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THE WORLD BANK
RESEARCH PROGRAM

1997

ABSTRACTS OF CURRENT STUDIES



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WASHINGTON, DC**

Objectives and Definition of World Bank Research

The World Bank's research program has four basic objectives:

- To support all aspects of Bank operations, including the assessment of development progress in member countries.
- To broaden understanding of the development process.
- To improve the Bank's capacity to give policy advice to its members.
- To help develop indigenous research capacity in member countries.

Research at the Bank encompasses analytical work designed to produce results with wide applicability across countries or sectors. Bank research, in contrast to academic research, is directed toward recognized and emerging policy issues and is focused on yielding better policy advice. Although motivated by policy problems, Bank research addresses longer-term concerns rather than the immediate needs of a particular Bank lending operation or of a particular country or sector report. Activities classified as research at the Bank do not, therefore, include the economic and sector work and policy analysis carried out by Bank staff to support operations in particular countries. Economic and sector work and policy studies take the product of research and adapt it to specific projects or country settings, whereas Bank research contributes to the intellectual foundations of future lending operations and policy advice. Both activities—research and economic and sector work—are critical to the design of successful projects and effective policy.

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INTRODUCTION

The World Bank is in the midst of a renewal. Through a long process of managed change, it is reshaping itself to strengthen its effectiveness in helping countries reduce poverty and improve the quality of life. Central to this process is a focus on learning:

- Learning how to strengthen social and environmental sustainability.
- Learning how to foster participation in the projects that the Bank supports.
- Learning how to build partnerships with others in the development community.
- Learning how to support local institutions in developing countries.

Some of this learning comes through accumulated experience—not only the Bank's but also that of clients and donors—from slow and sometimes painful trial and error. Some comes through discussions with other members of the international community, as comparisons of what each has done separately begin to reveal important patterns in growth and development. But on the issues that are the most complex and the most controversial—and often on the issues that involve the greatest conflicts between those who will gain and those who will lose—useful lessons emerge only when such patterns are studied carefully, objectively, over time, and across countries or regions.

It is to these issues that World Bank research repeatedly turns. And because these issues usually involve tradeoffs, changes in patterns of living, and shifts in the distribution of losses and benefits under current policies, the results of research investigating them are questioned, examined, and disputed. So Bank researchers refine the studies, revise the definitions and measures, and expand the coverage of countries and possible policy approaches. The process of learning, of acceptance, and of change is a slow one.

This volume is a snapshot of one year in this process of investigation, debate, and reassessment. Some issues are just emerging, others are the subject of major programs of research, and a few have been resolved and the findings are beginning to be reflected in policy.

The Bank's work encompasses lending programs, technical assistance, and policy advice across the broad range of issues that governments confront. Because questions and conflicts arise across this entire range, the Bank's research program is equally broad.

What Research Is Now Under Way?

This volume reports on research projects initiated, under way, or completed in fiscal 1997 (July 1, 1996, through June 30, 1997). The abstracts in the volume describe, for each project, the questions addressed, the analytical methods used, the findings to date, and their policy implications. Each abstract also identifies the expected completion date, the research team, and any reports or publications produced. To make it easier to obtain information and data, each abstract gives the e-mail address for the research project's supervisor.

The abstracts cover 214 research projects from throughout the Bank, grouped under nine major headings:

- Poverty and social welfare, including equity, demographics, and health and nutrition.
- Labor markets and education.
- Environmentally sustainable development, including environmental economics, energy, agriculture, and natural resources.
- Infrastructure and urban development.
- Macroeconomics, including monetary and fiscal policy and adjustment.
- International economics, including trade, finance, and debt.
- Domestic finance and capital markets.
- Transition economies.
- Private sector development and public sector management, including industrial organization, regulation, institutions, political economy, and privatization.

An appendix lists reports and publications produced from Bank research and explains how to obtain them. Finally, the abstracts are indexed by the sponsoring unit.

How to Get More Information

This is the annual compendium of current Bank research. Readers interested in obtaining more frequent and up-to-date information on Bank research projects and their findings may wish to subscribe to the quarterly *Policy and Research Bulletin*. Each issue includes information on recent World Bank publications and working papers, abstracts of newly initiated research projects and summaries of recent research findings, a column identifying electronic information available from the Bank, and a form for ordering reports featured in that issue. The bul-

letin is available free of charge. For information on how to subscribe, see the subscription request form at the back of this volume.

The bulletin, *Abstracts of Current Studies*, abstracts of articles in the Bank's two journals, the *World Bank Research Observer* and *World Bank Economic Review*, and a host of

Bank reports are available on the World Wide Web at <http://www.worldbank.org>. Research reports and information on the World Bank's research branch, the Development Economics Vice Presidency, are available at <http://www.worldbank.org/html/dec/home.html>.

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ABSTRACTS OF CURRENT STUDIES

POVERTY AND SOCIAL WELFARE

Adjustment and Poverty in Mexican Agriculture: How Farmers' Wealth Affects Supply Response

Ref. no. 679-50

Mexico's government intends to undertake extensive reforms in agriculture, eliminating virtually all controls and tariffs. It has already initiated reforms relating to virtually all important agricultural inputs—land, seeds, credit, fertilizer, machinery. The reforms promise higher incomes for those who can take advantage of new opportunities. But how well can farmers—particularly poor farmers—adjust to the changes?

A pilot study focusing on a small sample of farmers between 1991 and 1993 found interesting results. Although farmers with limited access to productive assets had lower-quality land, more difficulty getting credit, and less education than better-off farmers, they fared as well as or better than other groups of farmers in the face of the reforms. Yet econometric analysis showed that farmers with access to irrigation and harvest machinery showed a significant response to changes in prices, and those without those productive assets no statistically significant response.

This study uses an expanded data set—covering more years and more farmers—to increase the reliability of the analysis and extend it in several directions. The broader data set supports a more accurate descriptive analysis of how the conditions of farmers have changed and whether such changes are correlated with land tenure status and assets. It also allows expanded econometric analysis assessing the effects of constraints on poor farmers' ability to adjust. This analysis, based on an enhanced model of the farm household, controls for household characteristics and improves the quality of the estimates and conclusions. The data for the analysis have been collected, and the analysis is under way.

The study will show whether the government's policy reforms are meeting their goals. A finding that they are not would signal a need for remedial action—for example, certain kinds of targeted assistance.

Responsibility: Europe and Central Asia, Country Department II, Agriculture and Regional Development Operations Division—John Nash (jnash1@worldbank.org). With HIL Actuarios; Ramón López and Julie Stanton, University of Maryland; Gloria Rubio; and Isidro Soloaga.

Completion date: December 1997.

Report:

López, Ramón, John Nash, and Julie Stanton. 1995. "Adjustment and Poverty in Mexican Agriculture: How Farmers' Wealth Affects Supply Response." Policy Research Working Paper 1494. World Bank, International Economics Department, Washington, DC.

Improving the Policy Relevance of Living Standards Measurement Study Surveys

Ref. no. 679-61

The World Bank has assisted developing countries in implementing Living Standards Measurement Study (LSMS) surveys for more than 10 years. This research project draws on that work and the work of other household survey programs to synthesize the lessons of experience so that countries can incorporate them in the design of their survey programs. The research focuses on the following questions: Can LSMS surveys be modified to cover policy issues that are difficult or impossible to analyze using existing LSMS data? Can the reliability and accuracy of the data currently gathered in LSMS surveys be further improved? And can implementing LSMS surveys be made easier?

The research includes detailed analysis of all major sections (modules) of LSMS questionnaires, including those on health, education, fertility, migration, housing, anthropometrics, employment, agriculture, nonagricultural enterprises, credit and savings, and consumption. Data from LSMS surveys and other pertinent surveys are being analyzed for quality, literature on relevant analytical issues is being reviewed for the implications for data requirements, and field experiments have been set up for the consumption module.

The interim results of the research support a re-endorsement of the original modular, multitopic approach of the LSMS surveys. Guidance will be given on how to combine modules more flexibly into different kinds of surveys with different purposes, samples, and periodicities. The largest modifications will be made to the old health and agriculture modules. Options for environmental modules are being explored, and questions about how to better define the community for the community questionnaire are being addressed. For most modules, short and long versions will be suggested to help in combining them into surveys for different purposes.

The interim results were discussed at two workshops in Washington, DC, on April 17–19, 1996, and June 11–13, 1997, each attended by about 75 participants. The workshops were meant principally to bring together the authors participating in the project to agree on a vision for the final output and to detect gaps and overlaps in the work. Representatives of eight client agencies in developing countries attended to ensure that the product would meet their needs. World Bank operational staff implementing surveys and policy advisers in all sectors covered in the questionnaire were also invited, to ensure that their needs too were met. Representatives of other agencies involved in survey work in developing countries and the United States were also invited, to benefit from their experience and make them aware of the research.

The *Manual for Planning and Implementing the LSMS Survey*, produced under this project, was disseminated at an international survey workshop sponsored jointly by the Inter-American Development Bank (IDB), the World Bank, and the Economic Commission for Latin America and the Caribbean (ECLAC) in Asunción, Paraguay, on December 3–4, 1996, and at a sampling course for representatives of 30 francophone countries on June 12–21, 1997. The manual serves as the textbook for the Bank's annual training course on household surveys.

The project's work is expected to influence how survey projects funded by the Bank and other agencies are carried out. Project materials have already affected the design or implementation of surveys in Azerbaijan, Cambodia, Jamaica, and the Kyrgyz Republic and are being used as training materials by the new joint IDB–World Bank–ECLAC survey program for Latin America.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Margaret Grosh (mgrosh@worldbank.org), Paul Glewwe, Harold Alderman, and Kinnon Scott, and Environment, Infrastructure, and Agriculture Division—Maureen Cropper; Poverty and Social Policy Department—Nobuhiko Fuwa, Shahidur Khandker, Andrew Mason, and Tara Viswanath; and Europe and Central Asia, Country Department IV, Moldova Resident Mission—Wlodek Okrasa. With Indu Bhushan, Asian Development Bank; Kim Chung, Brown University; the Central Statistical Bureau, Latvia; Angus Deaton, Princeton University; Elizabeth Frankenburg, Rand Corporation; Paul Gertler, University of California at Berkeley; Andrew Harvey, St. Mary's University; Hanan Jacoby, University of Rochester; Anjini Kochar and Julie Schaffner, Stanford University; Robert Lucas, Boston University; Fiona Mackintosh; Stephen Malpezzi, University of Wisconsin; Andrew McKay, University of Nottingham; Donald Mead and Thomas Reardon, Michigan State University; Juan Muñoz, Sistemas

Integrales; Elaina Rose, University of Washington; Wim Vijverberg, University of Texas at Dallas; and Dale Whittington, University of North Carolina, Chapel Hill.
Completion date: December 1997.

Reports:

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The Public-Private Mix and Equity in Health Care: An Exploratory Empirical Study

Ref. no. 679-95

Many governments have stated an objective to ensure that health care is available to everyone according to medical need, not by ability to pay. Laudable as this objec-

tive is, in reality resources are scarce, and in the absence of a price mechanism other forms of rationing take over. In most developing countries doctors and hospitals are concentrated in the cities, where they are available to the urban middle class but too far away to benefit most of the rural poor.

Even when care is provided free of charge, equal access to medical care is an illusion. When medical care is publicly financed, the distribution of services is often regressive, with middle-income and higher-income groups benefiting disproportionately. When the poor do receive services, the quality is generally low. Lacking access to adequate public services, the poor often turn to the private sector, where they face high prices for brand-name drugs and private office visits. So the poor often spend more on health care as a share of household budgets than the rich do, even in countries where all care is supposed to be provided free of charge by the public sector.

But few studies have systematically documented the incidence of publicly provided health services and the distribution of private health care expenditures. For most developing countries the total amount spent on health care is not known. This research addresses these issues using data from Living Standards Measurement Study (LSMS) surveys for 12 countries. It is also investigating the issues at a regional level, through a study under way in Latin America and the Caribbean and studies planned for Africa and Asia.

In assessing the "equity" of a country's health care system, the project uses household survey data to show the distribution of health indicators between urban and rural households and by income level, and the distribution of the use of health care services (both public and private) for the same population groups. Data from the LSMS surveys make it possible to calculate total private spending on health care and, when combined with government budget data from the International Monetary Fund and other sources, to obtain a reliable estimate of a country's total health care spending. A particularly important result will be estimates of the private resources spent on health care relative to public resources, even in countries where all health care spending is supposed to be public. The study is attempting to determine the relationship between the public-private mix and different measures of equity in health care.

Preliminary findings indicate that the incidence of illness is about the same across income groups. But a slightly higher percentage of the better-off than of the poor seek medical care. The poor devote as large a share of household expenditures to health care as the better-off do. But the quality of the health care the poor receive is somewhat lower, in part because they often visit public health facilities, while the better-off rely more on pri-

vate health facilities. Similarly, residents of rural areas spend as much of their income on health care as urban residents, but receive lower-quality care. For example, a smaller percentage of people who are ill visit a doctor in rural areas than in urban.

The results of the study will be used to inform the growing number of health care reform efforts under way. For example, they should shed light on the role of the private sector in health care.

Responsibility: Human Development Department, Office of the Director—Jacques van der Gaag (jvandergaag@worldbank.org). With Hailu Mekonnen.

Completion date: December 1997.

Nutrition, Health, and Labor Productivity in Kenya

Ref. no. 680-03C

Using panel data for rural Kenya, this project investigated the relationships between nutritional status, morbidity patterns, time allocation, and child school performance. The study estimated a system of dynamic equations explaining morbidity patterns, time allocation decisions, and scores on psychometric tests. The analysis incorporated biomedical, behavioral, infrastructural, and seasonal factors. And it tested whether results in an earlier, related project in Rwanda also hold true in Kenya.

Results show that poor nutritional status significantly compromises children's learning ability and school performance. The findings suggest that interventions to improve early childhood nutritional status in poor areas can bring lasting gains in schooling and future productivity.

Results from the study have been presented at the World Bank, the International Food Policy Research Institute, the World Food Programme, and the Indian Statistical Institute.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Martin Ravallion (mravallion@worldbank.org). With Alok Bhargava, University of Houston.

Completion date: June 1997.

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Dynamics of Child Health in Indonesia

Ref. no. 680-37

The first phase of this research identified determinants of infant and child mortality in Indonesia in an effort to explain the dynamics of decline in such mortality there. The second phase is assessing the relative importance of interventions for improving infant and child health. The intent of the study is to inform government and World Bank efforts to formulate and evaluate strategies for improving child health status in Indonesia and to contribute to methodologies for analysis of health sector interventions.

Using pooled data from the 1987, 1991, and 1994 Demographic and Health Surveys in Indonesia, the study has completed a descriptive analysis of trends and differentials in mortality by mother's education, island group, sex, age, and household expenditure. It has used multivariate models to capture the effects of maternal factors, reproductive dynamics, socioeconomic status, and use of preventive and curative health services, as well as time period, which captures unmeasured factors.

The results indicate that child mortality in Indonesia declined markedly from the early 1970s to the early 1990s. The under-five mortality rate declined by about 60 percent over the period, and the infant mortality rate by almost 50 percent. The study found large differences in under-five mortality by education of mother and among regions. Sex patterns of child mortality show a net advantage for females of about 20 percent under age five. Multivariate analysis shows that the infant mortality rate declined fastest in the period after 1990, quite slowly in 1970-83, and by an almost negligible amount in 1983-89, a period of budgetary retrenchment. Mortality is significantly lower in urban than in rural areas, suggesting that access to health services is important.

Findings were presented at a World Bank seminar held in September 1996 in Washington, DC, for about 40 participants, primarily World Bank staff and Indonesian health professionals.

Responsibility: East Asia and Pacific, Country Department III, Population and Human Resources Division—Fadia Saadah (fsaadah@worldbank.org). With Kenneth Hill, Steve Chapman, and Nick Hill, Johns Hopkins University.

Completion date: September 1997.

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Saadah, Fadia, Kenneth Hill, and Steve Chapman. "Child Mortality Declines in Indonesia: Trends and Differentials, 1970 to 1995." World Bank, East Asia and Pacific, Country Department III, Washington, DC.

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Rural Poverty in Latin America: Analytics, New Empirical Evidence, and Policy

Ref. no. 680-75C

This study profiled rural poverty and carried out a quantitative analysis of the determinants of income differences among the rural poor in Chile, Colombia, El Salvador, Honduras, and Paraguay. Its purpose was to contribute to the design of a strategy for rural poverty reduction.

Using data from recent cross-sectional household surveys in the five countries, the study analyzed the determinants of income differences through econometric estimation of income functions. Drawing on other research, several thematic studies examined the links between rural poverty and land, rural finance, labor, gender and ethnicity, off-farm income-earning opportunities, and natural resource degradation. The study was structured around three themes: building the assets of the poor, countering the effects of missing or failing markets, and remedying the failures of the government.

Building the assets of the poor. The study found that education has only a small effect on rural incomes and farm output. Its main contribution might be to prepare people to migrate. The study found that family size and dependency have a powerful negative effect on per capita income. It found that small farmers are not better off than landless farm workers and that poor farmers have lower total factor productivity than nonpoor farmers. And controlling for household characteristics, it found that geographical location does not appear to determine per capita income.

Countering the effects of missing or failing markets. The study's analysis showed that the potential efficiency gains from land redistribution have been overrated. It also showed that land has a smaller effect on per capita income than on output. Because of the high transaction costs of credit, the traditionally disadvantaged groups are trapped in low-risk, low-return investment strategies, which limits their economic opportunities. But rural nonagricultural employment is large and growing and is greater in rural areas that are better served by roads, electricity, and communications.

Remedying the failures of government. The study's findings suggest that countries should not rely exclusively on land reform to improve land markets; other options include rental, titling and registration, and land taxation. The potential of land reform to raise income is more limited than generally expected, and expanding market-based land reform would increase land prices, raising the

cost of land redistribution. The findings also suggest that the role of government in financial markets needs to be reexamined. Traditional rural credit interventions have failed and may actually prevent the development of a well-functioning rural financial market. The study found that labor legislation designed to protect farm workers may have reduced permanent employment. Most of the disadvantage of indigenous people and of women appears to be explained by government failures—not by market-induced distortions.

Responsibility: Agriculture and Natural Resources Department, Office of the Director—Alberto Valdés (avaldes@worldbank.org); Policy Research Department, Poverty and Human Resources Division—Peter Lanjouw; Latin America and the Caribbean Region, Sector Leadership Group—Rodrigo Chavez and Susana Sanchez; and Poverty and Social Policy Department—Alejandra Cox-Edwards. With Ramón López, Roberto Korzeniewicz, and Claudia Romano, University of Maryland; Edward Barber, University of York; Michael Carter, University of Wisconsin; and Eduardo Zegarra. The Italian Trust Fund contributed funding for the research.

Completion date: June 1997.

AIDS and Development: The Role of Government

Ref. no. 680-80C

The World Health Organization estimates that 23 million adults worldwide were infected with the human immunodeficiency virus (HIV), the virus that causes AIDS, by the end of 1996. Two-thirds of all infections were in Africa, and more than 90 percent in developing countries.

There are two extremes of opinion on what the response to the AIDS epidemic in developing countries should be. Many of those close to the epidemic predict that the economic and social impact of AIDS on developing countries will be catastrophic. They argue that funding for AIDS prevention and mitigation should receive priority in the portfolio of government programs in all sectors. But many policymakers outside the health sector believe that there is little that the government can or should do. This debate is complicated by the fact that policy responses to the AIDS epidemic compete with other development programs for resources.

This research project supported background studies for a forthcoming World Bank Policy Research Report, *Confronting AIDS: Public Priorities in a Global Epidemic* (New York: Oxford University Press), that will clarify the role of public policy in preventing HIV/AIDS and mitigating the impact of the epidemic in developing coun-

tries, as seen through the lens of an economist. The main audience for the report is developing country policymakers, in health as well as other sectors, and others with an interest in public policy in developing countries. The report will identify priority actions for government as well as activities that can be undertaken by private individuals and organizations. It will also provide guidance to the World Bank's lending program. The Bank is now the single largest source of external finance for HIV/AIDS programs in developing countries, with \$700 million in commitments for such programs in 1996.

The background studies financed by the research project and other sources addressed several key themes of the report: the public economics of the AIDS epidemic, the economic determinants and impact of HIV/AIDS morbidity and mortality, public and donor spending on HIV/AIDS interventions, the cost-effectiveness of alternative interventions, and priorities for public policy. The studies included literature reviews, reanalysis of existing data sets (such as Demographic and Health Surveys), and, in a few cases, original data collection and research.

The Policy Research Report, scheduled for publication in October 1997, will be disseminated at international AIDS conferences in 1997 in Manila and Abidjan. The background papers will be issued in a companion volume to the main report.

Responsibility: Policy Research Department, Office of the Director—Lyn Squire (lsquire@worldbank.org) and Nina Brooks, Poverty and Human Resources Division—Martha Ainsworth and Emmanuel Jimenez, Environment, Infrastructure, and Agriculture Division—Mead Over and Zmarak Shalizi, and Public Economics Division—Jeffrey Hammer; Human Development Department, Health, Nutrition, and Population Team—Eduard Bos; South Asia, Country Department II, Population and Human Resources Division—Salim Habayeb; Europe and Central Asia Regional Office, Office of the Regional Vice President—Christine Jones; and East Asia and Pacific, Country Department I, Human Resources Operations Division—Nicholas Prescott. With Dennis Ahlburg, University of Minnesota; Stefano Bertozzi, UNAIDS; Julia Dayton, Yale University; Jean-Claude Deheneffe, ICP; Deon Filmer; Samantha Forusz; Lieve Fransen, European Commission; Dik Habbema and Carina van Vliet, Erasmus University, Rotterdam; King Holmes, University of Washington; Roberto Iunes, University of São Paulo; José Antonio Izazola-Licea, Fundación Mexicana para la Salud; Wattana Janjareon, Chulalongkorn University, Thailand; Eric Jensen, College of William and Mary; Tiékoura Kone and Allechi M'Bet, University of Abidjan; Sukhontha Kongsin, Mahidol University, Thailand; Michael Kremer, Massachusetts Institute of Technology;

Lawrence MacDonald; Ajay Mahal, Harvard Institute for International Development; Kathleen Mantila; Rekha Menon and Anne Mills, London School of Hygiene and Tropical Medicine; Martina Morris, Pennsylvania State University; Hnin Hnin Pyne; Kara Riehman, University of Florida; Deirdre Ruffino; Manju K. Shah; Donald Shepard, Brandeis University; Burton Singer, Princeton University; Diane Steele; John Stover, Futures Group; Paula Tibandebage, University of Dar es Salaam; and Maria Wawer, Johns Hopkins University. The report is cosponsored by UNAIDS and financed in part by the European Commission and the governments of Australia and Switzerland. The European Commission has pledged funding for publication of the background papers as a companion volume to the Policy Research Report and translation of the report into French in fiscal 1998. UNAIDS has pledged funding for translation of the report into a foreign language in fiscal 1998.

Completion date: August 1996.

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Assessing the Economic Impact of Nonocular Onchocerciasis

Ref. no. 680-81C

Onchocerciasis, caused by infection with the nematode worm *onchocerca volvulus*, is a serious public health problem in much of tropical Africa, where an estimated 17.5 million people are infected. The devastating impact of blinding caused by onchocerciasis is relatively well documented, but the impact of the nonblinding strain of onchocerciasis is not. This study investigated the economic impact of nonblinding (or nonocular) onchocerciasis, whose symptoms are intense itching, fatigue, and insomnia.

The research was based on wage and employment data collected from a sample of workers at a coffee plantation in southwest Ethiopia, an area known for its high prevalence of onchocercal skin disease. In addition, clinical examinations were conducted to classify the severity of the disease. Using regression and other data analysis techniques, the research tested a variety of hypotheses on the incidence and severity of the disease and its impact on economic productivity.

Analysis of data from plantation records shows that the economic impact of onchocercal skin disease is a function of such factors as age, gender, and type of employment. The effects on labor productivity are greatest for older (aged 35 and above), permanent, male employees. Infection with onchocercal skin disease reduces daily earnings by about 10–15 percent.

Responsibility: Africa Technical Families, Onchocerciasis I, Program Administration—Aehyung Kim (akim@worldbank.org) and Ajay Tandon. With the Institute of Pathobiology, University of Addis Ababa, Ethiopia.

Completion date: June 1997.

Report:

World Bank, Africa Human Development Department, Onchocerciasis Coordination Unit, and University of Addis Ababa, Institute of Pathobiology. Forthcoming. "Health and Labor

Productivity: The Economic Impact of Onchocercal Skin Disease." Policy Research Working Paper. World Bank, Africa Human Development Department, Washington, DC.

Maternal and Child Overweight and Obesity: A Global Comparison

Ref. no. 680-83C

As developing countries become richer, overweight and obesity are emerging as important global public health problems. But lack of nationally representative and internationally comparable data has impeded documentation of the extent of the problem of overweight in developing countries, its geographical and social class distribution in each country, and its global patterns.

This research examined the extent of maternal and child overweight and obesity using the data sets from 16 national Demographic and Health Surveys from Africa, Asia, the Near East, and Latin America and the Caribbean. As indicators of nutritional status, the research used height, weight, and body mass index relative to those of reference populations of the U.S. Center for Health Statistics. Prevalence was estimated as the proportion of the population falling above or below cutoff points for height-for-age, weight-for-age, and body mass index.

Preliminary results indicate that overweight and obesity in children are increasing problems even in populations in which undernutrition remains a significant concern. In these same populations overweight and obesity are also increasing problems among women of childbearing age. And overall, the prevalence of overweight and obesity is greater in urban than in rural populations. Because overweight and obesity are important risk factors for a number of noncommunicable diseases (such as cardiovascular disease and diabetes), their growing prevalence suggests that national departments of health will need to devote increased resources to control overnutrition as well as to deal with high levels of undernutrition.

This research is expected to influence Bank operations in two ways: by alerting task managers to the problems of both undernutrition and overnutrition in all regions, and by providing a basis for discussions of these problems with countries. A seminar will be held at the Bank in October 1997 to present the results to Bank staff, particularly task managers in health and nutrition.

Responsibility: Human Development Department—Peter Heywood (pheywood@worldbank.org); and East Asia and Pacific, Country Department III, Population and Human Resources Division. With Laura Kettel Khan, Emory University.

Completion date: April 1997.

Valuing Mortality Reductions in India: A Study of Compensating Wage Differentials

Ref. no. 680-84C

Conducting cost-benefit analyses of health and safety regulations requires putting a dollar value on reductions in health risks, including the risk of death. In the United States a widely accepted method of valuing changes in risk of death is to estimate compensating wage differentials using observed labor market data. These estimates measure the additional wages workers would require to accept an increased risk of dying on the job.

Although there is an extensive literature on compensating wage differentials in the United States, no such studies exist in developing countries. In the absence of these studies policymakers often value improvements in life expectancy using the human capital approach, in which a person's additional earnings over a longer life span are said to equal the value of the risk reduction. But this approach tends to understate what people would be willing to pay for small changes in risk.

The purpose of this research was to provide estimates of compensating wage differentials for risk of death using data from India. Using multivariate regression techniques, the study estimated hedonic wage equations explaining variation in wages—by occupation and industry—as a function of the risk of fatal and nonfatal injury. The study used wage data collected and published by the Indian Labor Bureau in the *Occupational Wage Survey* and injury rates reported in the *Labor Yearbook*. Additional data on profits and value added per worker, government ownership, and separation rates were taken from the Annual Survey of Industries.

The resulting estimates provide values of improvements in life expectancy that can be used to evaluate the benefits of health and safety programs. These estimates were used in a related study (*Measuring the Health Effects of Air Pollution in Developing Countries*, ref. no. 679-96) to value mortality risks associated with ambient air pollution, but they also could easily be used to value improvements in industrial safety risks.

Responsibility: Policy Research Department, Environment, Agriculture, and Infrastructure Division—Maureen L. Cropper (mcropper@worldbank.org) and Nathalie B. Simon. With Anna Alberini, University of Colorado, Boulder; and Seema Arora, Vanderbilt University.

Completion date: June 1997.

Decentralizing Safety Nets: Community Choices and Their Impact on Households

Ref. no. 680-98

A number of countries in Eastern Europe and North Africa have begun to expand their cash-based safety nets. A key obstacle to improving means-tested or indicator targeting of safety nets is the cost of obtaining accurate information on incomes and need. Ideally, decentralizing the finance and administration of safety nets through block grants could alleviate this problem—presuming that local authorities can monitor poverty and need more accurately than can more distant administrators. But the potential advantages of block grants may be overstated, and even their real advantages may not be realized because of inherent drawbacks. So there is a need for further information on their performance in practice.

This research seeks to derive lessons on the institutional framework of poverty reduction in order to contribute to the design of more effective programs. It uses three related approaches to study efforts to decentralize safety nets in Eastern Europe by means of block grants to local governments. First, it studies the range of targeting rules used for distribution by analyzing the budgetary decisions of communities. Data on these decisions are also used to study what determines the types of investments made with the block grants. Second, the research uses household data to indicate the levels and incidence of social assistance under alternative distribution mechanisms that have delivered the same level of funding, providing a perspective on the effects of the mechanisms themselves. Third, it uses qualitative research techniques to study the community decisionmaking processes, to determine whether they are participatory or exclusive.

All three approaches are being used to study decentralization in Albania, which legislated the use of block grants to urban and rural communities in October 1995. This reform continues the reorganization of the country's network of social assistance and insurance initiated with the assistance of technical support funded through a World Bank credit. Analysis indicates that allocation of block grants to the communes, which is not based on fixed funding rules, appears to be partially determined by voting patterns, particularly in swing areas. The importance of the size of the grant to the commune in determining the level of assistance to a household was confirmed from household survey data collected by the Ministry of Labor and Social Protection in August 1996. Nevertheless, the targeting of social assistance on the basis of poverty compares favorably with international experience.

A parallel study combining the first and second approaches is under way in Hungary. This study uses

data collected between 1992 and 1995, straddling a major reform of social assistance initiated in 1993.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Harold Alderman (halderman@worldbank.org) and Carlo del Ninno; and Europe and Central Asia, Country Department II, Human Resources Operations Division—Sandor Sipos. With Raffaelli Nanetti, University of Illinois; Robert Leonardi, London School of Economics; Artan Agolli; Anne Case, Princeton University; Robert Ackland; Leka Bezhani, Consulate Albania; and Maria Zam, Social Policy and Development Enterprise.

Completion date: November 1997.

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Case, Anne. 1997. "Election Goals and Income Redistribution: Recent Evidence from Albania." Princeton University, Princeton, N.J.

Impact of Targeted Credit Programs on Consumption Smoothing and Nutrition in Bangladesh

Ref. no. 681-09C

Targeted credit programs of Grameen Bank, the Bangladesh Rural Advancement Committee (BRAC), and a number of other organizations in Bangladesh provide production credit and other services to the poor who lack access to formal credit institutions. The purpose is to generate income and employment for the poor and thus reduce poverty. In recent years government and non-governmental organizations in many low-income countries have introduced similar programs.

A recent World Bank study (Credit Programs for the Poor: Household and Intra-household Impacts and Program Sustainability, ref. no. 676-59) showed that the targeted credit programs of Grameen Bank, BRAC, and the Bangladesh Rural Development Board (BRDB) have boosted per capita consumption in participating households. But that research did not address the question of whether women—often the primary target of such programs—and children benefit from the increased per capita consumption. Nor did it address the question of whether program participation affects the seasonality of consumption, an important issue in Bangladesh's predominantly agricultural rural economy.

This study addressed the following questions: Does program participation enhance the nutritional status of children? Does program participation affect the seasonality of consumption and labor supply? And does the gender of program participants matter in the effects of

participation on nutrition and on the seasonality of consumption and labor supply?

The research examined these issues using data from a household survey in Bangladesh conducted in the earlier study. This survey, a multipurpose, quasi-experimental household survey, was conducted in 1991–92 in 87 villages in 29 *thanas* (subdistricts) of rural Bangladesh, randomly drawn from 391 *thanas*. Of these 29 *thanas*, 24 had one or more of the three credit programs under study (Grameen, BRAC, and BRDB RD-12), and 5 had none.

The research found that microcredit provided by the programs helps smooth consumption and labor supply by reducing seasonality in both consumption and labor use in various activities. Microcredit also improves the nutritional status of children. These effects are much larger for credit extended to women than for credit extended to men, suggesting that targeting credit to women may be a way to reduce poverty, especially among children.

Responsibility: Poverty and Social Policy Department—Shahid Khandker (skhandker@worldbank.org). With Mark M. Pitt, Brown University.

Completion date: June 1997.

Welfare Impacts of Alternative Ways of Providing Rural Infrastructure

Ref. no. 681-13C

Many World Bank rural roads projects have as their primary objective raising the living standards of the rural poor. Yet despite a general consensus on the importance of rural roads and other infrastructure for promoting economic development and reducing poverty, there is little hard evidence on the size and nature of the benefits. And little attention has been paid to the effect of the mechanism through which the infrastructure is provided. Yet project design—such as the degree of competition, participation, and decentralization used in planning and executing road works—is largely about that mechanism.

This project is part of a larger research effort to study the effect of rural roads on living standards, allowing for the organizational and institutional arrangements used in providing the roads. The empirical investigation focuses on Vietnam, where physical infrastructure is poor and poverty levels are high and where the World Bank is financing and helping to implement a large-scale rural roads project designed to reduce poverty. The research will test the assumption that basic infrastructure investments will reduce poverty in Vietnam.

The research will investigate three aspects of rural roads provision:

- The kind of organizational structures used to provide rural roads, including the degree of participation by rural communities and others, competition in execution, and devolution of decisionmaking, financing, execution, or maintenance to local governments and rural communities.

- The institutional factors determining the type of provision mechanism adopted in a particular setting.

- The impact of the provision mechanism on infrastructure outcomes and the living standards of the rural poor.

This project laid the theoretical, methodological, and data foundation for the empirical analysis. It designed a baseline survey of initial conditions that includes a detailed commune-level questionnaire, a household questionnaire, and a district-level questionnaire. These are being implemented in 200 or so communes (both project communes and nonproject “control” communes) in six provinces throughout Vietnam. A second round of the survey is planned for 1999. The resulting data set will include a time series of project characteristics, regional fixed and time-varying characteristics, and household-level characteristics. It should provide the basis for a rigorous impact evaluation.

The research involves close collaboration with the World Bank’s Vietnam country operations project team.

Responsibility: Policy Research Department, Public Economics Division—Dominique van de Walle (dvwandewalle@worldbank.org); and South Asia, Country Department I, Infrastructure Division—Frannie Humplick. With Lorena Alcazar, Nathalie Simon, and Tran Tu. The Canadian International Development Agency is providing funding for the data collection.

Completion date: June 1997.

Policies for Poor Areas

Ref. no. 681-39

Most countries have well-recognized “poor areas” in which the incidence of absolute poverty is unusually high by national standards. In China, for example, there is a high incidence of poverty in rural areas of the southwest and northwest. Similar examples in other countries abound.

Are specific policy interventions called for in response to such poor areas? One would hope, and under certain conditions expect, that the growth process would help these poor areas catch up. But that does not appear to be happening in some countries. Poor areas appear to persist even with robust economic growth.

Governments and donors are regularly called on to do something about these lagging poor areas, and area-

based interventions are now found in most countries. The World Bank has assisted more than 300 area development projects since the early 1950s, most designed to develop a rural area for the benefit of poor people. Other agencies also provide substantial support for such programs.

How much impact do these efforts have on living standards? To answer this question we must be able to assess what would have happened to living standards in the absence of the interventions. It should not be assumed that such schemes will bring net gains to poor people; by acting against the flow of labor from low- to high-productivity areas, they may actually make matters worse in the longer term.

Properly assessing the benefits (net of hidden costs) of these programs is problematic. But the geographic variation in initial conditions and in the evolution of living standards over time offers scope for disentangling the effects of poor-area programs from other factors. Even within poor countries geographic areas differ widely in their endowments of "geographic capital," including locally provided public services and access to area-specific subsidies. These differences are both geo-climatic and the outcomes of past policies and projects. There typically is also a spatial variance in poverty indicators.

By exploiting this spatial variation in the incidence of poverty and in area characteristics, this project aims to understand what part lack of geographic capital plays in creating poor areas, as opposed to such factors as residential differentiation, whereby people who lack "personal capital" end up being spatially concentrated. By identifying specific policy interventions—or their immediate outcomes in terms of community-level attributes—the analysis will assess the gains from poor-area policies and projects and the implications for the design of future projects.

The project will study the dynamics of the geography of poverty from a microeconomic level so that it can help in understanding how various governmental and nongovernmental area-based actions as well as other variables affect households' prospects of escaping poverty. This will be done through a microeconomic investigation of the economic geography of poverty in selected countries in Asia. The proposed empirical approach entails a substantial increase in the policy-relevant variables included in micro-empirical models of poverty.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Martin Ravallion (mravallion@worldbank.org), Shaohua Chen, Jyotsna Jalan, and Quentin Wodon. With Shankar Subramanian, Cornell University.

Completion date: June 1999.

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Incentives for Doctor Placements in Rural and Remote Areas

Ref. no. 681-56

In most countries rural areas are underserved by physicians. The problem is particularly acute for countries that have poor populations living in remote areas, such as Indonesia. If physicians could be induced to relocate to these areas and effectively manage health services there, the access of the poorest to health care and public health services could be substantially improved. The cost-effectiveness of this strategy depends on the cost of inducing physicians to relocate.

This study seeks to inform project and policy design by determining how responsive doctors' decisions on location might be to the level and composition of different compensation packages. Using a utility-theoretic framework, the study will assess the relative sensitivity of these decisions to such attributes as cash salaries, locational amenities and disamenities, and working conditions. The results can be used to design cost-effective incentive packages for improving the geographic distribution of physicians.

The analytic framework will be applied to three data sets from Indonesia. The first describes actual choices made by recent medical graduates when choosing among locations for compulsory service. The locations differ in amenities, salary, and the prospects for subsequent appointment to the civil service. Because the range of actual choices is limited, the study will complement this revealed preference data by conducting two surveys—of medical students and of doctors—and assessing their preferences between pairs of hypothetical assignments. This approach, often used in environmental and market research, will permit estimation of a utility function defined over a wider set of prospec-

tive compensation and locational packages than now exists.

Responsibility: East Asia and Pacific, Country Department III, Population and Human Resources Operations Division—Howard Barnum (hbarnum@worldbank.org); and Policy Research Department, Environment, Infrastructure, and Agriculture Division—Kenneth Chomitz, and Poverty and Human Resources Division—Yvonne Ying. With David Witzel and Margareta Kettner, ForumOne Communications. The Indonesian Ministry of Health is contributing funding for the research, and the Indonesian Medical Association is collaborating in the study.

Completion date: December 1997.

Poverty and Income Distribution Dynamics in a High-Growth Economy: The Case of Chile, 1987–94

Ref. no. 681-59

The past decade saw persistent, high rates of economic growth in Chile in the context of a market-oriented policy environment coupled with a deliberate government emphasis on targeted interventions to ensure “growth with equity.” Nevertheless, a wide-ranging debate has ensued on whether the fruits of economic growth are benefiting all or whether large segments are being left behind as a result of increasing poverty and inequality.

This study seeks to establish the facts for a better-informed debate. It relies on detailed analysis of four waves of the CASEN (Caracterización Socio-económica Nacional) household surveys (for 1987, 1990, 1992, and 1994), using methods and techniques not previously applied to Chilean data. Special care is taken to control for regional differences in cost of living, for differences in needs among households, and for economies of scale within households. In addition to scalar measures of poverty and inequality and three different poverty lines, the study brings to bear stochastic dominance techniques to establish robust intertemporal comparisons.

The results show that there was a substantial reduction in the incidence, depth, and severity of poverty from 1987 to 1994, although the last years in the sample saw some losses for the poorest decile because of increasing unemployment. There were no robust changes in Chile’s high level of inequality over the period, although there is some evidence of a slight compression (improvement) at the lower tail, compensating for an increase in dispersion at the upper tail. Decomposition analyses suggest that the distribution of educational opportunities is a key determinant of the continuing high inequality.

The findings were presented at the 1997 Latin American Meetings of the Econometric Society.

Responsibility: East Asia and Pacific Regional Office, Office of the Regional Vice President—Francisco H. G. Ferreira (fferreira@worldbank.org). With Osvaldo Larranaga, University of Chile; and Julie A. Litchfield, London School of Economics.

Completion date: September 1997.

Report:

Ferreira, Francisco H.G., and Julie A. Litchfield. 1997. “Poverty and Income Distribution in Chile: 1987–94.” World Bank, World Development Report Office, Washington, DC.

Does Schooling Expansion Equalize Income?

Ref. no. 681-67

This project aims to explore the interaction between education and the distribution of income in order to determine to what degree a massive expansion of education can be used to improve income distribution. Because few high-inequality countries have embarked on rapid expansion of education, this research requires a counterfactual. The project will construct a counterfactual by decomposing the changes in income distribution in countries with rapid expansion in education using comparable cross-sections of household income data at various points in time.

The project uses a traditional earnings equation to construct a conditional distribution of schooling and earnings that would allow isolation of the impact of education—and education policies—on distributional outcomes. Appropriate adjustment for endogenous labor force participation and family rather than individual incomes makes it possible to construct a counterfactual that can answer the research question in a partial equilibrium context. Because the assumption of an unchanged earnings function implicit in the micro-level earnings function model will not necessarily hold, the study complements the model with aggregate demand functions for various types of labor, which makes it possible to derive equilibrium remuneration rates and thus incorporate price effects that may result from the expansion of schooling.

This methodology has been applied to data for Taiwan (China) derived from a series of household surveys from 1975–93. Earnings functions have been estimated, and conditional distributions of income based on the micro-level model have been derived. Work on derivation of equilibrium wage rates from the general equilibrium model is in progress.

Contacts have been established with Bank operational staff to considerably expand the project’s country cov-

erage. Given the promising results thus far and the importance of education policies in the Bank's policy advice, it is expected that the findings will have an important impact on Bank operations. They could have major implications for the kind of policy instruments that policymakers choose to improve the welfare of the poor.

Responsibility: Policy Research Department, Office of the Director—Lyn Squire (lsquire@worldbank.org). With François Bourguignon; and Marc Gurgand, DELTA.

Completion date: June 1998.

The Measurement and Prediction of Poverty in an Aging World

Ref. no. 681-73

Although we have relatively good predictions of how many elderly there will be in South and East Asia 10, 25, or 50 years from now, we have much less information on how many of them are likely to be poor. But there are many reasons to expect an increase in poverty in older age groups. The size of the baby boom generation affects its wage earning potential and savings opportunities. The skills of older groups may fast become obsolete as Asian economies undergo rapid change. Changing family structures may also affect the proportion of the elderly in poverty.

This project will use a time series of cross-sectional data sets from a number of Asian countries to investigate two questions. First, how should poverty among the elderly be measured? In particular, what can we say about the poverty of the elderly as a group in countries where the elderly typically live with family members? Second, what are the implications of rapid population aging for poverty and inequality among the elderly?

The fact that the data sources have a number of surveys for different years that are directly comparable is central to the project's analytical approach. While the data sets do not allow the tracking of individuals over time (as a panel data set would), they do allow comparison of cohorts and the tracing of average income and its dispersion over time.

The study will produce two papers, one reporting on the sensitivity of poverty measures to the way in which household equivalence scales are constructed, and the other looking at changes in income and its dispersion over time. Both reports will make cross-country comparisons.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Harold Alderman (halderman@worldbank.org); and East Asia and Pacific Regional Office, Office of the Regional Vice President—

Michael Walton. With Angus Deaton and Christina Paxson, Princeton University.

Completion date: January 1998.

Poverty and the International Economy: What Are the Links?

Ref. no. 681-83

This research investigates the effects of increased international openness on the very poor. As countries liberalize their trading regimes and allow dramatic exchange rate adjustments, prices change, wages adjust, and resources are reallocated. The study uses multiple econometric methodologies and data sets to investigate the effect of these changes on poverty, using Indonesia and South Africa as case studies.

The links between poverty and trade reform are an important policy issue, but one for which evidence is lacking. The heightened emphasis on addressing poverty in the development process suggests that evidence on the links between internationalization and poverty is desirable both in its own right and to help with the design of policy packages or compensation policies. The issues are of particular relevance to South Africa, where a vigorous policy debate about liberalization is under way.

In an ideal world this study would investigate the impact of internationalization on the very poor using a well-specified and econometrically estimated general equilibrium model. This would encompass both the link between policy and prices (of goods, services, and factors) and the link between prices and household welfare. But this has never been done in one step—for fairly obvious practical reasons. This study too will separate the two links.

The study starts by asking how trade liberalization affects the prices of the goods consumed and produced and the wages and other incomes of the poor. It will examine detailed time-series data from particular liberalizations to establish a basis of evidence on these pass-throughs and couple this work with computable general equilibrium modeling to derive implications for a wider set of policy shocks than have actually been observed. It will then perform a careful household-level analysis of demand and supply to explore how households adjust to these shocks and what the net effects are.

For South Africa only one year of household data are available, so responses to price changes will need to be simulated. For Indonesia the household data span certain reforms, so responses and consequences can be observed. The Indonesia case study will experiment with highly data-intensive, nonparametric approaches to the estimation. Both case studies will recognize that the poor are not a homogeneous group.

Responsibility: International Economics Department, International Trade Division—L. Alan Winters (awinters@worldbank.org) and Will Martin; and Policy Research Department, Public Economics Division—Shantayanan Devarajan, and Poverty and Human Resources Division—Martin Ravallion. With Steven Berry, Yale University; Anne Case, Princeton University; and W. Fan and James Levinsohn, University of Michigan. The Swedish International Development Authority is contributing funding for the research.

Completion date: June 1998.

Quantifying the Net Economic Loss or Gain from Tobacco Use

Ref. no. 681-95

This study tests the hypothesis that tobacco production and use result in a global economic loss and that this loss remains over a range of discount rates, mortality and morbidity effects, and prices.

The study proposes a novel cost-benefit analysis. The methodology builds on initial work by Howard Barnum ("The Economic Burden of the Global Trade in Tobacco," *Tobacco Control* 3[4]:358–61, 1994), refining the estimates of benefits and costs arising from tobacco consumption. The study will calculate the net benefit or cost of a unit reduction in tobacco consumption, taking into account some of the major direct and indirect costs of tobacco use. The main benefits from tobacco use include the consumer and producer surpluses; the main costs include the direct and indirect costs of morbidity and mortality. The study will also examine income transfers (formal and informal) in relation to the cost-benefit analysis and experiment with different approaches.

Data for calculating the consumer and producer surpluses will be drawn from Food and Agriculture Organization (FAO), World Bank, and World Health Organization (WHO) sources. The indirect costs of premature death will be estimated on the basis of tobacco consumption data from the FAO and WHO, data on deaths and years of life lost from the recent work quantifying the global disease burden and smoking-related mortality (C. J. L. Murray and A. Lopez, *Global Burden of Disease*, Cambridge, Mass.: Harvard University Press, 1996, and R. Peto and others, *Mortality from Smoking in Developed Countries, 1950–2000*, New York: Oxford University Press, 1994), and Bank projections of future income. To estimate the indirect costs of morbidity, the study will use correlations of tobacco consumption and disability from the Murray and Lopez book, adjusted by disability weights for the different regions. The study will estimate the direct costs of morbidity using Bank data

on hospital budgets and data from the literature on treatment costs per year for tobacco-attributable diseases, average number of years until the onset of tobacco-related disease, and average expected years of life after the onset of disease.

Results will be disseminated through the health, nutrition, and population lecture series, starting in June 1998. The analysis should provide approaches that countries could use in preparing tobacco control projects.

Responsibility: Human Development Department, Health, Nutrition, and Population Team—Prabhat Jha (pjha@worldbank.org); and Europe and Central Asia, Country Department IV, Municipal and Social Services Division—Laura Rose. With Frank Chaloupka, Rich Peck, and Nicole Klingen.

Completion date: June 1998.

Public Expenditures and Poverty

Public expenditure programs play an important part in poverty reduction, income redistribution, and safety net provision in many countries. The past decade has seen tremendous advances in the use of household-level data sets to explore a vast array of issues relating to public expenditures as access to good data has markedly improved, at least for some countries.

This research developed and used econometric techniques on household-level data sets in order to learn more about the wide range of factors underlying the incidence of public expenditures and, where feasible, about dynamic issues in incidence and social income provision. The research also aimed to improve on the standard methodology for analyzing the incidence of public expenditures. And the research explored the closely related issue of fiscal federalism and countries' revenue-collecting and other constraints—constraints that can have consequences for poverty and inequality.

In one study the project looked at dynamic issues in incidence using new panel data on consumption and social incomes from the Hungarian Household Budget Surveys of 1987 and 1989. It reviewed Hungary's social safety net and the changes that occurred during the period of study. It tried to throw light on such questions as, How have the reforms instituted so far performed? How has the incidence of social spending been affected? What are the implications for future reform?

The study found that while social incomes in Hungary are redistributive—accounting for higher shares in the consumption of the poor than in that of the rich—they are not well targeted. In both survey years the richest group received more than twice the social income of the

poorest. Disaggregating social incomes shows that targeting performance differs between components: family allowance receipts decrease sharply as the standard of living increases; the opposite is true for pensions.

The study also tried to distinguish policy impacts on persistent poverty from transient poverty. To do so it used a new approach in which consumption changes over time are simulated with and without policy changes, allowing for behavioral responses. The study found that poverty increased over the period and would have increased even more if not for the gains in social income that protected many households from poverty. It also found that almost all the safety net's ability to protect the poor lies in higher average outlays rather than improved targeting.

The project included a case study on Vietnam's spending on physical infrastructure, focusing on its effects on rural living standards. In particular, it asked how physical infrastructure constraints affect households' participation in the emerging market economy. The study used newly available data from the Vietnam Living Standards Measurement Study survey.

A workshop on the research on the Hungarian social safety net was held in July 1993 in Budapest, with participants from universities and government ministries. The Vietnam infrastructure and poverty work was presented at the International Economics Association Congress in Tunis in December 1995, as well as at a University of Namur (Belgium) conference, Economic Growth and Poverty: The Roles of the Market, Public Action, and the Community, in July 1996.

Responsibility: Policy Research Department, Public Economics Division—Dominique van de Walle (dvandewalle@worldbank.org).

Completion date: October 1996.

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_____. 1996. *Infrastructure and Poverty in Vietnam*. Living Standards Measurement Study Working Paper 121. Washington, DC: World Bank.

van de Walle, Dominique, Martin Ravallion, and Madhur Gautam. 1994. *How Well Does the Social Safety Net Work? The Incidence of Cash Benefits in Hungary, 1987–89*. Living Standards Measurement Study Working Paper 102. Washington, DC: World Bank.

_____. 1994. "Poverty and Social Spending in Hungary." World Bank, Policy Research Department, Washington, DC.

A Volume on Subsidies Research

Despite general, impressive progress in reducing poverty over the past 30 years, widespread poverty and its correlates continue to present a challenge to governments and development institutions. As budget constraints have tightened in recent years, the need for cost-effective strategies for poverty reduction has taken on special urgency. Interest in the concept of targeting government spending toward the poor has grown. There is heightened interest, too, in the distributional effect of government spending and in the effect of public programs on the welfare of the poor.

This project responded to the widespread and growing interest in these topics and the importance of understanding these issues for effective poverty reduction. The research, which consisted of both theoretical and empirical studies, investigated public expenditure benefit incidence, the effectiveness of public spending in reducing poverty, and the role and scope for better targeting of public spending toward the poor. Some of the studies used primary data, particularly from household surveys, and others surveyed the literature. Some of the empirical studies used econometric estimation; others used noneconometric techniques, such as benefit incidence analysis, to explore the distribution of government subsidies and other issues.

The research highlights the following points: Measuring the distributional effect of the benefits from public spending and determining the effectiveness of targeted programs and their targeting mechanisms in reducing poverty are extremely complex. The desirability of alternative instruments must be decided case by case. In particular, the usefulness of targeting must be evaluated in the context of each policy environment, ideally on the basis of the relevant counterfactual. The behavioral responses of participants and others must be taken into account when designing and evaluating antipoverty programs; a number of the studies show that these responses can have a large effect on the potential of a scheme to reduce poverty.

Results and findings were presented at a World Bank conference in June 1992; in Tokyo, at the Bank's Japan Research Fair, and in Tunis, Tunisia, at the International Economics Association Congress, in December 1995; in Santiago, Chile, at the Regional Fiscal Policy Seminar for Latin America, organized by the Economic Commission for Latin America and the Caribbean in January 1996, to about 60 economists from all over the region; in Washington, DC, at three training courses for World Bank economists; and in Nairobi, Kenya, at the African Economic Research Consortium research workshop in May 1996, to an audience of

120 African economists. A workshop on the topic was held in Amsterdam in June 1996, at the Tinbergen Institute, for researchers and Netherlands Ministry of Foreign Affairs staff. Presentations have also been made to government officials and other policymakers in Argentina, Chile, and Zimbabwe and to the Board of the World Bank.

Responsibility: Policy Research Department, Public Economics Division—Dominique van de Walle (dvandewalle@worldbank.org). With Kimberly Nead. The Ministry for Development Cooperation, the Netherlands, contributed funding for dissemination.

Completion date: December 1996.

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van de Walle, Dominique. 1995. "Public Spending and the Poor: What We Know, What We Need to Know." Policy Research Working Paper 1476. World Bank, Policy Research Department, Washington, DC.

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van de Walle, Dominique, and Kimberly Nead, eds. 1995. *Public Spending and the Poor: Theory and Evidence*. Baltimore and London: Johns Hopkins University Press.

The Methodology of Poverty Assessments

Policies to fight poverty rely increasingly on data about the living conditions of the poor, as reflected in a poverty profile. But constructing a poverty profile that can be relied on to guide policy choices is often difficult. And the data and methods used can matter greatly to the policies chosen. At their worst, poorly devised poverty profiles can misdirect poverty reduction efforts—for example, by channeling scarce resources to cities when poverty is worse in rural areas, or vice versa.

What methods are available for constructing poverty profiles? What are their strengths and weaknesses? This research project sought to answer those questions by investigating the theoretical and empirical foundations of the methods that are used in constructing poverty profiles. Typically, too little work goes into assessing the robustness of poverty comparisons as the underlying measurement assumptions change. Many of the data that are routinely used in poverty analysis are full of errors—a situation that is unlikely to change. There also are unavoidable value judgments underlying measurement practices. The quality of the World Bank's policy assessments and prescriptions may or may not depend on these errors and assumptions. An important task is to find out

just how confident analysts can be in forming poverty comparisons.

The project examined the properties of the measures used for assessing individual welfare, including the practices used in comparing the welfare of different demographic groups (such as large and small households). It also investigated the different methods used for setting poverty lines and how much they matter to the policy conclusions drawn. And it studied ways of making better use of such nonincome indicators of welfare as health and education indicators.

The research project was tailored to the problems that are faced by World Bank staff undertaking poverty assessments, and there is an active program of training and dissemination.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Martin Ravallion (mravallion@worldbank.org), Peter Lanjouw, Gaurav Datt, and Benu Bidani.

Completion date: June 1997.

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Chaudhuri, Shubham, and Martin Ravallion. 1994. "How Well Do Static Indicators Identify the Chronically Poor?" *Journal of Public Economics* 53(March):367–94.

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Ravallion, Martin, and Benu Bidani. 1994. "How Robust Is a Poverty Profile?" *World Bank Economic Review* 8(1):75–102.

Ravallion, Martin, and Shankar Subramanian. 1996. "Welfare Measurement with and without Substitution." World Bank, Policy Research Department, Washington, DC.

World Poverty Monitoring

Is poverty increasing in the developing world? This question is surprisingly difficult to address convincingly using

existing data sources because little effort has gone into compiling and analyzing the available distributional data on a reasonably comparable basis. Yet there is a clear need to do so—to help monitor progress in reducing poverty and as a first step toward understanding the causes and effects of changing distribution. This project aimed to monitor progress in reducing aggregate poverty using a consistent compilation of distributional data from household surveys.

Estimates of various poverty measures are available from numerous studies of individual countries, but their use for monitoring world poverty is questionable because of comparability problems. Past work at the country level has used poverty lines appropriate to each country. But there is a marked tendency for the real value of local poverty lines to increase with the average income of a country. This fact clouds attempts to compare and aggregate across countries using the poverty data that are available in standard (secondary) sources. The use of official exchange rates also biases international poverty comparisons.

This project therefore turned to the primary data sources and reestimated all poverty measures on a consistent basis. It converted local currencies to constant purchasing power parity. The project also tested the robustness of comparisons across regions and over time to measurement assumptions. The data set it constructed contains 60 countries, 40 of which have data at two or more points in time over the period 1981–94.

The estimates indicate that around 1993, 1.3 billion people—roughly one in three—were living on less than a dollar a day at 1985 prices. The incidence of absolute poverty in the developing world as a whole fell slightly over 1987–93. The number of poor—by any consumption standard for defining poor—has been growing at about the same rate as the population of the developing world, about 2 percent a year. But there is marked variation among regions and countries, with generally rising poverty incidence in Africa, Europe and Central Asia, and Latin America and the Caribbean and generally falling incidence in Asia.

Results of this research were used in the World Bank's *Poverty Reduction and the World Bank: Progress and Challenges in the 1990s* (Washington, DC, 1996). Results have also been used in recent *World Development Reports*.

Responsibility: Policy Research Department, Poverty

and Human Resources Division—Martin Ravallion (mravallion@worldbank.org), Gaurav Datt, Shaohua Chen, and Benu Bidani.

Completion date: June 1997.

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Anand, S., and Martin Ravallion. 1993. "Human Development in Poor Countries: On the Role of Private Incomes versus Public Services." *Journal of Economic Perspectives* (winter).

Bidani, Benu, and Martin Ravallion. 1994. "Decomposing Social Indicators Using Distributional Data." Policy Research Working Paper 1487. World Bank, Policy Research Department, Washington, DC.

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Ravallion, Martin, Gaurav Datt, and Dominique van de Walle. 1991. "Quantifying Absolute Poverty in the Developing World." *Review of Income and Wealth* 40(December):359–76.

Allocation of Public Expenditures

This project aims at formulating methods for analyzing the impact of government expenditures on welfare. The focus is on measuring the welfare gain from corrections of market failures such as externalities (as in primary education), deviations from perfect competition (as in health care), and in poverty reduction. The emphasis in the coming year will be on social sector issues, primarily health, and on expenditures with significant effect on people's exposure to risks.

Responsibility: Policy Research Department, Public Economics Division—Jeffrey Hammer (jhammer@worldbank.org).

Completion date: June 1998.

LABOR MARKETS AND EDUCATION

Putting Inputs to Work in Primary Schools: Four Experiments in the Philippines

Ref. no. 679-01C

Education in the Philippines appears relatively well developed at first sight. The gross primary enrollment rate is 112 percent, well above the 87 percent rate for Asian countries with comparable per capita GNP. But not all is well. Although most Filipino children enter first grade, 30 percent drop out before finishing the cycle. Of those, 60 percent drop out in the first two grades, when still too young for many tasks at home, on the farm, and in the family business. That suggests that poor progress at school plays a part in parents' decision to terminate a child's schooling.

The government recognizes the need to improve student achievement and has invested heavily to do so, in part with assistance from the World Bank. Under the Second Elementary Education Project, four experiments addressed the problem of dropouts in low-income communities: school feeding programs, use of multilevel learning materials, school feeding programs with parent participation, and use of multilevel learning materials with parent participation.

This research evaluated the cost-effectiveness of the four interventions in enhancing student achievement and lowering dropout rates. The results are expected to provide guidance for future investments in elementary education.

The research used data from a survey of students in 30 schools that received the interventions and in 10 control schools that received no intervention. The survey tracked the students in the sample for attendance and test scores over the course of two years, the first being the base year before the interventions were put in place. The survey also generated information about the students' family backgrounds and their schooling environments.

The data allowed the study to separate out a number of different effects. Repeated observations over schools made it possible to control for school heterogeneity, and repeated observations across individuals over time for individual heterogeneity. The presence of a control group captured the impact of interventions. Since students are relatively immobile across schools, the potential for substitution of interventions was limited. And since the assignment of interventions was random (determined by

the flip of a coin), there was little possibility of intervention selection bias.

The study investigated two outcomes of the interventions: the effect on dropping out and the effect on student test scores. It found that the interventions had little measurable direct effect on dropping out. The transmission mechanism appeared to be through test scores. The study found that multilevel learning materials were particularly useful in raising test scores; this had an indirect effect in then lowering the probability of dropout.

As part of a collaborative arrangement to enhance local analytical capacity, the Bureau of Elementary Education, Philippine Department of Education, oversaw the computerization of the data.

Responsibility: Human Development Department, Education Team—Jee-Peng Tan (jptan@worldbank.org). With Julia Lane, American University; and Gerard Lassibille, University of Bourgogne.

Completion date: September 1996.

Report:

Tan, Jee-Peng, Julia Lane, and Gerard Lassibille. "Schooling Outcomes in Philippine Elementary Schools: The Impact of Four Experiments." World Bank, Human Development Department, Washington, DC.

Impact Evaluation of Education Projects: Decentralization and Privatization Issues

Ref. no. 679-18

There is a growing awareness in many developing countries that central governments are limited in their ability to address local needs and to use local capacity to meet those needs. In the education sector this awareness has led to such policies as transferring decisionmaking from central to local governments, increasing autonomy for schools, involving communities in school management and resource mobilization, introducing voucher schemes, and offering incentives for private school providers. But will these reforms improve the delivery of services and thus, ultimately, enrollment and student performance? What type of decentralization will achieve this difference? What incentive structures are needed at the community and school levels to raise enrollments and school quality? On the methodological side, what types of data and empirical methods are needed to evaluate institutional changes of this sort in the education sector?

This study is relating how schools operate and how students learn in a decentralized setting to detailed information on schools and their directors, teachers, and school councils and to characteristics of students and their parents and families. In addition, the research is drawing lessons on how effective the nongovernmental sector can be in increasing enrollment among targeted groups such as girls and the poor. The study is looking at the education sector in five countries: Colombia, El Salvador, Nicaragua, Pakistan, and Tanzania.

To assess the impact of decentralization and privatization on school effectiveness and student performance, the research must identify changes in institutions (schools or communities) and education indicators that can be attributed to the reform—which requires identifying and measuring the counterfactual. To define and measure the counterfactual, the research has used different impact evaluation strategies—including matched comparison designs, reflexive comparisons, and experimental design—depending on how the reform has been implemented and on the timing of the research relative to the start of the reform.

The first two years of the project were spent designing evaluation strategies, developing survey instruments and sampling designs, collecting the baseline data from program and nonprogram schools (or communities), and monitoring the implementation of the reforms. The research has doubled its efforts to measure school indicators often missing from survey data—attendance rates of teachers and students, grade repetition, and parental participation. In addition to quantitative surveys applied in schools and households, the research has developed student achievement tests or analyzed available test scores. Finally, in three of the five countries a qualitative evaluation is being undertaken, based on focus group meetings and intensive interviews with local stakeholders, to flesh out some of the findings from the quantitative analysis. The baseline data are being analyzed, and follow-up data collection and analysis are under way. All these tasks have been undertaken with substantial participation by government staff and local consultants.

The study has produced two main preliminary findings. First, school autonomy reforms of the type being implemented by El Salvador and Nicaragua, which shift the locus of decisionmaking in the public education system to schools, are transforming the management of public schools. But this shift does not necessarily translate into a more equal distribution of power among a school's director, teachers, and parents or into better student performance. Data suggest that the changes may have increased internal tensions and conflicts within schools. How these changes affect the quality of instruction is yet to be examined. Very preliminary findings for

Nicaragua suggest that it takes more than two years for such reform to produce a discernible effect on student performance.

Second, using the private sector to deliver education services to disadvantaged groups (to the poor in Colombia and to girls in Pakistan) serves the central mandate of promoting equity. In Colombia a school voucher system appears to be reaching the communities most likely to benefit. In Balochistan Province, Pakistan, the net enrollment of girls has increased significantly in program communities relative to control communities.

The study has included extensive and broad-ranging dissemination efforts targeting the donor, academic, and policymaking communities.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Elizabeth King (eking@worldbank.org), Harold Alderman, Emmanuel Jimenez, Dan Levy, Berk Ozler, Laura Rawlings, and Diane Steele; Human Development Department, Education Team—Jee-Peng Tan; and Latin America and the Caribbean Region, Human and Social Development Group—Donald Winkler. With Hideo Akabayashi, Keio University, Japan; Bruce Fuller, University of California at Berkeley; Peter Orazem and Elizabeth Paterno, Iowa State University; Magdalena Rivarola; Carlos Torres; Julia Lane, American University; K. Rust, Westat, Australia; R. M. Rakotomalala, IREDU, Tanzania; P. P. Gandye; S. A. Sumra, National Exams Council of Tanzania; A. Bryk, University of Chicago; Rodrigo Villar; F. Akbar; D. Morganstein; P. Gupta; S. Khemani; and local evaluation teams in Colombia, El Salvador, Nicaragua, Pakistan, and Tanzania. The Ministry of Education and National Testing Service, Colombia; the Ministry of Education, Nicaragua; the Ministry of Education, El Salvador; the Ministry of Education, Pakistan; the Ministry of Education, Tanzania; and the Japan Trust Fund have contributed staff time and funding for the research.

Completion date: June 1998.

Reports:

Alderman, Harold, Peter Orazem, and Elizabeth Paterno. "School Quality, School Cost, and the Public/Private School Choices of Low-Income Households in Pakistan." Working Paper Series on Impact Evaluation of Education Reforms 2. World Bank, Policy Research Department, Washington, DC.

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King, Elizabeth, Laura Rawlings, Berk Ozler, P. Callejas, N. Gordon, and N. Caldera. 1997. "Is School-Based Management Really Changing Schools? The Case of Nicaragua's Reform in Progress." World Bank, Policy Research Department, Washington, DC.

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Dynamic Implications of "Return Migration" for Labor Markets

Ref. no. 679-21C

This research analyzed the dynamic adjustment process generated by return migration. It emphasized unemployment, real wages, and investment in the home, or receiving, country. It also considered policies that can be helpful during the adjustment process by encouraging investment and job creation—for example, expanding public infrastructure and subsidizing private investment and new employment.

The research integrated lessons from past episodes of return migration and assessed the extent of potential return migration. The study produced an analytical paper and two case studies. One case study addressed the effects of the immigration of Soviet Jews on the Israeli economy, which represents almost a laboratory experiment of return migration. The other looked at Russia. Because of data limitations, the Russian case received less in-depth analysis.

Theory suggests that if the return migration is not too large, the economy converges over time to a low-unemployment steady state. A large shock may destabilize the economy, however, and the unemployment rate may then continue to increase.

The Israel case study provides an analysis of the largely successful absorption of a massive influx of immigrants from the former Soviet Union in 1990–93. The study focused on the policies adopted—subsidizing employment expansion and undertaking a massive infrastructure investment program—and their effect on employment and unemployment. The study found that the employment subsidy and infrastructure construction program together accounted for more than half the employment expansion. Further, it found that the cost of the subsidy is higher when it is accompanied by other (effective) policy measures—suggesting a need to evaluate policy programs by considering not only their direct effect but also the relationships between them.

The risk of a destabilizing shock is potentially more relevant for Russia, which faces at least the possibility of large return migration. For Russia then, the policy implications of return migration relate mostly to the scope and speed of the restructuring of state enterprises. In designing policy reform, it would be helpful to consider the relationship between immigration (in its effects on unemployment dynamics) and restructuring.

Responsibility: East Asia and Pacific Regional Office, Office of the Regional Vice President—Michael Walton (mw Walton@worldbank.org); and Policy Research Department, Poverty and Human Resources Division—Emmanuel Jimenez. With Anat Levy, Bank of Israel; Zvi Hercowitz, Tel Aviv University; Flora Tsui, Johns Hopkins University; Sumana Dhar; and Karnit Flug.

Completion date: October 1996.

Reports:

Flug, Karnit, Zvi Hercowitz, and Anat Levy. 1994. "Return Migration: The Influx from the Former Soviet Union to Israel." World Bank, Policy Research Department, Washington, DC.

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National and International Wage Differentials: Effects of Trade, Growth, and Education

Ref. no. 679-26C

The relationship between patterns of development, international interactions, and wage differentials has prompted rising interest and concern. This relationship has been intensively analyzed and debated for the OECD countries. Most observers agree that there has been a demand shift against unskilled labor in these countries and that this explains the rising wage inequality in the United States and the persistent, high unemployment disproportionately affecting the unskilled in Europe. Most also agree that changes in wages and employment reflect the joint effects of three factors: changes in the relative supply of skilled labor, the effects of international trade, and the effects of the growth process, including technological change. But differences remain about the importance of each of these factors.

Until recently little attention had been paid to the relationship between trade, technological change, and wage differentials in low- and middle-income countries. Conventional wisdom suggests that opening to trade would narrow the wage gap between skilled and unskilled workers in developing countries, a result consistent with the relative abundance of unskilled labor. But the experience of such countries has varied, with a narrowing of wage differentials in some, such as the Republic of Korea, but, more recently, a widening of differentials in others, especially in Latin America (including Argentina, Chile, and Mexico). The aim of this study was to expand the empirical and analytical basis for interpreting these developments in selected countries.

The project carried out country studies of changes in wage differentials using microeconomic data sets from household surveys in Argentina, Colombia, Costa Rica, and Malaysia and an enterprise survey in Mexico. The household survey analysis was designed to differentiate between supply and demand determinants of changes in differentials, using data on the educational characteristics of workers. The enterprise survey analysis used information on technology spending by firms to distinguish between trade and technology influences as causes of widening differentials. This work was complemented by a compilation of data on wages by skill category from a multicountry source (the International Labour Organisation's October survey) and by a survey of the theoretical and empirical work.

Initial results of the research confirm that there has been a widening of wage differentials in the countries studied and that this widening has resulted from demand shifts. Supply shifts have favored unskilled workers because educational expansion has increased the relative abundance of skilled workers.

The empirical work on the sources of demand shift represents a first round of analysis in this complex area. Within the scope of this project it was not feasible to fully resolve the sources of shifts. But there is at least suggestive evidence that trade is a source of widening differentials in Chile and perhaps in Colombia, while technological change may have played a part in Mexico. The broader review of the theory and evidence documents the various channels of change in differentials and shows how increasing inequality in middle-income countries can be consistent with increasing international integration through trade.

Responsibility: East Asia and Pacific Regional Office, Office of the Regional Vice President—Michael Walton (mwalton@worldbank.org). With Richard Freeman and Donald Robbins, Harvard University; Adrian Wood, University of Sussex; and Gordon Hanson, University of Texas.

Completion date: September 1996.

Reports:

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Public Sector Retrenchment and Efficient Compensation Schemes

Ref. no. 679-51C

Economic reforms often include shrinking the public sector, which in turn sometimes requires massive layoffs. But what are the best mechanisms for shedding redundant public sector workers? If severance pay packages are offered to induce voluntary departures, how should they be designed to minimize the total cost? And are there ways to prevent the most valuable workers from leaving the public sector, and the least productive from staying? These questions became even more pressing for the World Bank after February 1996, when the Operations Policy Committee authorized lending for severance pay.

This study investigated the optimal design of downsizing operations, combining three approaches. The public economics perspective was used to assess the financial and economic returns to downsizing. With overstaffing only one of several distortions and imperfections in the public sector, redundancy must be estimated on the basis of a shadow price of labor rather than actual labor costs. The labor economics perspective was used to predict the losses public sector workers may experience as a result of displacement. The link between these losses and the workers' observable characteristics (age, education, and the like) can be used to tailor compensation for individual workers, reducing the cost of downsizing. Finally, the principal-agent approach was used to identify the self-selection mechanisms appropriate when individual productivity is not observable in the public sector. Unlike severance pay offers, these mechanisms can create an incentive for the best workers to remain in the public sector.

Data on individual earnings, expenditures, and other, related variables were used to evaluate the losses from displacement in several country case studies. For Argentina these data referred to public sector workers who had received a severance pay offer and either accepted or rejected it. For Ecuador and Turkey they referred to workers separated from their public sector job. For Egypt and Kazakhstan they related to the entire labor force. The welfare losses from displacement were estimated on the basis of these data by comparing two states (staying and leaving, before and after, in and out).

A cross-country analysis of experience with retrenchment used data on 41 downsizing operations supported

by the World Bank. These data, assembled from operational reports and meetings with Bank task managers, cover program characteristics, such as the shares of voluntary and involuntary job separations, the amounts of severance offered, and the use of training and other support mechanisms. The analysis related the financial and economic returns of these programs to their characteristics.

The project has had a significant operational impact, providing input and materials for downsizing operations in Brazil (two operations), India (Andhra Pradesh), Jordan, Madagascar, Mongolia (an operation managed by the Asian Development Bank), Pakistan, Peru (an operation managed by the Inter-American Development Bank), Sri Lanka, Yemen, and Zambia. Because of the operational interest in this research, a follow-up project will be prepared in fiscal 1998 to test some of its recommendations in selected downsizing operations.

The main findings of the project and the papers it has produced are available at the Website <http://www.worldbank.org/html/prdph/downsize/home.htm>. New features will be added to this Website, including a database of downsizing operations, references, and a mail system to facilitate correspondence.

Two presentations on public sector downsizing were held in June 1997 in Africa, in Lomé and Abidjan, and presentations have also been made in World Bank training seminars. In addition, a two-day conference for researchers involved in the project and about 100 Bank operational staff was held in Washington, DC, in November 1996. The May 1998 issue of *World Bank Economic Review* will be devoted to this project and will contain several of the papers it has produced.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Martín Rama (mrama@worldbank.org). With Ragui Assaad, University of Minnesota; Kaushik Basu and Gary Fields, Cornell University; José Manuel Campa, New York University; Julia Gonzalez, Central Bank of Ecuador; John Haltiwanger and Manisha Singh, University of Maryland; Anat Levy, Bank of Israel; Richard McLean, Rutgers University; Donald Robbins, Harvard University; and Aysit Tansel, Middle East Technical University.

Completion date: June 1997.

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- Basu, Kaushik, Gary Fields, and Shub Deb Gupta. "Retrenchment, Labor Laws, and Government Policy: An Analysis with Special Reference to India."
- Campa, José Manuel. "Public Sector Retrenchment: Spain in the 1980s."
- Carneiro, Francisco, and Indermit Gill. "Public Sector Downsizing in Brazil: An Evaluation of Ten Severance Schemes."

Haltiwanger, John, and Manisha Singh. "Cross-Country Evidence on Public Sector Retrenchment."

Levy, Anat, and Richard McLean. "Optimal and Sub-Optimal Retrenchment Schemes: An Analytical Framework."

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Rama, Martín, and Donna MacIsaac. "Earnings and Welfare after Retrenchment: Central Bank Employees in Ecuador."

Rama, Martín, and Kinnon Scott. "The One-Company Town Problem: The Case of Kazakhstan."

Robbins, Donald. "Public Sector Retrenchment: A Case Study of Argentina."

Ruppert, Elizabeth. "A Financial and Economic Assessment of Unemployment Insurance in Algeria."

Schwarz, Anita. "Early Retirement: Downsizing Solution or Downsizing Disaster?"

Tansel, Aysit. "Workers Displaced Due to Privatization in Turkey: Before versus After Displacement."

The Impact of Child Health and Nutrition on Education Outcomes in Cebu, Philippines

Ref. no. 679-57

Episodes of malnutrition during early childhood are often thought to have serious implications for a child's school performance later in life. But research on this issue has been ambiguous, in part because of a lack of high-quality data with which to address the issue. This research project is using new data collected in Cebu, Philippines, to assess the impact of early childhood nutrition on subsequent school attendance and performance. The data, which cover 3,000 children, were collected initially in the 1980s, during the first two years of life, and then again in 1991. In 1994–95 this research collected supplemental data on current school enrollment and performance for these children, almost all of whom were enrolled in primary school. The research is assessing schooling outcomes on the basis of such indicators as enrollment, attainment, attendance, and cognitive skills (mathematics, English, and Cebuano). It also examines other determinants of school progress, such as family background and school and teacher characteristics.

The findings so far indicate that children who are malnourished do perform relatively poorly in school. In particular, they are more likely to enroll late, to repeat grades, and to learn less per year of schooling. An obvious implication is that health and nutrition programs aimed at very young children can lead to improved school performance in later years.

A draft paper on the study's findings was presented at a World Bank lunch seminar in December 1996 and at the American Economic Association annual meeting in New Orleans in January 1997.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Paul Glewwe (pglewwe@worldbank.org) and Elizabeth King. With Hanan Jacoby, University of Rochester and International Food Policy Research Institute; Linda Adair, University of North Carolina, Chapel Hill; and Azot Derecho, Office of Population Studies, University of San Carlos, Cebu, Philippines. The Asian Development Bank is contributing funding for the research.

Completion date: October 1997.

Report:

Glewwe, Paul, Hanan Jacoby, and Elizabeth King. 1996. "An Econometric Model of Nutrition and Learning: Evidence from Longitudinal Data." World Bank, Policy Research Department, Washington, DC.

Costs and Effectiveness of In-Service Primary Teacher Education at a Distance: A Comparative Study

Ref. no. 679-93C

The low direct and opportunity costs of nonresident, in-service training programs for teachers have encouraged support for such programs since the 1960s. Evaluations of the approach have generally shown that it works and is cost-effective. But studies have not investigated what methods have been effective in achieving specific objectives in specific environments. This study compared the cost and effectiveness of a distance education mode of teacher training in Uganda with those of the conventional alternative, a teachers college. The study also provides a model for the cost and effectiveness analysis of a planned cross-country study of distance education programs.

The Mubende Integrated Teacher Education Project (MITEP) was established in 1992 to provide training for 1,000 underqualified teachers in two districts. MITEP used a combination of self-study materials, residential courses, and supervision to upgrade teachers' skills. Completed in 1995, MITEP offered a rare opportunity to examine the methods, outcomes, and costs of a distance education program and to compare them with those of the conventional teachers colleges in the same districts.

The research addressed two main questions: Did MITEP produce teachers who are as effective as those trained in conventional ways? And did it produce trained teachers as cost-effectively as the conventional colleges? The research also looked at how MITEP operated, identified which components worked well, and assessed whether it is sustainable and replicable.

The principal data source was an evaluation of MITEP by the International Extension College and Action Aid. The results provided student characteristics and num-

bers, and dropout, completion, and success rates. Other data sources were staff of MITEP, Action Aid, the Ministry of Education and Sports, and conventional colleges, and classroom observations of MITEP and conventional college students. Cost data were drawn from government budget documents, records of conventional colleges, and MITEP accounts, and data on student and teacher achievement were obtained from the Ugandan National Examinations Board.

The study's findings were discussed through a video-conference among staff of the Open University, the University of East Anglia, the International Extension College, and the World Bank. They were also presented at the Global Knowledge Conference in Toronto in 1997.

Responsibility: Economic Development Institute, Human Resources and Poverty Division—Paud Murphy (pmurphy@worldbank.org). With Bernadette Robinson and Jason Pennells, International Extension College, Uganda; and James Hough, Loughborough University.

Completion date: September 1996.

Report:

Robinson, Bernadette, and Paud Murphy. 1997. "The Costs and Effectiveness of In-Service Primary Teacher Education at a Distance in Uganda." World Bank, Economic Development Institute, Washington, DC.

An Institutional Approach to the Promotion of Education Services in Brazil

Ref. no. 680-38C

Economists have long recognized human capital as an important factor in development. So expenditures for education have figured prominently in the budgets of developing countries and have been an important focus of Bank assistance. Education outcomes, however, vary inconsistently with expenditures, prompting some to suggest a restructuring of priorities to increase the efficiency of resource use.

This research hypothesized that resource efficiency is highly correlated with local cultural and institutional factors. It was based on the notion that institutional factors—trust, social norms, modes of behavior, and the like—explain much of the variation in students' educational performance across regions. The nexus of informal rules, civic-minded attitudes, and relationships of trust forms a region's stock of social capital. Social capital increases the efficiency of society by facilitating coordinated activity. By instilling in children a sense of the importance of education and by fostering family and community involvement, social capital enhances the productivity of public expenditures for education.

The research incorporated social capital in a model of the educational performance of primary school age children in Brazil. Using data on cultural and institutional factors, it constructed an index of the stock of social capital for several municipalities. The study used econometric techniques to estimate education production functions, with social capital as a technological shift.

The literature on educational achievement has established that simply increasing expenditures is not an efficient way to improve outcomes. By providing insight into the role of social capital in student achievement, this study contributes to the design of institution-building interventions. And its examination of institutional issues previously overlooked in project analysis could contribute to future education projects in Brazil and elsewhere that are more effective in delivering good primary education. The study's findings will be discussed with members of the Brazilian academic community.

Responsibility: Latin America and the Caribbean, Country Department I, Country Operations Unit 2—Danny Leipziger (dleipziger@worldbank.org), Country Department I, Country Operations Unit 1—Homi Kharas, and Brazil Resident Mission—Robin Horn. With Vijay Gupta, Georgetown University; John Frost, Brown University; and O. B. de Lima, M. L. de Oliveira Barbasa, and L. da Veiga, Instituto João Pinheiro. The Instituto João Pinheiro contributed data for the research.

Completion date: June 1997.

International Measures of Schooling Years and Schooling Quality

Ref. no. 680-54C

This project updated and extended the widely used data compiled on educational attainment. The most important recent efforts in constructing cross-country data on educational attainment had been that by Robert Barro and Jong-Wha Lee ("International Comparisons of Educational Attainment," *Journal of Monetary Economics* 32[December]: 363–94, 1993) and that by Vikram Nehru, Eric Swanson, and Ashutosh Dubey ("A New Database on Human Capital Stock," Policy Research Working Paper 1124, World Bank, International Economics Department, Washington, DC, 1995). Both studies, however, have gaps in data construction and coverage, gaps that this study addressed.

In the study cited above, Barro and Lee constructed estimates of educational attainment by sex for persons aged 25 and over. The values applied to 129 countries over five-year intervals from 1960 to 1985. The authors used census and survey data to obtain benchmark stocks of schooling for various years, filling more than 40 percent of the quinquennial cells. They then estimated the

remaining cells using a perpetual inventory technique and data on gross enrollment ratios.

This method is more accurate than the approaches others have used. In particular, the measures are not subject to problems related to mortality, migration, and boundary changes. In addition, the method does not require a long history of enrollment data to construct benchmark stocks of schooling. And because the resulting data set provides a breakdown between male and female school attainment, it allows estimation and testing of such key hypotheses about development as the importance of female schooling in determining fertility, infant mortality, and the schooling of children.

This study built on that data set, adding census information for 1985 and 1990 and updating the estimates of educational attainment to 1990. It also added estimates for a few countries, notably China, that had previously been omitted because of missing data.

In connection with the study, a seminar, *New and Improved Measures of Educational Attainment*, was given on March 21, 1997. The data set is available on the Bank's Growth Research Website (<http://www.worldbank.org/html/prdmg/grthweb/datasets.htm>).

Responsibility: Policy Research Department, Macroeconomics and Growth Division—William Easterly (weasterly@worldbank.org). With Robert Barro, Harvard University; and Jong-Wha Lee, University of Korea.

Completion date: February 1997.

The Informal Sector in Mexico

Ref. no. 680-59C

The informal sector is often considered the disadvantaged sector of a dualistic labor market segmented by excessive formal sector remuneration, benefits, and regulation. Departing from that view, this study found that the informal sector may be the unregulated analogue to the industrial country small-firm sector and therefore may represent desirable employment for many workers.

The study analyzed patterns of transition between formal and informal sectors across the business cycle and during a period of trade liberalization in Mexico. It drew on data from the Mexican National Urban Unemployment Survey (1987–93), which allows the construction of five-quarter panels that make it possible to track workers' movements among sectors. The research used multinomial logit and partially observed probit models to identify determinants of mobility, and relative wage and wage differential series to compare remuneration among sectors.

The analysis showed that, contrary to the traditional view, the size of the informal sector and movements into it are strongly procyclical. This suggests that entrepre-

neers may choose to start a firm or take on additional workers in good times and that the informal sector is not the employer of last resort. But there is evidence of queuing to enter formal employment, suggesting that some fraction of informal sector employment is involuntary. There is also evidence of increased subcontracting during the period of trade liberalization, but whether workers are better or worse off as a result cannot yet be ascertained.

The study applied factor and cluster analysis to data from the 1992 microenterprise survey to identify subsectors and stratification within the microenterprise sector. It also looked for multiple distributions within factors, and compared earnings equations as evidence of dualism arising from distortions in the labor market. The analysis found that the sector does consist of multiple subsectors distinguished by such factors as prosperity, plans for expansion, capital-labor ratios, and education level. But fewer than a quarter of microenterprises appear to be involuntarily informal, and other divisions seem to correspond to those predicted by mainstream models of firm dynamics. The earnings distributions appear to reflect endowments of human and physical capital rather than labor market distortions.

Overall, the study found little evidence of segmentation. Most informal employment probably reflects an efficient allocation of labor. It may be more appropriate to view most informal sector workers as voluntarily self-employed rather than as rationed out of the workforce. The findings suggest that the proper unit of analysis of the informal sector is the small-scale firm not the disadvantaged worker, that labor market reform should focus more on raising the productivity of the formal sector than on eliminating segmentation, and that policies to address income distribution are probably best focused on education rather than on labor market segmentation.

The study's findings have been presented at a large number of seminars and conferences, including the American Economic Association meetings in San Francisco in January 1996, the Latin American Meetings of the Econometric Society in Rio de Janeiro, Brazil, in August 1996 and in Santiago, Chile, in August 1997, a World Bank seminar in May 1997, and a seminar at Mexico's Ministry of Labor in August 1997.

Responsibility: Mexico Country Department—Zia Qureshi (mqureshi@worldbank.org); and Europe and Central Asia, Country Department I, Office of the Director—Frank Lysy. With William Maloney, University of Illinois, Champaign-Urbana.

Completion date: March 1997.

Reports:

Maloney, William. 1996. "Heterogeneity in Small-Scale LDC Enterprises: The Mexican Case." University of Illinois Working Paper Series.

_____. 1996. "Labor Market Structure in Mexico: Time-Series Evidence on Competing Views." University of Illinois Working Paper Series.

Child Labor: What Role for Demand-Side Interventions?

Ref. no. 680-64C

Child labor is pervasive throughout the world, especially in developing countries, with Asia and Africa accounting for more than 90 percent of child employment. Children work for a variety of reasons, the most important being poverty. Though they are not well paid, they still contribute a major share—as much as a quarter—of family income in developing countries. Laws have been able to control child labor in the formal sector to some degree—but as a result, child labor is most prevalent in the largely unmonitored informal and rural sectors.

The intuitive solution would be to immediately abolish child labor. But there are problems with this strategy. There is no international agreement on the definition of child labor. And many children may have to work to attend school, so abolishing child labor would only hinder their education.

This research analyzed the determinants of different forms of child labor in Bolivia, Colombia, Côte d'Ivoire, and the Philippines, using household and labor force survey data. The study used a simple household production model in which the supply of child labor is a function of the economic and demographic characteristics of the household, the age and sex of the children, and the costs and benefits of alternative uses of children's time. The analysis was based on children who are out of school and did not model the demand for education by the household. It assumed that children are involved in one of three activities: household work (caring for infants, assisting parents), working for wages, or working for the home enterprise. The analysis focused on the labor supply decision by the household.

In general, the results are consistent across the four countries. The study found that the age and sex of the child are important determinants of child labor. Among household characteristics the education and employment of the parents are the most important factors. The presence of siblings generally matters, but the effect varies among the countries. The presence of a household enterprise or farm is the most important household economic attribute in determining child labor. And poverty status exerts an influence over and above the other household characteristics controlled for, suggesting that the constraints of poverty increase the likelihood of child labor.

Responsibility: Human Development Department, Education Team—Harry Anthony Patrinos (hpatrinos@worldbank.org); and Environment Department, Social Policy and Resettlement Division—Christiaan Grootaert and Gi-Taik Oh. With Kimberly Cartwright; Christos Sakellariou, Nanyang Technological University, Singapore; and Felicia Knaul.

Completion date: December 1996.

Reports:

Cartwright, Kimberly. 1996. "Child and Youth Labor Force Participation in Colombia." World Bank, Human Development Department, Washington, DC.

_____. 1997. "Child Labor in Urban Bolivia." World Bank, Human Development Department, Washington, DC.

Grootaert, Christiaan. 1997. "Child Labor in Côte d'Ivoire: Incidence and Determinants." World Bank, Environment Department, Washington, DC.

Sakellariou, Christos, and Ashish Lall. 1997. "Child Labor in the Philippines."

Technology and Basic Education Reform: A Comparative Analysis in Chile and Costa Rica

Ref. no. 680-68

Revolutionary advances in information technology and communications are transforming the world economy and presenting new challenges to all countries. One such challenge is the need to compete in the emerging information economy, a challenge in which education must play a central part by preparing new generations to participate effectively in this dynamic environment.

This research undertook case studies of the experiences of two developing countries, Chile and Costa Rica, which have undertaken major programs to introduce computers in their education systems. Chile's program, which began as a pilot program in 1993, has placed computers in more than 200 primary and secondary schools and established a wide area network that electronically links students and teachers throughout the country. Costa Rica's program—launched in the 1980s by a nongovernmental organization, the Omar Dengo Foundation—has installed computers in about 150 primary schools, covering 40 percent of the primary school population.

The case studies sought answers to these questions: What factors support—and what factors impede—the integration of technology into curriculum and practice? What factors contribute to effective teacher training, support services, and maintenance systems? What are the characteristics of the schools perceived as the most effective educators in each program? And what are the ben-

efits and costs of the programs and the factors needed to sustain them? To address these questions, richly qualitative data were collected through attitude surveys and in-depth classroom and school observations in six technology-using schools in Chile and five in Costa Rica—schools selected because of their reputed success with technology.

The research was launched in April 1996 at a workshop in San José, Costa Rica, where the research team refined the goals, methodology, and work program for the investigation. A second workshop, held in June 1996 in Washington, DC, reviewed the results of the first school visit, confirmed the effectiveness of the methodology, and revised the evaluation instruments. A final workshop was held in May 1997 to review the results of the fieldwork in each country and present the country reports. The research team is now drafting the final research report comparing the main findings from the Chilean and Costa Rican cases and drawing lessons from the research to guide policy and project formulation in other countries contemplating introducing computers in their education systems.

The principal findings of the country reports point to lessons on the design, implementation, and effects of introducing technology in primary schools. Among the lessons being explored more fully are those relating to the role of nongovernmental institutions in developing, introducing, and sustaining a technology program; the role of technology in changing the learning environment in the classroom and laboratory; and the effect of technology on the role and status of teachers.

Responsibility: Human Development Department, Education Team—Michael Potashnik (mpotashnik@worldbank.org); and Policy Research Department, Poverty and Human Resources Division—Laura Rawlings. With Barbara Means, Stanford Research International; Jeanina Umaña, Jackeline Garcia, Magaly Zuñiga, and Marica C. Dobles, Omar Dengo Foundation, Costa Rica; and Maria Ines Alvarez and Francisca Roman, ENLACES, Chile.

Completion date: November 1997.

Technology, Education Costs, and Distance Education

Ref. no. 680-70C

Accelerating change in technology means that workers need to pursue education throughout their working lives to remain competitive in the labor market. But conventional means of education will not suffice to meet the needs of large populations for lifelong learning or, in poor countries, even to provide primary education for all.

With the growing demand for education—and the rising relative cost of conventional education—the prospect of electronic distance education becomes increasingly important. The digital revolution is steadily and dramatically reducing the cost of storing, manipulating, and transmitting information. And the convergence of the once-distinct media of image, sound, books, and computer networks into digital multimedia is making the world's knowledge base accessible anywhere on the planet. What part could such technology play in expanding education in developing countries?

This study reviewed distance education technologies and their use, effectiveness, and cost in developing countries to find out what technologies, under what conditions, can provide cost-effective alternatives to conventional education. It focused on computer-based electronic communications that integrate text, audio, and video media, transmitted by Internet and similar electronic data distribution systems. The study gathered quantitative, descriptive data on the provision and availability of electronic distance education in postschool continuing education and carried out case studies of electronic distance education in Brazil, Egypt, Estonia, Russia, and South Africa.

Responsibility: Human Development Department, Office of the Director—Jacques van der Gaag (jvandergaag@worldbank.org) and Michael Potashnik; and External Affairs Department, Electronic Media Center—Peter Knight. With Michael Moore.

Completion date: December 1996.

The Effect of Education Decentralization Reforms on Resource Allocation, Quality, and Equity in Hungarian Schools

Ref. no. 680-78C

Decentralization of administration and finance has become a common reform in education. In Hungary responsibility for public education through the secondary level now lies with municipalities, which spend more than 35 percent of their budgets on education. Yet little is known about how municipalities make funding decisions, what criteria they use in allocating funds among schools, and how decentralization has affected school quality and equity.

This study used both qualitative and quantitative data collection and analysis to address these research questions. It utilized archival data from national school-based surveys of student achievement and school inputs that were conducted in 1991 and 1995. Using a variety of simple descriptive techniques, the study looked at differences among types of municipalities in the level and

distribution of student achievement and school inputs at these two points in time. In addition, in a small sample of municipalities researchers conducted in-depth interviews with school and municipal officials on changes related to recent decentralization initiatives. The study's findings need to be interpreted with care because of the small sample size and the difficulty in evaluating the many variables relating to student achievement.

One of the findings is that academic performance in Hungary has been declining in recent years, with growing differences in performance among different types of communities. The greatest difference in performance was noted between villages and small towns, but differences are increasing even between larger towns and the capital, Budapest.

The study postulates that worsening economic and social conditions, together with uncertainty in the education system due to the long transition process, have contributed to this decline. In an analysis of the causes of deterioration at municipal and institutional levels, the study found that academic performance was influenced by spending per student, the type of community, and the resources of the community. In many cases, however, the results depended largely on the personal attributes of local education personnel, such as head teachers. The absence of quality control mechanisms at the local level also contributes to declining quality.

Actions that could reverse this decline are linked to creating a better balance between local autonomy and central policy guidance. Central finance could be used to support improved self-evaluation and reporting mechanisms and better dialogue and consensus building on desired school outcomes. In addition, government monitoring and supportive financing for deprived areas could be considered.

The findings have been disseminated through presentations at the Bank's annual Human Development Week and the Annual Comparative and International Education Society Meeting in Mexico City, through discussion with Bank operational staff, and through meetings with municipal and central government personnel in Hungary.

Responsibility: Human Development Department, Education Team—Marlaine Lockheed (mlockheed@worldbank.org) and Eluned Schweitzer; and Europe and Central Asia, Country Department II, Human Resources Operations Division—Christine Allison. With Gabor Halasz, Gyorgy Martonfe, Eva Balazs, Anna Imre, Maria Nagy, and Peter Vari. The National Institute of Public Education, Hungarian Institute for Educational Research, and Statistics Institute of Hungary participated in the research.

Completion date: September 1996.

Reports:

- Gabor, Halasz. 1997. *As Oktatas Minosege es as Onkormanyzati Oktatasiranyitas* (Quality of Education and Local Governmental School Administration). Budapest: OKKER Kiado.
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The Economics of Early Child Development Programs

Ref. no. 680-87C

Abundant literature documents the positive effects of early child development programs on children's health and nutritional status and their preparedness for and progress in primary school. Many developing country governments have been expanding their investments in such programs, often with financial assistance from the World Bank. Yet little assessment has been made of the economic returns to such investments, making it difficult to evaluate alternative interventions for improving child welfare.

This research aimed to provide a systematic cost-benefit framework for evaluating investments in early child development programs. It produced easy-to-use computer software to aid such evaluations and a survey of the literature on the costs and benefits of existing programs.

The research used standard cost-benefit analysis. It started with what is by now widely accepted evidence from the economics of education literature that workers with schooling earn more (are more productive) than workers without schooling. The monetary benefits of early child development programs can thus be estimated on the basis of the programs' effect on the number of children who survive to primary school age, their probability for enrolling in school, and their probability for progressing through the school system. Given the benefits, it is then possible to ascertain the maximum cost consistent with an economic investment in an early child development program (that is, one that yields an economic return of, say, at least 10 percent a year).

The computer software sets up the calculation to allow users to enter country-specific data on child survival and schooling and earnings profiles of people with and without schooling. This approach gives users a tool that is easily manipulated to assess the cost parameters for efficient investments in early child development programs, which typically lack a standard format and vary widely in cost according to their content and design.

The project tested the utility of the software in specific country settings and consolidated information on the cost

of early child development programs and their effect on child survival and schooling.

Responsibility: Human Development Department, Office of the Director—Jacques van der Gaag (jvandergaag@worldbank.org), and Education Team—Jee-Peng Tan. With Husein Abdul-Hamid.

Completion date: September 1996.

Report:

van der Gaag, Jacques. 1996. "Early Child Development: Investing in the Future." Paper presented at conference on early child development, Carter Presidential Center, Atlanta, Georgia, April 8–9.

Gender and the Rural Economy: Evidence from Mexico

Ref. no. 680-95

Little gender-disaggregated information exists for Mexico, particularly in the rural sector. Studies have typically collected and analyzed household data based on the household as a single unit, without considering the conditions, preferences, and roles of individual members. The 1994–95 Mexico Rural Financial Markets Study (RFMS) is an exception. In each of the nearly 2,000 households surveyed, the RFMS interviewed all male and female members engaged in entrepreneurial activity. Because it interviewed individuals rather than the conventional household head, the RFMS captured important gender-disaggregated information on credit and entrepreneurship patterns, property and land ownership, household characteristics, educational attainment, and employment patterns (including gender roles in agricultural production). The RFMS also conducted case studies of nonbank lenders in selected rural areas in the states of Guanajuato, Puebla, and Veracruz, focusing on lending technologies, mechanisms used to monitor borrowers, and lending instruments used to enforce credit contracts.

Using the RFMS data, this research is examining the influence of gender on rural economic activities in Mexico. Preliminary analysis of the data shows that there are differences in the types of enterprises formed by men and women. Although there is little difference in the participation rates of men and women in credit markets, there are differences in their access to credit services and lenders. For example, male rural entrepreneurs are more likely to receive cash loans and to use financial savings instruments than their female counterparts. The analysis also shows that women's enterprises earn about half as much as men's. And it has found that educational attainment, number of children, and characteristics of the locality affect the labor force participation rates of both men and women.

The research is evaluating three explanations of gender differences in labor and credit markets: measured differences between male and female entrepreneurs, gender differences in preferences, and pure discrimination. Differences by gender in earnings and interest rates are being analyzed using the Oaxaca decomposition method. The study is also assessing the policy implications of these gender differences.

The research has influenced the way the Bank conducts studies on financial markets. Following on the Mexican research, the Guatemala Rural Finance Study included gender-disaggregated data. A database the Bank plans to establish on financial markets and entrepreneurship for Central America will also include gender as a key variable. And in the Bank-financed Mexico Rural Financial Markets Loan recommendations from the study will be used in designing financial services so that they meet the different needs of male and female entrepreneurs.

Preliminary discussions with policymakers in Mexico indicate that the study has had an impact on their thinking about the relevance of gender in financial services. Mexican officials have requested Bank guidance in identifying gender-differentiated needs in urban credit markets.

Findings were disseminated in a workshop held in Mexico City in July 1997 for Mexican policymakers and bankers and financial intermediaries involved in rural credit.

Responsibility: Latin America and the Caribbean Region, Sector Leadership Group—Maria Correia (mcorreia@worldbank.org) and Rodrigo Chaves. With Susana Sanchez.

Completion date: August 1997.

The Impact of Labor Market Policies and Institutions on Economic Performance

Ref. no. 680-96

This is the second phase of a broader study whose main goal is to assess the effect of labor market interventions on wages, employment, and economic growth. A related objective of this research is to understand how the reform of those interventions should be approached. Rather than discussing the consequences of labor market rigidity in general, the study focuses on a series of well-defined departures from the undistorted, partial equilibrium model of the labor market: minimum wages, mandated benefits (or nonwage costs), payroll taxation (including social security contributions), public sector employment, job security, and unionization.

The research combines detailed case studies using household- and plant-level data, cross-country analysis, and theoretical work. For each labor market distortion

considered, a couple of studies are carried out, focusing on countries where the distortion is thought to be particularly acute. The cross-country analysis is made possible by the construction of a cross-country, time-series database of labor indicators. This database includes information on employment and wage structures, the extent of government intervention in the labor market, the degree of unionization, and other variables. The data are collected from existing cross-country sources and a variety of country-specific sources. The database is used to extend the now standard growth regression analysis so as to take labor market policies and institutions into account. Other cross-country studies focus on short-run adjustment and on the determinants of public sector employment. The theoretical work deals with the political economy of labor market distortions and its implications for the design of economic reforms.

Findings have been disseminated through workshops, training, and seminars, including a presentation on poverty and the labor market for 50 South African researchers in Johannesburg in August 1996 and a presentation on trade unions in Latin America and East Asia for 40 researchers at the Pacific Council on International Policy in Los Angeles in April 1997. As part of a course on techniques of financial analysis and programming, a lecture on labor market policies was given to 45 government officials from Africa and Latin America at the International Monetary Fund in March 1997. A presentation on labor law reform was given to 30 trade union leaders from French-speaking countries in Africa in Lomé in June 1997, and a presentation on minimum wages and pay issues was made in Abidjan in June 1997.

At the end of the project the cross-country database will be made available at its marginal cost to researchers interested in labor market issues in developing countries.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Martín Rama (mrama@worldbank.org) and Raquel Artecona. With Jean-Paul Azam, Université d'Auvergne; Ann Bartel and Ann Harrison, Columbia University; Kristin Butcher, Boston College; Alex Cukierman, Tel Aviv University; Francesco Daveri, Università di Brescia; Iyabode Fahm; Alvaro Forteza, Universidad de la República, Uruguay; Anna Fruttero and Guido Tabellini, Bocconi University; Donna MacIsaac, Inter-American Development Bank; Dani Rodrik, Harvard University; Cecilia Rouse, Princeton University; and Manisha Singh, University of Maryland.

Completion date: December 1997.

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Understanding the Rationale for Education Reform: Parents as Principals and Teachers as Agents

Ref. no. 681-12C

This research tried to answer the question, Why are publicly provided education services not technically efficient, and what can be done about it? Studies have consistently found that education expenditures in the public sector are allocated across inputs in such a way that the productivity of teaching inputs is much lower than the productivity of nonteaching inputs. This research contrasted two behavioral approaches to understanding this misallocation. In the first, policymakers attempt to maximize schooling output but choose the wrong allocation of expenditures through ignorance. In this case, which is the general implicit assumption of researchers, solving the problem requires more (or more convincing) research about the technical aspects of the education production function.

The second approach models the behavior of the public sector to reflect that it is not an impassive technocrat and that expenditures are also income streams. So the size of teachers' salaries matters to teachers, and the employment of teachers matters to a patronage-seeking politician—that is, money matters. In this case the allocation of the budget is determined not just by technical considerations about the education process but also by politics. The study's review of the empirical literature found that only a political model of expenditure allocation can explain the existing findings.

The adoption of a political model of expenditure allocation would have strong implications for Bank recommendations on education reform and for policymakers because the model changes how one views education reform. It shifts the debate from a technocratic one about appropriate pedagogy to one about the allocation of power and accountability among the stakeholders in education. If inefficient allocation of expenditures is the result of a misalignment of political incentives, then only reforms that change the underlying incentives can achieve sustained changes in performance. So education reforms that change incentives—such as those promoting decentralization, local community schools, and greater competition among suppliers—may be more likely to produce changes in the allocation of expenditures than programs that attempt to operate directly on spending.

The study's findings will be presented at an Asia Pacific Economic Cooperation meeting in November 1997. They have also contributed to Bank country dialogues in Brazil and Estonia.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Lant Pritchett (lpritchett@worldbank.org) and Deon Filmer. With Jonah Gelbach, Massachusetts Institute of Technology.

Completion date: June 1997.

Report:

Pritchett, Lant, and Deon Filmer. 1997. "What Educational Production Functions Really Show: A Positive Theory of Education Spending." Policy Research Working Paper 1795. World Bank, Policy Research Department, Washington, DC.

Improving Primary Education in Kenya: A Randomized Evaluation of Different Policy Options

Ref. no. 681-14

Many econometric studies have tried to estimate the effect of education policies on school performance in industrial countries. But even the most sophisticated econometric techniques may yield biased estimates if schools with different levels of inputs also differ systematically in other, unobserved ways. Randomized experiments overcome many of the statistical problems inherent in these econometric studies, but they are rarely done because of their high costs and because of public officials' reluctance to vary the level of inputs among schools. This research takes advantage of an opportunity to perform randomized evaluations of several different education policy options in collaboration with an international non-governmental organization.

The study began with a small number of schools in 1995. Out of 14 schools, 7 were randomly chosen to receive the nongovernmental organization's standard package of assistance. Pretests were administered at the beginning of 1995, and posttests in the fall of 1995. The results are now being analyzed.

The project expanded in 1996. Out of 50 schools, 25 were randomly chosen to receive a large number of textbooks. Pretests were administered in early 1996, and posttests near the end of that year. The children will be followed for at least two more years to assess whether the initial effects endure for several years. Two other policy interventions will be tried in 1997 and 1998.

Preliminary results indicate that the impact of textbooks is not as strong as some previous studies have indicated. Of particular interest is the finding that only better students, as identified by the scores on the 1996 pretests, benefited from the provision of textbooks.

In future work results of the interventions will be compared with findings based on standard econometric techniques to see whether those techniques yield biased results.

Findings have been presented at Cornell, Harvard, and Yale Universities, at the MacArthur Foundation, and at the International Food Policy Research Institute.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Paul Glewwe (pglewwe@worldbank.org). With Michael Kremer, Massachusetts Institute of Technology; Dan Levy, Northwestern University; and Sylvie Moulin. The International Christian Humanitarian Services, the Netherlands; and the National Science Foundation, United States, are contributing funding for the research.

Completion date: October 1999.

Reports:

Glewwe, Paul, Michael Kremer, and Sylvie Moulin. "Textbooks and Test Scores: Evidence from a Prospective Evaluation in Kenya." Draft.

Kremer, Michael, Sylvie Moulin, David Myatt, and Robert Namuny. "The Quantity-Quality Tradeoff in Education: Evidence from a Prospective Evaluation in Kenya." Draft.

Explaining Gender Disparity in South Asia: A Cross-Sectional Approach

Ref. no. 681-29

That gender disparity is a large problem in South Asia is well known. But understanding the root causes of gender disparity across countries, particularly within countries in South Asia, so that programs and policies can be designed to address it is more problematic.

This research takes a small step forward by creating a new database that allows consistent comparisons of a range of indicators of gender disparity both across countries and within the large countries of South Asia (India and Pakistan). Outcomes for states of India, for example, can be directly compared with those for other states of India, provinces of Pakistan, and other countries.

The database has led to three initial findings. First, certain regions of South Asia, particularly a crescent running through Pakistan and northern India, consistently have among the worst indicators of gender disparity in the world. Second, the variations in gender disparity within India are as large as those across countries. Third, there is no correlation between average income and gender disparity in the sample, either across nations or within India. These findings suggest that while gender disparity is pervasive, its worst manifestations are regionally concentrated and that efforts therefore need to focus first

on understanding and eliminating its adverse consequences in those places.

This research has already influenced the Bank's dialogue with India through its contribution to poverty assessment in the country. It is expected that the database will be made available electronically once it is finalized.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Lant Pritchett (lpritchett@worldbank.org), Elizabeth King, and Deon Filmer; and Asia Technical Department, Human Resources and Social Development Division—Benu Bidani.

Completion date: December 1997.

Report:

Filmer, Deon, Elizabeth King, and Lant Pritchett. "Gender Disparity in South Asia: Comparisons between and within Countries." World Bank, Policy Research Department, Washington, DC.

Child Diet and Academic Achievement in Cebu, Philippines

Ref. no. 681-78

School-based nutrition interventions, such as school lunch programs, are widely viewed as a cost-effective approach to improving academic achievement in developing countries. Yet there is little evidence to support this view. This study will examine the impact of current diet on academic achievement using an unusually rich data set from Cebu, Philippines.

Another World Bank research project has drawn on the Cebu data to examine the cumulative impact of chronic malnutrition on learning (The Impact of Child Health and Nutrition on Education Outcomes in Cebu, Philippines, ref. no. 679-57). Much of this malnutrition occurs before children reach school age. To examine the impact of school-based nutrition programs requires data on changes in the academic performance of children while they are in school. This project has therefore collected new data in Cebu so that the data set includes achievement test scores one to two years apart for the same children. Some of these children participate in school-based nutrition programs; others do not. Some of the programs are based on grade in school, providing a credible instrumental variable to control for the endogeneity of school-based nutrition programs.

The data for this project were collected in the first half of 1997. Analysis will begin in the fall of 1997 and finish in early 1998.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Paul Glewwe (pglewwe@worldbank.org) and Elizabeth King. With Hanan Jacoby, University of Rochester.

Completion date: March 1998.

Child Labor and Schooling in Latin America

Ref. no. 681-79

Child labor is recognized as a serious problem in many developing countries. But little information is available on how many children are working, what types of activities they are involved in, where they work and under what conditions, and how child labor affects educational attainment. And there is scant information on the labor force participation of primary school age children (aged 6–12).

This study looks at child labor in Latin America, where it is important to examine child labor issues for several reasons. First, the problem of child labor is quite severe. Although children's participation rate in the labor market is about 10 percent in the region as a whole, it varies widely across countries. In Brazil it is as high as 16 percent, and in Nicaragua it is 14 percent. Second, the low quality and high inefficiency of education in the region may be related to the prevalence of child labor. Third, age heterogeneity in the classrooms, which is often associated with repetition and dropout, is high. Fourth, the quality of education in the region is poor. Only 50 percent of graduates are capable of written communication at the level required by modern society. So understanding child labor is important not only because of the significance of the issue, but also because of its potential impact on educational attainment and its implications for the design of education policies for the region.

Four countries—Brazil, Ecuador, Nicaragua, and Peru—were selected for this study. Living Standards Measurement Study surveys conducted in these countries in the early 1990s provide comparable information in such areas as employment, education, household consumption, and household characteristics. The information covers nationally representative household samples.

The study will be undertaken in two stages. In the first stage the study will draw on the household surveys to describe the labor market activity of children, including their rate of participation in the labor market, the hours they work, the earnings they receive, and the sectors in which they work. The description will be disaggregated as much as possible by age, gender, poverty level, enrollment status, and area (urban and rural).

In the second stage the study will examine the determinants of children's participation in the labor market and of their school enrollment. Two approaches will be used. The first is the traditional approach that assumes that the decision to work and the decision to attend school are made separately. For this approach the univariate probit model will be the econometric technique used. The second approach assumes that the two decisions are made jointly, and the bivariate probit model will be used. Both

approaches will take into account characteristics of children, their parents, their households, and their community and consider the effects of the direct costs of schooling and the distance to school in labor market and schooling decisions.

The study's results—on the reasons for children's labor market activities, the relationship between labor market activity and school enrollment, and the types of incentives that work in favor of education and against chil-

dren's labor market participation—should be useful in designing education policies and in targeting vulnerable children through Bank-financed projects.

Responsibility: Latin America and the Caribbean Region, Human and Social Development Group—Donald Winkler (dwinkler@worldbank.org); and Human Development Department, Office of the Director—Hailu Mekonnen.

Completion date: December 1997.

ENVIRONMENTALLY SUSTAINABLE DEVELOPMENT

Land Tenure Insecurity in Honduras and Paraguay

Ref. no. 678-74C

This research studied the efficiency implications of land tenure insecurity and other institutional restrictions affecting rural land markets in Honduras and Paraguay. Although earlier Bank studies had analyzed the constraints arising from insecure property rights in Africa and Asia, there had been no studies of similar scope for Latin America.

This study developed an econometric model to rigorously quantify the effects of several factors related to land tenure security that contribute directly to agricultural productivity and to identify the effect of titling on the demand for land. The study considered three factors affecting agricultural productivity: an efficiency effect, an input demand effect, and a credit supply effect. The efficiency effect of land tenure security captures market mechanisms that allocate land among farmers with different management efficiencies. The input demand effect reflects incentives to invest, especially in capital goods that are attached to the land. And the credit supply effect reflects credit constraints that untitled farmers frequently face in formal credit markets.

Data from household surveys in Honduras and Paraguay were analyzed to provide panel data sets over a period in which land titling was implemented. The survey in Honduras used a baseline study of 1,500 farm households that had been surveyed in 1983–85 and again in 1987–88 as part of a land titling project funded by the U.S. Agency for International Development. In 1994, 437 of these households were resurveyed to obtain comprehensive data on farm income, investments, assets, land transactions, and use of credit. The analysis of these data indicates that titling is strongly associated with higher yields and farm incomes (which are in turn closely associated with greater use of credit and inputs) and with increased investment on titled land, especially investments attached to that land, such as coffee plantations. The total benefit of land titling in Honduras is about \$100 per household, which provides a return of 17 percent on the estimated cost of titling.

For Paraguay the data set covered 286 farming households interviewed in a 1991 survey. Of these households, 120 had some titled land in 1991. This number increased to 137 in 1994. The Paraguay data reflected enough

intertemporal variation in the land tenure status of the surveyed households to allow the study to apply the first-differences econometric method of analysis. The results suggest that titling had a positive and significant effect on the demand for attached capital and on access to credit, especially for larger farmers. The estimated effect of titling on household income is \$40.

The results of these analyses show that land titling is a good investment in Latin America. But several issues remain to be addressed. First, much more than land titling is needed to realize the potential benefits. An appropriate legal framework for land tenure, cadastral surveys, a registry of liens on land to allow the use of land as collateral and facilitate efficient land transactions, and implementation and enforcement mechanisms, including a functional judicial system, are all necessary conditions. And the collateral effect will be realized only if there are well-developed financial markets.

Second, mounting large-scale, regionally focused land titling programs that are proactive in supplying titles is likely to be more efficient and equitable than is providing titling on demand. In regionally focused programs cadastral surveys can be mounted more efficiently, and the costs in legal and other fees and payments for individual titling can be reduced, especially for small farmers.

Third, regional land titling programs represent a significant investment and an area in which development banks and donors could help support rural development efforts.

The results of this study have prompted the World Bank to intensify its dialogue on land issues in the region. The main results were disseminated and discussed at a two-day seminar in June 1996.

Responsibility: Agriculture and Natural Resources Department, Agriculture and Forestry Systems Division—Derek Byerlee (dbyerlee@worldbank.org), and Office of the Director—Hans Binswanger; East Asia and Pacific, Country Department III, Agriculture Operations Division—Gershon Feder; and Latin America and the Caribbean Technical Department—Alberto Valdés. With Ramón López, Claudia Sepulveda, and Isidro Soloaga, University of Maryland; Alexander Coles; Michael Carter and Pedro Olinto, University of Wisconsin; Atenec de la Agro-Industria, Honduras; and Centro Paraguayo de Estudios Social, Paraguay.

Completion date: August 1996.

The Determinants of Agricultural Growth: Country and Cross-Country Analysis

Ref. no. 679-03C

Interest in why and how agricultural sectors grow stems primarily from concern about adequate food supplies. But agriculture remains an important sector in many developing economies and the primary source of income for many rural poor. The purpose of this research was to quantify the sources of growth in agriculture by drawing on a large panel of data—including a newly assembled panel of investment data for agriculture and manufacturing.

The study found that in 1967–92, 81 percent of the world's population lived in countries where agricultural growth exceeded population growth. Further, this growth occurred as agricultural prices declined. Productivity gains are a dominant characteristic of agriculture for the period, with average productivity increasing for land and labor. Moreover, agricultural labor productivity gains exceeded average productivity gains for the economy in 80 percent of the countries covered by the study. Consequently, measuring the effects of technology choice on productivity is crucial to understanding the determinants of growth for agriculture. Investments in technology have yielded large gains for agriculture, and the benefits of these gains have been passed on to consumers through lower prices.

Growth in agriculture is partly determined by the migration of labor. Almost all countries have experienced off-farm migration. The study found that average income differences between agriculture and the rest of the economy, education levels, and the age of the labor force are all significant determinants of off-farm migration. It reviewed several theories that suggest that migration between sectors would stop at a point where average incomes were not fully equalized, but found no empirical evidence to support this. Historically, average incomes show a strong trend of equalizing as countries develop, but in many countries the pace of migration only marginally exceeds the rate of natural increase in the agricultural labor force. These findings have several policy implications. First, policies that encourage education will encourage out-migration from agriculture. Second, removing policies that artificially tax (subsidize) agricultural incomes will slow (accelerate) out-migration. Finally, migration out of agriculture is generally consistent with increases in agricultural productivity and development. But the adjustment takes time and is likely to span generations.

The study examined and compared productivity gains in agriculture and manufacturing and concluded that productivity growth has been higher in agriculture for

both industrial and developing countries. Further, for agriculture there is evidence of a convergence in total factor productivity levels. For most countries agriculture has not proved stagnant but has been a source of productivity gains, arguing against policies that discriminate against agriculture as an instrument for economic growth. Policies that foster the generation and dissemination of agricultural technology and knowledge are important to development.

The study also estimated a production function for agriculture using a panel of data covering 20 years and 37 countries. The panel makes it possible to distinguish between explaining differences across countries at any point in time and explaining differences in agricultural production through time. A comparison of the results with those of earlier studies showed that methods that fail to account for country effects and differences in state variables can lead to unstable and spurious results. It also yielded several empirical results:

- Changes in capital accumulation account for a large part of agricultural growth.
- Decomposing the capital stock into fixed capital—structures and equipment—and livestock and orchards reveals that fixed capital explains much of the difference in agricultural growth.
- Unlike cross-country studies, this analysis found no evidence of increasing returns to scale and cannot reject the hypothesis of constant returns to scale.
- Applied technology is an important determinant of agricultural production.
- Relative prices contribute little empirically to explaining agricultural production, but that does not mean that relative prices are unimportant; rather, prices are important in directing the use of productive resources.

From the empirical results come several policy implications. First, policy changes that lead to changes in relative prices will affect agricultural production in a cumulative way that sometimes takes time. Production is explained primarily by land, labor, and accumulated capital stock. Total land use varies little over time, labor decisions are based on a lifetime perspective, and investment (or depreciation) will affect capital stocks slowly. Second, the returns to investment in fixed capital are likely to be high. Thus projects that facilitate the development of fixed capital as well as those that facilitate the application of existing technology are likely to improve agricultural output and productivity.

Responsibility: International Economics Department, Commodity Policy and Analysis Unit—Donald Larson (dlarson@worldbank.org), and International Trade Division—Will Martin. With Yair Mundlak, University of Chicago and Hebrew University; Al Crego, University of Maryland; Julie Coronado, University of Texas; Rita

Butzer, University of Chicago; Nanae Yabuki, Yale University; and Devashish Mitra, Columbia University.

Completion date: December 1996.

Reports:

Larson, Donald, and Yair Mundlak. 1997. "On the Intersectoral Migration of Agricultural Labor." *Economic Development and Cultural Change* 45(2).

Martin, Will, and Devashish Mitra. 1996. "Productivity Growth in Agriculture and Manufacturing." World Bank, International Economics Department, Washington, DC. Draft.

Mundlak, Yair, Donald Larson, and Rita Butzer. 1997. "The Determinants of Agricultural Production: A Cross-Country Analysis." World Bank, International Economics Department, Washington, DC. Draft.

Mundlak, Yair, Donald Larson, and Al Crego. Forthcoming. "Agricultural Development: Issues, Evidence and Consequences." In *International Economics Association Proceedings*.

Energy Demand in Asian Developing Economies

Ref. no. 679-19C

Energy demand in developing countries merits research attention for two main reasons. First, developing countries play an increasingly important role in world energy markets, with their consumption of commercial energy increasing substantially over the past two decades. The increase has been particularly pronounced among the developing countries of East and Southeast Asia and is expected to continue into the next century. Second, the growing concern about the environment and the global nature of environmental problems have focused attention on the pattern and trend of energy demand in developing economies. More than half the world's carbon dioxide emissions originate in the energy sector, and a large and increasing share of the emissions will be from lower-middle-income countries. A detailed analysis of energy demand and the possibilities of interfuel substitution in Asian developing economies is therefore of great importance to a better understanding of global environmental problems and the energy needs of these economies.

This research reviewed recent patterns of energy consumption in Asian developing countries, modeled energy demand using econometric and end-use approaches, projected the energy demand of the major Asian countries to 2010, and analyzed the effects of energy-related policies on energy demand.

The study used an econometric approach to obtain estimates of income and price elasticities of sectoral energy demand disaggregated by fuel type. For most sectors it paid special attention to adjustment dynamics, developing and using dynamic fuel share equations for this

purpose. For countries for which detailed time-series data were not available, the research relied on cross-section estimates based on long averages. The estimated elasticities were incorporated into the model to project demand.

The study produced two sets of forecasts of energy demand in Asia. The first used individual country estimates. The second used pooled mean group estimates that impose common long-run elasticities but allow short-run coefficients, intercepts, and disturbance variances to differ across countries. The forecasts suggest that, on plausible assumptions about growth, average per capita energy consumption in the region will double between 1990 and 2000 and double again between 2000 and 2010.

The policy implications of the study are stark. Detailed examination of the evidence suggests that the average GDP elasticity for the region is over unity, around 1.2, and the average price elasticity is quite small, around -0.3. Given the high growth rates in these countries, these estimates suggest that energy demand will grow rapidly and that restraining that growth to any significant extent would require implausible increases in national energy prices. While the estimates for individual countries are more uncertain, what matters for the global energy market and the global environment is the average for the region as a whole.

Responsibility: International Economics Department, Commodity Policy and Analysis Unit—Takamasa Akiyama (takiyama@worldbank.org) and Shane Streifel. With H. Pesaran, Cambridge University; R. Smith, Birbeck College; and J. Mitchell.

Completion date: December 1996.

Report:

Pesaran, H., R. Smith, and Takamasa Akiyama. Forthcoming. *Energy Demand in Asian Economies*.

Pollution Control by Electric Utilities

Ref. no. 679-94C

When advising governments on pollution control, economists have traditionally argued in favor of using economic incentives—especially effluent taxes and marketable pollution permits—as an alternative to command-and-control regulation. The most significant experiment in the use of economic incentives is the market for sulfur dioxide allowances (pollution permits) in the United States. This research examined the gains from the trading of these allowances among electric power plants. Specifically, it asked how large the potential cost savings from the allowance trading are and how much of these gains were realized during the first year of the allowance market's operation.

To answer these questions requires estimates of the marginal cost of abating sulfur dioxide emissions for all electricity-generating units. To provide econometric estimates of marginal abatement costs and the potential gains from trade, the study assembled a database covering more than 800 coal-fired generating units for 1985–94. For each generating unit the database included annual observations on labor, generating capital, abatement capital, and inputs of high- and low-sulfur coal. It also included information on the emissions standard each generator faced, its output, its mean annual emissions rate, and its input prices.

The study used these data to answer two questions: How large are the potential gains from allowance trading that stem from the difference between abatement costs at current emissions levels and the least-cost solution for achieving these emissions levels? Are these gains being realized? Of particular interest was how the scope of trading affects the potential gains from trade. According to the Clean Air Act Amendments of 1990, reductions in sulfur dioxide emissions are to be achieved in two phases. In the first phase, which began in 1995, the 110 dirtiest power plants (referred to as phase 1 plants) were to reduce their average emissions. Beginning in 2000 all fossil fuel power plants larger than 25 megawatts must reduce their average emissions. (Those plants affected only by the second phase of emissions reductions are usually termed phase 2 plants.)

The study's most important finding is that the gains from trades among phase 1 firms are modest, especially relative to the gains when both phase 1 and phase 2 plants participate in the market. One reason that phase 1 gains are so modest, especially in comparison with earlier predictions, is the fall in low-sulfur coal prices. If plants can attain the phase 1 emissions target by substituting low-for high-sulfur coal, the marginal cost of abating a ton of sulfur dioxide is a function of the price difference between low- and high-sulfur coal. As this difference declines, so does the marginal cost of abatement. As locational price differences disappear, marginal abatement costs tend to be equalized, lowering the potential gains from trade. This phenomenon becomes less important in phase 2, when more units must rely on abatement capital to meet the still tighter emissions target.

Preliminary results suggest that initial allowance prices compare favorably with the estimate of the marginal cost of abatement in the least-cost solution, suggesting that gains from trade are being realized.

Responsibility: Policy Research Department, Environment, Infrastructure, and Agriculture Division—Maureen L. Cropper (mcropper@worldbank.org). With Curtis Carlson, Charles Griffiths, and Nathalie B. Simon, University of Maryland; and Santosh Makhijani, Central Pollution Control Board, India.

Completion date: December 1996.

Report:

Cropper, Maureen, Dallas Burtraw, Curtis Carlson, and Karen Palmer. 1996. "SO₂ Control by Electric Utilities: What Are the Gains from Trade?" Paper presented at the National Bureau of Economic Research Summer Institute, Cambridge, Mass., July.

Measuring the Health Effects of Air Pollution in Developing Countries

Ref. no. 679-96C

In evaluating the health damage from air pollution, policymakers in developing countries often must extrapolate results from studies in industrial countries. These extrapolations may be misleading, for two reasons. First, pollution levels, especially for particulates, are often three to four times higher in developing countries than in industrial ones. Second, people in developing countries die earlier and from different causes than do people in industrial countries.

This study related levels of particulate matter to daily deaths in Delhi, India, between 1991 and 1994 and compared the results with those from U.S. studies. A well-known study of the effects of total suspended particulates (TSP) on daily deaths in Philadelphia found that an increase in TSP of 100 micrograms per cubic meter increased nontrauma deaths by 6.7 percent (Joel Schwartz and Douglas Dockery, "Increased Mortality in Philadelphia Associated with Daily Air Pollution Concentrations," *American Review of Respiratory Disease* 145:600–04, 1992). In Delhi the same change in TSP increases deaths by only 2.3 percent. The reason is that people in Delhi die from causes less susceptible to the effects of air pollution. The main effects of acute exposure to air pollution on daily deaths occur through impacts on cardiovascular and respiratory disease. While 47 percent of deaths in Philadelphia are attributable to cardiovascular disease, only 23 percent of deaths in Delhi are.

Although the effect of an increase in air pollution on nontrauma deaths is smaller in Delhi than in Philadelphia, the same increase causes more life-years to be lost in Delhi. This is because more deaths occur at younger ages in Delhi than in Philadelphia and because the effect of air pollution on deaths is greater at younger ages in Delhi. To illustrate, a 100-microgram reduction in daily TSP levels should reduce nontrauma deaths by 1,383 in Delhi (1991 data) and by 3,438 in Philadelphia (1989 data). But the total number of life-years saved is higher in Delhi (51,344) than in Philadelphia (47,331).

The study leads to two conclusions. First, estimating the number of nontrauma deaths associated with air pollution in a developing country city on the basis of U.S.

studies may yield misleading results. In Delhi calculations based on U.S. studies would overestimate the number of nontrauma deaths associated with air pollution. Second, the effects of air pollution on deaths by age group may be very different in developing countries than in the United States. In the Philadelphia study the peak effects occur among people aged 65 and older. In Delhi peak effects occur in the age group 15–44, implying that a death associated with air pollution causes more life-years to be lost.

Responsibility: Policy Research Department, Environment, Infrastructure, and Agriculture Division—Maureen L. Cropper (mcropper@worldbank.org) and Nathalie B. Simon. With P. K. Sharma, New Delhi Municipal Committee; and Santosh Makhijani, Central Pollution Control Board, India.

Completion date: April 1997.

Reports:

Cropper, Maureen L., Nathalie B. Simon, Anna Alberini, Seema Arora, and P.K. Sharma. Forthcoming. "The Health Benefits of Air Pollution Control in Delhi." *American Journal of Agricultural Economics*.

Cropper, Maureen L., Nathalie B. Simon, Anna Alberini, and P.K. Sharma. 1997. "Measuring the Impact of Air Pollution on Health: The Case of Delhi." Paper presented at the Eastern Economic Association Meetings, Washington, DC, April 4.

The Catalytic Effect of Tree Plantings on the Rehabilitation of Native Forest Biodiversity on Degraded Tropical Land: An Exploratory Analysis

Ref. no. 680-05C

Many indigenous forest species are becoming endangered because of inappropriate and unsustainable land use and fragmentation of natural forest ecosystems. Preliminary research in Puerto Rico and in several tropical countries showed that tree plantings (exotic or native) on degraded tropical land can dramatically increase the otherwise slow rate of recolonization of native forest species. The plantations seem to catalyze natural forest succession.

Validation of such observations in other regions and a better understanding of the underlying ecological processes are needed. The principal goal of this 18-month pilot project was to provide a strong scientific foundation on plantation-catalyzed native forest rehabilitation. The research examined a series of hypotheses relating to the importance of environmental and management factors that influence native forest regeneration. It compared biodiversity development on tree plantations and on unplanted control sites on moderately to highly degraded land in several tropical settings.

The project conducted field surveys of floral and faunal biodiversity at sites selected to include a variety of existing plantations of different ages and species compositions in tropical Asia and the Pacific (Australia, Hawaii, and Sri Lanka), Africa (Congo, Malawi, and South Africa), and Latin America (Brazil and Costa Rica). The data from the surveys were used to test the hypotheses at both local and pantropical levels and to identify the geographical and biophysical conditions, landscape types, and plantation management options that can lead to significant improvements in biodiversity.

In June 1996 an international symposium, Accelerating Native Forest Regeneration on Degraded Tropical Lands, was organized in collaboration with the U.S. Department of Agriculture Forest Service and the International Union of Forestry Research Organizations to evaluate the results of this research. The meeting was attended by 80 research scientists, forest resource managers, and policymakers from 21 countries. Workshops yielded a general consensus on the validity of the hypotheses and recommendations on plantation species and management practices for effective rehabilitation of native forest biodiversity under a range of conditions. Discussions suggested a broad array of uses for this rehabilitation approach, ranging from short-rotation commercial forestry to community-based forest management and restoration of forest ecosystems. While the general principles derived from the research hold for all these applications, the management objectives at any site will have to be dictated by stakeholders' needs and priorities.

Responsibility: Agriculture and Natural Resources Department, Agriculture and Forestry Systems Division—Jim Douglas (jdouglas@worldbank.org). With John A. Parrotta, U.S. Department of Agriculture Forest Service. The USDA Forest Service, the Center for International Forestry Research, and the Overseas Development Administration (United Kingdom) contributed funding for the research. Additional financial support and staff time were provided by research institutions and international organizations collaborating in the field studies.

Completion date: September 1996.

Cost-Effectiveness Analysis of Coral Reef Management and Protection: A Least-Cost Model for the Developing Tropics

Ref. no. 680-08

The primary research question asked by this project is, What is the most cost-effective means for achieving a given level of coral reef health? A supplementary question that recognizes the realities of analyzing this question in the developing tropics is, How can the

limited ecological data available in developing countries be used most efficiently in identifying least-cost solutions?

There are many practical issues in devising cost-effective policy interventions to manage and protect coral reefs under pressure from human and economic activities. There is also a key conceptual barrier: a lack of quantitative models for comprehensive economic and ecological analysis of the effects of economic activity on coral reefs. This lack has made it difficult to rank policy interventions and investments by cost-effectiveness and thus to develop least-cost plans to manage and protect coral reefs.

The central focus of this research is to develop a least-cost model of coral reef management and protection. A key output of this model will be an optimized cost function relating marginal costs of reef conservation to coral reef quality. The cost function can be used to identify a set of least-cost interventions for a given target of coral reef quality.

The project has developed a prototype model that is capable of measuring the cost-effectiveness of single policy interventions, though it is not yet capable of developing an optimized set of interventions. In the prototype model cost-effectiveness is derived in three steps. First, a baseline is established by developing annual forecasts of economic activity and implied pollutant levels for 60 years and, on the basis of the pollutant levels and oceanographic and biotic conditions, annual forecasts of coral reef health. The measure of coral reef health is coral reef abundance, the percentage of the reef covered by live coral. Second, the total cost (as a present value) of a policy intervention is derived, along with annual pollutant levels and coral reef abundance after the policy intervention is in place. Finally, the cost-effectiveness is estimated on an annual basis, taking into account improvements in reef health over the entire period but giving greater weight to early effects. The measure of cost-effectiveness is the unit cost of the impact of the intervention (the cost of a 1 percent increase in coral reef health).

Preliminary estimates of unit costs have been prepared for 10 policy interventions, using data loosely based on Montego Bay, Jamaica. In this case the key factors believed to be responsible for deterioration of the reef are sediment and nutrient loads, and the most cost-effective intervention is a sewage outfall and pump station that takes the sediment beyond the reef edge. Other case studies include the southern coast of Curaçao and the Maldives.

The dissemination strategy centers on in-country workshops and seminars for user groups and stakeholders, government agencies, and nongovernmental organiza-

tions involved in coastal zone management. It also includes activities to foster cooperation among countries on coordinated environmental policies, strategies, and action plans in the coastal zone and to provide a consultation mechanism for formulating, strengthening, harmonizing, and enforcing environmental laws and regulations. Workshops have been held in Montego Bay, Jamaica, in November 1995 and March 1997, and in Curaçao, in November 1995 and April 1996.

This study is complemented by another research project, Marine System Valuation: An Application to Coral Reefs in the Developing Tropics (ref. no. 681-05). That project is deriving improved estimates of the benefits of coral reefs to be used in conjunction with the cost function.

Responsibility: Latin America and the Caribbean, Country Department III, Environment and Urban Development Division—Richard M. Huber (rhuber@worldbank.org) and Carlo Rietveld, and Office of the Director, Norman Hicks; and Environment Department, Land, Water, and Natural Habitats Division—Jan Post. With H. Jack Ruitenbeek, H. J. Ruitenbeek Resource Consulting Limited; Frank Rijsberman, Rolf P. M. Bak, J. Peter M. Kouwenhoven, R. Susie Westmacott, and Danielle Hirsch, Resource Analysis Consulting; and Steven Dollar and Mark Ridgely, University of Hawaii. The Netherlands Environment Consultant Trust Fund, the Norway Consultant Trust Fund, the Swedish Consultant Trust Fund, and the Canadian Consultant Trust Fund are contributing funding for the research. Various organizations in Jamaica and Curaçao are contributing staff time.

Completion date: June 1998.

Reports:

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Rijsberman, Frank, Richard Huber, Susie Westmacott, and Danielle Hirsch. 1995. "Cost-Effectiveness Analysis of Coral Reef Management and Protection: A Case Study of Curaçao." World Bank, Latin America and the Caribbean, Country Department III, Washington, DC.

Westmacott, Susie, Frank Rijsberman, and Richard Huber. 1996. "Cost-Effectiveness Analysis of Coral Reef Management and Protection: A Case Study of the Maldives." World Bank, Latin America and the Caribbean, Country Department III, Washington, DC.

The Economics of Industrial Pollution Control in Developing Countries

Ref. no. 680-20

Industrial pollution has become a serious problem in many developing countries during the past two decades. But support for regulation of industrial pollution has remained lukewarm from many policymakers, despite research suggesting large benefits from pollution reduction even in very poor countries. There is widespread concern about diverting resources to pollution control when poverty, illiteracy, and infant mortality are still major problems. The resistance stems in part from uncertainty about which pollution control instruments will actually work under developing country conditions. Equally important is concern about how costly pollution reduction may be. This research project is designed to address both of these critical issues.

How much does pollution control cost? Until recently, empirical analysis of abatement costs in developing countries had been almost nonexistent. This research project will provide a comprehensive assessment of abatement costs at the plant level, contributing to cost-benefit analyses of pollution control options in China in fiscal 1998.

What works in practice? Many developing countries have adopted regulations to improve environmental quality. The strictness of monitoring and enforcement has varied widely across countries, however, and often even across regions within a country. Some jurisdictions have comprehensive systems of plant-level emissions reporting and inspection; others have limited systems or none. Some jurisdictions have imposed significant penalties on noncompliant firms; others have been reluctant to impose any penalties. Where formal regulation is absent, local communities with sufficient interest and power have sometimes pursued informal regulation, negotiating pollution reduction agreements with neighboring factories.

Whatever the degree of formal or informal pressure to reduce pollution, industrial facilities exhibit widely varying responsiveness. This research examines the effect of different policies on plant-level pollution and the circumstances under which local communities have improved environmental quality despite the absence of formal environmental standards. The results have improved the understanding of how effective different policies and institutional arrangements have been in reducing pollution.

The findings of this research should help new regulatory agencies in developing countries develop pollution control systems that are both cost-effective and appropriate for conditions in those countries. The project focuses on seven countries, in collaboration with the World Bank regional vice presidencies concerned: Brazil,

China, India, Indonesia, Mexico, the Philippines, and South Africa.

Research results have been widely disseminated outside the Bank through traditional print sources, through a Website (<http://www.worldbank.org/NIPR>), and through several seminars at environmental agencies in Mexico and the United States and at universities in Singapore and the United States.

Responsibility: Policy Research Department, Environment, Infrastructure, and Agriculture Division—David Wheeler (dwheeler1@worldbank.org), Sheoli Pargal, Mead Over, Hemamala Hettige, Susmita Dasgupta, Benoît Laplante, Mainul Huq, Shakeb Afsah, David Witzel, David Gray, Muthukumara Mani, Raymond Hartman, and David Shaman.

Completion date: June 1999.

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Total Factor Productivity Growth in the Post-Green Revolution Agriculture of Pakistan and Northwest India

Ref. no. 680-34C

This research aimed to develop and apply appropriate methods to measure recent trends in total factor productivity in irrigated agriculture in northwest India and Pakistan. In recent years there has been much concern about productivity growth and sustainability in these irrigated agricultural systems. These systems are critical to the food security and livelihoods of some 500 million people. Accumulating micro-level evidence suggests that intensification of cropping is resulting in degradation of the land and water resource base and negating the effects of technologically induced productivity growth.

But there is much controversy about the aggregate performance of the agricultural sector. Although growth in crop yields—especially for the two main crops, wheat and rice—has slowed sharply in the past decade, the evidence on overall performance as measured by growth in total factor productivity is inconclusive. In Pakistan especially, recent estimates of total factor productivity show conflicting trends in the post-green revolution period, ranging from significantly positive to negative growth over the past two decades. Given the general weaknesses in the methods and data used to measure total factor productivity, there is an urgent need to measure it and to interpret trends in terms of indicators of technological progress, changes in cropping patterns, and land degradation.

The project assembled comprehensive and up-to-date district-level data sets for Pakistan and India. It then estimated total factor productivity using the Tornquist-Theil index, with careful attention to system definition, the range of inputs and outputs and their valuation, and indexing methods. To aid comparisons for relatively homogeneous ecological regions and help determine whether productivity slowdown or environmental degradation (or both) is associated with particular cropping systems and ecologies, estimation of total factor productivity was disaggregated to the level of districts, grouped on the basis of production system and technology level.

The results confirm that there has been a slowdown in productivity growth in these irrigated systems, with the largest slowdown in rice-wheat systems. In Pakistan total factor productivity growth was negative in the rice-wheat systems of both the Punjab and the Sindh. The research provides hypotheses on reasons for differences in total factor productivity trends according to cropping system, country, and time period. Resource degradation appears to be an important factor, especially in Pakistan.

The research findings underline the importance of increasing support to technology generation and dissemination in the region, with an emphasis on promoting the long-term sustainability of major irrigated production systems. They strongly support World Bank-supported efforts to understand and arrest resource degradation in the rice-wheat systems of the region, as well as Bank lending strategies to strengthen research on natural resource management in specific production systems.

The results of the research will be discussed widely in seminars at the Bank and in the participating countries, where senior policymakers have expressed keen interest in the study.

Responsibility: Agriculture and Natural Resources Department, Agriculture and Forestry Systems Division—Derek Byerlee (dbyerlee@worldbank.org); and South Asia, Country Department II, Agriculture and Water Operations Division—Benoît Blarel, and Country Department I, Agriculture and Natural Resources Division—Rashid Faruquee. With Mubarik Ali, AVRDC, Taiwan (China); Rinku Murgai, University of California at Berkeley; and Greg Traxler, University of Alabama.

Completion date: December 1996.

Reports:

Ali, Mubarik. "Technological Change and Resource Productivity in Pakistan's Agriculture."

Murgai, Rinku. "Diversity in Economic Growth and Technical Change: A District-wise Disaggregation of the Punjab and Haryana Growth Experiences."

Improving the Quality of Teak Germination: A Study of Seed Dormancy and Germination

Ref. no. 680-56C

Although teak has been cultivated on plantations for more than a century, the methods for raising its planting stock have changed little in that time. Foresters have paid scant attention to what is required for optimal growth, in part because teak, ideally suited to plantation cultivation, will grow regardless of the quality of planting stock. But that does not mean that all seedlings planted will produce well: only about a quarter will attain 100 percent of their growth potential. With teak one of the world's most valuable timbers, the poor planting stock leads to an enormous loss of resources.

The main problem is poor germination in nurseries. Only 3 percent of seeds result in a plantable seedling, and because of irregular dormancy cycles, germination is spread over a long period, making comparison of seedlings for culling difficult. To produce uniform, high-quality planting stock, germination needs to be rapid, complete, and synchronized. To help make this possible, this study investigated cycles of dormancy and studied the response of nondormant seeds to saturation and temperature variation to induce germination. Greater understanding of the nature of dormancy may eventually help in identifying artificial ways to break it.

The study collected seed from a range of important sources, confirmed the germination protocol for non-dormant seed, and tested seeds during a year's storage to detect any possible annual cycle in seed dormancy. Nine samples of seed from seven sources were included in the initial investigations: five from India, one from Malaysia, and three from Central America. Results were encouraging, with three of the samples showing 30–50 percent germination after only 10 days. During February–May 1996 no obvious change in the dormancy of any sample in storage was detected.

An important and unexpected issue was raised during a visit and discussions with DANIDA scientists in March 1996 concerning the character of fruits and seeds of dry-zone teak from India. Compared with moist-zone teak, fruits of the dry-zone teak have a more restricted water uptake when moistened and seeds do not readily germinate when removed from the fruit. Investigations were undertaken to determine the nature and scale of these differences.

Responsibility: Agriculture and Natural Resources Department, Agriculture and Forestry Systems Division—Jim Douglas (jdouglas@worldbank.org). With J. A. Mackenzie.

Completion date: September 1996.

Measuring the Impact of Climate Change on Indian Agriculture

Ref. no. 680-63C

In recent years there has been growing concern that changes in climate will lead to significant damage to both market and nonmarket sectors. This project examined how climate change will affect agriculture in developing countries by exploring the case of India. That country is well suited for this research for three reasons. First, India encompasses a large land mass with a range of climates. By examining how farmers have adapted to the climates, the research could begin to understand how they might adapt to climate change. Second, India has detailed agricultural, climatological, and hydrological statistics. Third, the country has a mix of modern and subsistence farms, so the study could examine how both systems adapt to climate change.

The study relied on two independent methods—an empirical production function approach and a Ricardian model—to measure climate effects. The empirical production function approach estimated the effects of soil, water, climate, and other major factors of production on yields farmers receive for specific crops. A second model could then be estimated to determine crop mixes for each climate and location. Combining these two estimates yielded estimates of farm net revenue as a function of climate, from which welfare estimates could be made for different climate outcomes. The Ricardian model, a reduced form estimation of this process, estimated the relationship between net revenue and climate directly from the data. Both models thus yielded a relationship between net revenue and climate variables that could be used to forecast the impact of any specific climate change.

The research found that, overall, climate change will have a negative effect on Indian agriculture, though varying by season and region. But farmers' adaptation to climate change—through changes in farming practices, cropping patterns, and use of new technologies—will help to ease the impact. These findings suggest a need to consider crop price support and subsidies to major agricultural inputs; programs to promote technology development, including breeding of heat-tolerant plant species; and ways to address locational and resource scarcity issues.

The study also found that subsistence farmers adapt less to climate change than do commercial farmers. This may necessitate appropriate mitigation strategies, including financial and technical support.

The study's findings were disseminated at a workshop, the Impact of Climate Change on Indian and Brazilian Agriculture, held in May 1997 at the World Bank for staff of the Bank and U.S. government agencies.

Responsibility: Agriculture and Natural Resources Department, Sector Policy and Water Resources Division—Ariel Dinar (adinar@worldbank.org). With Jyoti Parikh and Kavi Kumar, Indira Gandhi Institute of Development Research; Robert Evenson and Robert Mendelsohn, Yale University; Stephen Lonergan, University of Victoria, Canada; and Apurva Sanghi, University of Chicago.

Completion date: May 1997.

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Waste Imports for Recycling

Ref. no. 680-71C

Resource recovery and recycling have gained momentum in many countries as a result of environmental concerns worldwide. An emerging but important aspect of this economic activity is the import of secondary raw materials (paper, pulp, plastics) from OECD countries by recycling industries in developing countries. This trade has important economic and environmental implications, both positive and negative. It raises two broad questions. First, what are the economic incentives driving these international flows of waste? And second, what are the economic, environmental, and social externalities associated with waste trade from the perspective of a developing country?

Before addressing these questions, however, it is important to understand the dimensions of waste trade, the kind of resources being shipped for recycling in developing countries, the principal sources and destinations, the transport costs, and the markets for the recycled products. This project was designed as a scoping study to generate this baseline information and provide the framework for a larger, in-depth study. The project assessed the magnitude and composition of the trade in waste material, the direction of flows, and the related international and national regulations, policies, technologies, and practices.

It was based mainly on a desk study in Washington, DC. In addition, case studies of India and Indonesia were carried out by local consultants based on existing information.

The study found that Asian countries import significant amounts of secondary raw material from OECD countries. China and Indonesia are among the biggest importers of waste paper, followed by India and Thailand. India is the largest importer of both ferrous and nonferrous metal scrap. Imports of waste plastic have met with much controversy, and Indonesia banned all such imports in 1993.

The Bank has been promoting recycling as part of its urban projects in borrower countries. But knowledge about the magnitude of trade in secondary raw materials and the effect of this trade on domestic recycling activities is limited. The findings from this scoping study enhance the Bank's understanding of the issues involved and provide a basis for an in-depth study and for initiating discussions with policymakers in borrower countries. The study has implications for policies and decisionmaking in solid waste management in developing countries and for the large informal sector involved in waste recycling. Highlights from the study will be incorporated into sector work on solid waste management in Indonesia.

Responsibility: Asia Technical Department, Environment and Natural Resources Division—Maritta Koch-Weser (mkochweser@worldbank.org) and Uma Subramanian. With Steffen Beerbaum, University of Stuttgart-Hohenheim; Isono Sadoko; V. K. Sharma, Indira Gandhi Institute of Development Research; and Alok Srivatsav, University of Maryland.

Completion date: August 1996.

Incentives for Pollution Control in Developing Countries: The Role of Capital Markets

Ref. no. 680-76C

It is often argued that firms in developing countries lack incentives to invest in pollution control efforts because of weak monitoring and enforcement of environmental regulations. But this assumes that the regulator is the only agent that can penalize a firm for poor environmental performance or reward it for good performance. Another possible source of incentive is capital markets, which may react negatively to the announcement of an adverse environmental incident involving a firm (such as a spill or a permit violation) or positively to the announcement of greater pollution control effort (such as the adoption of cleaner technologies). To the extent that capital markets

react to environmental news, the inability of regulatory institutions in developing countries to provide incentives for pollution control efforts may not be as serious a matter as is generally believed.

This research set out to determine whether capital markets in developing countries do react to the announcement of firm-specific environmental news. It used event-study analysis to review the experience of publicly traded companies in Argentina, Chile, Mexico, and the Philippines in 1990–94. The study drew on two data sources: daily stock market data from each study country and environmental news involving publicly traded companies collected from the principal newspapers read by the financial community in each study country.

The evidence from these countries reveals that capital markets do react to environmental news and that certain sectors are affected more than others. Preliminary findings also indicate that market reactions, whether positive or negative, follow a sectoral pattern.

Responsibility: Policy Research Department, Environment, Infrastructure, and Agriculture Division—Susmita Dasgupta (sdasgupta@worldbank.org) and Benoît Laplante. With Nlandu Mamingi, University of West Indies, Barbados; Maria Teresa Correa; and Deric Miodrag.

Completion date: June 1997.

Reports:

Dasgupta, Susmita, Benoît Laplante, and Nlandu Mamingi. 1997. "The Role of Capital Markets for Pollution Control in Developing Countries: Evidence from Argentina, Chile, Mexico, and the Philippines." World Bank, Policy Research Department, Washington, DC.

Lanoie, Paul, Benoît Laplante, and Maité Roy. 1997. "Can Capital Markets Create Incentives for Pollution Control?" Policy Research Working Paper 1753. World Bank, Policy Research Department, Washington, DC.

Marine System Valuation: An Application to Coral Reefs in the Developing Tropics

Ref. no. 681-05

This project is developing improved methods for deriving estimates of coral reef benefits. Such estimates can be used in conjunction with the cost function being developed in a related study (Cost-Effectiveness Analysis of Coral Reef Management and Protection, ref. no. 680-08) to help in identifying an optimal set of interventions for improving coral reef health.

The project adapts and refines existing valuation methods so that they take account of the key characteristics of coral reefs and derive more accurate estimates of coral reef benefits for selected sites. To keep the analysis tractable, the study focuses on three methods for valu-

ing the benefits: direct use valuation, contingent valuation, and marine system biodiversity valuation. The study will apply and refine each of these valuation methods and then develop a synthesized benefits function. It will also identify appropriate policy and institutional reforms for improving the capture of resource values associated with coral reefs in developing countries and outline a potential role for the World Bank and other development assistance agencies in helping to effect these reforms.

The study applies direct use valuation to provide a baseline analysis of the direct use benefits accruing to the coral reefs at Curaçao and Montego Bay, Jamaica. Well-established techniques are available for estimating easily quantifiable values associated with direct consumptive and nonconsumptive uses of reefs (such as tourism, demersal fisheries, and mariculture). The study will use contingent valuation to monetize amenity and other noninstrumental uses of the coral reef site in Montego Bay.

The project's work on marine system biodiversity valuation will be more involved. It will require identifying appropriate physical or biophysical indicators in marine systems to which economic values might be attached, and appropriate, quantifiable indicators of biodiversity. It also will require identifying appropriate methods for marine system valuation—based on methods used for terrestrial systems—and for imputing values to natural products. Once the study has identified potential methods for marine biodiversity valuation, it will evaluate them for policy relevance, methodological soundness, operational tractability, and data availability. Up to three of the methods will then be subjected to a preliminary field test.

The dissemination strategy will focus on in-country workshops and seminars targeting those involved in coastal zone management. The workshops will provide training in conducting the contingent valuation survey and in analyzing and collecting data.

Responsibility: Latin America and the Caribbean, Country Department III, Environment and Urban Development Division—Richard M. Huber (rhuber@worldbank.org) and Carlo Rietveld, and Office of the Director—Norman Hicks; Policy Research Department, Environment, Infrastructure, and Agriculture Division—Kenneth Chomitz; Global Environment Facility—Raffaello Cervigni; and Environment Department, Land, Water, and Natural Habitats Division—Jan Post. With H. Jack Ruitenbeek, H. J. Ruitenbeek Resource Consulting Limited; Daniel M. Putterman, Biodiversity Technology Transfer Center; Clive Spash, Cambridge University; Nick Hanley, British University of Stirling, Scotland; Frank R. Rijsberman, J. Peter M. Kouwenhoven, R. Susie

Westmacott, and Danielle Hirsch, Resource Analysis Consulting. The Netherlands Consultant Trust Fund is contributing funding for the research. Various organizations in Jamaica and Curaçao are contributing staff time.

Completion date: December 1999.

Report:

Huber, Richard M., H. Jack Ruitenbeek, and Daniel M. Putterman. 1997. "Marine Resource Valuation: An Application to Coral Reefs in the Developing Tropics." World Bank, Latin America and the Caribbean, Country Department III, Washington, DC.

An Evaluation of Cane Payment Systems in Selected Sugar Industries

Ref. no. 681-30C

Sugar cane is milled soon after cutting in order to produce raw sugar. The amount of raw sugar produced depends on the quality and quantity of sugar cane delivered by the farmers and on the recovery of sugar from the cane in the milling process. The cane growers and the mills share in the revenue from the sale of raw sugar according to a variety of payment arrangements. The cane payment system is the linchpin of the sugar industry. Since it determines the financial incentives for producers and millers, it influences the sugar content of the cane delivered to the mills, which depends on many factors that farmers can control, and the quantity of raw sugar that can be recovered from the sugar cane, which depends on the operation, maintenance, and technical capabilities of the mill.

This research surveyed the cane payment system in 12 industrial and developing countries. The survey identified factors associated with the sugar cane industry in each country, such as the number and size of growers, the historical performance of the sugar cane industry, and the agroclimatic conditions. It described the cane payment systems and made a subjective evaluation of the incentives they provide for the growers and millers. The research also included an extensive literature survey on cane payment systems and the performance of sugar cane industries over the past 30 years.

This research, the most comprehensive survey of cane payment systems ever done, provides an easy comparison of the systems in use around the world. The results are useful for Bank staff and for industry officials in countries involved in the sugar cane industry. The research has proved to be of strong interest to Bank and International Finance Corporation staff working on countries with large sugar industries.

Responsibility: International Economics Department, Commodity Policy and Analysis Unit—Donald Mitchell (dmitchell@worldbank.org) and Donald Larson. With

James Fry, Gill Lavers, Martin Todd, and Andy Duff, LMC International.

Completion date: January 1997.

Spatial Environmental Processes

Ref. no. 681-35

This project is undertaking two studies of land use in the north of Thailand using spatially disaggregated data. The first study focuses on areas—watersheds near the cities of Chiang Mai and Chiang Rai—that are typical of montane watersheds in mainland Asia. The results are therefore likely to be relevant to agricultural practices and areawide developments in similar environments in the Lao People's Democratic Republic, Myanmar, and Vietnam. The study will quantify the effect of changes in population, roads, and agricultural prices on five broad types of land use: primary forest (virgin forest), secondary forest (regrowth), tree crops (plantations), paddy rice (subsistence agriculture), and upland crops (cash crops). The second study will examine the effect of levels of the same variables on spatial variation in land use across all the northern provinces of Thailand in 1986.

The analysis should help answer such questions as these: If the prices of rice and other agricultural commodities change, what would be the quantitative effect on land use in these watersheds? At what prices would land be converted to agricultural uses? At what prices would farmers shift from subsistence crops to field or tree crops? What would be the environmental consequences of these changes in terms of soil erosion and siltation of rivers? What would be the quantitative effects on land use of population increases in the region? Does the cost of land conversion increase steeply with declining soil quality and inaccessible topography? If rural development is predicated on improving or extending physical access (roads), how would rural development programs change cropping patterns quantitatively? What would be the environmental implications of these changes?

The research was presented at the Association of Environmental and Resource Economists invited session *Deforestation: Underlying Causes and Policy Implications*, in San Francisco in January 1996.

Responsibility: Policy Research Department, Environment, Infrastructure, and Agriculture Division—Maureen L. Cropper (mcropper@worldbank.org), Charles Griffiths, and Muthukumara Mani.

Completion date: December 1997.

Report:

Cropper, Maureen L., Charles Griffiths, and Muthukumara Mani. 1997. "Roads, Population Pressures, and Deforestation in

Thailand, 1976–89.” Policy Research Working Paper 1726. World Bank, Policy Research Department, Washington, DC. (Also forthcoming in *Land Economics*.)

Public Involvement in Industrial Pollution Control in Argentina and Brazil

Ref. no. 681-46

A growing body of empirical and historical research shows that conventional command-and-control and market instruments are insufficient by themselves to prevent and control pollution in rapidly industrializing countries. When formal government standards are lacking or monitoring and enforcement are weak, citizen or community groups often serve as informal regulators of industrial pollution.

This research project is an attempt to understand the social causes, dynamics, and consequences of informal regulation in Argentina and Brazil. It poses several questions: How do local communities and citizen groups perceive industrial pollution risks and control problems? Do perceptions vary by type of industry and by the socioeconomic, occupational, and educational characteristics of individuals and communities? How effective is citizen and community activism in industrial pollution control? What part do intermediary institutions (nongovernmental organizations, labor unions, professional associations, public defenders’ offices) play in voicing and supporting citizen concerns about pollution? How effective are government agencies—federal, state, and local—in responding to citizen and community concerns? What part does dissemination of information play in generating and sustaining citizen involvement in industrial pollution control activities? Would formalized agreements or partnerships among citizen and community groups, government agencies, and private industry improve the effectiveness of pollution control?

The study’s analytical approach draws on several concepts in the contemporary social science literature. These include the idea of informal regulation as developed in the economic literature on industrial pollution performance; the social and cultural construction of risk as studied by anthropologists and sociologists; and the growing political science literature on civil society. Based on these concepts, the study has developed a set of hypotheses to explain the social causes, dynamics, and consequences of citizen and community response to industrial pollution issues in different local and national contexts. It tests these hypotheses using an array of sociological techniques—community case studies, questionnaire surveys, citizen complaint analysis, and cross-state and cross-national comparisons.

Findings show that the nature and efficacy of citizen and community efforts in regulating industrial pollution depend on:

- The nature of the polluting industries (for example, whether old or new, multinational or nationally owned, state or recently privatized).
- The history, socioeconomic characteristics, and occupational structure of the communities in which the industries are located (rural or urban, single employer or diverse employment, fishermen and farmers or industrial workers).
- The role of intermediaries in voicing the complaints of citizens and communities and supporting their efforts.
- The nature and strength of government environmental agencies and their interaction with local municipal authorities and citizen and community groups.
- The existence of effective consultative or deliberative forums where local citizens can voice their concerns and seek redress outside the formal court system.

The research shows that the design and efficiency of participatory or multistakeholder approaches to industrial pollution control can be greatly improved with better understanding of the dynamics of informal regulation in the local area. Targeted assistance—capacity strengthening, technical support, and dissemination of information to local community groups, municipal authorities, intermediary organizations, and state agencies—may be less costly and more sustainable than conventional top-down or technocratic approaches to pollution control.

The research is being conducted in close collaboration with Argentine and Brazilian social science research institutions and is expected to contribute to the national dialogue on how to strengthen public involvement in environmental decisionmaking and management in the two countries.

The first of several workshops on the findings will be held in Rio de Janeiro in October 1997. The workshop will bring together all researchers working on the project in Argentina and Brazil, Brazilian state environmental authorities, and Bank staff involved in the research or in the preparation of industrial pollution control projects in the two countries. It will be followed by other workshops with state and municipal environmental authorities, community groups, nongovernmental organizations, scientists, and parliamentarians involved in industrial pollution control issues. Presentations on the study’s analytical framework, methodology, and results will be periodically made to Bank research and operational staff.

Responsibility: Environment Department, Social Policy and Resettlement Division—Shelton H. Davis (sdavis@worldbank.org), and Pollution and Environmental Economics Division—Sergio Margulis and David

Hanrahan. With Jose Sergio Leite Lopes, Federal University of Rio de Janeiro; Rosane M. Prado, State University of Rio de Janeiro; and Glaucia Oliveira da Silva, Federal University of Fluminense. The Federal University of Rio de Janeiro is contributing funding for the research.

Completion date: October 1998.

Gender, Property Rights, and Resource Management in Ghana

Ref. no. 681-47

This research focuses on individual property rights and individual decisions regarding use of land resources in Ghana. The study will test the hypothesis that cultivation decisions are influenced by individual (as well as household) access to credit and provide an estimate of the extent to which women's farm productivity can be influenced by credit market interventions. In addition, it will document the extent of participation in contract farming by both men and women, explore the links between contract farming and financial transactions, and examine the implications for farming practices of involvement in contract schemes.

Data collection is being carried out near Nsawam, in the Eastern Region of Ghana, where the farming system has changed from an established system of maize and cassava intercropping to intensive vegetable production. The primary challenge in this transition is to find techniques that will maintain soil fertility under the new cropping system.

Three central economic issues arise. First, the development of innovative methods of maintaining soil fertility is characterized by social learning (farmers know about one another's experiments) and thus by externalities. Second, there is a close relationship between property rights (vested, critically, in the individuals in the household) and incentives to apply techniques to maintain soil fertility. Finally, decisionmaking with respect to soil fertility maintenance depends critically on characteristics of the markets, particularly the capital markets, available to farmers.

The study's methodology is based on a simultaneous and interactive process of detailed observation, theory construction, and statistical testing. On the basis of preliminary fieldwork, models have been developed on the three core economic issues. The goal is to model individual incentives in the context of a given set of institutions rather than to model the evolution of the institutions themselves. The preliminary modeling has informed the development of the initial set of survey instruments. Preliminary results from the initial rounds of the survey,

along with less structured interviews, are expected to lead to changes in the preliminary models and to modifications in the initial survey instruments.

Responsibility: Poverty and Social Policy Department—Shahidur R. Khandker (skhandker@worldbank.org) and Andrew D. Mason. With Christopher Udry, Northwestern University.

Completion date: September 1998.

Water Management in Irrigation

Ref. no. 681-50

The fundamental question this research addresses is whether modernization of irrigation projects—such as through improvements in canal operating rules or in the design of water control structures—can effectively improve their performance. If the answer is yes, the second task is to determine what types of modernization are most beneficial. A third task is to identify the surrounding circumstances (economic, legal, labor) that might help determine the success or failure of modernization efforts. Another important task in this research is to identify internal and external performance indicators that can be used to classify irrigation projects.

The study is looking at irrigation projects in nine developing countries in different regions. Each irrigation project is visited for about a week, during which a rapid diagnostic survey is completed. Information is collected using a detailed form that requires data from project reports and from interviews with project managers and engineers, canal operators at all levels of the distribution system, and farmers. An important aspect of the study is the quality of perceptions and observations by the research staff. To provide consistency in observations, all projects are visited by the same two experienced individuals. The data collected are used to compute numerical performance indicators. For each project there is also a narrative description of observations and comments. Once data have been collected for all the projects, the results will be compiled and analyzed to search for common factors that influence performance.

Four projects have been visited, but the analysis has been completed for only one, Khon Kaen in Thailand. In that project, the analysis has found, external economic factors are affecting agricultural production. The performance of the irrigation distribution system could be markedly improved if the operating rules were modified and simple water control structures were installed. A major constraint to efficient operation appears to be a misunderstanding of canal operation by upper-level staff and trainers.

This study is the first attempt to systematically analyze a large group of irrigation projects using a common set of performance indicators. It will provide valuable information on whether modernization can be effective and under what circumstances (including training, economics, and employment conditions).

Responsibility: Agriculture and Natural Resources Department, Sector Policy and Water Resources Division—Hervé Plusquellec (hplusquellec@worldbank.org) and Randall Purcell. With Charles Burt, Stuart Styles, and Linda Fidell, California Institute of Technology; M. G. Bos; and Chris Perry, International Irrigation Management Institute (IIMI). The IIMI, Sri Lanka; the Food and Agriculture Organization; and the International Program on Technology Research in Irrigation and Drainage, United States, have contributed funding to the research.

Completion date: June 1998.

Causes and Consequences of Tropical Deforestation

Ref. no. 681-56

Although tropical deforestation is a major global environmental concern, its causes remain poorly understood. In connection with a larger project looking at links among growth, poverty, and the environment (Social and Environmental Consequences of Growth-Oriented Policies), this study examines the causes, correlates, and consequences of forest conversion in the tropics. A particular focus is the economic and environmental effects of road building, since roads are thought to help the rural poor but also to lead to deforestation. The research also seeks to elucidate the nature of smallholder activities at the forest margin and the degree to which these activities are affected by macroeconomic and sectoral policies.

The research strategy emphasizes spatial analysis of deforestation patterns for two reasons. Important for analytical purposes is that spatial variation in the causes of deforestation makes it possible to determine the relative importance of these causes. And important for policy is that the impact of change in land cover on both biodiversity and poverty depends strongly on where the change takes place. Accordingly, the research has pioneered in the statistical analysis of geographic information systems (GIS) data. These data include remote sensing data on land cover and topography, data from soil surveys, and geo-referenced socioeconomic data from censuses and household surveys. Study areas include Belize, Brazil, Chad, Indonesia, Mexico, and the tropical belt of Africa.

Research results for Belize, Brazil, Mexico, and Central Africa emphasize the important effects of road networks but show that these effects are highly sensitive to soil characteristics and market proximity. This suggests that well-informed regional planning can enhance rural development while preserving the environment. Analysis of village-level data for Indonesia suggests that high-value tree crop cultivation, not subsistence-oriented food production, plays a major part in smallholder conversion of forest in that country.

Responsibility: Policy Research Department, Environment, Infrastructure, and Agriculture Division—Kenneth M. Chomitz (kchomitz@worldbank.org), Klaus Deininger, David A. Gray, Charles Griffiths, Nlandu Mamingi, and Bart Minten. With Vivi Alatas, Princeton University; Upik Rosalina Wasrin, SEAMEO/Biotrop; and Xiaowen Huang. The International Center for Research in Agroforestry, Bogor, Indonesia, is participating in the research. The Swedish and U.K. Trust Funds for the Social and Environmental Consequences of Growth-Oriented Policies are contributing funding for the research.

Completion date: March 1998.

Reports:

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Land Tenure, Land Markets, and Land Productivity in Rural China

Ref. no. 681-76

This project will construct a panel data set on households and villages in China to study three questions of key policy relevance not only for China but also for a wide range of other developing countries. First, how large is the output-reducing effect of administrative restrictions on land ownership and transferability? How much of this effect is due to disincentives to invest and how much to inefficient allocation of labor? By implication, what would be the expected effect of improved transferability of land rights within the existing tenure arrangements (that is, long-term leases) compared with measures specifically aimed at increasing tenure security?

Second, to what degree can the informal land rental arrangements used in the study villages be relied on to bring about efficiency-enhancing reallocation of land? Is the amount of land rental constrained by restrictions on land transferability that are inherent in the current tenure systems or by village-level factors unrelated to land tenure, such as limited off-farm employment and failure by local enterprises to sufficiently differentiate wages by skill level?

Third, to what degree can outside intervention contribute to (or prevent) a smooth evolution of land tenure arrangements toward enhanced productivity? Can insights on how fast and how efficiently land tenure has adjusted in the past to changing economic conditions be used to design productivity-enhancing interventions?

The panel data set will contain information on 600–800 farm households and 80 villages and will be made publicly available. The household data include a detailed assessment of agricultural production, household characteristics, assets, and land-related agricultural investments. The village data include a detailed characterization of land tenure arrangements (number of intravillage redistributions, freedom of use and transfer rights), financing of local public goods (education, health) and communally owned assets, taxes in kind and cash, and the economic structure of the village.

The study will explore the scope for conducting a third survey. A survey covering the same households and villages in 1998 would make it possible to trace the effects of changes in land arrangements for the same households over a period of 10 years and thus to establish a unique data set.

The study's results are expected to feed into the Bank's current policy dialogue with China. The possible gains in production and efficiency associated with specific changes in land tenure arrangements will be discussed

with policymakers and researchers at a conference in October 1997.

Responsibility: Agriculture and Natural Resources Department, Sector Policy and Water Resources Division—Shem Migot-Adholla (smigotadholla@worldbank.org) and Anning Wei, East Asia and Pacific, Country Department II, Rural and Social Development Division—Jürgen Vögele; and Policy Research Department, Office of the Director—Klaus Deininger. With Michael Carter, University of Wisconsin-Madison; Charles Krusekopf; Shouying Liu, Development Research Council, China; Yang Yao, Beijing University; and Min Zhu, People's Bank, China.

Completion date: April 1998.

Ash Management, Disposal, and Utilization in India

India relies heavily on thermal generation of electricity (for 65 percent of the total supply) and is likely to continue to do so. Most Indian coal is of poor quality, with ash content of more than 40 percent and low calorific values. It is estimated that thermal power plants in India produce about 45 million tons of ash a year. With decreasing coal quality and increasing power generation, coal ash production is projected to reach 90–100 million tons a year by the turn of the century. Only 2 percent of the ash produced is used; the rest is disposed as waste material.

This research had two objectives: to develop guidance on engineering practices and environmental impact mitigation strategies for use in supervising the planning and management of ash disposal systems in coal-fired power projects funded by the World Bank, and to report on the current status and economics of ash utilization in India through a detailed review of available literature.

To gather information, site visits were made to nine thermal power plants across India, including ash pond reclaimed sites of the National Thermal Power Corporation and state-owned plants. The information was used to determine the potential environmental impacts of current ash management, disposal, and utilization practices and the mitigation strategies that would be effective with improved engineering and management practices. Alternative ash disposal technologies consistent with state-of-the-art international practice and with Indian conditions were analyzed. The current status of ash utilization in India was determined through a detailed review of reports from the government and other sources.

The plant visits found that most stations had little or no planned strategy for ash management, such as site closure or reclamation practices. Environmental standards were not observed because of lack of resources.

The plants emphasized coal ash utilization, though unsuccessfully.

The study provides guidance useful to future coal-fired power projects on the best engineering practices for cost-effective mitigation of undesirable environmental impacts. The guidance it provides on the status and economics of ash utilization will be useful in the planning and management of ash disposal systems.

Responsibility: Asia Technical Department, Environment and Natural Resources Division—Yaacov Ziv (yziv@worldbank.org) and Suhashini DeFazio. With Derek Smith, David Harding, and B. R. Ravishankar, Water and Earth Science Associates.

Completion date: December 1996.

Reports:

Water and Earth Science Associates and World Bank. 1996. "Coal Ash Management in Thermal Power Plants." World Bank, Asia Technical Department, Washington, DC.

_____. 1996. "Review of Coal Ash Utilization." World Bank, Asia Technical Department, Washington, DC.

Environmental Accounting

This project was an experiment to investigate how, using a conventional national accounts framework, the depletion of natural resources and degradation of the environment by pollution could be incorporated in a system designed to measure economic performance. An important objective was to develop a framework for deciding on long-term strategic development goals with an underlying concern to ensure sustainable economic progress. The project examined the theoretical issues relating to the valuation of nonpriced environmental goods and services in an essentially market-based system predicated on an assumption that the price structure is determined by a consideration of marginal costs and revenues in their broadest sense, sufficient to clear the market. A major problem with this approach, however, is the need to take into account a time horizon perspective and reconcile the potential imbalances arising from short-term issues of demand and supply and long-term concerns of resource scarcity.

The study reviewed what constitutes environmental services and identified environmental indicators that signal important changes in environmental conditions and thus help inform policy aimed at minimizing the impact of environmental degradation and depletion arising from a certain pattern of economic growth. But in trying to unravel the uncertainties about future resource availability, particularly within a current price accounting system, the research encountered difficulty in mapping established statistical practices and related empirical data

needs into the existing theoretical constructs and recognized methodologies. Although the System of National Accounts provides an accepted theoretical model and an established methodology that permits consistent imputations, partial imputations and shadow values are difficult to define and measure reliably in this framework. Use of this framework would require arbitrary adjustments to existing market prices and observed values.

In the end, determining an environmentally adjusted national income measure—an estimate of the output (at the sectoral level) that a national economy can achieve while maintaining environmental quality and stewarding resources—becomes less important than seeing how development projects and monetary and fiscal strategies affect different parts of the economy. A "green GNP" is a "counterfactual" statistical certificate representing the sum of what could be feasible if an attempt were made to observe environmental principles and maintain existing conditions.

Responsibility: International Economics Department, Development Data Group—Michael Ward (mward@worldbank.org), Mohammad H. Ordoubadi, and Yi Chen.

Completion date: June 1997.

Industrial Emissions and Abatement Costs

Many of the Bank's client countries are now committed to industrial pollution control, and rapid development of supporting information and analysis systems has become a priority. Cost-effective regulatory strategy requires detailed information about the location and severity of emissions and the cost of abatement. But most developing countries lack such data. For the foreseeable future, environmental planners, researchers, and international agencies will have to base much of their analysis on estimated pollution loads and abatement costs.

To meet the need for such estimates, the Policy Research Department's Environment, Infrastructure, and Agriculture Division has developed the Industrial Pollution Projection System (IPPS), which is built around emissions and abatement cost parameters estimated from large samples of plant-level data. These parameters can be combined with commonly available data from manufacturing surveys to provide comprehensive estimates of industrial emissions and abatement costs for all major sectors and industrial areas in client countries.

This project involved statistical estimation of comprehensive parameters for a large number of industrial sectors and pollutants from a massive U.S. database that the division constructed in collaboration with the U.S. Census Bureau and U.S. Environmental Protection

Agency. In work now under way revised estimates will be developed from large samples of plant-level data in developing and newly industrializing countries.

The research has focused on three countries—Brazil, China, and Mexico. During fiscal 1997 the division, in collaboration with environmental agencies in each of these countries, gathered and analyzed large plant-level databases. In fiscal 1998 it expects to finalize pollution intensities for China (water and air), Mexico (air), and Brazil (water) at the four-digit level of the International Standard Industrial Classification (ISIC). The fiscal 1998 agenda also includes plans to publish estimates of abatement costs in China.

The IPPS has been widely used in Bank operations, client countries' environmental protection agencies, and international policy research institutes. As the most comprehensive system of its kind, the IPPS is helping to establish a new standard of quality for estimation of emissions and costs.

Responsibility: Policy Research Department, Environment, Infrastructure, and Agriculture Division—David Wheeler (dwheeler1@worldbank.org), Susmita Dasgupta, Sheoli Pargal, Hemamala Hettige, Keta Ruiz, Shakeb Afsah, Kenneth Chomitz, Mainul Huq, and Hua Wang. With Keith Florig, Resources for the Future; Ray Hartman, Charles River Associates Inc.; Jan Peter Kooiman, Free University, Amsterdam; Manjula Singh; and Dave Witzel.

Completion date: June 1997.

Reports:

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Common Property Resource Management Issues in World Bank Projects

The concept of common property resource management originated in resource economics and political economy and has been expanded on by anthropologists. The common property resource management approach integrates perspectives, data, and ways of working from the environmental sciences, economics, and anthropology. From the point of view of the overriding goals of the Bank's work—poverty reduction and sustainable development—it represents a broad and holistic approach. Common property resource management complements the emphasis on private property, eases analysis and understanding of the interaction of different resource management systems on various levels, allows a more culturally sensitive approach to project preparation and implementation, and contributes to increasing environmental and social sustainability.

This research looks at common property resource management issues in World Bank projects. Its analytical approach includes general participation methods, social assessment, and interviews. It has gathered information from people affected by projects, traditional leaders, project documents, and the social science literature (including sociology, anthropology, history, and political science). Data collection, along with preliminary analysis and dissemination, was completed in June 1997. A final report is being prepared.

The research has found that all natural resources that are managed in a traditional way, or in a way that combines traditional and more modern approaches, are affected by Bank projects. The recognition of traditional property rights in Bank projects varies enormously across sectors, countries, and regions. In some sectors, such as rangeland management in Africa, traditional resource management is commonly emphasized in Bank projects. In others, such as fisheries, it has received little attention. The role of the task manager is clearly very important, as is that of the borrower country. With few exceptions, traditional property rights are not addressed in the Bank's economic and sector work and country assistance strategies. As a rule, borrowers attach little value to supporting and maintaining communally managed natural resources, for many reasons. Often the explanation has to do with the rural-urban dichotomy—between rural resource users and urban decisionmakers. Management of traditional property rights knowledge within the Bank, including establishing and maintaining institutional memory, is difficult because this knowledge builds on different disciplines.

The project's findings are being disseminated outside the Bank largely through conferences and workshops.

Within the Bank the Common Property Resource Management Network (CPRNET) was established in early 1995 partly as a vehicle for raising the awareness of common property resource management among Bank operational and legal staff. The CPRNET organized a number of lunch seminars in February–June 1997 that addressed aspects of common property resource management in the Bank, including both operational and policy-related issues.

The preliminary findings of this project are particularly important for Bank operations involving indigenous people and involuntary resettlement. Results and insights from the project have already had some influence on several operations: the Bangladesh Third Fisheries Project, the Ghana Sector Work on Integrated Coastal Zone Management, and the Bangladesh Fourth Fisheries Project (under preparation).

Responsibility: Asia Technical Department, Environment and Natural Resources Division—Maritta Koch-Weser (mkochweser@worldbank.org) and Lars T. Soeftestad; and Environment Department, Social Policy and Resettlement Division—Gloria Davis and Narpal S. Jodha. The Norwegian Consultant Trust Fund contributed funding for the research.

Completion date: October 1997.

Reports:

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_____. 1997. "Property Rights and Environmental and Social Sustainability." Paper presented at annual conference of the Society for Applied Anthropology, Seattle, March 4–9.

Estimating the Extent of Corrosion Damage Caused by Acid Rain in China

This study will estimate the extent of corrosion damage caused by acid rain in China and its cost to that country. Data will be gathered on materials and stock at risk of damage by acid rain. Available dose response equations will be reconciled to Chinese conditions. The costs of materials replacement and repair will be estimated for different acid rain scenarios.

The analysis will draw on secondary data on population distribution in polluted areas, a completed analysis of stock at risk in the Guangzhou region, corrosion data from the Central Iron and Steel Research Institute in Beijing, and dose response equations available for Europe.

Responsibility: Asia Technical Department, Environment and Natural Resources Division—Herman Cesar

(hcesar@worldbank.org) and Tanvi Nagpal. With Vladimir Kucera and Johan Tidblad, Swedish Corrosion Institute. The Swedish Environment Consultant Trust Fund is contributing funding for the research.

Completion date: November 1997.

World Food Situation

This research was designed to provide a review of the world food situation as background for the World Food Summit held by the Food and Agriculture Organization (FAO) in Rome in November 1996. The increase in world grain prices in 1995–96 made this an especially timely issue. The price increase had raised concerns about the adequacy of global food supplies and the prospects of a world food shortage like those that have occurred in the past.

Using data from the FAO, the U.S. Department of Agriculture, and the World Bank, the research looked at recent trends in global grain production, yields per hectare, and area devoted to grain production at the global and regional level and in selected countries. It examined determinants of historical grain yields to better understand future yield prospects.

The principal finding of the study is that world grain stocks will probably be rebuilt over the next several years because of expanding production in the major exporting countries. The medium-term outlook is for adequate world food supplies, which should keep grain prices below the levels seen in early 1996. But slower yield growth in recent years and the uncertainty affecting demand growth are still cause for concern for the longer term. Developing countries can expect the world market to supply grain near historical levels at prices that will probably be lower than those in early 1996. But over the longer term continued investments in agriculture will be required to keep prices from rising in real terms. And large imports by a single country such as China or by a group of smaller countries would likely lead to higher prices.

The report produced by the study was disseminated to World Bank staff involved in agriculture and to participants in the World Food Summit. It has been used by Bank operational staff in preparing food security papers for individual countries, including China.

Responsibility: International Economics Department, Commodity Policy and Analysis Unit—Donald Mitchell (dmitchell@worldbank.org), and Office of the Director—Merlinda Ingco; and Agriculture and Natural Resources Department, Office of the Director—Alex McCalla.

Completion date: November 1997.

Report:

Ingo, Merlinda D., Donald O. Mitchell, and Alex F. McCalla. 1996. *Global Food Supply Prospects*. World Bank Technical Paper 353. Washington, DC.

Survey of the Impact of Acid Rain in China

This research project will identify ways to strengthen and deepen the participation of national and local institutions in RAINS-ASIA, China. RAINS-ASIA is a program that is developing and implementing a model to assist Asian policymakers and researchers in anticipating the effects of acid deposition due to sulfur dioxide emissions and in identifying cost-effective controls in the energy sector.

The research project will survey relevant Chinese research and academic institutions for links and information to strengthen ongoing research on acidification in China. It will also conduct a socioeconomic survey of selected sites to gain an understanding of the magnitude of potential economic losses stemming from acidification and air pollution. A primary source of data is the International Rice Research Institute.

Responsibility: Asia Technical Department, Environment and Natural Resources Division—Ramesh Ramankutty (rramankutty@worldbank.org). With Valter Angell, Norwegian Institute for International Affairs. The Norway Environment Consultant Trust Fund is contributing funding for the research.

Completion date: December 1997.

Air Quality Measurement in Asia Using Passive Samplers

This research will test the suitability of passive samplers for air quality measurement in Asian cities. Sulfur dioxide measurements will be taken in four countries—China, India, Pakistan, and Thailand. Seven samplers will be tested in 11 urban areas on three occasions, and the sampling procedure will also be evaluated. Volatile organic compounds, nitrogen oxide, sulfur dioxide, organic acids, and other emissions will be measured at two sites outside each urban area. The measurement is projected to begin in fiscal 1998.

Responsibility: Asia Technical Department, Environment and Natural Resources Division—Ramesh Ramankutty (rramankutty@worldbank.org) and Tanvi Nagpal. With Martin Ferm, Swedish Environment Research Institute. The Swedish Trust Fund is contributing funding to the research.

Completion date: June 1998.

Analysis of Critical Loads for Acid Rain in Asia

The concentration of air pollution above which damage can occur is known as the critical level. The highest deposition of compounds that will not cause chemical changes leading to harmful effects on an ecosystem's structure and function is defined as the critical load. While these values are known for Europe, they are less well defined for Asia. This research will consider critical loads specific to Asia, especially China.

The study will provide detailed information on areas in Asia, especially in China, that have been most critically affected by acid deposition. It will produce data for calculating critical loads in Asia, and a framework for critical load uncertainty analysis. Critical loads will be computed and compared with data on the sensitivity of ecosystems in China to test their reliability.

Responsibility: Asia Technical Department, Environment and Natural Resources Division—Ramesh Ramankutty (rramankutty@worldbank.org) and Tanvi Nagpal. With Jean-Paul Hettelingh, National Institute of Public Health and Environmental Protection, the Netherlands. The Netherlands Environment Consultant Trust Fund is contributing funding for the research.

Completion date: June 1998.

Social and Environmental Consequences of Growth-Oriented Policies

The World Bank has long maintained that economic growth is good for people and good for the environment. Yet skepticism persists about whether this "win-win-win" scenario applies in all places at all times. In some cases there are tradeoffs that clearly have to be considered: A new factory that brings higher incomes may also foul the air and water. Expansion of smallholder farming may result in the loss of natural habitats. How significant and widespread are these tradeoffs? Do win-win-win solutions become fewer as an economy becomes more efficient? Are there instances in which economic growth is at odds with improved human and ecological welfare, or in which poverty can be reduced only by harming the environment?

This project addresses these and other questions about the relationships between poverty, growth, and the environment. It uses a systematic, quantitative approach and draws on extensive data reflecting a wide range of country experience that have recently become available. The study seeks to derive lessons from this experience to guide future policy, using three analytical methods.

The first of the three parts of this research project consists of cross-national analysis. This analysis is intended to set the stage by examining the relation, across countries and over time, between macroeconomic policy indicators and indicators of growth, environmental conditions, and poverty or equality.

The second part, centered on structural models, is the heart of the project. The research attempts to model three sets of issues in which tradeoffs between growth, poverty reduction, and environmental protection are thought to be especially acute. The first set of issues relates to industrial pollution and the behavior of industrial firms. The research analyzes regional and firm-level data on industrial output, employment, and emissions. Policy levers examined include macroeconomic policies affecting the sectoral composition of industry, such as trade, industrial, and energy policies, and pollution regulation policies. Study sites include Brazil, China, Ecuador, India, Indonesia, and Pakistan.

The second set of issues relates to land use conflicts between agricultural expansion and natural habitat preservation. The research analyzes the incentives to convert tropical forests and other habitats to agriculture, the ecological consequences, the magnitude and persistence of economic gains, and the distribution of those gains. Policies investigated include agricultural pricing (including exchange rates) and regional development strategies, especially the siting of infrastructure. Study sites include Belize, Indonesia, Mexico, and tropical Africa.

The third set of issues centers on poverty, fertility, and household use of environmental resources. Because of the diversity of households and their environmental problems, the set of models used in this research is also diverse. One line of research studies the links between poverty, fertility, education, technology, and use of fuelwood and other environmental resources in Nepal and Pakistan, and the relationship between tenure and poverty in Uganda. Another line of research concentrates on the responsiveness of decisionmaking and urban sanitation to changes in tenure conditions in Ecuador and Indonesia.

In the third part of the project, case studies build on the structural models, placing them in a historical, environmental, and policy context and exploring cross-sectoral links. Case studies include economic liberalization in China, trade reform in Mexico, and exchange rate reform in Nigeria and may also include electricity pricing in India.

Most of the data used in the project come from existing sources. The project has also merged databases, and has collected data for some of the studies.

The research done to date suggests the following conclusions: A more even income distribution is more important than initial income levels in determining the extent

to which economic growth reduces poverty. Enforcement of pollution regulations increases with income and education in China and Indonesia, and informal pressures play an important part in determining pollution levels. On communal lands in Mexico poverty increases deforestation, while liberalized agricultural prices had the opposite effect. In Indonesia deforestation is sensitive to macroeconomic policies such as exchange rates, and in tropical Africa the location of infrastructure plays an important part in deforestation. In Pakistan the relation between fertility and environmental degradation varies among regions, and in Nepal environmental degradation adversely affects schooling. In Ecuador and Indonesia investments in sanitation are found to increase with more secure tenure.

A workshop was held on May 1–2, 1997, at the World Bank to discuss the results. There were 35 participants, including discussants from academic institutions as well as the Bank.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Emmanuel Jimenez (ejimenez@worldbank.org), Martin Ravallion, Lant Pritchett, Peter Lanjouw, Deon Filmer, Annika Haksar, and Quentin Wodon, Environment, Infrastructure, and Agriculture Division—David Wheeler, Charles Griffiths, Muthukumara Mani, Hua Wang, Ayo Heinegg, Xiawen Huang, Binayak Sen, Rebecca Grey, and William Hawthorne, Macroeconomics and Growth Division—William Easterly and Giuseppe Iarossi, and Office of the Director—Bart Minten; Environment Department, Land, Water, and Natural Habitats Division—David Gray, and Social Policy and Resettlement Division—Gi-Taik Oh; and Asia Technical Department, Environment and Natural Resources Division—Chonghua Zhang. With David Coady; Jean Lanjouw, Yale University; Jorge Eguiguren; Jan Gunning, Free University, the Netherlands; David Loughran; Javier Poggi; Angus Deaton, Princeton University; Robert Lucas, Boston University; Mark Heil; Qingying Kong; Jean-Philippe Platteau, University of Namur; and Thomas Tietenberg, Colby College. The Swedish Trust Fund; the Overseas Development Administration, United Kingdom; and the Netherlands Ministry of Foreign Affairs Trust Fund are contributing funding for the research.

Completion date: June 1998.

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Integrated Acidification Study in China

This project addresses several questions relating to acid rain in China: Is ecological damage occurring due to acidification? What is the extent of the damage, and which ecosystems have been most affected? Is it possible to establish provisional site-specific dose response equations?

In addition to analysis of data gathered by Chinese researchers, the research project includes field visits by Norwegian and Chinese researchers to estimate the extent of damage. Soil and other samples will be analyzed in Chinese and Norwegian laboratories. The results of the analysis will be used in developing dose response equations.

Responsibility: Asia Technical Department, Environment and Natural Resources Division—Ramesh Ramankutty (rramankutty@worldbank.org) and Tanvi Nagpal. With Espen Lydersen, Norwegian Institute for Water Research; Hans Martin Seip, University of Oslo; Jan Mulder, Norwegian Forest Research Institute; Arne Semb, Norwegian Institute for Air Research; Ivar Pors Muniz, Norwegian Institute for Nature Research; Xiong Jiling, Guizhou Institute of Environmental Studies; Zhao Dawei, Chongqing Institute of Environmental Science and Monitoring; Wen Dazhi and Yu Meng De, South China Institute of Botany; and G. J. Lee, Institute of Social Science, China. The Norway Trust Fund for Environment is contributing funding for the research.

Completion date: September 1998.

Prices, Policies, and Industrial Pollution

What pollution control strategies are the most cost-effective for developing countries? Anecdotal evidence suggests that many factors play some part in determining international (and interregional) variations in industrial pollution: differences in input prices, environmental standards, regulatory instruments, enforcement strategy, and informal regulation (pressure from neighboring communities, "green consumers," and so on). But little is known about the relative importance of these factors in reducing pollution. Better pollution control strategies require much more detailed quantitative analysis of outcomes. They also require the adaptation of regulatory theory to the conditions that prevail in developing countries.

This research project has two parts. The first is using detailed plant-level data from several countries to econometrically estimate the effect of variable input prices, formal regulation, and informal regulatory pressure on the environmental performance of industrial facilities. The second part is working on ways to adapt OECD-based regulatory economics to conditions in developing countries.

The initial empirical work has focused on gauging the potential of informal regulatory pressure as a low-cost complement to formal regulation. Analyses for several Southeast Asian countries, most notably Indonesia, have suggested that local community pressure and national emissions disclosure campaigns can, under at least some conditions, lead to rapid reductions in emissions.

The initial work on regulatory economics has focused on adapting for developing countries incentive regulatory systems that are now widely used in OECD countries. Such systems combine performance targets with economic incentives for industrial facilities. Given the inevitability of quantitative targets in many pollution control programs, such incentive regulatory systems may contribute significantly to economic efficiency because they can approximate the workings of tradable permit systems.

Findings from the study have been disseminated through several seminars outside the Bank, through regular print outlets, and through a new Website (<http://www.worldbank.org/NIPR>) developed for the research project Economics of Industrial Pollution Control in Developing Countries (ref. no. 680-20).

Responsibility: Policy Research Department, Environment, Infrastructure, and Agriculture Division—David Wheeler (dwheeler1@worldbank.org), Hemamala Hettige, Sheoli Pargal, Shakeb Afsah, Mainul Huq, Benoît Laplante, Susmita Dasgupta, Zmarak Shalizi, Maureen Cropper, Mead Over, Kenneth Chomitz, Koshy Mathai,

and David Shaman. With EPTRI, India; Forum One, United States; Mark Heil; Nabil Makarim; Nlandu Mamingi; Craig Meisner; J. C. Rodriguez; Hua Wang; Yun Ping; Raymond Hartman; David Witzel; C. H. Zhang; and Madhushree Dasgupta.

Completion date: June 1999.

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Environmental Change and Adaptive Resource Markets: A Computer-Assisted Market for Water Allocation

Experimental economics can yield a formal and replicable system for analyzing alternative market structures, such as the "smart" market, before these market structures are actually implemented. For example, during

years of sufficient water supply, a smart market for water allocation can be developed and tested in the laboratory under simulated drought conditions. If the results are positive, such a market could be implemented during years of water scarcity.

This project is developing and testing a smart water market for California, using a simplified approach. The approach is based on several components, including a water quantity and quality production function model of major agricultural crops, estimates of a demand function for urban centers, environmental water quantity and quality requirements, and costs of conveyance between water supply and water consumption centers. Laboratory experiments were carried out to study the efficiency and price performance characteristics of a uniform price, double auction mechanism for the simultaneous allocation of water and transport capacity rights among buyers, transporters, and sellers. A computer algorithm, Water-Mart, was developed that maximizes total gains from exchange based on the submitted bids and offers and determines allocations and nondiscriminatory prices at all nodes. The work draws on data from the California Department of Water Resources, previous studies on water in California, and data collected through surveys and interviews.

Preliminary findings, based on four laboratory experiments with reward-motivated subjects, suggest that water networks using a computer-coordinated smart allocation mechanism yield substantially competitive outcomes. Several institutional assumptions are inherent in these experiments: alternative transport paths have comparable costs, single paths have shared ownership or are common carriers at fixed rates (though the second is inadequate to deliver appropriate price signals for new investment), and transport capacity is adequate. Such institutions appear to uniformly discipline the behavior of the different types of agent involved in the water market.

Responsibility: Agriculture and Natural Resources Department, Sector Policy and Water Resources Division—Ariel Dinar (adinar@worldbank.org). With Vernon Smith and Steven Rassenti, University of Arizona; the Economic Research Lab, Tucson; and Richard Howitt, University of California at Davis. The National Science Foundation is funding the research through a grant to the Universities of Arizona and California.

Completion date: June 2000.

INFRASTRUCTURE AND URBAN DEVELOPMENT

Urban Transport Indicators

Ref. no. 679-64C

The effect of transport on the environment is an important concern in the rapidly growing cities of the developing world. An indicator often used to measure this effect, as well as the real resource cost of urban transport, is the amount of transport fuel consumed per capita.

A separate exercise established an extensive and meticulous database on such variables for a set of industrial country cities for 1971 and 1981. This project supported the updating of the database to 1991 and the addition of new indicators of public transport demand, supply, and cost as well as data for a number of developing country megacities.

Analysis of the initial database showed that the amount of fuel consumed per capita depends on a complex interaction between such factors as the size and structure of cities, the amount of transport demanded, the choice of transport mode, and the technologies used. The implication drawn from that analysis was that action to control urban form could reduce the resource and environmental costs of urban transport both through its direct effect on the number and length of trips and through its effect on the choice of transport mode. Less well understood were the relationship between fuel costs and total transport costs (including the costs of urban public transport subsidies) and the applicability of conclusions drawn from analysis of industrial countries to the developing world. This project supported analysis of those issues.

The research contributed to Bank papers on the urban environment and served as the basis for discussion of the Bank transport and land use policy embodied in *Sustainable Transport: Priorities for Policy Sector Reform* (Washington, DC: World Bank, 1996). It also underpins the arguments for establishing the multimodal, multi-functional conurbation transport authorities being encouraged in many client countries (for example, in Buenos Aires).

Responsibility: Transportation, Water, and Urban Development Department, Transport Division—Kenneth Gwilliam (kgwilliam@worldbank.org). With Peter Newman and Jeff Kenworthy, Murdoch University, Perth.

Completion date: September 1996.

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Reaching Turkey's Spontaneous Settlements

Ref. no. 680-66C

*Gecekondu*s—spontaneous settlements—house half the urban population in Turkey. These settlements began springing up after World War II as rural immigrants flooded Turkey's cities looking for work. Because of limited resources and land and housing markets that failed to meet their needs, these people built their own dwellings on government-owned land, doing without infrastructure services or obtaining them informally for high prices.

Some of the *gecekondu*s have been legalized and have gained some services. In these settlements modern apartment blocks are rising, foretelling dramatic growth in their populations and in demand for services—even as more *gecekondu*s emerge. And most *gecekondu*s still lack services.

What explains the lack of services in these settlements? This study explored that question within the framework of institutional economics, which suggests that institutional behavior is motivated by incentives that are created by formal and informal rules. To establish a relational matrix of rules, incentives, and outcomes, the study collected data through a search of the relevant literature, a review of Turkish laws and regulations, and semistructured interviews conducted in a sample of 10 Turkish cities with formal and informal infrastructure providers and consumers.

The research has produced findings on the process of infrastructure provision in *gecekondu*s, on the relationship among rules, incentives, and behavior, and on out-

comes. Among the main findings: The existence of a rational road network or plan is an essential precondition for infrastructure provision. Formal rules are largely irrelevant and have been replaced by a set of informal rules. And the quality of infrastructure and services in *gecekondu*s is generally poor, and the costs are higher than in legal areas.

The finding that informal rules have replaced formal ones is significant for development policy. It highlights the need to shift the focus of efforts away from formal institutions and their regulations toward informal actors and informal rules. For Bank operations the research findings suggest that bringing benefits to poorer households in urban areas might involve the use of informal rules and channels. They also suggest a logical focal point for Bank urban assistance in Turkey—road planning and construction in squatter settlements.

A Bank meeting to review the research findings was held on March 5, 1997, with eight staff and managers participating. Findings will also be disseminated by distributing the report produced by the research to Bank staff preparing infrastructure projects. A workshop in Turkey is planned to present the findings to government, academic, and private sector representatives.

Responsibility: Europe and Central Asia, Country Department I, Infrastructure Operations Division—Henry Boldrick (hbaldrick@worldbank.org). With Josef Leitman and Deniz Baharoglu.

Completion date: March 1997.

Report:

Leitman, Josef, and Deniz Baharoglu. 1997. "Reaching Turkey's Spontaneous Settlements: The Institutional Dimension of Infrastructure Provision." World Bank, Europe and Central Asia, Country Department I, Washington, DC.

Valuing Direct and Indirect Benefits of Water Supply and Sanitation Projects: Application to Project Investment Analysis

Ref. no. 680-79

The World Bank is executing a number of water supply and sanitation projects that have direct and indirect benefits. Direct benefits are welfare improvements resulting from connection to a service. Indirect benefits stem from the environmental and public health effects of the projects. Project analysis commonly values such direct and indirect benefits through willingness-to-pay surveys using the contingent valuation method.

But concerns about limitations of the contingent valuation approach have led to questions about the validity of using it to estimate project benefits. Are the estimates it yields stable over time? Are they replicable across

locations? Do they measure the true benefits of the project? Can they be reliably used to make investment decisions?

Several considerations point to a need to evaluate the use of the contingent valuation approach for estimating the direct and indirect benefits of water and sanitation projects. First, little or no effort has been made to validate preproject estimates by comparing them with the actual consumption choices people have made as a result of a project. Second, it has been observed that estimates of willingness to pay vary widely across locations and across income categories. It is critical to know the reasons for such variations—whether real differences in preferences or artifacts of the methods and their assumptions. And third, the costs of data collection and estimation using alternative methods differ—sometimes by large amounts—mainly because of differences in sample size requirements and in the number of questions needed to get to an appropriate answer.

To contribute to improved project evaluation procedures for direct and indirect benefits, this research addresses these analytical gaps. It compares estimates of marginal willingness to pay calculated for the same location using different methods, including contingent valuation, property value analysis, and an analysis of the impact of incidence of diarrhea on willingness to pay. It compares values for marginal benefits estimated using the contingent valuation method and based on responses from beneficiaries of similar projects in different locations in Brazil. And it suggests correction factors that can be applied at the project level to conduct sensitivity analyses of the estimated direct and indirect benefits of water and sanitation projects.

The research draws on data on willingness to pay in anticipation of a project collected in the preinvestment evaluation of World Bank–financed projects in the Brazilian cities of Vitoria, Guarapari, Belem, and Fortaleza. It also uses data being gathered on postproject willingness to pay, property values before and after the project and in locations with differing service levels, and the incidence of diarrhea among children under five in areas with different service conditions.

Preliminary results using existing data sets show that survey respondents are generally sensitive to variations in the service that they will receive. Respondents already connected to a service were willing to pay higher prices for better service. And the willingness to pay for a new connection is higher than the willingness to pay for improved service, showing that respondents are able to evaluate the benefits of different characteristics of the public good offered. Further research will test whether the willingness to pay is affected by such factors as having experienced illness due to a waterborne

disease, or having sold or purchased a property before or after an improvement in water supply and sanitation services.

Since choosing a project evaluation method involves tradeoffs between cost and reliability of results, it is important to compare alternative methods. This research will provide the main elements for making such a choice for water and sanitation projects with environmental management components. The research will classify methods by the degree to which estimated benefits are consistent or biased.

The results of the research will be disseminated in an Institute for Applied Economic Research workshop in Brazil in 1997. The database developed from the research will be made available.

Responsibility: South Asia, Country Department I, Infrastructure Operations Division—Frannie Humplick (fhumplick@worldbank.org); Policy Research Department, Infrastructure, Environment, and Agriculture Division—Maureen Cropper and Nathalie Simon; and Latin America and the Caribbean, Country Department I, Urban Infrastructure and Environment Operations Division—Alex Bakalian, Yoko Katakura, and Carlos Velez, and Office of the Director—Homi Kharas. With Luiz Antonio Baltar and Marcio Tagliari, Institute for Applied Economic Research, Brazil; and Marcia Rosado, University of Maryland. The water supply utilities in Vitoria (CESAN), Fortaleza (CAGESE), and Belem (COSAMPA) and the Institute for Applied Economic Research, Brazil, are participating in data collection.

Completion date: December 1997.

Resolution of River Basin Disputes on the Indian Subcontinent

Ref. no. 680-85C

This research project examined the potential for using computer-based decision support systems in the analysis of river basin issues and options, highlighting their use in transboundary conflict resolution. The project constructed nonlinear optimization models to address two kinds of issues. This work involved the construction of a common information system—primarily using geographic information systems (GIS), interactive spreadsheets, databases, and the Internet—and two interactive models:

- MEDUSA-1 (Multiobjective Environmentally Sustainable Development Using Systems Analysis) is a multiple-objective optimization model that focuses on the potentials and tradeoffs in such issues as water use, agricultural output, hydropower, in-stream water quality, groundwater recharge, floods, navigation, minimum

flows, and urban, domestic, and industrial water and wastewater.

- MEDUSA-2 uses an innovative approach to highlight optimal combinations of “hardware” approaches (development of hydropower generation, transport and grid facilities, and the like) and “software” approaches (pricing, establishment of links) on both the supply and the demand side to integrate regional resource planning in the water, energy, and transport sectors. It is intended to help maximize regional benefits and illustrate environmental tradeoffs (for example, between the environmental effects of hydropower development and the additional local, regional, and global air pollution that would result from increased fossil fuel use in the absence of large-scale hydropower development).

The development of these models drew on the literature on such topics as Pareto frontiers, game theoretic approaches, multiobjective optimization, decision support systems, river basin planning, and integrated energy and transport planning. The software used includes Microsoft Excel, Visual Basic, Generalized Algebraic Modeling System, ArcView, and Arc/Info. Data sources included traditional print sources as well as a variety of GIS databases on the Indian subcontinent.

The decision support system—consisting of the information system and models—appears to be an excellent tool for intersectoral and interregional conflict resolution. Of course, as with other such approaches, it must be used carefully so that the results are not misinterpreted. The project found that there are a variety of new ways of handling data to help in the decisionmaking process. The models have been run for a variety of scenarios and levels of disaggregation, and a paper will be prepared on the results.

For Bank operations this kind of approach could be extremely useful in conducting spatial analysis of projects, resources, and options; developing a regional and intersectoral cost-benefit strategy; identifying key constraints (such as transmission capacity), especially in the energy, transport, and water sectors; providing a framework for integrating environmental tradeoffs in large projects; and identifying the benefits of cooperation and the costs of the status quo. There has been tremendous interest from a variety of potential users in the region (government, academic, and nongovernmental organizations) and in other regions in using the methodology and software to address a wide range of the issues touched on in the study.

Much remains to be done to operationalize the models, however. Further work will be done in gathering more data, generating scenarios, and refining the models. And the practical use of such systems will be examined in collaboration with teams in the Bank and in the countries on the Indian subcontinent.

The findings and methodology have been and will continue to be disseminated through seminars and demonstrations, discussion and technical papers, and workshops and meetings in Bangladesh, India, and Nepal (workshops were held in October 1996 and April 1997 for up to 100 participants). There are also plans to disseminate the data and information to facilitate future research through electronic media. The most promising media seem to be interactive Internet access using an ArcView Internet server and interactive spreadsheets, electronic maps, and Websites.

Responsibility: Asia Technical Department, Environment and Natural Resources Division—Maritta Koch-Weser (mkochweser@worldbank.org) and Uma Subramanian. With Harshadeep Nagaraja Rao; and Peter Rogers, Harvard University.

Completion date: March 1997.

Performance Measures for Infrastructure and Environmental Resources, Phase 2

Ref. no. 680-88

The deterioration of infrastructure, particularly in urban areas, is a pervasive constraint on economic development in many developing countries. In an environment of limited managerial and analytical capacity, utility managers face complex decisions in preserving these assets. Effective measures of asset performance would significantly improve management decisions. Most attempts to measure performance focus on the input side of a delivery service (for example, the quantity and quality of water put into the system), not on the output or delivery side (the quantity, quality, and reliability of water delivered to the consumer). Users’ perspectives give a true measure of service. This research is developing an analytical framework and a process for incorporating users’ perspectives in performance measures and infrastructure management decisionmaking.

Phase 1 of the research, a case study in Indonesia, showed that performance measurement can improve the cost-effectiveness of investment and operations and maintenance decisions and provided a model for service-level performance measurement and valuation methods. It also developed a framework to measure the costs and benefits of investment decisions based on user and provider criteria. The study found the service-level approach particularly useful in evaluating the impact of projects on low-income groups, and it showed that inexpensive survey techniques can be used effectively in developing models of users’ responses to changes in service. An interactive geographic information management system, a database, and a beneficiary assessment

strategy were developed to analyze decisions that affect the performance of the water sector.

The goal of phase 2 is to replicate the framework in case studies in Africa and to extend it to provide decision support in expanding public water supply services for unserved and underserved communities. The framework has been developed in collaboration with Umgeni Water, in Pietmaritzburg, South Africa. Umgeni managers have successfully incorporated user-oriented performance measures into an effective decision support system. They are testing the system's effectiveness for utility management and for addressing its new mandate of supporting the cost-effective extension of services to the poor.

This pilot decision support system establishes relevant performance measures (from the perspective of both provider and users), analyzes existing data to identify current deficiencies, and builds a development investment framework that allows managers to interpret the effects of their decisions. It analyzes water supply investment options and the effects of operations and maintenance decisions on service performance, predicts users' responses to changes in service levels, and calculates net economic costs and benefits for users and providers. Based on the test of the system in South Africa, a pilot performance optimization decision support system will be developed for a water project in Senegal.

The performance optimization decision support system should provide an effective method for evaluating infrastructure management issues, with far-reaching policy implications for public infrastructure decisionmakers. It should improve the Bank's capacity in designing, monitoring, and evaluating infrastructure projects. And it will help meet the growing demand in the Bank for user-based, "bottom-up" project evaluation.

The research has been disseminated at several conferences: the Information Technology for Africa Conference in November 1996 in Durban, South Africa (75 participants); the GIS for Africa Conference in December 1996 in Johannesburg, South Africa (400); the Water Utility Partnership for Africa Conference in February 1997 in Abidjan, Côte d'Ivoire (250); and the Water Utility Partnership for Africa Conference in February 1997 in Gaborone, Botswana (250).

Responsibility: Africa Technical Families, Water, Urban, and Energy 1 Division—David Grey (dgrey@worldbank.org) and Letitia Obengand, Water, Urban, and Energy 2 Division—Jan Janssens, Richard Verspyck, and Robert Roche, and Nairobi office—Jean Doyen. With Jonathan Stevens; Peter Cook, GIS/Trans; Brian Walford, Adrian Wilson, and Robert Paine, Umgeni Water; and Roman Pryjompko and David McPherson, GIMS. Umgeni Water is contributing funding for the research.

Completion date: September 1997.

Infrastructure and Growth: A Multicountry Panel Study

Ref. no. 680-89

This study will estimate the growth effects of four types of infrastructure—roads, rail, telephone lines, and electricity generating and transmission capacity—over the past three decades for about 100 countries. It will model these four types of infrastructure separately in a standard growth framework, including private capital and human capital as additional explanators of output and productivity growth.

In looking at how different kinds of infrastructure affect growth, the study will pay particular attention to whether private capital is crowded in or out by infrastructure investments and whether the growth effect is mediated through structural change of the economy and urbanization. The study will also address questions on the speed with which growth effects occur, whether infrastructure investment affects the level of GDP or the rate of growth, and whether infrastructure acts as a normal input into production and whether as a bottleneck.

Responsibility: Policy Research Department, Public Economics Division—Shantayanan Devarajan (sdevarajan@worldbank.org); and Transportation, Water, and Urban Development Department, Office of the Director—Christine Kessides.

Completion date: October 1998.

Infrastructure Productivity: Direct and Indirect Effects

Ref. no. 681-54

Over the past decade studies have repeatedly reported rates of return to public capital far exceeding those to private capital or those emerging from cost-benefit analysis or project evaluation for infrastructure investments. In part to investigate these still controversial returns and to find out whether the operation of indirect effects may help explain them, this study will identify and measure the growth and productivity effects of infrastructure in India using time-series data for roughly 1960–90.

The study will address three main questions: First, in addition to direct effects on output and growth, does physical infrastructure have significant indirect effects? Second, what are the economic rates of return of different kinds of infrastructure investment, and how do they compare with the social rates of return to other uses of capital? Third, is infrastructure a necessary condition for growth?

The study will estimate growth effects separately for roads, rail, telephone lines, and electricity generating and

transmitting capacity. The growth effects will be measured in manufacturing and in domestic product first at the state and then at the district level. The study will try to determine at what level the effects operate and through what channels—for example, urbanization or change in the organization of manufacturing.

Responsibility: Policy Research Department, Public Economics Division—Shantayanan Devarajan (sdevarajan@worldbank.org) and Sethaput Suthiwart-Narueput; and Transportation, Water, and Urban Development Department, Office of the Director—Christine Kessides. With Esra Bennathan; Subhashis Gangopadhyay; Sylaja Srinivasan; Charles Hulter; Paul Seabright; and Martin Robert Weale.

Completion date: December 1998.

Contingent Valuation of the Rehabilitation of Cultural Heritage

Ref. no. 681-98

Estimating the rate of return of investments in cultural heritage is straightforward, but it may undervalue the intrinsic worth of heritage for the global, national, and local society. This study will test the contingent valuation method as a way to evaluate urban cultural heritage investments, a method that has proved valuable in estimating the willingness to pay for services in such sectors as water supply, sanitation, and environmental services.

The study will use contingent valuation in interviewing foreign tourists in Morocco to elicit information on their maximum willingness to pay for the rehabilitation of the Fez medina. The analysis will focus on the benefits accruing to the foreign tourist population. A total of 600 randomly selected tourists will be interviewed in Fez and Casablanca. Some of the sample will be interviewed in Casablanca to ensure access to enough tourists and to include tourists who have never visited Fez and whose values therefore will provide information relevant to a larger sampling frame.

The study will also assess the impact of municipal finance on the revitalization of cultural heritage and the impact of financial structure or revitalization projects on affordability.

It is expected that the findings of the study will be disseminated widely, both within the Bank—to staff working on projects with cultural heritage components—and to outside agencies.

Responsibility: Environmentally Sustainable Development, Office of the Vice President—Michael Cohen (mcohen@worldbank.org). With Richard Carson and the Harvard University Graduate School of Design.

Completion date: August 1997.

Private Financing of Toll Roads

This study assessed the international private toll road industry by examining financed projects. It analyzed the public policy and financing challenges in undertaking private toll road concessions and mobilizing financing for their construction and operation. It also assessed the future prospects for private toll roads and the international outlook for these ventures.

The study distilled the main issues and drew conclusions on the basis of an analysis of nine toll road projects that have attracted substantial amounts of private capital. It analyzed several aspects of private toll road financing, including project economics, the country and concession environment, risk sharing between the public and private sectors, financing structures and sources, policy issues, and future developments.

The findings suggest several conclusions: Project economics for toll roads vary widely, depending on the function, the cost, and the volume and certainty of traffic. Governments have pursued a wide range of strategies for sharing risk between the public and private sectors. Governments can support toll roads in several ways, but before committing themselves to particular arrangements, they should weigh the tradeoff between the value of such support to the private sector and their exposure.

Responsibility: Cofinancing and Project Finance Department, Project Finance and Guarantees Group—Suman Babbar (sbabbar@ifc.org). With Greg Fishbein, Mercer Management Consulting.

Completion date: December 1996.

Report:

Fishbein, Greg, and Suman Babbar. 1996. "Private Financing of Toll Roads: A Review of Experience." Resource Mobilization and Cofinancing Discussion Paper. World Bank, Washington, DC.

The Financing of the Hub Project in Pakistan

The Hub Power Project is a 1,292-megawatt oil-fired power station in Balochistan Province, Pakistan, some 40 kilometers northwest of Karachi. This private sector project was undertaken by a single-purpose company, listed on the Karachi and Luxembourg stock exchanges, that has a concession to build, own, and operate the power station. The project has become a landmark in infrastructure finance because it demonstrated the viability of private finance for a major infrastructure project in a developing country.

This study examined the lessons learned from the World Bank's participation in the Hub Power Project, where the Bank played a catalytic role in the financing of the project, in the development of the energy sector

and local institutions in Pakistan, and in the international market for private sector infrastructure. Because of its pioneering nature, the project probably encountered most problems that are likely to face a private infrastructure project in a developing country during implementation, and thus the solutions developed and the lessons learned have wide application. The study focused on the solutions and lessons that generally apply to similar private infrastructure projects, emphasizing the financial instruments used by the Bank and its management of the project development process.

Responsibility: Cofinancing and Project Finance Department, Project Finance and Guarantees Group—Suman Babbar (sbabbar@ifc.org).

Completion date: July 1997.

Report:

Gerrard, Michael. 1997. "Review of the Hub Power Project." Resource Mobilization and Cofinancing Discussion Paper. World Bank, Washington, DC.

Private Power Study

Private power continues to face many challenges in developing countries. Contract renegotiations and inadequate risk assumption by governments may erode investor confidence and restrain private investment. Continued growth may require greater private risk taking. This study analyzes the 1994–96 private power market to assess trends in market competition, risk allocation, and struc-

tures and sources of financing. The analysis is aimed at providing governments and investors insights that can help them to maintain or expand the role of private power in developing countries.

Nearly two-thirds of the capital raised for private power projects between 1994 and 1996 was provided under project finance, under which project cash flows, rather than sponsors' balance sheets, provide lenders their primary source of security. This study focuses on one part of the project-financed market—power project finance—where privately controlled power projects sell power to utility off-takers for distribution to a national power grid. The study examines trends in regulation, project structure, debt sources, and development times in this power project finance market.

The study evaluates trends in power project risk management by examining 10 power project finance deals in Asia, Latin America, and the Middle East. The analysis has shown that these power projects largely reflect a rational allocation of risks among public and private sector participants.

Responsibility: Cofinancing and Project Finance Department, Project Finance and Guarantees Group—Suman Babbar (sbabbar@ifc.org). With John Schuster, Hagler Bailly Consulting.

Completion date: June 1998.

Report:

Babbar, Suman, and John Schuster. 1997. "Private Power Study." Resource Mobilization and Cofinancing Discussion Paper. World Bank, Washington, DC.

MACROECONOMICS

Decentralization, Fiscal Systems, and Rural Development

Ref. no. 679-68

Policies and processes that encourage decentralization are the latest in a succession of initiatives aimed at bringing about rural development. Although decentralization efforts have a long history, much more needs to be understood about the different aspects of decentralization if sound advice is to be given to policymakers.

This program of research aims to add to that understanding. It investigates the hypothesis that more decentralized decisionmaking and resource allocation will improve the responsiveness and accountability of public institutions and strengthen the capacity of local governments and communities to manage development programs.

The research program consists of six components that cover three main areas of investigation: democratic decentralization, fiscal decentralization, and decentralization of decisionmaking and responsibilities. It uses a variety of quantitative and qualitative instruments to analyze issues of participation, accountability, responsiveness, political economy, the capacity of local governments, and efficient and sustainable delivery of public goods.

Early findings of the research show that decentralization holds promise for reinforcing national-level democracy and central government commitment to rural development, reversing "urban bias," solving the coordination complexity of integrated rural development projects and improving their sustainability, reducing poverty that arises from regional disparities and giving attention to socioeconomic factors, facilitating the scaling-up of development efforts and promoting cooperation between government and nongovernmental organizations, and increasing the transparency, accountability, and responsiveness of institutions. Decentralization seems to hold little promise for reducing poverty that arises from disparities within localities, easing excessive rates of agricultural taxation, ensuring macroeconomic balance, and reducing overall government expenditure.

These early findings suggest that the Bank and the rest of the development community should focus on maximizing the benefits that decentralization can help bring about, monitor carefully issues that could go either way and intervene through various mechanisms, and ensure an appropriate role for central government in addressing areas where decentralization offers little promise.

The program's dissemination efforts have included providing operational support to Bank projects and sector work; developing ties with other international development agencies; presenting a workshop, seminars, and training courses on decentralization; and preparing papers and other publications. In addition, the research program is preparing a database on the status of decentralization in 20 countries, dissemination notes aimed at policymakers in developing countries, and a workshop in Rome in partnership with the Food and Agriculture Organization, International Fund for Agricultural Development, and United Nations Capital Development Fund. It is also preparing training materials for a series of regional seminars for policymakers, a Bank policy paper that will present a revised strategy for the Bank's rural development policies, and good-practice materials for Bank operational staff.

Responsibility: Agriculture and Natural Resources Department, Office of the Director—Hans Binswanger (hbinswanger@worldbank.org), Graham Kerr, Suzanne Piriou-Sall, Keith McLean, and Talib Esmail, and Agriculture and Forestry Systems Division—Willem Zijp; Operations Evaluation Department, Country Policy, Industry, and Finance Division—Anwar Shah; Environment Department, Social Policy and Resettlement Division—Gloria Davis, and Pollution and Environmental Economics Division—Ernst Lutz; Latin America and the Caribbean Region, Human and Social Development Group—Mike Garn and Donald Winkler, and Technical Department, Advisory Group—Thomas Weins and Maurizio Guadagni; Human Development Department, Office of the Director—Jacques van der Gaag; and South Asia, Country Department I, Infrastructure Division—Frannie Humplick. With Johan van Zyl, Pretoria University; Justin Yifu Lin, Peking University; James Manor, University of Sussex; Dave Riper; Fernando Bernal; Tarsicio Castenda; and Wendy Ayres. The Swiss Development Cooperation Consultant Trust Funds I and II and the Norwegian Royal Ministry of Foreign Affairs Consultant Trust Fund are contributing funding for the research.

Completion date: December 1998.

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Total Investment, Agricultural Investment, and Investment in Manufacturing

Ref. no. 680-50C

The accumulation of stores of physical and human capital is considered essential to growth and development. During the process of growth not only do resources accumulate, they also flow between sectors. Still, much of the work on growth and such related areas as the measure of productivity gains has been limited by the lack of a consistent database on sector investment. The purpose of this research was to assemble existing information on sector investments from international and national sources and to find an appropriate method for converting the data into capital stock series.

The research located, recorded, and documented data series on fixed investment for 57 economies along with subsector investment for agriculture and manufacturing. It adapted a method developed by Eldon Ball and others ("The Stock of Capital in European Community Agriculture," *European Review of Agricultural Economics* 20:437-50, 1993) to convert the investment series into fixed capital stock series. In addition, for agriculture it developed measures of livestock and tree stock capital. Comparisons with capital stocks calculated from the same investment data using perpetual inventory methods revealed that the capital stock estimates are largely insensitive to the choice of method.

The results show that nearly half the countries in the sample experienced capital stock growth rates of more than 3.5 percent annually in recent decades. Agricultural fixed capital makes up a small share of total fixed capital—less than 10 percent in most countries—and this share

has been falling for all countries in the sample. Manufacturing capital is growing rapidly in some countries, but in most the share of fixed capital in manufacturing is declining as well. Still, the agricultural sectors of most countries are becoming more capital intensive. In nearly half the countries examined the difference between the growth rates of agricultural capital and agricultural labor exceeded 2 percent. Similar results were found for capital in the economy as a whole.

Generally, manufacturing and agriculture are becoming more capital intensive. Related analysis showed that the returns to agricultural capital are especially high. Policies and programs that encourage and facilitate capital flows and do not discriminate against agriculture are therefore likely to encourage economic growth.

Responsibility: International Economics Department, Commodity Policy and Analysis Unit—Donald Larson (dlarson@worldbank.org). With Yair Mundlak and Rita Butzer, University of Chicago; and Al Crego, University of Maryland.

Completion date: December 1996.

Report:

Crego, Allan, Donald Larson, Rita Butzer, and Yair Mundlak. 1997.

"A New Data Base on Investment and Capital for Agriculture and Manufacturing." World Bank, International Economics Department, Washington, DC. Draft.

Estimating the Marginal Cost of Public Funds in Developing Countries

Ref. no. 680-69

Public expenditures, regardless of the benefits they confer, impose a cost on society to the extent that they are financed by distortionary taxes. This cost is not just the resources diverted to private use but also the deadweight loss associated with distortionary taxation. So to evaluate a public expenditure, the analyst needs to know the marginal cost of public funds—the sum of the marginal dollar raised from the private sector and the "marginal excess burden," or the change in the total welfare cost of taxation caused by increasing tax revenue by that dollar.

Estimates of the marginal cost of funds are critical for properly evaluating projects and conducting public expenditure reviews. Reconsidering the role of the state, governments and the World Bank in the 1990s have been shifting their mix of projects toward health, education, and infrastructure, where there is a strong case for public sector involvement. In projects in these sectors the benefits are enjoyed by the private sector while the costs are borne by the public sector. Since the World Bank has not used the marginal cost of funds in its economic appraisal of projects, it has implicitly treated these public costs and

private benefits equally. As a result, it has systematically overestimated the net benefits of many of its projects.

Estimates of the marginal cost of funds also provide a guide for tax reform by highlighting the types of taxes that generate the highest welfare costs. In principle the marginal cost of funds should be equated across all tax instruments to minimize distortionary losses. But in practice governments do not behave optimally, and the marginal cost of funds varies among tax instruments. Estimates of marginal cost of funds indicate tax reforms that would provide equal revenue at lower cost.

As part of the Policy Research Department's broader research effort on fiscal policy in developing countries, this research seeks to provide estimates of marginal cost of funds for six developing countries—Bangladesh, Cameroon, India, Indonesia, the Philippines, and South Africa—and use these estimates to derive guidelines for calculating the marginal cost of funds in other countries. The project addresses the following questions:

- What are the most important determinants of the marginal cost of funds? For example, do the tax rate and elasticity of demand capture most of the welfare burden? Under what conditions is the partial equilibrium calculation a good approximation?
- Are there any patterns in the marginal cost of funds across countries? A finding that trade taxes are consistently costlier than consumption taxes, for example, would provide a useful guideline for tax reform.
- What is the effect of additional untaxed sectors on the marginal cost of funds? In industrial countries the untaxed sector is typically given by leisure. But in developing countries entire productive sectors of the economy, such as small-scale agriculture, often go untaxed. How might estimates of the marginal cost of funds for developing countries differ from those for industrial countries?
- What is the sensitivity of estimates of the marginal cost of funds to different uses of government revenue? Other studies have shown that the marginal cost of funds depends not only on the tax but also on the effect of the type of government spending under consideration. Some of these considerations can be captured through different closure rules in computable general equilibrium (CGE) models.

The study estimates the marginal cost of funds for the six countries by modifying existing CGE models for these countries and conducting tax exercises with them. The study then assesses how estimates derived from simpler methods compare with those obtained from the CGE simulations. This should provide guidance on how analytical (partial equilibrium) formulas and simple CGE models can be used to derive benchmark estimates of the marginal cost of funds in countries for which full-fledged CGE models do not exist.

Initial estimates indicate a wide dispersion in the marginal cost of public funds, depending on the type of tax used to generate government revenue. The marginal cost can even be negative because of second-best effects from other distortions in the economy. The findings indicate that policymakers can significantly lower the welfare costs of public spending through careful selection of tax instruments.

Responsibility: Policy Research Department, Public Economics Division—Delfin Go (dgo@worldbank.org), Sethaput Suthiwart-Narueput, and Shantayanan Devarajan. With David Wildasin, Vanderbilt University; Karen Thierfelder, U.S. Naval Academy; Michael Haney, Stanford University; David Witzel, Prosody Communications; and Ling Li, Towson State University.

Completion date: November 1997.

Economic Liberalization and Industrial Restructuring: The Sri Lanka Experience

Ref. no. 681-03

Sri Lanka's economic liberalization, which began in 1977, provides an important and continuing experiment for examining how trade, finance, and exchange rate reforms affect a country's industrial structure. Research on this question generally has been confined to aggregate analysis, examining the overall response of production, exports, imports, and productivity. This study examines the results of liberalization at the firm level in Sri Lanka. It also attempts to find out how long a reform impact lasts and where the main changes occur in industries and in patterns of industrial development following a multifaceted liberalization. The postliberalization period in Sri Lanka is sufficiently long to distinguish the long-term resource allocation effects of liberalization from the short-term impact effects. The purpose of the research is to derive lessons for other countries undertaking liberalization.

Using a firm-level data set, the study attempts to establish changes in patterns of industrial growth, export orientation, factor proportions, employment potential, and factor productivity following liberalization. It also attempts to measure the gap between declared policy and the policy actually implemented, in the context of the political support for or opposition to the reforms. This allows the incorporation of sociopolitical and institutional factors that might explain any inconsistency between stated and actual reforms.

The study has established a set of hypotheses about what was expected following the liberalization and what actually happened. The firm-level results are used to examine changes in the level and composition of output, in factor proportions, and in investment behavior.

This has been made possible by the annual surveys of manufacturing initiated in Sri Lanka in 1977. If the study finds that patterns that have regularly been found in other countries after liberalization do not appear in Sri Lanka, it will use the firm-level findings to examine the outcomes more closely. This will allow more accurate generalizations about the effects of economic liberalization on industrial structure.

Responsibility: Operations Policy Department, Operations Policy Group—Sarath Rajapatirana (srajapatirana@worldbank.org). With Premachandra Athukorala, Australian National University. The Institute of Policy Studies is providing data and data processing for the research.

Completion date: October 1997.

Political Economy of Aid, Crises, and Growth

Ref. no. 681-31C

This project studied the political economy of structural reform, focusing on the relation of economic crises and foreign aid both to the reform process and to each other. The question of whether poor economic performance actually increases the probability of structural reform has long been the subject of heated debate, and the debate continues. Careful statistical analysis has revealed a strikingly high correlation between high inflation and subsequent high growth. What then is the connection between an economic crisis (such as a period of high and accelerating inflation) and reform leading to improved macroeconomic performance?

A body of recent research has argued that if it is political constraints that are blocking the adoption of a reform program, a crisis may lead to a suspension of "politics as usual" and thus ease the road to reform. A leading approach to the question of why crises may be beneficial starts with the war-of-attrition model from the stabilization literature. In this approach interest groups agree on the need to reform, but each wants the main costs of reform to be borne by some other group. An alternative approach argues that groups may find it rational to delay reform even if they correctly foresee the deterioration of the economy and thus the costliness of waiting. The key to this initially puzzling finding is uncertainty about the postreform environment.

Though these approaches are useful, a number of issues on the relation between adverse circumstances and the impetus to reform remain to be addressed. The first is the argument that a crisis is beneficial for reform because it causes policymakers to focus their attention on the problem. Why would a policymaker wait until the situation has so deteriorated that reform is quite costly? The study

addressed this question by looking at the interactions of uncertainty about the permanence or temporariness of the economic deterioration (a signal extraction problem) and the need to retain political support in the face of multiple interest groups with different agendas. A second argument the study considered is that a crisis is beneficial for reform because it acts as a "cleansing" mechanism, removing economic and political distortions standing in the way of real reform.

The argument that crises beget reforms has become so widely accepted that some see it as the new conventional wisdom. The danger in such a view is that it obscures the cases where welfare-improving policy change is helped by good rather than bad times.

Any study of the role of crises in inducing reform must address the issue of the conditions under which the reverse might be true. Some have argued that the effect of external developments on policy choices (and on the credibility of the government's commitment to policies) depends very much on how external circumstances affect the information that reforms convey. A policy change undertaken under one set of circumstances may convey little information about the government's commitment to reform. This study asked both when reform will signal future policies in such a way as to evoke an especially favorable response from investors and how external developments can induce reforms (or may hinder them) when the information content of reform is important.

Responsibility: Policy Research Department, Macroeconomics and Growth Division—David Dollar (ddollar@worldbank.org) and William Easterly. With Allan Drazen, University of Maryland at College Park; and Charles Chang.

Completion date: April 1997.

Comparative Analysis of Growth

Ref. no. 681-37

This study has two main objectives: to establish the limitations for development policy of much of the output of recent research on growth and to bring into the analysis suggestions from the development literature largely ignored in Barro-type regressions.

Preliminary results confirm the fragility of many of the important results of growth regressions. Splitting a broad sample of countries by region, population size, income, and decade produce markedly varied coefficients and levels of statistical significance. The fragility of statistics commonly used in growth regressions is also apparent when results derived by taking out one country at a time are compared.

Standard variables and specifications have very weak explanatory power at the sectoral level, but initial sectoral composition seems to have a significant effect on aggregate growth. Economic size and the availability of natural resources are shown to be useful for explaining growth.

Analysis of sustained periods of high growth suggests that countries that have managed to grow for a prolonged period at an annual rate of 7 percent have remarkably few things in common.

The current phase of the research focuses on Africa and Latin America, studying the effects of initial conditions, neighborhood growth, and natural resources on growth rates and income levels.

Two papers are in preparation, one on the robustness (or lack of robustness) of growth regressions and the other on the proximate sources of growth in Africa and Latin America.

Responsibility: Research Advisory Staff—Moshe Syrquin (msyrquin@worldbank.org). With Charles Kenny.

Completion date: September 1997.

Impact of Intergovernmental Grants

Ref. no. 681-58

Every attempt at fiscal decentralization involves the assignment of taxes and expenditures to different levels of government and a system of intergovernmental grants. In theory these instruments should be used to improve allocative efficiency, equity, and macroeconomic stability. Central governments have tended to transfer more spending responsibilities to local governments than revenue, using intergovernmental grants to fill the resulting gap. By their nature, intergovernmental grants tend to divorce local spending from local revenues and to separate the benefits of providing local public services from the costs. They may also lead to inefficient and inequitable delivery of social services. These problems can become more severe, the more local governments rely on intergovernmental grants and the less accountable they are to local residents. Because of the limited ability of local governments in developing countries to raise revenue from their own sources, however, intergovernmental grants will continue to be a heavily used instrument of fiscal decentralization. So it is crucial to evaluate the effect of intergovernmental grants on the behavior of local governments.

Through lending and nonlending advice, the World Bank is helping clients reform their systems of intergovernmental grants as part of a program to improve intergovernmental fiscal relations and macroeconomic management. But the Bank's advice is based on analysis

of primarily industrial countries' experience with intergovernmental grants and so may be of little relevance to developing countries. Compared with industrial countries, developing countries tend to have a much more limited set of intergovernmental grants, greater separation of taxing and spending decisions, and weaker institutional capacity to carry out intergovernmental fiscal arrangements.

This research aims to provide a positive analytical framework more suitable for evaluating the impact of intergovernmental grants on the level and composition of local public spending in developing economies and to apply the framework to a cross-country panel data set and two country case studies, Bangladesh and China.

Responsibility: Policy Research Department, Public Economics Division—Heng-fu Zou (hfzou@worldbank.org) and Tao Zhang. With Ling Li, Towson State University; Biyun Ha, Stanford University; and Liutang Gong, Wuhan University.

Completion date: November 1997.

A Unique Data Set to Test Hypotheses about Inflation and Stabilization

Ref. no. 681-77C

Why are some countries much more prone to inflation than others? Is it that people in some countries are culturally more averse to inflation? Or is this aversion an endogenous function of past and current inflation experiences? There are two well-known hypotheses about inflation aversion, both of which seem commonsensical. Yet these two commonsensical hypotheses contradict each other.

The first hypothesis is that countries with a history of high inflation become inflation-averse. The second hypothesis is that countries with high inflation "get used to it." These hypotheses, although frequently mentioned in the literature, have not been explicitly tested. The existing literature on inflation aversion focuses mainly on the tradeoff with unemployment or on the general public's knowledge of economics.

Because inflation has distributional effects between income classes and between debtors and creditors, knowing who is averse to inflation and who isn't is important in understanding when anti-inflation coalitions will form. This study analyzed these questions using a data set from a Roper Starch Worldwide Survey conducted in 1995 in 41 countries. The survey asked respondents to rank important concerns, including inflation, and so allows assessment of inflation aversion in a country. A separate analysis of countrywide averages for several countries arrived at the puzzling finding that inflation was ranked as a seri-

ous problem in some countries that have relatively low inflation.

The data include information on each respondent's age, income, occupation, gender, marital status, and education level. Because the survey asked about class resentment, the data set allows testing of another hypothesis about inflation: that countries polarized by, say, income class will be slower to stabilize because each faction will try to make others bear the costs of stabilization. The study was thus able to compare the effect of class polarization with that of high or low aversion to inflation.

Responsibility: Policy Research Department, Macroeconomics and Growth Division—William Easterly (weasterly@worldbank.org). With Alberto Alesina, Harvard University; and Giuseppe Iarossi.

Completion date: June 1997.

Fiscal Decentralization and Fiscal Performance

Earlier analyses of the relationship between fiscal decentralization and the size of the government treat fiscal decentralization as the decentralization of either taxing or spending powers. But decisions about taxation and spending are inseparable. This research corrected this deficiency, analyzing the effect of simultaneous decentralization of taxing and spending powers on the size of the public sector using cross-country data. The analysis used an econometric model of government behavior.

The results show that simultaneous decentralization of a national government's taxing and spending powers tends to reduce the size of the public sector. They also indicate that revenue-sharing arrangements in which decisions about taxation are made by the national government tend to eliminate the constraining effect of the decentralized spending power. These findings suggest that to reduce the size of the public sector, countries should decentralize both taxing and spending decisions.

Responsibility: Policy Research Department, Public Economics Division—Heng-fu Zou (hfzou@worldbank.org).

Completion date: December 1996.

Latin American Growth Puzzle

After years of poor macroeconomic performance, many Latin American countries undertook ambitious programs of macroeconomic stabilization and structural reform in recent years. The policy changes created high expectations for the region. But some observers question whether

growth outcomes have measured up to expectations in several Latin American countries.

This study found evidence that the economic growth response to reforms in Latin America has not been disappointing. Because of the significant policy changes in Latin America by the 1990s and despite the global slowdown, the region returned to its historical per capita growth rate of 2 percent in 1990–93.

To obtain consistent estimates of the parameters linking policy variables and growth, the study used a dynamic panel methodology that both controls for unobserved time- and country-specific effects and accounts for the likely joint endogeneity of the explanatory variables.

Responsibility: Policy Research Department, Macroeconomics and Growth Division—Norman Loayza (nloayza@worldbank.org) and William Easterly. With Peter Montiel, Williams College.

Completion date: December 1996.

Report:

Easterly, William, Norman Loayza, and Peter Montiel. Forthcoming.

“Has Latin America’s Postreform Growth Been Disappointing?”

Journal of International Economics.

New Dimensions in Public Expenditure Analysis

This project attempted to show ways to put into practice a standard public economics approach to public expenditure analysis. This approach tries to evaluate spending in different sectors on the basis of the degree to which it contributes either to improving efficiency by alleviating a market failure or to reducing poverty. While market failure or poverty is a necessary condition for public intervention, public spending may not be the most appropriate instrument, and since public money comes at a premium, alternatives should be examined. Potential correction of market failure must be balanced by limitations of public action—so-called government failures.

This project was partly a compendium and dissemination strategy for previous studies and partly new analysis to fill in gaps in the logical structure laid out. New elements included a study to measure the external benefits of primary education in Thai agriculture, using data from a repeated income and consumption survey, and theoretical work on modeling market structures, particularly those in the social sectors and those relating to risk management (such as insurance).

The project produced several key findings:

- Attempts at quantifying market failures and distributional impacts, while difficult, can usefully motivate discussions of public expenditures.

- The external benefits of primary education appear to be a very large fraction of the private benefits.

- Targeting public expenditures involves significant costs and does not always do better in reaching the poor than self-targeted or even universal programs.

- Variation in institutional structure can have a significant impact on the quality of expenditure outcomes at a national level—in the design of decentralized schemes and in the provision of services.

This project provided inputs to several training activities in the Bank, including a seminar, *New Directions in Public Expenditure Analysis*, on June 4–6, 1997, with 40 Bank and outside participants; a course on public expenditure analysis in May 1997 with 25 participants; components of courses on the economics of poverty and project evaluation; and several seminars on aspects of public expenditure analysis (frequently as applied to social sectors) in operational departments of the Bank. Dissemination activities outside the Bank include a course on public expenditure analysis in the former Soviet republics in Vienna in October 1996 and a course on public expenditure analysis in Sub-Saharan Africa in Washington, DC, in February 1997.

Responsibility: Policy Research Department, Public Economics Division—Jeffrey Hammer (jhammer@worldbank.org), Shantayanan Devarajan, Sanjay Pradhan, Sethaput Suthiwart-Narueput, Vinaya Swaroop, Dominique van de Walle, and Heng-fu Zou. With David Wildasin, Vanderbilt University.

Completion date: June 1997.

Reports:

Devarajan, Shantayanan, and Jeffrey S. Hammer. 1997. “New Directions in Public Expenditure Analysis.” World Bank, Policy Research Department, Washington, DC.

_____. 1997. “Public Expenditures and Risk Reduction.” World Bank, Policy Research Department, Washington, DC.

Gertler, Paul, and Jeffrey S. Hammer. 1997. “Pricing Strategies for Publicly Provided Health Services.” Paper presented at the World Bank conference Health Reform Strategies in Developing Countries, Alexandria, Virginia, March.

Swaroop, Vinaya. 1997. “Experience with Public Expenditure Reviews.” World Bank, Policy Research Department, Washington, DC.

van de Walle, Dominique. 1997. “Broad or Narrow Targeting?” World Bank, Policy Research Department, Washington, DC.

The Economics of the Informal Sector

This study started from the view that the informal economy arises when excessive taxes and regulations are imposed by governments that lack the capability to enforce compliance. The research studied the determi-

nants and effects of the informal sector in an endogenous growth model whose production technology depends essentially on congestable public services. The model concluded that changes—in policy parameters and the quality of government institutions—that promote an increase in the relative size of the informal economy will also generate a reduction in the rate of economic growth.

The study then used data from Latin American countries in the early 1990s to test some of the implications of the model and to estimate the size of the informal sector in these countries. The empirical approach consisted of relating the size of the informal sector to a latent variable for which multiple causes and multiple indicators exist. The size of the informal sector was found to depend positively on proxies for tax burden and labor market restrictions and negatively on a proxy for the quality of government institutions. The empirical results also suggest that an increase in the size of the informal sector negatively affects growth by reducing the availability of public services for everyone in the economy and by increasing the number of activities that use some of the existing public services less efficiently or not at all.

Responsibility: Policy Research Department, Macroeconomics and Growth Division—Norman Loayza (nloayza@worldbank.org).

Completion date: July 1997.

Report:

Loayza, Norman. 1996. "The Economics of the Informal Sector: A Simple Model and Some Empirical Evidence from Latin America." *Carnegie-Rochester Conference Series on Public Policy* 45.

Applied Macroeconomic Models for Developing Countries

Applied macroeconomic models are an essential tool for evaluating countries' policy options and growth prospects under different scenarios. In recent years the World Bank has put significant effort into developing a family of policy-oriented macroeconomic models for use in its operational work. These models range from simple accounting frames to more complex tools with rich behavioral content firmly grounded in economic principles.

This research is reviewing and evaluating these models with the aim of producing a book on its results. It has four objectives. The first is to put the Bank models in a broader perspective by comparing them with applied macroeconomic frameworks for developing countries used by other international institutions and the policy-making community. The research has carried out a comparative analytical review of applied macroeconomic

models, taking stock of the field and providing the necessary reference for evaluating the Bank models. The review encompassed policy-oriented analytical frameworks ranging from rudimentary financial programming devices to relatively sophisticated macroeconomic models embodying a careful treatment of expectations and dynamics.

The second objective is to describe and document the structure of the Bank models and their application to specific countries. The research is completing the application of prototype versions of Bank models to the analysis of macroeconomic policies in specific developing countries, comparing the outcomes of policy experiments, and relating them to the structure and features of the analytical frameworks.

The third objective is to evaluate the application of models at the Bank from the point of view of users. For this purpose the study conducted a survey of model users, focusing on the objectives, the structure, the cost, and the performance of models. The study's fourth objective is to draw methodological and practical lessons from the Bank's experience with the design and use of applied macroeconomic models.

On the whole, users of applied models at the World Bank report high satisfaction with them. But more complex models—those with richer behavioral content—are typically found more satisfactory because of their superior ability to portray an economy's response to policy changes and external shocks. They also require more resources for development and maintenance. From the user's point of view, there is a steep tradeoff between a model's sophistication—its behavioral content and capacity to trace through the impact of policy and external disturbances—and its cost. That suggests that upgrading to more complex policy-oriented models should be highly selective.

Responsibility: Policy Research Department, Macroeconomics and Growth Division—Luis Servén (lserven@worldbank.org). With Klaus Schmidt-Hebbel, Banco Central de Chile; Peter Montiel, Williams College; Jaume Ventura, Harvard University; Rodney Chun, Cornell University; and Douglas Smith, Columbia University.

Completion date: December 1997.

Reports:

Montiel, Peter. 1994. "Applied Macroeconomic Models for Developing Countries." World Bank, Policy Research Department, Washington, DC.

Schmidt-Hebbel, Klaus, and Luis Servén. 1994. "Fiscal Policy in Classical and Keynesian Open Economies." Policy Research Working Paper 1299. World Bank, Policy Research Department, Washington, DC.

_____. 1995. "Dynamic Response to External Shocks in Classical and Keynesian Economies." In D. Curie and D. Vines, eds., *North-*

- South Linkages and International Macroeconomic Policy*. Cambridge: Cambridge University Press.
- _____. 1995. "Fiscal Adjustment and the Exchange Rate under Rational Expectations in Chile." World Bank, Policy Research Department, Washington, DC.
- _____. 1995. "Fiscal and Monetary Contraction in Chile: A Rational Expectations Approach." Policy Research Working Paper 1472. World Bank, Policy Research Department, Washington, DC.
- _____. 1995. "Hacia una menor inflación en Chile: contracción monetaria bajo expectativas racionales." In F. Morande and A. Rosende, eds., *Análisis empírico de la inflación en Chile*. Santiago: ILADES.
- _____. 1996. "Ajuste fiscal y tipo de cambio bajo expectativas racionales en Chile." In F. Morande and R. Vergara, eds., *Análisis empírico del tipo de cambio en Chile*. Santiago: Centro de Estudios Públicos.
- Ventura, Jaume. 1995. "World Bank Macroeconomic Models: Findings and Suggestions." World Bank, Policy Research Department, Washington, DC.

Structural Adjustment Participatory Review Initiative

This project grew out of a meeting between World Bank President James Wolfensohn and a group of international nongovernmental organizations (NGOs) that had expressed a desire to work with the Bank in evaluating structural adjustment. A Bank team was assembled from different departments to work with the NGOs in designing an evaluation method that highlights the importance of a participatory approach. Through a series of public forums and in-depth field investigations, the project aims to improve understanding about the effects of adjustment policies and about how broad participation of local civil society can improve policymaking. The initiative will attempt to identify practical changes in economic policies for both governments and the Bank.

The main issues to be investigated in the study will be determined by joint Bank, government, and NGO or civil society committees in each of the study countries. These countries include Bangladesh, Ecuador, El Salvador, Ghana, Mali, Uganda, and Zimbabwe. The project was officially launched in Washington, DC, on July 14, 1997, as the First Global Forum. Subsequent launches in the participating countries will take place through public forums at which the main issues of concern to NGOs and civil society will be presented and discussed with Bank and government officials. Persistent areas of concern that are seen as priority issues by the joint committees will be investigated in fieldwork.

The fieldwork forms the core of the project's research. Consistent with the consultative, participatory nature

of the project, the research will use an innovative approach to ensure that several methods of analysis—from qualitative to quantitative to new participatory methods—will be used. The fieldwork will begin in most of the case study countries in the fall of 1997 and is expected to take up to 12 months.

The research is expected to contribute to a better understanding of certain policies and should have a direct impact on the Bank's operational work. But perhaps more important, it should suggest new ways of approaching problems, given its emphasis on combining qualitative and quantitative methods. Once the results of all the studies have been analyzed, compiled, and discussed in a second series of national public forums, a final report will be drafted and presented for discussion at a Second Global Forum in Washington, DC.

Responsibility: Policy Research Department, Office of the Director—Lyn Squire (lsquire@worldbank.org), and Poverty and Human Resources Division—Emmanuel Jimenez and Branko Milanovic; Poverty and Social Policy Department—Lionel Demery, Andrew Mason, John D. Clark, and Alex Rondos; Human Development Department, Office of the Director—Jacques van der Gaag; and External Affairs Department, Issues Management Team—Kris Martin. With Constance Newman and Rajiv Kochar. The Norwegian Royal Ministry of Foreign Affairs Trust Fund is contributing funding for the research.

Completion date: June 1998.

Tools for Fiscal Analysis

The Public Economics Division has developed a simple yet flexible tool for the quantitative analysis of fiscal policies. Called the 1-2-3 model, this general equilibrium model of an open economy enables policy economists, using a popular spreadsheet format and little more than national accounts data, to calculate the likely impact of proposed policy changes, such as the effect of trade liberalization on the real exchange rate or the revenue impact of replacing trade taxes with domestic indirect taxes. The model has been adopted in several countries in Africa, including the CFA countries, Botswana, Swaziland, and Zimbabwe, and in such countries as India, Latvia, and Morocco.

The model is being integrated into RMSM-X, the World Bank's standard accounting framework, so that it can be used to generate policy scenarios or standard tables for country assistance strategies and unified surveys. A dynamic version of the framework also has been developed to examine the impact of fiscal policy on investment and growth. Future development of this tool will consist of econometric estimation of key parame-

ters of the model and the linking of similar models to household-level data to examine the interaction between macroeconomic policies and income distribution.

More than 250 copies of the fiscal analysis tool (on computer diskette) and 450 copies of the corresponding working paper have been distributed in training seminars and research fairs and to individuals in governments and the academic community.

Responsibility: Policy Research Department, Public Economics Division—Delfin S. Go (dgo@worldbank.org), Shantayanan Devarajan, Shankar Acharya, Sethaput Suthiwart-Narueput, and Vinaya Swaroop; and International Economics Department, Development Data Group—Jos Verbeek. With Bernardin Akitoby, Montreal University; Tarhan Feyzioglu, Georgetown University; Min Zhu; Hongyi Li; Suehail Issa; and Etsuyo Michida.

Completion date: December 1998.

Reports:

Devarajan, Shantayanan. 1997. "Real Exchange Misalignment in the CFA Zone." *Journal of African Economies* 6(March):35–53.

Devarajan, Shantayanan, and Delfin S. Go. Forthcoming. "The Simplest Dynamic General Equilibrium Model of an Open Economy." *Journal of Policy Modeling*.

Devarajan, Shantayanan, Delfin S. Go, Jeffrey D. Lewis, Sherman Robinson, and Pekka Sinko. 1997. "Simple General Equilibrium Modeling." In J. François and K. Reinert, eds., *Applied Methods for Trade Policy Modeling*. Cambridge: Cambridge University Press.

Devarajan, Shantayanan, Delfin S. Go, Sethaput Suthiwart-Narueput, and John Voss. 1997. "Direct and Indirect Fiscal Effects of the

Euro-Mediterranean Free Trade Agreements." Paper presented at the Mediterranean Development Forum, Knowledge and Skills for Development in the Information Age, Marrakech, Morocco, May 12–17.

Joint Policy Research Department– Africa Region Work Program on African Development

Achieving accelerated economic growth and poverty reduction in Sub-Saharan Africa may be the biggest challenge for the development economics profession and the World Bank. The Bank's Policy Research Department and Africa Regional Office initiated a joint effort to develop a work program on salient issues on which further analytical work could lead to improved policy outcomes in Africa. Preliminary work has identified seven issues: equitable rural development, trade and industrial policy, finance, public resource management, private capital flows, debt, and country selectivity.

The work program consists of a set of research projects on these topics carried out in 10 sample countries so that the interaction among the topics can be assessed. The work involves collaboration with African researchers and outside institutions.

Responsibility: Policy Research Department, Public Economics Division—Shantayanan Devarajan (sdevarajan@worldbank.org); and Africa Regional Office, Office of the Vice President—Alan Gelb.

Completion date: June 2000.

INTERNATIONAL ECONOMICS

Determinants of Japanese Foreign Direct Investment: Policy Implications for Developing Countries

Ref. no. 679-35C

This research empirically examined the main determinants of foreign direct investment (FDI) from Japan, which has emerged as a leading source of FDI for developing countries, and analyzed the implications for the direct investment policies of developing countries. The study also investigated the effects of FDI flows on other economic variables, particularly to ascertain the link between FDI and trade flows. The research developed a theoretical framework in which the major determinants of FDI and the relationship between FDI and trade could be rigorously explored, conducted a regression analysis in both time-series and cross-sectional settings, and assessed the policy implications of the results. The analysis drew on balance of payments data, Japanese Ministry of Finance notification data, survey data series, and host country data.

The relationship between FDI flows and various economic variables was estimated by using pooled cross-country and time-series data to control for country-specific and time-specific effects, paying particular attention to the differing characteristics of industrial and developing countries as investment locations for Japanese multinational firms.

The results indicate robust exchange rate effects on Japanese FDI for a variety of specifications and samples. These results confirm that appreciation of the yen had a positive impact on outflows of Japanese FDI and suggest that the substitutability of Japanese FDI and exports became stronger in recent years. Another important finding is the positive and statistically significant effect of the intensity of research and development in the host country on Japanese FDI. This provides support for the theory that Japanese FDI tends to be trade-oriented and focused in sectors where Japan is about to lose its competitiveness. In addition, profit and tax variables were found to be more significant in explaining the trend in Japanese FDI than conventionally believed. The regression estimation provides strong empirical support for the theory that an increase in effective corporate tax rates in the host country could increase inward FDI, reflecting the fact that Japan is a relatively high-tax country that has adopted the foreign tax credit system.

The study examined the effects of Japanese FDI on the pattern and characteristics of host country trade, focusing on differences in trade behavior between Japanese-owned firms and other multinational firms (especially U.S. firms). The first significant finding is that host country trade may become more sensitive to exchange rate movements as the share of multinational trade increases. This suggests that multinationals have flexibility in determining where to produce a particular product, taking advantage of changes in exchange rates and other location-specific advantages. Regression results reveal that exports by foreign-owned firms have responded more to exchange rate movements than have exports by the parent companies. The exports of Japanese affiliates have shown greater sensitivity to changes in exchange rates, with estimated coefficients three times those for other foreign firms in manufacturing.

The study found evidence providing partial support for the common proposition that foreign firms, especially Japanese-controlled ones, are more import-oriented than local firms in the host country, worsening the country's trade balance. But panel regressions suggest that the negative trade balance effect of Japanese FDI applies mostly to industrial countries; no significant adverse trade balance effects were detected for Japanese FDI in Asian developing countries. On the question of whether Japanese FDI is trade-creating or trade-substituting, the study's empirical results strongly support the theory that it is trade-creating. This effect is more apparent in Asian newly industrializing economies than in major industrial countries.

The study's results will be used as inputs to regular reports of the Bank, such as *Global Economic Prospects and the Developing Countries*. They are also expected to contribute to policy formulation and dialogue in developing countries on promoting FDI flows and enhancing economic integration as well as to operational cross-support.

Responsibility: International Economics Department, International Finance Division—Kwang W. Jun (kjun@worldbank.org). With Joosung Jun, Yale University; and Ewha University, Republic of Korea.

Completion date: November 1996.

Reports:

Jun, Kwang W., and Joosung Jun. 1996. "Japanese Foreign Direct Investment and Host Country Trade." World Bank, International Economics Department, Washington, DC.

_____. 1996. "Japanese Foreign Direct Investment: Trends and Determinants." World Bank, International Economics Department, Washington, DC.

Foreign Direct Investment Spillovers in Developing Countries

Ref. no. 680-07

Many developing countries see foreign direct investment (FDI) as a key element of their development strategies and seek to attract it through a variety of financial incentives. They view FDI as a source of important direct benefits for the host country—financing new firms or business expansions, creating jobs, and generating tax revenues. They also believe that FDI produces important indirect benefits for domestic firms—spillovers—from the accelerated transfer of superior technology, turnover of skilled labor, and increased export opportunities through links with multinational corporations and foreign buyers. This study seeks to quantify the most important spillovers from FDI and to investigate the mechanisms through which these spillovers occur.

In the course of the research the study has shifted its focus to just two developing economies—Malaysia and Mexico—where firm-level cross-section and panel data are available on foreign ownership, research and development (R&D) spending, training, and production. Data on the production, R&D spending, and worker training of foreign firms are used to characterize the presence and importance of FDI and to estimate the potential technology and skill spillovers of FDI for a sample of domestic firms. The effects of FDI on domestic firms are measured through frontier production function model estimates of the efficiency-enhancing effects of FDI on domestic firms, through aggregate measures of FDI presence, and through measures of the technological and training activities of foreign firms.

Early results based on cross-section data—for 1992 for Mexico and 1994 for Malaysia—are promising. Frontier production function estimates indicate that in both countries domestic firms have levels of technical efficiency that lag significantly behind those of multinational corporations, while joint ventures have intermediate levels of efficiency. More interesting is the evidence that the larger the foreign presence, as measured by the FDI share of industry output or employment, the higher the efficiency levels of local firms. In Mexico the evidence also suggests that R&D by foreign firms raises the productivity of local firms in the same industry, suggesting that technology spillovers are important. In Malaysia it is R&D by joint ventures that has the most significant effect on domestic firms. In Mexico no evidence was found for skill

spillovers from training by foreign firms. In Malaysia, by contrast, the intensity of training provided by multinational corporations has a positive impact on the efficiency of local firms.

To better identify the nature of FDI spillovers, the study is augmenting the cross-section analyses with panel analyses. For Malaysia, panel data linked to the 1994 survey are now available for 1973–94, and analysis of these data has begun. Access to the linked 1992–95 panel data for Mexico is still being negotiated. When both data sets are in hand, the study will compare and contrast the extent and nature of vertical and horizontal flows between firms of know-how, technology, technical assistance, quality control, and skills upgrading, and then investigate the effects of these links on the technical efficiency of firms.

When completed, this research should provide developing country policymakers and Bank staff with new insights into the nature of FDI spillovers, the role of inter-firm links and industry clusters in technology diffusion and skills upgrading, and potentially useful policy instruments for promoting these links and boosting growth in technical efficiency.

Responsibility: Private Sector Development Department—Hong Tan (htan@worldbank.org), Geeta Batra, and Xiaomin Chen.

Completion date: June 1998.

Reports:

Tan, Hong, and Geeta Batra. 1995. "Technology Spillovers from FDI: Evidence from Mexico." PSD Working Paper. World Bank, Private Sector Development Department, Washington, DC.

World Bank. 1997. *Malaysia: Enterprise Training, Technology, and Productivity*. World Bank Country Study. Washington, DC.

Analytical Perspectives on Aid Effectiveness in Africa

Ref. no. 680-18C

This project consisted of two main theoretical papers exploring the analytical links between aid and policy formation. The first paper, on policy conditionality, argues that a theory of policy persistence is needed for long-run policy conditionality to make sense. It then develops a lobbying model in which temporary policies induce policy-specific investments that then "lock in" the policies. The paper discusses the implications of the analysis for the design of conditionality programs.

The second paper, on aid, taxation, and development in Sub-Saharan Africa, surveys cross-country empirical evidence and theory on the damaging effects of high and uncertain taxation of capital in Sub-Saharan Africa. It develops a theoretical model in which an endogenous tax rate affects the composition and growth of invest-

ment in a political equilibrium that captures key features of African systems of personal rule. The model is used to study the role of aid conditionality in creating restraints on future policy, under the assumption that donors act as the agents of the recipient country's private sector. The analysis formalizes currently popular views about the importance of political economy and helps to explain the recent shift from economic to political conditionality. The paper argues that effective design of policy conditionality requires an understanding of domestic political institutions and their evolution.

Both papers attempt to formalize political aspects of conditionality that are extremely important in practice but have received little analytical attention in the economics literature. They are expected to contribute to more rigorous policy discussions of aid conditionality and to encourage the adoption of explicit models of political economy in analytical work.

Responsibility: Policy Research Department, Macroeconomics and Growth Division—Christine Jones (cjones4@worldbank.org). With Stephen A. O'Connell, Swarthmore College; Christopher S. Adam, Oxford University; and Stephen Morris and Stephen Coate, University of Pennsylvania.

Completion date: February 1997.

Reports:

Adam, Christopher S., and Stephen A. O'Connell. 1996. "Aid, Taxation, and Development: Analytical Perspectives on Aid Effectiveness in Africa." World Bank, Policy Research Department, Washington, DC.

Coate, Stephen, and Stephen Morris. 1995. "Policy Persistence." University of Pennsylvania, Wharton School and Department of Economics.

_____. 1996. "Policy Conditionality." University of Pennsylvania, Wharton School and Department of Economics.

Is Finance a Barrier for Small and Medium-Size Enterprise Exports in Mercosur?

Ref. no. 680-39C

Exports have more than tripled among the four original members of Mercosur (Argentina, Brazil, Paraguay, and Uruguay) since 1990. Large firms have led this growth, while small and medium-size enterprises (SMEs) have lagged behind. This research examined the extent to which access to credit, particularly from commercial banks, affects the ability of small firms in Mercosur to take advantage of export opportunities created by the regional trading bloc. While SMEs can finance small domestic orders with internal resources and with short-term credit from input suppliers, export orders increase the importance

of bank credit, which has longer maturities and is not tied to a specific input purchase.

To evaluate the effect of credit on SME exports in Mercosur, the study conducted a survey in the four original member countries of about 350 formal sector firms in manufacturing and services. The firms had an average of about 40 full-time employees and assets of less than \$3 million. The questionnaire covered export behavior, use of formal finance, general characteristics (age, size), and credit transactions with banks and suppliers.

The youngest firms were the most dynamic exporters. Firms established in the past 10 years generated about 40 percent of sales from exports, compared with only 13 percent for the oldest firms (48 years or older). Smaller firms' exports were less concentrated in Mercosur than larger firms', consistent with trade statistics showing that larger firms benefit most from Mercosur. The percentage of exports with financing backed by letters of credit and other legal documents was low across the sample and exhibited no clear trend by firm size or age.

The smallest firms had an average of slightly more than two banks and received credit from 1.5 institutions. The largest enterprises dealt with more than six banks and received credit from more than four of them. This number of banking relationships is relatively high and may contribute to information asymmetries between borrowers and lenders in the SME market. The share of bank credit in total credit showed no clear relation with size, but reliance on supplier or trade credit fell with size, indicating that firms reduce their dependence on this costly source of finance as they grow.

To test for the effect of bank credit on exports, empirical models were estimated using ordinary least-squares regression analysis. The dependent variable was the share of exports in firm sales; independent variables included firm size, age, use of different types of credit, and the nature of the bank-business relationship. The size of the firm in terms of asset value had no effect on export performance, but size in terms of employment had a statistically significant and negative impact, indicating that more capital-intensive firms perform better in foreign markets. The age of the firm was negatively correlated with the share of exports in sales, but the number of years exporting yielded a positive and statistically significant correlation—more experience means a greater share of sales from exports.

The percentage of credit that firms received from banks tested both positive and significant, indicating that greater access to bank finance has a positive effect on exports. Foreign lines of credit showed the strongest relationship with export success. Publicly sponsored lines of credit demonstrated a negative, but not statistically significant,

impact on export performance, and the share of credit from suppliers a negative and statistically significant effect.

Also shown to have a positive impact on export performance is the strength of the bank-business relationship, as proxied by the number of years the firm owner knew the loan officer in the firm's primary bank, the number of years the firm had done business with that bank, and the physical distance between the firm and that bank. This finding suggests that it is important for small firms to establish a trusting relationship with a bank. The benefits may include improved access to credit or greater choices in financing—both critical ingredients for export success.

Regressions to determine which exporters were most sensitive to bank credit showed that smaller exporters and those concentrating their exports in Mercosur were both greatly affected by access to bank finance—more so than larger exporters or firms focused on exports outside the region. When the sample was divided by asset size and age, however, it was the larger firms (with more than \$1 million in assets) and the older firms (10 years or older) for which bank credit had a positive and statistically significant impact on exports. More capital-intensive firms also benefited more from bank credit. These results show that while less mature exporters benefit from bank finance, firms must also have a minimum size, age, and capital structure to access institutional credit and use it for exports.

Analysis of the survey data thus confirms the importance of bank credit for small firm exports in Mercosur, but also shows that not all bank credit is equally valuable. The negative correlation between publicly backed credit lines and exports argues for caution on direct intervention in credit markets. The finding that bank credit is most important for exports of firms above a minimum size does not mean that bank credit would not benefit the smallest firms, but more likely reflects the extent to which they are credit-rationed. The link between credit and export performance suggests that tariff reduction may not be sufficient to stimulate trade growth if other distortions are not addressed.

The importance of the bank-business relationship to credit availability is another significant finding, given trends in Mercosur that may weaken these ties. Consolidation in the financial sectors of Mercosur nations has reduced the number of cooperative banks, state banks, and development institutions that traditionally have been important sources of credit for SMEs. While efficiency concerns may dictate greater concentration in banking services, the effect on SMEs needs to be monitored.

The findings that younger firms are more likely to be export-oriented and that more export experience means a greater share of sales from exports suggest the impor-

tance for export growth of facilitating new business creation.

Findings from the research were presented at the ABCDE-LAC Conference in Montevideo, Uruguay, and at a conference on Mercosur in Buenos Aires, Argentina, both in July 1997. The survey database will be made available to interested researchers. This research forms part of the Mercosur study (Economic Integration: The Americas) directed by the International Economics Department, International Trade Division, and Latin America and the Caribbean, Country Department I, Country Operations Unit 1.

Responsibility: Latin America and the Caribbean, Country Department I, Public Sector Modernization and Private Sector Development Division—Margaret Miller (mmiller5@worldbank.org), and Country Operations Unit 1—Homi Kharas; Policy Research Department, Finance and Private Sector Development Division—Gerard Caprio; and International Economics Department, International Trade Division—L. Alan Winters. With Beatriz Alonzo; Virginia Moori, Economic Commission for Latin America and the Caribbean (ECLAC); Hi-Tech International; CERES; Glaucia Vasconcellos Vale, SEBRAE; Jairo Procianoy; Gladys Benegas; and ECLAC.

Completion date: June 1997.

Report:

Miller, Margaret, and Gerard Caprio. 1997. "The Role of Credit in Small and Medium-Size Enterprise Exports: The Case of Mercosur." Latin America and the Caribbean Economic Note 21. World Bank, Washington, DC.

Revenue Consequences of Trade Reform

Ref. no. 680-93

Trade liberalization can cause fiscal problems, especially in countries where tariffs are a major source of revenue. Many economists have discussed this issue, generally taking an aggregative and macroeconomic perspective. But projecting the probable effects of trade reform is difficult because of the lack of detailed data linking imports and revenue collections. This problem is particularly important where high tariff rates are combined with a pervasive system of exemptions and quantitative restrictions.

This project is supporting improved design and implementation of trade reform programs by exploiting new data that have recently become available in a standard format for a large number of developing countries. The new data come as a result of a customs administration system, ASYCUDA, that was developed and implemented by UNCTAD. Roughly 76 countries have adopted the system since 1985, and 14 more are in the process of

doing so. The data include all the information from the customs entry documents and an exhaustive coding of the system of rates and exemptions, including historical changes.

The project is in some respects a demonstration project. Four of the countries selected for the study are likely to undertake trade reforms as members of free trade areas with common external tariffs. Each of these countries faces challenges representative of those facing the other members of its trade group, many of which also have the ASYCUDA system. The project could therefore be extended to other countries in a way that will support the coordinated development of regional trade agreements.

Data have been collected for five countries—Belize, Benin, Ghana, Guatemala, and Zimbabwe—for 1995 and 1996. Data for 1997 will be collected in early 1998. For each country the tax rate file, the exemption code file, and the customs entry file have been extracted, converted to DOS, and loaded into a database program (Foxpro). The data have been subjected to exhaustive screening and cleaning to render them suitable for analysis.

The data for Zimbabwe were used to analyze the impact of proposed trade reforms by combining the new rates with the existing trade and exemption patterns under alternative assumptions about import elasticities. The data and the analysis were instrumental in assisting the government in framing its final tariff reform. Further analysis was done to assess the conformity of the changes with Zimbabwe's commitments under the Cross-Border Initiative, a regional trade agreement.

A similar analysis is under way for Ghana. Estimates of the revenue costs of the exemption system are being formulated and will be shared with the government and the International Monetary Fund.

A seminar was held in January 1996 to inform Bank staff and others about the project and to disseminate preliminary results of the studies. Twenty-five Bank and IMF staff attended.

Responsibility: International Economics Department, International Trade Division—Alexander Yeats (ayeats@worldbank.org) and John Nash. With Ronald D. Hood, Ron Hood Associates; and Daniel Radack.

Completion date: June 1998.

A Strategic Approach to Asset and Liability Management in Developing Countries

Ref. no. 681-23

The World Bank and investment bankers regularly provide advice to developing countries on asset and liability management. But that advice often is nonoptimal or

simply wrong. Although many tactical tools for active risk management in developing countries have been developed in the past decade, a framework for developing a strategy that incorporates country-specific factors has lagged far behind. Typical approaches to asset and liability management exclude trade flows, for example, resulting in strategies that are unrelated to any measure of the country's earnings potential and that ignore the natural hedges in the import and export sector.

This project has developed tools and guidelines that incorporate country-specific factors, including trade flows, to assist developing countries in devising an asset and liability management strategy. It is completing a general modeling process that includes trade flows and estimates of the sensitivity of imports and exports to commodity prices, interest rates, exchange rates, and other macroeconomic factors. The project is also carrying out a study of the application of the methodology and model to a few developing countries, emphasizing significant paradigm shifts over existing methodologies. The project plans include developing a training program and implementation plan for transferring the methodology and model to interested developing countries.

To provide practical input to the model development, a mission was undertaken to the Colombian Central Bank and Ministry of Finance. The mission not only led to substantial improvements in the strategic tools and guidelines being developed but also made clear that these tools would greatly enhance Colombia's capacity for asset and liability management and provide new techniques for risk analysis.

The project has formulated an asset model for the Central Bank, a liability model for the Ministry of Finance, and a combined asset and liability model to ease financial coordination between the two institutions. For the asset model the project has developed techniques for capturing the uncertainty structure of the joint stochastic movements of interest and exchange rates for use in the stochastic dynamic optimization model. Further work to add macroeconomic factors and commodity prices is under way. New computing tools for the solution of stochastic dynamic optimization problems have been developed, linked to a modeling system, and ported to a PC. The ability to work with a modeling system on a PC allows the user to introduce changes to the equation system (constraints, policies, and the like) and eases the tree generation process capturing the stochastic nature of the problem.

In continuing work this project will refine the tools and solution process developed with Colombia for understanding and analyzing risk and model solutions. It will investigate how best to integrate these tools into developing countries' operations and to accommodate their

policy objectives, by applying these techniques to at least one more developing country. These applications are being designed to ensure that the model will be treated as a tool for decisionmaking and not as a substitute for it.

Responsibility: East Asia and Pacific Regional Office, Office of the Regional Vice President—Stijn Claessens (sclaessens@worldbank.org); Information and Technology Services Department, Information Engineering Unit—Jerome Kreuser; and Financial Operations Department, Office of the Director—Lester Seigel. With Roger J. B. Wets, University of California at Davis; and Philippe Jorion, University of California at Irvine.

Completion date: May 1998.

Exchange Rate Policy and Medium-Term Adjustment and Growth in South Africa

Ref. no. 681-28

South Africa's blend of economic structures presents some difficult choices and tradeoffs. In exchange rate policy there is tension between the short-run concerns of a sophisticated financial sector and the longer-term objectives of the economy. This project examines the evolution of real exchange rate policy in South Africa and the implications for adjustment and economic growth. It does this by estimating econometrically the determinants of the equilibrium real exchange rate, assessing the implications under different policies, and extending the basic real exchange rate model to include the role of capital flows and the link with the optimum savings rate in an irreproducible resource-based economy. The research uses data from the South Africa Reserve Bank tape and World Bank databases.

For a spectrum of exchange rate regimes the study looks in detail at the evolution of economic fundamentals and short-run policy factors affecting the real exchange rate. A cointegration framework is used with single-equation econometric models to investigate the short-run and long-run equilibrium determinants of the exchange rate in 1970–96. Finally, the study calculates the misalignment of the exchange rate under different assumptions, including estimates of sustainable capital flows across exchange rate regimes. The research represents the first quarterly real exchange rate model with both real and monetary determinants to 1996 and includes estimates of misalignment for South Africa.

The research will provide an important input into Bank policy advice on exchange rate and capital flow management issues. Many Sub-Saharan African countries have significantly liberalized their spot markets, or are in the process of doing so, and are developing forward

markets, but with inadequately developed financial sector and regulatory institutions. South Africa's experience has important lessons to offer these countries. Its institutions are more developed, but it faces similar problems in exchange rate management, with limited reserves and commodity-dominated export sectors. The lessons from this research will also be of benefit to other emerging economies that have to manage volatile capital flows.

The results will be disseminated in academic, policy, and business forums and in conferences in South Africa and the United Kingdom and at the Bank.

Responsibility: Africa Technical Families, Macroeconomics 1—Yvonne Tsikata (ytsikata@worldbank.org) and Luiz Pereira da Silva. With Janine Aron, University of Oxford; Ibrahim Elbadawi, African Economic Research Consortium, Nairobi; and Brian Kahn, University of Cape Town, South Africa.

Completion date: June 1998.

Report:

Aron, Janine, Brian Kahn, and Luiz Pereira da Silva. 1997. "A Review of Exchange Rate Policies and Foreign Exchange Markets in South Africa since the 1960s."

Trade Reform: Incentives on the Ground

Ref. no. 681-33C

This project collected information on prices, outputs, inputs, labor employed, wages paid, and the like for a sample of manufacturing enterprises in selected African countries. These data were used to gauge the impact at the enterprise level of trade policy reforms in these countries and to analyze the response of African manufacturing enterprises to policy reforms that affected their business environment.

Responsibility: International Economics Department, International Trade Division—Michael Finger (mfinger@worldbank.org). With Mayank Raturi; Iris Balvany; Manju Kedia Shah; and Jim Tybout, Georgetown University.

Completion date: June 1997.

The Dynamic Impact of Trade Liberalization in Developing Countries

Ref. no. 681-40

International trade economists and Bank policy advice have typically argued that an open trade regime is very important for economic growth and development. This view has been based in part on neoclassical trade theory, which generally finds that trade liberalization improves a country's welfare; in part on casual empiri-

cal observation that countries that remain highly protected for long periods appear to suffer significantly and perhaps cumulatively; and in part on empirical work that also finds trade liberalization beneficial to welfare and growth.

Yet numerical estimates of the impact of trade liberalization have generally found that it increases the welfare of a country by only about 1 percent of GDP. These estimates have been based on comparative static models, however, and researchers typically claim that they would be much larger if they incorporated the dynamic gains from trade liberalization. These gains have not yet been quantified. This project is developing models that will quantify the relationship between trade liberalization and growth.

The development of endogenous growth theory has provided a clear theoretical link from trade liberalization to economic growth. Because of the complexity of the models, the theoretical literature has necessarily been based on rather aggregate models, and it has focused on the steady-state growth path, so it is difficult to gain insight into the dynamic growth path of the key variables. This project is developing applied general equilibrium endogenous growth models that should make it possible to obtain a number of important insights into the relationship between trade liberalization and growth. It focuses on the class of models that are relevant to developing countries—small open economies with technological change generated primarily in the rest of the world.

The research first quantifies the dynamic gains from trade liberalization, taking into account the adjustment costs associated with forgone consumption, so as to assess the claim that the dynamic welfare gains from trade liberalization are considerably larger than the comparative static estimates. Using a numerical model, it then investigates the importance of the availability of a variety of imported inputs into domestic production as well as technological spillovers on domestic production deriving from imported goods. After developing somewhat stylized models, the study applies the model to a small open developing economy that has recently undertaken trade liberalization and signed an important regional trade agreement. The analysis draws on the Global Trade Analysis Project database, the International Trade Division's database on tariffs, and input-output tables as appropriate.

Two draft papers have been produced. The first extends a comparative static analysis of Chile's trade policy options to a Ramsey-type dynamic model of Chile with constant returns to scale and perfect competition. It shows that simply adding a dynamic element to the analysis does not increase the welfare gains from trade liberalization much. The second paper develops a stylized,

somewhat aggregate computable general equilibrium model of a small open economy with endogenous growth entering through an Ethier-Dixit-Stiglitz variety productivity multiplier. Trade liberalization in this model dramatically increases welfare because it results in a significant increase in the number of varieties (technologies) available in the economy.

These results provide support for the strong version of the link between trade liberalization and economic growth. They should buttress the intellectual case in the development community for the importance of openness for growth. In later stages of the project, work will be aimed at providing more specific advice on regional trade arrangements and growth.

The findings are being presented at several conferences, including one in Paris in September 1997 and one in Copenhagen in June 1998.

Responsibility: International Economics Department, International Trade Division—David Tarr (dtarr@worldbank.org). With Thomas Rutherford, University of Colorado.

Completion date: November 1998.

Reports:

Rutherford, Thomas, and David Tarr. 1997. "Regional Trading Arrangements for Chile: Do the Results Differ with a Dynamic Model?" Paper presented at the ASSA meetings, New Orleans, January.

_____. 1997. "Trade Liberalization and Endogenous Growth in a Small Open Economy: An Illustrative Model." Paper presented at the conference Trade and Technology Transfer: The Evidence with Implications for Developing Countries, Milan, April.

Aid Allocation in a Federal System: A Case Study of India

Ref. no. 681-41

The institutional arrangements in an aid-recipient country form an important part of the mechanism of aid. This research project evaluates how institutional arrangements affect aid fungibility. It looks at two main issues: What part do the aid-recipient country's institutions play in the resource transfer process? Is aid likely to be more or less effective when the ultimate recipient of the aid is not the primary one, as is often the case in a federal structure of government?

The central government of India receives and is liable for all aid, including that earmarked for state government projects. The study looks at this system of aid disbursement to analyze the institutional, political, and economic factors inherent in a federal structure of government that might influence aid disbursement within the country and thus the effectiveness of aid. Another

objective of the research is to analyze whether or not the size of aid inflows relative to the national income of the recipient country matters in making aid work. One cross-country study has argued that aid is nonfungible only when it is a big share of the recipient country's national income. But sharp insights into such issues can only come through looking in detail at the process of resource transfer to a country. The project assesses whether funds given by donor agencies to India are fungible at the margin. It also looks at the fungibility issue at the state level of government.

To analyze the role of budgetary institutions, particularly the intergovernmental fiscal transfer mechanism, in making foreign aid effective, the project studies the aid experience of India in a model of aid fungibility. It uses a linear expenditure demand system to estimate the fungibility coefficient across different functional classifications of public spending. The main data sources are publications of the government of India. The analysis addresses two questions: First, has aid to India been fungible, and what part has center-state relations played in this regard? Second, if aid is fungible, is the small size of aid inflows to India (relative to its domestic resources) a factor in this? Would it be better to link aid with an agreed on public expenditure program in areas critical to development?

Preliminary results indicate that foreign aid is fungible at the central government level, but that funds given by the central government to state governments are spent for the intended purposes. The study's findings should be useful not only for donors but also for the central government of India, for planning better management of external and internal resources.

Responsibility: Policy Research Department, Public Economics Division—Vinaya Swaroop (vsvaroop@worldbank.org). With Shikha Jha, Indira Gandhi Institute of Development Research; and Andrew Sunil Rajkumar, University of Maryland at College Park.

Completion date: December 1997.

Implications of Financial Integration for Capital Market Reform: The Asian Experience

Ref. no. 681-48C

Portfolio investment flows encourage investment, increase liquidity, and often bring improvements in managerial and financial techniques. But these flows can increase volatility in emerging markets, especially if the capital market infrastructure and regulatory framework are not well developed. Developing countries grappling with the problem of how to attract foreign investment without unduly increasing volatility can learn from the experience of other economies that have already

embarked on ambitious capital market reform, notably those in Asia.

The purpose of this research project was to develop a systematic information base on the attributes of the major capital markets in Asia, including priorities and recent initiatives in reform, to develop perspectives on best practice and the sequencing of reforms in the context of intensifying financial integration. The study used a variety of methodological approaches, including reviews of previous and ongoing work on capital market reform in Asia and a survey of the region's stock markets and regulatory agencies. It also drew on the results of a workshop attended by representatives of the region's main stock markets and regulatory agencies and by private market participants.

The study found that emerging Asian markets have been able to make rapid progress in improving their market infrastructure in the 1990s by leapfrogging to state-of-the-art systems. The improved infrastructure has reduced risks (both systemic and settlement risks) and transaction costs and has played a key part in attracting increased portfolio flows.

Asian markets have placed particular emphasis on setting up central depositories to facilitate settlement and registration. Fast, reliable settlement is important in reducing systemic risk and volatility in markets, and shortening the settlement cycle to achieve the G-30 standard of settlement speed has been a central focus for regulators and exchange managers. Foreign institutional investors are less interested in G-30 speed standards, however, than in a system that may take a few more days to settle but is predictable.

Asian markets have also focused on improving their trading systems. All the markets in the study sample have instituted a computerized trading system or are in the final stages of putting one in place. Computerized systems improve transparency and efficiency, a prime concern of market authorities and participants, and can handle the rapid increases in the number and value of transactions that have occurred in most Asian markets.

Where Asian markets have made less progress has been in achieving delivery versus payment in the settlement process. With central depositories, the delivery side is generally working well. It is on the payment side that the system often fails, perhaps because of weaknesses in domestic banking and payment systems.

The public sector's role in capital markets is changing from one of direct intervention to one of support and oversight. All the countries in the sample have adopted the disclosure and self-regulatory model and are in the process of gradually expanding the role of self-regulatory organizations. Because their markets are still developing, however, this process is liable to be a

lengthy one, and the state will continue to play a more important role in Asian markets than it does in industrial countries. Many Asian markets suffer from poor disclosure practices, lack of protection of minority shareholder rights, concentrated and financially weak capital market intermediaries, and inadequate skills and training in the self-regulatory organizations. These weaknesses raise concerns about potential conflicts of interest in these organizations and their capacity to monitor and regulate markets.

Fixed income securities markets are relatively underdeveloped in Asia but are expected to develop rapidly in the years ahead. There are massive investment needs, particularly in infrastructure, that will require debt financing, and the development of domestic institutional investors will significantly increase the demand for fixed income instruments.

Asian countries are exploring ways to overcome key constraints to the development of bond markets. To develop price benchmarks, some countries have been issuing government securities regardless of budgetary needs, while others have promoted high-grade non-government securities with well-known and stable risk properties. Governments throughout the region are also reforming their tax codes or instituting tax concessions to eliminate or moderate tax discrimination against bonds. And country experience in Asia shows that developing market infrastructure greatly enhances activity and liquidity in bond markets.

Responsibility: International Economics Department, Office of the Director—Pedro Alba (palba@worldbank.org) and Amar Bhattacharya. With Ismail Dalla and Martin Edmonds, Washington Asset Management; Yoon Shik Park, George Washington University; Joan Boros, Katten Muchin and Zavis; and Elizabeth Morrissey, Kleiman International Associates. The Asian Development Bank contributed funding for the research.

Completion date: December 1996.

Report:

Bhattacharya, Amar, and Pedro Alba. 1996. "Implications of Financial Integration for Capital Market Reform: The Asian Experience." Background paper to World Bank, *Private Capital Flows to Developing Countries: The Road to Financial Integration* (New York: Oxford University Press, 1997). World Bank, International Economics Department, Washington, DC.

World Price Signals, Policy Reforms, and Domestic Commodity Price Behavior

Ref. no. 681-49

Agricultural policies in many developing countries have tended to isolate domestic prices from world price move-

ments either directly, through tax or subsidy mechanisms, or indirectly, through quantitative restrictions. These interventions have shifted resources into or out of agriculture, depending on whether the effect was to implicitly subsidize or implicitly tax the sector. A number of studies have found that both taxation and subsidization through these policies have harmful effects in developing as well as industrial countries.

During the mid-1980s and early 1990s many developing countries embarked on policy reforms under structural adjustment programs, usually with the assistance of multilateral and bilateral lending institutions. One of the objectives of such programs has been to move domestic prices close to international ones. The transmission of world price signals to domestic markets allows more efficient allocation of resources not only in the commodity sector directly affected but also in the overall economy.

This study examines the extent to which domestic prices move closer to world prices following policy reforms. It is expected that domestic price levels will be closer to world price levels and that changes in world prices will be transmitted to domestic markets more fully and at a higher speed.

Responsibility: International Economics Department, Commodity Policy and Analysis Unit—John Baffes (jbaffes@worldbank.org) and Panos Varangis. With Bruce Gardner, University of Maryland; and Mohamed Ajwad, University of Illinois.

Completion date: October 1997.

Implementation of the Uruguay Round Agreement on Agriculture: New Issues and Progress in Post-Round Liberalization

Ref. no. 681-69

The signatories to the Uruguay Round agreement on agriculture made commitments to liberalize agricultural trade in three ways: by converting nontariff barriers into bound tariffs and reducing border protection, by reducing trade-distorting domestic subsidies, and by reducing the value and volume of subsidized exports. But the agreement did not spell out how the commitments would be implemented. That raises the central question that this research will address: How and by how much do countries still restrict agricultural imports?

The research will look at how the current applied rates of protection are set relative to the bound rates and assess the trade restrictiveness of post-Round agricultural policies. It will evaluate the progress in liberalization by quantifying the reduction in applied protection during the post-Round regime. The data used will come from the

World Trade Organization, UNCTAD, the U.S. Department of Agriculture, and country officials.

The study will provide information useful in identifying policy issues for the next round of negotiation (due to commence in 1999) and in enhancing developing countries' participation in—and thus their gains from—the multilateral trading system. The results will also contribute to Bank trade policy advice on implementation of liberalization and structural adjustment programs to enhance post-Round trade policy reforms.

Responsibility: International Economics Department, International Trade Division—Merlinda D. Ingco (mingco@worldbank.org) and Daniel Radack. With Can Erbil, Boston College.

Completion date: June 1998.

Economic Policies and the Effectiveness of Foreign Aid

Ref. no. 681-70

This research, part of a larger Policy Research Department study of aid effectiveness, aims to answer several questions: Does aid have a positive effect on growth in the presence of good economic policies? Have donors systematically allocated assistance in favor of good economic policies? Has aid affected policies—for good or for ill? What factors influence the success or failure of structural adjustment programs supported by the World Bank and the International Monetary Fund? How can we reform aid to strengthen its support of policy reform and of growth?

The research includes a theoretical explanation of how aid might affect growth in the context of a neoclassical growth model and looks at the sensitivity of these effects to the introduction of strategic behavior on the part of policymakers. It uses an empirical approach to measure the effects of aid on growth and the interactions between aid and policy.

The research has produced a paper showing that aid has a positive effect on growth in a good policy environment but no effect in a poor policy environment. This finding suggests that foreign aid would have a greater impact on growth and poverty reduction if it were more systematically allocated to poor countries with good reform programs. The paper also shows that there has been some tendency to allocate multilateral aid to poor countries with good policies, but no such tendency for bilateral aid.

Findings have been presented at workshops at the Bank and the Fund and at academic meetings. They will also be presented at a symposium, cohosted by the Bank and Japan's Overseas Economic Cooperation Fund, that

will be held in Tokyo before the 1997 World Bank–International Monetary Fund Annual Meetings. In addition, the results will contribute to a planned World Bank Policy Research Report on aid effectiveness.

Responsibility: Policy Research Department, Macroeconomics and Growth Division—David Dollar (ddollar@worldbank.org). With Charles Chang.

Completion date: October 1997.

Report:

Burnside, Craig, and David Dollar. 1997. "Aid, Policies, and Growth." Policy Research Working Paper 1777. World Bank, Policy Research Department, Washington, DC.

The Implications of Rapid Growth in Large Developing Countries

Ref. no. 681-75

Several large developing and transition economies—China, India, Indonesia, Brazil, and Russia—have achieved or are likely to achieve more rapid growth and integration into the world economy as a result of policy reforms undertaken in recent years. These countries—the Big 5—contain about half the world's labor force. The objective of this research is to assess which countries or groups of countries are likely to be most affected by the emergence of these large developing countries and to derive broad quantitative estimates of the potential size of changes in world and national resource allocation, production, trade, and product and factor prices over the next 25 years as a result of this process. Taking these effects into account, the study will then explore what remedial policy measures affected countries can take to mitigate adjustment costs or take advantage of new opportunities.

Because of the critical importance of intersectoral resource allocation effects in the problem being studied and the need for global macroeconomic consistency, the research uses a multiregion, applied general equilibrium approach. The main data sources are the Global Trade Analysis Project database and a model constructed and maintained at Purdue University.

Model simulations suggest that the emergence of the Big 5 countries will generate significant benefits for industrial countries and for most other developing countries. These benefits include generally rising real wages for both skilled and unskilled workers, resulting from broader opportunities for specialization along lines of comparative advantage and from improved terms of trade. Moreover, half the growth in industrial country exports in the next 25 years is expected to be to developing countries, based in part on growing specialization in service exports.

Among developing regions, the Middle East and North Africa, Sub-Saharan Africa, and Latin America and the Caribbean will derive the largest welfare gains from the emergence of the Big 5. Lower relative prices for some labor-intensive products as a result of trade liberalization and increased participation by countries with abundant unskilled labor, such as China and India, may, however, generate some pressures on unskilled wages in a few countries with a closely similar structure of endowments. But these countries can offset such pressures by accelerating trade liberalization, a policy that tends to benefit the most abundant factor of production (unskilled labor), and by undertaking other policy reforms to improve the efficiency of their allocation and use of resources. The analysis also suggests that fears that fast growth in the Big 5 will generate significant increases in world food and energy prices do not appear to be well founded.

The information and analysis from this research should prove useful to developing country policymakers in designing policies to take advantage of the market opportunities and potential gains from specialization and trade that will arise as a result of the emergence of the large developing countries—as well as policies to ease adjustment to intensifying competitive pressures and reduce undue exposure to potential market risks.

Interim research results are summarized in the World Bank's *Global Economic Prospects and the Developing Countries 1997* (Washington, DC, 1997) and are being presented as part of an extensive international program of dissemination of the report in September 1997.

Responsibility: International Economics Department, International Economic Analysis and Prospects Division—Milan Brahmbhatt (mbrahmbhatt@worldbank.org), T. G. Srinivasan, and E. Mick Riordan. With Thomas Hertel, Purdue University.

Completion date: January 1998.

Africa and the International Economy

In the mid-1950s Sub-Saharan Africa accounted for 3.1 percent of global exports. By 1990 this share had fallen to 1.2 percent. What are the reasons for this decline? One view is that falling commodity prices and external protection in OECD markets are largely to blame. If so, the solution to Africa's problems would be liberalization of industrial countries' trade barriers. Another view is that Africa's marginalization is primarily due to inappropriate domestic policies that reduced the region's ability to compete. If true, changes in Africa's own policies would be essential to reverse the adverse trade trends. This research attempted to determine which of these explanations is correct.

Using newly collected information on international trade and trade barriers, the study found that loss of international competitiveness played a key part in Africa's declining importance in international trade. If Africa had merely maintained its 1962–64 OECD market shares for its major products, its exports now would be more than twice their current value. Also a factor is that global demand for the region's exports grew at a considerably slower pace than that for most other goods. Africa therefore suffered from a two-pronged problem—it experienced declining market shares for its key exports, which were of declining relative importance in world trade.

Empirical evidence provides no support for the proposition that external protection contributed to Africa's marginalization in global trade. The share of African countries' exports subject to nontariff barriers is far lower than that for other developing countries, some of which launched successful, sustained, export-oriented industrialization drives. In addition, tariff preferences under the European Union's Lomé Convention or under OECD members' generalized system of preference schemes provide Africa with more favorable terms of market access than those for many other exporters. Even so, the OECD countries have policy options available that could further enhance market access for African exports.

Responsibility: International Economics Department, International Trade Division—Alexander Yeats (ayeats@worldbank.org), Azita Amjadi, and Ulrich Reincke.

Completion date: January 1997.

Reports:

Amjadi, Azita, Ulrich Reincke, and Alexander Yeats. 1997. *Did External Barriers Cause the Marginalization of Sub-Saharan Africa in World Trade?* World Bank Discussion Paper 346. Washington, DC.

Amjadi, Azita, and Alexander Yeats. 1996. "Have Transport Costs Contributed to the Relative Decline of Sub-Saharan African Exports?" Policy Research Working Paper 1559. World Bank, International Economics Department, Washington, DC.

Yeats, Alexander, Azita Amjadi, Ulrich Reincke, and Francis Ng. 1997. *Did Domestic Policies Marginalize Africa in International Trade?* Directions in Development Series. Washington, DC: World Bank.

Measuring the Dynamic Gains from Trade

This research investigated the links between trade policy and economic growth in a cross-section of 53 countries between 1970 and 1989. It developed a new measure of trade policy openness based on the effective policy component of trade shares and used this measure in a simultaneous equations system aimed at identifying the effect of trade policy on several determinants of growth.

The results suggest that trade policy openness has a strong positive effect on economic growth. Improvements in the quality of government policy and accelerated accumulation of physical capital account for three-quarters of this effect; smaller effects operate through technology transfer and reduced economic distortions. The study found this decomposition to be robust with respect to alternative specifications and time periods, and testing of the model determined that it exhaustively captures the effects of trade policy on growth.

Responsibility: International Economics Department, International Economic Analysis and Prospects Division—Milan Brahmbhatt (mbrahmbhatt@worldbank.org). With Romain Wacziarg, Harvard University.

Completion date: January 1997.

Report:

Wacziarg, Romain. 1997. "Measuring the Dynamic Gains from Trade." World Bank, International Economics Department, Washington, DC.

African Trade Barriers

Much evidence has accumulated showing a strong positive association between trade policy reform and economic growth. Trade restrictions and domestic policy interventions often create a bias against tradables, especially exports, that prevents economies from achieving otherwise attainable rates of growth. This study attempted to determine whether Sub-Saharan African countries' trade barriers have been an important factor in the poor trade and economic performance that has characterized almost all these countries.

Since detailed, systematic records on trade barriers in Sub-Saharan African countries were unavailable, the research undertook a large-scale data collection effort. It tabulated information on tariffs and nontariff barriers from national customs schedules for 17 African countries and stored it in machine-readable form for further analysis.

The study found that import barriers in Africa are far higher than those in the developing countries that achieved the highest export growth rates, and they appear to be biased against potential export products. African tariffs are more than three times higher than those in the developing countries with the highest growth rates and more than five times higher than those in OECD countries. In addition, more than a third of African imports encounter some form of nontariff trade barrier. These findings suggest that if Africa is to reverse its unfavorable export trends, the region needs to adopt appropriate trade policies to enhance its international competitiveness and to permit African

exporters to capitalize on opportunities in foreign markets.

Responsibility: International Economics Department, International Trade Division—Alexander Yeats (ayeats@worldbank.org) and Francis Ng. Basic data collection was undertaken by UNCTAD in Geneva.

Completion date: February 1997.

Reports:

Ng, Francis, and Alexander Yeats. 1996. "Open Economies Work Better! Did Africa's Own Barriers Cause Its Marginalization in World Trade?" Policy Research Working Paper 1636. World Bank, International Economics Department, Washington, DC.

_____. 1997. "Open Economies Work Better!" *World Development* (June).

Regionalism and Agricultural Trade

This research examined the ex post and ex ante effects of regional integration on international trade flows. It focused on agricultural trade because the impact of regional integration has often been much stronger for agricultural than for manufacturing trade.

Using a simple Dixit-Stiglitz-Krugman trade model with product differentiation, the study analyzed the impact of an expansion in a free trade arrangement on agricultural trade, comparing it with the impact on manufacturing trade. It found that the size of the impact depends on two key parameters, initial level of protection and degree of product differentiation: the higher the initial level of protection and the lower the product differentiation, the greater the impact. Thus expansion of a free trade arrangement tends to have a larger impact on agricultural trade flows than on manufacturing trade because initial protection is higher and goods are less differentiated in agriculture.

Examination of data on the change in trade flows after two instances of expansion of the European Community confirmed, at least to some extent, the validity of the theoretical prediction. When the European Community expanded, agricultural trade between the new and the old members increased dramatically, while no comparable jumps were observed for manufacturing trade. Further, among agricultural goods, the impact was stronger for less differentiated products, such as meat, oils, and animal feed, than for more differentiated products, such as fruits, vegetables, and beverages.

The study also applied the model to an ex ante analysis of the impact of the Asia Pacific Economic Cooperation (APEC) free trade agreement on rice in the Japanese market. The agreement could be expected to have a large impact on the Japanese rice market because the current level of protection is very high (with a tariff equivalent

of more than 500 percent). But there is also high product differentiation, which would tend to reduce the impact. The simulation results show that the impact of these two conflicting forces under partial liberalization is rather small, although when fully implemented, the free trade agreement will have a profound impact on Japanese rice producers.

Responsibility: International Economics Department, Commodity Policy and Analysis Unit—Junichi Goto (jgoto@worldbank.org) and Takamasa Akiyama.

Completion date: April 1997.

Trade Policy, Incentives, and Resource Allocation in Indian Agriculture

An earlier research project systematically measured the net impact of the many government interventions that affect the profitability of agricultural crops in India. Consultant studies, most covering 1980–81 to 1989–90, quantified the effects of export and import restrictions, import duties and export taxes, the activities of parastatals, and input subsidies in several of the main producing regions in India. In addition, the research compared agricultural incentives with incentives to manufacturing industries.

This project brought together the results of the earlier research, extending some aspects back to 1964–65 and forward to 1994–95 to capture the effects of the rupee devaluation of 1991 and the important trade and other reforms that began in July 1991. It also incorporated quantitative estimates of the effects of India's agricultural and manufacturing incentive policies on the exchange rate from 1970–71 to 1994–95, including a simulation of the likely effects over this period of the removal of export restrictions for rice, cotton, and wheat.

The research will be synthesized in a book, and the detailed underlying data will be presented in separate monographs. In addition, a number of papers have been prepared on special topics.

Responsibility: International Economics Department, International Trade Division—Garry Pursell (gpursell@worldbank.org) and Anju Gupta. With Ashok Gulati and Anil Sharma, National Council of Applied Economic Research, New Delhi.

Completion date: April 1997.

Reports:

Pursell, Garry. 1994. "Indian Agriculture: Some Evidence on Anti-Agriculture Bias." Paper presented at the conference South Asian Economic Development, Australian National University, November.

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_____. 1996. "India: Trade Policy, the Exchange Rate, and the Domestic Terms of Trade for Agriculture." World Bank, International Economics Department, Washington, DC.

_____. 1996. "Indian Trade Policies since the 1991–92 Reforms." World Bank, International Economics Department, Washington, DC.

Pursell, Garry, and Anju Gupta. 1996. "Trade Policies and Incentives in Indian Agriculture: Background Statistics and Protection and Incentive Indicators, 1965–95." Background Paper 1, Sugar and Sugarcane. World Bank, International Economics Department, Washington, DC.

Rosenblatt, David, Garry Pursell, Anju Gupta, and Benoît Blarel. 1996. "Protection, the Exchange Rate, and the Taxation of Agriculture in India." World Bank, International Economics Department, Washington, DC.

Sharma, Anil. 1996. "Indian Agricultural Trade Liberalization and the Uruguay Round Agreement." Paper presented at the conference Uruguay Round Agreement: Implications for South Asian Agriculture, Kathmandu, April.

Sharma, Anil, and Garry Pursell. 1995. "Food Grains, Pulses, Oilseeds, and Cotton in India: The Potential Impact of Unilateral Trade Liberalization." Paper presented at the 11th World Congress of the International Economic Association, Tunis, December.

Components of Successful Commodity Exports

An economy's dependence on primary commodities is often associated with low income and poor development performance. The World Bank's *Global Economic Prospects and the Developing Countries 1996* (Washington, DC, 1996) found that many commodity-dependent countries have lagged in global integration; slow integration too is closely related to low income growth. Pessimism has surrounded commodity dependence since the 1950s and the development of the Prebisch-Singer thesis. This thesis—that because demand for commodities is income inelastic, it is difficult for developing countries to achieve high export growth by focusing on primary commodity exports—gained renewed prominence in the 1980s, when commodity prices collapsed.

In response to the pessimism, many commodity-dependent countries might adopt strong anticommodity, pro-industry policies without duly considering their comparative advantages—as many Latin American countries did after the Prebisch-Singer thesis first appeared. Such policies are likely to fail, as many of the import substitution policies adopted by the Latin American countries did. In addition, these policies tend to reinforce other policies in commodity-dependent countries that already tend to have an urban bias. Because of these important

policy implications, this study examined the validity of the commodity dependence pessimism in some depth, both theoretically and empirically.

The study found that many commodity-dependent countries have achieved high growth rates in total merchandise exports and in per capita income through commodity exports. And many commodity sectors have showed spectacular production and export growth in developing countries. These facts cast doubt on the validity of commodity dependence pessimism.

The study also undertook both theoretical and empirical analysis to identify the reasons that commodity sectors in some developing countries have failed to develop.

Responsibility: International Economics Department, Commodity Policy and Analysis Unit—Takamasa Akiyama (takiyama@worldbank.org) and Nanae Yabuki.

Completion date: May 1997.

Reports:

Yabuki, Nanae, and Takamasa Akiyama. 1996. "Is Commodity Dependence Pessimism Justified?" Policy Research Working Paper 1600. World Bank, International Economics Department, Washington, DC.

_____. 1997. "Does Commodity Dependence Slow Development?" DEC Note 30. World Bank, Development Economics Vice Presidency, Washington, DC.

Private Capital Flows to Developing Countries: The Path to Financial Integration

The surge in private capital flows in the 1990s and the Mexican crisis in 1994 have focused the attention of policymakers on the growing importance of these flows to developing countries and the challenges they pose. This study, undertaken at the request of the Board, looked at the role of external private capital in developing countries. The study aimed to provide a better understanding of the factors driving financial integration and to draw policy lessons for managing the process of integration.

The study used a variety of methodological approaches, including reviews of previous and ongoing work, surveys of market participants (including pension and mutual funds), and empirical methods ranging from econometric tests of specific hypotheses to less rigorous cross-country analysis. It also drew on about a dozen full and partial country case studies. In addition to the surveys and country sources, data sources included Bloomberg, the International Monetary Fund's *International Financial Statistics* and *World Economic Outlook*, and the World Bank's *World Debt Tables* and Emerging Markets Database. Data on institutional aspects of the financial systems of emerging markets were drawn from primary sources in the countries as well as secondary sources.

While lower global interest rates provided an important impetus to the surge in private capital flows in the 1990s, the study found that these flows are now being driven by structural forces that are leading to progressive integration of developing countries into world financial markets. These forces include advances in information and communications technology, deregulation and innovation in financial markets, and the rising importance of institutional investors that are able and willing to invest internationally. In turn, reforms in developing countries have boosted creditworthiness and returns and opened these markets to foreign investment. Given continuing decline in investment risks and higher expected rates of return combined with opportunities for portfolio diversification, net private capital flows to developing countries are likely to be sustained at the high levels of the 1990s.

The study concludes, however, that private capital flows to developing countries will not expand uninterruptedly; sizable year-to-year fluctuations and large variations across countries are likely. The main risks of volatility and large reversals lie at the country level, because many developing countries lack the preconditions to ensure the sound use of private capital. Financial integration can magnify the effects of underlying distortions and institutional weaknesses and thereby multiply the costs of policy mistakes. Developing countries therefore face two related challenges: managing the overheating pressures and the risks of large reversals associated with large surges in private capital flows that are typical in the early stages of financial integration, and adapting policies and institutions to an increasingly integrated financial environment.

Based on country experience, the study drew several broad policy lessons on dealing with these challenges in macroeconomic management, banking, and capital markets. First, the macroeconomic policy mix used to combat overheating due to large surges in capital flows also has a major effect on the real economy's performance and its ability to benefit in the long term from capital flows and to avoid large reversals. In particular, heavy reliance on fiscal policy—supported by sterilization and, in more extreme cases, capital controls—not only can be an effective response to overheating but also can improve the balance between investment and consumption and moderate real exchange rate appreciation. Conversely, excessive reliance on monetary policy and the use of a nominal anchor can exacerbate the problem by attracting even larger inflows, especially short-term capital flows.

Second, the health of the banking system is key to securing the benefits of financial integration and avoiding its pitfalls. Banks in developing countries play a larger role in financial intermediation than those in industrial

countries but are generally weaker, and regulatory and supervisory capacity is also generally weaker in developing than in industrial countries. These weaknesses in banking systems make them more prone to lending booms in the early stages of financial integration. The study shows that countries that experienced large lending booms typically also experienced increases in macroeconomic vulnerabilities, in the riskiness of bank portfolios, and in financial sector vulnerability. Addressing the underlying weaknesses of the financial sector thus becomes more urgent with financial integration, because banks can increase lending more quickly and incur greater risks. Also important is to curb lending booms associated with capital inflows through macroeconomic policies and more targeted interventions in the banking sector and to deal promptly with banking sector crises, since delays only increase the ultimate cost.

Third, with a growing share of flows to developing countries taking the form of portfolio capital, the stakes are high for strengthening capital markets. To make their capital markets more attractive to foreign investors, developing countries should address three key areas in the market and regulatory structure: market inefficiencies that cause higher transaction costs and failed trades, lack of protection of property rights, and inadequate disclosure. Country experience suggests that rapid progress is possible in improving efficiency, but improving investor protection and disclosure requires more sustained efforts. Promoting domestic institutional investors that can mobilize large pools of dedicated money becomes even more important with financial integration, to assuage the fears of excessive foreign presence and potential volatility.

The study's findings have been presented in a variety of ways, including press briefings in Washington, DC, in May 1997, workshops and meetings for policymakers from developing and industrial countries, and workshops for market participants in London and Frankfurt. The findings will also be presented in Canada in September 1997 at an Asia Pacific Economic Cooperation meeting, in Latin America at the Latin American Economics Association meeting, and in a high-level policy workshop for Asia in Manila in November 1997. Other country seminars are planned during the coming year.

Responsibility: International Economics Department, Office of the Director—Amar Bhattacharya (abhattacharya@worldbank.org) and Pedro Alba, and International Finance Division—Swati Ghosh and Leonardo Hernandez.

Completion date: May 1997.

Report:

World Bank. 1997. *Private Capital Flows to Developing Countries: The Road to Financial Integration*. New York: Oxford University Press.

Agricultural Trade Liberalization and Food Security

The changes under way in the international trade and policy environment will have far-ranging consequences for the food and agriculture sector and for food security. Domestic policy responses to these changes will influence food security in both the short and the long term. These policy responses are occurring in a dynamic context of changing comparative advantage in agricultural production arising from population and income growth and changes in technology and resource constraints. Countries that have undertaken policy reforms and adjustment in the right direction have been much better positioned to cope with short-term shocks and take advantage of opportunities from more open markets than countries that have not done so.

This study evaluated the extent of trade and market liberalization carried out by industrial and developing countries during the post-Uruguay Round regime. It examined existing trade barriers and domestic protection, quantified the pre- and post-Uruguay Round applied rates of protection, and projected the effect of liberalization on production, consumption, and price levels through 2005. The study also analyzed the effect of the projected increases in world prices on low-income food-deficit countries. And it assessed the implications of liberalization for the food sector and food security by looking at changes in terms of trade, domestic output, food consumption, and incomes.

Work during 1997 focused on the consequences of rapid growth in the Pacific Basin, particularly in China, for world food demand and prices. This question was analyzed using the global general equilibrium model from the Global Trade Analysis Project to provide a more comprehensive assessment than has been possible with the partial equilibrium analyses used in the past.

Responsibility: International Economics Department, Commodity Policy and Analysis Unit, and International Trade Division—Merlinda Ingco (mingco@worldbank.org). With Kym Anderson, University of Adelaide; Christian Bach, University of Copenhagen; Betina Dimaranan, Purdue University; Dale Hathaway, National Center for Food and Agricultural Policy; and Tom Hertel, Purdue University.

Completion date: June 1997.

Reports:

Anderson, Kym, Betina Dimaranan, Tom Hertel, and Will Martin. 1997. "Asia-Pacific Food Markets and Trade in 2005: A Global, Economywide Perspective." *Australian Journal of Agricultural and Resource Economics* 41(1):19–44.

Ingco, Merlinda. 1996. "India's Domestic and External Trade Policy Environment: Implications for Market Stabilization Policies and

Strategies." Annex 6 in World Bank, "The Indian Oilseeds Complex: Capturing Market Opportunities." Report 15677-IN. South Asia Country Department II, Washington, DC.

Ingco, Merlinda, Donald Mitchell, and Alex McCalla. 1996. *Global Food Supply Prospects*. World Bank Technical Paper 353. Washington, DC. (Also presented as a background paper at the World Food Summit, Rome, November 1996.)

Commodity Marketing Systems

Government intervention in commodity marketing systems has resulted in significant costs and inefficiencies. Internal marketing costs and margins, for example, are significantly higher in countries with government monopolies than in those with free market systems. Recognizing these costs, many developing countries are liberalizing commodity marketing. They are reducing government controls and interventions, phasing out government monopolies, and encouraging a private sector role in commodity marketing. They also are abolishing administratively set prices and leaving prices to market forces, phasing out input and consumption subsidies, and passing internal and external export marketing to the private sector.

This research examined commodity market liberalization in several developing countries, particularly in Africa, and its effect on marketing costs, farmgate prices, quality, and crop financing arrangements. In a number of countries it found that private trade leads to lower marketing costs and margins and thus leaves a larger share of the export price for farmers. Improved incentives at the farm level have contributed to production and export increases in several countries. Following liberalization, the private sector can provide a channel for credit as private traders begin to establish financing agreements with foreign buyers and extend cash purchases down to the farm level. The government can still determine quality standards, but it can gradually pass quality inspection services to licensed private inspectors. Market liberalization need not affect crop quality.

The study also found that it is often preferable to have a gradual and orderly withdrawal of government monopolies, to reduce the possibility of disruptions in crop commercialization and quality. Equally important are the development of private sector institutions, such as professional associations of traders and exporters, and the introduction of appropriate laws and regulations for private trade. The dissemination of market information to farmers and traders is also very important, as is the training of the emerging private sector in modern commodity marketing and trading systems.

Responsibility: International Economics Department, Commodity Policy and Analysis Unit—Panos Varangis (pvarangis@worldbank.org).

Completion date: June 1997.

Reports:

Varangis, Panos. 1996. "Structural Adjustment and Africa's Competitiveness." Paper presented at the conference Commodities—Africa in the World Market, INZET (Association for North-South Campaigns), Amsterdam, September 26.

_____. 1997. "Market Reforms in West African Cocoa Subsectors and Their Impact on the World Cocoa Market." Paper presented at the Fourth International Cocoa Convention, Cocoa Merchants Association of America, Phoenix, Arizona, March 5–8.

Developing Countries and Government Procurement

Government procurement in most countries accounts for a substantial share of the total demand for goods and services, especially when purchases of public enterprises, regulated monopolies, state and regional governments, and municipalities are included. The Government Procurement Agreement (GPA) is intended to subject government procurement to international competition. The GPA was renegotiated as part of the Uruguay Round, but signing it was not obligatory, and only nine economies besides the European Union and the United States did so. Only one of the signatories was a developing country.

That so many countries, including nearly all developing countries, did not sign the GPA suggests that the costs were perceived to exceed the benefits. One objective of this research was to study how procurement markets function in developing countries so as to better understand the costs and benefits of procurement policies as actually applied and to explore what might be done to expand developing country participation in the GPA. For this purpose two small exploratory studies of procurement policies and practices in two important non-signers, Brazil and India, were carried out. In addition, the World Bank's project files were surveyed to see what light they throw on developing country procurement policies, and a paper was written on the experience with the GPA in industrial countries.

The studies of Brazil and India showed that, as a result of recent reforms, central government procurement policies and practices for goods are broadly compatible with the GPA rules. But the renegotiated GPA covers services as well as goods, and state, municipal, and local government procurement in addition to central government procurement. There is no systematic body of knowledge in either country on the procurement policies and prac-

tices of these government entities or of the many state enterprises. But enough is known to conclude that further and politically difficult reforms would be needed before these policies and practices would be compatible with the GPA.

The survey of the World Bank's procurement files indicated that a careful reading can give useful insights into the procurement practices of many developing countries, but that a more complete picture would require independent empirical research in each country. This is principally because, unlike for most transactions, procurement under Bank-financed projects is subject to the Bank rules on international competitive bidding.

The study of government procurement in industrial countries provides quantitative data for 1983–92. It shows that by far the largest markets covered by the GPA during this period were the United States, the European Union, and Japan, but that in these economies there was virtually no change in domestic firms' share in total procurement above the threshold contract levels to which the GPA applies. The share of domestic procurement in the smaller countries was lower and declined over the period, but other factors in addition to the GPA could account for this trend. In both cases, however, the GPA is a counterweight to nationalistic impulses and among other things helps to at least maintain the openness of these markets to developing country exports.

Responsibility: International Economics Department, International Trade Division—Garry Pursell (gpursell@worldbank.org), L. Alan Winters, Bernard Hoekman, and Marie-Helene Le Manchec. With Bibek Debroy; and Helson Braga, ABRASPE, Brazil.

Completion date: June 1997.

Reports:

Braga, Helson, and Marcelo Piantatelli. 1996. "Government Procurement in Brazil." World Bank, International Economics Department, Washington, DC.

Debroy, Bibek. 1995. "Indian Government Procurement Practices." World Bank, International Economics Department, Washington, DC.

Debroy, Bibek, and Garry Pursell. 1997. "Government Procurement Policies in India." In Bernard M. Hoekman and Petros C. Mavroidis, eds., *Law and Policy in Public Purchasing: The WTO Agreement on Government Procurement*. Ann Arbor: University of Michigan Press.

Hoekman, Bernard. 1997. "Operation of the Agreement on Government Procurement, 1983–92." In Bernard M. Hoekman and Petros C. Mavroidis, eds., *Law and Policy in Public Purchasing: The WTO Agreement on Government Procurement*. Ann Arbor: University of Michigan Press.

Hoekman, Bernard M., and Petros C. Mavroidis, eds. 1997. *Law and Policy in Public Purchasing: The WTO Agreement on Government Procurement*. Ann Arbor: University of Michigan Press.

Opening Domestic Debt Markets in Developing Countries

This study examined policy and analytical issues pertaining to the development and internationalization of domestic bond markets in emerging economies. The analysis was based on pooled regression and iterative three-stage least-square methods. It drew on balance of payments data from the International Monetary Fund and data from the World Bank's Debtor Reporting System and country sources.

Cross-country experience suggests that development of domestic bond markets may be best achieved by starting with the market for government debt, because a buoyant domestic market for government debt is a key prerequisite for the development of private fixed income markets. Voluntary domestic markets for government debt provide opportunities for learning-by-doing in market price determination for relatively simple financial claims. The skills acquired in domestic markets for government debt can then spill over into markets for private sector claims, in which the additional complication of credit risk arises. Before such markets can be opened to foreign investors with any realistic expectation of foreign participation, they must meet international standards in the market microstructure—trading practices, registry, transfer and settlement systems, and the like—and establish a track record.

Opening domestic fixed income markets to foreign participants is of secondary importance for both market development and surges of foreign capital. Both occur without foreign participation in domestic fixed income securities markets. There is evidence that permitting foreign participation exacerbates the problem of excessive capital inflows. But market development may be accelerated by foreign participants, who can bring experience and technology to these markets.

In general, little purpose is served by restricting foreign participation in segments of the domestic fixed income market. Any benefits from deterring short-term capital inflows can be effectively achieved only through a broad measure such as a tax on foreign exchange transactions related to the capital account. But the benefits of foreign participation for competition and liquidity may be greatest at the short end of the maturity spectrum. The transfer of technology from abroad and the other benefits of foreign participation could be particularly useful in the early stages of market development.

Responsibility: International Economics Department, International Finance Division—Kwang W. Jun (kjun@worldbank.org). With Maxwell Fry, University of Birmingham.

Completion date: June 1997.

Reports:

- Fry, Maxwell J., and Kwang W. Jun. 1997. "Opening Domestic Markets for Fixed Income Securities in Developing Countries." World Bank, International Economics Department, Washington, DC.
- Jun, Kwang W., and May Ng. Forthcoming. "Debt Issues from Emerging Asian Markets." In Michael Pettis, ed., *New Dynamics of Emerging Markets*. London: Euromoney Books.

Risk Management and Commodity Export Finance

Liberalization in commodity markets has brought profound changes in the way price risks are allocated and managed in commodity sectors. Price risks increasingly are allocated to private traders and farmers rather than absorbed by the government. The success of market reforms crucially depends on the ability of the emerging private sector to make full use of the range of modern commodity marketing, financing, and price risk management instruments (such as futures, options, and swaps). Because farmers are generally unable to access these instruments directly, there is a need for intermediaries. Large private traders and banks are best positioned to become these intermediaries. Uncertainty in commodity prices has negative implications for commodity financing: banks and other lending institutions are reluctant to finance commodity trade or commodity-related projects because loan repayment often depends on future commodity prices.

This study identified important preconditions for accessing modern commodity marketing, price risk management, and financing instruments:

- Reducing government intervention that crowds out private sector involvement.
- Removing controls on prices and margins, reducing trade restrictions, and allowing the market to determine prices.
- Creating an appropriate institutional, legal, and regulatory framework.
- Providing training and raising awareness.
- Improving creditworthiness and reducing counterparty risk.

The use of commodity derivative instruments to hedge commodity price risk is not new among developing countries. The private sector in many Asian and Latin American countries has been using commodity futures and options for some time, and more recently, commodity derivative instruments have increasingly been used in several African countries and many transition economies. Several developing and transition economies are working to establish commodity derivative exchanges.

Research results were disseminated in a seminar, Commodity Risk Management and Trade Finance, held in Prague in November 1996 for about 30 academics, government officials, policymakers, and private sector representatives from the Czech and Slovak Republics.

Responsibility: International Economics Department, Commodity Policy and Analysis Unit—Panos Varangis (pvarangis@worldbank.org), Donald Larson, Nanae Yabuki, and Shane Streifel; and Europe and Central Asia, Country Departments I and II, Agriculture and Regional Development Operations Division—Richard Lacroix.

Completion date: June 1997.

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- Lacroix, Richard, and Panos Varangis. 1996. "Using Warehouse Receipts in Developing and Transition Economies." *Finance and Development* (33)3.
- Varangis, Panos, and Don Larson. 1996. "Dealing with Commodity Price Uncertainty." Policy Research Working Paper 1667. World Bank, International Economics Department, Washington, DC.

Economic Integration: The Americas

The economic effects of Mercosur, a trade arrangement among Argentina, Brazil, Paraguay, and Uruguay, could be substantial. The new market encompasses 200 million people, a GDP of almost \$1 billion, and more than half of Latin America's market. The proposed reductions in tariffs and nontariff barriers under Mercosur are substantial and are expected to expose its member economies to vigorous competition.

Traditional static computations of welfare gains from trade do not predict great benefits from Mercosur. But they address only the effect of tariff changes on the likely pattern of trade. The changes under Mercosur are expected to go far deeper. If Mercosur is a harbinger of a broader philosophy of open trade and freer competition to encourage growth, it would represent a sea change in its members' development strategies and have important implications for the World Bank's country assistance strategies.

This research was intended to develop a better understanding of the implications of Mercosur—to help shape World Bank views on macroeconomic prospects, the constraints of policymaking, and the risks of recidivism. The work highlighted key sectoral issues likely to arise with adjustment to the new regime—issues relating to transport costs, agriculture, and services—as well as regional

issues. A hypothesis of the study was that improvements will be required in all these areas to maximize the hoped-for allocative efficiency gains; they are all elements of "getting the prices right." The work will inform consideration of the kinds of competition policies and institutions that need to emerge to support the new paradigm of competitive, private sector-led development.

The work was oriented less toward government institutions than toward the ongoing local dialogue on Mercosur. Its aim was to develop a World Bank position on key issues that can be discussed in broad, strategic terms in each Mercosur member country, and to build knowledge to support the Bank's ability to respond to requests for assistance. For these purposes the project produced papers on an overview of Mercosur, trade patterns developing in Mercosur, integration and intra-regional transport costs, trade in food and agriculture, small and medium-size enterprise finance, professional services, financial services, trade policy, and the scope for harmonization, competition policy, and industrial policies.

The research also considered Chile's prospective accession to the North American Free Trade Agreement (NAFTA) and to Mercosur. It assessed the arguments that the trade benefits are likely to be small since both Chile and the NAFTA countries have relatively low trade barriers, but that advantages might arise from locking in Chile's reforms and from increasing the security of its access to U.S. markets.

Responsibility: International Economics Department, International Trade Division—L. Alan Winters (awinters@worldbank.org), Alexander Yeats, and Maurice Schiff; Policy Research Department, Finance and Private Sector Development Division—Gerard Caprio; Industry and Energy Department, Telecommunication and Informatics Division—Carlos Primo Braga; Latin America and the Caribbean, Country Department I, Country Operations Unit 1—Homi Kharas, and Public Sector Modernization and Private Sector Development Division—Margaret Miller; Latin America and the Caribbean, Technical Department, Public Sector Modernization Unit—Malcolm Rowat and Mike Lubrano; and Economic Development Institute, Regulatory Reform and Private Sector Enterprise Division—Danny Leipziger and Antonio Estache. With Julio de Brun and Jose Mauro de Morais.

Completion date: July 1997.

Reports:

Amjadi, Azita, and L. Alan Winters. 1997. "Transport Costs and 'Natural' Integration in Mercosur." Policy Research Working Paper 1742. World Bank, International Economics Department, Washington, DC.

Frischtak, Claudio, Danny M. Leipziger, and J.F. Normand. "Industrial Policy in Mercosur: Issues and Lessons." Latin

America and the Caribbean Region Economic Note 10. World Bank, Washington, DC.

Laird, S. "Mercosur: Objectives and Achievements." World Bank, International Economics Department, Washington, DC.

Miller, Margaret, and Gerard Caprio. "Small Business Finance in Mercosur." World Bank, Latin America and the Caribbean, Country Department I, and Policy Research Department, Washington, DC.

Rowat, Malcolm, and Mike Lubrano. "Competition Policy and Mercosur." World Bank, Latin America and the Caribbean, Country Department I, Washington, DC.

Yeats, Alexander J. 1992. "Does Mercosur's Trade Performance Raise Concerns about the Effects of Regional Trade Arrangements?" Policy Research Working Paper 1729. World Bank, International Economics Department, Washington, DC.

Commodity Models: A Method to Evaluate Commodity Projects

For a country with a large world market share in a commodity with low price elasticity of demand, it is difficult to evaluate how expansion of the commodity's production will affect welfare. The difficulty arises because an increase in production under such circumstances often leads to a large reduction in prices and in the revenues and profits of producers. This issue has been addressed in the context of the adding-up problem, or immiserizing growth, by a number of economists. This research tries to determine how to evaluate the welfare effects of productivity increases in commodity production.

This issue is important in public policy decisions about how much to invest in infrastructure or research and extension to increase productivity in a commodity when there is a possibility of causing immiserizing growth. For some countries and some commodities, most of the benefits from the productivity increase could accrue to importers. In these cases in-depth welfare analysis is required to determine what level of resources should be allocated for the purpose of increasing productivity.

Although there have been a few theoretical analyses, evaluations of the effects of investment or research-induced technical change on a country's welfare are difficult, especially for policymakers and project managers. One reason is the difficulty of estimating supply and demand curves and elasticities. This research is developing a simple and practical method for estimating the welfare effect for a country of a supply shift in a particular commodity sector. The data requirements are small, and the quantitative solutions can be obtained using a widely available spreadsheet program. The model, which is essentially a single-commodity supply and demand

model rather than a general equilibrium model, should be easy to use even for noneconomists.

The model was presented at the Food and Agriculture Organization Intergovernmental Group Meeting on Tea in Bali, Indonesia, in July 1997.

Responsibility: International Economics Department, Commodity Policy and Analysis Unit—Takamasa Akiyama (takiyama@worldbank.org) and Nanae Yabuki.

Completion date: August 1997.

Private Capital Flows and the Role of Economic Fundamentals

Since the late 1980s there has been a sharp increase in private capital flows to developing countries, mainly in East Asia and Latin America. Developments following the devaluation of the Mexican peso in 1994 have reopened the question of how sustainable these flows are. This question is important because a generalized reversal of flows could have serious disruptive effects in the economies receiving them and, in the extreme, even derail economic reforms.

This research addresses the issue of sustainability, identifying the driving forces behind the recent surge in private flows to developing countries and assessing the relative importance of these forces. Because the surge in private capital flows since the late 1980s has coincided with a period of both domestic policy reform in the developing world and low international interest rates, there is debate about whether the surge is driven primarily by domestic or external factors. If by domestic factors, then domestic policies are the key to ensuring sustainable capital flows.

To explain private capital flows to developing countries, the research uses a model in which both domestic and external explanatory variables are defined. The model is estimated using panel data for 1985–94 for 73 developing countries, including countries that have benefited from the new wave of private capital flows and countries that have not.

The results provide evidence that domestic factors—initial conditions—matter in explaining the allocation of private capital flows among recipient countries. So countries can expect to continue receiving capital flows as long as domestic policy reforms continue strengthening their economic fundamentals and improving their long-term prospects. Official flows from multilateral institutions appear to play a complementary role in improving the creditworthiness of recipient countries.

Preliminary findings of the research were disseminated at a conference in Santiago, Chile, in August 1996, and the final results will be presented at the Latin America

and Caribbean Economic Association meeting in Bogotá, Colombia, in October 1997.

Responsibility: International Economics Department, International Finance Division—Leonardo Hernández (fhernandez@worldbank.org). With Vittorio Corbo, Catholic University of Chile.

Completion date: August 1997.

Global Economic Prospects—Related Research

Global Economic Prospects and the Developing Countries, an annual report by the World Bank, provides an assessment of global economic prospects as they affect developing countries. It also analyzes the links between developing countries and the world economy, particularly in trade and capital flows. Research for *Global Economic Prospects* is carried out by Bank staff and consultants on a variety of topics.

Research for the 1997 report reviewed the implications for developing countries of three important changes in the world economy that globalization is bringing about: the emergence of the large developing countries as key players in the world economy, the role of global production networks established by multinational enterprises, and the policy challenges for governments, particularly in handling the costs of adjustment associated with trade liberalization.

The rapid growth and integration of the Big 5 developing and transition economies over the next quarter century (China, India, Indonesia, Brazil, and Russia) will likely redraw the economic map of the world as their share of world output doubles. The emergence of the Big 5 will generate important net benefits for the world economy arising from increased specialization along lines of comparative advantage. But it will also cause significant economic adjustments, including those driven by greater competitive pressures in markets for labor-intensive manufactures. The analysis suggests that fears that fast growth in the Big 5 will generate significant increases in world food and energy prices do not appear to be well founded.

Developing countries are participating to an increasing extent in the global production networks of multinational enterprises, networks made possible by liberalization of economic policies, cost reductions in transport and communications, and the growing importance of knowledge and other intangible assets in modern production. These networks ease the access of developing countries to new means of enhancing their economic performance and increasing integration by diffusing the benefits of improved management and labor skills, better information about world markets, new ideas

and technologies, and, generally, faster catch-up with best practices in the world economy.

Concerns about job losses and other adjustment costs still deter many developing countries from undertaking or extending trade liberalization, though the evidence suggests that such costs tend to be more limited than is sometimes feared. Nevertheless, there is much that governments can do to minimize adjustment costs, as well as to carefully manage the political economy and equity issues that trade liberalization may raise. Adjustment costs will be lower if macroeconomic stability and complementary policies strengthen the credibility of reforms and support a quick and substantial increase in new private investment. For equity reasons it may also be desirable to implement carefully designed social safety net measures to assist the most vulnerable groups that may be adversely affected by reforms.

Responsibility: International Economics Department, International Economic Analysis and Prospects Division—Uri Dadush (udadush@worldbank.org), Milan Brahmbhatt, Dipak Dasgupta, E. Mick Riordan, T. G. Srinivasan, Ashok Dhareshwar, Caroline Farah, Kumiko Imai, Ken Itakura, Jaleleddin Jalali, Robert King, Robert Lynn, Kim Murrell, and Miria Pigato, and International Trade Division—David Tarr, Bernard Hoekman, and Alexander Yeats. With Robert Lipsey, National Bureau of Economic Research; Steve Mateuz, Michigan State University; Matthew Slaughter, Dartmouth College; and Romain Wacziarg, Harvard University.

Completion date: September 1997.

Report:

World Bank. 1997. *Global Economic Prospects and the Developing Countries 1997*. Washington, DC.

Managing Private Capital Flows in Asia: Lessons and New Challenges

Following up on the recent World Bank Policy Research Report *Private Capital Flows to Developing Countries: The Road to Financial Integration* (New York: Oxford University Press, 1997), this study aims to provide a better understanding of the policy challenges of managing the process of financial integration in developing Asia. While on balance financial integration can bring significant benefits, to secure these benefits developing countries need to put in place a set of policy and institutional preconditions. Since the process of financial integration is relatively well advanced in Asia, the analysis of country experience in the region should yield rich policy lessons for other developing countries.

To reduce vulnerability to large reversals in private capital flows, the key policy and institutional challenges

in the context of financial integration are to contain overheating, develop a sound financial system, and avoid negative interactions between macroeconomic and financial sector vulnerabilities. Although Asian countries have been broadly successful in dealing with the initial challenges of overheating associated with capital flows in the 1990s, developments over the past three years—particularly the recent crisis in Thailand and the contagion effects on other countries of the region—show that they are still prone to surges and ebbs in capital flows.

These recent events also illustrate how financial integration can magnify the effects of underlying distortions and institutional weaknesses, multiplying the costs of policy mistakes. A premise of the study is that the links and feedback effects between the macroeconomy and the financial sector have been particularly important in Asia. These effects have amplified macroeconomic cycles and reduced the effectiveness or constrained the use of macroeconomic policy instruments.

The study addresses three sets of research questions. First, what are the main channels through which financial integration is taking place in Asia, including the role of foreign, regional, and offshore centers? To what extent were external factors responsible for the observed surges and ebbs in capital flows? What does the changing nature of the investor base imply for the behavior of flows in the future?

Second, what lessons can be drawn from country experience on the conduct of macroeconomic policy, and the related role of the financial system, in a more integrated environment? What determines the best policy mix to deal with surges and ebbs in private capital flows? What are the emerging lessons and outstanding issues in avoiding and responding to speculative attacks on currencies?

Third, how does financial integration affect the context in which financial institutions perform their intermediation function? In particular, what risks does financial integration create or enhance? What are the implications for banks, capital market institutions, and the regulatory frameworks for both? What are the institutional reform and development priorities in this new context of financial integration?

The study uses a variety of methodological approaches, including reviews of previous and ongoing work and empirical methods ranging from econometric tests of specific hypotheses to less rigorous cross-country analyses. It also draws on about eight full and partial country case studies. Data sources include the International Monetary Fund's *International Financial Statistics* and *World Economic Outlook*, the World Bank's *World Debt Tables* and *Emerging Markets Database*, the *Morning Star*, and country sources. Data on institutional aspects of the financial systems of emerging markets are drawn from both primary and sec-

ondary sources. Information on capital markets is drawn from the parallel research project Implications of Financial Integration for Capital Market Reform: The Asian Experience (ref. no. 681-48).

The research findings will be disseminated through the joint publication of a volume by the Asian Development Bank and the World Bank, press briefings, and a senior policy seminar in Manila in November 1997 for finance ministers and heads of central banks. Small workshops and seminars in selected countries are also planned.

Responsibility: International Economics Department, Office of the Director—Amar Bhattacharya (abhattacharya@worldbank.org) and Pedro Alba, and International Finance Division—Swati Ghosh and Leonardo Hernandez. With Willem Jansen, George Washington University; Peter Montiel, Williams College; Michael Pomerleano; Yakup Ergincan, University of Michigan; Mr. Taimur, University of Illinois; and Madeleine Li-Chay-Chung, University of Western Ontario. The research is a joint project of the World Bank and the Asian Development Bank.

Completion date: December 1997.

Real Exchange Rate Misalignment in Latin America

This study examines the degree of misalignment of the real exchange rate in Argentina, Brazil, Chile, Colombia, Mexico, Peru, the United States, and Venezuela using a model in which balance of payments equilibrium is associated with conditions in asset markets. Using cointegration analysis, it finds that for all eight countries there is a long-run relationship between the real exchange rate, the stock of net foreign assets, and a measure of tradable sector productivity. It uses an unobserved components model to estimate the equilibrium value of the real exchange rate and the degree of misalignment.

The results suggest that in 1996 the real exchange rates in Argentina and Peru were in equilibrium, and those in Chile and Colombia were close to equilibrium though with some room for further appreciation. Mexico's and Venezuela's were slightly overvalued, and Brazil's was clearly overvalued. The exchange rate in the United States in 1995 was undervalued by about 5 percent.

Responsibility: Policy Research Department, Macroeconomics and Growth Division—Norman Loayza (nloayza@worldbank.org) and J. Humberto Lopez. With Fernando Broner, Massachusetts Institute of Technology.

Completion date: December 1997.

Report:

Loayza, Norman, J. Humberto Lopez, and Fernando Broner. 1997.

"Misalignment and Fundamentals: Equilibrium Exchange Rates

in Seven Latin American Countries." World Bank, Policy Research Department, Washington, DC.

Controlling Recidivism

This project will examine case studies in which developing countries have had to deal with significant pressures for "new" import restrictions, analyzing how they overcame or why they succumbed to these pressures. It will also design a rational safeguards system, one that makes economic sense and supports the politics of continuing a liberalization program.

Responsibility: International Economics Department, International Trade Division—Michael Finger (mfinger@worldbank.org).

Completion date: June 1998.

Estimating Equilibrium Exchange Rates in Developing Countries

A central problem in empirical macroeconomics in low-income countries is to determine when and by how much the exchange rate is misaligned. Decisions to devalue or to implement any exchange rate policy other than a clean float require both measuring the actual real exchange rate (RER) and estimating the equilibrium RER. In addition, when considering a devaluation, policymakers want to know what its effects on inflation, the RER, and output growth will be. Quantitative answers to these questions are essential for implementing exchange rate policy and for designing accompanying reforms.

The objective of this research project is to set out, for use by Bank economists and others, practical methodologies for assessing exchange rate misalignment in low-income developing countries where data, time, and professional capacity are limited. The research draws together methodologies from disparate sources and documents empirical innovations in applying them. It addresses three methodological questions that are central to effective exchange rate management: how to define and measure the actual RER, how to estimate the equilibrium RER, and how to quantify the likely impact of a nominal devaluation on the RER, inflation, and output.

The research produced 11 papers organized into four sets. The first set of 3 papers examines alternative concepts and measures of the actual RER to determine how accurately it can be measured in developing countries. These papers show that movements in RER indexes must be carefully analyzed when the home country is experiencing trade liberalization, fluctuations in its terms of trade, or different productivity growth rates than its trad-

ing partners—or where there are significant parallel markets, unrecorded trade, or shifts in trade patterns. In these circumstances calculating separate RER indexes for imports and exports is particularly important.

The second and third sets of papers assess alternative methodologies for determining the equilibrium RER. The second set discusses partial equilibrium approaches. These three papers consider the use of the parallel market rate as an indicator of the equilibrium rate, set out updated versions of two methodologies (purchasing power parity and base year, resource balance target and trade elasticities), and synthesize the empirical evidence on trade elasticities and the effects of exchange rate movements on trade flows in developing countries. These partial equilibrium approaches have several virtues: they draw on a substantial body of empirical work, impose minimal data requirements, and are computationally straightforward. Although they do not do justice to the general equilibrium nature of real exchange rate adjustments, they can still provide useful estimates of misalignment and benchmarks for more sophisticated analyses.

The third set of papers considers general equilibrium methodologies for estimating the equilibrium RER. These four papers discuss the theory of the long-run equilibrium RER, single-equation econometric estimates of the equilibrium RER, and computable general equilibrium and macroeconomic models for estimating the equilibrium RER. These methodologies make it possible to take into account the interaction of key macroeconomic variables in a sound theoretical framework but are far more complex than the partial equilibrium approaches.

Although much work has been done on methodologies for estimating the equilibrium RER, methodologies for determining the nominal exchange rate adjustments required to achieve a given realignment of the RER are more rudimentary and will often be the most problematic part of the policy analysis. The paper in the final part of the study establishes the stylized facts relating to the effects of exchange rate movements on inflation and the RER and sets out a reasonably accurate consistency framework for quantifying these effects that can be used until more sophisticated approaches are developed.

Responsibility: Policy Research Department, Macroeconomics and Growth Division—Lawrence E. Hinkle (lhinkle@worldbank.org), Public Economics Division—Shantayanan Devarajan, and Poverty and Human Resources Division—Lant Pritchett; International Economics Department, Commodity Policy and Analysis Unit—John Baffes; Africa Country Directorate 13—Theodore Ahlers; Africa Technical Families, Macro-

economics 4—Ingrid Ivins, and Macroeconomics 5—Fabien Nsengiyumva. With Ibrahim Elbadawi, African Economic Research Consortium; Nadeem Ul Haque, International Monetary Fund; Steven Kamin, U.S. Federal Reserve Board; Peter Montiel, Williams College; and Steven O'Connell, Swarthmore College.

Completion date: June 1998.

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- Haque, Nadeem Ul, and Peter J. Montiel. 1996. "Long-Run Real Exchange Rate Changes in Developing Countries: Simulations from an Econometric Model." World Bank, Policy Research Department, Washington, DC.
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International Comparison Programme Analysis

The Bank's work on the International Comparison Programme (ICP) is broadly split between two tasks: the statistical activities of data collection and accompanying quality control of price and expenditure information obtained from surveys in the 120 participating countries and six core regions, and the use and analysis of the resulting estimates. Experience in using the estimates is often fed back into the statistical compilation processes to improve the relevance and reliability of the raw data. ICP analysis is a continuing program of data interrogation and use.

The work under this project is currently focused primarily on the data compilation side, where the concern is the best choice of estimation methods, aggregation functions, and time-space linking procedures. ICP analysis has been concerned with the interpolation and extrapolation of previously derived benchmark figures. (The new and more comprehensive 1993 benchmark purchasing power parity [PPP] estimates at different expenditure levels for the 120 countries covered will not become available until late 1997.) The benchmarks are used to provide information on absolute price level differences for countries that are not covered in the baseline surveys and to compile values for nonreference years. In connection with this work the ICP has commissioned two studies to address some of the complex problems involved in linking grouped country data compiled on a regional basis and producing robust time-to-time extrapolations of ICP results.

This work is closely tied to a recent agreement to take over the Penn World Tables exercise that has been carried out by the University of Pennsylvania. The Bank's intention is to ensure that information on purchasing power parities at all levels is produced regularly and on a consistent and reliable basis. The overriding objective is to make sure that the aggregate GNP and more disaggregated sector numbers that are thus obtained remain economically meaningful across countries and over time.

More detailed, topical research activities are being built on the new database as new information becomes available, including:

- Carrying out price level analysis for specific income groups in seven African countries to enhance understanding of the spending behavior of poor households and of households' responses to markets and prices.
- Using aggregate and consumption-based PPP in preparing internationally comparable national poverty lines, such as a dollar a day per capita in 1985 consumption PPP terms.

- Applying the price data (and related expenditure weights) in reviewing the meanings and economic contexts of core inflation across countries and determining how the different concepts should best be measured.

- Compiling internationally comparable estimates of capital to use in growth analysis and to combine with human capital series in order to derive more meaningful assessments of total factor productivity in different countries.

- Looking at the importance of regional price level differences and market structure differences in large economies, particularly China, and relating this to provincial income distributions.

The Bank and other multilateral agencies make significant use of the purchasing power parities and aggregate price level measures (PPPs divided by exchange rates) that have been generated through the Bank's ICP initiative. Among the more important uses are the International Monetary Fund's determination of aggregate economic size in producing the *World Economic Outlook* tables; the Bank's estimation of nontariff barriers by comparing price levels of identical goods in different markets; the United Nations Development Programme's measure of economic well-being (the Human Development Index) prepared for the *Human Development Report*; and estimates of internationally comparable poverty rates. In addition, the latest information, based on econometric extrapolation methods for countries and years not covered in the baseline survey, was shared with the United Nations Committee on Contributions to assist in forming its recommendations to the General Assembly on member contributions.

Responsibility: International Economics Department, Development Data Group—Michael Ward (mward@worldbank.org), Sultan Ahmad, and Yonas Biru. With Yuri Dikhanov.

Completion date: June 1998.

Monitoring and Implementation of the Uruguay Round

This project includes a number of studies spanning the enormous range of issues addressed under the Uruguay Round. Some of the studies are pure research; others are more applied studies, undertaken in close cooperation with Bank operational staff to obtain the best assessment of the country-specific implications of the Round. The project focuses on the implementation of the commitments made under the Uruguay Round, which will determine both the long-run economic impact of the Round and the base from which future trade liberalization will be undertaken.

A key element of the project is the ongoing work on the implementation of the Uruguay Round agreement on agriculture. This study draws on the notifications to the World Trade Organization made by each member to assess the extent and manner in which each country has implemented key trade policy reforms. The analysis addresses two questions: How have countries been implementing their market access commitments under the Uruguay Round agreement on agriculture? And what has actually happened in agricultural trade liberalization since 1995?

In agriculture the new tariff quotas created new opportunities for rent seeking and for government intervention in trade. Quota rents are captured by those to whom the import rights are granted, creating incentives for non-market-based allocation and administrative intervention through licensing procedures. Since many in-quota allocations have been given to particular countries, domestic producer groups, or state trading enterprises, the new schemes have resulted in coalitions to preserve the status quo. Thus the mechanisms adopted determine whether markets have become more competitive, or whether the new arrangements have resulted in a form of "managed trade," as nontariff barriers did in the past. The lack of specified rules on how the tariff quotas are to be administered and allocated have resulted in some undesirable arrangements. The analysis shows that while many countries are faithfully implementing their market access commitments, the new rules have been less successful in actually liberalizing agricultural trade. Results from this analysis were presented at a well-attended seminar held as part of the Fourth World Bank Conference on Environmentally Sustainable Development, in 1996.

Several studies under the project have focused on the implications of the abolition of the Multifibre Arrangement (MFA) for developing countries and for particular sectors. Much of this work has focused on South Asia, expected to be one of the largest gainers. Since up-to-date data on the restrictiveness of the MFA were unavailable, a survey of Indian exporters was undertaken to assess the export tax equivalent of the MFA.

Country studies of the implications of Uruguay Round liberalization were undertaken for a number of countries and regions, including China, Egypt, South Asia, and the Middle East. Much attention was devoted to the implications of China's potential accession to the World Trade Organization.

Another study surveyed progress in implementing the General Agreement on Trade in Services. Yet another study examined the Government Procurement Agreement, providing the most comprehensive assessment currently available.

During 1998 the project's focus will turn from the context created by the Uruguay Round to the issues and opportunities for liberalization in the negotiations scheduled to begin by 2000.

Responsibility: International Economics Department, International Trade Division—Bernard Hoekman (bhoekman@worldbank.org), Merlinda Ingco, Will Martin, and Garry Pursell. With Aziz Elbeheri and Tom Hertel, Purdue University; Tim Josling, Stanford University; Denise Konan, University of Hawaii; and Keith Maskus, University of Colorado.

Completion date: June 1998.

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- Pursell, Garry. 1997. "Some Aspects of the Liberalization of South Asian Agricultural Policies: How Can the WTO Help?" World Bank, International Economics Department, Washington, DC.

Tradable Services

This project includes continuing work to monitor the role of services in international trade and investment flows. The project is compiling a database on global service flows and preparing a report analyzing patterns of trade and investment in services and the impact of protection of service industries in developing countries.

Responsibility: International Economics Department, International Trade Division—Bernard Hoekman (bhoekman@worldbank.org).

Completion date: June 1998.

Reports:

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Trade and Labor Standards

This project addresses the new and highly controversial issue of whether labor standards should be incorporated in multilateral trade agreements. An initial, exploratory analysis was prepared, followed by a detailed, book-length study of the issues.

Recent proposals to include labor standards in trade agreements have focused on a set of core labor standards, including such basic human rights as freedom of association and collective bargaining, and the absence of discrimination. Much of the support for these proposals has been based on a perception that weak labor standards give exporters a competitive advantage.

The study focused on developing simple, robust analytical models to analyze the consequences of core labor standards for workers in different situations. A key conclusion is that deficient provision of core labor standards typically reduces the competitiveness of exporting countries rather than increases it. One possible exception is the exploitative use of child labor, which could expand exports of some highly labor-intensive goods in the short run.

The study concludes that weak provision of core labor standards cannot be treated effectively by imposing trade sanctions, but should instead be approached through programs that aim directly at poverty reduction, educational improvement, and information disclosure.

Responsibility: International Economics Department, International Trade Division—Will Martin (wmartin1@worldbank.org) and L. Alan Winters. With Keith Maskus, University of Colorado.

Completion date: June 1998.

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The World Trade Organization and Developing Countries

At the Uruguay Round the developing countries for the first time took an active interest in the multilateral system as a means for advancing their own programs of policy reform. This project consists of studies of several areas of trade reform that are both of particular interest to developing countries and active items on the World Trade Organization (WTO) agenda: agricultural liberalization, use of safeguard mechanisms, and rules for international investment and for intellectual property. Research will also look at developing countries' effectiveness in promoting reforms through the WTO that are of particular interest to them.

Responsibility: International Economics Department, International Trade Division—Michael Finger (mfinger@worldbank.org) and L. Alan Winters. With Jeff Hayden and John Croome.

Completion date: June 1998.

Regionalism and Development

Nearly every developing country is in or is discussing a regional integration arrangement. Policymakers not only have to decide whether to pursue regional arrangements but also how best to manage them (including those that already exist). Many developing countries are seeking advice from the Bank on whether to join a regional arrangement or on how best to organize one. The Bank has also been asked to respond to initiatives such as the Cross-Border Initiative in Africa or the development of

the Free Trade Area of the Americas and to work with other multilateral agencies on regional matters.

Proponents of regional integration arrangements present them as a means of stimulating competition, reaping economies of scale, attracting capital inflows, and promoting technology transfer. They claim that such arrangements allow some liberalization by countries unwilling to open up on a nondiscriminatory basis and facilitate liberalization in areas too complex to be negotiated successfully in the World Trade Organization. Opponents see regional arrangements as fostering discriminatory trade restrictions, causing governments to look inward rather than outward, and undermining the multilateral trading system.

This research, and research undertaken elsewhere, is starting to shed light on such questions as the effect of trading blocs on growth and on policy credibility, the diplomatic and political benefits of regional integration, whether and how to harmonize standards or industrial policy, and whether regional blocs are undermining the multilateral trading system.

Responsibility: International Economics Department, International Trade Division—L. Alan Winters (awinters@worldbank.org), Maurice Schiff, Bernard Hoekman, David Tarr, and Will Martin. With S. Andriamananjara; Dani Ben-David, Tel Aviv University; Eric Bond, Pennsylvania State University; W. Chang; D. de Rosa, ADR International; A. Gupta; J. Hayden; Patrick Messerlin; and J. F. Ruhashyankiko.

Completion date: August 1998.

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African Trade Policy

This study assesses whether trade policy and macroeconomic reforms in Africa have translated into significant changes in microeconomic responses at the farm and household level. It evaluates changes in incentives, the supply and demand response, and incomes during the pre- and postreform periods using farm and household survey data.

The findings of the study will contribute to the understanding of how trade policy and macroeconomic reforms have affected farm households in poor countries. Through country case studies in Ghana and Zambia, the study will also provide a means of evaluating country assistance and adjustment strategies and point to ways to enhance the positive effects of reform for the poor.

Responsibility: International Economics Department, International Trade Division—Michael Finger (mfinger@worldbank.org) and Merlinda D. Ingco. With Adela Luque, National Bureau of Economic Research; and Adriana Castro.

Completion date: June 1999.

DOMESTIC FINANCE AND CAPITAL MARKETS

Term Finance: Theory and Evidence

Ref. no. 679-62C

This project investigated whether industrial firms in developing countries suffer from a shortage of long-term credit and, if so, whether this shortage has an impact on firm investment, productivity, and growth. Both these issues—access and performance—are important in designing the industrial lending policy of the World Bank. Both the Bank and the development community at large are reevaluating mechanisms aimed at increasing the availability of term finance or lessening the constraints imposed by its absence.

The study used cross-country analysis as well as country case studies. It drew firm-level data for the largest firms in industrial countries from the Global Vantage database of Standard & Poor's and data for large firms in developing countries from the International Finance Corporation's corporate finance database. Data for the case studies came from the Reserve Bank of India, the Colombian Central Bank, the Superintendencia de Compañías in Ecuador, and the Annual Survey of Manufacturing Establishments in Indonesia. The Italian data set was from CERIS, and the U.K. data from Datastream.

The study found that developing country firms use significantly less long-term debt than their industrial country counterparts, even after controlling for firm characteristics. The difference in debt composition between industrial and developing countries can be explained by firm characteristics, macroeconomic factors, and, most important, by financial development, government subsidies, and legal and institutional factors.

The research also concluded that a greater volume of long-term finance tends to be associated with higher productivity. The cross-country analysis of firm-level data showed that an active stock market and an improved ability of creditors and debtors to enter into long-term contracts are reflected in the ability of firms to grow at rates greater than they could attain by relying on internal sources and short-term credit alone. Although the research found that government subsidies around the world have increased the long-term indebtedness of firms, there is no evidence that these subsidies are associated with an ability for firms to grow faster. Indeed, in some cases subsidies are associated with lower productivity.

The study showed that the lack of term finance in developing countries is due mainly to institutional factors, such as the extent of government subsidies, the development of stock markets and banks, and the legal infrastructure. The results indicate that different policies would be necessary to increase long-term debt levels for different groups of firms. Relatively small improvements in the commercial code and the legal system through which contracts are enforced would initially benefit the largest firms in a country, which are more likely to use direct finance; far more significant improvements are needed to boost small firms' financing. Policies that would help improve the functioning and liquidity of stock markets would again benefit mostly large firms. Policies that lead to even small improvements in the development of the banking system, however, would improve the access of small firms to long-term credit. The results also provide a warning that government subsidies, often intended mostly for small firms, may find their way to larger and politically more influential firms.

The study also found that government intervention in providing term finance has generally not been successful, possibly because of weaknesses in design and in the institutional infrastructure. Subsidies in particular appear to be misguided; the availability of long-term credit may be more important than its price, and underpricing it appears to lead to inefficient use.

A general lesson from the project is that although the benefits of an increased supply of long-term credit provide a basis for intervening, any interventions should be carried out with care. In view of the strong tendency for firms to match assets and liabilities, increasing the availability of long-term credit might be ineffective or could spur asset-liability mismatches that would make companies more fragile. Care should also be taken to minimize subsidies, shown to be associated with lower productivity. Indirect methods of encouraging long-term finance, such as developing pension funds and improving the legal system and other parts of the financial system's infrastructure, are likely to have a high payoff.

Findings were disseminated at a conference held on June 14, 1996, in Washington, DC, for Bank staff, policy-makers, and the academic community. Papers arising from the research have also been presented at numerous academic seminars and conferences.

Responsibility: Policy Research Department, Finance and Private Sector Development Division—Gerard

Caprio (gcaprio@worldbank.org) and Asli Demirgüç-Kunt. With Charles Calomiris, University of Illinois; Douglas Diamond, University of Chicago; Fidel Jaramillo, Multiplica; James Kuhn; Vojislav Maksimovic; Sandra Ospina; Raghuram Govind Rajan; Fabio Schiantarelli, Boston College; Vivek Srivastava; Thekla Halouva; Qinghua Zhao; and Luis Zingales.

Completion date: June 1997.

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Bank Regulatory Regimes

Ref. no. 680-36C

This project examined bank regulation over relatively long time frames, focusing on periods in which spillover and contagion effects were common features of bank-

ing. The research incorporated cross-country comparisons of successful regulatory policy, with the goal of developing policy alternatives for developing countries that are sensitive to the country-specific regulatory context. The first stage of the research looked at the relationship between bank regulation and bank performance using about 100 years of data for the United States and evaluated different hypotheses about the factors that lead to greater financial fragility in banking. Using data for individual banks, it examined the relationship between banks' franchise value, their capital structure, their portfolio diversification, and other variables. The second stage applied this analysis to Mexico.

Results from the first stage indicate that insufficient diversification was a key factor in bank failure in the United States over the entire 100-year period. Especially before the provision of a federal safety net supporting the banking system, better diversified banks were able to hold less capital—in effect, the market demanded more capital in the more concentrated, risky banks. Nonetheless, the failure rate among the risky banks was higher.

Applying the analysis to Mexico, the study found that in 1992–94 Mexican banks concentrated their on-balance sheet risks in the sectors most exposed to devaluation. If the banks had diversified their portfolios across sectors, they would still have suffered in the short run from the December 1994 devaluation, but by the end of 1995 their portfolio marked-to-market would have increased from the end-1994 level and by 1996 they would have earned a significant return. Instead, 40 percent of the Mexican banking system's portfolio is now held by the authorities and some banks are reported still to have portfolio problems.

If supervision is weak, and since it cannot be improved in the short term, country authorities may want to consider simple rules that would lessen the likelihood of systemic banking problems. Mexican banks could have diversified better domestically but chose not to, a choice encouraged by one of the most generous deposit insurance schemes in the world and permitted by regulations. Authorities may thus wish to limit explicit deposit guarantees and also consider imposing minimum diversification guidelines. Such measures are especially relevant where banks are being privatized more quickly than the basic supervisory and regulatory framework is being improved.

The project results have been disseminated in seminars at the Bank and outside organizations (Cambridge University, the Bank of England), and a policy paper will be presented at a Bank-Fund Annual Meetings seminar in Hong Kong. A follow-up project will investigate the ability of Sub-Saharan African banks to diversify and the implications for the importance of regional banking in Africa.

Responsibility: Policy Research Department, Finance and Private Sector Development Division—Gerard Caprio (gcaprio@worldbank.org) and Philip Keefer. With Anqing Shi; Berry Wilson; and Anthony Saunders, New York University.

Completion date: April 1997.

Reports:

Caprio, Gerard, Jr., and Berry Wilson. 1997. "On Not Putting All the Eggs in One Basket: The Role of Diversification in Banking." World Bank, Policy Research Department, Washington, DC.

Saunders, Anthony, and Berry Wilson. 1997. "Bank Capital Structure: Charter Value and Diversification Effects." World Bank, Policy Research Department, Washington, DC.

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Derivatives Markets and Risks in Emerging Economies

Ref. no. 680-45C

Derivative instruments, increasingly used in developed markets, are now spreading to emerging markets. Their potential contribution to efficiency and economic performance is enormous. Derivatives can expand risk management capabilities, improve credit allocation and risk sharing among economic agents, reduce the transaction costs of achieving desired risk profiles, increase the pricing efficiency of financial markets, and provide new instruments for dealing with contractual and informational problems. This study was aimed at contributing to the knowledge of the preconditions for developing a successful derivatives market by looking at the structure of derivatives exchanges and products traded in both emerging and developed markets.

The research collected data in emerging and developed markets on the types of derivatives traded and their characteristics, the evolution of derivatives trading in each of the exchanges, and the volume of trading for each type of derivative. In addition, the research collected information on the structure of each derivatives exchange (membership, ownership, regulations), the trading or market-making system, the system for clearing operations, and the structure of the clearinghouse. The study obtained the data from existing data sources about derivatives markets and through a survey sent to each exchange.

The research used cross-sectional analysis of variables that describe activity in derivatives markets to examine possible differences in derivative instruments between emerging and developed markets. The study found that,

on average, agricultural contracts were introduced first in derivatives exchanges, followed by index and interest rate products. More recently, derivatives exchanges have introduced index and interest rate products first. There is no predominate form of ownership for the derivatives exchanges, although most are regulated directly or indirectly by the government. The most common market-making system is based on an open-outcry, daily mark-to-market with gross margining. A large share of exchanges maintain ownership of the clearing facilities.

The results of the research were presented at the Fourth Annual Meeting of the Multinational Finance Society on June 25–28, 1997, in Thessaloniki, Greece, and will also be presented at the Financial Management Association Annual Meeting on October 15–18, 1997, in Honolulu, Hawaii.

Responsibility: International Economics Department, Commodity Policy and Analysis Unit—Panos Varangis (pvarangis@worldbank.org). With George Tsetsekos, Drexel University; and Tom Scott, Sparks Companies.

Completion date: January 1997.

Report:

Tsetsekos, George, and Panos Varangis. 1997. "Architecture of Derivative Exchanges." World Bank, International Economics Department, Washington, DC.

Saving in Developing Countries

Ref. no. 681-36

Over the past three decades the world has witnessed a large and growing divergence in savings rates. The gap between industrial and developing country savings rates has widened since the mid-1970s, and there has been a dramatic divergence in the developing world: savings rates have doubled in East Asia, stagnated in Latin America, and collapsed in Sub-Saharan Africa. These regional disparities have been closely reflected in growth performance: with higher savings rates has come higher income growth.

Even apart from any direct effect on growth, there are other reasons that an adequate supply of savings is a central policy objective. A national savings ratio broadly in line with an economy's investment needs is key to reducing its vulnerability to unexpected shifts in international capital flows. In conditions of increasing international financial integration, high domestic saving helps ensure macroeconomic stability. Yet little is known about the relative effectiveness of different policies in encouraging saving, even for policy measures that have often been advocated for their positive effect on saving, such as pension system reform or financial sector liberalization.

This research addresses three broad questions: Why do savings rates differ so much across countries and time periods? How much do higher savings rates contribute to growth? And what policy measures are most effective in raising national savings rates?

The project is structured in five parts. The first involves the construction of an international macroeconomic database on saving and related variables. A preliminary version of the database is nearly complete. Using this new macroeconomic information and household surveys, the second part will seek to explain differences in saving across space and time and the link between saving and growth. The third part will focus on the effects of specific policies on saving, using a cross-country comparative approach. The fourth will assess the saving performance of different countries to draw lessons from policy experience. The last part will provide a policy-oriented synthesis of the main results and lessons from the research.

The research methodology will be based both on relatively narrow analytical frameworks derived from intertemporal optimization and on broader models not derived from first principles but encompassing a number of alternative consumption and saving motives. Empirical applications of the analytical models will use both microeconomic and macroeconomic data. The aggregate data for the cross-country studies will be drawn from the database on saving. The empirical models and data coverage will vary across studies, depending on data availability and the need to tailor the samples to the questions under investigation.

The project will contribute to Bank operational work in several ways. Clarifying what drives saving and how saving relates to growth will assist in policy diagnosis and the selection of policy targets. The quantitative assessment of the relative effectiveness of different policies in promoting saving will aid in the selection of policy tools, clarifying which instruments are likely to have the biggest effect under different circumstances. This will help to determine the priority and sequencing of reform measures. Finally, the development of empirically validated savings functions with firm analytical foundations will contribute to the formulation of country analyses, projections, and strategies.

The research findings will be disseminated to Bank country economists through a conference and a seminar on savings policies, to policymakers in developing countries through regional conferences in Latin America and Eastern Europe or the former Soviet Union, and to the broader development community through articles in Bank and academic journals and a volume of collected papers. A first volume with preliminary findings is under preparation.

Responsibility: Policy Research Department, Macroeconomics and Growth Division—Norman Loayza (nloayza@worldbank.org), Luis Servén, Craig Burnside, and Aart Kraay, and Finance and Private Sector Development Division—Gerard Caprio. With Klaus Schmidt-Hebbel, Central Bank of Chile; Timothy Besley and Costas Meghir, London School of Economics; Angus Deaton and Christina Paxson, Princeton University; Faruq Kahn, Harvard University; Andrew Samwick, Dartmouth College; Patrick Honohan, Economic and Social Research Institute; Jonathan Ostry and Alejandro López, International Monetary Fund; Fabio Schiantarelli, Boston College; Peter Montiel, Williams College; Janine Aron and John Muellbauer, Oxford University; Antonello Scorcu and Lucio Picci, Università de Bologna; Orazio Attanasio, University College of London; Carmen Reinhart, University of Maryland; Dani Rodrik, Columbia University; and Ijaz Nabi.

Completion date: December 1998.

Reports:

- Schmidt-Hebbel, Klaus, and Luis Servén. 1996. "Income Inequality and Aggregate Saving: The Cross-Country Evidence." Policy Research Working Paper 1561. World Bank, Policy Research Department, Washington, DC.
- _____. 1997. "Does Income Inequality Raise Aggregate Saving?" Working Paper 97-08. Central Bank of Chile, Santiago.
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- _____. Forthcoming. "Income Inequality and Aggregate Saving." In Andrés Solimano, ed., *Social Inequality, Values, Growth, and the State*. Ann Arbor: University of Michigan Press.
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Managing Natural Disasters in the Caribbean through Mitigation and Financial Risk Sharing

Ref. no. 681-44C

This project investigated whether better economic and financial management mechanisms and institutions than those now in use are available to manage natural hazard and catastrophe shocks (such as hurricanes) in the Caribbean economies.

The study's analytical approach was based on actuarial- and engineering-based loss probability models. The analysis combined engineering- and actuarial-based event

probability estimates of hurricanes with probable maximum loss exposures based on property coverage valuation. It derived the likely pricing for coverage and compared it with current market rates to determine whether intraregional funding would be more efficient with use of capital market instruments to cover the highest levels of risk. The analysis drew on insurance and reinsurance industry statistics (from the Caribbean, Germany, London, Switzerland, and the United States) and data from the Caribbean Disaster Emergency Relief Agency (on hazard events and frequencies), the U.S. banking industry, and California, Florida, and Hawaii (on pooled catastrophe insurance funds).

The study's findings indicate that it is possible to set up more self-sufficient funding and insurance mechanisms in the region in order to provide better financial and economic cushions against volatility in the event of natural catastrophes. In the long run such mechanisms (which can be coupled with international capital market instruments) might be cheaper and more reliable than the current dependence on donor grant funds for reconstruction on a case-by-case basis.

A standby line of credit or guarantee provided by the Bank could support the initial development of regional catastrophe insurance funds and maintain their liquidity while their capital is built up. Technical assistance for regulatory reform of the insurance industry and disaster mitigation measures in the real sector would need to be coupled with funding arrangements to ensure that appropriate incentives are in place for insurance underwriters and property owners. Enforcement of mitigation and emergency preparedness measures in the region would support a broader risk underwriting effort by the private insurance industry. This would help to increase domestic risk capital and thus reduce dependence on higher-priced external coverage.

The study's findings have been discussed with public and private sector representatives in the Caribbean and insurance and reinsurance specialists to determine what recommendations would be made to regional heads of government. A final report will be distributed to the region's governments and regulatory authorities as well as the private sector.

Responsibility: Latin America and the Caribbean, Country Department III, Public Sector Modernization and Private Sector Development Division—John D. Pollner (jpollner@worldbank.org) and Christopher Barham. With the Insurance Information Institute; Risk Management Center, Wharton School; Arthur Evans; and Isabelle Daverne. The Canadian (CIDA) Trust Fund contributed funding for the research.

Completion date: June 1997.

The Financial Structure and Governance of Venture Capital Funds in Developing Countries

Ref. no. 681-51

In developing countries venture capital funds have become an important source of financing for small and medium-size enterprises, which often have difficulty raising long-term financing because of underdeveloped capital markets. But developing countries can pose special challenges for venture capital funds if institutions and legal and regulatory frameworks do not adequately support enforcement of contracts with the enterprises in which they invest. What types of venture capital fund structure and governance are most effective in dealing with such regulatory environments? This study addresses that question by looking at funds active in developing countries.

Preliminary results based on industry data show that, in contrast to the United States, where pension funds are the leading institutional investors in venture capital, in developing countries nonfinancial corporations and banks are the two largest sources of formal venture capital. In the United States most venture capital is channeled into the computer and medical and biotechnology industries, while in developing countries the consumer goods and industrial products industries are the biggest recipients. Most venture capital investment in the United States is structured as convertible preferred equity shares, while in developing countries ordinary equity is more common.

In further analysis the study will draw on an International Finance Corporation database that documents venture capital fund structure and governance and on the results of a survey on the composition of fund portfolios. The study will examine how the structuring, monitoring, voting, board representation, and residual control rights given to venture capital funds vary with the asset characteristics of the businesses being financed and with the organizational form of the venture capital fund. The study will provide useful insights on best practice in the structure and governance of private equity investment in developing countries.

Responsibility: International Finance Corporation, Economics Department—Guy P. Pfeffermann (gpfeffermann@ifc.org). With Anthony Aylward.

Completion date: September 1997.

The Effects of Urban Land Titling and Tenure Security on Investments, Property Value, and Credit Access in Ecuador

Ref. no. 681-80

This research project examines the importance of tenure security for access to credit, investments in homes and in the community, and property values in Ecuador. It gives particular attention to the effects of tenure security on investments in local public goods, such as sewers and waste removal.

The research uses a stratified sampling technique to collect data and estimates the effects of land tenure security using an instrumental variable approach. It estimates environmental quality, investments in public goods, and property values as functions of title, other tenure variables, and control variables, and access to formal credit as a function of these variables as well as assets and access to other sources of credit.

The findings, still very preliminary, indicate that there are informal barriers to obtaining tenure security. Age and education of head of household are not significant predictors of whether title could be or had been obtained, but whether the neighbors have title is a good predictor. Title appears to add value to the property, but the effect diminishes over time. Households with a stronger claim to their property are significantly more likely to participate in activities to improve the community.

The study will generate data with unique detail regarding responses to tenure security and should give useful insights for the design of sector policies. Preliminary results were presented at the workshop on the research project Social and Environmental Consequences of Growth-Oriented Policies, May 1–2, 1997. The 35 participants were academics and Bank specialists.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Emmanuel Jimenez (ejimenez@worldbank.org). With Jean Lanjouw, Yale University; and Jorge Equiguren. The Social and Environmental Consequences of Growth-Oriented Policies Trust Fund, Ministry of Foreign Affairs, the Netherlands; the Yale Center for International and Area Studies; and the German Agency for Technical Cooperation are contributing funding for the research.

Completion date: December 1997.

Bank Reform, Concentration, and Costs

Ref. no. 681-90

This project will investigate the effects of financial reform on competition and efficiency in the banking sectors of several countries, including Chile, Colombia, Italy, the

Philippines, and Thailand. In particular, it will examine banks' behavior to find out whether interest rates are determined in a competitive manner and whether they represent a significant obstacle to economic growth. The project will use the most disaggregated data to analyze in which sectors these obstacles are greatest. The analysis is based mainly on data on individual banks (from financial statements collected in Bankstat) and aggregate data collected primarily from central banks.

Use of a common methodology will allow the study to carry out cross-country comparisons and assess the success of reforms in improving the competition and efficiency of banking sectors. The research should also provide policy recommendations relating to finance for small and medium-size firms, yielding insights on the effect of financial reforms on different kinds of borrowers.

The results will be presented at seminars and conferences and through one or two working papers. The study will also result in a database in Excel containing all the statistical information used.

Responsibility: Financial Sector Development Department—Fernando Montes-Negret (fmontesnegret@worldbank.org) and Luca Papi.

Completion date: December 1997.

Finance and Growth

This research found strong conceptual and empirical support for the view that better financial systems accelerate economic development. Financial systems mobilize savings, evaluate firms and allocate capital based on those evaluations, exert corporate governance, facilitate risk management, and ease transactions. Economies with financial systems that efficiently and abundantly supply these functions have stronger growth prospects. And evidence suggests that countries with larger banking systems and more liquid stock markets enjoy faster capital accumulation rates, larger productivity gains, and quicker overall growth rates than countries with less developed financial systems.

On the policy front, financial economists' opinions on financial repression are converging. Because the financial system serves important functions for the nonfinancial sectors of the economy, many financial economists argue against financial repression—taxes, interest rate controls, and directed credit. Much greater policy debate continues on what constitutes sound supervisory and regulatory policies.

Responsibility: Policy Research Department, Finance and Private Sector Development Division—Ross Levine (rlevine@worldbank.org).

Completion date: December 1996.

Reports:

- Levine, Ross. 1994. "Government Insurance and Financial Intermediaries: Issues of Regulation, Evaluation, and Monitoring." In Shakil Faruqi, ed., *Financial Sector Reforms, Economic Growth, and Stability: Experiences in Selected Asian and Latin American Countries*. Washington, DC: World Bank.
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- _____. 1996. "Financial Development and Economic Growth: Issues and Agenda." World Bank, Policy Research Department, Washington, DC.
- _____. 1996. "Financial Functions, Institutions, and Growth." In A. Harwood and B. Smith, eds., *Sequencing Financial Sector Development and Reform: Major Themes and Issues*. Washington, DC: The Brookings Institution.
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- _____. 1996. "Unresolved Issues in the Relationship between Finance and Development." In N. Hermes and R. Lensing, eds., *Financial Development and Economic Growth: Theory and Experiences from Developing Countries*. London: Routledge.
- _____. 1997. "Financial Development and Economic Growth: Views and Agenda." *Journal of Economic Literature* 35:688-726.

Internationalization of Emerging Capital Markets: Cross-Country Experience

This study explored the following questions: What are the major characteristics of emerging capital markets that have recently been internationalized? Did the market opening help or hurt domestic market performance? And what are the policy lessons for developing countries that have not yet fully liberalized their capital market?

The study assessed changes in key market indicators before and after the market opening, using data from the International Finance Corporation's Emerging Markets Database and from country and market sources in 10 emerging economies. Preliminary results suggest that most of these emerging capital markets saw their performance improve after the liberalization of foreign investment.

The study's findings provide further support for Bank operations in capital market development. The cross-country experience documented in the study should facilitate Bank policy dialogue with developing countries that have not yet implemented market liberalization programs.

Responsibility: International Economics Department, International Finance Division—Kwang W. Jun (kjun

@worldbank.org). With Amitava Sardar, Columbia University.

Completion date: December 1996.

Report:

- Jun, Kwang W., Amitava Sardar, and Gary Kleiman. 1996. "Internationalization of Emerging Capital Markets: Cross-Country Experience." World Bank, International Economics Department, Washington, DC. Draft.

Bank Restructuring in Sub-Saharan Africa

This project was intended to produce a best practice piece on bank restructuring in Africa. It was based on a practical, desk-based review of case studies in seven African countries—Benin, Côte d'Ivoire, Ghana, Kenya, Mozambique, Tanzania, and Uganda. The study analyzed factors that contributed to the success or failure of bank restructuring operations supported by the Bank in those countries. The choice of countries was determined by the availability of project completion reports or project performance audit reports issued by the Bank's Operations Evaluation Department, reports that allowed a meaningful comparison of outcomes and original program objectives. The data in these reports were complemented, where possible, by discussions with the task managers of the operations.

The analysis was based on secondary data tied either to structural adjustment programs that included a financial sector component or to financial sector adjustment loans and credits undertaken in the late 1980s and early 1990s. Close cooperation was maintained throughout with the Operations Evaluation Department, which was conducting a worldwide review of bank restructuring operations over the same period.

The results of the study point to the importance of certain key factors in the success or failure of bank restructuring operations in Africa. One such factor is strong government commitment to the banking reform. Without such commitment, reform is likely to be diverted by powerful interests and will ultimately fail. Other important factors are a willingness to liquidate insolvent institutions, a flexible approach to privatization in dealing with potential investors, and diligent work by the Bank's operational staff to identify and analyze problems facing banks and to help build a consensus around practical, realistic solutions to these problems.

The findings indicate a need for a more rigorous, systematic approach to bank restructuring, one that takes stock of past experience in the region and elsewhere and ensures that the necessary conditions for successful bank restructuring are in place before reforms are implemented. Hastily prepared operations and those that take insuffi-

cient account of reality on the ground or fail to build adequate consensus on the objectives will have no lasting positive effect on efficiency and competitiveness in the financial system.

The study's main findings and conclusions were widely distributed to staff in the Bank's Africa Region and to other Bank staff who are working on financial sector issues.

Responsibility: Africa Technical Families, Knowledge Information and Technology Division—Kevin Cleaver (kcleaver@worldbank.org), and Private Sector Finance Division—Jean-Jacques Deschamps.

Completion date: May 1997.

Report:

Deschamps, Jean-Jacques, and James Bonnardeaux. 1997. "Bank Restructuring in Sub-Saharan Africa: Lessons from Selected Case Studies." World Bank, Africa Technical Families, Private Sector Finance Division, Washington, DC.

World Bank Financial Sector Adjustment Lending: The Experience to Date

The past 20 years have seen banking crises in more than 100 countries. Both their size—in many cases bailout costs exceeded 10 percent of GDP—and the fact that they recur reflect fundamental weaknesses in the financial (particularly banking) sectors of many countries. Not surprising, the World Bank has increasingly issued loans with conditionalities designed to strengthen financial sectors. The objectives of this study were to describe how the conditionality of those loans has changed over time, to examine whether initial macroeconomic and financial sector conditions in recipient countries had a discernible impact on postloan financial sector outcomes, and, after controlling for initial conditions, to determine whether the type of conditionality had an impact on postloan outcomes.

The analysis used a database created by the Bank's Operations Evaluation Department to classify the types of conditionalities in each loan. Data on macroeconomic and financial sector conditions at the time of the loan were taken from the International Monetary Fund's *International Financial Statistics*. For loans that had matured sufficiently (those issued before 1994), simple statistical techniques were used to model subsequent changes in financial depth (especially as measured by the ratio of M2 to GDP). To further confirm inferences drawn from this statistical work, four brief case studies were completed (on Pakistan, the Philippines, Tanzania, and Venezuela).

The principal findings of the analysis are that postloan financial deepening was positively associated with

low inflation and an initially underdeveloped financial sector. Moreover, although loan conditionalities focus on the same six areas of reform—interest rate distortions, prudential regulation, bank supervision, bank recapitalization, bank privatization, and nonbank financial regulation—recapitalization, privatization, and supervision were more heavily emphasized after 1990. Controlling for initial macroeconomic and financial sector conditions, the analysis found that certain types of reforms, especially those that dealt with prudential regulation, were associated with relatively large increases in the ratio of M2 to GDP. Those dealing with recapitalization were also relatively successful, especially when they also tackled prudential regulation or banking supervision or both. But those that focused on supervision did not, on average, substantially outperform those that did not. In addition, reform focused on bank privatization was associated with much less financial deepening three years after intervention.

Responsibility: Policy Research Department, Finance and Private Sector Development Division—Gerard Caprio (gcaprio@worldbank.org) and Robert Cull; and Operations Evaluation Department, Country Policy, Industry, and Finance Division—Nicolas Mathieu.

Completion date: June 1997.

Report:

Cull, Robert. 1997. "Financial Sector Adjustment Lending: A Midcourse Analysis." Policy Research Working Paper 1804. World Bank, Policy Research Department, Washington, DC.

Bond Spreads in Emerging Markets

This study attempts to explain spreads on bonds issued by emerging markets since 1991. The study gives careful consideration to the selectivity problem—that is, it takes into account the factors that go into the actual issue of the bond simultaneous with the determination of the spread. A model estimated with 1991–95 data is used to predict the spreads in 1996 in order to ask whether declining spreads reflected fundamentals or "irrational exuberance."

Responsibility: Cofinancing and Project Finance Department, Project Finance and Guarantees Group—Ashoka Mody. With Barry Eichengreen, University of California at Berkeley.

Completion date: September 1997.

Report:

Eichengreen, Barry, and Ashoka Mody. 1997. "What Explains Spreads on Emerging Market Bonds: Economic Fundamentals or Irrational Exuberance?" World Bank, Cofinancing and Project Finance Department, Washington, DC.

Sustainable Banking with the Poor

This research project aims at improving the ability of donors, governments, and practitioners to design and implement policies and programs for building sustainable financing institutions that are effective in reaching the poor. The project is carrying out a series of case studies of microfinance institutions in Asia, Africa, and Latin America that have pioneered innovative approaches for reducing the costs and risks of providing financial services to a large number of low-income clients. The case studies cover a wide range of types of institutions, including commercial banks, specialized banks, nongovernmental organizations, nonbank financial institutions, and government development finance institutions.

The project draws on several disciplines—finance, economics, anthropology—and uses both quantitative and qualitative approaches to analyze why some programs have successfully delivered financial services to the poor while others have fallen short. Success is defined by financial sustainability and by access and outreach. Financial sustainability is measured in terms of key financial performance indicators, including the Subsidy Dependence Index widely used in the Bank. Access and outreach are measured by assessing how far beyond the “frontier of finance” a program has gone to reach those who have been unable to use formal financial services—whether because of gender, income, illiteracy, ethnic identity, geographic location, or lack of collateral.

On the basis of the case studies, the project will produce a sourcebook on sustainable banking with the poor that will distill lessons for policy formulation, program design, and implementation. In collaboration with the Consultative Group for Assisting the Poorest (CGAP), the project also is producing two guides on microfinance. The first is a practical guide designed to assist Bank task managers in the design and implementation of microfinance activities. It presents a step-by-step approach to designing a microfinance loan or loan component, and extensive advice on such nonlending activities as policy dialogue and technical assistance. The second is a technical guide targeted to a much wider audience, including client country governments, financial institutions, donor agencies, and practitioners. It offers a comprehensive overview of the main issues in microfinance and an update on the lessons learned and best practices in the field.

Drafts of the two guides have been completed and are being reviewed by Bank staff and external experts. The final version of the practical guide is scheduled for production in October 1997. A near-final version of the technical guide will be the subject of a regional workshop in Thailand in November 1997, organized in cooperation

with the Foundation for Development and Cooperation, Australia.

The project has established a seminar series to disseminate best practice and to discuss issues and problems emerging in the rapidly growing field of microfinance. Thus far it has held 25 seminars, including a discussion of the draft Operational Policy 8.30. Abstracts are available for most of these seminars. The project has also established a Website (<http://www-esd.worldbank.org/html/esd/agr/sbp/page.htm>).

Although the project is not yet completed, it has begun to influence the design and implementation of microfinance projects in the Bank. The case studies and the examples of good practice presented in the seminar series have prompted follow-up discussions with operational staff interested in applying the lessons learned.

Responsibility: Asia Technical Department, Human Resources and Social Development Division—James Socknat (jsocknat@worldbank.org), Lynn Bennett, and Laura Gomez; and Agriculture and Natural Resources Department, Office of the Director—Douglas Forno, and Sector Policy and Water Resources Division—Jacob Yaron and Carlos Cuevas. With Cecile Fruman; Tom Dichter; Joanna Ledgerwood; and Julia Paxton. The Royal Ministry of Foreign Affairs, Norway; the Swiss Agency for Development Cooperation; and the Ford Foundation are providing funding for the research.

Completion date: December 1997.

Reports:

- Bennett, Lynn, and Carlos Cuevas, eds. 1996. Special issue on Sustainable Banking with the Poor. *Journal of International Development* 8(2).
- World Bank. 1996. “A Worldwide Inventory of Microfinance Institutions.” Agriculture and Natural Resources Department and Asia Technical Department, Washington, DC.
- _____. 1997. “Case Studies in Microfinance: Benin, FECECAM.” Agriculture and Natural Resources Department and Asia Technical Department, Washington, DC. (Also published in French.)
- _____. 1997. “Case Studies in Microfinance: Zimbabwe, Zambuko Trust.” Agriculture and Natural Resources Department and Asia Technical Department, Washington, DC.
- _____. 1997. “An Inventory of Microfinance Institutions in East Asia and the Pacific.” Agriculture and Natural Resources Department and Asia Technical Department, Washington, DC.
- _____. 1997. “An Inventory of Microfinance Institutions in East, Central, and South Africa.” Agriculture and Natural Resources Department and Asia Technical Department, Washington, DC.
- _____. 1997. “An Inventory of Microfinance Institutions in Latin America and the Caribbean.” Agriculture and Natural Resources Department and Asia Technical Department, Washington, DC.
- _____. 1997. “An Inventory of Microfinance Institutions in South Asia.” Agriculture and Natural Resources Department and Asia Technical Department, Washington, DC.

_____. 1997. "Financial Sustainability for Credit Programs: A Travel Survival Guide." SBP Occasional Papers. Agriculture and Natural Resources Department and Asia Technical Department, Washington, DC.

Best Practice in Postal Financial Services

This research project addresses several questions: Could the national postal network provide an effective financial infrastructure in countries with a weak financial sector? Even in developing countries with a reasonably developed financial sector, could the postal network provide efficient basic financial services to rural areas, low-income communities, and small businesses and traders? What are the major issues and constraints in developing postal financial services? And what steps are effective in reforming postal financial services?

The research will be based on case studies of successful and unsuccessful reform and a statistical survey of postal financial services around the world. The project will conduct this survey to fill gaps in existing databases, which contain limited and sporadic information. The other primary sources of data will be the Universal Postal Union and the World Savings Banks Institute.

The research is expected to raise awareness within the Bank and among borrowers of the benefits of postal financial service reform for rural development and financial sector development in rural areas and among the poor. The findings will be disseminated mainly through publication and at least two conferences to be organized jointly with the Universal Postal Union.

Responsibility: Private Sector Development Department, Private Sector Development and Privatization Group—Kumar Ranganathan (kranganathan@worldbank.org) and Mariko Sakai.

Completion date: April 1998.

TRANSITION ECONOMIES

Impact of Market-Oriented Policy Reforms on Households in Rural China

Ref. no. 677-16

In the 1980s China dismantled the commune system, in which land was communally owned and farmed, and replaced it with the household responsibility system, in which land is leased to and worked by individual households. In the early 1980s agricultural production increased dramatically. No further large increases are expected, however, as it appears that the gains from this new policy have now been reaped.

This research project intends to obtain answers to the following questions: What are the main determinants of the productivity of agricultural households in rural China? Would removal of restrictions on factor markets (credit, labor, and land) produce further increases in agricultural output? How has the household responsibility system affected income distribution, and what are the principal determinants of the variation in incomes across rural households in China?

Answering these questions requires detailed household-level information, data that are rare for China. This project collected data from about 1,000 households in 30 villages in Hebei and Liaoning Provinces in the summer of 1995.

When the project is completed, the results are expected to shed light on two broad policy questions. First, what would be the effect on productivity of further liberalization of the rural economy (ending restrictions on hiring of labor, private provision of credit, and buying, selling, and renting of land)? And second, what avenues are available for further reducing poverty in rural China? Preliminary results have shown that clear property rights lead to more investments in land improvements.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Paul Glewwe (pglewwe@worldbank.org). With Loren Brandt, University of Toronto; Scott Rozelle, Stanford University; and the Research Center in Rural Economy, China. The National Academy of Sciences, United States, and the International Development Research Centre, Canada, are providing funding for the research.

Completion date: December 1997.

Report:

Rozelle, Scott, Li Guo, and Loren Brandt. "Land Tenure, Property Rights, and Productivity in China's Agricultural Sector."

Dynamics of Rural Poverty in China

Ref. no. 678-79C

Panel data on households (data tracking the same households over time) in developing countries are rare. Yet the need for such data is great for a number of reasons. The vagaries of rain-fed agriculture bring issues of risk and transient poverty to the fore, and transient poverty is also an important issue in the economic transition and adjustment that many of these countries have been undergoing. Conventional data are less than ideal for informing policy decisions in such settings.

This project constructed a large new panel data set for four provinces of rural China from a time series of household surveys from 1985 to 1990. Conducted by China's State Statistical Bureau, these surveys repeatedly resampled a large number of households. The four provinces range from a prosperous coastal region (where reforms have brought rapid gains) to far less prosperous, lagging inland areas. The data appear to be of good quality by prevailing standards.

The data allowed investigation of many research issues. In addition to creating the data set, the project focused on an important subset of these issues. In particular, it investigated the dynamics of poverty in rural China during 1985–90 and the determinants of both the persistent and the transient components of household consumption. This research was the first systematic investigation to use household-level data in analyzing the transitions into and out of poverty in rural China during a period of economic reform and growth.

The project involved close collaboration with China's State Statistical Bureau, both in constructing the data set and in drawing on the results of the research, to help the bureau put on a firm footing future poverty monitoring efforts using these and other data.

Results of the research have directly informed two tasks in Bank operations, the Southwest China Poverty Reduction Project and ongoing economic and sector work on income distribution in China.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Martin Ravallion (mravallion@worldbank.org), Shaohua Chen, and Jyotsna Jalan.

Completion date: December 1996.

Reports:

- Chen, Shaohua, and Martin Ravallion. 1996. "Data in Transition: Assessing Rural Living Standards in Southern China." *China Economic Review* 7(1):23–55.
- Jalan, Jyotsna, and Martin Ravallion. 1996. "Transient Poverty in Rural China." Policy Research Working Paper 1612. World Bank, Policy Research Department, Washington, DC.
- _____. 1997. "Are the Poor Less Well Insured? Evidence on Vulnerability to Income Risk in Rural China." World Bank, Policy Research Department, Washington, DC.
- _____. 1997. "Consumption Variability and Rural Poverty in Post-Reform China." World Bank, Policy Research Department, Washington, DC.
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- Ravallion, Martin, and Shaohua Chen. 1997. "When Economic Reform Is Faster than Statistical Reform: Measuring and Explaining Inequality in Rural China." World Bank, Policy Research Department, Washington, DC.

Labor Market Adjustment in Estonia

Ref. no. 679-71C

Many economies in transition have experienced massive dislocation of workers and painfully high unemployment. Few, if any, will avoid these outcomes. In contrast to Central and Eastern Europe, little is known about recent labor market adjustments in the former Soviet republics. This research aimed to fill that void. Using the data generated by the Estonian retrospective labor force survey of 1995, it assembled hard evidence on the patterns of labor mobility and wage changes during the transition of one former Soviet republic—Estonia. The country not only is implementing distinctive labor market policies, generally in the direction suggested by the World Bank, but also is in the forefront among the former Soviet republics in implementing policy reforms.

The project focused on three main issues. First, it investigated the main labor market adjustments by analyzing the magnitude and the determinants of the flows among labor market states and of direct job-to-job transitions, and the changes in returns to education, experience, and gender. Second, it identified workers who are being especially hurt in the transition. Third, the project investigated the incentive effects of unemployment insurance. The analysis relied on the estimation of probit, logit, and hazard models for analyzing determinants of labor market transitions, and estimation of earnings functions for analyzing changes in returns to human capital and determinants of workers' reemployment earnings losses.

The study on the evolution of the wage structure produced four main empirical findings. First, the relative returns to education rose rapidly during transition, as did the relative employment of more educated workers. The advantages of more education occurred for all experience cohorts and across all sectors of the economy. Second, returns to experience rose for most experience cohorts, most rapidly for the young (relative employment also rose for younger workers). Third, women's employment share declined in most sectors, but their relative wages increased. Ethnic minorities lost in both employment share and relative wages; some of this decline may be due to rising relative returns to Estonian language ability in most sectors of the economy. Fourth, relative wages declined in sectors with the largest reductions in employment and rose in sectors with the largest gains in employment. The consistency of this pattern of rising relative wages associated with rising relative employment for human capital and ethnic groups suggests a well-functioning labor market responding to demand shocks.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Branko Milanovic (bmilanovic@worldbank.org). With Milan Vodopivec, Institute for Macroeconomic Analysis, Ljubljana, Slovenia; John Haltiwanger, University of Maryland; Peter Orazem, Iowa State University; and Kalev Katus, Rivo Noorkoiv, and Allan Puur, Population Research Center, Estonian Interuniversity, Tallinn.

Completion date: June 1997.

Report:

Puur, Allan, Peter F. Orazem, Rivo Noorkoiv, and Milan Vodopivec. 1996. "Employment and Wage Dynamics in the Estonia Transition, 1989–95." World Bank, Policy Research Department, Washington, DC.

Government Financial Transfers to the Largest Recipient Enterprises in Russia

Ref. no. 679-98C

Most Central and Eastern European countries launched market reforms with a large volume of government financial transfers to the enterprise sector. Reducing these transfers was one of the major challenges for the region's governments in their efforts to stabilize their economies. In Russia at the start of the market transformation in 1992 this problem was much more severe than anywhere in Central and Eastern Europe. While the government has made much progress in the past few years in reducing overall transfers to enterprises, state financial assistance to enterprises remains substantial. And the remaining transfers are concentrated

among a small number of the largest and most well-connected enterprises.

Tackling these transfers will be critical for both macroeconomic stabilization and enterprise reform in the next couple of years, for several reasons. First, these transfers still constitute an unacceptably large share of government transfers to the economy and have a significant impact on the budget. They need to be further reduced and rationalized if macroeconomic stabilization is to be sustained. Second, many of the largest recipient enterprises are "problem" enterprises, and their problems can and will contaminate the rest of the economy through interenterprise arrears and arrears to the banking system. Their performance will have a significant effect on the financial system, especially the banking system. Third, because many of these enterprises are in basic, upstream industries, sometimes with monopolistic market positions, their performance will directly affect the competitiveness and adjustment of many other enterprises. Fourth, these enterprises are usually the largest employers in their regions and localities, so how they are restructured will have important social implications.

This study analyzed the rationale for and the size and type of such government financial support and examined the options for reducing and rationalizing it. The study used data from a large World Bank survey of industrial enterprises in Russia, case studies of 10–15 of the largest recipient enterprises in different regions of Russia, and official data on government financial support.

The study's results show that government financial assistance does not go to the enterprises that face the most severe financial problems or to those particularly affected by recent external shocks, such as the loss of markets in Eastern Europe and in other former Soviet republics. Nor is government assistance biased toward enterprises with more intensive investment spending. Instead, one of the most important determinants of whether an enterprise receives government transfers, and how large these transfers are, is the size of its workforce. Overall, government financial transfers do not seem to serve any identifiable objectives (such as promoting restructuring or supporting high-technology and export industries), although certain forms of transfers do play a slightly compensatory role for price controls or government procurement. The current system of government assistance to enterprises consists of about a dozen independent channels and a large number of government agencies, which makes government assistance even less efficient and more difficult to monitor.

The current level and system of government financial support clearly have not promoted enterprise restructuring, especially for the largest recipients. To encourage enterprise restructuring will require further reduction

and rationalization of government financial assistance—by deepening price and trade liberalization, reducing the total volume of transfers, reducing the number of channels and the number of agencies involved in the allocation of transfers, improving the transparency of the allocation system, conditioning remaining transfers on restructuring, and improving monitoring and supervision of the use of transfers.

Responsibility: Europe and Central Asia, Country Department III, Country Operations Division 2—Qimiao Fan (qfan2@worldbank.org) and Lev Freinkman, and Moscow Resident Mission—Alexander Morozov; and Private Sector Development Department—Syed Mahmood. With Victor Rassadin; Elena Starostenkova; Tatyana Chetvernina; Stepan Titov; Michail Broitman, Troika-Dialog; Yuri Kuznetsov; Georgy Semenov; and Alla Godunova.

Completion date: October 1996.

Reports:

Alfandari, Gilles, Qimiao Fan, and Lev Freinkman. 1996. "Government Financial Transfers to Industrial Enterprises and Restructuring." In Simon Commander, Qimiao Fan, and Mark Schaffer, eds., *Enterprise Restructuring and Economic Policy in Russia*. EDI Development Studies. Washington, DC: World Bank.

Freinkman, Lev, and Michael Haney. 1997. "What Affects the Russian Regional Governments' Propensity to Subsidize?" Policy Research Working Paper 1818. World Bank, Europe and Central Asia, Country Department III, Washington, DC.

The Consequences of Large-Scale Privatization in Mongolia

Ref. no. 680-27

The restructuring of state enterprises is an important aspect of all reforms in formerly socialist countries. Mass privatization is one favored method of accomplishing such restructuring. But analytical work on the consequences of mass privatization is only beginning. Longitudinal studies, which can illuminate the nature and speed of firm adjustment, are still rare. Work has been largely concentrated on the western rim of Eastern Europe and on Russia, where the issues are quite different from those in the second tier of reforming countries, those with less developed legal and market systems. So there are valuable lessons to be learned from analyses of the effects of the earliest privatizations in the second tier of reforming countries. Mongolia provides a fitting case study.

This project is collecting and analyzing data on privatized enterprises in Mongolia to examine the channels by which privatization affects enterprise behavior, the significance and speed of these effects, and their

relation to ownership structure. This research has two central, complementary goals—testing hypotheses on the effects of privatization and informing current policy discussions. A third objective is to generate firm-level information that permits more accurate analyses of Mongolian economic conditions and their implications for Bank and national policymaking.

The research examines links between various dependent variables and corresponding sets of explanatory variables in a series of separate econometric analyses, seeking to identify effects attributable to privatization. Three key explanatory variables are the structure of ownership, the allocation of internal influence among governance bodies, and the time since privatization.

The primary data source for the research is a survey of about 250 privatized enterprises in Ulaanbaatar and in eight provinces. Included among these enterprises are 94 firms surveyed in 1993, allowing a longitudinal analysis of the effects of privatization. Supplementing the survey is an extensive separate data set on enterprise characteristics and stock market sales constructed from data from the State Privatization Commission, the Mongolian Stock Exchange, and commercial trading data source files.

Findings to date are primarily descriptive because the econometric work is just beginning. Nevertheless, the study has identified several interesting patterns that stand in contrast to some widely held assumptions and observations relating to transition and that suggest promising avenues for deeper analysis. For example, the study has found that in Mongolia state behavior does not conform to the assumption of the disinterested owner that is commonplace in the literature and that has been demonstrated empirically in the Czech Republic, Hungary, and Russia.

Other findings reflect the differing objectives and constraints of local and central governments. The harder budget constraints of local governments and the presence of interjurisdictional competition are thought to explain the finding that, contrary to general expectations, locally owned enterprises appear to behave much more like completely privatized enterprises than like centrally owned enterprises. This suggests that the devolution of government functions to lower levels produces effects similar to those of privatization, although not of the same intensity.

In looking at postprivatization ownership changes, the study has observed a relatively weak securities market with little trading activity for most firms. For a subset of firms the study has found distinctive changes in the structure of ownership, with managers generally strengthening their ownership positions, acquiring equity both from outsiders and from workers. The results of a

preliminary examination of corporate governance and the quality of governance mechanisms imply that available institutions, despite a credible legal foundation, have been largely captured by insiders, sometimes in direct violation of law.

Information and results from the study have been incorporated into the latest country economic memorandum for Mongolia (July 1997) and a public enterprise review (fiscal 1996). Additional consultations with Bank operational staff are planned to inform the development of an assistance program for private sector development, including technical assistance in such areas as enterprise restructuring and privatization.

More broadly, the research findings relating enterprise restructuring in Mongolia to various explanatory factors are expected to contribute to the general debate on best practices for new programs and remedies for more mature programs that have deviated from those best practices.

Responsibility: East Asia and Pacific, Country Department II, Country Operations Division—Natasha Beschorner (nbeschorner@worldbank.org) and Hongjoo Hahn. With James Anderson, Georges Korsun, and Peter Murrell, University of Maryland.

Completion date: December 1997.

Poverty and Targeting of Social Assistance in Eastern Europe and the Former Soviet Union

Ref. no. 680-33

Declining incomes and growing income inequality have led to a rise in poverty in the transition economies of Eastern Europe and the former Soviet Union. But the effects have been uneven across different population groups, regions, and types of households.

The objective of this research project is to establish association, and even causality, between different factors—such as education, locality, age of household head, and number of household members—and vulnerability during the period of transition. The study covers four countries in Eastern Europe (Bulgaria, Hungary, Poland, and the Slovak Republic) and four countries in the former Soviet Union (Armenia, Estonia, the Kyrgyz Republic, and Russia).

Increased poverty causes difficulties for social assistance agencies in transition economies, both because fiscal resources are usually insufficient and because many people apparently qualify. This leads to the presence of many small programs with large “leakages” to the less needy. Thus, if social assistance is not provided effectively, scarce resources will be wasted, and chances to reduce poverty missed.

Using household income and expenditure data (from regular or Bank-sponsored household budget surveys) from the eight countries for 1993–95, the study attempts to answer two questions: What are the determinants of poverty in transition economies? And what types of households are systematically favored or discriminated against in the allocation of social assistance?

Not unexpectedly, the study has found that education and unemployment play an important part throughout the region (the first by raising income, the second by reducing it). The importance of locality (large city versus rural area), age of the household head (pensioner or employed), and gender of the household head differs among the countries, reflecting differences in such policies as those toward pensioners or protection of the real value of family benefits.

In some countries the study found systematic discrimination in the allocation of social assistance—that is, higher or lower access to social assistance than predicted. Access to social assistance varied depending on place of residence (for example, rural areas are helped more than expected in Hungary, but less than expected in Russia). It also varied according to ownership of such household durables as a car or color TV, clearly indicating an implicit means-testing of social assistance (which seems to be particularly strong in Poland). In almost all the countries, everything else equal, female-headed households are more likely than male-headed households to be helped.

The study has created a large database with data from the eight surveys. The database contains more than a hundred variables, identically defined (to the extent possible) across the surveys. The variables include the level and composition of income and expenditures and such personal and household attributes as education level, place of residence, and ownership of consumer durables. The database, which consists of about 4 million data points, will be available to interested researchers in SAS and STATA software within the next year.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Branko Milanovic (bmilanovic@worldbank.org) and Yvonne Ying; Poverty and Social Policy Department—Jeanine Braithwaite; Environment Department, Social Policy and Resettlement Division—Christiaan Grootaert and Gi-Taik Oh; and Europe and Central Asia, Country Department II, Human Resources Operations Division—Sandor Sipos. With Robert Ackland; Mark Foley; Thesia Gardner, U.S. Bureau of Labor Statistics; Sassoun Tsiourounian, University of Yerevan, Armenia; Alexandra Posarac; and Maria Balaz. The U.S. Department of Labor is contributing staff time.

Completion date: September 1997.

Formal Employment and Survival Strategies under Economic Reform in the Former Soviet Union

Ref. no. 680-52

Conventional labor market approaches are inadequate for understanding employment dynamics and strategies in the former Soviet republics. State enterprise workers make simultaneous decisions on the extent of their work in the state enterprise, on alternative occupations and sources of income (many of which are informal), and on social network interactions (that is, many are or become “network entrepreneurs”). As a result, complex survival strategies have evolved during the transition, transcending conventional notions of employed and unemployed. In response to shifting sets of incentives, workers move along a continuum of formal and informal employment and income options, a strategy that has important implications for social and labor market policies.

This study compares how the different reform efforts in Latvia, Russia, and Ukraine have affected workers. Using a survey methodology developed in Russia and Ukraine, it investigates what has happened in formal and informal employment and in network entrepreneurship. The empirical analysis sheds light on the patterns and importance of informal sources of income. The study suggests who is benefiting from reform in these countries and provides insights on the main characteristics of “non-copers.” It also analyzes the differential income outcomes resulting from the type of firm in which a worker was employed (state or private) and from whether the worker stayed in the firm or was separated. It shows that the deeper reform in Russia compared with that in Ukraine has implied more restructuring by firms, more network entrepreneurship, and more informal labor income. These outcomes help explain why unemployment has stayed low.

The results of this study are being disseminated through seminars, conferences, and publications.

Responsibility: Europe and Central Asia, Country Department IV, Office of the Director—Daniel Kaufmann (dkaufmann@worldbank.org) and Debra Tsimbidis. With Simon Johnson, Massachusetts Institute of Technology; Oleh Ustenko, Kiev State Economics University; and Lorena Barberia, Harvard University.

Completion date: December 1997.

Reports:

Johnson, Simon, Daniel Kaufmann, and Lorena Barberia. “Network Entrepreneurs during Reform.”

Johnson, Simon, Daniel Kaufmann, and Andrei Shleifer. 1997. “The Unofficial Economy in Transition.” Paper presented at the Brookings Panel on Macroeconomic Activity, Washington, DC, September.

Johnson, Simon, Daniel Kaufmann, and Oleh Ustenko. Forthcoming. *Formal Employment and Survival Strategies after Communism*. Washington, DC: National Academy of Sciences.
 _____. "Impact of Restructuring in the Transition."

Evaluating Active Labor Market Programs in Europe and Central Asia

Ref. no. 680-73

Active labor market programs (such as public works, retraining, job search assistance, and job subsidies) are becoming increasingly common in transition economies, which are experiencing unprecedented levels of unemployment. There are social, political, and economic reasons for government action to quicken the redeployment of labor and cushion the impact of layoffs. Nevertheless, to avoid costly mistakes, investments in labor market programs need to be carefully and quickly evaluated. The goal of this project is to develop comprehensive data on the costs of selected active labor market programs and evaluate the effectiveness of the programs in helping different groups of the unemployed under varying labor market conditions and during different stages in the transition to a market economy. The countries participating in the study are the Czech Republic, Hungary, Poland, and Turkey.

The research addresses several questions: What are the key indicators of success for different types of active labor market programs? How can information be collected on these indicators? Do the results justify the expenditures? And how can information be used to improve the targeting and effectiveness of program delivery?

Nonexperimental techniques that examine program participants' labor market success relative to that of an otherwise similar group of nonparticipants are used to evaluate the effectiveness of programs. The economic costs considered include direct program costs and the opportunity costs for participants. Cost-benefit ratios for active labor market programs will be calculated, and the results used to determine cost-effectiveness rankings for the programs.

The research project is being carried out in two phases. In the first, a detailed framework for the study was drawn up. In the second phase, now in the final stages, the data were collected and are being analyzed.

The study should help resolve the debate within the Bank between advocates of growth-oriented policies (combined with social safety nets for the most needy) and advocates of labor market interventions such as retraining and public works. For client countries that have decided to invest in active labor market programs, the study will help determine the relative cost-benefit ratios

of alternative programs and thus how much to allocate to each intervention. It will also provide guidance in targeting programs to those who will benefit most.

The study's findings will be disseminated in the participating countries by Bank staff involved with the study, by consultants, and by task managers of Bank-supported employment projects.

Responsibility: Latin America and the Caribbean, Country Department I, Country Operations Unit 1—Indermit Gill (igill@worldbank.org); and Europe and Central Asia, Country Departments I and II, Human Resources Operations Division—David Fretwell. With Upjohn Institute for Employment Research and ABT Associates.

Completion date: December 1997.

The Reach of Law into the Enterprise in Transition

Ref. no. 680-90

As early as July 1988 Mikhail Gorbachev used the notion of the rule of law as a rallying cry for legal reform in the Soviet Union. Establishment of the rule of law was similarly espoused as a fundamental goal during the Eastern European revolutions of 1989. It has ranked as high as stabilization and privatization among the priorities of the leading reformers and their foreign advisers, but it is typically more elusive.

In a market setting the rule of law is important to governments because it enhances the credibility of policymakers by placing restraints on their ability to arbitrarily reformulate policies. It is also critical to firms. Laws provide standards of conduct that can coordinate behavior and reduce transaction costs.

The purpose of this research is to understand the part that the rule of law plays in economic relationships in Russia and, by implication, in other reforming socialist economies. Using original survey research, it is examining the usefulness of laws and legal institutions to firms in organizing themselves and their relationships with other firms. This work focuses primarily on three bodies of law—contract law (including law on secured instruments), antitrust law, and company law.

Collection of data from 1,200 managers and legal experts in 300 firms in six regions of Russia should be completed by September 1997. In a pretest of the survey instruments, completed in the spring of 1996, 60 managers and legal experts in 15 firms in Yekaterinburg and Moscow were interviewed. Evidence from this pretest suggests several interesting preliminary conclusions.

Firms appear to have fairly good access to information about new laws and to legal institutions in both Yekaterinburg and Moscow. All the enterprises visited

have in-house legal expertise. Half have relationships with external lawyers, typically in connection with foreign activities. All subscribe to the standard printed sources of legal information, and 75 percent subscribe to computerized databases that are updated regularly.

The willingness of enterprise managers to maintain a legal department and to purchase a database suggests that they attach importance to obtaining up-to-date information about law. Yet although the legal departments serve as the main conduit for information about laws and legal institutions, they are not well integrated into the business life of enterprises. Representatives of legal departments do not regularly advise management about the consequences of proposed actions. Lawyers, whether in-house or external, do not play an active part in negotiating contracts, in restructuring relationships, or in corporate governance. Their functions are more technical, such as producing standard form contracts or verifying the legality of contracts negotiated by others.

Firms routinely use courts to settle disputes, apparently without large cost to their business relationships. But legal institutions do not appear to provide an adequate foundation for relationships. Court decisions often are not enforced, and norms necessary to increase contract compliance and reduce enforcement costs appear to be inadequate. Firms' routine use of courts appears to be a consequence of historical practice rather than of a deliberate strategy to use law and legal institutions to further their interests.

Despite the availability of legal information, managers and legal experts in firms are unfamiliar with important aspects of contract, antitrust, and company law; in most cases their knowledge of the law cannot be distinguished from random guesses. Respondents are more familiar with historical laws than current ones and often confuse the two.

Moreover, many of the economic institutions commonly thought of as ensuring compliance—cross-ownership, common membership on boards of directors, common membership in business associations, and common banks—appear to be absent or unimportant. Market power appears to be diminishing. So mutual economic dependence no longer appears to be an adequate mechanism for ensuring contractual performance. Social institutions commonly thought of as facilitating relationships between managers of different firms—common university affiliation, religion, national or ethnic group, or membership in a civic association—also are either absent or unimportant.

In the absence of legal and related institutions to support transactions, most contractual relationships appear to be based on historical relationships. Many relationships, particularly newer ones, are supported by the use of payment terms, such as prepayment, generally viewed

as costly. Private security firms are widely used for enforcement.

What is the apparent consequence of these institutional problems? No complex transactions were observed, despite an attempt to do so. Thus the absence of social, economic, and legal institutions to support transactions appears to undermine the ability of firms to undertake certain potentially important transactions.

Responsibility: Policy Research Department, Finance and Private Sector Development Division—Randi Ryterman (rryterman@worldbank.org). With Peter Murrell, University of Maryland; Barry Ickes, Pennsylvania State University; Kathryn Hendley, University of Wisconsin; Barbara Weber, Harvard University; Alla Mozgovaya, Institute of Sociology, Moscow; and Valery Makarov and other economists at the Central Economics and Mathematics Institute, Moscow. The National Council for Soviet and East European Research is providing funding for the research.

Completion date: June 1998.

Report:

Hendley, Kathryn, Barry W. Ickes, Peter Murrell, and Randi Ryterman. 1997. "Observations on the Use of Law by Russian Enterprises." *Post-Soviet Affairs* 13(1):19–41.

The Cultural Foundations of Economic Reform

Ref. no. 681-18C

A central tenet of neoclassical economics is that human initiative arises from the incentives embodied in free markets. Yet other branches of economics, as well as branches of sociology, political science, and psychology, suggest that human initiative cannot be explained on the basis of economic incentives alone. As Adam Smith well understood, economic life is deeply embedded in social life, and it cannot be understood apart from the customs, morals, and habits of the society. In short, it cannot be divorced from culture.

As economists seek to explain differences in the economic achievements of different countries, many are turning to explanations centered on culture. One area in which culture might play an important part is in the way a society adapts to economic reform. Attitudes toward political, economic, and judicial institutions are deeply rooted in historical experience and are often slow to change. Yet such attitudes are essential to the success of reform because they form part of the foundation of public support both for reform and for the new institutions created as part of the reform process. When attitudes do not support the development and use of the new institutions, the sustainability of reform is called into question.

This research examined the effect of culture, as embedded in the attitudes of economic agents, on the progress of economic reform in Russia. It looked at the role of attitudes in two types of adjustment: adjustment to markets and adjustment to a rule of law. The analysis was based on three sources of information: data collected by the European Community on the attitudes of 470 enterprise managers in seven Russian provinces, data collected by the World Bank on the attitudes of 60 managers and legal experts in 15 Russian firms, and field research on the functioning of legal institutions in two Russian provinces.

The results indicate that attitudes do play an important part in the adjustment of firms to markets and to a rule of law. The study found that one reason that output stabilization in Russia has been delayed is the uncertainty about the duration of financial stabilization, a consequence of declining tax collections. Firms in Russia are actively engaged in informal profit seeking—the production of wealth that can be hidden from official view. The willingness and ability of enterprises to engage in such activities depend in part on managerial attitudes. A manager will be more willing to propose a strategy to earn informal profits if he is confident that most other managers do not consider tax avoidance or evasion to be unethical. Managers must also trust that their business partners will not behave opportunistically or reveal illicit transactions to authorities. Data suggest that the level of social trust in Russia is moderately high; it is only slightly lower than that in Japan, on par with that in Germany, and much higher than that in other countries in transition. Civic behavior, which is often correlated with rule obedience, is very low in Russia; of the 33 countries for which data are available, Russia ranks 31st, followed only by Hungary and Romania.

The study found that the use and functioning of legal institutions also depend on managerial attitudes. New legal institutions are being formed, mostly on the ashes of socialist ones. While many new laws designed to facilitate transactions in a market setting are being enacted, the institutions and people who will interpret and enforce them, as well as those who will use and benefit from them, have a distinctly socialist past. The socialist legacy includes no experience with a state restrained from intervening in the economy. Attitudes formed under socialism have a potentially profound effect on the willingness of enterprises to use legal institutions. The study found that two attitudes—market orientation and rule obedience—explain nearly all the variation in the use of legal institutions. Other factors, such as the firm's ownership, industry, size, and age and the manager's personal characteristics, have virtually no effect.

Responsibility: Policy Research Department, Finance and Private Sector Development Division—Randi

Ryterman (rryterman@worldbank.org). With Peter Murrell, University of Maryland; Kathryn Hendley, University of Wisconsin; Barry Ickes, Pennsylvania State University; Barbara Weber, Harvard University; Alla Mozgovaya, Institute of Economics, Moscow; and Valery Makarov and other economists at the Central Economics and Mathematics Institute, Moscow. The National Council for Soviet and East European Research provided funding for data collection.

Completion date: June 1997.

Reports:

Hendley, Kathryn. Forthcoming. "Rewriting the Rules of the Game." *Post-Soviet Affairs*.

Ickes, Barry W., Peter Murrell, and Randi Ryterman. 1997. "End of the Tunnel? The Effects of Financial Stabilization in Russia." *Post-Soviet Affairs* 13(2).

Ryterman, Randi, and Barbara Weber. 1996. "The Role of Attitudes in the Performance of the Legal System: Evidence from a Survey of Russian Firms." World Bank, Policy Research Department, Washington, DC.

Potential Sources of Growth in Funding for Chinese Agricultural Research

Ref. no. 681-19C

Expenditure on agricultural research in China appears to be declining in the face of an urgent need to increase yields. Research expenditure is now equal to only about 0.4 percent of agricultural GDP, and the share is decreasing despite recent findings of very high rates of return to agricultural research in China. In some provinces, however, funding for research has increased.

This research addressed two questions: Why is funding increasing in some provinces? And do these provinces offer lessons for other parts of China on ways to increase funding? The study used a combination of interviews with government officials during 1996 and 1997 and official data on agricultural research funding in 25 provinces in China in 1990–94. It developed a political economy model of provincial research funding and used regression analysis to test the model.

The findings support the induced innovation hypothesis. They show that government funding of provincial agricultural research responds positively to an increase in the demand for agricultural products and negatively to the availability of alternative sources of agricultural growth, such as land. Proxies for the strength of agriculture in the political economy, such as the size of the agricultural population or the percentage of the total budget devoted to agriculture, do not have a positive impact. The important factors are provincial tax revenues—provinces with greater total revenue spend more on agri-

cultural research—and provincial interest in science of all types as measured by the percentage of provincial expenditure on science. Finally, the more income research institutes earn from commercial activities, the less money the government provides.

These findings imply that wealthy provinces, which have more tax revenue, more demand for agricultural goods, and tightening land availability, will invest more in agricultural research and that the gap in technological development between rich and poor provinces will widen. The negative relationship between earnings from commercial activities and government funds suggests that, to increase government research funding, research institutes should put less emphasis on increasing earnings from commercial activities.

The findings have been presented at the Center for Chinese Agricultural Policy in Beijing and at a Bank seminar in August 1997.

Responsibility: East Asia and Pacific, Country Department II, Rural and Social Development Division—Rapeepun Jaisaard (rjaisaard@worldbank.org); and Agriculture and Natural Resources Department, Agriculture and Forestry Systems Division—Derek Byerlee. With Carl E. Pray, Rutgers University.

Completion date: June 1997.

Household Welfare Change during the Transition in Poland

Ref. no. 681-21

The welfare effects of distributional changes brought about by the transition to a market-based system are among the best-established stylized facts on the Eastern European economies undergoing reform. Between 1989 and 1993 the Gini coefficient in Poland increased by 5 percent, and almost all Polish families experienced declines in real income after 1989. This research project investigates the effect of human capital on changes in the distribution of income and consumption, and the determinants of changes in families' well-being, focusing on the options and choices of Polish households. It pays particular attention to redistributive policies, especially social expenditures.

Changes in income and consumption during the transition period are estimated at selected points in time, to characterize the evolution of the socioeconomic conditions of Polish households. The effect of human capital is analyzed by comparing the results of regressions of households' income and consumption on a set of household characteristics (including education levels). Households' utilization of their human capital and other assets is explored by regressing the year-to-year change

in household expenditure on a set of explanatory variables, such as household characteristics; ownership of land, housing, and durable goods; income composition; and changes in income composition.

The project uses two sets of data from the Polish Household Budget Survey, obtained from the Central Statistical Office. The first set of data contains three two-year (overlapping) panels: 1989–90, 1990–91, and 1991–92. The second set of data covers two two-year panels, 1993–94 and 1994–95, and a three-year panel, 1993–95. The two data sets differ in that the first excludes private sector workers, while the second includes these workers as well as self-employed workers and those living on social benefits.

The results of the research should assist policymakers in identifying those most likely—and those least likely—to be hurt by the reform, facilitating the design and implementation of targeted programs.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Emmanuel Jimenez (ejimenez@worldbank.org). With Wladimir Okrasa and the Central Statistical Office, Poland.

Completion date: July 1998.

Ownership, Labor Strategies, and Firm Performance in China

Ref. no. 681-22C

This research addressed two questions: What effect does the ownership structure of Chinese enterprises have on their labor strategies (job creation, job destruction, bonuses, and the like)? And what effect do labor strategies have on firm performance (profitability, productivity, sales, growth)?

To answer the first question, a set of labor demand equations was estimated, exploiting the panel nature of the data to capture the speed of labor demand adjustment by type of enterprise ownership. To address the second, standard firm performance models were used to estimate the effect of labor strategies on various measures of firm performance, after controlling for other factors. The study used three data sets: the 1995 state enterprise survey; a World Bank-financed data set on state enterprises, collectively owned urban enterprises, and township and village enterprises; and a State Statistical Bureau data set on a variety of enterprises.

The results show that ownership structure is less important than labor strategy in determining firm performance. The amount of input and control by workers significantly affects both the speed of adjustment in response to output shock and the rates of job creation and destruction. This effect is consistently important across

ownership types. There appears to be a link between the ability of an enterprise to adjust employment and the performance of the enterprise.

These findings suggest that the degree of employee input is an important consideration when restructuring enterprises. Privatizing firms while retaining high levels of employee ownership may act to restrict the firms' ability to respond to demand shocks, with consequent negative effects on their performance.

Findings have been disseminated in the Bank and at the Southern Economic Association meetings in November 1996 in Washington, DC.

Responsibility: Private Sector Development Department—R. Shyam Khemani (skhemani@worldbank.org). With Julia Lane and Robert Feinberg, American University.

Completion date: June 1997.

Reports:

Lane, Julia, H. Broadman, and Robert Feinberg. 1997. "Do Labor Strategies Matter? An Analysis of Three Enterprise-Level Datasets in China." Private Sector Development Department Working Paper Series. World Bank, Washington, DC.

Lane, Julia, H. Broadman, and Inderjit Singh. 1997. "Labor Flexibility, Ownership, and Firm Performance in China." World Bank, Private Sector Development Department, Washington, DC.

Changing Ideas about Poverty in Russia

Ref. no. 681-42

In the transition to a market system the Russian economy has experienced a series of shocks—a sharp fall in output, rapid and continuing inflation, and the appearance of open unemployment. These shocks have led to a substantial fall in real wages. There has also been a marked increase in income inequality as the enterprising took advantage of new opportunities—and the lucky reaped windfall gains. While some Russians have prospered, most have seen a fall in their standard of living.

This research project aims to analyze how the ideas about poverty in Russia—particularly the subsistence minimum and the subjective poverty line—have evolved during this period of unprecedented changes. The sharp decline in income makes it possible to see, within a very compressed period, how ideas about poverty respond to abrupt changes in overall income and in income distribution. *The study will explore how these ideas differ among socioeconomic and demographic groups. It will also assess the importance of various factors in explaining the speed with which attitudes toward poverty respond to changes in the external environment. The study should yield important findings for policymakers about which social and demographic groups adjust their expectations more slowly and where the gaps between*

at least nominally guaranteed minimums and the perception of what a minimum should be are the widest.

The research is based on the results of a survey carried out by the All-Russian Center for Monitoring of Public Opinion (VCIOM). In this survey a representative sample of Russian households was asked a Leyden-type question (on the subjective subsistence minimum) monthly between March 1993 and January 1994 and about every other month from then until late 1996. The information from this repeated cross-sectional survey, covering three years, will be used to establish a series of subjective poverty lines for Russia.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Branko Milanovic (bmilanovic@worldbank.org) and Yvonne Ying. With Alastair McAuley, University of Essex and New Moscow Economic School; and Svetlana Sidorenko, VCIOM, Moscow.

Completion date: June 1998.

The Determinants of Agri-Food Market Integration in the Transition Economies, Phase 2

Ref. no. 681-45

In transition economies agri-food markets are typically segmented among different vertical chains, market locations, and types of owners and between domestic and international markets. This project investigates to what extent the segmentation of agri-food markets has been overcome through reform and what kind of government policies would facilitate further market integration.

The project's analytical approach is based on the solid understanding of market institutions and fluctuations of supply and demand. It applies models of market margin determination, price transmission, and cointegration to selected commodity markets, typically pork, wheat and wheat flour, and milk and dairy products. The analysis relies on statistical data published by government and nongovernment institutions and the results of field interviews and case studies.

The first phase of the study focused on Poland, where it found that agri-food markets are reasonably well integrated. Effective market liberalization led to the emergence of a strong private sector and intensive competition—and thus relatively high efficiency—in the agri-food markets. Market risk and a market structure dominated by processors are the two primary obstacles to further market integration.

This second phase of the study extends the analysis to Hungary, Romania, and Ukraine. Preliminary results for Ukraine suggest that liquidity, rather than a state

monopoly, is the primary challenge in developing an integrated agri-food market.

The findings of the first phase contributed to the Bank's agricultural sector adjustment loan operation in Poland, and the results of the second phase are expected to contribute to agricultural adjustment programs in Hungary, Romania, and Ukraine. The summary of experience in Poland should be helpful to other transition economies in developing their agri-food market systems.

The findings from the first phase were disseminated through two Bank seminars in August and October 1995, through presentations to government officials in Warsaw in January 1996, and through presentations at the 1995 American Association of Agricultural Economists Conference and the 1996 European Association of Agricultural Economists Conference.

The first phase produced an Excel database containing monthly agri-food price data for Poland for 1990–96.

Responsibility: Agriculture and Natural Resources Department, Sector Policy and Water Resources Division—Richard Burcroff II (rburcroff@worldbank.org) and Anning Wei. With Wladyslaw Piskorz, Waldemar Guba, Jerzy Dabrowski, Wanda Chmielewska, and Magdalena Opalka, Ministry of Agriculture and Food Economy, Poland; Yuri Nechayev and Svitlana V. Zhurova, Economic Research Center, Kiev, Ukraine; Jozsef Toth, Geza Tar, and Marton Szabo, Budapest University of Economic Sciences, Hungary; and Constantin Ciupagea and Virginia Campeanu, Institute of World Economy, Bucharest, Romania.

Completion date: June 1998.

Reports:

Guba, Waldemar, Anning Wei, Jerzy Dabrowski, and Wanda Chmielewska. 1995. "Emerging Trends in Polish Agri-Food Markets: A Report of Field Investigation." World Bank, Agriculture and Natural Resources Department, Washington, DC.

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Wei, Anning, Waldemar Guba, Richard Burcroff II, Jerzy Dabrowski, and Wanda Chmielewska. 1996. "Market Efficiency and Government Policy in the Polish Wheat Market." Paper presented at the European Association of Agricultural Economists Conference, Edinburgh, Scotland. (Also published in Polish. Forthcoming as a World Bank Discussion Paper.)

Wei, Anning, Waldemar Guba, Jerzy Dabrowski, Wanda Chmielewska, Magdalena Opalka, and Richard Burcroff II. Forthcoming. *The Emergence of Integrated Agricultural Markets: Price Co-movement since Liberalization in Poland's Hog and Pork Sector.* World Bank Discussion Paper. Washington, DC. (Also published in Polish.)

Wei, Anning, Waldemar Guba, and Z. Krzyzanowska. 1997. "Market Development and Government Policy in the Polish Dairy Sector." World Bank, Agriculture and Natural Resources Department, Washington, DC.

Zhurova, Svitlana V., Anning Wei, and Yuri Nechayev. 1997. "Agricultural Marketing in Ukraine: A Case Study of a Dairy Enterprise." World Bank, Agriculture and Natural Resources Department, Washington, DC.

Enterprise Restructuring in Bulgaria and Romania

Ref. no. 681-96

This project will document the degree of enterprise restructuring in Bulgaria and Romania and the relationships between enterprise restructuring and the banking systems, the macroeconomic environment, and enterprise surveillance (or isolation) programs. Three papers are planned, all comparative.

The first paper will look at the link between the (lack of) hard budget and the banking system on the one hand and the (lack of) enterprise restructuring on the other and ask whether there is a critical point at which a banking crisis occurs. The paper will be based on panel regression analysis over the entire population of firms, linking firm performance to bank lending and other measures of external financing. The analysis will draw on detailed annual enterprise-level data for 1992–96 covering the entire population of firms in Bulgaria and Romania.

The second paper will focus on the cost of delayed privatization. What are the direct and indirect costs (including spillover effects) of a lack of privatization? And what is the effect of preexisting sectoral characteristics on the entry of new firms? This paper will be based on a survey, developed for this project, of managers of state-owned, privatized, and new private firms. The paper will use the survey data to quantify the effects of delayed privatization and its determinants. Because of the qualitative nature of the variables, it will use a probit-type analysis.

The third paper will be an empirical assessment of the Bulgarian and Romanian surveillance programs for a subset of enterprises. The paper will use Wilcoxon rank tests and ANOVA econometrics to measure the impact of the surveillance programs. It will match each firm in a program with a firm that is similar (in size, initial profitability, and sector origin) and estimate the relative change in firm performance from 1992 to 1996. The analysis will rely on the enterprise-level data for 1992–96 and case studies and quarterly financial statements for the 71 enterprises in the Bulgarian surveillance program and the 147 enterprises in the Romanian program.

Responsibility: Europe and Central Asia, and Middle East and North Africa Technical Department, Private Sector Development and Finance Group—Simeon Djankov (sdjankov@worldbank.org) and Patrick Tardy; Europe and Central Asia, Country Department I, Office of the Director—Frank Lysy; East Asia and Pacific, Office of the Vice President—Stijn Claessens; and Private Sector Development Department, Private Sector Development and Privatization Group—Sudhee SenGupta. With Fabrizio Coricelli, University of Sienna, Italy; Enrico Perrotti, University of Amsterdam; Chonira Aturupane, Stanford University; and Kosali Ilayperuma, University of Maryland.

Completion date: June 1998.

Bank-Led Restructuring of Problem Enterprises in Poland

In 1993 Poland embarked on an innovative program to restructure its state-owned enterprises—the Enterprise and Bank Restructuring Program. The goals of the program were to separate unprofitable but viable state-owned firms from their nonviable counterparts, liquidate nonviable firms while minimizing the inappropriate liquidation of viable firms, and promote the speedy restructuring and privatization of potentially viable firms. The program forced commercial banks to address problem loans on their books at the end of 1991 through one of five routes: a nonjudicial bank-led workout with the debtor (under a new conciliation process), a judicial workout, filing for bankruptcy of the debtor, filing for liquidation of the debtor under the state enterprise law, or sale of the problem loan on the secondary market.

The objective of this research was to evaluate the impact of the program on enterprise restructuring and exit. The research emphasized the links between expected changes in creditor behavior (brought about by other aspects of the program, primarily bank restructuring and privatization) and enterprise performance. It was part of a larger comparative study on modes of restructuring and exit of financially distressed state-owned firms in several transition economies.

The study addressed the following question: To what extent is the bank-led restructuring component of the program leading to appropriate long-term restructuring of the viable firms and closure of the nonviable firms that are participating in the program?

This general question led to several more specific questions:

- What are the roles and incentives of the stakeholders (banks, other creditors, firm managers, owners, the state) in the program?

- To what extent do successful workout (or conciliation) agreements explicitly provide for new investments, asset sales, conversion of debt to equity, ownership stakes for management or labor, wage concessions, or changes in financial performance? How do an enterprise's characteristics (size, asset composition, current profitability, debt ownership structure) affect the contents of its conciliation agreement? Are the agreements being implemented?

- Under what circumstances do creditors push for liquidation or bankruptcy? Are creditors' interests sufficiently protected in liquidation and bankruptcy?

- What impact does the program have on the hardness of the budget constraint and the subsequent performance of participating firms? On the extent of asset reallocation and privatization in the economy?

To address these questions, the study undertook a detailed survey of the characteristics of firms and the outcomes of the process in a sample of 139 firms subject to the program. The sample was stratified to include a significant number in each of the five categories of outcomes and to ensure representation from each region of the country. The questionnaire used in the survey contained detailed questions on the firms' financial and operational performance from 1991 through 1994 and the characteristics of relevant processes under the program.

Analysis of the bank conciliation process and its outcomes through mid-1995 and of the other resolution paths (court conciliation, bankruptcy, state enterprise liquidation, repayment, and sale of debt) found that the Enterprise and Bank Restructuring Program was an important catalyst in getting banks and enterprises to tackle their bad debt problems. It also found that the program operated according to legal requirements. The program appears to have been generally able to push better firms into restructuring paths and worse firms into liquidation paths.

But each resolution path operated with serious shortcomings. Although it is perhaps still too early to judge results, the bank conciliation process appears to have led to little restructuring in firms subject to it. The bankruptcy and state enterprise liquidation processes are poorly designed and give creditors and trustees little power or incentive to use them properly. Court conciliation also is poorly and inflexibly designed, and sales of debt are impeded by tax rules and limits on purchasers' use of debt. So while the program is a good start, more work is needed to redesign the underlying reorganization and "exit" mechanisms and to strengthen creditors' and debtors' incentives to use them to restructure the Polish economy.

Responsibility: Policy Research Department, Finance and Private Sector Development Division—Cheryl W.

Gray (cgray2@worldbank.org). With Arnold Holle, Boston Consulting Group; and Stephan Krajewski, University of Lodz. The Japanese Trust Fund contributed funding for the research.

Completion date: December 1996.

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A Comparative Overview of Transition

This project undertook a broad overview of the post-socialist transition in the countries of Eastern Europe and the former Soviet Union, focusing on the institutional, sectoral, and microeconomic adjustments at the core of the transition process. It also touched on the experience in East Asia, especially in China and Vietnam. As countries pursued very different approaches to reform, there was an increasing need for comparative analysis of country experience, in particular to assess the progress of the more advanced reformers and to extract lessons of experience (both positive and negative) for other countries, some of which were lagging in their reforms and in stabilization. In some areas, such as energy, the issues require a multicountry perspective because adjustment involves interdependence among countries.

Many questions were addressed, including, What was the legacy of the previous system? What have been the main adjustment issues? What reform strategies have been followed in the leading countries, and how have they affected the behavior and performance of firms? What major policy lessons have emerged from experience to date? How do sectoral or market reforms interact with one another and with macroeconomic performance? Where are the major unknowns? Where are there still important areas of policy disagreement?

The studies completed under this project include an overview of the patterns of transition; a study on the role of initial conditions; and papers on agriculture, finance, energy, the role of markets, international trade and finance, the transition toward private ownership, changing social benefits in Russian enterprises, and the impact of transition on households. These studies served

as background for the World Bank's *World Development Report 1996: From Plan to Market* (New York: Oxford University Press, 1996).

Responsibility: Policy Research Department, Public Economics Division—Martha de Melo (mdemelo@worldbank.org), and Macroeconomics and Growth Division—Cevdet Denizer; Africa Technical Families, Regional Economics and Social Policy Division—Alan Gelb; International Finance Corporation—Stoyan Tenef; and Europe and Central Asia, Country Department III, Agriculture, Industry, and Finance Division—Karen Brooks, and Country Department II, Agriculture and Regional Development Operations Division—John Nash.

Completion date: December 1996.

Reports:

Brooks, Karen, and John Nash. Forthcoming. "Agriculture in Transitional Economies." In Bruce L. Gardner and Gordon C. Rausser, eds., *Handbook of Agricultural Economics*. Amsterdam: North-Holland.

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Welfare during the Process of Transition

Poverty has increased in Eastern Europe and in the former Soviet republics as incomes have declined and income distribution has become more unequal. Because of the general slide in incomes, large portions of the population, including the middle class, have become poor. The new poor include not only unemployed urban workers but also many employed but underpaid skilled workers, pensioners, single parents, education and health personnel, and administrative staff in enterprises and in government. This is not the residual poverty found in many other countries.

This research project, which covers 18 transition economies, is the first comprehensive, cross-country study of what has happened to real income, inequality, and poverty during the transition. The project was organized in five parts. First, it produced a brief overview of the social policy, income, inequality, and poverty at the end of the socialist period. Second, it estimated changes in the population's real income and expenditures using different measures (including GDP, household budget sur-

veys, and macroeconomic wage and income data). The changes vary among the countries, but in all but one or two of them real per capita incomes and expenditures are still below the pretransition levels. Expenditure data generally show smaller real decreases than do real income data, but the direction of change is the same in nearly all measures, whether of real income or consumption.

Third, the study looked at what happened to inequality, again using income and expenditure data. It found that inequality has increased in nearly all the countries, but much less so in Central Europe than in the former Soviet republics, particularly Russia. Fourth, the study analyzed the real income and inequality effects on poverty, finding that lower real incomes (or expenditures) and higher inequality have both contributed to increased poverty. But their effect has varied over time. Early in the transition poverty was driven by the decline in real incomes. More recently the balance has shifted, as the decline in incomes has subsided or been reversed. And now it is uneven incomes that are still driving poverty up in most countries. But in several countries (including the Czech Republic and Poland), where real incomes have registered improvement for a few consecutive years, poverty has stabilized or even started to decline.

Finally, the study addressed a number of social policy issues, such as the type of social assistance system transition economies might adopt, the role of a guaranteed minimum income, and pension reform and the informal sector.

Responsibility: Policy Research Department, Poverty and Human Resources Division—Branko Milanovic (bmilanovic@worldbank.org) and Yvonne Ying. With Carlos Cavalcanti; Nadia Soboleva; Victor Gabor; Luisa Ferreira; Izabela Rutkowska; Carol Graham, Brookings Institution; Alistair McAuley, Essex University, United Kingdom; and Nanak Kakwani, University of New South Wales, Australia.

Completion date: June 1997.

Reports:

- Cavalcanti, Carlos. 1993. "Bridging the Poverty Gap in the Former Soviet Union." Research Paper Series 4. World Bank, Policy Research Department, Washington, DC.
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- _____. 1993. "The Social Costs of Transition to Capitalism: Poland 1990-91." Research Paper Series 2. World Bank, Policy Research Department, Washington, DC. (Also published as Policy Research Working Paper 1165, World Bank, Policy Research Department, Washington, DC, 1993.)
- _____. 1995. "Poverty, Inequality, and Social Policy in Transition Economies." Research Paper Series 9. World Bank, Policy Research Department, Washington, DC. (Also published as Policy Research Working Paper 1530, World Bank, Policy Research Department, Washington, DC, 1995.)
- _____. 1996. "Income, Inequality, and Poverty during the Transition." Research Paper Series 11. World Bank, Policy Research Department, Washington, DC.
- _____. Forthcoming. *Income, Inequality, and Poverty during the Transition*. Washington, DC: World Bank.
- Ying, Yvonne. 1996. "Income, Poverty, and Inequality in China during the Transition to a Market Economy." Research Paper Series 10. World Bank, Policy Research Department, Washington, DC.

Progress in Transition

This project complements a related one (A Comparative Overview of Transition), providing a more focused analysis of issues relating to the transition process or countries in transition. The project consists of several studies. A study of monetary policy issues during transition reported on the progress of transition economies in switching to indirect monetary policy instruments and analyzed how such change has affected monetary policy effectiveness, especially with regard to inflation. Another study reviewed the experience of a group of transition economies and the transition strategies they adopted, showing how the strategies worked in practice. A review

of adjustment patterns in Azerbaijan and Central Asia discussed the achievements and failures of countries in that part of the world and showed that these countries were generally slower in implementing reforms than were Eastern European countries. Another study investigated the economic growth prospects for 26 transition economies and estimated each country's steady-state growth rate.

Most of the studies constructed a conceptual framework for analyzing the issues they addressed, then tested the hypotheses implied by these frameworks using econometric methods. The main data sources were national publications of transition economies, the International Monetary Fund, and the World Bank.

Some of the papers produced by the project were background papers for the World Bank's *World Development Report 1996: From Plan to Market* (New York: Oxford University Press, 1996). Papers have also influenced Bank lending programs in Europe and Central Asia, mainly adjustment operations.

Responsibility: Policy Research Department, Macroeconomics and Growth Division—Cevdet Denizer (cdenizer@worldbank.org), and Public Economics Division—Martha de Melo. With Marek Dabrowski, Center for Social and Economic Research, Poland.

Completion date: July 1997.

Reports:

Dabrowski, Marek. 1996. "Different Strategies of Transition to a Market Economy: How Do They Work in Practice?" Policy Research Working Paper 1579. World Bank, Policy Research Department, Washington, DC.

de Melo, Martha. 1996. "Monetary Developments during Transition." Paper presented at the Second Dubrovnik Conference, Croatia, June.

de Melo, Martha, and Cevdet Denizer. 1997. "Monetary Policy during Transition: An Overview." Policy Research Working Paper 1706. World Bank, Policy Research Department, Washington, DC.

Denizer, Cevdet. 1995. "Reforms and Comparative Economic Performance in Azerbaijan and Central Asia." Paper presented at a conference, University of Utah, March.

_____. "Stabilization and Adjustment and Growth Prospects in Transition Economies." Paper presented at a conference on transition economies, Bilkent University, Ankara, Turkey.

Reform along the Volga

The purpose of this project is to document and analyze the experience with reform at the grassroots level in Russia. Understanding the nature and diversity of this experience is important for understanding the impediments to growth and poverty reduction—and the poli-

cies and programs that might be most effective in achieving these goals. The study will also examine the relationship between regional and local governments—a relationship with increasing importance as efforts are made to reach an agreement on the revenue, expenditure, and regulatory responsibilities to be assigned to different levels of government.⁴

The nine cities included in the study are Astrakhan, Cheboksary, Kazan, Nizhny Novgorod, Samara, Sarotov, Ulyanovsk, Volgograd, and Yaroslavl. They lie along the Volga River, in the heartland of Russia, and span 3 of Russia's 11 regions. Each city is the capital of one of Russia's 89 federation subjects (oblasts and the like) and has a population between 0.5 million and 1.5 million.

In this first phase the project is developing case studies of each of the cities and a database with comparable indicators across the nine cities and their surrounding oblasts. These data will be used to construct indicators of initial conditions, political developments, and reform, and the study will try to use these indicators to explain reform and to identify policy levers that may be effective in achieving the goals of growth and poverty reduction.

The work to develop an information base for the surrounding oblast of each city draws on secondary data from a variety of sources. Russian researchers are developing indicators of initial conditions, political developments, and reform at the municipal level, where little information is readily available outside Moscow and St. Petersburg.

Responsibility: Policy Research Department, Public Economics Division—Martha de Melo (mdemelo@worldbank.org). With Michael Haney; Gür Ofer, Hebrew University; Maxim Ivanov, Nataliya Volchkova, Elena Lukoyanovo, Anna Dodonova, Yuri Khorozhilov, Nina Parphinnko, Gauhar Turmuhambetova, Yuri Andrienko, and Alexander Piskunov, New Economics School, Moscow; and the New Economics School.

Completion date: June 1998.

Trade Policy in Transition Economies

Integration with the international economy is an essential element of the transition from central planning to a market system. Price distortions, so common under central planning, could be maintained only through formidable trade and foreign exchange controls that divorced the domestic from the international market. Dismantling these barriers promotes efficient domestic resource allocation. International prices pose a competitive challenge to domestic producers and signal needed structural changes. Trade policy reform allows the link between

domestic and international prices and markets and is thus a key determinant of the pace and scope of the structural change necessitated by the transition.

The main output of this project in 1996 was a report summarizing trade performance and the experience with trade policy reform in the countries of the former Soviet Union. The report, based on eight country studies and other analyses, recommends strategies for increasing their integration with the international economy—strategies that entail actions by the countries as well as by their main trading partners, the OECD countries.

The report concluded that ineffective trade and payment policies in the countries of the former Soviet Union have been at the root of the decline in their trade, which has been linked to the contraction in output. Their heavy economic interdependence has intensified the problem.

Countries that have reformed slowly have often maintained that their strategy will reduce the high cost of transition. But the slow adjustment strategy typically has backfired—those that have reformed the fastest have also arrested their output decline the fastest.

In fiscal 1997 the main output was a paper on customs unions in the Commonwealth of Independent States (CIS). A number of the states in the CIS are considering implementing a customs union. The analysis shows that, although preferential trade areas in the CIS may have served a useful purpose in the past as a transitional device, the time for customs unions and free trade areas in the CIS is over. Integrating with the world economy should be the highest priority now, and customs unions will retard that integration.

Also in fiscal 1997 work was done on the issue of accession to the World Trade Organization (WTO) by the transition economies. This work emphasized that WTO accession provides a unique opportunity for the acceding country to "lock in" a trade policy that is beneficial to that country, providing it adopts a less than minimalist approach in its accession offer.

The findings and recommendations of the country studies have been communicated to the governments in the context of policy dialogue with the Bank on international trade reform, supported in many cases by Bank lending. The customs union paper has been discussed with and distributed to representatives of a number of transition economies that have requested advice on the subject. And the analysis of issues relating to accession to the WTO was presented at two three-day conferences in Vienna, Austria (January 30–February 5, 1997), held by the Economic Development Institute for 18 of the transition economies of Central and Eastern Europe and the former Soviet Union.

Responsibility: International Economics Department, International Trade Division—David Tarr (dtarr

@worldbank.org) and Bernard Hoekman; and Europe and Central Asia, Country Department III, Office of the Director—Constantine Michalopoulos.

Completion date: June 1998.

Reports:

Michalopoulos, Constantine, and David Tarr. 1996. *Trade Performance and Policy in the New Independent States*. Directions in Development Series. Washington, DC: World Bank. (Also published in Russian.)

_____. 1997. "Customs Unions in the Commonwealth of Independent States." *Post-Soviet Geography and Economics*. (Also published as Policy Research Working Paper 1786. World Bank, Europe and Central Asia, Country Department III, and International Economics Department, Washington, DC.

Social Capital in Transition

The cornerstone of the transformation of formerly socialist economies into market economies is the creation of a class of entrepreneurs who are willing to use markets and market institutions to support their transactions. These entrepreneurs must guide their firms through a process of restructuring, a process in which relationships formed under socialism must change to meet the demands of the market. The ability of entrepreneurs to effect such changes is inextricably linked to the composition of social capital in the economy.

Social capital consists of shared values and rules for social conduct, which enable a society to solve problems of collective action and to find cooperative solutions to difficult social and economic problems. Little is known about the creation of social capital, although it is believed to require habituation to the moral norms of society and to be transmitted by cultural mechanisms such as religion, tradition, or historical habit.

Two distinct and somewhat complementary aspects of social capital are especially relevant in transition

economies—rule obedience and social trust. Rule obedience measures the tendency of people to comply with society's formal rules and use its formal institutions. Social trust refers to expectations of honest and cooperative behavior by others in the community, expectations based on commonly shared norms. The most useful kind of trust is often not the ability to work under formal authority, but the capacity to form new associations and to cooperate within the terms of reference they establish. Thus rule obedience can be usefully thought of as the willingness of individuals to accept institutions created from the top down, while trust can be thought of as contributing to the ability of individuals to create institutions from the bottom up. In the context of transition, then, social capital can work to solve problems inherent in restructuring by facilitating institution building, both from above and from below.

This project aims to identify the role of social capital in the creation and functioning of institutions to solve problems of contract enforcement in Mongolia. This transition economy is a fitting subject for research on social capital because it is in many respects a traditional society in which social arrangements can be expected to play an important economic role. But it is also a country aggressively pursuing economic reform and thus one in which firms are seeking ways to ease transactions with new trading partners. This suggests that Mongolian firms might have discovered innovative ways to use social capital to solve problems of contract enforcement.

The analysis will be based on a survey of 250 firms in the three largest cities in Mongolia—Ulaanbaatar, Darhan, and Erdenet—as well as in surrounding towns and villages for contrast.

Responsibility: Policy Research Department, Finance and Private Sector Development Division—Randi Ryterman (rryterman@worldbank.org). With Peter Murrell, University of Maryland.

Completion date: June 1999.

PRIVATE SECTOR DEVELOPMENT AND PUBLIC SECTOR MANAGEMENT

The Policy Effects of Political and Electoral Institutions in Developing Countries

Ref. no. 680-41C

Even when optimal economic policies are known, governments often do not adopt them. What part might institutions play in this? This research project explored some of the political and electoral institutions that shape government policy responses and affect their credibility.

The project first synthesized the policy effects of a broad range of political and electoral institutions, taking into account for the first time the interactions among these institutions in generating policy outcomes. It then examined the influence of electoral and political institutions on electric utility rates and regulatory structures in Argentina, Chile, and Taiwan (China), on budgetary outcomes in Argentina, Chile, Mexico, and Taiwan (China), and on the pace and modalities of state enterprise reform in the Czech Republic and Poland.

The research found that the following institutional factors have an important effect on policy outcomes in the areas analyzed: the president's ability to control the agenda for policy initiatives, the possibility of reversion in policy if no decision is reached, the extent to which electoral rules lead to governments with divided authority, and the resource demands placed on political competitors by the electoral system. The study provides advice on how to adapt policy recommendations in these areas to the institutional framework of a country, and, more generally, it provides a framework for analyzing the constraints imposed by institutions on policy reform.

The project used a case study approach, taking advantage of the considerable variation in both institutions and policies across the countries considered. The case studies also benefited from some time-series variation within the sample of countries.

Results have been disseminated through a talk at the Bank. A small conference or workshop to disseminate the results is also possible.

Responsibility: Policy Research Department, Finance and Private Sector Development Division—Philip Keefer (pkeefer@worldbank.org) and Mary Shirley. With Mathew McCubbins, Stephan Haggard, Matthew Shugart, and Gary Cox, University of California at San Diego; William Heller, Stanford University; Mark Jones, Michigan State

University; John Carey and Lisa Baldez, Washington University, St. Louis; Greg Noble, University of California at Berkeley; and Tun-Jen Cheng.

Completion date: June 1997.

Report:

Haggard, Stephan, and Mathew McCubbins, eds. Forthcoming. *Political Institutions and the Determinants of Public Policy: When Do Institutions Matter?*

Cross-Country Indicators of Institutional Uncertainty

Ref. no. 680-51

The original aim of this project was to develop and test, on a small scale, a method for conducting cross-country surveys of the institutional framework in developing countries as perceived by private entrepreneurs. An opportunity to implement the method on a large scale has reversed the sequence: to provide background information for the World Bank's *World Development Report 1997: The State in a Changing World* (New York: Oxford University Press, 1997), the project used a shorter version of the questionnaire it has developed for a survey in a large number of countries to get comparable results on institutional climate. Detailed analysis of the resulting data set—drawn from more than 3,600 questionnaires from 69 countries—was the main focus of the project's work in fiscal 1997.

The original aim of the project has not been abandoned. One survey method—a mailed survey of private firms in developing countries—has been applied. The project will also experiment with a promising and lower-cost alternative that takes advantage of the comparative experience of executives in multinational firms. To test this method, executives will be asked to rank countries in which they operate with respect to the major categories of institutional uncertainty compiled for the *World Development Report* survey. These rankings will then be compared with those obtained from that survey. The project will also attempt to broaden the geographic coverage.

Responsibility: International Finance Corporation, Economics Department—Guy P. Pfeffermann (gpfeffermann@worldbank.org). With Aymo Brunetti and Beatrice Weder, University of Basel.

Completion date: December 1997.

Reports:

- Brunetti, Aymo, Gregory Kisunko, and Beatrice Weder. 1997. "Credibility of Rules and Economic Growth: Evidence from a Worldwide Survey of the Private Sector." Policy Research Working Paper 1760. World Bank, Office of the Senior Vice President, Development Economics and Chief Economist, Washington, DC.
- _____. 1997. "Institutional Obstacles to Doing Business: Region-by-Region Results from a Worldwide Survey of the Private Sector." Policy Research Working Paper 1759. World Bank, Office of the Senior Vice President, Development Economics and Chief Economist, Washington, DC.

Regulating Technology Transfer in Agriculture: Impact on Technical Change, Productivity, and Incomes

Ref. no. 680-61

This research continues work, begun in a pilot project, on regulatory barriers that block private technology transfer in agriculture. The pilot research developed a methodology to estimate the effect of regulatory reforms for countries that have reformed and to project the effect of proposed regulatory reforms for countries that have not yet reformed. Using this method, it studied the impact of Turkey's regulatory reforms in the 1980s, testing and confirming the hypothesis that removing barriers to private technology transfer accelerates technical change, boosting productivity and incomes.

The results from Turkey are interesting and suggestive, but they cannot be convincingly applied to all developing countries. This research further tests the hypothesis by investigating the effect of regulatory reforms in Bangladesh and India since the late 1980s and more recently in Zimbabwe. It has collected and is now analyzing information on the transfer of seed varieties, especially through private seed companies, to support projections about the effect of regulatory reform on crop yields. Drawing on country studies and other sources, the study will propose and discuss options for regulatory reforms that remove obstacles to private technology transfer while strengthening policies and programs that limit externalities. Further confirmation of the hypothesis that removing regulatory barriers blocking private technology transfer in agriculture boosts productivity would suggest a need to focus more attention on reform of such regulations.

The project's research activities have been designed on the basis of discussions with Bank operational staff. The project is expected to help improve Bank agricultural policy advice in general and for specific countries and to build capacity within the Bank to address regulatory

issues through collaboration with sector and project activities. By subcontracting research activities to local consultants, the project also is expected to build capacity in client countries to address regulatory issues.

Results from both the pilot project and this project are being disseminated through participation in operational missions (the work made an important contribution to the design of an agricultural sector adjustment program in Romania) and through workshops at headquarters and in the field.

Responsibility: Europe and Central Asia, Country Department II, Agriculture and Regional Development Operations Division—John Nash (jnash1@worldbank.org). With David Gisselquist; Carl Pray, Rutgers University; Rashid Harun-Ar; and Joseph Rusike. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is participating in the research.

Completion date: December 1997.

Reports:

- Gisselquist, David. 1996. "A Strategy for Modernizing Agricultural Technology in Ghana." Paper presented at the World Bank and Ghana Ministry of Food and Agriculture seminar Agricultural Inputs, Regulations, and Technology Transfer, Ghana, February.
- _____. 1997. "Constraints to Seed Multiplication and Distribution through Alternative Seed Systems." Paper presented at the conference Seed Policy in Southern Africa, Harare, Zimbabwe, March.
- _____. 1997. "Technology Transfer, Competition, and Trade Liberalization for Low-Risk Pest Management." Trade Expansion Program Occasional Paper. UNDP-World Bank Trade Expansion Program, Washington, DC.
- _____. "Toward a Competitive and Modern Seed Industry for Farmers in Southern Africa." World Bank, Southern Africa Department, Washington, DC.
- Gisselquist, David, and Carl Pray. "Deregulating Technology Transfer in Agriculture: Impact of Turkey's 1980s Reforms."
- Gisselquist, David, and Jitendra Srivastava, eds. Forthcoming. *Easing Barriers to Movement of Plant Varieties for Agricultural Development*. World Bank Discussion Paper. Washington, DC.
- _____. "Reform of Seed Regulations: Easing Barriers to Better Seed Variety." Agriculture Technology Note 12. World Bank, Agriculture and Natural Resources Department, Washington, DC.

Efficiency and Equity Implications of Argentina's Privatization of Utilities

Ref. no. 680-65C

Initiated in 1989, Argentina's privatization program has been impressive in both speed and coverage. The program has been intensively analyzed in the economics literature from two basic perspectives: the macroeco-

nomics—how it affected the public sector's financial position and the current account—and the process—how privatization was implemented. The literature has also assessed its impact on efficiency, but only in terms of some general technical indicators. No study has addressed the effects of the reform on other sectors and factor markets and on income distribution.

This research looked at these neglected issues, through simulations of a computable general equilibrium model capturing the full effect of relative changes in goods and factor prices on resource allocation and welfare. The model is based on a social accounting matrix prepared in 1993, the first year in which the new prices had stabilized.

The model includes five income brackets, 21 production sectors, the government, and a foreign sector. The social accounting matrix divides utilities into several categories: gas, power, telecommunications, and water and sanitation. The separation of these sectors is an innovation in Argentina, made possible because the new regulatory agencies generate most of the necessary information for each sector. The study complemented this information through private surveys used to estimate the decomposition of each sector's costs into their components. Another contribution of the research was its explicit modeling of the effect of regulatory policies on the prices of each utility service.

The simulation results suggest three main lessons:

- When regulators are effective, operational gains (in efficiency, productivity, quality, and tariff cuts) clearly benefit all sectors (except agriculture, forestry, and fisheries) and all income classes—and the poorest tend to gain relatively more than other income groups. The gains add up to about 1.25 percent of GDP a year.
- When regulators are ineffective—that is, when they do not ensure that the quasi rent generated by privatization is redistributed throughout the economy rather than retained by the owners of the privatized utilities—more sectors lose, and although all income classes still gain, they gain less than when regulators are effective. Thus ineffective regulation reduces the gains from privatization.
- The gains that resulted from the macroeconomic effects of privatizing utilities were not strong enough to offset the negative efficiency and distributional effects that resulted from the tequila effect.

In sum, the simulations suggested high rates of return for the privatization project, but they also showed a high shadow price for the regulatory activity, which is often neglected in utility privatizations. How serious governments are about the fair distribution of gains from reform is revealed by how serious they are about regulation.

The study's findings have been presented at seminars in Argentina (November 1996, 30 participants), in

Brazil (November 1996, 20 participants), and at the Inter-American Development Bank (June 1997, 38 participants).

Responsibility: Economic Development Institute, Regulatory Reform and Private Enterprise Division—Antonio Estache (aestache@worldbank.org). With Omar Chisari and Carlos Romero, Universidad Argentina de la Empresa.

Completion date: November 1996.

Reports:

Chisari, Omar, Antonio Estache, and Carlos Romero. 1997. "Winners and Losers from Utility Privatization in Argentina: Lessons from a General Equilibrium Model." Policy Research Working Paper 1824. World Bank, Economic Development Institute, Washington, DC.

Chisari, Omar, and Carlos Romero. 1997. "Descripción de la SAM de la Argentina en 1993 con Sectores de Infraestructura." World Bank, Latin America and the Caribbean, Country Department I, Washington, DC.

African Politics and African Development

Ref. no. 680-86

This research is developing a database to analyze how African political systems have been changing in order to investigate how politics might influence Africa's policy choices. These data will enable the study to address such crucial questions as these:

- Do different forms of government lead to different rates of investment and growth? For example, are military governments less likely than single-party regimes to attract capital and growth? Are governments installed by coup less likely to preside over high rates of growth than governments installed by election?
- Do different forms of government choose different forms of economic policy? For example, are politically open policies more likely to be economically open as well?

The research is developing detailed information about the political systems in 46 African states for 1975, 1980, 1991, and 1995. It will discern and describe patterns of political and economic variation across countries and over time. It will explore the impact of causal factors on the rates and magnitudes of variation, both political and economic. In particular, it will examine the effect of political differences on variations in economic performance and the effect of variations in economic performance on political change. Among the possible explanatory variables it will explore are the size of the middle class, differences in measures of instability and violence, and differences in levels of external dependence (measured by rate of external indebtedness). Once the research has identified overall patterns, it will collect qualitative information on six cases that provide greater insight into the

dynamics of the patterns and illustrate the causal mechanisms that generated them.

The data set and a numerical and graphical depiction of the patterns will be published. There will be a series of working papers and articles exploring the findings and the cases and their broader implications for African policymakers and Bank staff.

This research will provide insights to Bank operational staff working on Africa that will help them to design politically feasible reforms. A deeper understanding of how politics affects policy and how growth affects politics is useful for assessing the riskiness of projects and putting reforms into a broader institutional context.

Responsibility: Policy Research Department, Finance and Private Sector Development Division—Mary Shirley (mshirley@worldbank.org). With Robert Bates, Harvard University.

Completion date: June 1998.

Ownership Structure, Corporate Governance, and Firms' Performance: The Case of Chinese Stock Companies

Ref. no. 681-08C

Restructuring state enterprises has been considered key to the success of China's economic reform. This study investigated whether ownership structure significantly affects the performance of publicly listed companies in China and, if so, in what way. Publicly listed stock companies provide an opportunity to study this issue, because it is possible to quantify the mix and concentration of their ownership. The recent literature on the role of large institutional shareholders in corporate governance provides the theoretical foundation of this study.

More than 500 companies were listed on the two national stock exchanges in China at the end of 1996. This study used firm-level data for 1993–95 for more than 300 of these companies, drawn from their annual reports and from a sample survey. A typical listed company in China has a mixed ownership structure, with three predominant groups of shareholders—the state, legal persons (institutions), and domestic individuals—each holding about 30 percent of total outstanding shares. Employees and foreign investors together hold less than 10 percent. Ownership is heavily concentrated: the five largest shareholders accounted for an average 58 percent of outstanding shares in 1995, compared with 58 percent in the Czech Republic, 42 percent in Germany, and 33 percent in Japan.

Results from the study's empirical analysis show that the mix and concentration of stock ownership significantly affect a company's performance, as measured by

returns on assets, returns on equity, and ratio of market to book value. There is a positive and significant correlation between ownership concentration and profitability. The effect of ownership concentration is stronger for companies dominated by legal person shareholders than for those dominated by the state. Firms' profitability is positively correlated with the proportion of legal person shares; it is either negatively correlated or uncorrelated with the proportion of state shares and of tradable A shares, which are held mostly by individuals. Labor productivity tends to decline as the proportion of state shares increases. The study's descriptive analysis shows that legal person owners are able to monitor management effectively through their control over the board of directors, the selection of corporate officers, and the compensation of chief corporate officers.

These findings suggest the importance of large institutional shareholders in corporate governance and performance, the inefficiency of state ownership, and the potential problems of an overly dispersed ownership structure. Comparative studies show that in OECD countries ownership and control rights are increasingly concentrated in the hands of financial and nonfinancial institutions, a trend apparently driven by the benefits of ownership concentration as a means of corporate control.

Responsibility: Economic Development Institute, Office of the Director—Yan Wang (ywang2@worldbank.org). With Xiaonian Xu, Amherst College.

Completion date: May 1997.

Report:

Xu, Xiaonian, and Yan Wang. 1997. "Ownership Structure, Corporate Governance, and Firms' Performance: The Case of Chinese Stock Companies." Policy Research Working Paper 1794. World Bank, Economic Development Institute, Washington, DC.

Bureaucratic Structures and Economic Performance in Developing Countries

Ref. no. 681-16C

Lack of institutional capacity is commonly cited as a principal reason for failure to adequately implement economic policies conducive to development. The foundation of institutional capacity is public administration. Attempts to improve institutional capacity have therefore focused on professionalizing the public administration. But there has been little evidence on how professionalization affects policy outcomes or economic performance more generally.

This project measured the effect of bureaucratic structure on bureaucratic performance and economic growth. It focused on two aspects of bureaucratic structure: the

extent of meritocratic recruitment into agencies and the possibility for career building within agencies. Theory suggests that each of these, within certain limits, can restrain corrupt behavior by public officials and encourage them to perform more efficiently. The research found that meritocratic recruitment is most important in reducing corruption, followed by internal promotion and career stability. These factors are also associated with higher rates of economic growth.

The analysis was based on data collected on multiple characteristics of civil service in 35 countries through at least three questionnaires for each country, completed by experts on that country. (The data are available from Peter Evans, Department of Sociology, University of California at Berkeley.)

The research is being disseminated in the Bank to staff involved in public sector management issues. The study's work in quantifying the impact of common public sector management reforms should make a significant contribution to operations designed to improve public sector management.

Responsibility: Policy Research Department, Finance and Private Sector Development Division—Philip Keefer (pkeefer@worldbank.org). With Peter B. Evans, University of California at Berkeley; and James E. Rauch, University of California at San Diego.

Completion date: June 1997.

Reports:

Evans, Peter, and James Rauch. "Bureaucracy and Growth: A Cross-National Analysis of the Effects of 'Weberian' State Structures on Economic Growth."

Rauch, James E., and Peter B. Evans. "Bureaucratic Structure and Bureaucratic Performance in Less Developed Countries."

Talbot, John. "A Description of the 'Weberian State' Comparative Data Set."

Investment Performance in the Corporate Sector

Ref. no. 681-25

Despite the pivotal role that the public sector plays in economic development, most observers would agree that private investment is a powerful source of economic growth. This research will examine the investment activities and performance of a set of private sector corporations in 10 developing countries. Using an updated corporate finance database compiled by the International Finance Corporation's Economics Department, the study will compare the efficiency with which corporations use their physical and financial assets by analyzing the amount of capital used, the size of the operating margins that those assets produce, and the value of the

capital-asset ratio, all relative to corporations in other developing and industrial countries. The results will allow characterization of the assets held by corporations in developing countries and the efficiency with which those assets are used. In addition, a multivariate analysis relating investment performance to macroeconomic and microeconomic factors will explore the determinants of corporate investment activity.

The research will shed light on the nature and degree of competition facing firms in different countries and show how competition changes over time as a result of changes in the environment in which firms operate. The results should help the International Finance Corporation, a source of capital in these countries, to better understand the role of different factors in the private sector's ability to compete internationally. Results will be disseminated through seminars held in academic and industry settings and through a set of research papers that are expected to be published and distributed internationally.

Responsibility: International Finance Corporation, Economics Department—Jack Glen (jglen@ifc.org). With Ajit Singh and Rudolph Matthias, Cambridge University.

Completion date: December 1997.

Effectiveness of World Bank Nonlending Services

Ref. no. 681-26

The increased private capital flows to developing countries have led many to suggest that the Bank's comparative advantage will shift to nonlending services. Empirical evidence on the impact and effectiveness of nonlending services is thin, however. This project examines the effect of nonlending services on the success of Bank lending and investigates whether nonlending services have an impact on changes in sectoral policies or the efficiency of government spending.

To address these issues, the project has constructed a large database from internal Bank sources that includes staff resources spent on nonlending services (economic and sector work) and preparation and supervision of lending projects; total loan commitments; project-specific disbursement profiles, dates of initiation, approval, effectiveness, and closure; and project evaluation ratings in the Annual Review of Portfolio Performance and by the Operations Evaluation Department. At the project level the study regresses ordinal or cardinal project success indicators on economic and sector work and many other Bank-related and country-specific policy factors that might affect project success. At the country level the study, focusing on education policies, asks whether the Bank has lent more to coun-

tries with better policies, thus “rewarding” good policies; whether economic and sector work or lending, or both, have contributed to desirable policy changes; and whether economic and sector work has increased the efficiency of a given level of government spending.

Results thus far indicate that economic and sector work has had a significant and positive impact on a number of success indicators for Bank projects. Quantitative analysis shows that the benefits from economic and sector work far outweigh the costs and that projects in countries and sectors where more economic and sector work had been performed require significantly fewer resources for preparation and supervision.

The project is part of a departmentwide research effort on aid effectiveness, and results are being disseminated within this context. Findings were presented at a Bank workshop in December 1996. The database is already being used in other activities in the Policy Research Department and by the Operations Evaluation Department.

Responsibility: Policy Research Department, Office of the Director—Klaus Deininger (kdeininger@worldbank.org) and Lyn Squire.

Completion date: August 1997.

State Action and Private Sector Development

Ref. no. 681-34

The goal of this project is to identify new ways to apply the new institutional analysis in order to add value to the policy work of the World Bank. The project is exploratory, eliciting the views of world experts in the field and their reactions to Bank material.

The principal finding relates to the central importance of politics in shaping institutions and the difficult challenge this poses for Bank staff seeking to provide advice that is both welfare-enhancing and institutionally sensitive.

Some of the core ideas that emerged in this project served as input into the World Bank’s *World Development Report 1997: The State in a Changing World* (New York: Oxford University Press, 1997). A written synthesis that juxtaposes the perspective of academic institutional analysts with the imperatives of Bank operations is under preparation.

Responsibility: Office of the Senior Vice President, Development Economics and Chief Economist—Brian Levy (blevy@worldbank.org), Sanjay Pradhan, and Alison Evans. With Ken Shepsle and Robert Bates, Harvard University; Matthew McCubbins, University of California at San Diego; Pablo Spiller, University of California at Berkeley; and Michael Laver, Trinity College, Dublin.

Completion date: December 1997.

Efficacy of Beneficiary Assessment

Ref. no. 681-38C

Recognizing the importance of consulting with stakeholders, the World Bank has increasingly used beneficiary assessment, an approach entailing systematic listening to the people affected by development projects to identify issues and constraints and obtain feedback. Has the use of beneficiary assessment had a measurable impact on Bank-supported project work? This project investigated whether the value added of the approach could be measured and, if so, what the results would show.

The project combined qualitative and quantitative approaches: interviews with a large sample of task managers using beneficiary assessment to obtain their perceptions of its value and before-and-after and comparator (with-and-without) regression analyses (data permitting) to obtain more rigorous measures of its impact. In addition to the interviews with task managers, the project relied on information from World Bank project documents.

The research concluded that insufficient data exist for comparator analysis. But for 10 projects before-and-after data from task managers and project documents did reveal a measurable impact attributable to beneficiary assessment. A significant majority (86 percent) of the 41 task managers interviewed stated that the beneficiary assessments for their projects were very cost-effective; roughly three-quarters stated that they were very satisfied with the overall quality of the beneficiary assessments.

These findings show that gaining a more precise and measurable understanding of the impact of consultation on Bank work will require that task managers record the needed data more assiduously. But despite the dearth of solid data, the overwhelmingly positive response of task managers to beneficiary assessment suggests that a drive to institutionalize the approach in the Bank merits consideration. The research should give impetus to the move toward greater client feedback in Bank operations.

Responsibility: Environment Department, Social Policy and Resettlement Division—Lawrence Salmen (lsalmen@worldbank.org). With Seema Tikare, Debu Talukar, and Judith Tandler, Massachusetts Institute of Technology; Misgana Amelga; Sarah Keener; and Karin Kapadia, London School of Economics.

Completion date: June 1997.

Report:

Salmen, Lawrence. 1997. “Toward a Listening Bank: A Review of Best Practices and the Efficacy of Beneficiary Assessment.” World Bank, Environment Department, Washington, DC.

Science Parks and Firm-Level Productivity in China

Ref. no. 681-43

Like many countries, China has established national-level science parks in recent years as part of a strategy to boost economic and technological development. Its 52 science parks, called new and high-technology development zones, are designed to attract foreign direct investment and high-technology domestic companies and to create an environment conducive to technological development. The zones are characterized by dense networks of firms with informal channels for exchanging information and technology, close ties to research institutions, special tax and trade incentives, and a large pool of scientific personnel and skilled labor.

How effective are these zones in accelerating firms' technological development and productivity growth? To address this question, this study has developed panel data for 1992–95 on a sample of firms drawn from all the zones and on a control group of firms located outside the zones. One line of analysis is comparing the performance of these two groups of firms. The control group is far from ideal for such a comparison, because it consists of firms that are designated as "high-technology" and that therefore enjoy the same incentives as firms in the zones, though not the presumed benefits of location in a zone. While productivity in this control group is higher than among firms in the zones, the study has found that rates of total factor productivity growth are faster for firms in the zones than for those outside the zones.

A second line of analysis is comparing the performance of firms across zones and investigating the economic and policy factors that explain differences in performance. The study has found significant differences in firm performance across zones, but analyses to explain them are still at an early stage.

The study's findings on the differential performance of China's development zones and the economic correlates should provide guidance on policies that governments can use to enhance technological development and industrial performance—guidance useful not only for China but also for other developing countries that have established or are considering establishing science parks.

Responsibility: Private Sector Development Department—Hong Tan (htan@worldbank.org) and Xiaomin Chen. With Lan Xue, George Washington University; and Chen Zhao-Ying, National Research Center for Science and Technology for Development, Beijing. The research is being conducted jointly with China's National Research Center for Science and Technology for Development.

Completion date: March 1998.

Indicators of Government Quality as Perceived by the Private Sector

Ref. no. 681-52C

Increasingly it is recognized that the quality of government—credibility and the quality of service delivery—matters a great deal for a country's economic performance. But measuring this quality is difficult. Case studies on the quality of service delivery have been done, as well as surveys of multinational corporations on the quality of institutional frameworks. But the results do not fully reflect the concerns of local firms and are imperfect measures of the quality of institutions that affect private investment and growth.

This study compiled indicators of the quality of government in 69 countries through surveys of local businesspeople. Drawing on the survey results, the study developed an indicator of government credibility, measuring such characteristics as corruption, property rights, the reliability of the judiciary, and the predictability of laws and policies. The study contributed to the development of indicators of bureaucratic discretion to help in understanding the causes and consequences of corruption. The survey also yielded indicators of the quality of service delivery (such as roads, ports, and communications).

Together, these results provided powerful insights on the obstacles faced by private business, the impact of credibility on private investment and growth, the components of credibility and their policy implications, and the relative efficiency of delivery in different services and regions. The study also provided insights on region-specific obstacles to private sector development and investment.

The study was carried out to provide empirical analysis for the World Bank's *World Development Report 1997: The State in a Changing World* (New York: Oxford University Press, 1997).

Responsibility: World Development Report Office—Sanjay Pradhan (spradhan@worldbank.org) and Gregory Kisunko. With Aymo Brunetti; and Beatrice Weder, University of Basel.

Completion date: June 1997.

Reports:

Brunetti, Aymo, Gregory Kisunko, and Beatrice Weder. 1997.

"Credibility of Rules and Economic Growth: Evidence from a Worldwide Survey of the Private Sector." Policy Research Working Paper 1760. World Bank, Office of the Senior Vice President, Development Economics and Chief Economist, Washington, DC.

_____. 1997. "Institutional Obstacles to Doing Business." Policy Research Working Paper 1759. World Bank, Office of the Senior Vice President, Development Economics and Chief Economist, Washington, DC.

_____. 1997. "Institutions in Transition: Reliability of Rules and Economic Performance in Former Socialist Countries." Policy Research Working Paper 1809. World Bank, Office of the Senior Vice President, Development Economics and Chief Economist, Washington, DC.

Decentralization and Participatory Planning in Bolivia

Ref. no. 681-62

Proponents of decentralization argue that it can overcome the problems of poor information and skewed incentives that undermine public spending decisions because it makes decisionmakers more accountable to the governed. While the theoretical basis of this argument is clear, empirical studies of the effects of decentralization are still few in number, and general patterns have not yet emerged.

This study examines the effects of decentralization in Bolivia, which has gone from highly centralized to highly decentralized provision of public services. Reforms in 1994 doubled the share of national tax revenues going to municipalities, transferred to municipalities title to and responsibility for local infrastructure, and set up grass-roots committees to oversee municipal spending. Before the reforms citizens had an opportunity to help decide investment priorities for each municipality through provincial-level "town meetings."

The study addresses such questions as these: Is decentralization improving allocative efficiency—that is, are citizens getting what they want? How do the stated needs of citizens compare with the "objective" needs (assumed to be primary education and health care and infrastructure)? Is service provision more cost-effective after decentralization? The research also examines decentralization more closely through case studies of up to 10 municipalities, evaluating how democratic and representative local government is.

The study is now collecting data for the analysis, from national sources.

Responsibility: Policy Research Department, Public Economics Division—Gunnar Eskeland (geskeland@worldbank.org) and Shantayanan Devarajan. With Jean-Paul Faguet.

Completion date: June 1998.

Infrastructure Privatization Database

Ref. no. 681-66

Lack of data about infrastructure privatization has severely constrained the Bank's ability to carry out a systematic analysis of the relationship between the pol-

icy alternatives in privatizing infrastructure and the institutional environment in which these alternatives exist. This project, in line with the recommendations of the Bank's *World Development Report 1994: Infrastructure for Development* (New York: Oxford University Press, 1994), will develop a database of variables crucial to the understanding of experience in infrastructure privatization, enabling policymakers and Bank staff to learn from the successes and failures of infrastructure reform. The acceleration in infrastructure privatization and the rapid disappearance from the Bank's shelves and institutional memory of much of the information on utilities' performance as these entities are privatized make the need for this effort especially pressing.

The data to be collected will include information on performance before and after sale, the terms and conditions of the privatization transaction, and details on the regulatory framework. The database will cover sales in electricity, telecommunications, and, resources permitting, gas. This database will fill important gaps in the Bank's institutional memory and allow staff preparing and supervising infrastructure projects to quickly compare performance measures and regulatory frameworks with those for successful and unsuccessful privatized firms. Subsequent analysis using the data will develop detailed guidelines on what worked and what failed in privatizing infrastructure.

Responsibility: Policy Research Department, Finance and Private Sector Development Division—Mary Shirley (mshirley@worldbank.org) and Luke Haggarty. With Roger Noll, Stanford University.

Completion date: September 1999.

Managing Micro and Macro Risks for Private Participation in Infrastructure

Ref. no. 681-81

Recognizing the importance of infrastructure for economic development and the constraints on public provision, many governments are trying to attract private participation in infrastructure sectors. But private investors usually seek, and often receive, extensive government guarantees to cover project risks relating to, for example, exchange rates, demand for the service, and changes in regulation.

There is a danger that these guarantees will come back to haunt governments, blunting incentives and even triggering fiscal crises, and thus undermining the very purpose of involving the private sector. While there has been much work on how to attract private participation in infrastructure, there has been only limited analytical work on which risks governments should be willing to

assume and how they should reduce and manage the risks they do take on.

This study is summarizing the existing knowledge on how governments should approach risk allocation and risk management in relation to private infrastructure, attempting to advance the conceptual thinking, and developing concrete policy proposals. It addresses these questions: Which risks, if any, should a government be willing to guarantee either explicitly or implicitly? What attitude should it take toward risks related to changes in exchange and interest rates? What can be done to address political and regulatory risks? How can concessions (or franchises) be designed so as to encourage private participation without requiring the government to bear commercial risks? How should a government's exposure to infrastructure project risks be tracked and valued? And how can decisions on guarantees be integrated with fiscal accounting and appropriations mechanisms?

Responsibility: Latin America and the Caribbean, Office of the Chief Economist—Guillermo Perry (gperry@worldbank.org).

Completion date: December 1997.

Government-Business Consultative Mechanisms and Economic Governance: A Three-Country Comparison

Ref. no. 681-83

The central objective of this research project is to contribute to the understanding of how different organizational practices and institutional structures influence the effectiveness of business-government consultative mechanisms. The study will test four hypotheses:

- The effectiveness of a consultative mechanism is positively related to the formation (supply) of an organization explicitly designed to facilitate economic reform and restructuring by institutionalizing dialogue among economic stakeholders.
- The effectiveness of a consultative mechanism is positively related to the credibility of commitments undertaken by stakeholders.
- The effectiveness of a consultative mechanism is positively related to the creation of mutual monitoring mechanisms for the commitments undertaken by stakeholders.
- The effectiveness of a consultative mechanism is positively related to a membership that legitimately and authoritatively represents the major economic stakeholders.

The study will undertake a comparative analysis of three countries—Ghana, Malaysia, and Mexico—that have recently experimented with consultative mechanisms as a means to enhance their regulatory reform

and economic restructuring policies. The comparative design will allow empirical testing of the research hypotheses. Original field research will be conducted in all three countries. Secondary materials will be collected, and in-depth, semistructured interviews will be held with the major economic actors associated with the consultative mechanisms in each country. After the country case studies are completed, theoretical generalizations will be cross-checked through a review of a broader range of national experiences with consultative mechanisms.

This research will help clarify for the Bank when and how to promote consultative mechanisms, identifying the national contexts that are promising for the promotion of these mechanisms and the organizational and institutional forms that characterize effective ones.

Responsibility: Private Sector Development Department—Andrew Stone (astone@worldbank.org). With Jessie Biddle, Pennsylvania State University; Vedat Milor, Brown University; Michael Lofchie, University of California at Los Angeles; Joseph Ayee, University of Ghana; Jomo Kwame Sundaram, University of Malaysia; and Matilda Lunas, Autonomous University of Mexico.

Completion date: June 1999.

Political Credibility and Economic Reform

Ref. no. 681-85

The objective of this research is to develop a new framework to help analysts draw reliable judgments about a country's readiness for reform. The underlying question it addresses is, What are the necessary political conditions for successful reform? Extending the analysis in the World Bank's Policy Research Report *Bureaucrats in Business* (New York: Oxford University Press, 1995), the study will investigate whether policymakers feel that reform is in their interests, whether they are capable of passing and implementing reform that is in their interests, and whether they can sustain reform once it is passed.

The second question the research addresses is, What evidence can be used to determine whether those conditions are met? In particular, under what conditions can the desirability of reform be inferred from the statements of policymakers? The second phase of the research will involve systematic and rigorous empirical work to apply the theory to case study countries.

This work is part of a broad effort to improve the ability of the World Bank to design projects that are appropriate to the institutional conditions in countries and to assess more rigorously and transparently countries' readiness for reform.

Responsibility: Policy Research Department, Finance and Private Sector Development Division—Mary Shirley

(mshirley@worldbank.org), Philip Keefer, and Luke Haggarty. With Arthur Lupia and Mathew McCubbins, University of California at San Diego; and Roger Noll and Barry Weingast, Stanford University.

Completion date: June 1998.

Institutions, Politics, and Contracts: Private Sector Participation in Urban Water Supply

Ref. no. 681-87

Reforms promoting private sector participation in the provision of urban water supply are often cited as success stories, but these reforms have followed many different approaches, including leases, concessions, and management contracts. Lacking has been a rigorous analysis of outcomes that would enable development practitioners to choose the most efficient form of private participation for their circumstances.

This study will analyze the effect of political and contracting institutions on the design and performance of contracts for private sector participation in urban water supply. First, it will determine under what conditions the private sector may be more efficient than the government. Second, it will identify what privatization schemes are feasible and efficient in specific institutional settings. Third, it will provide guidance on how to implement the privatization reforms and how to obtain the desired results (improved performance and increased welfare) in different institutional and political settings.

The research will use a case study approach, systematically analyzing experience with private sector participation in the provision of urban water services in six countries: Argentina (concession in 1992), Côte d'Ivoire (lease in 1962 and concession in 1987), Guinea (lease in 1989), Mexico (management contract in 1993), and Chile and Peru (continued public operation). The sample represents the main contracting options used in water supply, provides significant variation in the institutional setting, and allows comparison with countries that have not used private participation.

The study will divide the analysis in three parts. The first part will analyze the political issues that may determine the design and performance of reform. It will analyze the political motivation for and feasibility of reform, the commitment to reform, and the role played by the political importance of water. The second part will analyze contracting issues in the design and performance of reform (including the process of selecting the contractor, the design of the contract, and the regulatory framework). It will look at how the different types of contracts address possible problems of incentives, information asymmetries, and credibility. The third part will assess

the results of the reform, looking at different indicators of performance. The study will also measure the welfare effects of each reform compared with the publicly owned and operated counterfactual (using the methodology developed by Ahmed Galal and others, *Welfare Consequences of Selling Public Enterprises: An Empirical Analysis*, New York: Oxford University Press, 1994).

The study aims to provide Bank task managers and client governments with a better set of tools for thinking through when and how best to involve the private sector in the reform of water and sanitation utilities, including guidelines for the design and implementation of a successful reform. It will also provide a methodology for assessing the welfare effects of reforms involving private sector participation in urban water supply. This methodology will also be useful for assessing the impact of privatization in other sectors.

The findings of the case studies will be disseminated through working papers and a synthesis paper on the policy and operational lessons of the research.

Responsibility: Policy Research Department, Finance and Private Sector Development Division—Mary Shirley (mshirley@worldbank.org) and George Clarke.

Completion date: June 1999.

Delay in Disposition: Judicial Performance in Developing Countries

Ref. no. 681-92

The general objective of this study is to provide an international comparative analysis of the performance of courts by developing performance indicators that measure time and cost of litigation and by analyzing how reform programs affect time and cost. The study will review the efficiency and effectiveness of courts in about a dozen developing and industrial countries.

The study will determine a court system's efficiency on the basis of the clearance rates (cases resolved as a percentage of those filed) and the ability to provide quality at a minimum cost. Indicators will be used that show the change over time in caseload, backlogs, time to dispose of a case, and cost of supplying court services. The measure of cost will include not only operational costs but also the capital expenditures and opportunity costs of financing the system. These indicators will allow the study to compare the relative improvement or deterioration of courts.

Effectiveness will be assessed on the basis of the court's capacity to resolve conflicts for a reasonable cost and within a reasonable time as well as objective and subjective perceptions that justice is being delivered by the court system. The subjective perception of the quality of

justice will be based in part on information collected through a questionnaire administered to a stratified sample of judges and court personnel in the courts that deal with the most common types of cases reaching the judicial system. The objective measure of effectiveness will be determined by a weighted index that will include several objective variables capturing the capacity of the courts to satisfy the public's demand for court services.

Most of the data for the study will be obtained from judges, through the questionnaire that the study has developed. The information on types of cases and litigants will be obtained from the statistical office of the supreme court or ministry of justice. The study is now collecting preliminary information on court structure, case statistics, procedural steps, and the like, and is developing a method for cataloguing, publicizing, and distributing the data collected.

Responsibility: Legal Department, Operations Front Office—Maria Dakolias (mdakolias@worldbank.org). With Ed Buscaglia, Stanford University and Washington College; Javier Said; Valerie Helbronner; Hans Korb; Neil Gold, University of Windsor; Isabel Atencio; Flor de Maria Meza Tananta; and Yasuhei Taniguchi, Kyoto University.

Completion date: February 1998.

Information and the Organization of Government

This research assumed that the key to effective organization of government activity hinges on the alignment of incentives and control with information. The perspectives it applied are particularly relevant for reforms involving decentralization. The project consisted of four studies.

The first study, a theoretical investigation, looked at environmental protection and revenue generation. The starting point was a global optimization problem for government in which all problems are solved at once. The study asked whether optimal policies can be implemented by two agencies that do not closely coordinate their policies. The "delegation" result involves a rule for each agency that is similar to rules that apply if there is only one problem and only one agency: pollution is taxed indiscriminately according to pollution damages, commodity taxes refer to demand elasticities only, and both agencies refer to the same shadow price of public revenues.

The second study looked at the effectiveness of health service delivery in rural El Salvador, particularly services delivered by nongovernmental organizations. And it asked what institutional and incentive mechanisms could be useful in governing resource use in the sector. Preliminary findings show that there is little information

on the effectiveness of service delivery in the current setting, and that mechanisms that elicit and use such information could improve service delivery.

The third study asked what institutional mechanisms around an environmental protection agency are conducive to its effectiveness. An environmental agency may easily be obstructed by entities around it that are interested in fiscal savings or in giving industries breaks. One solution is to establish a rapport with the beneficiaries of environmental protection, so that obstruction becomes detectable and thus riskier.

The fourth study expanded the normative model for project appraisal to allow for appraisal costs, so that it will provide pointers for funding agencies on how to allocate resources. The study also included incentive problems associated with appraisal costs.

Responsibility: Policy Research Department, Public Economics Division—Gunnar S. Eskeland (geskeland@worldbank.org).

Completion date: August 1996.

Reports:

Eskeland, Gunnar S. 1996. "Environmental Protection and Revenue Generation: A Delegation Result." World Bank, Policy Research Department, Washington, DC. Draft.

_____. "Rural Health Services in El Salvador: A Managerial Perspective." World Bank, Policy Research Department, Washington, DC.

Private Means, Public Ends: Private Sector Participation in Caribbean Water Systems

As in many developing countries, the water supply entities in the Caribbean are poorly managed and inefficient. The price of providing water and sewerage services bears no relationship to the cost, with the government usually making up the financial shortfall. But fiscal crises have rendered governments unable to support the increasing operational costs of producing and distributing water and the investments required for rehabilitating and expanding the systems. The water supply entities also face a serious backlog in water pollution control investments. The tourism sector, the main income earning sector for most of these countries, will suffer if water supply and pollution control do not improve, undermining long-term economic growth.

Some countries in the Caribbean have embarked on reforms. But many are still plagued by poor performance and low productivity. There is an urgent need for new approaches to the problems of water supply and sewerage services in the Caribbean.

The objective of this study was to provide the Caribbean countries with an overview of how water

sector reforms around the world are addressing the inter-linked problems of improving the sector's performance and obtaining financing for investments. It showed that private sector participation in the provision of water and sewerage services can help solve the kinds of problems faced by these countries.

The study assessed recent private activity in the water sector, focusing on the advantages and disadvantages of different options for private sector participation. It produced a water and sewerage inventory of all countries in the Caribbean to develop a prototype of the basic characteristics of the sector. And from case studies of private participation in water utilities in the Caribbean, it extracted lessons to guide countries in the region.

The study showed how private sector participation promotes the operational efficiency and commercial viability of water utilities. The models of private participation adopted by countries in the Caribbean demonstrate broadly successful attempts at risk sharing between the public and private partners. The public sector's role is now more regulatory and protects consumers against abuses of monopoly power. The private sector's role is to provide stable management, higher efficiency, and improved access to capital. Cooperation between the public and private sectors increases population coverage, improves the quality of service, and reduces water pollution and public health hazards.

Responsibility: Private Sector Development Department, Private Sector Development and Privatization Group—Helen Nankani (hnankani@worldbank.org).

Completion date: December 1996.

Report:

Nankani, Helen. Forthcoming. "Private Means, Public Ends: Private Sector Participation in Caribbean Water Systems." World Bank, Private Sector Development Department, Washington, DC.

Africa Privatization Study

This study examined privatization in Sub-Saharan Africa, addressing several questions: First, what has been happening in privatization in Africa? How many transactions have occurred, of what type and value, and in what sectors? How much competition is there in the process? And how much progress has been made? Second, what has been the impact of privatization in Africa? Third, what has been the driving force behind the privatization? Fourth, how has privatization been implemented? And finally, what lessons can be drawn from the African privatization experience for policymakers, practitioners, and donors?

To answer these questions, the study developed a database of privatization transactions in Africa covering the

period up to December 31, 1995. In addition, it undertook field studies in 10 countries (Benin, Burkina Faso, Ghana, Kenya, Madagascar, Mozambique, Nigeria, Togo, Uganda, and Zambia). The field studies consisted of surveys of a sample of privatized enterprises to obtain information on the privatization process and postprivatization performance; interviews with government departments and divestiture agencies to learn how the programs were developed and are being implemented, what issues have arisen, and how these issues have been tackled; and interviews with other relevant stakeholders, particularly private sector bodies, to learn about their experience and their perceptions of the divestiture process. The study also reviewed Bank reports and external publications and maintained a continuous dialogue with Bank task managers in the region.

The main findings of the research are as follows:

- Obtaining consistent and reliable data has been difficult, even within the Bank. Reported data have been unreliable, with many inconsistencies.

- Privatization has been adopted reluctantly and slowly, but it has become more generally accepted and the pace of divestiture has picked up. Divestiture activity is greater than is generally known.

- Privatization has had a small impact on government finances, foreign direct investment, and employment, mainly because of the general policy of first divesting small, relatively insignificant enterprises. This picture is expected to change as the larger, "strategic" enterprises come on stream. At the enterprise level privatization has shown encouraging results; despite some business failures, there is evidence of improving performance. But governments have not yet done much to meet the aim of broadening ownership.

- Governments have not always divested for the stated reasons. Generally, there has been a lack of consensus in favor of privatization, so governments have tended to adopt programs because of a need for financial support from the World Bank, the International Monetary Fund, and donors. As a result, programs have lacked ownership. But this is changing as privatization becomes more widespread and is increasingly regarded as inevitable.

- Governments have adopted many different approaches for planning and implementing divestiture and a variety of institutional models. Many programs are characterized by poor design and preparation. Most successful appears to be the model used in Zambia, where the program was carefully planned, the program and the privatization agency have full legal backing, the private sector plays a dominant role in privatization, capital market development was planned and implemented alongside the divestiture program, the government is fully

divesting its equity interests, and transactions are handled and reported transparently.

What are the lessons for Bank operational staff, national policymakers, and donors? The findings suggest that privatization programs work best when attention is paid to building consensus through public information and debate; privatization activities are centrally coordinated and the implementing agency has the necessary legal mandate and authority; the process is transparent, which extensive private sector involvement can help ensure; preparation for transactions is thorough; priority is given to privatizing major enterprises to achieve visible benefits; and government, Bank, IMF, and donor efforts and assistance are well coordinated. The findings also point to the importance of improved data collection and reporting, and of monitoring large privatized enterprises to track the effects of privatization. And they suggest that more could be done to ensure that ownership is broadened, to help meet the need for investment capital and improved corporate governance.

The findings are being disseminated through the publication of a report and the case studies, a series of workshops throughout Africa, and workshops in the Bank. The Africa privatization database will be made available to interested researchers.

Responsibility: Africa Technical Families, Private Sector Finance Division—Oliver Campbell White (ocampbellwhite@worldbank.org), and Best Practice and Technology Division—Anita Bhatia; Legal Department, Africa Division—Roal Toro; and Private Sector Development Department—Anne Castle and Syed Mahmood. With Michel Cramer, Charles Vellutini, Richard Thompson, and Hervé Dandois, IDC; and Robert Laslet, Moazzim Malik, Noah Mututi, Gil Yaron, Kwabia Boateng, Alistair Milne, Pierre Bide, and Symphorien Akangah, London Economics. The Overseas Development Administration, United Kingdom, contributed funding for the research.

Completion date: June 1997.

Decentralization in Latin America and the Caribbean: Best Practice and Policy Lessons

Decentralization, reform of the state, and democratization in Latin America and the Caribbean are creating a new institutional environment for local authorities and have triggered spontaneous reforms in governance at the subnational level. A new generation of elected leaders has produced a wave of innovations—upgrading professional staffs, raising taxes and user fees, delivering better services, and mobilizing participation in public choice making. With little help from outside, these lead-

ers may be laying the groundwork for long-term change.

This study was designed to deepen the understanding of innovation in local government. The study documented more than 20 cases of best practice at the city and regional levels, primarily through information provided by city and regional authorities responsible for innovations. These case studies and the analyses carried out in the study examined how good practice is born, where ideas come from, how they are introduced in a new context and successfully propagated, and what donors can do to advance the dynamics of change.

Unlike the many studies that merely document best practice, this work focused on the origins—the political and institutional preconditions—of best practice, as well as the process of launching innovation and change at the local level. How do local authorities learn? How do they identify good and best practices and then adapt them to solve problems at the local level? And what is the experience with replication? The lessons it found cover such areas as the scale and nature of first-time innovations, the modes of incorporating public participation, the importance of leadership and crises, the tremendous efforts needed—and the poor tools available—to foster communication to sell a new idea or product to the public, and the methods used to disseminate and diffuse innovations.

The study's findings suggest that the Bank can productively shift the focus in public sector reform to the local level. The Bank and donors can help encourage innovation in subnational governments by rewarding reformers with projects and technical assistance, participating in the incubation of innovations, and delving further into the process of public education as an important part of public choice making. They can also do more to promote past and potential innovators as an engine of change by highlighting success, evaluating impacts, and disseminating results.

Findings have been disseminated at the City Symposium at the Inter-American Development Bank's annual meetings in 1997, at various forums in the Bank, and on Bank missions (for example, the Philippines in June 1997 and Guatemala in July 1997). In addition, three international workshops, each sponsored by several agencies, were held for practitioners and country and Bank officials during the study. A book of cases and analysis is under preparation.

In Bank operations lessons from the study have been adopted in programs of urban administration reform in two major cities, La Paz and Asunción. An urban strategy now under preparation for Latin America and the Caribbean is also incorporating the findings.

Responsibility: Latin America and the Caribbean Technical Department, Advisory Group—Malcolm Rowat

(mrowat@worldbank.org), Tim Campbell, Harald Fuhr, and Marcela Huertas, and Office of the Director—Sri-Ram Aiyer. With Florence Eid, Massachusetts Institute of Technology; Fernando Rojas, Harvard University; Rafael de la Cruz, Instituto de Estudios Superiores de Administración, Caracas; Alberto Maldonado and staff, Departamento Nacional de Planeación, Colombia; Zandor Navarro, University of Porto Alegre, Brazil; and Ariana Legovini. The Economic Commission for Latin America and the Caribbean, Inter-American Development Bank, Instituto de Estudios Superiores de Administración, German Agency for Technical Cooperation, government of Spain, and Inter-American Foundation provided funding for the research and conference facilities. The government of Colombia provided support for five Colombian case studies and conference facilities.

Completion date: June 1997.

Reports:

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- Eid, Florence. 1996. "Implementing Municipal Policy Reforms: The Fondo de Desarrollo Vecinal of Conchali, Chile (The Neighborhood Development Fund in Conchali, Chile) and the Problem of 'Elite Control' in Promoting Participation." World Bank, Latin America and the Caribbean Technical Department, Washington, DC.
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America and the Caribbean Technical Department, Washington, DC.

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Project Evaluation and Public Expenditure

What is the proper role for project evaluation in today's world, where countries have reduced major economic distortions and are reconsidering the role of the state? This change in circumstances calls for a shift in the emphasis of project evaluation away from a concern with precise rate of return calculations and toward a broader examination of the rationale for public provision. Three considerations critical to proper project appraisal are the counterfactual private sector supply response, the fiscal impact of the project, and the fungibility of lending.

This project produced papers applying a method of project analysis that incorporates these considerations to the health and education sector and is preparing a paper applying it to the infrastructure sector. Work on the fiscal impact centers on estimating the marginal cost of public funds and is being undertaken by another research project (Estimating the Marginal Cost of Public Funds in Developing Countries, ref. no. 680-69).

Responsibility: Policy Research Department, Public Economics Division—Shantayanan Devarajan (sdevarajan@worldbank.org) and Sethaput Suthiwart-Narueput.

Completion date: July 1997.

Reports:

- Devarajan, Shantayanan, Lyn Squire, and Sethaput Suthiwart-Narueput. 1997. "Beyond Rate of Return: Reorienting Project Appraisal." *World Bank Research Observer* 12(1):35-46.
- Hammer, Jeffrey S. 1997. "Economic Analysis for Health Projects." *World Bank Research Observer* 12(1):47-71.
- Jimenez, Emmanuel, Elizabeth M. King, and Jee-Peng Tan. 1996. "Whither Economic Analysis of Education Investments?" World Bank, Policy Research Department, Washington, DC.

Private Provision of Water and Sanitation

This study reviews recent experience with private initiative and capital in the water and sanitation sector. It addresses two main questions: What is the extent of private involvement in water and sanitation? And what factors make private involvement in the sector productive and successful?

The study finds that there is a surprisingly large amount of private activity in water and sanitation in developing countries—despite the serious regulatory challenges in the sector. Through case studies in both industrial and developing countries (including Argentina, Australia, Guinea, Malaysia, Mexico, Turkey, and the United Kingdom), the study identifies the many risks associated with investment and service provision in the sector. It also identifies pragmatic solutions that many countries are adopting to mitigate these risks. The huge growth in demand for water and sanitation services will require continuing institutional, regulatory, and financial innovations to manage the risks in the sector.

Responsibility: Cofinancing and Project Finance Department, Project Finance and Guarantees Group—Ashoka Mody. With David Haarmeyer.

Completion date: September 1997.

Report:

Mody, Ashoka, and David Haarmeyer. 1997. "Tapping the Private Sector: Approaches to Managing Risks in Water and Sanitation." World Bank, Cofinancing and Project Finance Department, Washington, DC.

Regional Program on Enterprise Development in Africa

One of the lessons emerging from structural adjustment efforts in Africa is that macroeconomic reform is a necessary but not a sufficient condition for private sector growth. There are enterprise-level constraints that inhibit the growth of existing firms and impede the entry of new ones. This research is designed to get a better understanding of the constraints that inhibit enterprise development in Africa and to make recommendations to ease those constraints.

The research is investigating these issues in three ways. First, it is collecting survey data through interviews, conducted annually, of a panel of 200 large and small manufacturing firms in Cameroon, Côte d'Ivoire, Ghana, Kenya, Tanzania, Zambia, and Zimbabwe. The survey focuses on four manufacturing sectors: food processing, woodworking, metal working, and textiles and garments. Survey questions seek general information on the firm and on issues relating to labor, technology, regulation,

infrastructure, financial markets, conflict resolution, and the use of business support services.

Second, it is carrying out a series of case studies of firms focusing on selected aspects of the research agenda, such as finance, business strategy, and technological capability. These case studies are selected from a stratified subsample of the panel firms and are conducted to complement quantitative information gathered in the broader survey exercise.

Third, it is conducting cross-country studies and studies of issues related to firm dynamics over time. These issues include labor markets, business strategy, financial markets, technological capabilities, the nature and determinants of entrepreneurship, the impact of infrastructure on firm operations and growth, regulation and the extent to which firms perceive regulation as constraining their operations and growth, and how firms grow in these economies and why. The analyses of these issues should contribute to evaluations of the impact of structural adjustment programs in Africa.

The program has been extended for an additional three years. By allowing more panel data collection and analysis, the extension will permit further assessment of the impact of structural reform programs in Africa at the microeconomic level. In addition to assessing the impact of policy reforms, the extended program aims to build local capacity to continue gathering information after the program ends. A local base for continued monitoring of the microeconomic effects of structural adjustment would make a significant contribution to the Bank's operational programs. The program's extension also allows additional analysis of African private sector growth problems and further dissemination of the findings of this work.

The program links its findings to the Bank's operational work in Africa through regular seminars at the Bank, the *Findings* newsletter, and participation in regional and country private sector development strategies and program designs. Outside the Bank, the program has hosted seminars and conferences in Cameroon, Côte d'Ivoire, Ghana, Kenya, Tanzania, Zambia, and Zimbabwe, as well as in Belgium, Canada, Denmark, Finland, France, Germany, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom, and the United States. In addition to the publications listed below, the program has produced many country studies, analytical reports, case studies, and discussion papers.

Responsibility: Africa Technical Families, Private Sector Development and Economics Division—Tyler Biggs (tbiggs@worldbank.org) and Melanie Mbuyi. With Manju Kedia Shah; Mayank Raturi; Vijaya Ramachandran; Tilahun Temesgen; Alfred Robinson; Mark Gersovitz, Johns Hopkins University; Dipak Mazumdar; Howard Pack; Christina Paxon; and Gerald Tyler. The Ecole des

Hautes Etudes Commerciales, Canada; Centre Universitaire de Douala, Cameroon; Centre d'Etudes et de Recherches sur le Développement International, France; CIRES and ORSTROM (Abidjan), Côte d'Ivoire; Oxford University; University of Ghana; University of Goteborg, Sweden; University of Nairobi; Catholic University, Leuven, Belgium; University of Burundi; Helsinki School of Economics; University of Dar es Salaam; Foundation for Research in Economics and Business Administration, Norway; University of Zambia; Free University of Amsterdam; and University of Zimbabwe assisted in the field surveys and country reports. The Belgian Administration for Development Cooperation; the Canadian International Development Agency; the Danish International Development Agency; the Finnish International Development Agency; the Ministry of Cooperation and the Ministry of Foreign Affairs, France; the Federal Ministry of Economic Cooperation, Germany; the Ministry of Foreign Affairs, Italy; the Ministry of Foreign Affairs, the Netherlands; the Norwegian Agency for Development Cooperation; the Swiss Development Cooperation; the Swedish International Enterprise Development Cooperation; and

the Overseas Development Administration, United Kingdom, are providing funding for the research.

Completion date: June 2001.

Reports:

- Biggs, Tyler, Margaret Miller, Caroline Otto, and Gerald Tyler. 1996. *Africa Can Compete! Opportunities and Challenges for Garments and Home Products in the European Market*. World Bank Discussion Paper 300. Washington, DC.
- Biggs, Tyler, Gail R. Moody, Jan-Hendrik van Leeuwen, and E. Diane White. 1994. *Africa Can Compete! Opportunities and Challenges for Garments and Home Products in the U.S. Market*. World Bank Discussion Paper 242. Washington, DC.
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BANK RESEARCH OUTPUT

Below are listed various types of research output arising from research and policy review activities at the Bank. To provide maximum coverage of such output, research is defined for the purposes of this list in a broader rather than a narrower sense. Copies of Bank publications (categories A and E) can be purchased or ordered from the Bank's bookstore or distributors (see list on last page of this volume). Copies of working papers and background papers (categories F–H) can be obtained from the authors or the associated Bank departments. Reprints of articles from the Bank's research journals (category C) may be requested from the authors; other published material can be purchased from the publishers (categories B and D). The following types of fiscal 1997 research output are listed:

A. Research-oriented books written by Bank staff and published either by the Bank or by other publishers. This list also includes periodic data publications, such as *Global Development Finance*, that feed subsequent research.

B. Research by Bank staff published as part of collected volumes of research papers.

C. Articles appearing in the Bank's two economics journals, the *World Bank Economic Review* and *World Bank Research Observer*.

D. Articles related to Bank research and published in non-Bank professional journals.

E. World Bank Discussion Papers, Technical Papers, and other Bank series publications.

- *World Bank Discussion Papers*. This series provides an outlet in the public domain for a broad range of Bank output that provides detailed results of interest to development practitioners—from work on narrow research topics or country-specific studies.

- *World Bank Technical Papers*. This series provides an outlet in the public domain for research and studies that are highly technical and aimed at a narrower audience.

- *Other published series*. Papers in such series as the Living Standards Measurement Study Working Paper and Economic Development Institute series typically focus on a specialized topic and are designed to give prominence to Bank work on that topic or to work by a particular Bank unit.

F. Policy Research Working Papers. These working papers are a vehicle for quick dissemination, sometimes in an incompletely polished format, of findings of work under way in the Bank. The primary audience is Bank

staff, though some copies are circulated to interested researchers outside the Bank.

G. Other Bank working papers. These papers are produced and distributed by departments, some divisions, and a vice presidency. They disseminate quickly findings of departmental research and are targeted primarily to specialists in the Bank.

H. Background papers to *World Development Report 1997*. These papers are commissioned from researchers inside and outside the Bank. Some also come out as Policy Research Working Papers or in other forms.

A. Books by Bank Researchers

Bray, Mark. 1996. *Counting the Full Cost: Parental and Community Financing of Education in East Asia*. Directions in Development Series. Washington, DC: World Bank.

_____. 1996. *Decentralization of Education: Community Financing*. Directions in Development Series. Washington, DC: World Bank.

Bruno, Michael. 1996. *Deep Crises and Reform: What Have We Learned?* Directions in Development Series. Washington, DC: World Bank.

Bruno, Michael, and Boris Pleskovic, eds. 1997. *Annual World Bank Conference on Development Economics 1996*. Washington, DC: World Bank.

Caprio, Gerard, and Dimitri Vittas, eds. 1997. *Reforming Finance: A Historical Perspective*. Cambridge: Cambridge University Press.

Commander, Simon, Qimiao Fan, and Mark E. Schaffer. 1996. *Enterprise Restructuring and Economic Policy in Russia*. EDI Development Study. Washington, DC: World Bank.

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Denizer, Cevdet. 1997. *Stabilization, Adjustment, and Growth Prospects in Transition Economies*. London and New York: Macmillan.

Faiz, Asif, Christopher S. Weaver, and Michael Walsh, with Surhid Gautam and Lit-Mian Chan. 1997. *Air*

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- Finger, J. Michael, Merlinda D. Ingco, and Ulrich Reincke. 1996. *The Uruguay Round: Statistics on Tariff Concessions Given and Received*. Washington, DC: World Bank.
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- Greaney, Vincent, and Thomas Kellaghan. 1996. *Monitoring the Learning Outcomes of Education Systems*. Directions in Development Series. Washington, DC: World Bank.
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- Hoekman, Bernard M., and Petros C. Mavroidis, eds. 1997. *Law and Policy in Public Purchasing: The WTO Agreement on Government Procurement*. Ann Arbor: University of Michigan Press.
- Kaminski, Bartlomiej, ed. 1996. *Economic Transition in Russia and the New States of Eurasia*. Armonk, N.Y.: M. E. Sharpe.
- Lutz, Ernst, and Julian Caldecott, eds. 1996. *Decentralization and Biodiversity Conservation*. A World Bank Symposium. Washington, DC.
- Martin, Will, and L. Alan Winters, eds. 1996. *The Uruguay Round and the Developing Countries*. New York: Cambridge University Press.
- McCorkle, Constance M., E. Mathias, and Tjaart W. Schillhorn van Veen. 1996. *Ethnoveterinary Research and Development*. London: IT Publications.
- Munasinghe, Mohan, ed. 1997. *Environmental Impacts of Macroeconomic and Sectoral Policies*. Washington, DC: World Bank.
- Rivera, Daniel. 1996. *Private Sector Participation in the Water Supply and Wastewater Sector: Lessons from Six Developing Countries*. Directions in Development Series. Washington, DC: World Bank.
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- _____. 1996. *Toward Environmentally Sustainable Development in Sub-Saharan Africa: A World Bank Agenda*. Development in Practice Series. Washington, DC.
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- _____. 1996. *Tunisia's Global Integration and Sustainable Development: Strategic Choices for the 21st Century*. Middle East and North Africa Economic Studies Series. Washington, DC.
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- _____. 1997. *Taking Action to Reduce Poverty in Sub-Saharan Africa*. Development in Practice Series. Washington, DC.
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