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The World Bank Research Program

Abstracts of Current Studies

2001

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Introduction

The World Bank's research, described annually in this publication, is evaluated periodically by external experts and occasionally by policymakers in developing and transition economies. Evaluators generally commend the Bank's research program for its focus on important topics and its empirical testing of theoretical concepts in the light of international experience. Those characteristics reflect a review process established more than 30 years ago and the training and experience of a unique international staff.

The review process has been developed, revised, and managed by the World Bank's Research Committee, which allocates central funds for research within the Bank. The committee's mandate is to ensure that Bank research is relevant to policy and meets high standards of analytical quality. Its review process is competitive, and funds are available not only in Bank research offices but also to staff throughout the Bank. Both Bank staff and external experts review grant proposals, and the committee makes final decisions.

The committee's chairman is Nick Stern, the Bank's chief economist and senior vice president of development economics. Its members include regional chief economists from lending operations offices, sectoral experts and advisers to Bank member countries, and managers of the World Bank Institute's learning programs, the Bank's evaluation department, and the International Finance Corporation. These committee members bring to their reviews both comprehensive knowledge of analytical methods and familiarity with the most important development problems facing policymakers in Bank member countries.

World Bank Staff Keep a Sharp Focus on Policy

But the results of the committee's review process are only as good as the best of the proposals submitted—and those are both rigorous and relevant, thanks to the education and day-to-day work of the Bank's staff. Drawn from the world's leading academic institutions, the staff have received intensive analytical training. Those working on the Bank's lending operations or providing advisory services wrestle constantly with the needs and problems of developing and transition economies. Through their international experience, they often discern patterns in the successes and failures of policies and strategies—patterns that would not be evident at the national or even regional level. By rigorously analyzing these patterns, Bank staff have advanced our understanding of a wide range of critical development issues.

Experience has revealed that a large number of factors—beyond economics and finance—shape successful development. The Bank's mandate has broadened over time to accommodate these factors. This breadth has come at a cost, however. Responsible for a widening range of projects and programs, Bank staff must keep abreast of developments across an expanding professional portfolio and make long and frequent trips abroad. These demands absorb time that could otherwise be used to test the validity of the insights suggested by experience. As a result, research by the staff closest to government policymakers is declining, which could reduce the relevance and pragmatism of the Bank's research.

A New Initiative Promotes Research Critical for Policy

To address these issues, this year the Bank established the Regional and Network Research Initiative to focus research on issues critical for development policy and Bank operations and to help reverse the decline in research by lending operations staff and Bank sectoral experts.

The program will assist operations and network staff in planning and developing research projects, fund advice and participation by experts in these projects, and increase the incentives for conducting research by formally acknowledging the operations and network teams that make the most valuable contributions in research. The initiative also will encourage research on priority regions, such as Africa, and on priority issues that remain poorly understood, such as poverty, inequality, governance, and private sector development in transition economies. Research funded under this new initiative will be highlighted in future editions of the *Abstracts of Current Studies*.

What Research Is Now Under Way at the Bank?

This volume reports on research projects initiated, under way, or completed in fiscal 2001 (July 1, 2000, through June 30, 2001). 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 email address for the research project's supervisor.

The abstracts cover 150 research projects from throughout the Bank, grouped under 11 major headings:

- Poverty and social development.
- Health and population.
- Education, labor, and employment.
- Environment.
- Infrastructure and urban development.
- Agriculture and rural development.
- Macroeconomics and growth.
- International economics.
- Domestic finance.
- Industry and private sector development.
- Governance and public sector management.

The appendix lists reports and publications produced from Bank research and explains how to obtain them.

How to Get More Information

This is an annual compendium; readers interested in obtaining more timely information on World Bank research and its findings may wish to subscribe, free of charge, to the quarterly *Policy and Research Bulletin* (see the subscription request form at the back of the volume). Each issue includes information on recent World Bank publications and working papers, abstracts of newly initiated research projects and summaries of recent research findings, and a column identifying electronic information available from the Bank.

The Bulletin, *Abstracts of Current Studies*, articles from the Bank's two research journals—the *World Bank Research Observer* and *World Bank Economic Review*—and many research reports and publications are available on the Web at http://econ.worldbank.org.

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Abstracts of Current Studies

Poverty and Social Development

The Impact of the Financial Crisis on the Farm Sector in Thailand

This study identified and measured the short- and long-term effects of the shocks from the East Asian financial crisis on the well-being and behavior of rural households in Thailand. The aim was to contribute to the design of effective interventions to mitigate the adverse social impacts of the crisis and to a national consensus on short- and medium-term measures for restoring equitable and sustainable rural growth.

The study used two data sources: a detailed, nationwide, farm household survey conducted by the Ministry of Agriculture and Cooperatives in 1996, a year before the onset of the crisis, and a follow-up survey of a large subsample of the same households, conducted with the assistance of a ministry research team. These panel data were used to analyze how different indicators of shock are related to changes in household input expenditures, land use, investment, output, and consumption. The distribution of the effects of the crisis across poor and nonpoor rural households was also examined.

The main findings of the study are as follows:

- There is little sign of massive urban to rural migration, although there appears to have been a slowdown in rural emigration.
- Consumption and income fell much less in the central region than in the northeast or the north, which was hit particularly hard.
- The poor have borne the brunt of the crisis, with their expenditures and income (farm and off-farm) falling, both in real terms and relative to those of the rich. These findings are consistent with the fact that the poor derive most of their income from the labor market (which performed badly) rather than from farming (which generally performed well), while richer farmers derive most of their income from farming.
- No evidence of a credit crunch was found: outstanding loans did not decline substantially.

The key policy conclusion is that interventions that influence farmgate prices or enhance the availability of credit will probably have limited impact on the poor. By contrast, well-targeted social programs designed to fill gaps in the safety net will do more to alleviate rural poverty.

The results were presented at a seminar in Bangkok on June 22, 2000, attended by senior officials and staff of the Ministry of Agriculture and Cooperatives as well as representatives of the World Bank, the Mekong Environment and Resources Institute, Asia-Europe Meeting (ASEM) affiliates, other donors, local nongovernmental organizations, universities, and other elements of civil society. All survey data from the research will be publicly released.

Responsibility: Development Research Group, Rural Development—Gershon Feder (gfeder@worldbank.org), Jaime Quizon, and Hanan Jacoby. With Tongroj Onchan, Charles Mehl, and Anthony Zola, Mekong Environment and Resources Institute, Thailand; and Fabrizio Bresciani, University of Maryland. The ASEM Trust Fund contributed funding for the research.

Completion date: August 2000.

Report

Bresciani, Fabrizio, Gershon Feder, D. Gilligan, Hanan Jacoby, Tongroj Onchan, and Jaime Quizon. Forthcoming. "Weathering the Storm: The Impact of the East Asian Crisis on Farm Households in Indonesia and Thailand." *World Bank Research Observer.*

Technology and Poverty Alleviation

This project looked at the effects of post–green revolution technological change on poverty, assessing the relative importance of its direct effects (on the income or consumption of adopting households) and indirect effects (on food prices, wages, employment, and sectoral linkages). To do so, it estimated computable general equilibrium models for archetypal economies representing poor countries. The models characterize sources of income to identify the real income effects of food price declines and farm income improvements resulting from technological advances.

The study found that in a typical African context, where the agricultural sector is large and most of the poor are smallholders, direct effects are very important. Thus targeting technological change to poor farmers—to their crops, farming systems, market failures, and institutional gaps—is essential for reducing poverty. In Asia, by contrast, where most of the poor are rural and landless, indirect effects captured by the labor market are more important. So in this case targeting technological change toward employment creation is fundamental for reducing poverty. In Latin America, where poverty is largely urban and most of the land is in the hands of large farmers, most real income gains for the rural poor come through indirect effects, mainly from falling food prices. In this case the main role of technological change may be in the fields of large farmers.

The project also assessed the potential contributions of recent biotechnological advances to reducing poverty in the future. It identified the main features of agricultural biotechnology research that could have direct and indirect effects on poverty, analyzed the patterns of generation and ownership of *Bacillus thuringiensis* (Bt) patents, and developed a simulation model of the determinants of adoption of Bt seeds by small landholders. The project found that agricultural biotechnology has great promise for reducing poverty, through both direct and indirect effects. But the institutional requirements for making this promise a reality are demanding. Thus success lies less in the ability to progress in biological sciences than in the ability to put in place the institutions for generating, transferring, delivering, and adopting biotechnological innovations favorable to poverty reduction.

Finally, the project conducted a household survey in the northern highlands of Peru to assess whether poor farmers were benefiting from modern potato varieties introduced in the region. The survey results highlight the importance of taking risk into account when assessing the potential of genetically improved crops to reduce poverty. Although poor farmers have access to credit, they are unwilling to take on the risk of a loan to purchase the seeds of modern potato varieties. Instead, they use sharecropping contracts to acquire seeds and chemical inputs. The contracts provide insured credit: in the event of a crop failure, the farmers pay nothing for the inputs they received from the landlord. But calculations suggest that the price farmers pay for inputs through sharecropping is twice the market price on average. Although sharecropping provides informal insurance for poor farmers, the high price they pay may offset the benefits conferred by the new technologies. One option would be to offer credit programs that include limited liability, thereby enabling farmers to purchase inputs in advance.

In addition, analysis of data from a test of agricultural knowledge included in the survey questionnaire showed that poor farmers have significantly less knowledge of the use of disease-resistant potato varieties and pesticides than better-off farmers. And controlling for socioeconomic factors, the analysis found that farmers with lower test scores were more likely to suffer high crop losses from El Niño. These results underscore the need for agricultural extension programs to accompany the release of new technologies.

The study's results were presented at a workshop organized by the World Bank in Malaysia on May 10–12, 1999; at the Bank's Summer Research Workshop on Poverty in Washington, D.C., on July 6–8, 1999; and at a conference, The Shape of the Coming Agricultural Biotechnology Transformation: Strategic Investment and Policy Approaches from an Economic Perspective, at the University of Rome on June 17–19, 1999. The results also served as input to the World Bank's *World Development Report 2000/2001: Attacking Poverty* (New York: Oxford University Press, 2000). And they are informing ongoing efforts by the World Bank's Biotechnology Task Force to define guiding principles, strategies, and priorities in support of capacity building in agricultural biotechnology, to enhance its impact on poverty.

Responsibility: Development Research Group, Rural Development—Rinku Murgai (rmurgai@worldbank.org) and Gershon Feder. With Oscar Ortiz and Rebecca Nelson, International Potato Center, Lima, Peru; Alain de Janvry and Erin McCormick, University of California at Berkeley; and Paul Winters, University of New England, Armidale, Australia.

Completion date: September 2000.

Reports

de Janvry, Alain, Gregory Graff, Elisabeth Sadoulet, and David Zilberman. 2000. "Agricultural Biotechnology and Poverty: How to Make the Promise a Reality." University of California at Berkeley.

McCormick, Erin. 2001. "Reducing Poverty in the Andes with Genetically Improved Potatoes: The Importance of Risk and Knowledge." University of California at Berkeley.

Does Microcredit Empower Women? A Study of Grameen Bank, BRAC, and the RD-12 Projects in Bangladesh

This research investigated whether microcredit programs in rural Bangladesh empower women, the main participants in these programs. Indicators were developed for three concepts of women's empowerment—economic, social, and political—through participatory and focus group research involving women, men, village and urban elite, academics, program organizers, and leaders of women's groups.

The research used both quantitative and qualitative methods based on household and community survey data. Questionnaires based on the indicators of empowerment were administered to women in both program and nonprogram households in program villages and in target and nontarget households in nonprogram villages. The research used participatory and other qualitative approaches to study similar empowerment issues in selected households in the same study villages.

Answers to the questionnaires were processed with appropriate weights to develop indexes of social, economic, political, and overall empowerment. The quantitative analysis controlled for the unobserved empowerment of women before program participation; otherwise, it would be unclear whether participating in a microcredit program empowers women—or whether only empowered women participate.

Key findings suggest that microcredit targeted to women has a positive influence on their power to purchase household goods; their ability to make decisions about fertility, children's education, and general household welfare; their mobility; their access to household assets and savings; and their social and political awareness. These findings shed light on how microcredit can help advance women where they lack decisionmaking power in the family and the society.

Responsibility: World Bank Institute, Economic Policy and Poverty Reduction Division, and Development Research Group, Rural Development—Shahidur R. Khandker (skhandker@worldbank.org); and World Bank Institute, Economic Policy and Poverty Reduction Division—Hussain Samad. With Mark Pitt, Brown University; and Rita Afsar, Bangladesh Institute of Development Studies.

Completion date: December 2000.

Report

Pitt, Mark M., Shahidur R. Khandker, and Jennifer Cartwright. 2001. "Does Microcredit Empower Women? Evidence from Bangladesh." World Bank, World Bank Institute, Economic Policy and Poverty Reduction Division; and Development Research Group, Washington, D.C.

How Do the Poor Cope with Widespread Natural Disaster? A Study of the 1998 Flood of Rural Bangladesh

Large shocks such as floods, cyclones, and earthquakes have dramatic effects on the well-being of rural households, particularly the poor. Bangladesh experienced severe human suffering in 1998, after one of the worst floods of the century, when two-thirds of the country remained under water for more than four months.

This flood provided a unique opportunity to study how the poor respond to catastrophic events and how governmental and other agencies could improve the coping mechanisms of the poor. To do so, this project collected detailed information at the household and village level on the flood damage, the coping mechanisms adopted by households, and the speed of the recovery. This survey—which collected information on assets before and after the flood, distress sales of assets, credit market activity, interhousehold transfers, and temporary and permanent migration—was administered as part of a household survey conducted under the research project Long-Term Impacts of Microcredit Programs:

A Study of the Grameen Bank and Other Programs in Bangladesh (see the abstract in this volume).

To assess the vulnerability of the poor, the study used the household data to measure the effect of the flood on wages, distress sales of assets, and starvation. On average, the male wage fell by 10 percent in the agricultural sector and 22 percent in the nonagricultural sector. But the labor market rebounded quickly after the flood, with wages surpassing those before the flood. Only 10 percent of affected households made distress sales (selling land or other assets, or making advance sales of labor or crops) during the flood. About a third of the households in flood-affected villages skipped at least one meal a day during the crisis.

Interventions by the government and by nongovernmental organizations and other informal sources helped the poor cope. The assistance was well targeted; households with low per capita income and net worth received most of it. Among those receiving some help, some 6 percent received help from relatives and another 6 percent help from other people, while 78 percent received help from institutional sources. Among the institutional sources, nongovernmental organizations accounted for 12 percent of the monetary help received by households in all villages. Preflood assets helped households cope with the calamity, reducing distress sales and starvation. Microcredit also helped, increasing household net worth and reducing the probability of being poor.

Preliminary results of the analysis were presented in Bangladesh to local staff of the World Bank field office in Dhaka.

Responsibility: World Bank Institute, Economic Policy and Poverty Reduction Division, and Development Research Group, Rural Development—Shahidur R. Khandker (skhandker@worldbank.org); and World Bank Institute, Economic Policy and Poverty Reduction Division—Hussain Samad. With Mark Pitt, Brown University; and M. Abdul Latif and Binayak Sen, Bangladesh Institute of Development Studies.

Completion date: December 2000.

Report

Khandker, Shahidur R., Mark M. Pitt, and M. Abdul Latif. 2001. "How Do the Poor Cope with Natural Disaster? Evidence from Bangladesh." World Bank, World Bank Institute, Economic Policy and Poverty Reduction Division; and Development Research Group, Washington, D.C. Draft.

Long-Term Impacts of Microcredit Programs: A Study of the Grameen Bank and Other Programs in Bangladesh

An earlier study (Credit Programs for the Poor: Household and Intrahousehold Impacts and Program Sustainability) based on a household and community survey in Bangladesh in 1991–92 found that microcredit programs have a substantial effect in reducing poverty and that credit given to women has a substantially larger effect than credit given to men. But how sustainable are microcredit programs, and how sustainable are their benefits? Building on the earlier study, this research project explored these and related issues by resurveying the households and communities surveyed in 1991–92 and constructing a panel data set on borrowing from all microfinance programs, including Grameen Bank, the Bangladesh Rural Advancement Committee (BRAC), other nongovernmental organizations, and government programs.

The follow-up survey revisited all 1,798 households, in 72 program villages and 15 control villages, during February–September 1999. In addition, it added 17 new villages to allow comparison of program impacts between old and new program villages. And in each program village a few new participants were interviewed to allow a comparison of impacts between old and new participants.

The study addressed these questions: Do the estimated effects of microcredit programs remain over time? Are there diseconomies of scale in villages as microcredit programs expand? Do microcredit programs have any spillover effects? Do they have noncredit effects? And does the group play an essential part in group-based microcredit?

Preliminary findings show that microcredit programs have significant positive effects on household welfare, as measured by such indicators as net worth and per capita consumption. These effects are much larger for female borrowing than for male borrowing. In contrast, the expected impact of microfinance on contraceptive use and fertility is more pronounced for male borrowing than for female borrowing. Microfinance increases the labor supply of both men and women, supporting the view that these programs generate employment for the underemployed and unemployed of both genders.

Results also show that the effects of credit change over time. The marginal return to consumption, for example, is higher for women's past borrowing than for their current borrowing. This may reflect diminishing returns to consumption from microfinance as borrowers accumulate assets through higher incomes.

The study found evidence of village diseconomies, or market saturation for microfinance borrowers. In particular, the effects of male borrowing are smaller in villages with higher aggregate microfinance borrowing. But this is not the case for female borrowing, suggesting that men and women pursue different activities.

Noncredit inputs play an important role for both male and female borrowers. In fact, they seem to be more important than credit in influencing some behavioral outcomes.

Preliminary findings were disseminated at the Asia Poverty Forum organized by the Asian Development Bank in February 2001 and at a World Bank seminar organized by the Development Research Group in April 2001.

Responsibility: World Bank Institute, Economic Policy and Poverty Reduction Division—Shahidur R. Khandker (skhandker@worldbank.org) and Hussain Samad; and Development Research Group, Rural Development—Gershon Feder. With Mark Pitt, Brown University; and Binayak Sen and M. Abdul Latif, Bangladesh Institute of Development Studies.

Completion date: December 2000.

Report

Khandker, Shahidur R., and Mark M. Pitt. 2001. "The Impact of Group-Based Credit on Poor Households: An Analysis of Panel Data from Bangladesh." World Bank, World Bank Institute, Economic Policy and Poverty Reduction Division, Washington, D.C. Draft.

Policy Research Report on Gender and Development

Over the past several decades gender issues have gained greater prominence in the debate on development. Yet the importance of bringing a gender perspective to policy analysis and design still is not widely understood, nor have the lessons for development been fully integrated by donors and national policymakers. And despite considerable advances in gender equality in recent decades, gender discrimination remains pervasive.

This project brought together existing and new research from several social science disciplines to examine the costs of persistent gender disparities to well-being and to countries' development prospects, investigate how formal and informal institutions shape gender roles and relations and how household decisions and behaviors reproduce those roles, analyze the relationship between economic development and gender equality, and consider the role of public policy and civic action in promoting gender equality. The findings are reported in a World Bank Policy Research Report, *Engendering Development—Through Gender Equality in Rights, Resources, and Voice* (New York: Oxford University Press, 2001).

The report strengthens the analytical and empirical underpinnings of promoting gender equality and, in doing so, clarifies the value added of bringing a gender perspective to the analysis and design of development policies and projects. Based on the evidence, it argues that development policies that do not take gender roles and relations into account and that do not address gender disparities will have limited effectiveness. Among its key conclusions:

- Despite progress, gender inequalities are still pervasive worldwide and exist across many dimensions of life. In no developing region do women experience equality with men in legal, social, and economic rights. Gender gaps remain widespread in access to and control of resources, in economic participation, in power, and in political voice. These gaps are wider in poorer countries and in the poorest groups within countries.
- While girls and women are most disadvantaged by gender disparities, these inequalities reduce the well-being of all people. Societies that discriminate on the basis of gender pay a significant price—in more poverty, slower economic growth, weaker governance, and a lower quality of life. Where gender inequalities impose high human costs and constrain countries' development prospects, there is a strong argument for a state role in promoting gender equality.

• Promoting gender equality in basic rights and economic development is central to a long-term strategy for achieving equality. Societies that establish an institutional environment supportive of gender equality and that promote economic development are likely to be more effective in reducing gender disparities than those that focus on growth—or on rights—alone.

• But even an approach of equal rights and economic development may not lead quickly to major gains. Institutional change and economic growth and development can be slow and uneven. Active measures are needed to redress persistent gender disparities in the short to medium term.

• The evidence argues for a three-part strategy to promote gender equality: reforming legal, economic, and social institutions to establish a foundation of equal rights and equal opportunities for women and men; implementing policies for sustained economic growth and development; and initiating active policy measures to reduce gender disparities in the command of resources and political voice.

Drafts of the report were broadly reviewed and discussed inside and outside the World Bank. Discussions were held on the Web through the Global Development Forum and in meetings with staff of governments, universities, donor agencies, and nongovernmental organizations, including a panel session at the Beijing Plus-5 meetings at the United Nations in New York in June 2000. The report's authors have presented the findings in several countries. The report's executive summary and most of the background papers (see below) are available on the Web at http://www.worldbank.org/gender/prr.

Responsibility: Development Research Group, Public Services for Human Development—Elizabeth M. King (eking@worldbank.org); Poverty Reduction and Economic Management Network, Gender Group—Andrew D. Mason and Karen Mason; Operations Evaluation Department—Ananya Basu; World Development Report Office—Claudio Montenegro; and Global Development Network—Lyn Squire. With Tai Lui Tan, Lihong Wang, Cristina Estrada, Owen Haaga, and Branko Jovanovic. The government of the Netherlands and the Norwegian Royal Ministry of Foreign Affairs contributed funding for the research.

Completion date: January 2001.

Reports

Cox-Edwards, Alejandra. 2001. "Social Security Reform and Women's Pensions." Policy Research Report on Gender and Development Working Paper 17. World Bank, Development Research Group, Washington, D.C.

Das Gupta, Monica, Sunhwa Lee, Patricia Uberoi, Danning Wang, Lihong Wang, and Xiaodan Zhang. 2000. "State Policies and Women's Autonomy in China, the Republic of Korea, and India, 1950–2000: Lessons from Contrasting Experiences." Policy Research Report on Gender and Development Working Paper 16. World Bank, Development Research Group, Washington, D.C.

Dollar, David, and Roberta Gatti. 1999. "Gender Inequality, Income, and Growth: Are Good Times Good for Women?" Policy Research Report on Gender and Development Working Paper 1. World Bank, Development Research Group, Washington, D.C.

Dollar, David, Raymond Fisman, and Roberta Gatti. 1999. "Are Women Really the 'Fairer' Sex? Corruption and Women in Government." Policy Research Report on Gender and Development Working Paper 4. World Bank, Development Research Group, Washington, D.C.

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Ilahi, Nadeem. 2000. "The Intra-Household Allocation of Time and Tasks: What Have We Learnt from the Empirical Literature?" Policy Research Report on Gender and Development Working Paper 13. World Bank, Development Research Group, Washington, D.C.

Klasen, Stephan. 1999. "Does Gender Inequality Reduce Growth and Development? Evidence from Cross-Country Regressions." Policy Research Report on Gender and Development Working Paper 7. World Bank, Development Research Group, Washington, D.C.

Lampietti, Julian A., and Linda Stalker. 2000. "Consumption Expenditure and Female Poverty: A Review of the Evidence." Policy Research Report on Gender and Development Working Paper 11. World Bank, Development Research Group, Washington, D.C.

Lampietti, Julian A., Christine Poulos, Maureen L. Cropper, Haile Mitiku, and Dale Whittington. 1999. "Gender and Preferences for Malaria Prevention in Tigray, Ethiopia." Policy Research Report on Gender and Development Working Paper 3. World Bank, Development Research Group, Washington, D.C.

Lokshin, Michael M. 2000. "Effects of Child Care Prices on Women's Labor Force Participation in Russia." Policy Research Report on Gender and Development Working Paper 10. World Bank, Development Research Group, Washington, D.C.

Lokshin, Michael M., Elena Glinskaya, and Marito Garcia. 2000. "The Effect of Early Childhood Development Programs on Women's Labor Force Participation and Older Children's Schooling in Kenya." Policy Research Report on Gender and Development Working Paper 15. World Bank, Development Research Group, Washington, D.C.

Long, Lynellyn D., Le Ngoc Hung, Allison Truitt, Le Thi Phuong Mai, and Dang Nguyen Anh. 2000. "Changing Gender Relations in Vietnam's Post *Doi Moi* Era." Policy Research Report on Gender and Development Working Paper 14. World Bank, Development Research Group, Washington, D.C.

Newman, Constance. 2001. "Gender, Time Use, and Change: Impacts of Agricultural Export Employment in Ecuador." Policy Research Report on Gender and Development Working Paper 18. World Bank, Development Research Group, Washington, D.C.

Paul-Majumder, Pratima, and Anwara Begum. 2000. "The Gender Imbalances in the Export-Oriented Garment Industry in Bangladesh." Policy Research Report on Gender and Development Working Paper 12. World Bank, Development Research Group, Washington, D.C.

Quisumbing, Agnes R., and John A. Maluccio. 1999. "Intrahousehold Allocation and Gender Relations: New Empirical Evidence." Policy Research Report on Gender and Development Working Paper 2. World Bank, Development Research Group, Washington, D.C.

Rama, Martín. 2001. "The Gender Implications of Public Sector Downsizing: The Reform Program of Vietnam." Policy Research Report on Gender and Development Working Paper 19. World Bank, Development Research Group, Washington, D.C.

Rice, Patricia. 1999. "Gender Earnings Differentials: The European Experience." Policy Research Report on Gender and Development Working Paper 8. World Bank, Development Research Group, Washington, D.C.

Sen, Samita. 2000. "Towards a Feminist Politics? The Indian Women's Movement in Historical Perspective." Policy Research Report on Gender and Development Working Paper 9. World Bank, Development Research Group, Washington, D.C.

van der Meulen Rodgers, Yana. 1999. "Protecting Women and Promoting Equality in the Labor Market: Theory and Evidence." Policy Research Report on Gender and Development Working Paper 6. World Bank, Development Research Group, Washington, D.C.

World Bank. 2001. *Engendering Development—Through Gender Equality in Rights, Resources, and Voice.* World Bank Policy Research Report. New York: Oxford University Press.

The Impact of Prices, Taxes, Subsidies, and Stipends on Poverty

Policies affecting the prices of goods have important effects on the poor. There are many such policies, implemented through such instruments as import tariffs; sales and other indirect taxes; price subsidies for, say, food, energy, or transport; and stipends, for example, for increasing retention rates in schools.

The tools available for evaluating the poverty impact of changes in such policies have limits. They rely on particular measures of poverty (such as those of the Foster-Greer-Thorbecke class), particular poverty lines, and particular indicators of well-being (such as per capita income) without taking into account differences in need (as measured, for example, through alternative equivalence scales). That is, the tools do not provide tests for the robustness of the analysis—and thus the policy conclusions—to alternative value judgments relating to the poverty measure, poverty line, and indicator of well-being. With different assumptions and methodologies, the ranking of alternative pricing policies might be reversed. Without tests for robustness, an analyst suggesting policy changes to benefit the poor might end up proposing a regressive policy.

The goal of this research project was to provide new analytical tools that can contribute to the design of robust policies relating to prices, taxes, subsidies, stipends, and related instruments. These new tools were developed theoretically and applied empirically to household-level data for several Latin American countries, including Guatemala (income and fuel poverty) and Honduras (income poverty and housing).

The first set of tools starts with consumption dominance curves. These curves can be traced to test whether a particular value added tax reform involving several commodities will reduce or increase poverty and whether the result depends on the choice of poverty line, poverty measure, or both. The research extended the concept of the consumption dominance curves to the analysis of cash transfer and other government programs, also using graphical techniques. The second set of tools focuses on decomposing the impact of transfer programs on poverty into a targeting component (who gets the transfer) and an allocation component (how much different beneficiaries get). While the first set deals with stochastic dominance, the second set deals with sequential stochastic dominance, in which poverty comparisons and impact analysis are conducted without specifying the equivalence scale used to compare households of different sizes.

Papers from the project have been presented at several conferences and seminars, including a workshop at Tinbergen Institute, Amsterdam (March 2001), a World Bank seminar (May 2001), and conferences organized by Société Canadienne de Science Economique (May 2001), the Canadian Economic Association (June 2001), the Canadian Public Economics Study Group (June 2001), the University of York, and GREQAM, Marseille, France.
Responsibility: Latin America and the Caribbean Region, Poverty Sector Unit—Quentin Wodon (qwodon @worldbank.org). With Paul Makdissi, University of Sherbrooke, Canada; Jean-Yves Duclos, University of Laval, Canada; Jean-Philippe Tre; and Shlomo Yitzhaki, Hebrew University, Israel.
Completion date: June 2001.

Reports

Duclos, Jean-Yves, Paul Makdissi, and Quentin Wodon. 2001. "Assessing the Robustness of a Poverty-Reducing Indirect Tax Reform." Draft.

———. 2001. "Socially Efficient Marginal Tax Reforms." Draft.

Foster, V., Jean-Philippe Tre, and Quentin Wodon. 2001. "Energy Consumption and Income: An Inverted-U at the Household Level?" Draft.

———. 2001. "Energy Prices, Energy Efficiency, and Fuel Poverty."

Makdissi, Paul, and Quentin Wodon. 2001. "Consumption Dominance Curves: Testing for the Impact of Indirect Tax Reforms on Poverty."

———. 2001. "Fuel Poverty and Access to Electricity: Comparing Households When They Differ in Needs."

———. 2001. "Income Transfers, Family Size, and Poverty Orderings." Draft.

———. 2001. "Migration, Poverty, and Housing: Welfare Comparisons Using Sequential Stochastic Dominance."

A New Analytical Framework for Evaluating Social Programs

World Bank staff constantly confront the difficult problem of evaluating social programs and policies. This research project developed a new analytical framework for performing such evaluations. The framework takes into account not only flexible distributional weights for translating individual welfare gains into aggregate social gains but also the targeting performance of programs and the allocation of benefits among program participants.

The use of distributional weights is rarely made explicit in Bank work or in the broader literature, in part because the implications for policy may be disturbing. Yet the fact that policy reforms are evaluated using poverty measures implies that such distributional weights are being used. One problem with distributional weights based on standard poverty measures of the Foster-Greer-Thorbecke class is that they place no weight at all on the welfare of the nonpoor. The framework developed in this project provides an alternative in which the gains to all members of society are taken into account, though with different weights.

Starting from a well-known social welfare function, two summary parameters are estimated for each program or policy to assess its impact on social welfare. The parameters are flexible enough to take into account weighting schemes that place varying degrees of emphasis on poor members of society. The summary parameters consist of a growth term (the mean benefit of the program) and a distributional term (who is covered by the program and in what amount). The distributional term can be decomposed into several components. The first measures the targeting performance of the program (who is participating and who is not). The second measures the impact of the allocation rules for distributing the benefits among program participants. The third takes into account the fact that welfare measures for some nonparticipants are in the range of those for participants, which means that if targeting is not perfect, a loss will be incurred.

The framework has been applied to social programs and policies in several Latin American countries using household-level data. The results show how the performance of programs depends on both targeting and allocation rules and how the choice of programs can be given a welfare interpretation by using distributional weights. In Mexico, for example, the research found that a large program of cash transfers to rural farmers has little impact on inequality. Although the program is well targeted, the allocation procedure favors beneficiaries with large amounts of land. Another program in Mexico—Programa de Educación, Salud y Alimentación, or Progresa, which provides cash transfers to poor families as long as members visit health centers and the children attend school—was found to be much more effective. In Chile, where the research looked at a series of programs that target benefits using a common means-testing mechanism, it found that utility subsidies were much less efficient in reducing inequality and improving welfare than such programs as family allowances, noncontributory pensions, and subsidized child care. Poor performance of utility subsidies was also observed in Honduras for electricity, where the eligibility rules for lifeline consumption do not prevent errors of inclusion.

The project made another important methodological contribution by showing that with little risk of estimation bias, the techniques can be applied using grouped data rather than the unit-level data from household surveys. Simulation tools for use with grouped data are being created to ease the application of the techniques. A survey of the techniques is included in the *Poverty Reduction Strategy Sourcebook* CD-ROM (World Bank, Poverty Reduction and Economic Management Network, Washington, D.C., 2001).

Findings have been presented at Hebrew University, in April 2001, and at World Bank and International Monetary Fund seminars.

Responsibility: Latin America and the Caribbean Region, Poverty Sector Unit—Quentin Wodon (qwodon @worldbank.org). With Shlomo Yitzhaki, Hebrew University, Israel.

Completion date: June 2001.

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Private Transfers in a Cross-Section of Developing Countries

Comparisons of private transfers across countries can provide insights into the relationship between country-specific institutions and private transfers (those from adult children to their elderly parents, for example, might be less important in countries with more generous public pensions). But most studies of private transfers examine a single country. This study departs from the single-country case study approach by building a database on several developing countries in different regions.

The study begins with a simple question: How similar are patterns in private transfers around the world? It then highlights differences in private transfer behavior, particularly with respect to age patterns. Finally, it draws inferences about the relationship between public and private transfers across countries.

The main data sources are Living Standards Measurement Study (LSMS) surveys in Albania, Bulgaria, Jamaica, Kazakhstan, the Kyrgyz Republic, Nepal, Nicaragua, Panama, Peru, the Russian Federation, and Vietnam. The LSMS surveys' extensive coverage provides a unique opportunity for a consistent, cross-country econometric analysis of the determinants and magnitude of private transfers. These surveys overcome one of the main problems in the literature—the difficulty of defining interhousehold transfers. The questionnaire design and data quality controls allow comparable definitions of private transfers and income.

Some common threads emerge across the countries in the sample: Private transfers appear to flow from high-income to low-income households. They increase the share of income accruing to the poor in the national per capita distribution. And they tend to be targeted to female-headed households and to households in which a member suffered from a health shock.

Profiles of age and private transfer receipts tend to be U-shaped for all countries, but with distinct patterns according to whether the transfers are targeted to young households (as in Kazakhstan or the Kyrgyz Republic) or to older ones (as in Panama or Vietnam). The preliminary results suggest an inverse relationship between private and public assistance to the elderly. That inverse relationship holds when a more general definition of private help to the elderly is used, one that encompasses private interhousehold transfers received or co-residence.

The preliminary results were presented in the Development Research Group's seminar series on poverty, household economics, and rural development.

Responsibility: Development Research Group, Poverty Team—Emanuela Galasso (egalasso@worldbank.org); and South Asia Region, Education Sector Unit—Emmanuel Jimenez. With Don Cox, Boston College.

Completion date: September 2001.

The Impact of Growth on Poverty in Latin America

This research is using new econometric methods (based on maximum entropy) adapted to the available data to analyze the relationships between poverty, growth, and inequality in Latin America and in selected countries within Latin America. The aim is to obtain better estimates of the elasticities of poverty reduction to growth, taking into account the impact of growth on inequality, and to analyze why elasticities differ between countries or between sectors (such as urban and rural, or agriculture, manufacturing, and services) within countries and within the region.

The results should be useful both for World Bank staff and for government staff in Bank client countries, allowing them to be more specific and better prepared when setting poverty reduction targets and evaluating progress in reducing poverty.

Responsibility: Latin America and the Caribbean Region, Poverty Sector Unit—Quentin Wodon (qwodon@worldbank.org). With Amos Golan, American University; and Corinne Siaens.

Completion date: October 2001.

Using Semi-Parametric Methods for the Evaluation of Social Programs and Policies

Econometric work to evaluate the impact of social programs and policies typically assumes that the impact is the same throughout the distribution of the indicator under review—for example, throughout the distribution of income. This assumption stems from the fact that in a traditional regression setting, parametric methods of estimation yield one parameter estimate for the impact, whether the program or policy is captured in the data through a continuous or a categorical (for example, dichotomous) variable. Even when analysts use interaction effects in their specification, which helps in enriching the analysis, the estimates of the impact are generally assumed to be the same for all those with the given interaction. But in reality this need not be the case. Some households may benefit (or suffer) more than others from specific programs or policies. To avoid imposing strong assumptions in the estimation of impacts, analysts can rely on semi-parametric methods.

This research aims to better equip World Bank staff to use semi-parametric methods by providing the appropriate statistical programs and showing how the methods can be applied to a wide range of issues relating to social programs and policies. The research focuses on developing and applying semi-parametric methods for cases in which the program or policy variable is dichotomous. It builds on earlier work by analysts who applied semi-parametric methods to evaluate the impact of the minimum wage and unionization on the distribution of earnings in the United States.

In intuitive terms, the advantage of this semi-parametric approach is that it helps in analyzing the effect of different factors (such as institutional features, social programs, and individual attributes) on the full distribution of earnings or on the distribution of any other variable to which the method is applied. This effect is estimated by applying kernel density methods to the appropriately weighted samples. The procedure provides a visual representation of where in the density of earnings (or other variables) the factors exert the greatest impact.

The method makes it possible to differentiate impacts according to where the individuals are located in the distribution of wages (or another variable). It also allows the impact of changes in a factor over time to differ for different individuals. The same method can be used to compare the impact of policies or factors that differ between two sectors (say, urban and rural areas) rather than two periods. And it can be used to analyze the impact of factors or policies on nonmonetary indicators rather than wages or household per capita income.

Responsibility: Latin America and the Caribbean Region, Poverty Sector Unit—Quentin Wodon (qwodon@worldbank.org). With Diego Angel; Shlomo Yitzhaki, Hebrew University, Israel; and Rodrigo Castro-Fernandez.

Completion date: October 2001.

Economic Growth and Household Welfare: Policy Lessons from Vietnam

Most economists and other social scientists would agree that economic growth is essential for improving household welfare and that the form of that growth has important implications for poverty reduction. Yet this consensus still leaves many questions unanswered. Two stand out: What policies promote broad-based economic growth? And what policies should countries adopt to ensure that economic growth quickly reduces poverty—both raising income and consumption and improving other indicators of living standards? These questions are difficult ones, and more empirical evidence is needed to provide recommendations sufficiently precise to guide policymakers.

Examining countries unsuccessful in increasing growth and reducing poverty can provide lessons on what not to do, but the most useful information comes from countries that have been successful in both. A recent example of success is Vietnam. Growth in Vietnam has averaged about 8 percent a year since around 1988, while the incidence of poverty declined from about 75 percent in 1988 to 55 percent in 1993 and 37 percent in 1998.

This research project studies Vietnam's recent success in promoting economic growth, reducing poverty, and raising living standards with the aim of providing policy lessons for other low-income countries. Specifically, it addresses the following questions:

- What policies led to Vietnam's high rate of economic growth and allowed it to continue that growth (though at a lower rate) during the recent economic crises in East Asia and elsewhere?
- Which Vietnamese households experienced growth in their incomes and expenditures, and which components of their incomes increased most quickly? What public policies brought about these changes in household incomes?
- How have increases in income affected other aspects of living standards in Vietnam, such as child nutrition, school enrollment, adult health, fertility, child labor, and infant and child mortality? What has played a more important role in these socioeconomic outcomes—income or the more direct effects of such public policies as social safety nets?

The research addresses the first question by using macroeconomic data and cross-country data analysis, and the second and third by using data from the 1992–93 and 1997–98 Vietnam Living Standards Surveys.

Preliminary results were presented to donor agencies and Vietnamese researchers and policymakers at a workshop in Hanoi in May 2001.

Responsibility: Development Research Group, Macroeconomics and Growth—David Dollar (ddollar@worldbank.org), and Public Services for Human Development—Dominique van de Walle; East Asia and Pacific Region, Poverty Reduction and Economic Management Sector Unit—Nisha Agrawal and Nguyet Nguyen Nga; South Asia Region, Human Development Sector Unit—Emmanuel Jimenez; and Human Development Network, Health, Nutrition, and Population Team—Adam Wagstaff. With Robert Baulch; Paul Glewwe, University of Minnesota; Sarah Bales, Dwayne Benjamin, and Loren Brandt, University of Toronto; Donald Cox, Boston College; John Gallup and Dominique Haughton, Bentley College; Jonathan Haughton, Suffolk University; Nguyen Phong and Pravin Trivedi, Indiana University; and Wim Vijverberg, University of Texas at Dallas.

Completion date: December 2001.

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Household Coping with AIDS in Tanzania

Evidence from earlier research on the impact of AIDS in Kagera, Tanzania, suggests that less poor rural households are able to cope economically with the short-term impact of an adult death. Less is known, however, about how households cope. To shed light on this question, this research project analyzed household receipts of transfers after an adult death in Kagera. The analysis shows that households receive significantly more transfers after a death than before, but the type of transfers received varies by type of household.

The study first constructed an index of household resources from the first principal component of household assets, average body mass index, household size, and the sex, age, and education of the household head. It then estimated the impact of an adult death in the household on the receipt of each of three types of transfers, interacting the household resource index with whether a death occurred in the household and the time since the death. The results show that the pattern of transfers received differs substantially depending on the household's resources and the type of transfer. For households poor in financial and human resources (at the 10th percentile of the resource index), most assistance comes from public sources or through credit. In contrast, relatively wealthy households (at the 90th percentile) receive substantial private transfers but little public assistance and are not forced to borrow.

These findings have two implications for policies aimed at mitigating the impact of adult deaths in countries heavily affected by the AIDS epidemic. First, targeting public transfers to the most vulnerable households—those with the smallest endowments of financial and human capital—will greatly improve the efficiency of assistance. And second, the reliance of the poorest households on credit suggests that expanding microcredit programs might help poor as well as less poor households.

The findings were presented at conferences in Durban, South Africa, and in York, England.

Responsibility: Development Research Group, Infrastructure and Environment—Mead Over (meadover @worldbank.org) and Mattias Lundberg. With Phare Mujinja, University of Dar es Salaam; and Kathleen Beegle, Rand Corporation. The Joint United Nations Programme on HIV/AIDS (UNAIDS) is contributing funding for the research.

Completion date: December 2001.

Report

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Informal Safety Nets in Nicaragua

How did the macroeconomic shocks experienced by Nicaraguan households as a result of Hurricane Mitch in 1998 affect informal safety nets? This research is examining how private consumption insurance mechanisms within communities and across different groups (including the extended family) shifted as a result of the income shocks induced by Hurricane Mitch. It is also analyzing the extent to which the relative control over resources within the household (for example, by men or women) affected human development outcomes and the economic behavior of household members, and how resource control within the household shifted as a result of the economic crisis.

The research uses both quantitative and qualitative methodologies. The quantitative research consists of econometric analysis of a panel data set covering periods before and after Hurricane Mitch in Nicaragua (from Living Standards Measurement Study household surveys in 1998, 1999, and 2001). This analysis is investigating the extent and strength of informal consumption insurance mechanisms and exploring the determinants of household demand for goods and services, with direct links to poverty and human development outcomes. Qualitative research by national social science researchers explores the anthropological and cultural basis of risk sharing practices that influence private transfer arrangements among different population subgroups, and social norms relating to resource allocation within the household and the extended family. These qualitative data sources inform the econometric specifications and the interpretations of statistical results.

The research will provide concrete results on how economic and poverty outcomes are influenced not only by shocks and economic institutions, but also by cultural customs, beliefs, and institutions that govern resource allocation across households and within the family. In particular, the research will provide a better understanding of which groups in Nicaragua face the greatest risk of being excluded from informal and public transfer programs, as well as a better understanding of the cultural institutions that determine how shocks affect the functioning of informal safety nets. It will also aid in understanding how the control of financial resources within the household—and cultural norms that influence intrafamily resource control—influence the poverty and health outcomes of vulnerable members. The findings will help to guide the design of effective social protection measures for Nicaragua as well as labor market, health care, and consumer subsidy policies and programs.

In addition to an academic paper, the research will produce a policy paper intended for national policymakers and external partners involved in designing social protection programs and national poverty reduction strategies. The data analysts will make their statistical programs available within the World Bank and provide seminars to other data analysts interested in econometric analysis of consumption insurance arrangements and intrahousehold resource allocation in other countries.

Responsibility: Poverty Reduction and Economic Management Network, Poverty Reduction Strategy Initiative—Jeni G. Klugman (jklugman@worldbank.org) and Kate Withers; and Latin America and the Caribbean Region, Poverty Sector Unit—Florencia Castro-Leal. With Gabriel Arturo Basaluzzo, University of Pennsylvania; and Diana I. Kruger, University of Maryland.

Completion date: December 2001.

Social Exclusion and Poverty

This project examines how social exclusion (including gender exclusion) prevents people from participating in and benefiting from the opportunities provided by human development programs and economic growth. It looks at how social institutions interact with formal institutions to shape development outcomes in poor communities. It investigates how policies can be reshaped to reduce social exclusion and increase synergies between informal and formal institutions. And it looks at how poor people's health can be improved by reducing their exposure to communicable diseases.

Several studies served as background work for the World Bank's *World Development Report 2000/2001: Attacking Poverty* (New York: Oxford University Press, 2000): a theoretical analysis of social exclusion, a cross-country study of how land reform and other measures to reduce agrarian hierarchies interact with changes in local administrative institutions to generate state-community synergies for development, the ramifications of gender-based exclusion for poverty and development, and the links between social exclusion, poverty, and health. Two additional studies are under way—an analysis of social exclusion in the context of urban poverty and a study on ways to enhance public health programs for communicable disease control through improved governance and community participation, focusing on diseases affecting poor people in India.

The research has drawn on extensive analysis of secondary source material, existing data sets, and freshly collected field data. It has been conducted in close collaboration with major universities, government agencies, and key research institutions in developing countries. Results have been widely disseminated, with some incorporated in *World Development Report 2000/2001: Attacking Poverty*.

Responsibility: Development Research Group, Rural Development—Gershon Feder (gfeder@worldbank.org), Poverty Team—Ananya Basu, Vijayendra Rao, and Michael Woolcock, and Public Services for Human Development—Monica Das Gupta. With Kameshwar Prasad, All-India Institute of Medical Sciences, New Delhi; Paolo Belli, Harvard University; Devendra Gupta, National Council of Applied Economic Research, New Delhi; Peyvand Khaleghian, Sekhar Bonu, and William Reinke, Johns Hopkins University; and V. R. Muraleedharan, Indian Institute of Technology, Chennai.

Completion date: December 2001.

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The Dynamics of Urban Poverty in Rio de Janeiro and Implications for Public Policy

This study takes advantage of high-quality data gathered more than 30 years ago to shed light on the intergenerational persistence of urban poverty. The baseline data come from interviews conducted with 750 residents of squatter settlements in Rio de Janeiro in 1969. These interviews formed the basis of Janice Perlman's award-winning book *The Myth of Marginality* (Berkeley: University of California Press, 1976). This study has tracked down more than half the original respondents and administered a specially structured interview tied to the original. It has also interviewed past and present community leaders.

Data from the interviews make it possible to construct life trajectories of the families, tracing their fortunes and the main events in their lives over the past 30 years. The study maps these trajectories against the major political and economic transformations in Brazil over the same period, shedding new light on the effects of public policies, including some (such as state housing programs) targeted to the poor. The study also explores the survival strategies of households and the effectiveness of community and nongovernmental organizations as resources and as mediators of the effects of policy and economic and political change.

Many government and World Bank policies operate on the received wisdom that improving access to education and strengthening tenure will help lift the poor from poverty. But preliminary data suggest that this may not be so.

The results of the research could inform Bank policy and assistance relating to basic sanitation, primary education, primary health care, and upgrading of squatter settlements. The findings of the first phase of work were presented at a Bank seminar in November 1999. Findings of the main phase will be disseminated through working papers and a book.

Responsibility: Latin America and the Caribbean Region, Brazil Rain Forest Unit—Joseph Leitmann (jleitmann @worldbank.org). With Janice Perlman and Joanna Wheeler, Trinity College. The Tinker Foundation has contributed funding for the research.

Completion date: June 2002.

Report

Perlman, Janice, Carlos Vainer, Pedro Abramo, Rick Huber, and Tim Campbell. 1999. "The Dynamics of Urban Poverty and Implications for Public Policy: The Case of Rio de Janeiro, 1969–99." World Bank, Private Sector Development and Infrastructure Vice Presidency, Infrastructure and Urban Development Department, Washington, D.C.

Extreme Poverty and Social Exclusion in Latin America

The more the World Bank promotes participation by civil society and the poor in its programs and in the poverty strategies developed by governments, the more necessary it will become to be specific about the nature of empowerment and inclusion and the ways in which they can be promoted. This study aims to contribute to a better understanding of what empowerment and inclusion mean for development work.

Work so far has looked at what it means to live in extreme poverty, how to reach the very poor through programs and interventions, and how to make private and public institutions more responsive to their aspirations. It has also analyzed the relationship between extreme poverty and human rights. And it has looked at the contribution that the International Movement ATD Fourth World—a grassroots nongovernmental organization with (mostly local) staff in 25 countries—has made to the understanding of the very poor and what is needed to fight extreme poverty. The project has involved collaboration with this organization that will continue in the coming fiscal year, with joint work foreseen in Bolivia, Guatemala, and Peru.

In other work, based on three case studies, the project has shown that combining quantitative and qualitative methods can provide a better understanding of issues relating to poverty and social exclusion. The three case studies are on the CAS (benefit) targeting system in Chile, the marginalization of the urban poor in Uruguay, and reproductive health in rural Argentina.

In fiscal 2002 the study will attempt to make three contributions to the analysis of empowerment, extreme poverty, and inclusion in Latin America and the Caribbean. First, it will develop an informed framework for discussing these concepts and the relationships between them in the region. Second, it will conduct quantitative analysis designed to suggest ways to measure extreme poverty and social exclusion with survey data, and to analyze the relationships between the different dimensions of extreme poverty and social exclusion. Third, it will use case studies to analyze the institutional processes leading to extreme poverty and social exclusion. It will also look at the practical policy implications for the Bank's operations in the region.

The study has led to presentations in Argentina and at a number of Bank seminars in 1999–2001.

Responsibility: Latin America and the Caribbean Region, Environmentally and Socially Sustainable Development Sector Unit—Estanislao Gacitua-Mario (egacituamario@worldbank.org), and Poverty Sector Unit—Quentin Wodon and Carinne Clert. With Huguette Redegeld and Bruno Tardieu, International Movement ATD Fourth World; Charles Courtney, Drew University; Jona Rosenfeld, Hebrew University, Israel; and Leandro Despouy.

Completion date: June 2002.

Reports

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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 for the choice of policies. 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 seeks to answer those questions by investigating the theoretical and empirical foundations of the methods 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 routinely used in poverty analysis are full of errors—a situation 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 examines 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 investigates the different methods used for setting poverty lines and how much they matter to the policy conclusions drawn. And it studies ways of making better use of such non-income indicators of welfare as health and education indicators.

A new strand of the research is investigating the properties of subjective welfare indicators, such as self-rated assessments of the minimum income needed to make ends meet, of consumption adequacy, and of whether the respondent is poor or not. A series of case studies (including Jamaica, Nepal, and the Russian Federation) are examining these methods as potential complements to more conventional, objective methods of measuring poverty and welfare.

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

Responsibility: Development Research Group, Poverty Team—Martin Ravallion (mravallion@worldbank.org), Peter Lanjouw, and Michael Lokshin, and Public Services for Human Development—Berk Ozler; and East Asia and Pacific Region, Poverty Reduction and Economic Management Sector Unit—Menno Pradhan.

Completion date: June 2002.

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Safety Nets in an Emerging Market Economy

Vietnam's transition to a market economy has stimulated strong growth. Continued broad-based growth will help raise living standards for most people. But many people will continue to be poor, and most will remain vulnerable to risk. Under the former command economy lack of mobility ensured community and family solidarity, and households belonged to local cooperatives that provided for the welfare of their members. Developing a reliable and effective system of redistributive transfers and safety nets to replace these faltering institutions is an important part of the successful transition to a market economy.

This project consists of two parts. The first used Vietnam as a case study with which to assess the strengths and weaknesses of an existing safety net program. Because of an earlier lack of good data, the study performed a broad qualitative assessment, identifying key issues on which more needs to be learned. It reviewed existing public safety net programs, the principal sources of household vulnerability, and what is known about coping strategies, and outlined an agenda for strengthening the design and implementation of the main safety net programs.

The recently released 1998 Vietnam Living Standards Survey provides previously unavailable data on policy coverage across communes and, in some cases, households. These data allow quantitative analytical work to assess the performance of programs aimed at reducing poverty and providing insurance to poor households. Information on who the poor are can now be combined with information on needs, program participation, social relief disbursements, and outcomes. In addition, the new survey's coverage of many of the households and communities interviewed in the 1992 Living Standards Survey creates a panel that can be used to test and monitor the performance of interventions.

Drawing on these data, the second part of the project examines the performance of decentralized programs and expenditures for poverty reduction in targeting poor communes and poor people. It explores sensitivity to the definition of poverty and assumptions about household behavioral responses to the programs. The study examines whether programs perform a safety net function, recognizing that this involves both protection from poverty and promotion from poverty and assessing how well the safety net performs each function. The work also examines the role of non-income factors, including whether equally poor communes in different provinces are treated equally and, if not, what accounts for the differences. The research models the determinants of consumption changes over time as a function of (among other things) program placement at the household level. To assess the performance of the safety net, it will then compare poverty transition matrices with and without safety net programs.

Research results have been disseminated through a conference in Hanoi in May 2001.

Responsibility: Development Research Group, Public Services for Human Development—Dominique van de Walle (dvandewalle@worldbank.org).

Completion date: June 2002.

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Will Social Security Reform in Latin America Provide Greater Retirement Security?

In response to changing economic and demographic trends, Latin American governments embarked on social security reform in the 1980s and 1990s, dismantling centrally managed single-pillar pension systems and replacing them with multipillar systems. This study attempts to answer a difficult question: Will the new social security systems in Latin America provide better retirement security than the institutions they replaced? The study defines *better* as higher value for contributions, lower risk of loss, and greater coverage of the population—with lower poverty and greater equity. The analysis spans issues in fiscal management, financial sector development, labor market efficiency, and poverty reduction.

The study draws heavily on the macroeconomic and microeconomic literature on pension reform and theoretical and empirical research completed or under way in the region, applying a comprehensive insurance framework to consolidate the formidable amount of material. It takes a comparative approach to issues, with reference to the reformed pension systems in Argentina, Bolivia, Chile, Colombia, El Salvador, Mexico, and Uruguay as well as to social security in countries that have not undertaken reform, such as Brazil.

The fiscal analysis is based on PROST simulations using data on contributors and beneficiaries provided by the social security authorities in the sample countries. The principal variables of interest include the implicit pension debt and current balance as a share of GDP under different macroeconomic scenarios.

The financial analysis uses data on investment regulations, real returns, and new financial products provided by the regulators of the new private pension funds and the private insurance markets. The principal variables include private pension assets as a share of GDP, the supply of short-term and long-term securities, real returns from investment, and the supply of new annuity products.

The coverage analysis draws on household surveys in 12 countries; a survey on pensions and self-insurance in Santiago, Chile, in 2000; country-level data from pension authorities; and the World Bank's SIMA database. The principal variables are both country level and household level. Country-level variables include the share of the labor force contributing to the formal pension system, the share in self-employment, the total payroll tax for social insurance programs, and the share of the payroll in individual retirement accounts.

Responsibility: Latin America and the Caribbean Region, Human Development Sector Unit—Indermit Gill (igill@worldbank.org) and Truman Packard, and Finance, Private Sector, and Infrastructure Sector Unit—P. S. Srinivas; and Human Development Network, Social Protection Team—Asta Zviniene. With Juan Yermo, Oxford University and Organisation for Economic Co-operation and Development; and Salvador Valdes, Catholic University of Santiago, Chile.

Completion date: June 2002.

World Poverty Monitoring

Is poverty declining in the developing world? Because little effort has gone into compiling and analyzing distributional data on a reasonably comparable basis, this question is surprisingly difficult to address. Yet there is a clear need to do so, both to help monitor progress in reducing poverty and as a first step toward understanding the causes and effects of changing distribution.

This project monitors 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 the real value of local poverty lines tends to increase with the average income of a country. This fact clouds attempts to compare and aggregate across countries using the poverty data available in standard (secondary) sources. The use of official exchange rates also biases international poverty comparisons.

This project uses primary data sources and reestimates all poverty measures on a consistent basis, converting local currencies to constant purchasing power parity values. It also tests the robustness of comparisons across regions and over time to measurement assumptions. The data set covers 83 countries, with data for two or more points in time for 50 of them.

The estimates indicate that by 1998, 1.2 billion people—roughly a quarter of the population covered—were living on less than a dollar a day at 1993 prices. The incidence of absolute poverty in the developing world as a whole fell slightly between 1987 and 1998, while the total number of poor people remained the same. But there was marked variation among regions and countries, with the number of poor rising in most of Africa, Europe and Central Asia, and Latin America and the Caribbean and falling in East Asia.

Results of this research are reported in the World Bank's annual *World Development Indicators* (Washington, D.C.) and in its *World Development Report 2000/2001: Attacking Poverty* (New York: Oxford University Press, 2000). Data from this project have also been used in a number of studies of cross-country differences in progress in reducing poverty and inequality.

Responsibility: Development Research Group, Poverty Team—Martin Ravallion (mravallion@worldbank.org) and Shaohua Chen.

Completion date: June 2002.

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Patterns of Inequality and Government Intervention

The Deininger-Squire database on income distribution has become a standard source in cross-country analysis of the relationship between inequality and growth. This project aims to update and improve the database, thus increasing its usefulness.

Taking advantage of the large number of microeconomic data sets that have become available since the database was first put together, the project will increase both the number of countries and the observations covered by the database. It will incorporate data on decile income shares and a rural-urban disaggregation. And it will add data on access to key social services by income decile, facilitating more comprehensive analysis of changes in the welfare of the poor, their access to economic opportunities, and the role of government programs in expanding these opportunities.

Responsibility: Development Research Group, Rural Development—Klaus Deininger (kdeininger@worldbank.org), and Development Economics Senior Vice Presidency, Global Development Network—Lyn Squire. With Kihoon Lee, University of Maryland; and Changquing Sun, University of California at Berkeley.

Completion date: July 2002.

Public Spending and the Poor in Latin America

This research project looks at recent patterns of public expenditures in the social sectors in Latin America, focusing on health, education, social protection, and poverty reduction. The project, which has four components, addresses two main questions: To what extent do public social expenditures benefit the poor? And how could the benefits for the poor be increased?

The first component is a theoretical framework for evaluating public spending and social programs, with empirical applications. The framework uses a flexible social welfare function that takes into account not only absolute but also relative deprivation (people assess their welfare in part by comparing themselves with others). Two summary parameters are estimated to assess the impact of public expenditures on welfare. The first parameter accounts for the impact of programs and policies on growth, and the second accounts for the impact on distribution (inequality). Various decompositions are provided for the second parameter.

The second component is a database with social indicators for about 12 countries, with summary statistics by area (urban or rural), by gender, and by income or wealth quintile. The database covers health, education, employment, and access to basic infrastructure, and includes updated poverty and inequality numbers for Latin America through 1998.

The third component is a study on public spending and the poor in Latin America (including new methodologies for marginal benefit incidence analysis and assessments of program impacts and targeting performance). The study focuses on health, education, and social protection, but also examines such issues as the impact of indirect tax reform on poverty and the marginal efficiency cost of funds.

The project's fourth component is a set of Excel-based simulation tools (SimSIP) that allow users to set targets for poverty and social indicators and estimate the cost of reaching those targets. The simulation tools, which will be made available free of charge, are being used for these purposes by a number of World Bank client countries.

Results from the project have been presented at seminars at Hebrew University, the International Monetary Fund, and the World Bank.

Responsibility: Latin America and the Caribbean Region, Poverty Sector Unit—Quentin Wodon (qwodon @worldbank.org) and Judy Baker. With Mohamed Ihsan Ajwad; Bernadette Ryan; Corinne Siaens; Jean-Philippe Tre; and Shlomo Yitzhaki, Hebrew University, Israel.
Completion date: September 2002.

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Urban Poverty, Risk Management, and Social Capital

This project has both a substantive and a methodological purpose. Its substantive purpose is to study aspects of the relationship between social institutions and poverty in urban India in order to help improve the effectiveness of poverty reduction policies and programs. Its methodological purpose is to help develop an integrated qualitative and quantitative approach that combines econometrics and ethnographic methods with economic and social theory to study how poor urban households use social resources to manage risk. The project is preparing for a qualitative analysis of networks for survival and mobility, and tests of some hypotheses from the qualitative work using quantitative data. Work to assess living standards is under way.

The study draws on primary survey data and qualitative information from focus groups and in-depth interviews. Fieldwork began in October 1999 and was completed in January 2000. As analysis began, some problems with the data were discovered that required additional data collection in the field. Analysis of the data also revealed several econometric issues better addressed by collecting panel data, which it is hoped can be done in the coming year.

The results of the data analysis are expected to inform the design of slum infrastructure projects and social protection programs for the urban poor. The research has already contributed to several World Bank operational projects through an improved understanding of the nature of governance and networks among the urban poor. And the work in Delhi to develop a methodology for understanding urban poverty is contributing to a review of urban poverty in East Asia. The main findings of the study have been presented in several World Bank seminars.

Responsibility: Development Research Group, Poverty Team—Vijayendra Rao (vrao@worldbank.org), Michael Woolcock, and Ana Maria Ibañez. With Arup Mitra, Institute of Economic Growth, Delhi; Soumya Chattopadhyaya, University of Maryland at College Park; Lester Coutinho, Johns Hopkins University; and Saumitra Jha, Stanford University. The Netherlands Trust Fund is contributing funding for the research.

Completion date: October 2002.

Reports

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Cultural Change, Community Mobilization, and Participatory Development

Alarming infection rates for HIV and other sexually transmitted diseases prompted a group of sex workers to create the Durbar Committee for Coordination of Women (DMSC) in West Bengal, India, primarily to promote sexual health and HIV prevention among sex workers. But DMSC gradually began to address broader social and cultural issues, calling for the recognition and protection of sex workers' rights. Its activities reflected a transformation in the sex workers' capacity, self-image, and perception of their social position—a profound change in their cultural attitude.

Drawing on the analytical insights of sociology, anthropology, and social history, this research will examine the mechanisms that made this cultural change possible, including the catalytic role of development interventions. The research will:

- Examine the processes of dynamic transformation of cultural norms and reformulation of values and belief systems among the poor that enable them to engender developmental change.
- Identify forms of cultural change among the poor that enable them to redefine their self-identity and reconceptualize their potential and capabilities as human subjects and social agents.

◦ Investigate the processes through which cultural change leads to a sense of community identity and cohesion among the poor where none existed before.

◦ Identify forms of policy intervention that can create an enabling environment for cultural change among the poor, in which they emerge as the major actors and agents of cultural rethinking.

The research will be a qualitative, cross-sectional study based on focus group discussions, unrestricted interviews, participant observation, and desk-based research. It will involve DMSC in the research and dissemination, helping to strengthen the organization's institutional capacity.

The research is expected to contribute to the theoretical and analytical literature on the motivation for collective action, especially cultural factors, and to shed light on the relative importance of collective self-representation, expression of community identity, and the quest for material improvement as the motor of group activity. In addition, the study will provide a policy framework for creating an enabling environment for cultural change among sex workers and other poor and marginalized groups. And its findings will contribute to the World Bank's initiative on AIDS control in South Asia by pointing to the types of health interventions most likely to succeed.

Responsibility: Social Development Department—Kreszentia Duer (kduer@worldbank.org) and Sabina Alkire. With Nandini Gooptu, Oxford University; and Nandinee Bandyopadhyay. The Netherlands Trust Fund is contributing funding for the research.

Completion date: December 2002.

Innovations in the International Crafts Market and Empowerment of Artisans in India

Crafts form a significant sector in India, not only because of their intrinsic cultural and aesthetic value but also because of their promising potential for economic development. Recent estimates suggest that handicrafts employ more than 9 million people in India and contribute about $1.6 billion to export earnings and $4 billion to domestic earnings. But those producing the crafts reap the fewest benefits from the lucrative market, and even the most talented often live in abject poverty. Although most producers in India are highly skilled and many are true artisans, the vast majority are poorly educated and have low social status.

The objective of this project is to empower Indian artisans and reduce poverty among them by:

◦ Developing expanded market outlets in Europe and North America for high-quality crafts from India and creating more direct links between groups of artisans in India and international market outlets—to improve the flow of information to retailers on the craft products available from India and to artisans on improvements in technologies that would make their products more serviceable.

◦ Expanding the incomes going directly to the artisans.

◦ Enabling groups of poor artisans in India to sustain livelihoods they value and improve their well-being.

The project models market accessibility strategies using an approach that recognizes the role of intermediaries in facilitating artisans' links to the market. The shops of the Smithsonian's Freer and Sackler Galleries will organize a buyers network of museum shops and stores in North America and possibly Europe that are interested in fair trade in high-quality craft products, to ensure that a larger share of the profits goes to the artisans. The Mehrangarh Museum Trust in Jodhpur will help organize a network among artisans, focusing on groups of poor artisans in Gujarat, Madhya Pradesh, and Rajasthan. The trust will help the artisans network negotiate with the buyers network, fill orders, and resolve logistical problems in exporting, and hold workshops with the artisans to evaluate the process.

The project will conduct a baseline study of the participating artisans' groups and a control group, focusing on their incomes, their values, their security, their aspirations for their lives, their perception of their opportunities, the physical conditions under which they work, and the degree of social organization and bonding in their cooperative. The project will resurvey these factors each year for three years, evaluating changes and analyzing conditioning factors.

The project is expected to contribute to the understanding of the role of crafts and culture in poverty reduction, economic growth, and development. And by establishing a network of stakeholders to coordinate negotiations for higher prices for artisans' products, the project is expected to improve the understanding of the need for interventions in the crafts industry.

Responsibility: Social Development Department—Kreszentia Duer (kduer@worldbank.org) and Sabina Alkire. With Frank Penna, Policy Sciences Center; Marty Bernstein, Smithsonian Institution; and Maureen Liebl, Mehrangarh Museum Trust, Jodhpur. The Netherlands Trust Fund is contributing funding for the research.

Completion date: December 2002.

Organizational Cultures and Spaces for Empowerment: Interactions between Poor People's Organizations and World Bank Poverty Programs

As part of a broadening poverty agenda and a growing commitment to community-driven development, the World Bank is increasingly engaging with poor people's organizations and designing investment projects that directly finance such organizations. How will this engagement affect these organizations? In particular, how will it affect their culture? And what are the implications of this cultural impact for the organizations' effectiveness in empowering their members and increasing their incomes?

Through case studies in Bangladesh, Burkina Faso, and Ecuador, this research will study the link between culture and poverty at several levels, addressing these questions:

- How does the culture of poor people's organizations—and the culture of intermediary organizations working on behalf of the poor—affect the extent to which they are able to address poverty?
- How does the World Bank's culture influence the effectiveness of Bank-supported poverty reduction projects implemented through poor people's organizations? And how do the cultural differences between poor people's organizations and the World Bank affect the possibility of their engaging with each other in poverty reduction programs?

The research is expected to contribute to the World Bank's understanding of its potential role in empowering culturally marginalized social groups, particularly by using investment operations to create spaces for the direct involvement of organizations representing these groups. The research will thus contribute to the Bank's ability to carry out a poverty reduction agenda that includes empowerment as a key dimension of poverty.

Responsibility: Social Development Department—Kreszentia Duer (kduer@worldbank.org) and Sabina Alkire. With Anthony Bebbington, University of Colorado; and David Lewis and Simon Batterbury, London School of Economics. The Netherlands Trust Fund is contributing funding for the research.

Completion date: December 2002.

Evaluation of the Impact of Investments in Early Child Development on Nutrition and Cognitive Development

Early child development projects account for a rapidly growing share of World Bank lending. These programs combine nutrition, health care, and cognitive development to offset the disadvantages of growing up in poverty. Substantial evidence shows that poor health and an inadequate early learning environment lead to handicaps difficult to reverse later in life. Many children may never go to primary school without interventions that reach them in their early years. If they do attend primary school, they may be at high risk of dropping out early or repeating grades. That lowers the return to both public and private schooling. So early child development programs may both increase the efficiency of a range of other investments in human capital and promote equity in the population they serve.

Through early coordination with World Bank operations, this research is evaluating the impact of investments in early child development in three projects: the Bolivian Integrated Child Development Project, the Uganda Nutrition and Early Child Development Project, and the Philippine Early Childhood Development National Investment Program. All three case studies investigate the effect of early child stimulation and coaching on the age of school enrollment and on indicators of cognitive development. They also relate indicators of early cognitive development to early primary school grade progression and performance. In addition, the research assesses the suitability of measures of cognitive development and achievement for evaluating projects.

The case studies include both home-based (center-based) and parental education approaches to child stimulation. Moreover, because Bolivia is considering the sustainability of its day care program, which operates in the homes of service providers but functions as a center-based program, that case study compares the cost-effectiveness of that approach with the cost-effectiveness of new, indirect approaches that will be implemented on a pilot basis.

For Bolivia's early child development program, the initial evaluation was based on a comparison of the differences across groups between the baseline and the second round of data collection, conducted two years after the project was initiated. The results showed an unambiguous improvement in the cognitive development of program participants relative to the control groups. Because the program selected children of low height, those who have been in the program a short time are smaller than their counterparts. But as time in the program increases, the gap diminishes. The program appears to be particularly effective in preventing severe malnutrition.

While the program is expensive—costing more than $40 per child a month, including donated food—the analysis found that the benefits exceeded costs by up to 70 percent. These benefits include the expected increase in earnings directly due to higher cognitive development and greater physical stature, and the indirect impact on years of schooling mediated by improved health and learning capacity. Finally, the program appears to be well targeted to the poorest households in the selected communities.

A third round of data collection in Bolivia is scheduled for 2001. This data collection will allow a comparison of two variants of the intervention and analysis of the project's impact on primary school performance.

The Uganda case study will evaluate separately the impact of deworming on children under the age of six. While deworming programs worldwide are targeted to school-age children, for whom worm loads are highest, work in progress in Lucknow, India, shows the potential for dramatic increases in weight for younger children following a mass deworming campaign. As no comparable evaluation has been undertaken for this age group in other countries or for other indicators, the Uganda experiment will be particularly informative.

The deworming pilot in Uganda will follow a standard experimental methodology in which there will be a random assignment of treatment and control communities. Both the treatment and the control groups will be chosen from communities deemed especially at risk based on results of a survey of parasites undertaken as part of the project in 1998. The treatment began in October 2000 and will continue for two years or until a significant impact is measured. Initial analysis will be conducted jointly with the Imperial College School of Medicine in London and Ugandan counterparts.

The Uganda project includes demand-driven components (with communities selecting the programs they will support). So longitudinal data and community fixed effects will be used to address selection bias. The baseline data were collected in early 2000, and preliminary analysis has been undertaken by a staff member of the Ugandan Institute of Public Health. Since service delivery was not initiated until November 2000, the second round of household data collection will not be undertaken until 2002.

Implementation of the Philippine project was also delayed, as was the collection of baseline data. Both are now moving in parallel.

Responsibility: Rural Development Department—Harold Alderman (halderman@worldbank.org); and Development Research Group, Public Services for Human Development—Elizabeth King. With Jere Behrman, Yingmei Cheng, and Petra Todd, University of Pennsylvania; Patrice Engle, California Polytechnic State University; Donald Bundy, Oxford University; and N. B. Kabatereine, Vector Control Division, Uganda.

Completion date: June 2003.

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Infections among Schoolchildren in 18 Districts of Southern Uganda." *East African Medical Journal* (May).

Poverty and the International Economy: What Are the Links?

How trade liberalization affects poverty is clearly a crucial question for the World Bank's work. This project will produce both research and practical tools on the subject. Trade policies can be expected to affect the poor through their impact on the consumer and factor prices faced by the poor (or on the demand for their services). The impact of these price changes on the real income of the poor depends on their ability to adjust to the changes. Changes in the provision of public goods or safety nets that may be required as a result of changes in tariff revenues, or chosen as part of comprehensive reform, will also affect the welfare of the poor. And these effects involve a dynamic or time dimension, since the ability to adjust changes over time, as do investment and technology decisions affected by trade policy.

Preliminary findings from work on a number of these issues were presented at the conference on Poverty and the International Economy held in Stockholm on October 20–21, 2000 (the papers from this conference are available on the Web at http://www1.worldbank.org/wbiep/trade/povertyconf.html). The research program on which this conference was based began with detailed studies of Indonesia and South Africa and has since been broadened to include studies of Mexico and Turkey and a global assessment. Several of these studies used computable general equilibrium models to trace out effects on prices and then assessed the effects of the price changes on households. One study examined the dynamic links between trade reform, growth, and poverty. And two focused on developing practical methodologies for assessing effects on poverty—one at the country level (relevant for much Bank country policy work) and one at the global level (needed for the broader policy debate).

An important methodological finding is that the impacts on the poor seem to come more strongly through factor prices than through consumer prices, implying that researchers need to do the hard work of tracing the effects of trade reform on factor prices. Focusing on the impacts on budget shares on the expenditure side is simply not enough.

A key problem identified at the conference is the lack of information for evaluating poverty impacts at the national level. Information is needed on where households at different income levels get their incomes. Moreover, the data need to be collected in a form that will make it possible to map from changes in factor returns to impacts on households, and thus at a level of product disaggregation comparable to that in available economic models.

In future work the project will prepare a policy summary drawing out some of the key messages from the research and identify the research needed to move ahead with formulating well-founded policy responses. The project will also develop a computable general equilibrium model that addresses policymakers' needs in assessing the impact of trade liberalization on the poor. The model would include diverse households, distinguished by income and sources of factor income, and different labor markets, recognizing that the poor are often concentrated in the informal sector. The model should be a useful tool for designing pro-poor policies.

In addition, the project will collect available data on household incomes and expenditure of the poor and organize the data into coherent patterns allowing inferences about poverty impacts in countries for which comprehensive models and data sources are unavailable. And in a backward-looking element the project will examine a country or countries that have undertaken trade policy reform and investigate the effect of the reform on the poor.

Responsibility: Development Research Group, Trade—David Tarr (dtarr@worldbank.org), Will Martin, Alessandro Nicita, and Isidro Soloaga, and Macroeconomics and Growth—David Dollar and Aart Kraay; Human Development Network, Office of the Vice President—Shantayanan Devarajan; and Development Prospects Group—Dominique van der Mensbrugghe. With Steven Berry, Yale University; Anne Case, Princeton University; James Levinsohn and Jed Friedman, University of Michigan; Thomas Rutherford, University of Colorado; Glenn Harrison, University of South Carolina; Thomas Hertel and Paul Preckel, Purdue University; Dani Rodrik, Harvard University; and L. Alan Winters, University of Sussex. The Swedish International Development Cooperation Agency, the Swedish Ministry of Foreign Affairs, and the Netherlands Ministry of Development Cooperation (through the World Bank–Netherlands Partnership Program) are contributing funding for the research.

Completion date: December 2003.

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Welfare Impacts of Policy on Disadvantaged Groups

This study examines how policies affect the welfare of the poor and disadvantaged when there is inequality among groups, such as ethnic and gender groups. The project began by examining the sources of inequality among ethnic groups in Vietnam, where ethnic minorities tend to be concentrated in remote rural areas and typically have lower standards of living than the ethnic majority. It asked how much of minorities' lower living standards is due to poor economic characteristics and how much to low returns to characteristics. And it investigated whether a self-reinforcing culture of poverty exists, reflecting patterns of current and past discrimination. The results show that differences in returns to productive characteristics are an important explanation of ethnic inequality, particularly in areas where both minority and majority groups reside. There is evidence of compensating behavior on the part of minorities.

The results of this first part of the research suggest that it is not enough to target poor areas to redress ethnic inequality. Policies need to reach minority households within poor areas and to explicitly recognize behavioral patterns that have served the minorities well in the short term but intensify ethnic differences in the longer term. The majority group's model of income generation can serve as a guide on how to fight poverty among ethnic minority groups.

A second part of the research focuses on the delivery of services to disadvantaged groups. In some countries certain disadvantaged groups—for example, women or ethnic minorities—may be socially or economically excluded from society in ways that differ from those for the rest of the poor. This difference may be in part the result of current or past discrimination. How does this affect how services are delivered? Do services compensate for such inequalities or perpetuate them? Should services be delivered in different ways when dealing with disadvantaged groups, or should all groups be treated the same? Can better delivery methods help redress such inequalities? The project will do some follow-up work on Vietnam's ethnic minorities and on India's scheduled castes and tribes.

The research has been disseminated through seminars at the World Bank (August 1999); ARQADE, University of Toulouse (October 1999); DELTA-INRA, Paris (December 1999); and Tinbergen Institute, Amsterdam (March 2000).

Responsibility: Development Research Group, Public Services for Human Development—Dominique van de Walle (dvandewalle@worldbank.org). With Dileni Gunewardena, University of Peradeniya, Sri Lanka.

Completion date: December 2003.

Report

van de Walle, Dominique, and Dileni Gunewardena. 2001. "Sources of Ethnic Inequality in Vietnam." *Journal of Development Economics* 65(1): 177–207. (Also issued as Policy Research Working Paper 2297, World Bank, Development Research Group, Washington, D.C., 2000.)

Social Capital

The social dimensions of development are increasingly recognized as important determinants of individual well-being and institutional performance. This project consists of a number of studies that investigate the social dimensions of development, with the aim of improving the theoretical foundations, empirical support, and quality of the policy recommendations emerging from research on the subject. The studies use several analytical approaches, including formal modeling, econometric analysis, and qualitative analysis. They draw on a variety of sources, ranging from literature reviews and secondary sources (such as the World Bank Institute) to original fieldwork consisting of interviews and household surveys.

The principal findings pertain to how different types of social networks in poor communities are deployed for different purposes in managing risk and opportunity. The findings have implications for how external agents (governments, aid agencies, nongovernmental organizations) can best intervene in poor communities and how they can leverage—or even build—social ties connecting the poor to markets and to formal institutions. This work directly informed the World Bank's *World Development Report 2000/2001: Attacking Poverty* (New York: Oxford University Press, 2000) and continues to be drawn on as the Bank incorporates the report's findings into its operations and as it launches new initiatives on community-driven development.

The research is expected to improve the quality of Bank-supported projects concerned with encouraging the participation of the poor (through such initiatives as community-driven development) and improving institutional quality. Bank operations staff have been asked to contribute to future work examining the impact of social capital on development projects.

The work has become the foundation for major conceptual and policy analysis in Bank client countries. In Colombia social capital has served as the basis for a new urban renewal initiative designed to reduce crime and improve citizens' well-being. In Romania a social capital framework helped in building a dialogue among stakeholders (unions, government officials, media representatives) that for decades have not communicated with one another. In Guatemala a large, integrated quantitative and qualitative poverty analysis has been conducted, the first of its kind on this scale. In Indonesia new studies are looking at the impact of community-based projects on local institutions. And in India the findings of a study have led to changes in the public distribution system for food grains.

Results from the research project have been presented at many conferences and workshops for academics, politicians, policymakers, civil servants, the media, business leaders, and civil society representatives. In addition, the work formed the basis for a new course, Social Institutions and Economic Development, offered at Harvard University's Kennedy School of Government.

Responsibility: Development Research Group, Poverty Team—Vijayendra Rao (vrao@worldbank.org) and Michael Woolcock.

Completion date: Ongoing.

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Health and Population

The Impact of the AIDS Epidemic on the Health of the Elderly in Northwestern Tanzania

In Sub-Saharan Africa, as a result of the AIDS epidemic, the elderly often become the caregivers for adult children stricken with HIV/AIDS, the guardians of orphaned grandchildren, and substitute workers for ill or deceased adults in the home and on the farm. But until now most of what has been known about the impact of AIDS on the elderly has been anecdotal, based on case studies of those highly affected and without comparison to a control group. Are the impacts identified in these studies typical? Who is most seriously affected among the elderly? What policies can be most cost-effective in helping those affected?

This study analyzed the impact of mortality among prime-age adults on the nutritional status of the elderly, as measured by body mass index (BMI), while controlling for other factors that affect nutritional status. Drawing on data from a longitudinal household survey in the Kagera region of Tanzania in 1991–94, the study analyzed the BMI of 695 people over the age of 50 who were observed at least once and as many as four times. It estimated the determinants of BMI in a single period and those of changes in BMI over time (first differences), controlling for unobserved individual heterogeneity.

The analysis showed that the elderly in nonpoor households have higher BMI, but their households are more likely to have an adult death and they are more likely to suffer a decline in BMI before the death. The elderly in both poor and nonpoor households experience a significant drop in BMI following an adult death, but BMI recovers over time and there is no long-run association between BMI levels and recent adult deaths. The elderly in communities with poor road infrastructure have substantially lower BMI, and those in communities with recent epidemics of communicable disease (in the previous six months) had short-term reductions in BMI. These findings suggest three policies, in addition to HIV/AIDS prevention, that could improve the physical well-being of the elderly—raising incomes, improving road infrastructure, and preventing outbreaks of communicable disease.

The findings were presented to an African policy audience at African Development Forum 2000 in Addis Ababa, Ethiopia, in December 2000, and at the annual meetings of the Population Association of America, in Washington, D.C., in March 2001. Results are also available on the Web at http://www.iaen.org.

Responsibility: Development Research Group, Public Services for Human Development—Martha Ainsworth (mainsworth@worldbank.org). With Julia Dayton, Yale University, Department of Epidemiology and Public Health. The Joint United Nations Programme on HIV/AIDS (UNAIDS) contributed funding for the research.

Completion date: June 2001.

Reports

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Optimal Policies for Controlling Infectious Diseases

To characterize the essential features of optimal strategies for controlling infectious diseases, this research project merged two distinct literatures: the mathematical epidemiology literature that models the transmission of disease with sets of differential equations and the literature on the optimal control of such sets of equations widely used in economics. Previous work by the research team had shown that obtaining general analytical solutions to the problem is difficult and that further progress would require numerical analysis of alternative specifications. Other policy-oriented analyses of these models in the literature are flawed by overly simple characterizations of policy and behavior. To correct this flaw, this study analyzed differences in the scale economies of control technologies and individual behavior in preventing illness and in seeking care once ill.

The study selected and solved a few common models of disease transmission, then examined the timing and intensity of the policies involved. The models of directly transmittable diseases (such as tuberculosis or sexually transmitted diseases) yielded subsidies on preventive and curative interventions that were the same (in percentage terms). This outcome was somewhat surprising given the general presumption of a larger public sector role for preventive than for curative measures. This presumption is still justified if public actors can take certain actions (such as providing true public goods) that individuals cannot take. But the externality of actions that both public and private actors can carry out is just as large for preventive as for curative measures.

Models describing common vector-borne diseases (such as malaria or schistosomiasis) generated a set of rich results that yielded complex mixes of preventive (vector control) and curative activities. Most of the strategies can be characterized as relying more on vector control measures early on, and more on curative care later. But sensitivity analyses show substantial variation in parameter values, and some combinations of parameters change this order.

Responsibility: Development Research Group, Public Economics—Jeffrey S. Hammer (jhammer@worldbank.org). With Mark Gersovitz, Johns Hopkins University.

Completion date: June 2001.

Africa Nutrition Database Initiative

Lack of access to good-quality nutrition information for Africa has hampered the formulation of effective nutrition policies and strategies and impeded proper planning, monitoring, and evaluation of nutrition programs. To address this problem, the Africa Nutrition Database Initiative (ANDI) was launched in February 1997. This initiative was aimed at creating a user-friendly database on the Web covering anthropometric indicators, micronutrient deficiencies, food security, demography, and poverty. The ANDI Web site (http://www.africanutrition.net) allows users to compare African countries on several indicators and provides access to subnational-level information.

ANDI has developed a novel approach to databases that has the potential to yield savings in both cost and time in obtaining good-quality information. ANDI allows users to go to a single site rather than to the separate sites of the participating agencies, and because it uses data that are already available and are continuously updated by these agencies, the maintenance costs are negligible. A midterm evaluation in 2001 concluded that ANDI was answering a clear need and proposed that it continue with its focus on Africa, trying also to create links with operational information.

The World Bank served as a catalyst for the initiative, proposing the effort and funding work on the technical aspects of developing the interagency database. The United Nations Administrative Committee on Coordination, Subcommittee on Nutrition is coordinating the work of the participating United Nations agencies. A memorandum of understanding for database sharing has been signed by the Food and Agriculture Organization (which has provided parallel financing for this effort), the United Nations Children's Fund, and the World Bank, with the United Nations Educational, Scientific, and Cultural Organization and the World Health Organization as cooperating partners.

ANDI has provided a good foundation for preliminary work on models for in-country nutrition information systems in three pilot countries: Eritrea, Mali, and Zambia. A nutrition information system is being established in Mali, and discussions on doing so in Eritrea are under way. These efforts will build local capacity to use the information for better research and more effective planning, monitoring, and evaluation of nutrition programs.

Responsibility: Africa Region Technical Families, Human Development 2—Richard Seifman (rseifman@worldbank.org) and Alexandre Abrantes, and Institutional and Social Policy—Antoine Simonpietri. With Dario Berardi, Data Analysis Support Center, Italy. The Italy–Special Studies Consultant Trust Fund contributed funding for the initiative.

Completion date: August 2001.

Poverty and Health

This research project takes as its starting point the two principal objectives of the World Bank's Health, Nutrition, and Population Team: to improve health and nutrition outcomes for the world's poor and to reduce the impoverishing effects of adverse outcomes. Using data from household surveys, the research aims to shed light on questions raised by these objectives. For example, how large are the gaps in health and nutrition outcomes between the poor and the nonpoor in different countries? Why do the gaps exist, and what explains the differences in the size of such gaps across countries and over time? What role do inequalities in access to health services play, for example? What effects have programs and policies had on the differences in outcomes? To what extent do adverse health and nutrition outcomes impoverish households, and how do the effects vary across countries? What role do health insurance and prepayment schemes play in cushioning households from these impoverishing effects?

In the past year the study has extended methods, based on concentration indexes, that allow analysts to specify attitudes toward inequality in health (by income level) and to compute an index of achievement combining information on the mean level of health and the degree of inequality in health between the poor and the nonpoor. The study also extended a decomposition method that allows analysts to unpack the causes of changes in inequality over time or of differences across countries or across regions within a country.

The research on the impoverishing effects of adverse health and nutrition outcomes has focused on the reduction in living standards associated with out-of-pocket payments for health services. It has investigated different approaches to measuring such impacts, distinguishing among the analysis of fairness or equity in health care payments, the analysis of the degree to which payments can be construed as "catastrophic," and the analysis of the impoverishing effects of health care payments.

An application of the index of achievement to data on health and nutrition indicators used in the international development goals showed the importance of looking beyond national averages to the differences in outcomes across the income distribution. Pakistan and India, for example, have similar rates of under-five mortality, but Pakistan outperforms India on the index of achievement because its under-five mortality varies much less across income groups.

The decomposition method was applied in an analysis of the sources of the increase in inequality in malnutrition in Vietnam between 1993 and 1998. The results indicate that much of the rise in inequality was due to an increase in the impact of income on malnutrition and to increased income inequality at the community level. Results of an analysis of health care payments in Vietnam indicate that although payments are broadly proportional to household consumption, they nonetheless have an impoverishing effect, driving already poor households further into poverty.

Methods developed by the project have begun to be used by researchers participating in three international initiatives, sponsored by the European Commission, by the Pan-American Health Organization, and by the Rockefeller Foundation. In addition, the methods have been used in a number of developing countries, often in work funded by the U.K. Department for International Development. All these initiatives involve local researchers.

The project's work has been presented in the World Bank Institute's health economics and health financing course and in a Health, Nutrition, and Population Team training course on health and nutrition programs and the poor. Results have been presented at a conference of the Canadian Health Economics Association in Toronto (April 2001); to the World Health Organization Commission on Macroeconomics and Health (April 2001); at the U.K. Department for International Development in London (July 2001); at an International Health Economics Association congress in York, England (July 2001); and at seminars at the World Bank (September 2000), Princeton University (December 2000), the University of Sussex (March 2001), Catholic University of Santiago, Chile (April 2001), and the Bank's Hanoi Country Office (May 2001).

Responsibility: Human Development Network, Health, Nutrition, and Population Team—Adam Wagstaff (awagstaff@worldbank.org). The Belgian and Japanese Trust Funds contributed funding for the research.
Completion date: August 2001.

Reports

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The Economics of Malaria

According to recent estimates, malaria leads to 1.5–2.7 million deaths and around 600 million clinical cases a year. This research project is aimed at contributing to the renewed effort to fight the disease. It examines economic aspects of malaria and malaria control, with the goal being to improve policy recommendations.

The project has several components. The first uses Demographic and Health Survey data collected in the 1990s in more than 20 Sub-Saharan African countries to explore the geographic relationship between poverty and the incidence of fever, as well as the household-level relationship between household wealth, the incidence of fever, and treatment-seeking behavior. Results show that poverty and the incidence of fever tend to be only weakly related, but that a household's economic status strongly influences treatment-seeking behavior. The analysis also looks at household data from Eritrea, focusing on the links between household income, the reported incidence of malaria, and its treatment.

The second component, an analytical review of social and epidemiological conditions for malaria, looks at how these conditions might affect policy prescriptions. This review has led to several findings. First, epidemiological and ecological situations do not have a one-to-one relationship with economic situations, so public interventions need to incorporate information on both of these to promote malaria control. Second, strengthening the health sector and improving the government's regulatory effectiveness are key to improving outcomes. Third, economic analyses should incorporate information on the behavior of households and the functioning of the health sector, which cost-benefit and cost-effectiveness analysis typically do not do. And finally, more research is needed to ascertain which determinants of demand for and supply of malaria control have the greatest impact on its efficiency.

The third component of the project is a modeling exercise that combines epidemiological models with economic behavioral parameters to assess the sensitivity of policy recommendations to assumptions about these parameters. The exercise uses a tractable choice theoretic approach (relating to prevention and treatment options) to generate the policy implications of different patterns of behavior, as well as the emergence of drug resistance.

The fourth component has analyzed monthly data on malaria incidence and interventions in 45 malaria zones over five years in the Solomon Islands. Since the data are nonexperimental, ordinary least squares multiple regression produced biased estimates of the impact of the interventions, especially for house spraying with DDT. Applying instrumental variables estimation improved the plausibility of the results, which suggested that DDT spraying has contributed more than three other common interventions to the observed decline in the incidence of malaria over the period.

The fifth component involves working with the African Economic Research Consortium (AERC) to identify and sponsor African researchers to carry out analyses of the relationship between malaria and poverty. The AERC has commissioned studies now under way in Cameroon, Kenya, Nigeria, and Zambia.

Another activity has focused on the economic implications of the emergence of drug resistance. Since the malaria parasite is increasingly resistant to drugs now used to treat malaria, combination therapy is being advocated. This activity is developing a framework for assessing the conditions under which the economic benefits of combination therapy would make it the preferred policy option.

Responsibility: Development Research Group, Public Services for Human Development—Deon Filmer (dfilmer @worldbank.org) and Varun Gauri, and Infrastructure and Environment—Mead Over and Maureen Cropper. With Christie Poulos, University of North Carolina; Lakshmi K. Raut, Yale University; Fadi Balesh, McGill University, Montreal; Bernard Bakotee, government of the Solomon Islands; and Patricia Graves, University of Colorado.

Completion date: June 2002.

The Public Economics of Health Reform

This project encompasses research efforts that apply standard techniques of public economics—and develop and apply extensions to those techniques—to the problems of the health sector in developing countries. The research formulates the problems in a way consistent with a public expenditure review—that is, it examines the equity, efficiency, and implementability of health sector policies and expenditure regimes.

• *Equity.* Based on analyses of about 60 Demographic and Health Surveys, this component has introduced the innovation of extracting a measure of wealth from these surveys. It uses this index to examine the relationship between health measures (infant and child mortality, nutritional status, incidence of disease) and family wealth, using a design-adaptive nonparametric regression. Results for infant and child mortality show pronounced nonlinear relationships, with the mortality rate falling steeply relative to "wealth" at various points in the wealth distribution in most countries. This effect is not noticeable with the common nonparametric measures of quantiles, since those confound the effect of income on health with the distribution of income.

For a subset of countries for which data are available on the distribution of income or consumption in terms of purchasing power parity U.S. dollars, the study has scaled the wealth index to that distribution to yield a common consumption standard. It then assesses the relative contribution of country-specific and common patterns. This analysis shows that the more uniform the measure of income, across and within countries, the greater the impact of income on health appears to be among the very poor.

• *Efficiency.* Private health care is characterized by two major types of market failure and the interaction between them: the principal-agent problem associated with a health care provider's knowledge, and the general absence of insurance markets, due primarily to adverse selection and moral hazard. This study attempts to develop tools for modeling markets with these characteristics, measuring the welfare loss from the lack of insurance and assessing the effect of different payment systems (capitation, salaried positions, fee for service) on health care. The study also attempts to measure the externalities in the health sector, for example, in the impact of neighbors' education on fertility and mortality.

• *Implementability.* In part as a result of the efficiency problems, the public sector has always been a major provider of medical services. For standard reasons in public economics—the inherent market failures—public intervention is warranted. But the quality of public provision has ranged from good to horrendous. This study looks at alternative incentive arrangements for the delivery of public services, focusing initially on decentralization and contracts with nongovernmental organizations. A particular problem it addresses is the allocation of doctors to rural areas.

Responsibility: Development Research Group, Public Services for Human Development—Jeffrey Hammer (jhammer @worldbank.org), Varun Gauri, and Deon Filmer. With Paolo Belli, Harvard University; William Jack, George-

town University; and Maria Eugenia Bonilla-Chacin, Johns Hopkins University.
Completion date: Ongoing.

Reports

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Gauri, Varun. 2001. "Are Incentives Everything? Payment Mechanisms for Health Care Providers in Developing Countries." Policy Research Working Paper 2624. World Bank, Development Research Group, Washington, D.C.

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Education, Labor, and Employment

The Impact of Labor Market Policies and Institutions on Economic Performance

This study, the second phase of a research project that assessed the effect of labor market interventions on labor market outcomes and aggregate economic performance, aimed to improve the understanding of how best to approach the reform of such interventions. The study focused on a set 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 combined theoretical work, detailed case studies based on household- and plant-level data from countries in which labor market distortions are believed to be acute, and cross-country analysis. Several detailed studies were carried out for each labor market intervention. The cross-country analysis was made possible by the construction of a cross-country time-series database of labor indicators, which comprises data collected from cross-country and country-specific sources. The database was used to extend the now standard growth regression analysis so as to take labor market policies and institutions into account. The theoretical work focused on the political economy of labor market distortions and its implications for the design of economic reforms.

The cross-country database includes 44 indicators relating to labor force participation, employment and unemployment, wages and productivity, conditions of work and benefits, trade unions and collective bargaining, public sector employment, and labor standards. It covers 121 countries and 11 five-year periods, starting immediately after World War II. No comparable labor market database is available to researchers and practitioners.

The research findings have been disseminated through workshops, training sessions, and seminars for researchers, government officials, and trade union leaders. A policy-oriented volume is planned that would combine the study's results with lessons drawn from other research on labor market policies and institutions in developing countries.

Responsibility: Development Research Group, Public Services for Human Development—Martín Rama (mrama @worldbank.org). With Raquel Artecona; Iyabode Fahm; Donna MacIsaac; Alema Siddiky; Jean-Paul Azam, Université des Sciences Sociales, Toulouse; Ann Bartel and Ann Harrison, Columbia University; Kristin Butcher, Boston College; Alex Cukierman, Tel Aviv University; Francesco Daveri, University of Brescia, Italy; Alvaro Forteza, Universidad de la República, Uruguay; Anna Fruttero and Guido Tabellini, Università Bocconi, Milan; Catherine Ris, University of Auvergne; Dani Rodrik, Harvard University; Cecilia Rouse, Princeton University; Manisha Singh, University of Maryland; and Jan van Ours, Tilburg University, Center for Economic Research, Netherlands.

Completion date: June 2001.

Reports

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Income Support for the Unemployed: Mandatory Severance Pay in Peru

This research was part of a larger project on income support programs for the unemployed in Latin America, undertaken jointly by the Latin America and the Caribbean Region's Office of the Chief Economist and the Development Research Group. The objectives of the larger project were to improve the understanding of who the unemployed are and to assess five income support programs for the unemployed that have been tried in middle-income countries: public works, unemployment insurance, mandatory severance pay, training for the unemployed, and individual unemployment savings accounts.

This research looked at mandatory severance pay, focusing on Peru in the 1990s. As in many other developing countries, in Peru employers have a legal obligation to compensate workers dismissed through no fault of their own. The research assessed whether this obligation is an efficient mechanism for providing income support to the unemployed. The analysis, which was based on individual records from a household survey with a panel structure and relied on five indicators of coverage, found that in the private sector roughly one in five workers, and one in three wage earners, are legally entitled to severance pay. Coverage is more common among wealthier workers. Results based on several empirical strategies suggest that workers "pay" for their entitlement to severance pay through lower wages. Results also show that consumption among unemployed workers who receive severance pay is 20–30 percent greater than among those who do not. In fact, consumption among these workers is higher than consumption among employed workers, suggesting that mandatory severance pay is overly generous in Peru.

The findings of the larger project were disseminated through a conference in Washington, D.C., in June 2000, and through a report released at that conference (David de Ferranti, Guillermo E. Perry, Indermit S. Gill, and Luis Servén, *Securing Our Future in a Global Economy*, Washington, D.C.: World Bank, 2000).

Responsibility: Development Research Group, Public Services for Human Development—Martín Rama (mrama @worldbank.org) and Donna MacIsaac. The Canadian Trust Fund contributed funding for the research.

Completion date: June 2001.

Report

MacIsaac, Donna, and Martín Rama. 2000. "Mandatory Severance Pay: Its Coverage and Effects in Peru." Policy Research Working Paper 2626. World Bank, Development Research Group, Washington, D.C.

Assessing the Impact of Early Childhood Malnutrition on Academic Achievement

Improving the health and nutrition of preschool-age children is widely recognized as an important development objective in its own right. If improving the nutritional status of preschool-age children increased the acquisition of knowledge at school and led to greater height as an adult, it would also have instrumental value where positive associations existed between schooling and productivity and between height and productivity. Although many cross-sectional studies have examined these relationships, many have documented associations between preschool malnutrition and subsequent attainments, not causal relationships.

This study explored these issues using longitudinal data collected in rural Zimbabwe between 1982 and 2000. Using a variety of estimators, the study produced preliminary results showing that improved anthropometric status for preschool-age children, as measured by height for age, is associated with earlier enrollment in school, a lower likelihood of grade repetition, faster progress through school, the completion of more grades, and greater height as a young adult. But the study did not find a robust association between preschool anthropometric status and achievement on Zimbabwe's primary school leaving examination.

The results also show that short-term shocks (such as conflict and drought) have long-term consequences for nutrition and for education, suggesting a need for investment in both social protection and nutrition programs.

The results were presented at a seminar at the International Food Policy Research Institute in Washington, D.C., on June 26, 2001, and at a World Bank seminar attended by research staff and the Zimbabwe country team on June 28, 2001. A seminar is planned for August 2001 in Harare, Zimbabwe.

Responsibility: Rural Development Department and Development Research Group, Public Services for Human Development—Harold Alderman (halderman@worldbank.org). With John Hoddinott, Dalhousie University, Halifax, Canada; and Bill Kinsey, University of Zimbabwe.

Completion date: July 2001.

Report

Alderman, Harold, John Hoddinott, and Bill Kinsey. 2001. "Assessing the Impact of Early Childhood Malnutrition on Academic Achievement and Adolescent Height in Rural Zimbabwe." World Bank, Development Research Group, Washington, D.C.

Evaluation of Active Labor Market Programs in China

As reforms of state enterprises in China have accelerated, addressing labor redundancy in these enterprises has gained urgency. But downsizing has been hindered by enterprise-based provision of social benefits to workers. A practical response to this problem has been the emergence of a new category of workers, *xiagang* workers, who are laid off but retain their links to their enterprises as well as subsistence wages and access to housing and medical benefits.

The government's main response to the unemployment threat has been the Reemployment Project, launched as a pilot in 30 cities in 1994 and expanded to 200 cities in 1995–96. The project encompasses a range of active labor market policies, including retraining, job search assistance and counseling, wage subsidies and tax breaks for enterprises that employ laid-off workers, and assistance for self-employment designed to redeploy unemployed workers in productive activities.

This research is evaluating the cost-effectiveness of retraining and employment services in two Chinese cities, Shenyang and Wuhan. The study uses a quasi-experimental evaluation design that involves collecting data from individuals who participated in retraining and data from a comparison group drawn randomly from a list of retrenched workers. Using these data, the study compares such outcomes for the groups as probability of reemployment and earnings after reemployment to derive the net impact of the programs. Using data on the costs of administering the programs, it also compares the cost-effectiveness of different interventions.

The random sample of retraining participants was drawn from program lists kept at the training institutes. For the comparison group a random sample was drawn from the lists of redundant workers maintained at the municipal labor bureaus. The Institute of Labor Studies completed the data collection for a sample of participants and for the comparison group in May–June 2000 and has also collected the data on program costs.

The World Bank already funds projects with active labor market components, and such programs are increasingly being considered in several East Asian economies affected by the economic crisis. This study will add to the body of research on the evaluation of active labor market policies, and its results will be useful in designing and evaluating such interventions in other countries.

A conference on labor market policies was held in Beijing in May 1999 to discuss the urban labor market adjustment in China, lessons of international experience with active labor market policies, and evaluation methodologies. A conference is planned to disseminate the study's results to policymakers and practitioners in China.

Responsibility: East Asia and Pacific Region, Poverty Reduction and Economic Management Sector Unit—Tamar Manuelyan Atinc (tmanuelyanatinc@worldbank.org) and Benu Bidani. With Christopher O'Leary, W. E. Upjohn Institute for Employment Research; and Institute of Labor Studies, Beijing.

Completion date: October 2001.

Migration, Remittances, and Poverty in Latin America

Migration is one of several ways through which households adapt to such structural shifts as the transformation of a rural agricultural economy into an urban industrial one. Households may use migration, which offers the promise of higher earnings, as a strategy for escaping poverty. They may use migration to overcome credit constraints due to imperfect markets or to overcome other forms of rationing, such as lack of access to education and health services. And they may use migration —permanent or temporary, internal or international —as a strategy for coping with both macroeconomic and idiosyncratic shocks.

This study aims to provide a balanced view of the gains from and costs of migration by analyzing its impact on both monetary and nonmonetary outcomes. It is both reviewing the literature and undertaking new research on the geographic determinants of income and other indicators of well-being, the impact of rural cash transfers on migration, and the impact of remittances on inequality, education, and housing.

Preliminary results from the research show that remittances are used to fund public goods—that is, goods that benefit both the migrant and the family at home. The marginal impact of remittances on children's enrollment in school and on investments in housing (two goods likely to enter the utility function of the migrant) exceeds that of other sources of income for the family at home. The study has found that remittances increase inequality in poor areas but reduce inequality in better-off areas. And while cash transfers to rural farmers reduce permanent migration, they have little or no impact on temporary migration.

Responsibility: Latin America and the Caribbean Region, Poverty Sector Unit—Quentin Wodon (qwodon @worldbank.org) and Corinne Siaens. With Gabriel Gonzalez Konig, American University; and Victoria Malkin, New York University.

Completion date: October 2001.

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Gonzalez Konig, Gabriel, and Quentin Wodon. 2001. "Do Cash Transfers to Rural Farmers Reduce Migration?" World Bank, Latin America and the Caribbean Region, Poverty Sector Unit, Washington, D.C.

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

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 in Kenya to perform randomized evaluations of several different education policy options in collaboration with an international nongovernmental organization.

The study began with 14 schools in 1995. From these, 7 were randomly chosen to receive the standard package of assistance. Pretests were given at the beginning of 1995, and posttests in the fall of 1995. Preliminary results show a large increase in attendance, probably due to the provision of free school uniforms, which effectively lowered the price of schooling. However, test scores showed no improvement.

The project expanded in 1996 to 100 schools, of which 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 were followed for three more years (1997–99) to assess whether the initial effects endure for several years. Preliminary results suggest that the impact of textbooks is less strong than some earlier studies had indicated. Of particular interest is the finding that only the top 20 percent of students, as identified by the scores on the 1996 pretests, benefited from the provision of textbooks. The textbooks had little effect on dropout rates or grade repetition.

In 1997 another 25 of the 100 schools were selected to receive block grants that could be spent on several options, such as textbooks, other school supplies, or construction of new classrooms. The purpose of this intervention was to see whether funds are used more effectively when schools are given a choice on how to spend them. Analysis of the results indicates a small but statistically significant impact on test scores after one year, but the impact seems to diminish over time. As with textbooks, the better students seem to have benefited the most. The results show statistically significant effects in reducing dropout rates and increasing repetition rates.

In 1998 another randomization was done for all 100 schools. Fifty schools participated in a program in which teachers received rewards if their students' performance on standardized tests improved; the other 50 schools did not participate. Preliminary results show statistically significant effects on test scores after two years.

Findings have been presented at Brown, Cornell, Harvard, Hebrew, Michigan, Minnesota, Toronto, and

Yale Universities, at the MacArthur Foundation, and at the International Food Policy Research Institute.

Responsibility: Development Research Group, Public Services for Human Development—Harold Alderman (halderman@worldbank.org). With Paul Glewwe, University of Minnesota; Michael Kremer, Harvard University; Sylvie Moulin, Hillary Rodham Clinton Women's Empowerment Center, Morocco; Stacy Nemeroff; Nauman Ilias, University of Pennsylvania; and Alexander Wolfson and Eric Zitzewitz, Massachusetts Institute of Technology. The International Christian Humanitarian Services, the Netherlands; and the National Science Foundation, United States, are contributing funding for the research.

Completion date: December 2001.

Reports

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Providing Unemployment Benefits through Unemployment Insurance Savings Accounts

Traditional unemployment insurance systems are prone to moral hazard, creating adverse incentives that reduce job search efforts and increase unemployment. This research examines an alternative income support scheme, based on unemployment insurance savings accounts, in which workers would be required to save a fraction of their earnings and draw unemployment compensation from these savings. By internalizing the costs of unemployment benefits, the system is expected to avoid the moral hazard inherent in traditional schemes. And it could conceivably provide the same protection to the unemployed. But too little is understood about how the system functions to know for which groups of workers, and under what conditions, this would hold true.

Moreover, application of the system in developing countries would raise a host of issues:

- How feasible is the system? Unemployment insurance savings accounts eliminate pooling across individuals. If a significant share of workers could not generate sufficient savings to draw on during spells of unemployment, such a system might not be viable.
- What distributional effects would the system have? In particular, what effects would it have on consumption smoothing, observed income distribution, personal savings, and private transfers?
- What redistributional effects would replacing traditional unemployment insurance with the savings account system have? Research shows that such effects are likely to be small for the United States, but what can be expected for developing countries?
- What is the optimal design of a savings account system? For example, what rules should govern the withdrawal of benefits?

The research investigates these issues through simulation studies and theoretical modeling. To examine whether the lack of cross-pooling would make unemployment savings accounts nonviable, and how replacing a traditional system with the savings account system would affect income distribution, the study simulates the introduction of unemployment accounts in Estonia, Malaysia, and Slovenia (countries for which rich panel data exist for a representative sample of labor force participants). The simulation consists of applying the rules of unemployment insurance savings accounts to a representative sample of labor force participants over their entire working life and determining contributions and withdrawals for each worker.

Preliminary results for Estonia and Malaysia show that the savings account system is a viable alternative to traditional unemployment insurance. For example, assuming a 3 percent contribution rate and a 60 percent replacement rate, the Estonian study shows that only 9–17 percent of workers would end their working life with a negative cumulative balance in their savings account, and that 30–45 percent would experience a negative balance at least once during their working life (by assuming no changes in hazard rates from unemployment, these results underestimate the viability of the savings account system).

Using theoretical modeling, the study aims to formulate an optimal design for an unemployment insurance savings account system by evaluating alternative specifications of its parameters, including the rules for contributions and withdrawals, the limit on account balances, and the mix of financial sources. The modeling will incorporate the basic tradeoff between the provision of insurance and the incentives for reemployment. By deriving optimal consumption paths and corresponding reemployment probabilities, the study will investigate the extent to which a fine-tuned savings account system could adequately approximate such an optimal scheme. The study will also determine the optimal combination of mandatory savings by workers and payroll taxes paid by employers. The modeling of financial sources will be based on the fact that introducing unemployment insurance savings accounts improves incentives for reemployment while also imposing costs on workers by distorting intertemporal consumption decisions.

Responsibility: Human Development Network, Social Protection Team—Milan Vodopivec (mvodopivec @worldbank.org). With Hugo Hopenhayn, University of Rochester and Universidad Torcuato Di Tella, Buenos Aires; Jungyoll Yun and Yoonjung Koh, Ewha University, Seoul; Tomaz Rejec, Jozef Stefan Institute, Ljubljana, Slovenia; Ulle Pettai, Statistical Office of Estonia; and Zala Kalan, Statistical Office of Slovenia.

Completion date: March 2002.

The Impact of Deworming Treatment on Primary School Performance in Busia, Kenya

This study is evaluating the effect of mass deworming treatment (treating all students in a school) on education outcomes in Busia District, Kenya. The deworming treatment was phased in at 75 primary schools with an enrollment of about 30,000 students. The treatment was provided to randomly assigned schools, while the schools not selected for treatment served as a control group.

In the first year of the project (1998) deworming treatment was provided to 25 of the 75 schools. The remaining 50 were a control group. During the second and third years (1999 and 2000) treatment was provided to the initial 25 schools plus an additional 25. Twenty-five schools thus remained as a control group. (These last 25 schools are currently receiving deworming treatment.) This experimental design allows an unbiased estimation of the impact of deworming treatment on education outcomes—school attendance, grade progression, dropout rates, and academic performance.

A randomized evaluation suggests that the school-based mass treatment with deworming drugs reduced absenteeism by a quarter, with especially large gains among the youngest children. There is no evidence that the deworming treatment improved academic test scores, however.

By reducing disease transmission, the deworming also created large positive externalities—health and school participation benefits—among untreated children in the treatment schools and among children in neighboring schools, suggesting a rationale for public deworming subsidies. Existing experimental studies, in which deworming treatment is randomized among individuals in the same school, find small and insignificant effects on education; however, these studies underestimate true treatment effects if deworming creates positive externalities for the control group. The findings suggest that deworming is an attractive public policy under a variety of approaches.

Responsibility: Development Research Group, Public Services for Human Development—Harold Alderman (halderman @worldbank.org) and Sylvie Moulin; and Human Development Network, Education Team—Donald Bundy. With Michael Kremer, Harvard University; Edward Miguel, University of California at Berkeley; Simon Brooker, Imperial College, London; Alfred Luoba, Vector Borne Diseases, Kenya Division; and Internationaal Christelijk Steunfonds, Nairobi.

Completion date: April 2002.

Report

Miguel, Edward, and Michael Kremer. "Worms: Health and Education Externalities in Kenya." University of California at Berkeley, Department of Economics.

Educational Enrollment and Dropout

Patterns of educational enrollment and attainment vary greatly across countries and, within countries, across population groups (particularly wealth groups). For some, basic education is practically universal; for others, educational attainment is dismal. This research has documented these differences using a unique collection of comparable household data sets. The research first addressed a methodological issue—establishing the validity of ranking households by their wealth status in the absence of data on household consumption expenditures. The study then conducted several analyses: investigating the relationship between education outcomes and wealth status in 35 countries, identifying determinants of education outcomes in states of India, and examining the interaction of gender and wealth in generating inequalities in educational enrollment and attainment in 40 countries.

Cross-country comparisons are often hindered by lack of comparability across data sets. There are data sets collected using almost identical methods—the Demographic and Health Surveys (DHS) for a large number of developing countries and the National Family Health Survey (NFHS) for India. But the data do not include consumption expenditures, usually used to rank households by economic status. This research established an alternative approach to ranking households. As a proxy for long-run household wealth, it constructed a linear index from a set of asset indicators using principal components analysis to derive the weights, then validated the index using data from India, Indonesia, Pakistan, and Nepal. The study found that the asset index has reasonable coherence with current consumption expenditures and, most important, works as well as, or better than, traditional expenditure-based measures in predicting enrollment status. This index approach has allowed reanalysis of existing data by researchers in the World Bank and elsewhere, focusing on socioeconomic inequalities in human development outcomes.

The study used DHS data from 44 surveys (in 35 countries) to document differences in the enrollment and attainment patterns of children from rich and poor households, ranked by the asset-based index. It found that the enrollment profiles of the poor differ across countries but fall into distinctive regional patterns. In some regions the poor reach nearly universal enrollment in first grade, but then drop out in droves, leading to low attainment (typical of Latin America). In other regions the poor never enroll in school (typical of South Asia and West Africa). The study found enormous differences across countries in the "wealth gap," the difference between rich and poor in enrollment and educational attainment. In some countries the difference in median years of school completed is only 1 or 2 years; in others it is 9 or 10. The attainment profiles can be used as diagnostic tools to examine issues in the education system, such as where to focus interventions or the extent to which low enrollment is due to unavailability of schools.

The research used NFHS data from India to estimate the determinants of child enrollment (for those ages 6–14) and educational attainment of a recent cohort (ages 15–19). The analysis found enormous gaps in enrollment and attainment between children from rich and poor households. While 82 percent of children from rich households complete grade 8, only 20 percent of those from poor households do. The wealth gaps vary widely across states of India. Moreover, gender differences exacerbate the gaps: while 80 percent of girls from rich households complete grade 8, only 9.5 percent of girls from poor households do. The physical presence or absence of schools in rural villages explains only a small part of differences in enrollment. Across states there are huge gaps in enrollment rates between observationally equivalent households, especially among the poor. For example, enrollment rates in Kerala are 44 percentage points higher than for observationally equivalent poor households in Bihar.

The study used DHS data to investigate the ways in which gender and wealth interact in generating within-country inequalities in enrollment and attainment in 40 countries. In addition, it carried out a multivariate analysis in each country to assess the independent effects of the education of adults in the household and the presence of schools in the community, and how these interact with gender. The study found a large female disadvantage in education in countries in South Asia and North, West, and Central Africa. But while gender gaps are large in a subset of countries, wealth gaps are large in almost all the countries. The education of adults in the household has a significant relationship with the enrollment of children in all the countries, and the relationship with women's education is larger than that with men's in some but not all of the countries. The presence of a primary and secondary school in the community has a significant relationship with enrollment in some countries (notably in West and Central Africa), and the relationship does not appear to differ systematically with the gender of the child.

This research has led to two new strands of investigation. First, the study will look at the diffusion of education and the use of public services. Assessments of the impact of education often include the education of only heads of household (or of mothers) in regressions of individual and household behaviors and outcomes. Since the education of other people can also influence behaviors and outcomes, this research will use comparable (DHS) data from many poor countries to examine whose education matters.

Second, methodological work will look at the implications of using nontraditional data to analyze inequalities in human development outcomes. This research will compare consumption-based welfare measures and a variety of other measures for many countries using data sets with both types of measures. It will address several questions: How closely correlated are the measures? How do different measures affect conclusions about the behaviors and outcomes under study? What are the issues in adjusting welfare measures to control for household size and composition? And are there special purposes for which non-consumption-based measures can be or should not be used?

Results have been presented at many sessions in the World Bank and at the annual meetings of the Population Association of America. The findings are available on the Web at http://www.worldbank.org/research/projects/edattain/edattain.htm.

Responsibility: Development Research Group, Poverty Team—Deon Filmer (dfilmer@worldbank.org); and Africa Region Technical Families, Regional Human Development—Jee-Peng Tan. With Lant Pritchett, Harvard University.
Completion date: May 2002.

Reports

Filmer, Deon. 1999. "The Structure of Social Disadvantage in Education: Gender and Wealth." Policy Research Working Paper 2268. World Bank, Development Research Group, Washington, D.C.

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Filmer, Deon, and Lant Pritchett. 1999. "Educational Enrollment and Attainment in India: Household Wealth, Gender, Village, and State Effects." *Journal of Educational Planning and Administration* 13(2): 135–64.

———. 1999. "The Effect of Household Wealth on Educational Attainment: Evidence from 35 Countries." *Population and Development Review* 25(1).

———. 2001. "Estimating Wealth Effects without Expenditure Data or Tears: An Application to Educational Enrollments in States of India." *Demography* 38(1): 155–32.

Gender Data and Labor Markets

Labor market outcomes differ by gender in Latin America, as they do in all regions, but there is scant evidence on why they differ and what implications the differences have for the well-being of men and women. Moreover, little is known about how these differences have evolved over the past 10 years of economic reform. This research project identifies the changes in labor market outcomes for men and women in Latin America over the past decade and examines the importance of gender roles in shaping these outcomes.

The project has two parts. First, it is constructing a database of gender-disaggregated statistics on a variety of labor market and demographic indicators to permit comparisons across countries and over time. The database draws on household and labor market surveys providing statistics on wages, education, time use, gender roles, social capital, household structure, labor force participation, and informal sector employment for 15 countries. Statistics on health, violence, and gender expectations and attitudes have been compiled from other sources. The data are being formatted into a Web-based database with a search engine.

Second, the project is undertaking an empirical study of the causes of observed differences in wages, unemployment, entrepreneurship, labor force participation, informal sector employment, and sectoral allocation of labor between men and women and within each gender group. The study draws on the database and complements it with econometric analysis of the determinants of the differences in labor market outcomes. The results are used to build alternative explanations for gender differences in the labor market by taking into account the opportunities and constraints created by gender roles and how these shape labor market choices and outcomes. The study will include all countries in the database to permit cross-country comparisons.

Three preliminary results have emerged from the ongoing work:

• Women's and men's labor market behavior and returns are becoming more similar, but that does not necessarily mean that women are better off than they were before. New challenges are arising for both men and women in the home and workplace as workloads increase and wages become more equal.

• The interface between household roles and gender is increasingly important in explaining observed labor market outcomes. Often there are more similarities in labor market behavior between those with similar roles in the household (primary breadwinner or primary caregiver) than between those of the same sex.

• The most vulnerable groups—women, informal sector workers, and the least educated—saw the most rapid gains in wages, employment, and formal sector employment in the 1990s. Women experienced particularly rapid gains.

The study's results challenge the conventional thinking on what causes gender differences in the labor market and suggest alternative policies that could be more effective in narrowing those differences.

The database has provided inputs to several World Bank reports, including the Policy Research Report *Engendering Development—Through Gender Equality in Rights, Resources, and Voice* (New York: Oxford University Press, 2001). The database will be available on the Web at http://www.worldbank.org/lacgender in December 2002.

Responsibility: Latin America and the Caribbean Region, Poverty Reduction and Economic Management Sector Unit and Gender Sector Unit—Wendy Cunningham (wcunningham@worldbank.org) and Raquel Artecona. With Omar Arias, Inter-American Development Bank; Luz Saavedra, University of South Florida; Diana Prieto and Diego Angel, Georgetown University; and Maria Lourdes Gallardo, Columbia University. The Danish, Netherlands, and Norwegian Trust Funds have contributed funding for the research.

Completion date: June 2002.

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Educating Nomadic Herders out of Poverty

The world's nomadic herders, mainly in Africa, the Middle East, and South, Southwest, and Central Asia, number in the tens of millions and are among the poorest and most vulnerable population groups. Reaching them with formal schooling is difficult, and millions of nomadic pastoral children remain outside the education system. This situation will continue until more effective ways are found to bridge the gap between what formal education systems teach and what pastoral children need to know.

This research project will investigate alternative approaches to education for nomadic pastoralists. It aims to improve the understanding of the relationship between culture, indigenous knowledge, social institutions, and poverty in the context of nomadic pastoralism, and to identify the conditions under which more effective schooling could be provided for those wishing to remain in the pastoral livelihood system. The research will focus on adjacent areas of northern Uganda and northern Kenya.

Building on a literature review on nomadic education commissioned by the World Bank's livestock group, the research will investigate three questions:

• How is indigenous knowledge embedded in social organizations?

• What are the outcomes of formal education for nomadic pastoralists, particularly its effect on social capital?

• What alternative approaches to education could better equip pastoralists to fight poverty?

The research is expected to lead to a better understanding of how indigenous knowledge is linked to social structure and economic expectations, how to integrate indigenous knowledge and formal education in efforts to prepare nomadic pastoralists for a future within the pastoral economy or outside it, and what policies and interventions governments, the World Bank, and other development agencies might pursue to do so.

Responsibility: Social Development Department—Kreszentia Duer (kduer@worldbank.org) and Sabina Alkire. With Jeremy Swift and Saverio Kratli, University of Sussex. The Netherlands Trust Fund is contributing funding for the research.

Completion date: December 2002.

Public Sector Retrenchment, Phase 2

Economic reforms often require shrinking or divesting public sector agencies and enterprises, which in turn sometimes requires massive layoffs. But experience shows that the process can be badly mishandled. This research looks at how to deal with redundant labor in the public sector.

The first phase of the research investigated the optimal design of downsizing operations, combining three approaches. It used the public economics perspective to assess the financial and economic returns to downsizing. It used the labor economics perspective to predict the losses public sector workers may experience as a result of displacement. And it used the principal-agent approach to identify the self-selection mechanisms appropriate when individual productivity is not observable in the public sector.

However, the research made it obvious that several important policy questions had not been addressed. It also showed that the answers to some of the questions that were addressed have never been applied in practice, so that the potential obstacles to their implementation are unknown. And it left unclear whether the partial implementation that can be expected in practice would substantially improve the outcome of downsizing operations.

This second phase of the research combines further analytical and empirical work with experimentation in downsizing operations. The experimentation provides an opportunity to assess how public sector units adjust under different downsizing strategies and whether the assistance received by redundant public sector workers is sufficient to cope with the welfare loss from job separation. The main research advantage of the experimentation and evaluation component is that it circumvents some of the typical identification problems in econometrics. The approach also ensures that the research has a direct impact on operations. Because of the time span of downsizing operations, some of the results of the research will not be available for several years. Present efforts focus on setting up information systems, including baselines and tracer surveys.

The analytical and empirical work in this second phase of the research involves ex ante assessment of labor redundancies, across public sector units and across countries. It also involves evaluating the impact of the downsizing of public enterprises on their labor productivity and on their privatization prices. Other work looks at the use of labor market information in designing assistance packages for redundant workers, estimates the economic returns to downsizing operations when product markets are imperfectly competitive, and investigates the gender implications of public sector downsizing.

Findings have been disseminated through numerous presentations on public sector downsizing for policymakers in many countries. More recently, a module on public sector downsizing was prepared for a World Bank Institute course on labor market policies for developing countries, and a pilot version of the course was delivered in Dublin, Ireland, in October 2000 to policymakers from Central Asia and Eastern Europe. The first full version of the course was offered in Washington, D.C., in April 2001. In addition, the project has developed an Excel-based toolkit, the Downsizing Options Simulation Exercise (DOSE), to predict the effects of downsizing strategies combining early retirement and severance pay. Country-specific versions of the toolkit have been prepared for Guinea-Bissau, Guyana, Morocco, and Vietnam.

Responsibility: Development Research Group, Public Services for Human Development—Martín Rama (mrama @worldbank.org). With Sarah Bales; Patrick Belser; Alberto Chong; Alice Hong; Elizabeth Ruppert; Ragui Assaad, University of Minnesota; Kaushik Basu and Gary Fields, Cornell University; José Manuel Campa, New York University; John Haltiwanger and Manisha Singh, University of Maryland; Doh-Shin Jeon, Universitat Pompeu Fabra, Barcelona; Jean-Jacques Laffont, Université des Sciences Sociales, Toulouse; Anat Levy, Central Bank of Israel; Florencio López-de-Silanes, Harvard University; and Aysit Tansel, Middle East Technical University, Ankara.

Completion date: June 2003.

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Economic and Environmental Impacts of Lowland Agricultural Development on Poor Upland Communities in Palawan, Philippines

Through a detailed case study, this research investigated how intensification of agricultural production is affecting patterns of labor demand and pressures on forest areas in the province of Palawan, a frontier area of the Philippines. To do so, it administered a survey to 200 households to extend a small panel data set previously collected in a low-income farming community.

The results of the analysis show that the increased off-farm opportunities provided by lowland irrigation were more likely to accrue to larger and poorer households, that the resulting income gains were likely to lead to fertilizer purchases, and that concomitant increases in labor productivity probably undermined incentives to clear forest in subsequent periods.

The insights generated by the project should help in identifying potential "win-win" investments and possible tradeoffs between poverty reduction and environmental objectives. The results are most directly applicable in East Asia, where the combination of extensively cultivated uplands and intensively cultivated lowlands, like that found in the study area, is particularly common.

The work was carried out in collaboration with researchers from the University of the Philippines at Los Baños. The results will be disseminated in the Philippines through presentations (for example, to the Department of Agriculture's Bureau of Agricultural Research, to the Philippine Institute of Development Studies, and in the academic community) and through articles in academic journals. The results will also be disseminated through working papers, World Bank seminars, and World Bank Institute training activities, as well as through presentation at the annual meetings of the American Agricultural Economics Association. The panel data set generated by the research, including the two previous rounds of data collection, will be made available to any interested researcher.

Responsibility: Environment Department—Stefano Pagiola (spagiola@worldbank.org). With Jerry Shively, Purdue University; and Richard Yao, University of the Philippines at Los Baños. Purdue University contributed staff time to the research.
Completion date: June 2001.

Factors Affecting the Pace of Deforestation in Northern Thailand

When seeking policies to alter the rate of deforestation, it is important to distinguish two competing theories of agricultural expansion—the population-driven, or subsistence, model and the market-driven expansion, or perfect markets, model. According to the subsistence model, agricultural decisions are made by households that are imperfectly mobile and have limited opportunities for off-farm work. In the simplest such model each household's goal is to achieve a fixed level of consumption, either by consuming what it produces or by selling its output in the market. Two key predictions of this model are that an increase in agricultural population will increase the area cultivated and that an increase in agricultural productivity will reduce the area cultivated. An immediate implication is that programs aimed at intensifying agricultural production, such as subsidies for inputs or provision of seeds for high-yielding varieties, will ease the pressure on forests.

The perfect markets model leads to the opposite implication. This model assumes that complete labor markets exist, that on- and off-farm labor are perfect substitutes, and that agricultural households maximize profits. The amount of agricultural land cultivated does not depend directly on population, but instead depends on output and input prices, especially the wage rate. So in the perfect markets model an exogenous increase in output per hectare increases the cultivated area, implying that programs to raise farm incomes may have adverse environmental consequences.

This study used data for 361 villages in reserved forests in Chiang Mai, a province in northern Thailand, to examine factors affecting the rate of agricultural expansion between 1986 and 1996. The key question from a policy perspective is whether this agricultural expansion was population driven—due to increases in the number of hill tribe people who practice shifting cultivation—or market driven—due to increases in production (and thus acreage) for cash crops.

In reality, elements of both models are likely to affect agricultural expansion within villages in Chiang Mai. The study therefore attempted to explain variation in agricultural land across villages as a function of village population, the price of agricultural outputs, the cost of transporting goods to market, and policy variables such as credit availability. Because the impact of these variables may differ from one crop to another, the study estimated separate models to explain areas devoted to paddy rice, short-run crops, and long-run crops.

Preliminary findings suggest that paddy rice and short-run crops (primarily maize and soybeans) are more sensitive to increases in population than are long-run crops (primarily upland rice), but the elasticity of acreage planted with respect to population is well below one for both rice (0.3) and short-run crops (0.6). All three types of crops are sensitive to changes in the cost of transporting goods to market, but the effects are small. Programs to promote high-yielding varieties of paddy rice appear to have reduced acreage planted, while making credit available through the Bank of Agriculture and Agricultural Cooperatives has increased acreage devoted to rice and short-run crops.

Results have been presented at several conferences: the American Agricultural Economics Association meetings in Tampa, Florida (August 2000); the conference on Global Change and Sustainable Development in Southeast Asia organized in Chiang Mai, Thailand, by the Southeast Asian Regional Committee for START (System for Analysis Research and Training) in collaboration with the United Nations Development Programme (February 2001); and the Land Cover and Land Use Change Conference in Chiang Mai, Thailand, sponsored by the National Research Council of Thailand (August 2001).

Responsibility: Development Research Group, Infrastructure and Environment—Maureen Cropper (mcropper @worldbank.org). With Jyotsna Puri, University of Maryland. Data for the study were obtained from Jariya Boonjawat and Chetpong Buttathep, Chulalongkorn University, Bangkok.

Completion date: June 2001.

Report

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Economic Instruments for Habitat Conservation

As pressures for both agricultural expansion and biodiversity protection increase, land must be allocated and managed as efficiently as possible to meet these two needs. This project is aimed at improving the ability to meet those dual needs through three activities:

- Developing a quantitative, operational definition of biodiversity useful for assessing large-area conservation policies.
- Developing and demonstrating a methodology for assessing biodiversity and development tradeoffs arising from land allocation decisions or policies.
- Applying that methodology to assess the potential environmental impact of economic instruments for conservation, with particular attention to incentive payments for land uses consistent with conservation.

The study site for the research is the Atlantic Forest of southern Bahia, in Brazil, an area that exemplifies the issues that arise when economic pressures threaten important biodiversity resources. The Atlantic Forest has an extremely high level of biodiversity; many conservation biologists rank it among the habitats with highest priority for conservation. The Bahian section of the forest is now reduced to relatively small fragments, making up perhaps 7 percent of the forest's original area. Less than a fifth of this is protected. The remaining area is threatened by conversion, often to uses with low economic value and little impact on employment.

The project has built a spatially explicit bioeconomic model. The model's economic component represents landholder responses to alternative economic instruments and assesses the instruments' economic and social impacts. The biological component assesses the impact of resulting land use configurations on the ecosystem, taking into account both the representation of diverse species or elements and the viability of plant and animal populations. The model uses secondary data, including geographic information system (GIS) data and data from the census and other sources, and primary data on land values and biodiversity collected by Brazilian partners under a parallel project. It is informed by focus group interviews with stakeholders on the acceptability of alternative economic instruments.

Initial results of the bioeconomic model suggest substantial flexibility in achieving ecological goals, with relatively low opportunity costs for assembling representative sets of viable habitats. A draft version of the model was presented to a broad group of regional stakeholders at a workshop in June 2001.

The research is expected to contribute directly to the design and implementation of the Central Corridor Project, administered by the World Bank for the Pilot Program for the Tropical Brazilian Forests. And it will shed light on the feasibility of new, market-like approaches to conservation that may be of broad interest to the Bank and its clients.

Responsibility: Development Research Group, Infrastructure and Environment—Kenneth Chomitz (kchomitz @worldbank.org) and Timothy Thomas. With Instituto de Estudios Sócioambientais do Sul da Bahia, Brazil; the Institute for Computational Earth System Science, University of California at Santa Barbara; Wayt Thomas; and Andre Mauricio de Carvalho, CEPLAC and Industrial Economics. The Rain Forest Trust Administration Unit is contributing funding for the research. Conservation International (Brazil and the United States), the Federal University of Minas Gerais, and Instituto de Estudios Sócioambientais do Sul da Bahia are contributing data and staff time, and Instituto Brasileiro de Geografia e Estatística is contributing data. The parallel project is funded by Programa Estadual para a Conservação da Biodiversidade (PROBIO).

Completion date: December 2001.

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Stoms, David, and Frank Davis. 2001. "Economic Instruments for Habitat Conservation."

Global Overlay Brazil

This study analyzes emerging policy issues and proposed economic mechanisms related to protecting and establishing forests in Brazil, looking at the implications for biodiversity protection, mitigation of climate change, and the local economy. The study uses spatial simulation and other methodologies to assess policy impacts.

The study has three components:

• *Transferable development rights and greater flexibility under the legal forest reserve requirement.* Brazilian law requires land owners to maintain at least 20 percent of each property under natural forest cover as a forest reserve. There is active discussion about allowing property owners to meet this requirement for one piece of property on another. This component examines the costs and benefits of alternative proposals for such a transferable development rights system, focusing on the state of Minas Gerais. Analysis suggests that restricting enforcement and trading of legal reserves to the largest properties might substantially reduce compliance and enforcement costs while satisfying much of the aggregate forest cover requirement.

• *Native forests, planted forests, and coke in Minas Gerais.* This component examines a nexus of issues related to the substitutability between charcoal from native woodlands, charcoal from plantations, and mineral coke in meeting the energy needs of Minas Gerais's large iron and steel industries, assessing policies that would internalize the environmental benefits of using sustainable sources of energy.

• *Land use in the Amazon.* This component examines the economic and environmental costs and benefits of various land use policies. The study has found that most agricultural land in Amazonia has very low productivity and that under current forms of agriculture the wet Western Amazon is probably even less productive. Ongoing analysis examines the potential effectiveness of deforestation taxes and transferable development rights in encouraging productive agriculture while preserving environmental assets.

The research project is expected to contribute to policy discussions in Brazil, to the design and implementation of World Bank projects relating to land use and sustainable development, and to worldwide discussions of innovative approaches to conservation. Preliminary results have been presented at seminars and meetings in Brazil and abroad and were featured in a Bank policy paper.

Responsibility: Development Research Group, Infrastructure and Environment—Kenneth Chomitz (kchomitz @worldbank.org) and Timothy Thomas. With Aline Tristão Bernardes; Antonio Salazar Brandão, Santa Ursula University, Rio de Janeiro; Peter May, Federal Rural University of Rio de Janeiro; Instituto do Homem e Meio Ambiente da Amazônia; Instituto Brasileiro de Geografia e Estatística; and Fundação Biodiversitas. The Global Overlay Program (Danish Trust Fund) is contributing funding for the research, and Instituto Brasileiro de Geografia e Estatística is contributing data.

Completion date: December 2001.

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Nature Tourism's Contribution to Economic Development and Conservation Finance

Improperly managed nature tourism can degrade or destroy the environmental assets on which it is based. But if managed wisely, it offers potentially valuable opportunities for generating revenues, not only for development but also for conservation.

This study investigates the contribution that nature tourism can make to conservation and the economy. It also examines the choices that determine the sustainability of nature tourism assets and the process by which these assets are exploited in developing countries. The research explores these questions:

- Is it better to raise conservation funds through changes in destination pricing or through taxes on the tourism trade?
- How should park entrance fees be structured? Should differential pricing be used (for example, for local and foreign visitors)?
- At what level should entrance fees be set to maximize the economic returns to both the site and the tourism sector?
- At what level should entrance fees be set to minimize environmental degradation and its associated costs and to maximize revenues?
- What are the main managerial options for improving the resource base or minimizing degradation?
- What are the net local economic benefits from nature tourism? That is, what are the leakages and local multipliers involved? How much do the poor in local communities adjacent to parks benefit? Are there ways to increase those benefits?
- Is there potential for local tourism activities by previously disadvantaged groups, and if so, how can they be encouraged?

There has been little applied economic analysis of the supply and demand relationships in nature tourism markets or of the relationships among the markets. For this reason, this project uses a multimarket model approach. Where possible and appropriate, the research attempts to incorporate environmental damage functions into the analytical framework, methodology, and case studies. Through evaluation of the links between nature tourism and the environment, it attempts to highlight potential threshold effects and critical features of the relationship.

Since the political, institutional, and managerial contexts play a fundamental role in the tradeoffs in nature tourism, the project seeks collaboration and cooperation with state agencies, the private sector, nongovernmental organizations, and civil society to identify local limitations. Nonetheless, as an effort in applied economic research, the project questions these limitations.

The project has developed a general sectoral multimarket analytical framework that clarifies the main direct and indirect links between the economic, environmental, social, and policy variables involved in nature tourism. The model attempts to respond to four key issues: the sustainability of resource use, the relative benefits from and interactions among multiple users, the roles of the public and private sectors in nature tourism activities, and social equity. The goal was to develop a framework that would allow policy analysts to assess these issues in different circumstances and regions.

The framework was applied to the northern area of the KwaZulu-Natal Province in South Africa in partnership with the KwaZulu-Natal Nature Conservation Service and the KwaZulu-Natal Tourism Organization. The intent was to illustrate the utility of the model, particularly in shedding light on the relative importance of different policy variables in a particular ecological and economic context. The application was also expected to demonstrate how parameters for the model relationships can be estimated and what data can reliably be found for this purpose.

The project has carried out an on-site survey (in two phases), an ecological survey, a geographic information system (GIS) analysis, a producer survey, a focus group survey involving previously disadvantaged groups, a household survey, social accounting matrix work, and an origin-country survey (in the Netherlands). In addition, it is expected that a game sales survey will be undertaken. A hunter survey had to be dropped because of resource constraints. A workshop was held in Mkuzi, KwaZulu-Natal, in June 2001, to discuss the results of all these studies with key stakeholders and obtain their feedback. The studies will be revised and pulled together for an integrated multisectoral policy analysis.

Responsibility: Africa Region, Environmental, Rural, and Social Development Department—Ernst Lutz (elutz @worldbank.org); and Environment Department—John Dixon. With Bruce Aylward; Geert Creemers, Pete Goodman, and Stuart Ferrer, KwaZulu-Natal Nature Conservation Service, South Africa; Kreg Lindberg, Griffith University, Australia; Barry James, Brousse-James & Associates, South Africa; Dawie Mullins, Conningarth Consultants, South Africa; Aki Stavrou; and DRA-Development, Durban, South Africa. The KwaZulu-Natal Nature Conservation Service has made contributions in kind.

Completion date: December 2001.

Understanding and Improving the Environmental Performance of China's Township-Village Industrial Enterprises

In less than a decade China's township-village industrial enterprises (TVIEs) have risen to near parity with the traditional industrial sector. Recent estimates suggest that these small and medium-size rural enterprises now account for about 50 percent of China's industrial output and more than 30 percent of rural income. Emissions from these enterprises remain only partially regulated, however, and China's State Environmental Protection Administration seeks a more systematic and comprehensive approach to pollution control for TVIEs.

This project will contribute to the discussion of regulatory reform in several ways. First, its results should provide useful insights for decentralization of the national regulatory system. Reforms now under discussion may involve changes in the administration of national regulatory standards, pollution charges, and monitoring and enforcement procedures. The research will point to appropriate local adjustments to respond to the gap between actual and optimal emissions.

Second, the research will focus attention on pollution exposure risks for workers in TVIEs. The welfare of workers in heavily polluting factories may be severely affected even when community-level air quality is relatively good. The study will contribute to the understanding of the issue by sharpening the overall cost-benefit assessment through separate impact estimates for exposed workers and neighboring communities. In addition, its econometric analysis will attempt to identify the main determinants of within-plant pollution. Variables to be tested include sector, output, wages, vintage, human resources, environmental management strategies, quality of environmental information, and alternative employment opportunities.

Third, the project will provide insights into the impact of more general policy reforms on TVIE pollution. Research in other Asian countries has suggested that policies affecting input prices, worker education, enterprise scale, and technology choices can have effects on pollution similar in size to those of direct regulation. Results from this research should promote a broader dialogue on the relationship between environmental and economic policy reforms in China.

Fourth, the project will use local survey data to assess the impact of environmental information and the local capacity to use it effectively. The results should improve the understanding of environmental information as a source of pressure on TVIEs to control pollution. An important role for this factor would suggest allocating greater regulatory resources to collecting and disseminating appropriate environmental information.

Fifth, the project will provide insight into the use of environmental information by TVIEs. Recent evidence from Mexico suggests that internal environmental management and training strategies can have a significant impact on factory emissions, because they increase responsiveness to regulatory incentives for pollution control. The project will assess the importance of such strategies in TVIEs. Strong results would suggest a need for greater focus on pilot technical assistance and training programs for plant-level environmental management as complements to (but not substitutes for) more traditional regulatory development programs.

Personal interviews of community leaders, plant managers, workers, and heads of household and the collection of plant-level pollution data have been completed, and the data are being analyzed. A project workshop is scheduled for September 21–22, 2001, in Beijing.

Responsibility: Development Research Group, Infrastructure and Environment—Hua Wang (hwang@worldbank.org), David Wheeler, Susmita Dasgupta, Jun Bi, Lei Liu, and Xun Wu. With Fengzhong Cao, China's State Environmental Protection Administration; Zhifeng Yang, Beijing Normal University; Genfa Lu, Nanjing University; and Guangshou Peng, Guizhou Environmental Protection Institute.
Completion date: December 2001.

Making Long-Term Growth and Development More Sustainable

Development strategies generally emphasize sustained growth as a means of raising average incomes. But failure to account for environmental degradation can erode the capital base for future development. This research aims to improve the understanding of the links between economic development and the environment and to identify policies that will help maintain long-term growth prospects.

The project, which focuses on case studies of Brazil, Chile, and Sri Lanka, adopts a variety of approaches. Each case study includes an action-impact matrix, a cost-effective approach that uses available data (primarily from in-country sources, the World Bank, and the International Monetary Fund) to show the key environmental impacts of development policies. Other approaches range from fairly simple models to quite complex (and thus costly) ones. The study compares their usefulness and cost-effectiveness in modeling the links between growth and the environment.

Initial work focused on organizing strong, in-country teams of researchers who would be responsible for critical elements of the work, consistent with the project's emphasis on capacity building. It also included gathering data, prioritizing issues, identifying options, and refining the analytical models.

The second phase of research is examining how economywide, growth-inducing policies (such as liberalization), and the growth that ensues, may exacerbate the environmental harm caused by policy distortions (such as subsidized prices for natural resources). The work is also identifying conditions under which growth could worsen the adverse environmental effects of market failures. The three country case studies are in the final stage of preparation.

Several in-country workshops that included senior decisionmakers have been held, and more are planned for reviewing and disseminating the results of the study. If resources are available, a concluding conference will be organized to communicate the study's main findings.

Responsibility: Environment Department, Office of the Director—Mohan Munasinghe (mmunasinghe @worldbank.org); and World Bank Institute, Economic Policy and Poverty Reduction Division—Jorge Araujo. With Noreen Beg; Peter Meier, IDEA Inc., United Kingdom; Chitru Fernando, ESI Inc., Sri Lanka, and Tulane University; Ronaldo Seroa da Motta and Claudio Ferraz, Instituto de Pesquisa Econômica Aplicada (IPEA), Brazil; Carlos Young, Federal University of Rio de Janeiro; Osvaldo Sunkel and Carlos de Miguel, Center for the Analysis of Public Policies, Chile; Shavi Fernando and D. C. Wijeratne, Ceylon Electricity Board; Nimal Siripala, Ministry of Finance, Sri Lanka; U. Sapukotane, Ministry of Environment, Sri Lanka; and D. Chandrasekere, Ceylon Petroleum Corporation.

Completion date: January 2002.

Report

Munasinghe, Mohan, Osvaldo Sunkel, and Carlos de Miguel. 2001. *The Sustainability of Long-Term Growth: Socioeconomic and Ecological Perspectives.* London: Edward Elgar.

Valuing Mortality Risk Reductions

In most industrial countries the mortality benefits of environmental programs accrue primarily to older people. In the case of air pollution controls the age distribution of statistical lives saved parallels the age distribution of deaths, implying that 75 percent of people saved are over 65 years old. Yet the most common method of valuing these risk reductions is to use compensating wage differentials from the labor market.

To remedy this problem, this study has developed a survey that asks people ages 40–75 what they would pay to reduce their risk of dying. Specifically, it asks respondents what they would pay for a drug (not covered by health insurance) that, if taken for the next 10 years, would reduce their chances of dying over this period by a stated amount. This question is preceded by exercises to familiarize respondents with the concept of risk of dying and with their own baseline risk of dying over the next 10 years. Also preceding it is a section discussing measures that people ages 40–75 commonly take to prolong their lives (such as screening for cancer and drug therapy for high cholesterol or high blood pressure) and the quantitative risk reductions provided by such measures.

This survey will be administered in six countries to compare and contrast estimates of the value of a statistical life for people over the age of 40. Thus far the survey has been administered to 1,200 people in the United States, 930 people in Canada, and 600 people in Japan. Current plans call for administering the survey in France, Italy, and the United Kingdom.

Results from the Canadian and U.S. surveys are remarkably similar, implying values of a statistical life of between $950,000 and $3 million (U.S. dollars), lower than the values currently used by either Health Canada or the U.S. Environmental Protection Agency. The reason for these lower estimates is not, however, the age of the respondents. The study has found that the willingness to pay to avoid the risk of death eventually falls with age, but this effect is modest: at age 70 it is 65 percent of the peak willingness to pay, which occurs at age 54. The lower willingness-to-pay value is consistent with the results of other stated preference surveys, which tend to produce values for a statistical life lower than those in revealed preference studies.

Interestingly, having a chronic heart or lung condition has no impact on willingness to pay. But a respondent's mental health score (based on a standardized health questionnaire) is a significant correlate of willingness to pay: other things equal, people with higher mental health scores are willing to pay more to increase their life expectancy.

Results of the research have been presented at the American Economic Association meetings in Boston (January 2000); the Wharton School, University of Pennsylvania (March 2000); North Carolina State University, Raleigh (May 2000); Florida State University, Tallahassee (March 2001); the John F. Kennedy School of Government, Harvard University, Cambridge, Massachusetts (May 2001); and the Summer Institute of the National

Bureau of Economic Research, Cambridge, Massachusetts (July 2001).

Responsibility: Development Research Group, Infrastructure and Environment—Maureen Cropper (mcropper @worldbank.org). With Anna Alberini, University of Maryland; Ronald Goeree and Bernard O'Brien, McMaster University, Ottawa; Alan Krupnick, Resources for the Future, Washington, D.C.; and Nathalie Simon, U.S. Environmental Protection Agency. The National Science Foundation (United States), the U.S. Environmental Protection Agency, and Resources for the Future have contributed funding for the research. Health Canada provided funding for administering the Canadian survey.

Completion date: April 2002.

Report

Krupnick, Alan, Maureen Cropper, Anna Alberini, Nathalie Simon, Bernard O'Brien, Ronald Goeree, and Martin Heintzelman. Forthcoming. "Age, Health, and the Willingness to Pay for Mortality Risk Reductions: A Contingent Valuation Survey of Ontario Residents." *Journal of Risk and Uncertainty.*

Measuring the Economic Value of Environmental Protection Projects: Methodology and Application to Armenia's Lake Sevan

Lake Sevan, a large, high-altitude lake in Armenia with much symbolic, cultural, and historical importance to Armenians, has been significantly depleted over the past 50 years. Withdrawals have lowered the water level and shrunk the surface area, destroying fisheries and reducing tourism. The Armenian government is considering actions to stop or partially reverse the damage. The costs of these actions are estimated to be high. The benefits have not been estimated.

This study is using contingent valuation methods to estimate the benefits related to the lake's recreational and nonuse values. Through surveys, it is assessing the willingness of Armenians—in the country and in the diaspora—and tourists to pay to prevent further degradation of the lake. It is also testing different formats for eliciting value (open-ended, close-ended, likelihood), different survey modes (mailed questionnaires, in-person interviews), and different payment vehicles (utility bills, a trust fund, tourist fees).

Surveys in Armenia have been completed, and the resulting data are being analyzed. Surveys in France and the United States are expected to be finished soon.

The findings from the research will serve as input to government policy decisions relating to restoration of Lake Sevan. In addition, the results from testing survey methods will be useful for managers of projects dealing with large nonuse or nonmarket environmental benefits and for practitioners of environmental valuation, particularly in developing countries.

Responsibility: Development Research Group, Infrastructure and Environment—Hua Wang (hwang@worldbank.org), Maureen Cropper, Benôit Laplante, Craig Meisner, Xun Wu, Wenhua Di, and Yanghong Jin. With Vic Adamowicz and Dale Whittington.

Completion date: June 2002.

Pesticide Use in Brazil

Growing use of chemical pesticides and fertilizers has caused serious damage to human health and the environment in many developing countries. According to estimates by the World Health Organization and United Nations Environment Programme, pesticide poisoning injures 1–5 million agricultural workers a year. At least 20,000 workers die from exposure to pesticides every year, most of them in developing countries. Chemically polluted runoff from fields has contaminated surface and ground waters, damaged fisheries, destroyed freshwater ecosystems, and created growing "dead zones" in the ocean.

Despite growing awareness of the human health hazards and environmental degradation from pesticide use, policymakers in developing countries have shown little response. The reason, in large part, is that most developing countries have little or no reliable information about their pesticide application and the associated damage—and even less information about what determines pesticide use and how it would respond to regulatory instruments. Until recently, lack of data has prevented systematic research in this area.

Drawing on a range of new data from Brazil, this research attempts to help close that gap by quantifying the negative externalities of pesticide poisoning and ecosystem damage throughout the country and by drawing a correlation between these results and the spatial distribution of intensive pesticide use at the county *(municipio)* level. This work will give policymakers a more reliable measure of the problem and help to identify areas where the problem is most intense and where targeted monitoring and intervention could yield the maximum social benefits. Recognizing the wide variation in use throughout Brazil, the analysis will attempt to examine regional differences and offer alternative strategies for a responsive agricultural (pesticide) policy.

The research, a collaborative effort with Fundação Instituto Brasileiro de Geografia e Estatística (IBGE), involves compiling data on pesticide use from secondary sources in Brazil, mapping comprehensive profiles of pesticide application at the county level, modeling regional differences in pesticide use in Brazil, and systematically tracking cases of pesticide poisoning and ecosystem damage.

The study has found that Brazil's agricultural growth in the 1990s was associated with a more than doubling of pesticide use, leading to serious damage to human health and the environment. The main message emerging from the findings is nevertheless hopeful. The results suggest that pesticide use in Brazil is heavily skewed toward a few cash crops for export, suggesting that targeting interventions to these few crops offers promise for offsetting the rapid increase in pesticide use and consequent harm.

Responsibility: Development Research Group, Infrastructure and Environment—Susmita Dasgupta (sdasgupta @worldbank.org). With Craig Meisner; Nlandu Mamingi, University of West Indies; Guilherme Soria Bastos Filho; and SCIENCE, Escola Nacional de Ciências Estatísticas, Brazil.

Completion date: June 2002.

Report

Dasgupta, Susmita, Nlandu Mamingi, and Craig Meisner. Forthcoming. "Pesticide Use in Brazil in the Era of Agroindustrialization and Globalization." *Environment and Development Economics* (special issue on agroindustrialization and globalization).

Environmental Data Accounting

This project investigates how the depletion of natural resources and degradation of the environment by air and water pollution could be incorporated into a system of conventional national accounts to measure economic performance and sustainability. Through participation in the London Group on Environmental Accounting, the project supports international initiatives to revise the United Nations' Recommended System of Integrated Environmental and Economic Accounts (SEEA). In conjunction with related research activities by the United Nations, Eurostat, the Organisation for Economic Cooperation and Development, and leading industrial countries, the project is working to develop a general measure of sustainability. It is also reviewing different approaches to creating a coherent set of environmental accounts and assessing how well each fits with internationally established economic accounting methods that link asset stocks with flows.

All these activities are closely tied to efforts within the World Bank to expand the range of environmental indicators, strengthen their relevance, and produce and refine associated statistical series. This initiative thus forms an important part of the Bank's commitment to providing suitable data for monitoring newly agreed on international development goals for the environment in the 21st century.

Some of the data compiled to better understand the links between the economy and the environment appear regularly in the World Bank's annual *World Development Indicators*. In particular, "genuine savings," an indicator of sustainability, has been estimated for some 120 countries and published in the *World Development Indicators* and the Bank's *Little Green Data Book*. The project has also produced working papers on the revised SEEA for the London Group on Environmental Accounting.

Responsibility: Development Data Group—M. Saeed Ordoubadi (mordoubadi@worldbank.org); and Environment Department, Office of the Director—Kirk Hamilton.

Completion date: December 2002.

Biodiversity, Habitat, Conservation, and Valuing Natural Resources in the Amazon Estuary

The Amazon estuary is relatively pristine. But ranching activities are encroaching on its wetland habitats, putting at risk fisheries with important commercial and subsistence value. This project investigates whether unrestricted expansion of cattle ranching is a good land use for the Amazon estuary and will attempt to establish whether joint management of cattle ranching and fisheries would optimize economic returns and conservation benefits for the region. The project's principal objectives are to:

- Identify, analyze, and evaluate major wetland resource uses in the Amazon estuary.
- Call attention to the need to incorporate the overwhelming influence of urban-driven exploitation of wetland resources into conservation policy for the Amazon wetlands.
- Spatially define wetland habitats and patterns of resource use in the Amazon estuary in order to develop a realistic geographic basis for conservation planning.
- Analyze the estuary's ecological and economic relationship to inland wetlands, using cattle ranching and migratory catfish as examples.
- Produce a report that can be used by policymakers to launch sound conservation measures in the Amazon estuary.

The project's analytical framework integrates an ecological assessment and biodiversity analysis of the estuary's principal habitats with an economic valuation of the most important wetland resources exploited. The project is developing a land use model that provides the economic framework for evaluating the ecological effects of land conversion. This leads to the estimation of three models: the demand for fish, the demand for cattle products, and the effect of land on ranch profits.

Data are being collected for the ecological assessment, biodiversity analysis, and evaluation of the estuary's main economic activities. These include data on structural components (especially vegetation types and biodiversity) of estuarine wetland habitats, the spatial distribution of estuarine habitats, major impacts (especially deforestation) on the habitats, estuarine fisheries and inland fisheries (migratory species from the Amazon estuary), estuarine livestock, estuarine timber and non-timber resources, and market prices for marketed species.

The land use analysis is expected to provide useful insights into optimal patterns of land use in this and similar regions. Estuarine biodiversity and habitat databases will be developed and made available on diskette and through Web sites to local research and government institutions in Brazil. In addition, the work will support ongoing efforts by the World Bank and the Global Environment Facility to promote stakeholder dialogue and the dissemination of information within the estuary and across the Amazon Basin.

Responsibility: World Bank Institute, Environment and Natural Resources Division—Gayatri Acharya (gacharya @worldbank.org). With Nigel Smith, University of Florida; Michael Goulding, Amazon Conservation Team; Ronaldo Barthem, Museo Goeldi; and Kenneth McConnell, University of Maryland.

Completion date: June 2003.

The Impact of Regulatory Risk on the Cost of Private Debt for Infrastructure Projects in Emerging Markets

During the 1990s capital markets became the main source of funding for infrastructure projects, once financed overwhelmingly by governments. In developing and transition economies infrastructure bonds were the most common method of financing oil, gas, transport, electricity, and telecommunications projects. Since investments in infrastructure are particularly susceptible to the risks of government interference, countries raising private finance for infrastructure projects need to ensure that their political and regulatory frameworks allay investors' concerns about the risk of default.

Through analyses of rich cross-sectional and time-series data on the fixed rate infrastructure bonds issued and traded during the 1990s, this research examined the effect of political and regulatory frameworks on investors' perceptions of risk and thus on the cost of debt. The research considered such aspects of polity and governance as the tradition of law and order, the presence of corruption, the quality of the bureaucracy, the strength of the contract enforcement system, the extent of regulatory discretion and the political constraints on this, and the likelihood of expropriation and other political risks. It also identified the political and regulatory risks that concern investors most. The research compared infrastructure bond markets of developed and emerging economies to see how the factors driving infrastructure finance in the two country groups differ and to draw policy conclusions from these differences.

The study included several methodological innovations:

- It enhanced the explanatory capacity of credit risk models by combining firm-specific and macroeconomic factors and adding the full spectrum of risks associated with the quality of governance and regulation in the country and sector issuing a given bond.
- It applied hierarchical cluster analysis to examine an array of indicators of regulatory and political risk and to identify variables that drive the perception of governance risk in a given country.
- It complemented the analysis based on cross-sectional data by constructing a database of time-series yield data on infrastructure bonds traded in the secondary market and examining factors that affect bond risk in actual market conditions.
- It investigated the effect of industry structure and regulation on infrastructure bonds in the power sector.
- It compiled and analyzed the rating history of an entire universe of infrastructure bonds, then used the history of upgrade and downgrade events to investigate the effects of governance over the lifetime of the bonds.
- Finally, the study analyzed the information about key governance risks to get at the implications for policy.

The relationship between regulatory policy and the cost of private debt for infrastructure in developing countries has received little attention, yet has important implications for the World Bank's policy advice on building and strengthening regulatory regimes to promote private sector development. This research contributed to that advice as well as to the Bank's methodology for pricing risk insurance to facilitate private project finance. The research also produced a database of regulatory risk indicators in industrial and developing countries, which will be made available to researchers and practitioners.

Responsibility: Europe and Central Asia Region, Energy Sector Unit—Laszlo Lovei (llovei@worldbank.org). With Nina B. Bubnova and John M. Quigley, University of California at Berkeley; and Ilya Lipkovich, Virginia Polytechnic Institute.

Completion date: October 2000.

Report

Bubnova, Nina. 2000. *Governance Impact on Private Investment: Evidence from the International Patterns of Infrastructure Bond Risk Pricing.* World Bank Technical Paper 488. Washington, D.C.

Yardstick Competition across Ports: An Illustrated Guide for Regulators

This research showed how to use relatively standard methodologies in measuring the efficiency gains from reforms in the organization of port infrastructure—and then how to use these measures to promote competition between ports and introduce regulation driven by built-in incentives. Measuring efficiency in the context of incentive-based regimes and yardstick competition is among the key policy issues for regulated infrastructure activities, and the study showed that despite the well-known difficulties of getting good data on the infrastructure sector, it is possible to collect enough comparable data on production to establish cost-cutting incentives and to promote ex post competition in the sector.

Based on performance and productivity data assembled in collaboration with the Mexican port regulator, the study estimated a stochastic production frontier. It then applied this frontier in an analysis of the effects of Mexico's 1993 port reform during 1996–99, the first efficiency analysis of port restructuring in a developing country. The results showed that Mexico has achieved annual efficiency gains of 6–8 percent in the use of port infrastructure since assigning the management of the infrastructure to independent, decentralized operators. The size of the gains is roughly the magnitude by which the price cap should be cut in the next tariff revision, in order to penalize operators performing below average and reward those performing above average. The relative performance ratings over time are revealing: they identify consistent sets of leaders and laggards, including some that would not have been identified with the partial productivity indicators commonly used in the sector.

Through continuing collaboration with the Mexican port authority, work is being done to update the results with final data for 2000. In addition, Mexico is using the results in its tariff revision.

The project also established initial contacts with countries where the project team hopes to continue working with local researchers (Argentina, Brazil, Chile, China, Colombia, Côte d'Ivoire, Peru, and Senegal). Several of these countries are considering a similar analysis of their port sectors. In addition, studies are under preparation for the water sector in Africa and the electricity sector in Latin America. To motivate similar research in Africa and Latin America, the project involved reviewers from these regions and offered seminars to develop the interest of local researchers.

Seminars and presentations have included a regulatory accounting workshop at the Mexican port authority for participants involved in tariff revision (June 2000); a lecture on efficiency measures in regulated industries at a regulatory economics course for utility regulators from seven Latin American countries (January 2001); a three-day course on competition in regulated industries at the Chinese Academy of Social Sciences in Beijing for regulators and academics from all sectors (February 2001); a workshop at a regulation and intermodal integration course in Barcelona, Spain, for port regulators from Spain, Portugal, and eight Latin American countries (May 2001); and a course on measuring efficiency for African infrastructure regulators in Dakar, Senegal (June 2001). A presentation is also planned for a conference of Latin American regulators and academics in Santiago, Chile, in January 2002.

Responsibility: World Bank Institute, Governance, Regulation, and Finance Division—Antonio Estache (aestache @worldbank.org). With Antonio Alvarez, University of Oviedo, Spain; Tim Coelli, University of New England, Armidale, Australia; Marianela González and Lourdes Trujillo, Universidad de Las Palmas de Gran Canaria, Spain; Eugene Kouassi, University of Cocody, Côte d'Ivoire; Sergio Perelman, University of Liege, Belgium; Martín Sgut; G. de la Merced; S. Lamarroy; and J. Pastrana. The government of Mexico contributed staff time for the research.

Completion date: November 2000.

Reports

Coelli, Tim, Antonio Estache, Sergio Perelman, and Lourdes Trujillo. Forthcoming. *A Primer on Efficiency Measurement for Utilities and Transport Regulators*. World Bank Institute Development Studies Series. Washington, D.C.: World Bank.

Estache, Antonio, Marianela González, and Lourdes Trujillo. 2001. "Technical Efficiency Gains from Port Reform: The Potential for Yardstick Competition in Mexico." Policy Research Working Paper 2637. World Bank, World Bank Institute, Governance, Regulation, and Finance Division, Washington, D.C.

Community Comanagement of Urban Environmental Quality: Water, Sanitation, and Water Pollution Control

The main goal of this research was to answer this question: What is the best decisionmaking procedure for coordinating the actions and resources of the municipal government, the community, and the private sector in designing water and sanitation, solid waste management, and water pollution control systems that are sustainable, equitable, effective, and efficient?

From this main objective came three specific objectives. The first was to develop a planning methodology consisting of a set of decisionmaking procedures and a set of guidelines for selecting the procedure most appropriate for a given situation. The decisionmaking procedures needed to be designed to determine the best systems for serving a given urban community, the resources required for those systems, and the contributions to be provided by the municipality, the community, and the private sector. The second objective was to apply the procedures in an urban environment in Latin America. And the third was to evaluate the procedures on the basis of this application.

The project developed a multiobjective participatory planning methodology for helping service users and providers collaborate in determining the best technology mix and the best way to share the burdens of finance, labor, and materials. The planning methodology focuses on the household as a fundamental unit of decisionmaking and resource allocation; links three levels of analysis—the household, the community, and the municipality—in an operational procedure for allocating resources; recognizes the link between environmental management and economic development; and offers an operational framework for linking sustainability, efficiency, effectiveness, and equity.

The initial intention was to apply the methodology in three varied case studies. But as a result of insurmountable difficulties, case studies at two of the three proposed sites failed to get off the ground, while those conducted at the third site, in Soyapango, El Salvador, failed to elicit the collaboration of government service providers, despite earlier commitments to participate. The similarity of the cases in Soyapango diminished the richness of possible lessons and reduced the universe of cases to which they might be extrapolated. Moreover, failure of government agencies to participate prevented exploration of methodologies to support negotiation of burden sharing and resource allocation by service providers (government and private) and consumers (the community).

The project applied the planning methodology in three low-income communities in Soyapango (a suburb of San Salvador): Las Margaritas (with a population of 275), Reparto San Luis (235), and Nueva Esperanza (385). Fifty-six alternative service systems were determined to be feasible for Las Margaritas and Reparto San Luis, and 16 for Nueva Esperanza. Through intensive consultation in each community, in group forums and individual discussions, hierarchies of objectives for the systems were developed, focusing on costs, benefits, and opportunities. In each community a workshop was then conducted at which members of the neighborhood board would design several alternative plans, evaluate them, and select the preferred one. The work to design alternative plans was based on a multiobjective mixed-integer optimization model in which the main decision variables were the number of households to be served by a given system.

Using operational versions of this model that combined a weighting method and compromise programming, the project generated 6–10 solutions for consideration by the board. After some were eliminated as of no interest and the remaining ones were ranked, a variant of the weighted Tchebycheff method was used to generate three or four more alternatives. Board members then chose the three most attractive plans for a detailed evaluation based in part on the hierarchies of objectives. Although no group completed the full assessment during the workshop, the Las Margaritas and San Luis groups made sufficient progress to select their preferred plan.

The application of the methodology led to several lessons:

• *Plan implementation.* Omission of a project component to implement the plan chosen was a sticking point that hampered the investigation. Given the time and energy that communities are expected to give to studies such as this one and the problems that can occur when implementation is not part of the research, it appears that studies should guarantee funds for implementation. But if a community or agency knows that money will be available for whatever technologies it selects, it will have no incentive to consider anything but the most convenient choices or to consider cost—hardly a realistic approach.

• *Beneficiary initiative.* Lack of interest by some parties during the case studies required the team to "market" the project, underscoring the importance of ensuring that the expected beneficiaries are the driving force and that they have something at stake.

• *Strengthened ties.* Participation in the project strengthened the ties between community leaders and the people they represent and improved their ability to discuss and tolerate different viewpoints.

• *Community realism.* The communities came to understand that real constraints—legal, technical, financial—were at play, precluding some solutions and demanding tradeoffs among objectives. For example, despite frequent assertions that they would not accept latrines, San Luis and Las Margaritas ultimately selected systems utilizing latrines because of the cost of alternatives.

Don Bosco University, a private Catholic institution in the heart of Soyapango, collaborated in the research and served as principal liaison with the communities.

Responsibility: Latin America and the Caribbean Region, Environmentally and Socially Sustainable Development Sector Unit—Richard M. Huber. With Mark Ridgley and Aimee del Aguila, Terra Group; Maria Cristina de Barahona, Francisco Rivas, Nelly Castillo, and Saul Benitez, Don Bosco University, El Salvador; and Arnold vd Klundert, Maria Muller, Jaap Rijnsburger, and Lex Hemelaar, WASTE, the Netherlands. The Netherlands Partnership Trust Fund contributed funding for the research.

Completion date: December 2000.

Institutions, Politics, and Contracts: Private Sector Participation in Urban Water Supply

Since the late 1980s many developing countries have reformed urban water utilities to improve performance, involving the private sector through such approaches as leases, concessions, and service contracts. Despite the wide variation in approaches, no rigorous analysis had critically examined how the design of reform affects the development of the urban water sector or how institutional and political factors affect options for reform.

Using a case study approach, this research attempted to fill that gap by systematically analyzing the experience with reform and private participation in the provision of water in six cities in Africa and Latin America: Buenos Aires, Argentina; Santiago, Chile; Abidjan, Côte d'Ivoire; Conakry, Guinea; Mexico City, Mexico; and Lima, Peru. This 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 analyzed the effects of political and contracting institutions on the design and performance of contracts for reform of urban water supply, comparing different forms of private participation and reforms under public ownership. It examined the design and performance of reform (including the contractor selection process, contract design, and regulatory framework), looking at how the different types of reform addressed (or failed to address) possible problems of incentives, information asymmetries, and credibility. Finally, the research assessed the results of the reform, looking at different indicators of performance and measuring the welfare effects of reform compared with a 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 research produced several important findings:

• In institutionally weak environments it is difficult to provide institutionalized protection against expropriation of quasi rents and regulatory capture.

• Constraints such as the political importance of water, the cost and scarcity of water resources, and the extent of unmet demand profoundly affect the design and difficulty of reform.

• The political motivation for, feasibility of, and commitment to reform affect the choice of design for reform and its success.

• Even in difficult institutional environments and with serious failings in design or implementation, private participation produced gains over reasonable counterfactuals. Most notably, despite the very difficult institutional environment in Conakry, consumers, the government, and the foreign firm that entered the sector all benefited from privatization.

• The large health and environmental externalities associated with water provision make it fundamentally different from other infrastructure sectors.

• In the African case studies one of the largest problems was nonpayment by the government. Although the private operator in Conakry could cut off nonpaying agencies, it chose not to, fearing retaliation. It is important that governments recognize the cost of nonpayment, particularly to the poor, who cannot afford to subsidize government consumption.

• The gains from having a politically independent regulator are significant. Performance improved in Santiago without privatization, apparently as a result of improved regulation. Santiago's regulator was powerful, independent, politically insulated, and guided by detailed laws that left little room for discretion. Moreover, it paid salaries above the civil service norm, and its staff was regarded as honest, professional, and competent.

The case studies will be published in a forthcoming book and will also be used by the World Bank Institute in training programs on the water sector and on regulation. Results have been presented at a World Bank Institute clinic in India and at the Regional Conference on Reform of the Water Supply and Sanitation Sector in Africa, in Kampala, Uganda, on February 26–28, 2001.

Responsibility: Development Research Group, Regulation and Competition Policy—Mary Shirley (mshirley@worldbank.org), Luke Haggarty, Colin Xu, Ana Maria Zuluaga, and George R. G. Clarke; and Private Sector Development Department, Private Participation in Infrastructure—Penelope Brook. With Claude Ménard, Sorbonne University; Simon Cowan, Worcester College, Oxford; Manuel Abdala, Navigant Consulting and University of San Andrés, Buenos Aires; Lorena Alcázar, University of the Pacific; Douglass North, Washington University at St. Louis; Scott Masten and Keith Crocker, University of Michigan; Roger Noll, Stanford University; Dale Whittington, Northeastern University; and Matthew McCubbins, University of California at San Diego.

Completion date: December 2000.

Reports

Alcázar, Lorena, Manuel A. Abdala, and Mary M. Shirley. 2000. "The Buenos Aires Water Concession." Policy Research Working Paper 2311. World Bank, Development Research Group, Washington, D.C.

Alcázar, Lorena, Colin Xu, and Ana Maria Zuluaga. 2000. "Reforming Urban Water Supply: The Case of Lima, Peru." World Bank, Development Research Group, Washington, D.C. Draft.

Clarke, George R. G., Claude Ménard, and Ana Maria Zuluaga. 2000. "The Welfare Effects of Private Sector Participation in Guinea's Urban Water Supply." Policy Research Working Paper 2361. World Bank, Development Research Group, Washington, D.C.

Haggarty, Luke, Penelope Brook Cowen, and Ana Maria Zuluaga. 1999. "Institutions, Politics, and Contracts: Private Sector Participation in Urban Water Supply Systems—The Case of Mexico City Water Sector Service Contracts." World Bank, Development Research Group, Washington, D.C.

Ménard, Claude, and George R. G. Clarke. 1999. "Reforming Urban Water Supply: The Case of Abidjan, Côte d'Ivoire." Policy Research Working Paper 2377. World Bank, Development Research Group, Washington, D.C.

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Shirley, Mary M., ed. Forthcoming. *Thirsting for Efficiency: Experiences in Reforming Urban Water Systems*. Oxford: Elsevier.

Shirley, Mary, and Claude Ménard. 1999. "Cities Awash: Reforming Urban Water Systems in Developing Countries." World Bank, Development Research Group, Washington, D.C. Draft.

Shirley, Mary, L. Colin Xu, and Ana Maria Zuluaga. 2000. "Reforming Urban Water Supply: The Case of Santiago, Chile." Policy Research Working Paper 2294. World Bank, Development Research Group, Washington, D.C.

Competition and Privatization in Urban Water Supply

Compared with other infrastructure sectors, urban water supply has been privatized more slowly while involving the private sector less. One plausible reason for this is that introducing product market competition is much harder in the water sector. Consequently, competition must be introduced indirectly—in the form of competition for the market (competitive bidding for a lease or concession), yardstick competition (benchmarking), and competition in the capital market. Rather than relying on competition for the market, the government of the United Kingdom decided to rely on yardstick and capital market competition, combined with a new regulatory regime to protect consumers.

This project evaluated the performance of this approach in the United Kingdom. Using data from company balance sheets and income statements, the research used a partial equilibrium cost-benefit analysis (developed by Ahmed Galal and others, *Welfare Consequences of Selling Public Enterprises: An Empirical Analysis*, New York: Oxford University Press, 1994) to assess the effect of privatization on welfare and identify who gained and who lost.

The research found that privatization appears to have resulted in net societal gains while failing to benefit either consumers or the government—but allowing big gains to stockholders. The main reason is that the government allowed the water companies to increase prices significantly. Thus shareholders earned large windfall gains—despite the establishment of a well-funded, independent, and highly competent regulator and the attempts to introduce competition.

Several broad lessons can be drawn from this experience:

• When the cost of meeting future obligations is highly uncertain, as it was at the time of privatization in the United Kingdom as a result of a tightening of environmental laws, setting prices for long periods in advance can be costly. The large price increases proposed to cover the cost of the new requirements resulted in large losses to consumers and large gains to shareholders when it turned out that the water authorities could meet the requirements at far lower cost than originally thought.

• This miscalculation occurred despite a relatively apolitical, highly competent, and noncorrupt regulator and civil service. In many developing countries setting appropriate price caps for long periods under great uncertainty is likely to be even more difficult.

• Price caps that are generous to shareholders (and less so to consumers) are more likely when soft price caps serve the government's political purposes, as they did in the United Kingdom.

• It is important to have a strong, independent regulator in place well before the main parameters that affect privatization outcomes are established. Although privatizing the water authorities was originally proposed in 1985, the regulator was not fully operational until after the prices were set for the first five years following privatization. Failure to have an independent regulator in place not only increases the probability of errors, but also opens the government up to charges of politicizing the privatization process.

Preliminary results were presented at a World Bank seminar in April 1998, and more recent results at the Regional Conference on Reform of the Water Supply and Sanitation Sector in Africa, in Kampala, Uganda, on February 26–28, 2001.

Responsibility: Development Research Group, Competition and Regulation Policy—George R. G. Clarke (gclarke@worldbank.org) and Ana Maria Zuluaga. With Simon Cowan, Oxford University.

Completion date: June 2001.

Reports

Clarke, George R. G., Simon Cowan, and Ana Maria Zuluaga. 2000. "Competition and Regulation in Urban Water Supply: The Privatization of Thames Water." World Bank, Development Research Group, Washington, D.C.

———. 2000. "A Cost-Benefit Analysis of the Privatization of Thames Water." World Bank, Development Research Group, Washington, D.C.

The Effects of Telecommunications Infrastructure on Investment: An Empirical Analysis

This research studied the effect of telecommunications infrastructure on the allocation of foreign direct investment and on the outcome of World Bank projects through cross-country econometric analysis. The research involved creating and analyzing a data set and carrying out supporting case studies.

The research found a positive relationship between teledensity (telephone lines per capita) and inflows of foreign direct investment. It also found that privatization of telecommunications was significantly and positively related to growth in foreign direct investment inflows. However, only by using some methodologically irregular techniques could the research find a relationship between teledensity and World Bank project performance that was supported by the data.

Material from the econometric research was combined with case study material on the use of information and communications technologies in developing countries as they might relate to foreign direct investment and World Bank project performance. The resulting working paper has been used in several courses on information and communications technologies and development. The research results, data set, and case studies have also provided input to many Bank reports and papers. The data set is being updated and will be used in future studies, and the case studies are being incorporated into articles.

Responsibility: World Bank and International Finance Corporation, Global Information and Communications Technology Department, Policy Division—Charles Kenny (ckenny@worldbank.org) and Christine Zhen-wei Qiang. With Taylor Reynolds and Jia Liu, American University; and Jeremy Grace, State University of New York at Geneseo.

Completion date: June 2001.

Reports

Grace, Jeremy, Charles Kenny, and Christine Zhen-wei Qiang. 2001. "ICTs and Broad-Based Development." World Bank and International Finance Corporation, Global Information and Communications Technology Department, Washington, D.C.

Liu, Jia, Charles Kenny, and Christine Zhen-wei Qiang. 2001. "Telecommunications Infrastructure and Success of World Bank Projects: An Empirical Analysis." World Bank and International Finance Corporation, Global Information and Communications Technology Department, Washington, D.C.

Reynolds, Taylor, Charles Kenny, and Christine Zhen-wei Qiang. 2001. "Telecommunications Infrastructure and Foreign Direct Investment: An Empirical Analysis." World Bank and International Finance Corporation, Global Information and Communications Technology Department, Washington, D.C.

Privatization and Basic Infrastructure Services for the Urban Poor

Latin America has been at the forefront of the worldwide movement toward reform of utility services (water, energy, telecommunications). While social concerns have not been absent from the reform process in Latin America, they have often been secondary to fiscal considerations. As a result, it is difficult to generalize about the overall impact of reform on poor households.

This study examined the impact of infrastructure privatization on the poor in Latin America. It reviewed the transmission mechanisms through which infrastructure reform may affect the poor, focusing on microeconomic issues related to the poor's access to infrastructure services and the affordability of those services. Using household survey data from 12 countries, the study reviewed the trends in access to infrastructure services, examining whether the poor are benefiting from increases in connections. It also looked at the policy options for improving access and ensuring affordability of service and assessed how priorities should be set.

The study found that in many cases the poor have benefited from utility reform, but there is little doubt that more could have been achieved if reform had focused more explicitly on poverty from the outset. In two areas in particular reforming countries consistently failed to take the interests of the poor into account: the affordability of service and that of connections.

Throughout Latin America cross-subsidies have been the preferred method for safeguarding the interests of poor households. But there is evidence that many cross-subsidy mechanisms are poorly designed, directing as much as 60–80 percent of cross-subsidies to households well above the poverty threshold and failing to benefit as many as 80 percent of poor households. The alternatives to cross-subsidies have often been overlooked by policymakers. One alternative is to provide poor households with the option of receiving a lower quality of service in return for more affordable tariffs. Another is to provide customers with better ways of budgeting for utility costs.

Another common failing in the reform has been the introduction of prohibitively high connection charges that fail to take into account the difficulty poor households have in making one-time capital payments. For poor households affordability can be much more of a barrier to access than to service use. There are several strategies for circumventing this problem. The utility could provide customers with a credit line, allowing them to pay the connection charges in several installments. The cost of connection could be reduced by using innovative low-cost technologies or allowing poor households to contribute labor. And the cross-subsidy approach could be applied to financing connections rather than reducing service tariffs.

The findings of the study have been widely disseminated. They are being used in two World Bank Institute courses on private participation in infrastructure and its implications for the poor and have served as input to a World Bank energy strategy and to poverty diagnostic reports for several Latin American countries. In addition, findings have been presented at seminars and conferences, including at the Canadian Economic Association, the Canadian Public Economics Study Group, GREQAM (Marseille, France), the Planning Ministry of Uruguay, the University of York (England), Société Canadienne de Science Economique, and the World Bank.

Responsibility: World Bank Institute, Governance, Regulation, and Finance Division—Antonio Estache (aestache @worldbank.org); and Latin America and the Caribbean Region, Poverty Sector Unit—Quentin Wodon and Vivien Foster. With Mohamed Ihsan Ajwad; Corinne Siaens; and Jean-Philippe Tre.

Completion date: June 2001.

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The Sustainable Financing of Investments in Municipal Infrastructure: Cost Recovery for Solid Waste Management in the Philippines

This study uses contingent valuation surveys to measure the willingness to pay for garbage collection and disposal. Results of a 1998 survey of 500 representative households, 300 representative commercial establishments, and 150 itinerant vendors in Iloilo, a medium-size city in the Philippines, reveal that on average households are willing to pay 24.45 pesos and commercial enterprises 89.15 pesos a month for solid waste collection. (The number of usable responses from the itinerant vendor sample was too low to obtain robust results.) In contrast, willingness to pay for solid waste disposal was close to zero for both households and commercial entities. Similar results were obtained in a second medium-size city, Naga.

Household income, the respondent's level of schooling, male gender, hiring help to dispose of garbage, and recycling waste in the household were all positively related to the willingness to pay for garbage collection. Age and burning garbage were negatively related to willingness to pay. These results clearly underline the importance of education and information campaigns in increasing awareness of the importance of solid waste management—and thus the willingness to pay for the service.

The data are also being used to study the feasibility and applicability of the benefit transfer methodology, in which the benefits associated with an improvement program are assessed by using the results from one city to predict the response in another. The household survey data from Naga and Iloilo on willingness to pay for a garbage collection program were examined using survival time models and a Weibull distribution under the same model specification for each city. Respondent characteristics—age, gender, income, home ownership, household size, level of schooling, and level of garbage collection service—were used as explanatory variables. The results were mixed. Although overall mean and median willingness-to-pay values for the service in the two cities were similar, explanatory variables entered the equation with differing levels of statistical significance. Additional work in this area is looking at the effects of the choice of distribution on model fit and the resulting implications for benefit transfer.

Preliminary analytical results were presented to mayors and city officials in Iloilo and Naga, the Philippine Department of Environment and Natural Resources, local nongovernmental organizations, and academics in Manila in February and March 1999. Results were also presented to World Bank operational staff during the Study Tour on Waste Management in Scandinavia, on June 7–11, 1999.

Responsibility: Latin America and the Caribbean Region, Finance, Private Sector, and Infrastructure Sector Unit—Sheoli Pargal (spargal@worldbank.org); and Development Research Group, Infrastructure and Environment—Maureen Cropper. With Nathalie Simon, U.S. Environmental Protection Agency; and the University of the Philippines. The Japanese government contributed funding for the research.

Completion date: July 2001.

Comparative Study of Water Institutions and Their Impact on Water Sector Performance in Selected Countries

In response to increasing water scarcity, water institutions —formal and informal policy, legal, and administrative entities—are undergoing far-reaching changes worldwide. What has been the cross-country experience with the evolution of water institutions? Do the changes advance or impede the water sector's financial viability and the sustainability of water resources?

This project addressed these questions through a comparative study of water institutions and their impact on the sector's performance in selected industrial and developing countries. The interdisciplinary study compared the water institutions of the 35 sample countries within a common framework defined by a set of institutional (legal, policy, and administrative) features, focusing on economic and operational performance. It then compared water sector performance, based on qualitative and quantitative variables. By linking the comparative analysis of institutions with the analysis of sector performance, the research identified both common and unique features in best-practice and worst-case institutions.

The analysis drew primarily on data from personal interviews on key water sector challenges and recent institutional responses and from a detailed questionnaire administered to water sector experts to obtain factual and subjective information on water institutions and sector performance.

Despite variations in resources and political economy situations, common trends and patterns emerged.

The key issues are no longer resource development and water quantity but resource allocation and water quality. The notion of water provision as a public good and a welfare activity is being replaced by the concept of water as an economic good and an input in economic activity. And the old development paradigm centered on centralized decisionmaking, administrative regulation, and bureaucratic allocation is fast giving way to a new paradigm rooted in decentralized allocation, economic instruments, and stakeholder participation.

For the World Bank and other international development agencies, the findings suggest a critical need to concentrate efforts in countries, areas, and subsectors that already have a critical mass of institutional capacity, where lower transaction costs increase the probability of success. The institutional changes occurring across countries suggest that the potential net gains from such changes are beginning to exceed the corresponding transaction costs in most contexts.

The multidimensional links among key sector problems suggest that an integrated approach to reform will have the greatest impact. At the heart of such an approach lie institutional changes to strengthen and modernize the legal, policy, and administrative arrangements governing the water sector.

The second phase of the study developed an analytical framework to identify layers of institutional links and links between institutions and performance. It then evaluated these layers of links using an evaluation methodology employing perception-based cross-country data. These analytical and empirical efforts were used to identify key inputs for a generic strategy of water institution reform.

The results show the relative strength, direction, and significance of the effects of institutions on performance. They suggest that the interaction of institutions and performance can be determined by the general socioeconomic, political, and resource-related environment in which it occurs. And they strongly favor a sequential strategy for institutional reform.

The third phase of the study analyzed the entire data set, which includes 127 observations from 43 countries.

The results of the study have been presented at seminars at the World Bank, the University of Indiana at Bloomington, and the Water Resources Center of the University of Illinois at Urbana, and at a conference of the European Association of Environmental and Resource Economists. A final report on the results is being prepared.

Responsibility: Rural Development Department—Ariel Dinar (adinar@worldbank.org). With R. Maria Saleth, Institute for Social and Economic Change, Bangalore, India. The Netherlands Trust Fund contributed funding for the research.

Completion date: October 2001.

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The Impact of Rural Roads

Rural roads can boost agricultural growth and investment, household food security, and investment in human capital. And they can improve access to markets for rural products and reduce transaction costs. But the returns to rural road investments are not known, in part because of methodological problems. Even if the returns are calculated using the internal rate of return approach, the estimates are generally so low that the investments do not appear viable. Moreover, the effects of rural roads are long term and cannot be captured through cross-sectional survey data.

This research project has designed a long-term impact study of a World Bank–financed rural roads project in Bangladesh. It is providing technical help to the Bangladesh Institute of Development Studies (BIDS) in carrying out baseline and follow-up surveys and support in analyzing the descriptive data. Based on the panel data on households and communities, the study is calculating the economic and social returns of rural roads.

The BIDS conducted the baseline survey in program and nonprogram areas in 1997. The follow-up survey, planned for 1999, had to be postponed because of the devastating flood of 1998, which delayed completion of some of the project roads. The first follow-up survey was carried out between November–December 2000 and March–April 2001. The data are now being processed by the BIDS; once data processing is completed, analysis will follow.

Responsibility: World Bank Institute, Economic Policy and Poverty Reduction Division, and Development Research Group, Rural Development—Shahidur R. Khandker (skhandker@worldbank.org); World Bank Institute, Economic Policy and Poverty Reduction Division—Hussain Samad; and South Asia Region, Infrastructure Sector Unit—Thampil Pankaj. With M. A. Latif, Bangladesh Institute of Development Studies.

Completion date: December 2001.

The Impact of Urban Spatial Structure on Travel Demand

This research is quantifying the effects of urban sprawl and the availability of public transportation on the travel demand (annual miles driven and choices of tranport mode for commuting) of U.S. households. Decentralization of jobs and housing has been presumed to greatly increase travel demand, but attempts to measure this effect have been hampered by the use of data on city-level travel, which is determined simultaneously with urban spatial structure. This study overcomes this problem by matching city-level measures of sprawl and transit supply, which are exogenous to individual households, with household-level data on annual miles driven and the principal mode of commuting to work.

By estimating the effects of the spatial distribution of jobs and housing, the characteristics of the road network, and the characteristics of public transit on the travel demand of urban households in the United States, the research can answer a range of questions important for transport economists, environmental economists, and urban planners: What is the effect of the decentralization of jobs and housing on annual household vehicle miles traveled? How does improved access to public transit affect annual household vehicle miles traveled and the transport mode used for commuting to work? How does the density of the road network and its shape affect annual miles traveled?

The empirical strategy involves two main steps. First, in contrast with previous studies, this project constructs a variety of citywide measures that capture different aspects of the spatial configuration of cities and are exogenous to individual households. For example, it measures the share of the population living within a certain number of miles from the central business district and uses the area under this distribution to measure the centrality of the population in a city. It constructs a similar centrality measure for employment. To measure the compactness of the city, the study computes the share of the population living within a certain percentage of the area around the central business district and uses this to construct a spatial Gini coefficient of residential sprawl. It also constructs a measure of the balance between jobs and housing.

Second, the study merges its measures of urban spatial structure, computed for the 130 largest metropolitan areas in the United States in 1990, with the 1990 National Personal Transportation Survey. It uses the resulting data set of about 8,000 households to estimate equations for annual household vehicle miles traveled and choice of transport mode for commuting. This yields estimates of the elasticity of travel demand with respect to population and employment sprawl and characteristics of the transport system, controlling for such household characteristics as income, education, and household size and composition.

Preliminary results suggest that urban form has a nonnegligible effect on travel demand. For example, if Washington, D.C., were to become as sprawling as Atlanta (in terms of the population centrality measure), households that currently drive would drive 8 percent more on average. If Washington, D.C., were to become as unbalanced as Dallas in the distribution of jobs and housing, households would drive about 4 percent more. And if Washington, D.C., had a rail system similar to that in Dallas, households would drive 7 percent more.

Although the analysis uses U.S. data, its methods can also be applied to developing country cities. The research was presented at the National Bureau of Economic Research Summer Institute in Cambridge, Massachusetts, in July 2001.

Responsibility: Development Research Group, Infrastructure and Environment—Maureen L. Cropper (mcropper @worldbank.org). With Antonio Bento, University of California at Santa Barbara; and Ahmed Mushfiq Mobarak and Katja Vinha, University of Maryland.

Completion date: December 2001.

Linking Culture and Poverty Reduction in the Himalayas: A Comparative Study in Bhutan, Nepal, and Ladakh (India)

This research set out to explore the feasibility of using traditional technologies and architecture in modern construction as a means of conserving the cultural identity of towns and cities. But in the course of field surveys it became evident that the issue was linked with fundamental questions about urban livability and the way societies define and manage their built environment. The study therefore shifted its focus to examining the process of change in the built environment and its impact on that environment, with the aim being to identify the conditions that allow social and economic transformations to take place.

Innovation in the built environment occurs at two levels: in the management and organization of urban life, particularly with regard to the relationship between communities and urban space, and in the construction process, through its impact on the labor and materials markets. Thus the impact of innovation on the urban poor is mediated through several processes: the creation of livable spaces for the urban poor, the promotion and protection of supporting economic systems for poverty reduction, and the redefinition of the knowledge economy to benefit the poor.

The research uses the built form as an entry point for examining a range of issues that affect the way in which livable cities are created, including urban land, local governance and planning, local economic development, and employment. The study aims to define the parameters for intervention, going beyond traditional concepts of historical preservation to broader issues of urban planning and development. The process of change was studied in three places that share a common cultural and historical identity but have responded quite differently to change—Leh, Kathmandu Valley, and selected Bhutanese towns.

With the broadening of the focus from traditional architecture to built form (both buildings and urban spaces), the study adapted its methodology to give greater emphasis to participatory research. It has organized workshops of practitioners and artisans and civic consultations to envision future town development. It has also used participatory exercises to define an urban vision that would serve as a basis for developing guidelines within which innovation and tradition can interact and redefine the built environment.

A workshop conducted in Bhutan in June–July 2001, with the Thimphu Municipal Corporation, focused on the question of how to conserve the traditional built form under the pressures of globalization. The research team worked with local planners and officials to identify and document "innovations" in different types of buildings. And the group discussed public and private concerns about the impact of Western influences on the traditional built form.

Early findings were incorporated in an urban management course organized by the World Bank Institute in Bhutan on June 17–29, 2001, which focused on urban livability and the importance of culture.

The research supports the Bhutan Urban Development Project. In addition, the research findings are expected to influence the World Bank's emerging agenda for livable cities.

Responsibility: Transportation and Urban Development Department, Urban Unit—Evangeline Kim Cuenco (ecuenco@worldbank.org). With Solomon Benjamin; Biresh Shah; Karma Jimba; Dasho Karma Gelay; Luke Young; Kirk Nyland; Reinhard Goethert, Dennis Frenchman, Jan Wampler, and Mike Priore, Massachusetts Institute of Technology; Daniel Pini, University of Ferrara; Franco Frizon; Andre Alexandre, Tibet Heritage Trust; Christian Hlade; E. Seckler, Harvard University; Carl Puscha, College of Fine Arts, Vienna; and Meghraj Adhikari, Dawa Zangmo, Tashi Wangm, and Manjusha Rai, Department of Urban Development and Housing, Bhutan.

Completion date: December 2001.

The Macroeconomics of Infrastructure in Latin America

The progress in stabilization and reform that many Latin American countries have achieved in the past decade has been based largely on strong fiscal adjustment efforts. There is a wide perception that public infrastructure investment (and, in many cases, infrastructure maintenance) has been a casualty of this fiscal retrenchment. Evidence shows that across Latin America fiscal corrections have been associated with a slowdown in the growth of infrastructure stocks, such as road networks and power generation capacity. Deficiencies in infrastructure could hamper private sector activity and growth in the medium term, eventually constraining the expansion of tax bases and making the fiscal effort self-defeating.

In part in response to this risk, but also as part of the regionwide shift away from state-led development, most Latin American countries have allowed increased private sector involvement in infrastructure, such as ports, roads, railways, power, telecommunications, and water and sanitation. Indeed, among developing regions, Latin America has advanced furthest in privatizing and liberalizing basic infrastructure sectors.

This study asks a fundamental question: How has this redefinition of the private and public sector roles affected the volume and quality of infrastructure services and the economy's investment and growth prospects, and with what fiscal costs or benefits? More specifically, it addresses the following policy issues:

- What are the short- and long-run fiscal costs and benefits of the new public-private partnership—and of the reduced public sector involvement in infrastructure? How should they be reflected in the priority ranking of public expenditures at a time that fiscal restraint is a dominant concern?
- How have the opening of infrastructure industries to the private sector and the new forms of public-private partnership affected the volume and quality of infrastructure stocks and services? Where have crowding-in effects between public and private investment been reinforced, and where have they been hampered?
- What has been more effective in attracting the private sector to "fill the gap" left by public sector retrenchment—privatizing existing firms, allowing entry of new firms, or allowing entry of foreign firms? What kind of regulatory framework has yielded the biggest payoff in attracting private initiative?

To address these questions, the research combines microeconomic and macroeconomic data from Latin America and elsewhere. It will produce a data set on infrastructure stocks and flows for the major economies in Latin America. Results will be disseminated at a conference in the fall of 2001.

Responsibility: Latin America and the Caribbean Region, Office of the Chief Economist—Luis Servén (lserven @worldbank.org), and Finance, Private Sector, and Infrastructure Unit—Antonio Estache, Sheoli Pargal, and Marianne Fay. With César Calderón, University of Rochester.

Completion date: December 2001.

Policy Research Report on Regulation

Since the late 1980s many developing and transition economies have implemented far-reaching structural reform and privatization programs in key infrastructure sectors. The policy outcomes clearly reveal the critical importance of the organization and architecture of post-privatization markets and governance structures to the continuing success of the reform. Indeed, unless the reform is accompanied by appropriate policies for promoting competition and regulating monopoly, improvements in performance will be limited and are unlikely to be sustainable in the long run. Moreover, the potential benefits could be substantially undermined, and perhaps transformed into harm, if the regulatory architecture and rules that evolved in industrial countries are uncritically applied in developing and transition economies with entirely different economic characteristics and institutional endowments.

This research will look at competition and regulation in the infrastructure sectors of developing and transition economies, giving equal emphasis to the institutional issues of regulation and the substantive regulatory policies. This balance is consistent with the emerging conventional wisdom that the procedural aspects of regulation are critical in determining how well the substantive goals of regulatory policy are achieved. Specifically, the research will:

• Review the economic rationale for regulation (economic, social, and administrative) in infrastructure and the worldwide trend toward regulatory reform.

• Assess the role of regulatory policy as an integral part of national economic policy and its contribution to improving resource allocation, productive efficiency, economic growth, and prosperity.

• Identify the important elements of the framework that must be established by government and the commercial culture for competition to work effectively—laws that establish rights to tangible and intellectual property and create the ability to undertake transactions at reasonable cost, contract law and contract dispute resolution that facilitate flexible and reliable commercial agreements, and central banking services and orderly structures for capital markets that foster the efficient provision of currency transactions and credit.

• Evaluate the efficacy of the new regulatory principles reflecting a preference for competition and market-like solutions, and assess their applicability to developing and transition economies.

• Analyze the transitional problems of deregulation, especially those relating to labor entrenchment, tariff rebalancing, business liquidation, and universal service.

• Identify the substantive regulatory issues likely to arise in countries implementing competitive restructuring and privatization programs, and suggest strategies for addressing them.

• Review the institutional architecture for enforcement of regulation and competition and the procedural safeguards needed to ensure the integrity, transparency, and accountability of regulatory and antitrust intervention.

• Identify the fundamental principles that must be publicly articulated by regulatory agencies as the basis for their policy analysis and decisions.

• Identify the important elements and goals of regulatory dynamics—how regulatory mandates and rules should adapt to new problems, changed circumstances, and new information on the workings of the regulated sectors.

The research will draw on reports issued by the World Bank and other multilateral institutions, on databases of external consulting firms, and on information from the sectoral ministries, regulatory agencies, and regulated firms of Bank client countries. The results will be published in a forthcoming World Bank Policy Research Report.

Responsibility: Development Research Group, Regulation and Competition Policy—Ioannis N. Kessides (ikessides @worldbank.org), Mary Shirley, George R. G. Clarke, Luke Haggarty, and L. Colin Xu; Latin America and the Caribbean Region, Finance, Private Sector, and Infrastructure Sector Unit—Jose L. Guasch; and Infrastructure and Urban Development Department, Transport Division—Kenneth M. Gwilliam. With Paul Joskow, Massachusetts Institute of Technology; Jean-Jacques Laffont, University of Toulouse; Roger Noll, Stanford University; and David Newbery, Cambridge University. **Completion date:** June 2002.

Economic and Engineering Evaluation of Alternative Strategies for Managing Sedimentation in Storage Reservoirs

The traditionally accepted practice in designing and operating reservoirs is to allow them to fill slowly with sediment, leaving the consequences of the sedimentation and abandonment of reservoirs for future generations. That stage has already arrived for many reservoirs, and suitable sites for new reservoirs are limited. What is needed is sustainable management of reservoirs. But not all reservoirs can be managed sustainably, and economic guidelines are needed to identify those that can be.

This research is developing a mathematical optimization model that can be used to determine the economic feasibility of sustainable management of storage reservoirs, taking into account economic, social, environmental, and engineering factors. The model is being designed to provide policymakers with a general framework for assessing whether a particular site can support a sustainable reservoir and whether that mode of operation makes economic sense. The model has been validated through five case studies (Baira and Ichari, India; Sefid-Rud, Islamic Republic of Iran; Tarbela, Pakistan; and Gebidim, Switzerland) as well as in nine additional reservoirs in Morocco, and sensitivity analysis has been carried out.

The study was launched with a World Bank workshop on December 8–9, 1999, attended by people from both developing and industrial countries (Austria, Brazil, Italy, Japan, Malaysia, the Philippines, South Africa, Turkey, the United Kingdom, and the United States) and by Bank staff. The workshop was intended to help outline the first phase of the research. In addition, the research has been discussed at several other events: the International Water Resources Association Workshop on Dams, Development, and the Environment on February 14–16, 2000, in São Paulo, Brazil; the conference on Reservoir Sedimentation on June 20, 2000, in Wallingford, England; the annual meeting of the U.S. Commission on Large Dams on July 10–13, 2000, in Seattle, Washington; and the Third Workshop on Development and Management of Reservoirs in the Rio de la Plata Basin, Posadas, Argentina, on March 9–17, 2001.

The results of the research may influence the way policymakers and engineers approach the design of dams. And the research is expected to initiate a new generation of operations in the Bank, focusing not only on dam safety but also on reservoir conservation.

Responsibility: Rural Development Department—Alessandro Palmieri (apalmieri@worldbank.org) and Ariel Dinar. With Farhed Shah, University of Connecticut; and George Annandale, Hydrosystems Engineering, Denver, Colorado.

Completion date: October 2002.

Privatization of Telecommunications in Sub-Saharan Africa

Much of the policy advice on privatization and regulation of telecommunications is based on the experience of high- and middle-income countries. Yet a growing number of low-income countries in Sub-Saharan Africa have privatized their telecommunications firms or allowed private cellular operators to enter their domestic markets. A better understanding of this experience would help donors develop policy advice tailored to the region's institutional environments and market conditions, avoiding "one size fits all" approaches to reform.

This research is analyzing in depth the experiences of Sub-Saharan African countries with telecommunications reform and tracking changes over the period 1999–2002. The research explores three key questions faced by policymakers in the region: How can greater competition be encouraged by facilitating efficient entry? How can the incumbent telecommunications provider be motivated to use its existing assets better and to invest in additional capacity? How can telecommunications reform be structured so that it gains the support of key stakeholders and fits well with the country's institutional capacity?

The research analyzes these questions though its broad data set and through case studies of countries that have tried a mix of reform approaches, including no reform. (The set of countries includes Côte d'Ivoire, Ghana, Malawi, Senegal, Tanzania, and Uganda.) The work began in 1999 with a pilot case study (Ghana), followed by team meetings to ensure consistency in the conceptual framework and the quality of the work. Four case studies have been discussed with project advisers, revised, and finalized, and are expected to be disseminated through a regional conference in Africa in late 2001. Additional developments will be tracked and analyzed, resulting in a set of updated cases and papers for a conference in late 2002.

The rigorous empirical analysis not only will assist donors but also will help the proponents of reform make their case. The project is also strengthening policy and regulatory skills in the region by joining African research institutes in close partnership with senior researchers from academia and the World Bank, all using a single methodological and conceptual framework. Over the project's four years the participating African research institutes—the Ivoirian Center for Economic and Social Research in Côte d'Ivoire and the Economic and Social Research Foundation in Tanzania—are taking on more and more lead responsibility for the research, with the goal being to create an institutionalized regional capacity to advise on telecommunications reform and on infrastructure regulation more broadly.

Findings have been discussed with World Bank operational teams working on telecommunications regulation in Benin, Ghana, Malawi, Niger, Tanzania, Togo, and Uganda. The research has also been discussed with members of the World Bank and International Finance Corporation's joint Global Information and Communications Technology Department, who have applied the results in a number of countries. And the research has contributed to policy discussions on regulating entry, competition, and interconnection in telecommunications.

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Completion date: October 2002.

Connecting Cities with Macroeconomic Concerns: The Missing Link

Income and employment creation (and thus poverty reduction) requires local public goods—such as security and urban transport—that make urban locations more productive (beyond the "pure" gains from agglomeration) or, more precisely, that lower firms' unit production costs. Thus an understanding is needed of the links between local production costs and job creation. This study will measure and document these links and determine how the quality of local public goods can affect them. The analysis will draw on data from surveys of firms in Brazil, Canada, Costa Rica, El Salvador, and Mexico (about 100 firms in each country).

Production costs and markets may not appear to be "social" issues. But in market economies it is private firms that must generate employment if poverty is to decline, and the study identifies private firms as the primary actors in urban economies, an essential link between microeconomic and macroeconomic concerns. This focus differs from the usual one in efforts to reduce urban poverty, where the dominant approach has been to directly target poor people or poor neighborhoods through local projects, such as slum upgrading, housing construction, and service delivery. The perspective of this study is metropolitan rather than neighborhood-focused.

The research will shed light on the economic cost of urban failures, quantifying the lost opportunities in growth and employment associated with inadequate provision of local services. The research is expected to contribute to World Bank operations by sharpening the analytical tools needed to understand the factors hampering the development of small and medium-size enterprises at the local level and by highlighting the public services that most need improvement.

The study is being conducted in partnership with four local institutions. The results will be incorporated in an urban management course in Central America.
Responsibility: Latin America and the Caribbean Region, Finance, Urban Cluster—Mila Freire (mfreire @worldbank.org). With Fundação João Pinheiro, Belo Horizonte, Brazil; Programa de Desarrollo Urbano Sostenible (Produs), University of Costa Rica; Mario Lungo; Institut National de Recherche Scientifique, Montreal; and Benemerita Universidad Autonóma de Puebla, Mexico.
Completion date: December 2002.

Emergence from Subsistence: Infrastructure, Location, and Development in Nepal

Intuitively, the economic effect of such projects as roads, irrigation projects, fertilizer distribution programs, and small business assistance schemes would seem to depend critically on where they are located. But research has shed little light on the effect of location on economic outcomes. The purpose of this research is to begin to fill this gap by studying the relationships among infrastructure, geographic location, and economic development in Nepal, whose extreme diversity in accessibility and proximity to urban centers makes it a particularly suitable place to study spatial specialization.

To study how proximity to towns and cities affects households' participation in labor and output markets and their allocation of land, the research uses the von Thunen model of specialization. It modifies the simple von Thunen model to account for several facts: that the size of the market (measured by city population) affects the width of the circle, that the presence of a network of cities enables villagers to trade different goods in different markets, and that workers in villages surrounding cities commute to urban centers while workers farther away migrate permanently. In the econometric estimation the research takes a nonparametric approach that allows for a flexible relationship between household decisions and proximity to cities of different sizes.

The first stage of the research combined household data from the 1995–96 Nepal Living Standards Survey (NLSS) with geographic information system data on travel time to major cities, using the 1991 population census for data on urban populations. Estimation based on a cross-section of 3,300 households reveals a strong spatial division of labor. Nonfarm employment is heavily concentrated in and around cities (up to four hours of travel time), while agricultural wage employment dominates villages located farther away (three to eight hours). Isolated villages (more than eight hours from the nearest city) are essentially self-subsistent in both farm and nonfarm products. Vegetable and cereal production for sale takes place near urban centers, while oilseed and other commercial crops are more important at intermediate distances.

These findings are consistent with the von Thunen model of concentric specialization, and they also show the importance of city size. The research also finds that border effects are significant: proximity to Indian towns does not have the same effect on local specialization as proximity to Nepalese towns.

The research used data from the 1999 Labor Force Survey (covering 14,355 households in 719 villages across 73 districts) to study the pattern of individual and village-level specialization. The econometric estimation, based on a simple theoretical model of specialization in the presence of increasing returns and agglomeration effects, reveals that villages in and near cities have more diversified and more market-oriented activities. This finding implies externalities harnessed through markets. In manufacturing, proximity to cities is associated with larger firm size and more diversified employment structures.

The research finds that urban women specialize more than rural women. While urban women either work in paid jobs or perform household chores, rural women tend to do both. This finding suggests that with better infrastructure, not only will the pattern of specialization change dramatically but so will women's role in the work force.

Although the results are promising, they are based on cross-sectional analysis, in which the geographic location of households is partly endogenous. If, for example, a village is good for vegetable production, it may attract people good at producing vegetables. Over the years roads are likely to have been built to serve more promising or productive areas.

To account for individual-specific fixed effects and the endogeneity of road placement, the second stage of the project will resurvey the NLSS households in 2001–02, after the population census is completed. The new survey will provide data on how urbanization and the construction and upgrading of roads since 1995 have affected market participation and geographic patterns of specialization. The research will also investigate how liberalization of trade with India has affected border trade and the division of labor across space within Nepal.

The results of the research should help in identifying strategies for placing infrastructure and development projects. And the updated, representative data set produced by the study can be used for further poverty assessment in Nepal.

Responsibility: Development Research Group, Rural Development—Forhad Shilpi (fshilpi@worldbank.org). With Marcel Fafchamps, Oxford University; Isuzu Otsuka, Johns Hopkins University; and Jyotsna Puri, University of Maryland. The Japanese, Netherlands, and Swedish Consultant Trust Funds have contributed funding for the research.

Completion date: February 2003.

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———. 2000. "The Spatial Division of Labor in Nepal." World Bank, Development Research Group, Washington, D.C.

Information, Knowledge, and Capacity Building for Effective Urban Strategies: Information-Based Instruments for Urban Management

Decisionmakers in urban areas increasingly are becoming responsible for designing policies and developing programs to improve the quality of life of urban residents. To help improve the efficacy of such policies and programs, this project has initiated research and analytical work to develop detailed information systems within cities for identifying, evaluating, and prioritizing issues related to urban management, urban productivity, and urban poverty. Focusing initially on Bangladesh and India, the project is initiating collaborative efforts between the World Bank and local governments, research institutions, the private sector, and nongovernmental organizations to encourage the collection and use of spatially detailed data and related analytical methods for urban planning and policy. Large-sample, geo-referenced household surveys are being administered to capture heterogeneity within cities in living standards, service delivery, and resource mobilization.

The underlying premise of the work is that public disclosure of credible information offsets costs created by weak institutions. By emphasizing the collection, validation, and public dissemination of data—and thus encouraging transparency, accountability, and participation in decisionmaking—it is possible to improve the effectiveness of public programs and enhance the quality of urban management.

Government officials and researchers have been involved from the outset in designing and implementing the project. In India a national steering committee of senior government officials and eminent researchers has been formed to provide feedback and ensure that the research findings are useful for policy analysis and decisionmaking. The project also involves coordination with World Bank operational staff to enhance the utility of the work for Bank lending and policy dialogue.

The project will produce analytical and empirical publications on the quality of urban life, service delivery, and public finance. Findings also will be disseminated through national and regional workshops. Information on the project is available on the Web at http://www.info-urban.org.

Once the data are collected, validated, and analyzed, efforts will be undertaken to train local government counterparts in using the data in economic and spatial analysis, build capacity for using and sharing spatial data for urban management, and provide training in conducting surveys to monitor service delivery and quality of life.

Responsibility: World Development Report Office—Zmarak Shalizi (zshalizi@worldbank.org); and Development Research Group, Infrastructure and Environment—Somik Lall, Uwe Deichmann, and David Wheeler. With Hoon Chang; Vernon Henderson; Marcela Gonzales; Sudeshna Ghosh; Pulin Nayak; Atul Sarma; and the Society for Development Studies, India. The U.K. Department for International Development is contributing funding for the research.

Completion date: March 2003.

Privatized Utilities

Lack of data about the effects of infrastructure privatization has severely constrained the World Bank's ability to systematically assess the policy alternatives for such efforts and how these relate to a country's institutional environment. This project is developing an extensive database of variables crucial to understanding the experience in infrastructure privatization, to enable policymakers and Bank staff to learn from the successes and failures in infrastructure reform. The rapid increase in countries attempting infrastructure privatization has made this a difficult undertaking. Early efforts to collect information from Bank sources identified substantial gaps that must be filled through country visits and further work.

The database currently covers telecommunications in 40 countries and includes financial information and performance indicators before and after sale, the terms and conditions of the privatization transaction, and details on the regulatory framework, as well as a number of institutional variables, although not all series are complete. It also provides thin coverage of electricity, with an initial series for about 15 countries.

When complete, the 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.

Analysis using the data will develop detailed guidelines based on what worked and what failed in privatizing infrastructure. In addition, the data will be an important input for the forthcoming World Bank Policy Research Report on regulation.

Responsibility: Development Research Group, Regulation and Competition Policy—Mary Shirley (mshirley@worldbank.

org), Luke Haggarty, Colin Xu, and George R. G. Clarke. With Roger Noll, Stanford University. Stanford University is contributing staff time for the research.
Completion date: June 2003.

Rural Roads: Welfare Impact Evaluation

Rural roads are often seen as key to raising living standards in poor rural areas. Yet despite the consensus on their importance—and much anecdotal evidence—there is surprisingly little hard evidence on the size and nature of their benefits.

This study aims to assess the impact of rural roads on poverty and contribute to policy discussions on how best to allocate scarce public resources. The empirical investigation is being conducted in Vietnam, where the World Bank is financing and helping to implement a large-scale rural roads project for poverty reduction.

The study focuses on how the determinants of living standards change over time in communes that have road projects compared with ones that do not. It addresses several key questions: What is the relationship between spending on rural roads and poverty reduction? What impacts do rural roads have on living standards, broadly defined to include health, education, and security, and what factors affect those impacts? Do roads really reduce poverty? How do the benefits and their distribution change over time? And how much do the benefits depend on other investments, such as those in human capital?

A survey collected baseline data for a random sample of 100 project communes and 100 nonproject communes in the spring of 1997. A second round of surveying was conducted in June 1999, although floods delayed the survey in a few provinces. The data from these two rounds should allow the assessment of initial impacts. To get at longer-term impacts, a third round of data collection is planned for June 2001, and a fourth for two years later.

Four other surveys were also conducted in each round. In each sampled commune a questionnaire was administered to 15 randomly sampled households. A short district-level survey was conducted to help put the commune-level data in context, and an extensive province-level database was created to help understand the selection of provinces for the project. Because the impact of road projects varies with the size of the resulting changes and the method of project implementation, a project-level database for each project area surveyed is also being constructed.

The baseline data will be used to model the selection of project sites, with a focus on the underlying economic, social, and political economy processes. Later rounds will be used to understand gains measurable at the commune level, conditional on selection. The general approach will be in the tradition of double differencing with matching methods. Matching methods can be used to select ideal controls from among the 100 sampled nonproject communes, and outcomes in project communes can be compared with those in the control communes before and after the road projects. Outcome indicators to be examined include commune-level agricultural yields, income diversification, employment opportunities, availability of goods, land use and distribution, services and facilities, and asset wealth and distribution.

Responsibility: Development Research Group, Public Services for Human Development—Dominique van de Walle (dvandewalle@worldbank.org). With Vu Tuan Anh, Economics Institute, Hanoi; Dorothy Jean Cratty, University of Maryland at College Park; and Jyotsna Jalan, Indian Statistical Institute, New Delhi. The Canadian International Development Agency Trust Fund and the U.K. Department for International Development Vietnam Poverty Trust Fund are contributing funding for the research.
Completion date: December 2005.

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Agriculture and Rural Development

The Impact of Public Spending in Uganda

This research used data from a series of household surveys (spanning 1992–99) in Uganda to investigate a set of questions about social and economic development in the country's rural areas. The study produced two main findings.

First, while education, access to roads, and access to extension have a significant positive impact on agricultural production, rural producers overuse nontraded inputs (homegrown seed) and underuse purchased inputs (fertilizer). Credit constraints significantly affect demand for inputs. Lack of access to financial services (as measured by distance to the closest bank) negatively affects the start-up of nonagricultural enterprises and integration into markets for agricultural produce, supporting the government's emphasis in its rural development strategy on improving access to financial services.

Second, knowledge about the causes and treatment of diseases, in addition to access to health services and their quality, has a significant impact in reducing individuals' propensity to fall sick. Even under conservative assumptions, the monetary benefits (derived by valuing the number of days lost at the local wage rates) can be very high.

Responsibility: Development Research Group, Rural Development—Klaus Deininger (kdeininger@worldbank.org). With John Okidi, Makerere University, Kampala, Uganda.

Completion date: December 2000.

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Deininger, Klaus. 2000. "Does Cost of Schooling Affect Enrollment by the Poor? Universal Primary Education in Uganda." World Bank, Development Research Group, Washington, D.C.

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Market Development and Allocative Efficiency: Irrigation Water in the Punjab

With the rapid development of private tubewells, groundwater markets have flourished across South Asia in the past few decades. Barriers to entry and extreme spatial fragmentation in these markets have raised concerns about local monopoly. This study used data from Pakistan's Punjab, collected by the International Water Management Institute, to examine monopoly power in the groundwater market, with the aim of clarifying a role for policy.

The study used two complementary approaches to test for monopoly power. First, since groundwater markets and tenancy contracts are linked in the Punjab, a monopolistic tubewell owner would be expected to charge his own tenants a lower price than other buyers. Using data on groundwater transactions over an 18-month period, the analysis compared prices charged by a tubewell owner to different customers, including his own tenants. Second, since the shadow price of groundwater to the tubewell owner (as cultivator) is the marginal extraction cost, he would be expected to use more of it per acre than a groundwater buyer facing a monopoly price. The study thus compared groundwater use across buyers, tubewell owners, and their tenants, at the plot level, as another test for monopoly distortion.

The study also analyzed weekly panel data on canal water endowments and use over three agricultural sea-sons to test whether informal exchange of canal water fosters allocative efficiency, given monopoly pricing of groundwater.

The results strongly support the existence of monopolistic price discrimination and corresponding water misallocation in one watercourse in Pakistan. But evidence from canal water transactions indicates that the effect of this misallocation on crop yields may be somewhat blunted by reallocations within the season. Using both the price and the quantity data, a welfare analysis showed that monopoly power in the groundwater market has only limited effects on efficiency and equity. In the long run a policy aimed at eliminating monopoly pricing would do little to help the poorest farmers.

The study was done in collaboration with the International Water Management Institute field office in Lahore, Pakistan. Its findings have been presented at a World Bank seminar, sponsored jointly by the Development Research Group and the Water Resources Thematic Group, in December 2000, and at seminars at several universities and research centers during the first half of 2001 (Yale University, University of Toulouse, University of Maryland, Johns Hopkins University, and INE/DELTA, Paris).

Responsibility: Development Research Group, Rural Development—Hanan G. Jacoby (hjacoby@worldbank.org) and Rinku Murgai. With Saeed Ur Rehman, International Water Management Institute, Lahore, Pakistan.

Completion date: June 2001.

Report

Jacoby, Hanan G., Rinku Murgai, and Saeed Ur Rehman. 2001. "Monopoly Power and Distribution in Fragmented Markets: The Case of Groundwater." Policy Research Working Paper 2628. World Bank, Development Research Group, Washington, D.C.

The Dynamics of Rural Sector Growth

Although many studies have analyzed the spectacular economic growth of Asian countries, they have given little attention to the rural sector, the mechanisms of its growth, or the impact of government policies on the sector. Asian countries have achieved impressive agricultural and rural development, and the World Bank and its client countries would benefit from a comprehensive study of the region's policies, institutions, and mechanisms of rural development.

This research examines the mechanisms of rural development in Indonesia, the Philippines, and Thailand in a historical context. The research has several parts. First, it reviews the development of policies that have had direct or indirect effects on the rural sector, particularly on rural income growth, over the past three decades. It uses quantitative analysis to evaluate the impact of different policies on rural income and examine the political, social, and economic background of policy choices. Second, a cross-country comparative study looks at investment and productivity and at trade and domestic markets. Applying quantitative and comparative institutional economic analysis, the study examines the dynamics of rural development and the impact of policies on it. Finally, the research synthesizes the mechanisms of rural development, the impact of policies on the rural sector, and the political, social, and economic background of these policies.

Responsibility: Development Research Group, Rural Development—Takamasa Akiyama (takiyama@worldbank.org), Maria Amelina, and Donald Larson. With Toshihiko Kawagoe and Masa Honma, Seikei University, Tokyo; Jun Teranishi, Hitotsubashi University, Tokyo; Y. Hayami, Aoyama Gakuin University, Tokyo; Nobuhiko Fuwa and Professor Kikuchi, Chiba University, Tokyo; N. Okura, Senshu University, Tokyo; Yair Mundlak, University of Chicago; Peter Timmer, Harvard University; Shin Shigetomi, Institute of Developing Economies, Japan; Professor Manarungsan, Chulalongkorn University, Bangkok; Professor Balisacan, University of the Philippines; and Dr. Dillon, Center for Agricultural Policy Studies, Indonesia. The Japanese Consulting Trust Fund for Large-Scale Studies has contributed funding for the research.

Completion date: October 2001.

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Guidelines for Pricing Irrigation Water Based on Efficiency, Implementation, and Equity Considerations

World Bank–supported irrigation projects increasingly emphasize pricing as a primary means of regulation. Conditions for the disbursement of a loan for constructing an irrigation project often require "appropriate" pricing of the irrigation water that will be generated. Yet it is unclear what "appropriate" water prices are or how they should be applied. Disagreements among competing groups of water users are common, particularly if they are in different economic sectors. Surprisingly, economists also disagree on these issues.

This project clarifies the basic concept of water pricing and lays out a set of guidelines on how to price irrigation water under different circumstances. The primary measure of performance is efficiency, broadly defined to include implementation costs. Income distribution, available water institutions, and political constraints are considered in case studies.

The project conducted detailed studies in five countries—China, Mexico, Morocco, South Africa, and Turkey—with different physical, social, economic, and institutional conditions. It developed a cost-benefit framework to evaluate the performance of different water pricing methods. And it is carrying out an economywide analysis (applying a computable general equilibrium framework) in Morocco.

Country reports and databases for China, Morocco, South Africa, and Turkey have been completed, and reports and a database for Mexico are being finalized. Mathematical programming models that capture various aspects of water pricing at the regional level have been completed for several perimeters in Morocco and for one irrigation scheme in China, in South Africa, and in Turkey.

Analysis in five irrigation districts in four of the countries (China, Morocco, South Africa, and Turkey) has focused on estimating the (derived) demand for irrigation water under the conditions in each location. Following are some of the important findings:

- Although volumetric pricing is both efficient and equitable, the costs of implementing it can be prohibitive. A combination of per-area charging and water quotas can achieve efficiency results similar to those of volumetric pricing. A combination of tiered pricing (taking care of variable costs) and per-area charges (taking care of fixed costs) can achieve similar efficiency and equity results—and better cost recovery.
- Similar pricing policies can have very different effects under different conditions, as reflected in the shape (elasticity) of the derived demand curves. Farms with steep curves (inelastic demand) will be less responsive to price increases than farms with more horizontal curves (elastic demand).
- Farmers respond to water prices. The nature of that response (derived demand) reflects both endogenous conditions (big or small farm, rich or poor farm, crop mix) and exogenous conditions (water supply reliability, water institutions, prices of other inputs and outputs, extension and availability of appropriate technologies, production quotas, access to markets and credit). To be effective, policy interventions therefore need to address these conditions.

Because agriculture remains an important sector in most low- and middle-income countries, and because the agricultural production process is affected by many policies, water pricing policies must be viewed in an economywide context. The economywide analysis in Morocco has produced such findings as these:

∘ Trade liberalization increases the shadow price (opportunity cost) of water for fruits and vegetables, compared with the values before reform, and reduces the shadow cost of water for the crops that were protected before reform.

∘ In the post–trade reform environment a water allocation mechanism allows Moroccan water authorities to manage the sector exactly as they have historically (for example, by allocating water quotas to farmers and crops), except that they now grant farmers water rights to their quotas and permit them to rent water out, rent water in, or simply proceed as in the past. This mechanism allows water markets to clear at a relatively uniform shadow price throughout a perimeter, allows farmers to internalize the rents earned (and thus to recoup much of the loss from trade reform), and allows expanded production of the crops in which the country has a comparative advantage in world markets.

∘ Thus trade reform (and, by extrapolation, related reforms) may create an opportunity to introduce water pricing reforms with less political controversy, because it allows more flexibility in adjusting to the pricing reform and to the internalization of water rents.

∘ In the context of economic growth these new incentives cause capital deepening in the comparative advantage crops. Moreover, since the economy is more efficient and savings are now a larger share of a larger GDP, capital accumulation occurs in the other agricultural subsectors. As a result, for many of the crops that the country cannot produce as cheaply as the rest of the world (such as soft wheat), production often approaches pre-reform levels after about seven years (reassuring from a food security perspective).

∘ The growth in agricultural GDP encouraged by these policies also increases the social returns to investments in canals, dams, and other fixed structures. In an environment where the marginal cost of water supply is minuscule relative to these fixed costs, however, the marginal cost pricing that leads to the efficient allocation of water does not lead to total cost recovery. The economywide framework helps to assess the least resource-distorting mechanisms that might be used to recover the remaining fixed costs.

Findings were presented at a workshop for World Bank staff and participants from the U.S. Department of Agriculture, the U.S. Environmental Protection Agency, and the International Food Policy Research Institute on February 27, 2001.

Responsibility: Rural Development Department—Ariel Dinar (adinar@worldbank.org). With Yakov Tsur and Vladimir Lubinsky, Hebrew University, Rehovot, Israel; Terry Roe and Robert Johansson, University of Minnesota; Rachid Doukkali, Institute of Veterinary Science and Agriculture, Rabat, Morocco; Michael Schur, Ministry of Finance, South Africa; Enrique Aguilar; and Zhou Yaozhou and Wei Bingcai, Ministry of Water Resources, China.

Completion date: October 2001.

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Johansson, Robert C., Yacov Tsur, Terry L. Roe, Rachid M. Doukkali, and Ariel Dinar. 2001. "Pricing and Allocation of Irrigation Water: A Review of Theory and Practice." World Bank, Rural Development Department, Washington, D.C.

Reforming China's Agricultural Research System: A Research Production Function Approach to Measuring Economies of Size and Scope and Efficiency

China's agricultural research system, the world's largest, has a strong record of past accomplishments, but today it can be characterized as bloated, sluggish, and unresponsive to client needs. To overcome the most serious inefficiencies, China's government plans radical changes to the system beginning in 2001. Planned reforms involve cutting up to 80 percent of the agricultural scientists and increasing salaries and research support for the remaining 20 percent—the best and the brightest—by 200–300 percent.

To assist policymakers and research administrators in defining efficient research policy and to provide guidance for the reform, this research project is developing a methodological framework for studying the process of creating new agricultural technology, particularly new cultivars. The research focuses on understanding the nature of the economies of size and scope that exist (or do not exist) in China's agricultural research system, addressing such questions as these: What is the most efficient size for research institutes? Are several large institutes better than many small ones? What types of research institutes have been most productive—those with only breeders or those with a broad range of agricultural scientists? In other words, how strong are the economies of scope? The research also seeks to identify other institutional factors that may affect agricultural research productivity in China.

The project will construct a production (or cost) function for research on crop improvement, in which the output is the number of varieties produced. Inputs include research expenditures and number of researchers in breeding programs, research expenditures and number of scientists in other programs at the same institutes, and institutional factors. The project will test for economies of size and scope based on the estimation results of the research production function. The project is funding a survey of about 100 wheat and maize breeding programs throughout China to provide the basic data for estimating the research production function. Data will be collected on costs and outputs over a 10-year period.

The research is being implemented by the Chinese Center for Agricultural Policy and carried out by Chinese scientists and economists, with inputs from other team members.

The project will provide key information for designing a World Bank loan to support agricultural research in China. Findings will be widely discussed with Chinese policymakers in a series of seminars and workshops.

Responsibility: Rural Development Department—Derek Byerlee (dbyerlee@worldbank.org); and East Asia and Pacific Region, Beijing Country Office—Jürgen Vögele. With Linxiu Zhang, Jikun Huang, and Ruifa Hu, Chinese Center for Agricultural Policy, Beijing; and Songqing Jin, Scott Rozelle, and Julian Alston, University of California at Davis. The Chinese Center for Agricultural Policy and the University of California at Davis are contributing staff time for the research.

Completion date: October 2001.

Weather-Based Index Insurance

This study is assessing the feasibility of weather-based index insurance in four countries—Ethiopia, Morocco, Nicaragua, and Tunisia. Weather insurance is triggered by certain weather events (such as rainfall, temperature, and wind speed). Because it does not require inspecting individual farms, it reduces administrative costs and lowers the risk of adverse selection and moral hazard associated with traditional insurance.

In the four study countries droughts have severely affected agricultural production, GDP, and farmers' ability to repay loans. Linking drought insurance to credit could significantly improve loan recovery. Moreover, weather-based insurance could lessen the pressure on government budgets from ad hoc drought relief.

The feasibility analysis for Morocco and Tunisia was based on rainfall and yield data for critical crops in specific areas of each country. The analysis computed a value at risk defined as the revenue from the crops, which is equal to area planted times yield times price (area planted and price are fixed—that is, only yield varies). Using information from agronomic analysis on the critical periods of rainfall that affect the crops in the selected regions, the analysis established the correlation between crop revenue and rainfall variations. The results indicate a wide variation in the correlation coefficients among regions in each country.

For Morocco the correlation between crop revenue and rainfall was found to be sufficiently strong in three climatic zones that account for 71 percent of the estimated revenue for the crops. The correlation coefficients for 1979–99 ranged between 60 percent and 85 percent. For Tunisia the correlations between crop revenue and rainfall were somewhat weaker, ranging between 50 percent and 70 percent in several regions.

Next, the analysis simulated the performance of a proportional rainfall contract with 5 percent and 10 percent pure premium cost. For Morocco insurance would lower crop revenue risk by up to 30 percent. For Tunisia it would lower the revenue risk by about 20 percent.

For Nicaragua data limitations prevented the study from establishing a correlation between yields and rainfall. But the project continues to investigate the impact of rainfall on agricultural production. It also has simulated the performance of a proportional weather contract with a 5 percent and 10 percent premium cost. Historical simulations showed that this contract would have made some indemnity payments about every three to four years, payments that producers might value if they prefer more frequent payments and are affected by less catastrophic but more frequent droughts. Analysis of farm budgets indicates that a drop in yields below 20 percent could significantly affect many farmers' profitability and their ability to repay loans. Yield losses of 40–50 percent or more would probably cause crucial problems in loan repayments.

In Ethiopia the study has found that weather-related risks are a fundamental obstacle to development. Weather station data confirm that weather patterns vary throughout Ethiopia. The cost of weather insurance would therefore vary—sometimes dramatically—among communities. But the pure risk premiums for some stations would not preclude insurance markets. The institutions charged with gathering, analyzing, and disseminating the basic data needed to support weather insurance in Ethiopia are adequate. But the private markets needed to distribute weather insurance instruments are weak and are further hampered by regulations precluding foreign partnerships. And oversight of the insurance and microfinance industries is weak because of limited capacity. Public and donor-supported institutions that currently deliver credit and input packages could be used to deliver weather insurance.

In future work the study will evaluate the potential demand for rainfall insurance in two of the countries and assess the institutional feasibility of supplying such insurance.

The results of the study have been presented at seminars and conferences, including a Weather Risk Management Association meeting in Bermuda on June 5–7, 2001; the United Nations University, World Institute for Development Economics Research meeting on Insurance against Poverty in Helsinki, Finland, on June 15–16, 2001; and a conference, Agricultural Insurance: New Global Trends, organized by the Latin American Association for the Development of Agricultural Insurance in Buenos Aires, Argentina, on November 14–17, 2000.

Based on the results of the study, the International Finance Corporation and several private partners are establishing the Global Weather Risk Facility to help weather-exposed businesses and farmers in emerging markets to manage their risks and improve their creditworthiness.

Responsibility: Development Research Group, Rural Development—Panos Varangis (pvarangis@worldbank.org) and Donald Larson; Financial Sector Development Department—Vijay Kalavakonda, Rodney Lester, and Don McIsaac; Middle East and North Africa Region, Private Sector Development and Finance Group—Stephanie Gober; and Human Development Network, Social Protection Team—Paul Siegel. With Peter Hazell, International Food Policy Research Institute; Pasquale Scandizzo, University of Rome and Sichelgaita, Salerno, Italy; Roberto Pasca, University of Rome; Andrea Stoppa, Procom, Italy; Sonia Carbone and Marco Zupi, Sichelgaita, Salerno, Italy; Jerry Skees, University of Kentucky; and Mario Miranda, Ohio State University. The Italian Trust Fund and the Development Marketplace are contributing funding for the research.

Completion date: November 2001.

Report

Skees, Jerry, Stephanie Gober, Panos Varangis, Rodney Lester, and Vijay Kalavakonda. 2001. "Developing Rainfall-Based Index Insurance in Morocco." Policy Research Working Paper 2577. World Bank, Development Research Group, Washington, D.C.

Agriculture in Transition: Land Reform and Farm Restructuring in Formerly Socialist Countries

In the formerly socialist countries of Europe and Central Asia land reform and farm restructuring are among the main elements of the transition to the market in agriculture. The World Bank has been monitoring progress in these aspects of transition since 1992 for all 23 countries of the former Soviet Union and Central and Eastern Europe through country sector reviews supplemented by extensive farm-level surveys. This monitoring work shows that despite the countries' common heritage of socialist command economy with pervasive collectivization of agriculture, they are not following the same path in market reforms.

This research is examining the different paths of land reform and farm restructuring in Europe and Central

Asia to produce a coherent picture of the agrarian transformation in the region. It aims to analyze the causes of the observed patterns of transformation; establish relationships between a country's progress in agricultural reforms and its social, cultural, political, and economic profile; and formulate policy conclusions based on an integrated overview of the processes and experiences throughout the region.

The research combines several methodological approaches. The first involves generalizing and synthesizing information on agricultural transformation in the region to evaluate progress in land reform and farm restructuring, through a detailed comparison of farming structures in the formerly socialist countries with those in market economies. The second develops a multivariate typology of agricultural reform in different countries through cluster analysis, supplementing and validating existing subjective rankings. The third approach applies statistical and econometric tools to detect the impact of reform by analyzing differences in performance, income, and satisfaction between different groups of stakeholders, between regions with different levels of reform, and between countries with different political orientations. It applies data envelopment analysis to estimate differences in efficiency between collectives and family farms.

The research will produce a book summarizing and generalizing the experiences of the first decade of agricultural transition. The book will give policymakers in the region a cross-country perspective and thus enable them to judge on the basis of empirical information what transition strategies work better and why. And it will give international donors and others outside the region a competent overview of the first decade of reforms, contributing to the development of assistance strategies for the next decade.

As part of ongoing dissemination efforts, partial results of the research have been presented to international audiences, including scholars from formerly socialist countries in Europe and Central Asia. Upon completion of the research, a special workshop will be organized for scholars, policymakers, and government officials in the region.

Responsibility: Europe and Central Asia Region, Environmentally and Socially Sustainable Development Sector Unit—Csaba Csaki (ccsaki@worldbank.org); Development Research Group, Rural Development—Gershon Feder; and Africa Region Technical Families, Rural Development 1—Karen Brooks. With Zvi Lerman, Hebrew University, Israel.

Completion date: December 2001.

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presented at the conference Subsistence Agriculture in Central and Eastern Europe: How to Break the Vicious Circle, Institute of Agricultural Development in Central and Eastern Europe, Halle, Germany, May.

Sending Farmers Back to School: An Econometric Evaluation of the Farmer Field School Extension Approach

Studies of the economic and other effects of agricultural extension programs, particularly traditional training and visit programs, have yielded a mixed record. The many problems associated with administering large and often expanding extension bureaucracies; the growing disenchantment with packaged technologies and the top-down, centralized approach to disseminating knowledge; and the general alienation of farmers from the creation and dissemination of knowledge have led many to question staff-intensive public extension systems. And in the light of growing fiscal deficits in many countries, a particular concern is economic sustainability.

In recent years many development agencies, including the World Bank, have promoted farmer field schools as a more promising approach to extending science-based knowledge and practices to farmers. The approach relies on participatory training methods to convey knowledge to field school participants and encourages all graduates to share their experiences with other farmers. The spread of knowledge from farmer to farmer is expected to make the approach cost-effective and sustainable.

This research evaluates the performance of farmer field schools at the farm and program level in Indonesia, Peru, and the Philippines. At the farm level farm profits are used as a key indicator of success. Farm-level impacts are measured econometrically using both with-and-without and before-and-after comparisons with panel data, to deal with estimation problems arising from individual selection and program placement biases. The empirical strategy also seeks to isolate secondary effects of farmer-to-farmer diffusion of knowledge from direct program effects on participants and to measure the depth and breadth of this knowledge diffusion through case studies and participant observation. At the program level the study aggregates the farm effects to compare the program's overall economic benefits with its overall costs.

For Indonesia a 1990–91 survey with a with-and-without design serves as the baseline. The same households (about 450) were resurveyed, and the household data from the two panels were mapped and are being analyzed. In Peru a baseline survey covered about 500 households. The Peru study analyzed the baseline data but dropped the full before-and-after analysis because of contamination of the control group by interventions similar to farmer field schools. In the Philippines a survey of some 300 households (including some of the 45 farmers tracked by a separate study since 1995) has been completed and used to explore the spread effects of farmer field schools and the retention of knowledge.

Evidence from Indonesia and the Philippines shows that fiscal unsustainability is a risk that cannot be ignored if the farmer field school approach is applied on a large scale. Because of the high costs per trained farmer, the amount of funding for extension in the Philippines cannot provide for significant farmer outreach. Moreover, the Philippine case study shows little informal farmer-to-farmer diffusion of knowledge. Program coverage would have to be extensive to have significant impact.

Some view farmer-led field schools as a way out of the fiscal dilemma if part of the cost is shifted to the community. But survey data from Indonesia show that farmers have taken over little formal training responsibility. And even these farmer-led schools are not funded mainly by community resources. The results suggest a need for great selectivity and caution in initiating pilot field school programs, with a focus on fiscal sustainability if the intention is to scale up the program.

A case study of rice farmers in Iloilo, Philippines, found that field school graduates generally score higher than their counterparts on tests of knowledge typically acquired in a field school, and that there is little diffusion of the knowledge from graduates to other community members. There appear to be no significant differences in scores between old and new graduates, suggesting that graduates retain the knowledge acquired.

A case study in Peru pointed to several factors explaining farmers' participation in farmer field schools: whether or not the schools are based on preexisting local groups with preexisting rules for participation that exclude some community members; farmers' perceptions of the benefits of participation, which are influenced by experience with other extension organizations and, often, the receipt of short-term economic benefits; the gender division of labor in potato cultivation (which resulted in male-dominated field schools); and competition from farming activities. Farmers perceived the cultivation of new potato varieties (introduced through the farmer field school) and the knowledge of which fungicides to use as the main benefits of participation.

The research has involved close collaboration with staff of local organizations in Indonesia, Peru, and the Philippines. The results of the Philippine study were presented at seminars in the Philippines and at the World Bank in 2001. Preliminary results from the Indonesia study were presented at seminars in Nairobi, Kenya, and Bogor, Indonesia, in November 2000.

Responsibility: Development Research Group, Rural Development—Gershon Feder (gfeder@worldbank.org), Jaime Quizon, and Rinku Murgai. With Tahlim Sudaryanto, Sjaiful Bahri, and Hania Rahma, Center for Agro-Socioeconomic Research, Indonesia; Agnes Rola, University of the Philippines at Los Baños; Rebecca Nelson, Paul Winters, and Oscar Ortiz, International Potato Center, Lima, Peru; and Hermann Waibel, University of Hannover, Germany.

Completion date: December 2001.

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Welfare Outcomes of Decentralized Land Reform

Major policy reforms in China and Vietnam effectively privatized most farmland, one of the most important assets for the security of poor people. Institutional reform on this scale raises many questions: Were central dictates on how the land should be allocated followed locally? What were the implicit objectives of local decisionmakers? How did they weigh equity against efficiency? Did they forgo aggregate income gains for their preferred distribution, and how much did they forgo? Did the tradeoff between equity and efficiency improve over time, through feedback effects of land distribution on growth? How much did the fact that the land reallocation was limited to existing members of each commune (with no scope for redistribution between communes or for mobility) constrain its overall distributional impact?

This project addresses these questions, studying the socioeconomic determinants of the land allocations and the premium local decisionmakers appear to have attached to equity. The work draws in part on discussions with policymakers and others, but much of it involves an econometric analysis of household- and community-level socioeconomic data.

Household panel data allowing an examination of the issues are available for both Vietnam and China. For Vietnam the quantitative data are from the Vietnam Living Standards Surveys of 1992–93 and 1998, covering about 4,000 rural (3,457 panel) households in 120 communes throughout the country. For China similar data are available from the Rural Household Surveys, for four contiguous southern provinces (Guangdong, Guangxi, Guizhou, and Yunnan). The panel spans 1985–90 and covers 5,000 households. The panel data feature of both surveys permits estimation of dynamic models of consumption growth and land allocation and also allows for the possibility of land reallocation.

The research will provide a deeper understanding of the ways in which central policy initiatives affect welfare when key aspects of policy implementation are decentralized. Decentralizing policy implementation is a common practice. Indeed, the World Bank often advises central governments to rely more on better informed local agents. But without a proper understanding of local political economy, is such advice well founded and will the expected gains materialize? This question has relevance for a wide range of development initiatives.

Responsibility: Development Research Group, Public Services for Human Development—Dominique van de Walle (dvandewalle@worldbank.org) and Poverty Team—Martin Ravallion. With Tomomi Tanaka, University of Hawaii, East-West Center.

Completion date: April 2002.

Report

Ravallion, Martin, and Dominique van de Walle. 2001. "Breaking up the Collective Farm: Welfare Outcomes of Vietnam's Massive Land Privatization." World Bank, Development Research Group, Washington, D.C.

Commodity Risk Management and Export Finance

Policymakers have long debated how best to manage volatility in commodity prices. The solutions offered by policymakers and the resulting institutions—international commodity agreements, marketing boards, compensatory financing, stabilization funds—were based on collective responses largely coordinated by government. The dominant concerns of macroeconomic growth and stability also influenced the approaches that governments chose.

During the 1990s the focus of the debate shifted from governments and sectors to households and firms. Moreover, a series of events—including the collapse of the Soviet Union—initiated policy and institutional changes that profoundly altered how most commodity markets worked. Marketing boards were eliminated, and thus so were trade interventions and publicly financed minimum price guarantees. Producing firms and households were forced to become self-reliant. For many agricultural producers who had been implicitly taxed under earlier rules, the institutional changes brought higher incomes, even as income volatility increased. For other producers the changes have come at a cost.

This study synthesizes the results and experiences presented in papers that examined institutional aspects of dealing with commodity price fluctuations in developing countries, focusing on the change in approaches to risk management preferred by policymakers. New approaches to reducing uncertainty in commodity prices rely much more on market solutions than on administrative arrangements. Most aim at easing access to risk management instruments, such as commodity futures, options, and swaps, and rely on households and firms to make appropriate choices.

The evidence suggests that while farmers' direct access to market-based risk management instruments may be limited, they can gain indirect access to these instruments through producer associations, rural credit institutions, and traders and processors. Thus identifying local institutions that could provide price risk management instruments to farmers is key. These institutions can then hedge their own exposure in international markets.

Responsibility: Development Research Group, Rural Development—Panos Varangis (pvarangis@worldbank.org), Donald Larson, and Takamasa Akiyama. With Christopher Gilbert, Free University of Amsterdam; and Alexander Sarris, University of Athens.

Completion date: June 2002.

Report

Akiyama, Takamasa, Donald Larson, and Panos Varangis, eds. 2001. "Agricultural Risk Management." World Bank, Development Research Group, Washington, D.C. Draft.

Land Markets, Gender, and Access to Land in Latin America

This study investigates how recent property rights reforms aimed at improving the functioning of rural factor markets in Honduras, Mexico, and Nicaragua have affected agricultural productivity and the lives of the rural poor. It also examines how the reforms have affected the property rights of women in rural areas and therefore the well-being of rural households. The study is part of a broader research agenda ultimately aimed at identifying policies that can help to improve the functioning of land markets and increase equity and productivity. It relies on microeconometric analysis of recently collected panel data and data collected in the course of the project in Mexico and Nicaragua and in Honduras, where data collection has only recently been completed.

Results for Mexico indicate that legal and institutional changes, together with a participatory and transparent program of tenure regularization (the Program for Certification of Ejidal Rights, or Procede), led to both economic and noneconomic benefits. The reform reduced conflicts, significantly increased access to land for formerly marginalized groups, improved governance and accountability at the local level, and had a clearly positive impact on equity. Econometric evidence suggests that Procede, but not the legal reforms, improved the functioning of rental markets and access to common property resources, though it had no significant impact on land sales or access to credit. In addition, the reform significantly reduced the transaction costs associated with land rentals. But because of credit market imperfections, the poor were often unable to take advantage of the increased market opportunities. The economic benefits were generated mainly through increased incorporation of *ejidatarios* (smallholders) into the nonfarm sector.

In Nicaragua liberalization has improved the functioning of rental markets, and many landless farmers have been able to make the transition from rental to ownership. At the same time, the rental market remains very small. Lack of properly registered titles, a problem experienced disproportionately by the poor, hampers the supply of land to the rental market. The poor express a clear demand for increased tenure security but lack the resources to register their titles. Receipt of registered titles increases land values by 30 percent and increases the propensity to invest, bringing investment closer to the optimum. These findings suggest not only that the legal validity of the certificates issued is of overriding importance but also that titling can have a positive distributional effect.

Responsibility: Development Research Group, Rural Development—Klaus Deininger (kdeininger@worldbank.org). With Michael Carter and Bradford Barham, University of Wisconsin at Madison; and Alain de Janvry and Elisabeth Sadoulet, University of California at Berkeley. The European Union is funding a major part of the Honduras component, and the U.S. Agency for International Development contributed funding for the surveys in Honduras and Nicaragua.

Completion date: June 2002.

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Land Reform

New opportunities and lingering problems have renewed the interest of developing country governments in agrarian reform:

- The inability to address rural violence, deep-rooted poverty, and inequality of opportunity through conventional means, and the expectation that a redistribution of productive assets would improve the access of the poor to economic opportunities.
- The potential for improving productivity and equity given the large tracts of unutilized or underutilized land on large farms, the inverse relationship between farm size and productivity, and the desire of large landlords to liquidate their landholdings.
- The failure of old-style land reform, the continuing political pressure for land reform, and the drop in land prices following the elimination of many distortions favoring agriculture.

This research project aims to quantify the scope for and economic potential of land reform, help in the design of programs that would realize this potential, and mount monitoring and evaluation systems that would allow in-depth evaluation of the impact of such programs on both productivity and poverty reduction. The project combines ex ante analysis of land reform based on farm budget analysis with econometric analysis of survey data for Brazil, Colombia, Guatemala, Malawi, the Philippines, South Africa, and Zimbabwe. Country-specific results and international experience provide feedback on ongoing efforts.

In addition to helping to establish baseline surveys, the project has undertaken several case study evaluations. In general, these demonstrate the scope for increasing productivity through land reform and the advantages of a demand-driven approach. But they also highlight the importance of designing mechanisms for implementing incentive-compatible reforms to ensure replicability and economic viability.

The findings support the World Bank's stance in favor of land reform, and the efforts in developing countries to address long-standing issues of maldistribution of assets. They also emphasize the importance of placing such efforts in a broader policy context.

The research has contributed to the design of Bank operations by pointing to elements critical to success (such as focusing on integrated productive projects, involving financial intermediaries, and using a decentralized approach) and by elaborating a framework for monitoring and evaluating projects that will eventually allow an in-depth assessment of their impact. The research has also helped to inform the policy debate and clarify the potential and limits of land reform in countries where it remains controversial. Results have been presented at conferences and workshops for policymakers in Brazil, the Philippines, South Africa, and Zimbabwe.
Responsibility: Development Research Group, Rural Development—Klaus Deininger (kdeininger@worldbank.org) and Pedro Olinto. The Swiss Trust Fund and the Brazilian government are contributing funding for the research.
Completion date: June 2002.

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Land Tenure in Rural China

This research aims to quantify the costs and benefits of improving the definition of land use rights in China and to determine the distribution of gains and losses accruing to different types of farmers. It is based on a resurvey of a panel of about 1,000 farm households in three provinces for which comprehensive data are available from four rounds of the State Statistical Bureau's annual household survey (1995–99).

The study tests the following hypotheses:

• Even where formal credit markets are absent, secure tenure is very important for increasing household investment and wealth.

• The greater tenure security resulting from property rights reform increases the propensity to participate in factor markets (for land and, through out-migration and off-farm employment, for labor), thus generating gains in allocative efficiency that tend to increase household income and improve rural well-being.

• If initial land endowments are distributed equitably and education and off-farm employment are widely accessible, less costly means of insurance than periodic redistribution of land are likely to be available, implying that property rights reform will not adversely affect the poor.

• The net economic benefits from property rights reform are large, and failure to implement such reforms carries a high opportunity cost.

The study goes beyond the current literature in several ways. First, most studies on the subject have been limited to examining the impact of formal title rather than informal means of increasing tenure security. This, together with the fact that most of these studies find that the main impact of title comes through credit markets, implies that little is known about the effects of tenure security in areas where credit markets are underdeveloped and most poor people live. This study promises to shed light on rural poverty reduction more generally.

Second, several studies have found the impact of land tenure on short-term investments to be small, leading to a belief that even the long-term benefits from increased tenure security would be limited. This study will determine whether there is empirical support for such a view.

Third, the earlier finding that the nearly universal access to land in China performs an important safety net function helps focus the study on the distributional impact of land tenure reform. Because attitude surveys in China have found broad support for periodic land redistribution, many believe that tenure reform would be antipoor, an issue that the research can directly address.

Finally, the research explicitly considers the relationship between land tenure and the functioning of other factor markets. This is not only important because other markets will affect households' options for self-insurance. It is also important for the transferability of the findings to other Asian countries where legal restrictions on the functioning of land rental markets continue to be widespread.

Responsibility: Development Research Group, Rural Development—Klaus Deininger (kdeininger@worldbank.org); and East Asia and Pacific Region, China Country Unit—Jürgen Vögele, and Rural Development and Natural Resources Sector Unit—Li Guo. With Yang Yao and Yaohui Zhao, Beijing University; Michael Carter, University of Wisconsin at Madison; and Songqing Jin, University of California at Davis.

Completion date: December 2002.

Might Culture Pay Off? Evaluating the Effects of Farming Innovations and Cultural Empowerment among Lowland Amerindians in Bolivia

In the past few decades loggers, ranchers, colonists, and commercial farmers have encroached on the territory of lowland Amerindians in Latin America, leading to insecurity of land tenure and the depletion of farmland. To get by, lowland Amerindians have been forced to tighten their link with the market, but they lack the information and bargaining skills to compete successfully in a modern market economy.

This study will investigate whether introducing farming innovations that increase yields and maintain or improve soil fertility while building on traditional farming practices would improve the welfare of the lowland Amerindians in the tropical rain forest of Bolivia. Using a randomized experimental design, the research will estimate the effects of farming innovations and training—and workshops on cultural empowerment, defense of land rights, and skills for dealing with the modern market economy—on a number of outcomes: wealth, income, consumption, crop yields and prices, health and nutrition, the share of farm output sold and the share consumed, reciprocity within and between villages, defense of territorial rights, and feelings of cultural self-worth. Specifically, the study addresses the following questions:

- Can farming innovations that build on traditional technologies yield greater dividends when accompanied by workshops on cultural empowerment, defense of land rights, and marketing skills than when introduced alone or with agricultural extension only?
- Will the use of an experimental design with random assignment of villages to treatment and control groups make it possible to obtain unbiased estimates of the effect of interventions; to estimate the return of investments in cultural empowerment; to test whether investments in agricultural technology, culture, and skills for dealing with the modern market economy reduce poverty; and to learn about the ethical, logistical, and substantive problems that might arise in using a randomized design to evaluate World Bank investment projects?

To address these questions, the study will use several analytical approaches, including qualitative and statistical techniques, and draw on sources ranging from interviews to a literature review.

Responsibility: Social Development Department—Kreszentia Duer (kduer@worldbank.org) and Sabina Alkire. With Ricardo Godoy, Brandeis University; Tomas Huanca; Victoria Reyes-Garcia and Vincent Vadez, University of Florida; and Josh Angrist, Massachusetts Institute of Technology. The Netherlands Trust Fund is contributing funding for the research.

Completion date: December 2002.

Crisis, Polarization, and Reform

This research project looked at countries' policy decisions as determined by two opposing forces—crisis and polarization—using regressions on data over time for all countries for which data were available. Crisis tends to spur reform, while polarization of society between opposing interest groups tends to delay reform.

The project produced several papers exploring aspects of these issues. One paper examined the ability of policymakers to postpone true reform by engaging in illusory reforms, and found that they often do so. Another examined who minds inflation more, the poor or the rich, and found that the poor do. Yet another tested the hypothesis that crisis (as reflected by a number of different indicators) leads to reform, and found that while crises characterized by high inflation or a high black market premium do lead to reform, other macroeconomic crises do not. And still other papers looked at the role of ethnic tensions in determining policies, public service delivery, and government employment—and found that ethnic divisions inhibit the supply of public services.

Responsibility: Development Research Group, Macroeconomics and Growth—William Easterly (weasterly @worldbank.org). With Alberto Alesina, Harvard University; Reza Baqir, University of California at Berkeley; Allan Drazen, University of Maryland; and Stanley Fischer, International Monetary Fund.

Completion date: June 2001.

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The Quest for Growth

This extended research project has studied the contribution of national policies, institutions, factor accumulation, and productivity to the growth of economies, using regressions on data over time for all countries for which data were available. The results show that policies and institutions affect growth mainly through productivity rather than through investment or education.

Since the end of World War II economists have tried to figure out how poor countries in the tropics could attain standards of living approaching those of countries in Europe and North America. Attempted remedies have included providing foreign aid, investing in machines, fostering education, controlling population growth, and making aid loans as well as forgiving those loans on condition of reforms. None of these solutions has delivered as promised. The problem is not the failure of economics, but the failure to apply economic principles to practical policy work.

A book based on the research, *The Elusive Quest for Growth,* shows how these solutions all violate the basic principle of economics, that people—private individuals and businesses, government officials, even aid donors—respond to incentives. The book analyzes the development solutions that have failed and suggests alternative approaches.

Responsibility: Development Research Group, Macroeconomics and Growth—William Easterly (weasterly @worldbank.org), David Dollar, and Norman Loayza; Human Development Network, Office of the Vice Pres-

ident—Shantayanan Devarajan; and Office of the Senior Vice President, Development Economics—Roumeen Islam. With Peter Montiel; Ross Levine; Michael Bruno; and Howard Pack, University of Pennsylvania.
Completion date: July 2001.

Reports

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Structural Adjustment Participatory Review Initiative

This joint project involving six governments and an international network of nongovernmental and civil society organizations examined the impact of structural adjustment through a broad-based consultative process including both public forums and field investigations. The project aimed to improve the understanding not only of the effects of adjustment policies but also of the ways broad participation of local civil society can improve policymaking. The initiative attempted to identify practical changes in economic policies for governments and the World Bank.

In each of the countries participating in the project—Bangladesh, Ecuador, Ghana, Hungary, Mali, and Uganda—nongovernmental and civil society organizations set up local networks and representative committees to work with representatives from the Bank and from different parts of the government in designing the work. The tripartite steering committee in each country was responsible for planning an opening public forum, a field investigation into the impact of selected policies, and a closing forum at which the results of the analysis were presented.

The project was launched at a global forum in Washington, D.C., in July 1997 and ended in July 2001 with a second global forum, where the discussion centered on the six country studies and their policy findings. The policy findings are being summarized in a book.
Responsibility: Office of the Senior Vice President, Development Economics—Jozef M. Ritzen (jritzen@worldbank.org) and John Randa; South Asia Region, Bangladesh Country Office—Fred Temple, Syed Nizammuddin, and Zaidi Sattar; Latin America and the Caribbean Region, Ecuador Country Office—Marcelo Romero; Africa Region, Ghana Country Office—Peter Harrold and Kofi Marrah, Mali Country Office—Grace Yabrudy and Youssouf Thiam, and Uganda Country Office—James Adams, Robert Blake, and Mary Bitekerezo; and Europe and Central Asia Region, Hungary Country Office—Roger Grawe and Mihaly Kopanyi. The Belgian, Netherlands, Norwegian, and Swedish Trust Funds contributed funding for the research.
Completion date: July 2001.

Report

World Bank. 2001. "Adjustment from Within: Lessons from the Structural Adjustment Participatory Review Initiative." Office of the Senior Vice President, Development Economics, Washington, D.C.

Capital Subsidies and the Quality of Growth

This research project examines how capital subsidies and public expenditure affect the quality of growth, especially through their impact on investment in human capital and exploitation of the environment. Work has focused on building a theoretical model, collecting evidence on capital subsidies, and reviewing the literature on their impact. The project is also conducting four country studies—on Brazil, Chile, China, and India—and collecting evidence on the size of capital subsidies and their effect on the sustainability of growth. Finally, the study will provide evidence on how policies and public expenditure allocation have affected the quality of growth and what the possible tradeoffs are between capital subsidies and the quality of growth. The framework and initial evidence will serve as the basis of a proposal for a larger research project.

The evidence indicates that government subsidies to industry, agriculture, and infrastructure worldwide are large. Although the data are fragmented and partial, and the estimates gross rather than net (not accounting for taxes), initial evidence nonetheless shows that these subsidies introduce elements of nontransparency, discrimination among activities, and pressure on scarce resources.

The four country studies show that subsidies to foreign investors are often significant, with preferential tax treatment for foreign firms sometimes costing the government in forgone tax revenues. Competition for foreign investment is sometimes the reason for these subsidies. In Chile, for example, foreign firms account for about 60 percent of copper production. Extensive private investment led to a rapid expansion of production and exports, which worsened the terms of trade. In addition, while private firms paid less than $100 million a year in taxes in 1995–2000, the publicly owned Codelco paid about $600 million. Thus as a result of subsidies for foreign investment in the copper industry, the country has been losing more than $100 million a year.

Recent studies examining the effect of corporate subsidies suggest that as an instrument for increasing productivity and promoting growth, many are counterproductive. Detailed firm-level panel data over several years for Israel and Sweden show that subsidies have only a small effect on output and and sometimes even a negative effect on productivity.

Partner institutes have been invited to conduct case studies as part of the research. Once the research is completed, the results will be incorporated in World Bank Institute courses, seminars, and conferences.

Responsibility: World Bank Institute, Office of the Vice President—Vinod Thomas (vthomas@worldbank.org), Economic Policy and Poverty Reduction Division—Yan Wang, and Environment and Natural Resources Division—Nalin M. Kishor. With Ashok M. Dhareshwar; Ramon E. Lopez, Sumeet Gulati, Gustavo Anriquez, and Andres Ulloa, University of Maryland; Yudong Yao; Viju Ipe, Illinois State Geological Survey; Ashok Guha, Yale University; Claudia Ocana; and Arati Belle.

Completion date: September 2001.

Trade and Fiscal Reform and Investment Booms in Latin America: The Chilean Case and Application to Other Reformers

Many developing countries have liberalized foreign trade and investment policies over the past two decades. Some have achieved excellent—even spectacular—results, while others have seen little change in trade, investment, and growth. How do policies of openness interact with other elements of the investment climate to produce good or bad economic outcomes? This research project addresses that question in order to provide policymakers with guidance on what policies are needed to complement openness as countries attempt to integrate with the global market.

The project has two parts. The first is an in-depth case study of Chile with new econometric work based on the Chilean census of manufacturing. The study focuses on the reduction in the tax on retained profits in the mid-1980s. Taxing retained earnings is particularly harmful in an economy with poorly developed financial markets but favorable macroeconomic policies as well as policies of openness, such as the Chilean economy in the mid-1980s. When some firms are credit constrained, taxing retained profits is more distortionary than taxing dividends, and it reduces investment and slows growth. The study hypothesized that by reducing the tax rate on retained earnings, the government increased the internal funds of credit-constrained firms, leading to an investment boom and subsequent growth.

To test this theory and evaluate its importance, the study analyzed annual plant-level data covering all Chilean manufacturing firms with more than 10 employees. It divided the firms into two groups—those more likely to face financing constraints and those less likely to—and compared their investment behavior. It found that plants with high correlations between cash flow and investment before the reform increased investment significantly more during and, to some extent, after the reform than did similar firms with low correlations. Plants that previously had low short-term reserves also increased investment more during and, to some extent, after the reforms. The study found no evidence that smaller plants or plants paying rent benefited disproportionately from the reform (though the size distinction is less likely to reflect the financial constraints facing a plant in Chile than in the United States).

Earlier studies have often pointed to other market-oriented reforms in Chile—liberalization of trade, liberalization and deepening of financial markets, privatization of the public pension system—as the underlying cause of Chile's boom. But the study's findings do not suggest that these reforms are irrelevant for growth. Instead, they emphasize that the policies of openness combined with the improvement in tax policy led to an investment boom and rapid growth in Chile.

The second part of the project, a survey of firm-level studies in open economies, looks more generally at the policies that usefully complement openness to foreign trade and investment. Individual cases and firm-level studies reveal that developing country firms can be competitive. But they are often hampered by a poor investment climate—corruption, inefficient regulation, infrastructure weaknesses, and poor financial services. A recent study of India based on firm surveys highlights the critical importance of the investment climate. With the same (national) trade and macroeconomic policies, Indian states are experiencing widely differing results from liberalization. Not surprisingly, "good climate" states—those with more efficient regulation and better infrastructure—are experiencing more foreign and domestic investment, more income growth, and more poverty reduction, while "poor climate" states lag behind.

If sound institutions are needed to get strong benefits from openness, should countries wait until they have such institutions to open up? Not necessarily. One reason that liberalizing services trade is so important is that developing countries can use this market to improve the investment climate: allowing foreign firms to provide power, telecommunications, and financial services can be a good strategy for strengthening the investment climate.

The survey also looks at targeted efforts to attract foreign investment. Countries often try to attract investment through subsidies and tax holidays, but the evidence suggests that these instruments are not particularly successful; they also discriminate against domestic firms. The really successful cases—Taiwan (China), for example—have created an environment of good governance and good infrastructure in which both foreign and domestic firms can be competitive.

Responsibility: Development Research Group, Macroeconomics and Growth—David Dollar (ddollar@worldbank.org), Mary Hallward-Driemeier, and Tilahun Temesgen, and Office of the Director—Paul Collier. With Chang-Tai Hsieh, Princeton University.

Completion date: September 2001.

Reports

Hallward-Driemeier, Mary. "Openness, Firms, and Competition." World Bank, Development Research Group, Washington, D.C.

Hsieh, Chang-Tai, and Jonathan Parker. 2001. "Taxes and Growth in a Financially Underdeveloped Country: Explaining the Chilean Investment Boom."

Economic Growth, Social Capability, and Preindustrial Development

Recent studies have conjectured that the preindustrial development experiences of countries in Asia, Africa, and Latin America left these countries differently positioned for achieving modern economic growth following World War II. Preindustrial development can be conceptualized as running along a spectrum from primitive, foraging, band-type societies, to extensive agricultural and pastoral small-village societies, to intensive state-level agrarian societies resembling those of Europe and Japan on the eve of industrialization. In cross-country growth regressions preindustrial development—proxied by population density, farmers per hectare, the irrigated share of farmland, or the first principal component of the three—has been shown to be a good predictor of per capita income growth in developing countries in 1960–75, 1975–90, and 1960–90.

In further explorations using the Barro-Lee education data and the Adelman-Morris social development index, the preindustrial development measures usually show a robust, statistically significant relationship with the economic growth rate, in the direction predicted: when conventional explanatory factors are controlled for, countries more densely populated and intensively cultivated at the beginning of the period achieved faster per capita income growth during postwar periods for which data are available.

This research project further investigates the relationship between premodern development and recent growth to see whether the original hypotheses can be verified using larger samples, longer time series, earlier data for premodern development, and more sophisticated methods. It also explores the connections between premodern development, growth, and the demographic changes of recent decades. And it seeks to improve the understanding of the relationship between premodern development, as proxied by population density and similar variables, and "social capability."

The research has found that initial population density, farmers per acre, and irrigation are good predictors of economic growth rates when other factors are controlled for in cross-country growth regressions of standard form. Two other indicators, social development and ethnolinguistic heterogeneity, bear a less robust relationship to growth rates. But experience with state-level structures, another measure of social development suggested by the social evolutionary literature, is a strong predictor of growth in such regressions.

The findings suggest that history matters, that the human factor is crucial to growth, that a society's human capacities are formed by a wider range of influences than those associated with formal schooling, and that fostering the development of human technological and organizational capabilities is indeed as important as many have contended.

The research has contributed to the debate on growth prospects in Africa.

Responsibility: Africa Region Technical Families, Macroeconomics 2—Miria Pigato (mpigato@worldbank.org). With Louis Putterman and Areendam Chanda, Brown University.
Completion date: October 2001.

Report

Chanda, Areendam, and Louis Putterman. 2000. "Economic Growth, Social Capability, and Preindustrial Development." World Bank, Africa RegionTechnical Families, Macroeconomics 2, Washington, D.C.

The Quality of Fiscal Adjustment

This research project analyzed the quality of fiscal adjustment undertaken by policymakers in response to macroeconomic pressures. The analysis combined cross-country data for Latin America, data for all developing countries, and selected case studies. The results show that policymakers sometimes postponed true reform by engaging in illusory reforms. And they sometimes sacrificed future growth for current fiscal adjustment, which worsened their long-run budget constraint.

Responsibility: Development Research Group, Macroeconomics and Growth—William Easterly (weasterly @worldbank.org); and Latin America and the Caribbean Region, Office of the Chief Economist—Luis Servén. With César Calderón, Rochester University.
Completion date: December 2001.

Reports

Calderón, César, and William Easterly. 2001. "How Did Latin America's Infrastructure Fare in the Era of Macroeconomic Crises?" World Bank, Development Research Group, Washington, D.C.

Easterly, William. 1999. "When Is Fiscal Adjustment an Illusion?" *Economic Policy* (April): 57–86.

———. 2001. "Growth Implosions and Debt Explosions: Do Growth Slowdowns Explain Public Debt Crises?" *Contributions to Macroeconomics* 1(1) (Berkeley Electronic Press).

Geography, Growth, and Comparative Advantage in Sub-Saharan Africa

Sub-Saharan Africa has experienced a sustained economic slowdown for the past 20 years or more and, despite notable success stories, the trend is likely to continue for the region as a whole well into the 21st century. Reversing this economic decline is the most serious challenge the development community faces. Efforts to identify the root causes of the deep, persistent decline have pointed to disadvantages in geography and, more recently, in health and population. If these factors are found to be critical for Africa's growth and international competitiveness, what would the implications be for development policy in the region?

This project aims to contribute to the understanding of these issues by analyzing Africa's growth performance and its potential comparative advantage in labor-intensive manufactured exports. The research draws on global panel data sets on geographic, demographic, and institutional and policy indicators for the period 1965–97. The growth analysis is based on a dynamic endogenous growth model, and the comparative advantage analysis on an extended Heckscher-Ohlin framework. Both analyses emphasize rigorous econometric modeling to ensure that the estimated models permit policy simulations.

If the results should show that Sub-Saharan Africa's geography is not destiny, yet does influence the region's growth and international competitiveness, they would suggest a balanced approach to development that would also require strategic measures in technology and infrastructure. In particular, the approach would need to emphasize the development of technology (especially in agriculture) to deal with the unique features of geography and climate in Africa, and regional cooperation in developing infrastructure and communications to reduce economic isolation and expand markets.

A preliminary analysis of the climate ecology, soil characteristics, and topography of Sub-Saharan Africa suggests that, given current agricultural technology, the region suffers from adverse endowments. Thus these preliminary findings appear to support the project's key assumption that health and agriculture in Africa require a new scientific agenda.

This research effort will contribute to a larger, collaborative research project, Explaining Economic Growth Performance in Sub-Saharan Africa, that involves many researchers and policymakers from the region. An interagency initiative, this collaborative project is led by the African Economic Research Consortium (AERC) and includes the United Nations Economic Commission for Africa, the World Bank's Development Research Group, Oxford University, and Harvard University.

Results will be disseminated at an AERC meeting in December 2001 or May 2002, and through presentations at the World Bank in February 2002.

Responsibility: Development Research Group, Macroeconomics and Growth—Ibrahim A. Elbadawi (ielbadawi @worldbank.org), and Office of the Director—Paul Collier. With Anke Hoeffler, Oxford University; and Siham Mohamedahmed, University of Arizona, Tucson.

Completion date: June 2002.

International Economics

Aid and Reform in Africa

Recent cross-country studies have found that foreign aid has a strong, positive effect on a country's economic performance if the country has undertaken certain policy and structural reforms. But the evidence also shows that less aid goes to countries that have undertaken these reforms than to those that have not. Moreover, there is evidence that "aid cannot buy reform."

This research project went beyond the cross-country regressions to arrive at a better understanding of the causes of reforms and of the link between foreign aid and reform. It focused on the real causes of reform and whether and how aid has encouraged, generated, influenced, supported, or retarded reforms. Accordingly, it analyzed the processes of reform rather than the results.

Case studies of 10 African countries examined the nature of external assistance, investigated the causes and paths of policy reforms, and traced the relationship, if any, between aid and reform. The studies were based largely on interviews and on reviews of available data, literature, and documentation. The data came from sources at the International Monetary Fund, Organisation for Economic Co-operation and Development, and World Bank.

A major finding is that reforms are generated largely by causes not directly related to aid, such as crises, political leadership, committed local technocrats, country role models, and consensus among social groups. But in certain circumstances and phases, foreign assistance can help trigger and sustain reforms through policy dialogue, advisory services, and financial aid. Conditions attached to assistance can help reform-minded technocrats lock in reforms, but probably cannot generate sustainable reforms. These findings could influence how aid is used, and what types and amounts are used, during different phases of a reform program and how donors allocate their resources among countries and sectors.

Preliminary case study findings and potential conclusions on cross-cutting issues were discussed at workshops and seminars in Frankfurt, Germany (June 1999); Washington, D.C. (September 1999); Dar es Salaam, Tanzania (November 1999); Nairobi, Kenya (September 2000); and Clermont-Ferrand, France (September 2000). Participants included host country officials, policymakers from case study countries, and representatives of bilateral donor agencies, international organizations, and research institutions.

General project information and the report produced by the research project are available on the Web at http://www.worldbank.org/research/aid/.

Responsibility: Development Research Group, Macroeconomics and Growth—David Dollar (ddollar@worldbank.org), Torgny Holmgren, and Waly Wane, Public Economics—Shantayanan Devarajan, and Office of the Director—Paul Collier. With Elliot Berg, Patrick Guillaumont, and Sylviane Guillaumont, Auvergne University; Jacques Pegatienan, University of Abidjan; Jerome Chevallier; Gilbert Kiakwama; Berhanu Abegaz, College of William and Mary; Samuel Wangwe, Yvonne Tsikata, and Deogratias Mutalemwa, Economic and Social Research Foundation, Dar es Salaam, Tanzania; Stephen O'Brien; Cheikh Sidibé, Ministry of Finance, Mali; Jeffrey Herbst, Princeton University; Charles Soludo, University of Nigeria; Arne Bigsten, University of Göteborg, Sweden; Louis Kasekende, Michael Atingi-Ego, and Daniel Ddamulira, Bank of Uganda; Terry Ryan, University of Nairobi; Lise Rakner, Christian Michelsen Institute, Bergen, Norway; Nicholas van de Walle, Michigan State University; Dominic Mulaisho; Dennis Tao; and Winifred Thompson. The governments of France, Germany, the Netherlands, Norway, Sweden, and Switzerland contributed funding for the research.

Completion date: May 2001.

Report

Devarajan, Shantayanan, David Dollar, and Torgny Holmgren, eds. 2001. *Aid and Reform in Africa: Lessons from Ten Case Studies*. Washington, D.C.: World Bank.

The Antiexport Bias of Duty Drawbacks

Among the most commonly used instruments for correcting the antiexport bias of protectionist trade regimes are duty drawbacks, which provide duty-free entry of imported inputs used in producing exports. But by reducing exporters' incentives to participate in lobbying against protection, the introduction of duty drawbacks may lead to greater trade protection—and thus increase the antiexport bias of the trade regime.

This research project explored the conditions under which duty drawbacks correct the antiexport bias of trade regimes when trade policy is subject to lobbying by interest groups. Its empirical investigations focused on India and on Argentina and Brazil, for an analysis of the impact of eliminating duty drawbacks on intraregional trade in the context of bilateral trade agreements (Mercosur). The analysis was based on recent models developed in the political economy literature on trade policy, extended to include counterlobbying by users of intermediate goods.

The analysis showed that within a Grossman-Helpman model of endogenous protection, equilibrium tariffs escalate with the degree of processing. This result was empirically verified both for India and for Argentina and Brazil.

The research also showed that the presence of duty drawbacks for exporters reduces the incentives to counterlobby against higher tariffs on imported inputs, a finding confirmed by evidence for India and the Mercosur members. In Mercosur eliminating duty drawbacks for intraregional exports led to a reduction in the average common external tariff of 3.5 percentage points.

The findings are being presented at seminars and conferences, including a Latin American and Caribbean Economic Association conference in Montevideo, Uruguay; Econometric Society meetings in Buenos Aires, Argentina; and seminars at the World Bank, the World Trade Organization, and several universities. A survey of the literature on duty drawbacks and the research project's findings is under preparation.

Responsibility: Development Research Group, Trade—Marcelo Olarreaga (molarreaga@worldbank.org). With Olivier Cadot, INSEAD and University of Lausanne; Jean-Marie Grether, University of Neuchatel; and Jaime de Melo, University of Geneva.
Completion date: June 2001.

Reports

Cadot, Olivier, Jaime de Melo, and Marcelo Olarreaga. 2000. "Can Duty Drawbacks Have a Protectionist Bias? Evidence from Mercosur." Policy Research Working Paper 2523. World Bank, Development Research Group, Washington, D.C.

———. 2001. "Lobbying and the Structure of Tariff Protection in Poor and Rich Countries." World Bank, Development Research Group, Washington, D.C.

Cadot, Olivier, Jean-Marie Grether, and Marcelo Olarreaga. 2001. "Lobbying and Protection: Who Does It and Who Gets It? The Indian Case." World Bank, Development Research Group, Washington, D.C.

Comprehensive Database on Trade and Production

This project constructed a database on trade, production, and tariffs in 67 industrial and developing countries over the period 1976–99. The data were filtered into a common classification and disaggregated by the 27 industries of the three-digit International Standard Industrial Classification (ISIC) and, where available, the 81 industries of the four-digit ISIC.

The production data are from the United Nations Industrial Development Organization and include value added, total output, average wages, capital formation, number of employees, number of female employees, and number of firms. The trade data are from the United Nations' Commodity Trade (Comtrade) database and include imports, exports, and mirrored exports. Trade flows were aggregated by region and income group, and a separate database was constructed on bilateral trade flows. The tariff data are based on most-favored-nation tariffs from the Trade Analysis and Information System (Trains) maintained by the United Nations Conference on Trade and Development and the World Trade Organization's Trade Policy Reviews. Input-output tables were obtained from the Global Trade Analysis Project.

The database could be used to analyze a wide range of issues. The Development Research Group's Trade Team is using it to study the impact of trade liberalization on the mobility of female workers across sectors and on the acquisition of foreign knowledge by producers.

The database will be made available on demand, in ASCII files and Microsoft Excel worksheets on CD-ROM. It will also be available in a handbook on the new round of World Trade Organization negotiations. A descriptive paper accompanies the database.

Responsibility: Development Research Group, Trade—Marcelo Olarreaga (molarreaga@worldbank.org) and Alessandro Nicita.

Completion date: June 2001.

The Dynamic Impact of Trade Liberalization in Developing Countries

International trade economists and World 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 empirical 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 growth and welfare.

Yet numerical estimates of the impact of trade liberalization have generally shown 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 the estimates would be much larger if they incorporated the dynamic gains from trade liberalization.

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, making it difficult to gain insight into the dynamic growth path of the key variables. Moreover, since the theoretical literature does not evaluate the adjustment costs, it cannot clearly indicate that welfare is significantly increased even if the long-run growth rate increases.

This study quantified the dynamic gains from trade liberalization in a small developing country in an applied general equilibrium model, taking into account the adjustment costs associated with forgone consumption. It assessed the claim that the dynamic welfare gains from trade liberalization are considerably larger than the comparative static estimates. Using computable general equilibrium models, it also investigated the importance of having a variety of imported inputs available in domestic production and of opening service sectors to foreign competition. The analysis drew on the Global Trade Analysis Project database, the Trade Team's database on tariffs, and input-output tables as appropriate.

The project produced three papers. 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 a productivity multiplier of the Ethier-Dixit-Stiglitz variety. 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. The paper shows that when the impact of trade liberalization on technology diffusion is taken into account, the estimated welfare gains are very large and consistent with the large econometrically estimated effects on growth.

The third paper examines the impact of liberalizing foreign direct investment in service sectors. It shows that not only does liberalizing foreign investment have a large welfare impact, but opening business services to foreign competitors is likely to significantly benefit domestic skilled labor. Even the pattern of what the country exports and imports can change.

The study's results support the strong version of the link between trade liberalization and economic growth, as well as the importance of opening service sectors to foreign direct investment. They should buttress the intellectual case in the development community for the importance of openness for growth.

Liberalizing services is particularly important in countries acceding to the World Trade Organization, and the project's innovation in allowing a practical assessment of the impact of service liberalization should prove extremely useful in the policy dialogue with such countries. The study's results have been incorporated in the World Bank Institute's course on trade policy.

Responsibility: Development Research Group, Trade—David Tarr (dtarr@worldbank.org). With Thomas Rutherford and James Markusen, University of Colorado.

Completion date: June 2001.

Reports

Markusen, James, Thomas Rutherford, and David Tarr. 2000. "Foreign Direct Investment in Services and the Domestic Market for Expertise." NBER Working Paper 7700. National Bureau of Economic Research, Cambridge, Mass.

Rutherford, Thomas, and David Tarr. 1998. "Regional Trading Arrangements for Chile: Do the Results Differ with a Dynamic Model?" Paper presented at the conference Using Dynamic Computable General Equilibrium Models for Policy Analysis, Assens, Denmark, June 14–17.

———. Forthcoming. "Trade Liberalization and Endogenous Growth in a Small Open Economy: An Illustrative Model." *Journal of International Economics.* (For another version of this paper, "Trade Liberalization, Product Variety, and Growth in a Small Open Economy: A Quantitative Analysis," contact mkasilag@worldbank.org.)

Forecasting Capital Flows

This study examined three issues relating to developing country borrowing. First, the study looked at what determines the maturity of developing country bonds. The results of this analysis shed light on what factors might be manipulated to move bonds away from short maturities, which have been shown to be a risk factor in recent financial crises. Second, the study examined the effects of a recent sovereign debt restructuring on the country's access to debt markets and its borrowing costs, an analysis that contributes to the debate on bailout and moral hazard. Finally, the study looked at the relationship between exchange rate regime (hard peg, soft peg, or relatively free float) and the cost of external finance.

Responsibility: Development Prospects Group—Ashoka Mody (amody@worldbank.org). With Mark Taylor and J. Y. Kim, Warwick University.

Completion date: June 2001.

Reports

Mody, Ashoka, and Mark Taylor. "Modeling Capital Crunches." Draft.

Mody, Ashoka, Mark Taylor, and J. Y. Kim. 2001. "Modeling Fundamentals for Forecasting Capital Flows to Emerging Markets." *International Journal of Finance and Economics* 6(3): 201–16.

———. Forthcoming. "Forecasting Capital Flows to Emerging Markets: A Kalman Filtering Approach." *Applied Financial Economics.*

International Capital Flows

This research project compiled new measures of financial liberalization and capital controls, gathering data on 28 industrial countries and emerging markets (in East Asia and Latin America) since 1973. The project collected information on regulations in the domestic financial sector, including controls on interest rates (lending and deposit), on quantities (credit controls and reserve requirements), and on other aspects (foreign currency deposits).

The project collected data on international capital flows for a large cross-section of countries since the 1960s. The flows were disaggregated into assets and liabilities (debt instruments, foreign direct investment, and portfolio equity), and a data series was constructed for the share of foreign direct investment represented by mergers and acquisitions. The research then identified the basic patterns of international flows—their composition, their countries of origin and destination, their trends over time, and their relationship with domestic macroeconomic and governance conditions. These stylized facts will be used to construct a model of capital flows, focusing mostly on foreign direct investment.

The project also carried out research on the integration of developing countries with the international financial system. This research analyzed the benefits and risks of financial globalization, the flows of mutual fund investments to developing countries, the impact of financial globalization on firms' financing choices, and the transmission of international interest rates and credit rating upgrades and downgrades to stock market prices and country premiums.

The research found that developing countries have gradually lifted restrictions on capital account transactions to take greater advantage of financial globalization—though there have also been periods in which restrictions were reimposed. The most substantial reversals occurred in Latin America in the aftermath of the 1982 debt crisis and in the mid-1990s, and in Asia in the aftermath of that region's financial crisis.

As a result of the easing of restrictions and of technological advances, net capital flows to developing economies have increased sharply since the 1970s, one of the benefits of financial globalization. Capital flows rose from less than $28 billion in the 1970s to about $306 billion (in real terms) in 1997, when they peaked. The composition of capital flows to developing countries changed significantly during this period. The share of official flows declined by more than half, while private flows became the major source of capital for many emerging economies. The composition of private capital flows also changed markedly, with foreign direct investment growing continuously throughout the 1990s.

While financial liberalization brings benefits, it also involves clear risks, reflected in the devastating crises in recent years. The research shows that the process of opening leads to a more extreme cycle in financial markets. In the typical stock market cycle of an open developing country, stock prices increase nearly 100 percent in the 18 months before the cycle peaks, then fall 20 percent over the first six months of the downturn. But in the first cycle within three years of financial liberalization, on average stock prices triple, then drop by 50 percent over the first six months of the downturn. Thus a key question for developing countries is whether they have the robust financial institutions needed to manage this temporary volatility. If not, a serious crisis can ensue.

The research also looked at the effect of capital controls. It found that these controls can work in the short run, directing flows toward longer maturities, but that their effectiveness declines over time.

Responsibility: Development Research Group, Macroeconomics and Growth—David Dollar (ddollar@worldbank.org), Sergio Schmukler, Norman Loayza, and Hairong Yu; and Latin America and the Caribbean Region, Office of the Chief Economist—Luis Servén. With Jeffrey Frankel, Harvard University; Graciela Kaminsky, George Washington University; Richard Lyons and Changqing Sun, University of California at Berkeley; Andrea Bubula, Columbia University; Eduardo Fajnzylber, University of California at Los Angeles; Federico Guerrero, Francisco Vazquez, and Jose Pineda, University of Maryland; Jon Tong; Nong Thaicharoen, Massachusetts Institute of Technology; Sergio Kurlat; Leonor Coutinho-Gouveia; Chris van Klaveren; Yanchun Zhang; Yaye Sakho; Tatiana Brandao; and Akido Terada. The National Science Foundation, United States, contributed funding for the research.

Completion date: June 2001.

Reports

Frankel, Jeffrey, Luis Servén, and Sergio Schmukler. "Global Transmission of Interest Rates: Monetary Independence and Currency Regime."

Kaminsky, Graciela, and Sergio Schmukler. 2001. "Short- and Long-Run Integration: Do Capital Controls Matter?" *Brookings Trade Forum 2000*, pp. 125–78.

Schmukler, Sergio, and Pablo Zoido-Lobatón. "Financial Globalization: Opportunities and Challenges for Developing Countries."

Regionalism and Technology Transfers

This research project examines the determinants of technology transfers from industrial to developing countries, and the impact of these transfers on total factor productivity. In particular, it investigates whether economic openness and education in the host country contribute to the absorption of foreign technological knowledge and thus to growth. The research is based on econometric analysis using an approach for determining the relationship between total factor productivity and foreign research and development.

The study uses an industry-related database for developing countries, which has not been done before in the literature. The data are drawn from several sources, including the World Integrated Trade Solution information system, the Barro-Lee cross-country database on educational attainment and the quality of education, the Analytical Business Enterprise Research and Development Database maintained by the Organisation for Economic Co-operation and Development (OECD), and databases of the World Bank, the United Nations

Industrial Development Organization, and the United Nations Educational, Scientific, and Cultural Organization.

Preliminary findings show that openness contributes to the absorption of foreign technological knowledge and to total factor productivity and that education contributes additionally to this process. These findings should strengthen the arguments on the importance of economic openness and good-quality education. The findings also have implications for regional agreements—whether countries should enter or form one and, if so, with which partners.

The findings have been discussed with economists and policymakers in Mercosur, at the European Commission in Brussels, and at the OECD Development Centre in Paris. They have also been presented to World Bank staff and to academic audiences at Yale University, University of Paris I, University of Clermont-Ferrand, and Universidad Catolica, Chile.

Responsibility: Development Research Group, Trade—Maurice Schiff (mschiff@worldbank.org). With Joseph François; Yanling Wang, Georgetown University; Wolfgang Keller, University of Texas at Austin; Giorgio Barba Navaretti, Università degli Studi di Ancona and Centro Studi Luca d'Agliano (Milan); and Nisha Malhotra, University of Maryland at College Park.

Completion date: August 2001.

Micro Foundations of International Technology Diffusion

Developing country governments often seek to spur adoption of foreign technologies through policy interventions designed to encourage domestic firms to enter into joint ventures with foreign partners, import sophisticated capital goods, license technology, and export to industrial country markets. Which of these policy interventions (if any) is appropriate depends crucially on which leads to effects that improve firm performance, how large the effects are, and whether the effects are internal or external to the firm.

Much of the research on these questions for developing countries relies on cross-sectional data, which make it difficult to identify the direction of causation between activities and performance; aggregate time-series data, which are difficult to interpret; or case studies, which are difficult to generalize. The premise of this research project is that analysis of firm-level panel data is most likely to shed light on the issues.

The project is documenting cross-country and sectoral patterns in the incidence of the activities associated with technology transfer and, where possible, relating the patterns to country policies. The research uses firm-level panel data sets for 10 developing and transition economies: Bulgaria, Colombia, the Czech Republic, Ghana, Indonesia, the Republic of Korea, Morocco, Poland, Romania, and Taiwan (China). Econometric techniques are used to investigate the causal relationship between firm activities and firm performance and the size of the effects.

Results to date suggest that:

- In high- and medium-technology sectors foreign investors that are technology or marketing leaders in their industries are more likely to engage in wholly owned projects than to share ownership (Poland).
- Total factor productivity growth tends to be higher in wholly owned firms than in firms with joint ventures and firms without foreign partnerships (the Czech Republic, Indonesia).
- As foreign owners relinquish their equity stake, productivity falls (Indonesia).
- Productivity growth in manufacturing is positively correlated with the complexity of machines imported in a given industry (Morocco, Poland).
- Firms that neither import intermediate goods nor export tend to produce lower-quality products than counterpart firms engaged in international activities (Colombia).
- Differences in technology inflows related to the pattern of imports explain about 20 percent of the variation in productivity growth between countries.

The findings of the project have been presented at the World Bank Trade Seminar Series, the Annual Bank Conference on Development Economics, and other conferences.

Responsibility: Development Research Group, Trade—Bernard Hoekman (bhoekman@worldbank.org), Isidro Soloaga, and Beata Smarzynska, Macroeconomics and Growth—Aart Kraay, and Finance—Simon Evenett. With Gary Anderson, University of Maryland; Bee-Yan

Aw, Mark Roberts, and James Tybout, Pennsylvania State University; Marc Bacchetta and Felix Eschenbach, World Trade Organization; Howard Pack, University of Pennsylvania; Kamal Saggi, Southern Methodist University, Dallas; Francis Teal, Oxford University; Alex Voicu, Rutgers University; and Giorgio Barba Navaretti, Università degli Studi di Ancona.
Completion date: December 2001.

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Trade Liberalization, Industrial Performance, and Export Growth in India

Over the past decade India has deregulated industries, liberalized trade, opened its economy to foreign investment, and reformed its financial sector. How have these reforms affected the economy? To find out, this study examines the links between trade liberalization, industrial performance, and export growth in India during the 1990s.

The study is carrying out an analysis of manufacturing at the aggregate level and at the two-digit level of disaggregation. To supplement this, it is also conducting an analysis of the auto components and pharmaceutical industries, based on firm-level data, to explore the microeconomic responses to the new policy regime. The analyses are based on ordinary least squares and panel regressions and draw on the World Bank's World Development Indicators database, data from national sources, and some primary data collected through direct questionnaires. The work is being carried out by the Indian Council for Research on International Economic Relations (ICRIER).

The study's findings may serve as a useful input for the Indian government in determining its stance in the World Trade Organization on opening the pharmaceutical and automobile sectors. The findings will be discussed at interim seminars and at a larger seminar once the study is completed. The data collected will be made publicly available.

Responsibility: South Asia Region, Poverty Reduction and Economic Management Sector Unit—Deepak Mishra

(dmishra@worldbank.org) and Shahnaz Rana. With Isher Judge Ahluwalia and Basudev Guha, Indian Council for Research on International Economic Relations.
Completion date: December 2001.

The Effects of American Depository Receipt Trading on Local Markets

Large companies in developing countries are migrating to international equity markets, particularly in London and New York, through the trading of depository receipts and the cross-listing of their stocks. As the number of companies listed domestically shrinks, several local markets are becoming illiquid, making it difficult for the companies remaining at home to raise equity. Foreign direct investment might be exacerbating the liquidity problem: when local companies are acquired, they withdraw their listings from local markets (delist). And foreign companies tend to move their equity abroad.

This process could have important policy implications if equity financing becomes more difficult for a large number of companies. In response, policymakers have been proposing new local or regional equity markets. To contribute to the debate on these issues, this project is evaluating the importance of the liquidity problem and its determinants.

The project will analyze recent trends in domestic equity markets, using country-level data for a large set of countries to test whether the introduction of depository receipts and the internationalization of equity markets are affecting the liquidity and development of local stock markets. It will measure the extent of the migration of trading from domestic to international markets at the aggregate level, controlling for macroeconomic and institutional factors affecting the development of local stock markets.

The project will also analyze the effect of migration related to foreign direct investment on the companies remaining in the domestic market. Using firm-level data on value traded in the local market and international markets, the project will analyze how migration and delisting affect the trading activity of companies without American depository receipt programs. These data will also shed light on how much trading is migrating to international markets for firms with such programs.

To conduct these analyses, the project has been collecting data for a large group of developing countries. It has also been collecting data on stock prices in each domestic market and on world exchanges, on trading volumes of stocks, and on stock returns in major world markets. These data will make it possible to compute time-series measures of liquidity, volatility, and integration across the developing country markets.

In addition, the project has assembled the dates of major cross-listings of equities and has been constructing trading volume series in the local market and in international markets for companies with and without cross-listings and American depository receipt programs. The database shows when each company issues equity in different stock markets around the world. So, for each country, data can be obtained for several companies, for several cross-listing events, and for a continuous series for each company.

The data come from several sources, including Bloomberg, DataStream, Euromoney, the Bank of New York, and the International Finance Corporation.
Responsibility: Development Research Group, Macroeconomics and Growth—Sergio Schmukler (sschmukler @worldbank.org); and Financial Sector Strategy and Policy Department—Stijn Claessens, Daniela Klingebiel, and Ying Lin. With Ross Levine, University of Minnesota; Tatiana Brandao, Catholic University, Rio de Janeiro; Yaye Sakho, University of Pennsylvania; and Francisco Vazquez, University of Maryland.
Completion date: June 2002.

Financial Development and Contagion

This project consists of several studies aimed at improving the understanding of the functioning of financial markets, the benefits of financial integration, and the effects of financial and banking crises.

First, the project examined the interaction between deposit insurance and market discipline in the banking sector, and the impact of banking crises on market discipline. This study used bank-level data for Argentina, Chile, and Mexico, all of which experienced banking crises during the sample period (1980s and 1990s). The results show that in these countries depositors—large or small, with local or foreign currency deposits—do exert market discipline, punishing banks for risky behavior by withdrawing their deposits and by requiring higher interest rates.

Deposit insurance need not reduce market discipline. In Chile uninsured depositors seem to respond more aggressively than insured depositors to bank risks, while in Argentina no significant differences were observed in the responses of the two groups. The results suggest that depositors, even if covered by deposit insurance, might exercise market discipline when there is uncertainty about the future availability of their deposits—for example, if the government has reneged on its promises in the past, if the deposit insurance scheme is undercapitalized, or if depositors are concerned about the cost of repayment (typically in the form of delays) through the deposit insurance fund.

Crises seem to be wake-up calls for depositors. Withdrawals become more frequent immediately after banking crises, but this kind of market discipline is much more limited before and during crises. Interest rates were responsive to bank risk taking throughout the sample period. These results suggest that depositors become more aware of the risk of losing deposits, and start to shift them, after they observe bank failures.

Second, the project studied the effects of financial integration on firms' financing choices, using data on a large panel of nonfinancial companies in East Asia and Latin America. This study focused on seven emerging economies that have experienced financial liberalization and crises—Argentina, Brazil, Indonesia, the Republic of Korea, Malaysia, Mexico, and Thailand. The data cover the 1980s and 1990s, allowing comparison of pre- and post-liberalization periods.

The main results show that integration of financial markets does affect firms' financing choices and that the effects seem to be uneven. Firms that participate in international markets obtain better financing opportunities—gaining the ability to extend their debt maturity structure, for example. Debt maturity tends to shorten, however, when countries undertake financial liberalization. This implies that firms that do not participate in international markets are probably increasing their short-term liabilities. The shift in the maturity structure toward the short term after financial liberalization suggests that it could be important to accompany liberalization with prudential regulation to prevent a mismatch in maturity between assets and liabilities.

Some authors have argued that bank-based and market-based financial systems provide different types of financing, with firms able to obtain more debt financing in bank-based systems and more equity financing in market-based systems. The study showed that the financial structure of firms in different systems is not notably different.

Third, the project examined stock market cycles in 28 countries—in the G-7, Europe, East Asia, and Latin America—characterizing the amplitude and duration of cycles over time and across regions. It also examined the claim that financial cycles are more protracted after domestic and external financial liberalization.

The findings show that financial liberalization does not necessarily lead to financial excesses. Financial cycles become more severe only in the aftermath of the opening of the economy to international capital flows. Over time, liberalized capital markets become more stable. Why? Markets with fewer capital controls are more exposed to shocks from abroad and thus more prone to contagion. But eliminating capital account restrictions favors the development of capital markets. As financial markets deepen and investors become more diversified, markets become less prone to wild gyrations.

The findings also show that the behavior of stock market prices in developing countries differs from a random walk, so that it is meaningful to analyze stock market booms and busts. Monte Carlo experiments showed that the characteristics of cycles derived from processes in which parameters are obtained from country data differ from those derived from random processes in which returns are unpredicted.

To continue this research, the project is creating a data set on financial liberalization for the same 28 countries, from the early 1970s through the 1990s, with information on restrictions on the domestic financial sector and international capital flows. The data set, for which 11 indicators of financial liberalization have been collected, will be valuable for measuring financial integration.

Fourth, the project examined whether local managers of firms have an informational advantage in predicting currency fluctuations and crises. This study was based on data from the Global Competitiveness Survey, which gathers the perspectives of managers around the world on their country's economic, political, and institutional situation. The data used are from surveys at the end of 1995, 1996, and 1997 and thus precede the crises in Asia, the Russian Federation, and Brazil.

The results suggest that local managers were able to predict the crises in the Republic of Korea and Thailand, but not those in Indonesia or Malaysia. The evidence also suggests that there were information asymmetries: local residents were shifting funds out of the country before foreign investors were. Foreign market participants (such as international mutual funds) and market analysts largely did not expect the Asian crisis.

The results also show that local managers' private information can help predict exchange rate fluctuations. Their information seems superior to that revealed by macroeconomic and financial data and by markets.

Findings have been presented at the Central Bank of Chile, the Federal Reserve Board, the Federal Reserve Bank of New York, American Economic Association meetings (Boston and New York), European Econometric Society meetings, Latin American and Caribbean Economic Association (LACEA) meetings (Buenos Aires, Argentina; and Rio de Janeiro, Brazil), LACEA Winter Camps on International Finance (Cartagena, Colombia; and Santiago, Chile), Society for Economic Dynamics meetings (Philadelphia), and World Bank conferences. The papers from the project have been posted on the Web at http://www.worldbank.org/contagion/.

Responsibility: Development Research Group, Macroeconomics and Growth—Sergio Schmukler (sschmukler@worldbank.org), and Finance—Maria Soledad Martinez Peria; and World Bank Institute, Governance, Regulation, and Finance Division—Daniel Kaufmann. With Jon Tong; Sergio Kurlat; Graciela Kaminsky and Akiko Terada, George Washington University; Gil Mehrez and Esteban Vesperoni, International Monetary Fund; Arun Sharma, Federico Guerrero, Francisco Vazquez, Jose Pineda, and Kevin Wang, University of Maryland; Carlos Arteta, University of California at Berkeley; Cecilia Harun, Columbia University; Marco Sorge, Stanford University; Matias Zvetelman, University of Buenos Aires; Matteo Ciccarelli, Universitat Pompeu Fabra, Barcelona; and Miana Plesca, McGill University, Montreal.

Completion date: June 2002.

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Trade Policy in Transition Economies

Integration with the international economy is an essential part of the transition from central planning to a market system. Price distortions, so common under central planning, can be maintained only through formidable trade and foreign exchange controls that divorce 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.

This project has looked at trade policy reform issues in the countries of the former Soviet Union. A study summarizing trade performance and the experience with trade policy reform in these countries recommended 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.

A study of customs unions showed that although preferential trade areas in the Commonwealth of Independent States (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. Work on the issue of accession to the World Trade Organization by the transition economies emphasized that accession provides a unique opportunity for the acceding country to "lock in" a trade policy that is beneficial to that country, as long as it adopts a less than minimalist approach in its accession offer.

The project has also examined issues relating to tariff policy and tariff uniformity for transition economies, focusing on the Russian Federation. And it has assessed the progress of the transition economies in integrating into the world trading system and acceding to the World Trade Organization. This research concluded that for many countries of the former Soviet Union, integrating effectively will require considerable reform and adjustment. But the United States and the European Union also may need to make some changes, especially in their designation of some of these countries as "nonmarket" economies.

Research has also looked at the impact of the European Union on the trade policies of Central Europe. It found that, except for certain "sensitive products," the link with the European Union has offset protectionist pressures in Central Europe. And an examination of the effect of overvalued exchange rates on growth and on trade policies, initially focusing on Kazakhstan, found that the effect on growth is strongly negative, just as in other parts of the world.

The study's findings and recommendations have been communicated to the governments in policy dialogue on international trade reform, discussed with representatives of transition economies, and presented at conferences.

Responsibility: Development Research Group, Trade—David Tarr (dtarr@worldbank.org) and Bartlomiej Kaminski; and Europe and Central Asia Region, Brussels Office—Constantine Michalopoulos.

Completion date: June 2002.

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African Trade Facilitation and Standards: Bridging the Divide

Trade facilitation and standards are at the center of trade policy discussions. Standards and technical regulations may either raise or lower economic efficiency, promote or block competition, facilitate or constrain international trade, and enable or exclude the participation of the poor in economic activities. These issues are of particular importance for the least developed countries in Sub-Saharan Africa as these countries attempt to strengthen industrial performance, increase agricultural productivity and competitiveness, and engage in international trade. Expanding access to information on international standards and strengthening the implementation of trade obligations are important development objectives—goals that require both stronger empirical understanding and creative programs in capacity building.

This project is aimed at contributing to those objectives and thus helping to strengthen Sub-Saharan Africa's integration into the world trading system and its capacity to exercise rights and meet obligations under World Trade Organization agreements on trade standards. The project involves the following activities:

- Through workshops and capacity building efforts, assessing and building awareness of the range and importance of international standards and technical regulations affecting Africa's current and prospective trade in food, agricultural, and light manufactured products.
- Analyzing the status of African supply systems and regulatory and certification arrangements and the gaps between these systems and supply chains linked to OECD markets. The analysis will also cover the strategies that different industries use to comply with the evolving international and external standards and the bottlenecks and costs that they face.
- Highlighting best practice models—in Africa and elsewhere—for implementing reforms and capacity building in the area of international standards, including public, private, and joint public-private initiatives.
- Developing five action plans—for Kenya, Mozambique, Nigeria, South Africa, and Uganda—for expanding access to and use of information on international standards. This work will include identifying infrastructure and capacity building needs in the public and private sectors. The study expects to extend the work to other countries over time, including those in West Africa.
- Developing databases and a design for a Standards Access Africa network to deliver information on standards and regulations critical to development and trade obligations. This network will leverage the World Bank's Global Distance Learning network.

The project is being carried out in partnership with the African Economic Research Consortium (AERC) and the Trade and Investment Policy Secretariat of South

Africa, among other groups. Fieldwork began in July 2001, and a planning forum hosted by the World Bank and the AERC was held that month in Nairobi, Kenya. National workshops will take place in the first quarter of 2002, and country action plans will be prepared by September 2002. A regional conference will be held in 2002.

Information on standards and trade can be found on the Web at http://www.worldbank.org/research/trade/. A new Web site focusing on these issues in Africa is being developed and will be linked to that site.

Responsibility: Development Research Group, Trade—John S. Wilson (jswilson@worldbank.org) and Tsunehiro Otsuki; and Africa Region Technical Families, Private Sector—Steve Jaffee. The U.S. Agency for International Development has contributed funding for the research through a trust fund (Africa Trade and Investment Policy Project).

Completion date: September 2002.

Trade in Services

In response to a widely felt need for more research on trade in services, especially on issues of interest to developing countries, this program is generating and drawing together data and research on services trade. Its aim is to improve the formulation of services trade policy and facilitate effective participation by developing countries in the World Trade Organization negotiations on services. The program supplements sector-specific work in the World Bank on finance, transport, telecommunications, and other service sectors.

The program has three components: collecting information on trade in services; conducting research projects (on such topics as liberalizing trade in maritime transport services, the determinants of foreign investment in service industries, the economic performance of the telecommunications sector, and the impact of service sector policies on growth); and mainstreaming trade in services at three levels—national policies (through direct advice and capacity building), World Bank country operations, and the international policy environment, including support in negotiations.

Preliminary databases have been created on maritime transport and basic telecommunications services. The maritime transport services database covers 58 countries (37 developing economies), drawing together information from Asia Pacific Economic Cooperation, the Organisation for Economic Co-operation and Development (OECD), the World Trade Organization, and other sources to identify impediments to trade in the sector. The telecommunications database draws together information on more than 100 countries from the International Telecommunication Union, the OECD, the World Bank, and other sources.

A Web site has been established (http://www.worldbank.org/trade/services.html) as a vehicle for disseminating research on trade in services conducted within and outside the Bank. The Web site now includes links to information on trade in services, including measures, trade flows, and other economic variables, and will soon be expanded.

The program is being undertaken by World Bank staff in collaboration with other international organizations—such as the OECD, Andean Pact, World Trade Organization, International Telecommunication Union, Organization of American States, and United Nations Conference on Trade and Development—and with research networks and institutions—notably the Latin American Trade Network, the National Council of Applied Economic Research (India), the Coordinated African Program of Assistance on Services, the Trade Policy Forum of the Pacific Economic Cooperation Council, and the Economic Research Forum for the Arab Countries, Iran, and Turkey.

Responsibility: Development Research Group, Trade—Aaditya Mattoo (amattoo@worldbank.org) and Carsten Fink. With Randeep Rathindran, University of Maryland; Ileana Cristina Neagu; and Robert Simms. The U.K. Department for International Development is contributing funding for the program.

Completion date: October 2002.

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Trade, Standards, and Regulatory Reform

This project aims to expand the understanding of how product standards and government regulations (health, food safety, environment) affect trade. It also seeks to identify policy priorities relating to product standards and to recommend actions to strengthen developing countries' capacity to address technical and regulatory barriers to trade. The project supports research and policy assessment of the ways governments and the private sector can reduce transaction costs and facilitate trade through standards. The project has also provided new links between research on these issues and World Bank operations.

Through a workshop and a series of empirical papers, the project has launched efforts to design new approaches to quantifying the trade effect of product standards. It is also developing a new database on standards, regulations, and trade by drawing on a survey of firms in 15 developing countries around the world.

The project has completed research on the impact of food safety standards on global trade, including in Sub-Saharan Africa. It has carried out case studies in Africa, Central America, Thailand, Ukraine, Vietnam, and elsewhere on the effects of international standards. Research has also been completed on the impact of environmental standards on trade in pollution-intensive exports. The case studies show that developing countries face major challenges in gaining access to information on international standards and that many have difficulty implementing World Trade Organization (WTO) obligations on product standards. The findings suggest a role for development agencies in assisting in areas of clear public good.

The project has organized two seminars on standards —one in Panama City for representatives of seven Central American governments and another in Geneva for developing country WTO missions. In addition, it organized a conference in Singapore in September 2000 on standards, trade facilitation, and development in the Asia Pacific region. The workshop on measuring the link between trade and standards was held in Washington, D.C., for academics, trade experts, WTO representatives, and others.

Results of the research have been incorporated in the World Bank Institute core course on global trade and the new agenda. Information on project activities, research papers, and findings is available on the Web at http://www.worldbank.org/trade/.

Responsibility: Development Research Group, Trade—John S. Wilson (jswilson@worldbank.org) and Tsunehiro Otsuki. The U.K. Department for International Development Trust Fund has contributed funding for the research.

Completion date: November 2002.

Report

Maskus, Keith, and John S. Wilson, eds. Forthcoming. *Quantifying the Impact of Technical Barriers to Trade: Is It Possible?* Ann Arbor: University of Michigan Press.

Domestic Finance

Deposit Insurance: Issues of Principle, Design, and Implementation

Most countries have some form of protection for bank deposits, but the arrangements vary considerably in design. While there are formal systems that explicitly guarantee deposits, implicit systems—in which participants simply take it for granted that the government will step in if there is a crisis—are also widespread. Explicit systems vary in coverage, in whether membership is voluntary or mandatory, in funding and premium structures, and in management. Some deposit insurance institutions are also responsible for supervising the insured institutions. While most policymakers consider deposit insurance a stabilizing tool that spares countries from banking crises, a growing literature emphasizes the destabilizing effects of deposit insurance systems that end up exacerbating the very crises they were meant to prevent.

Policymakers often ask the World Bank for advice on the design of deposit insurance. In responding to such inquiries, Bank staff have been hampered by the lack of professional consensus on the main issues and the unavailability of a cross-country data set on design characteristics of deposit insurance and safety nets. This project was aimed at improving Bank advice on the design of deposit insurance.

The project involved three main tasks. The first was to compile a comprehensive database on the existence and design of deposit insurance systems around the world. Information was collected from various sources, updated, put into a format suitable for empirical analysis, and made available to researchers inside and outside the Bank. In addition to supporting research, this database enables Bank economists to readily compare the system in a country with others around the world.

The second task was to survey the theoretical and empirical literature on deposit insurance and develop a conceptual framework that illustrates how the international and contracting environments of countries affect the optimal design of their safety nets. The third task was to test the impact of deposit insurance design on the financial system. This analysis focused on the impact on the stability of the banking system, on market discipline, on financial system development, and on crisis management.

The ultimate purpose of the research was to turn the considerable theoretical work on financial regulation in industrial countries into a tested body of theory that can support reliable policy recommendations on how to tailor deposit insurance to the circumstances of developing countries. The results indicate a need to be careful about a blanket endorsement of explicit deposit insurance for all developing countries. Without adequate institutional development, there is a real risk that deposit insurance could lead to less market discipline, greater financial system fragility, less financial sector development, and, ultimately, slower growth and higher poverty. Thus governments considering deposit insurance should make auditing their institutional framework the first step in their decisionmaking. Those that decide to establish an explicit insurance system should incorporate design elements that minimize moral hazard.

Papers produced for this project were presented at the World Bank conference on Deposit Insurance in Washington, D.C., on June 8–9, 2000. All these papers, along with the database, are available on the Web at http://www.worldbank.org/research/interest/confs/upcoming/deposit_insurance/home.htm.

Responsibility: Development Research Group, Finance—Asli Demirgüç-Kunt (ademirguckunt@worldbank.org) and Robert Cull. With Edward Kane, Boston College.

Completion date: September 2000.

Reports

Beck, Thorsten. 2000. "Market Discipline through Private Insurance: The Case of the German Safety Net." Paper presented at the World Bank conference on Deposit Insurance, Washington, D.C., June 8–9.

Boyd, John, and Bruce Smith. 2000. "Deposit Insurance Design and Bailout Costs." Paper presented at the World Bank conference on Deposit Insurance, Washington, D.C., June 8–9.

Calomiris, Charles. 2000. "Can Emerging Market Bank Regulators Establish Credible Discipline? The Case of Argentina." Paper presented at the World Bank conference on Deposit Insurance, Washington, D.C., June 8–9.

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Demirgüç-Kunt, Asli, and Enrica Detragiache. 2000. "Does Deposit Insurance Increase Banking System Stability? An Empirical Investigation." Paper presented at the World Bank conference on Deposit Insurance, Washington, D.C., June 8–9.

Demirgüç-Kunt, Asli, and Harry Huizinga. 2000. "Market Discipline and Financial Safety Net Design." Paper presented at the World Bank conference on Deposit Insurance, Washington, D.C., June 8–9.

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Kane, Edward. 2000. "Adjusting Financial Safety Nets to Country Circumstances." Paper presented at the World Bank conference on Deposit Insurance, Washington, D.C., June 8–9.

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Kane, Edward, and Berry Wilson. 2000. "Analyzing Safety Net Design during Economic Development in the U.S., U.K., and Canada." Paper presented at the World Bank conference on Deposit Insurance, Washington, D.C., June 8–9.

Martinez Peria, Maria Soledad, and Sergio Schmukler. 2000. "Do Depositors Punish Banks for 'Bad' Behavior? Market Discipline, Deposit Insurance, and Banking Crises." Paper presented at the World Bank conference on Deposit Insurance, Washington, D.C., June 8–9.

Policy for Small Financial Systems

As many as two-thirds of the World Bank's members have small financial systems. Do these countries need different advice than other World Bank members on the design of financial sector regulatory institutions and practices and competition and entry policies? This research project carried out a preliminary exploration of the ways in which small and very small financial systems are likely to underperform as a result of their size, gauged the importance of the underperformance in each dimension, and identified policy options that could alleviate the problem.

The study produced several findings:

• *Intermediaries and markets.* The literature reveals considerable economies of scale and scope in financial intermediaries and markets, although this may change somewhat with new technology. Securities markets in small financial systems are incomplete. Small banking systems have higher intermediation costs than large ones, suggesting that they are less competitive. The effects are potentially large as a share of GDP.

• *Risk.* The literature suggests that the benefits of international risk diversification are larger for smaller financial systems. More research is needed here, however, to examine correlations between openness and stock market characteristics and between openness and reinsurance practices.

• *Regulation.* There is clear quantitative evidence of economies of scale in official regulatory costs, although they are not large. The potential hidden costs of small size, including reduced regulatory autonomy, remain difficult to confirm.

The research identified gaps in knowledge and proposed future work that could include capacity building for research. The research findings were presented at a World Bank Finance Forum and incorporated in the World Bank Policy Research Report *Finance for Growth: Policy Choices in a Volatile World* (New York: Oxford University Press, 2001). The findings could have an immediate and significant impact on the Bank's policy approach to financial systems, including the Financial Sector Assessment Program.

Responsibility: Development Research Group, Finance—Patrick Honohan (phonohan@worldbank.org) and Anqing Shi; and Financial Sector Strategy and Policy Department—Biagio Bossone. With Millard Long.

Completion date: September 2000.

Report

Bossone, Biagio, Patrick Honohan, and Millard Long. 2001. "Policy for Small Financial Systems." Financial Sector Discussion Paper 6. World Bank, Washington, D.C. [http://wbln0018.worldbank.org/html/FinancialSectorWeb.nsf/(attachmentweb)/Fs06/$FILE/Fs06.pdf].

Financial Liberalization

Many countries have encountered difficulties in moving to market-based interest rates, experiencing heightened asset market volatility, distributional shifts, and a net deterioration in the incentives for sound risk management and corporate governance of financial intermediaries. This study assessed the degree to which complementary policies need to be in place for better performance of the financial sector in the liberalized environment. The research methodology included country case studies chosen to reflect the contrasting conditions in transition economies, industrial economies, low-income countries, economies with severe fiscal problems, countries with chronically high inflation, and countries that have relied heavily on directed credit. One case study tracked the role of poorly phased and implemented liberalization in the 1997 crisis in the Republic of Korea. The research also used cross-country econometrics.

The research found that financial liberalization has been far from smooth. In many countries interest rate volatility contributed to banking fragility. In the former Soviet Union, an extreme case, de facto liberalization unsupported by contract enforcement led to an implosion of the monetary economy. In most countries interest rate spreads widened to levels suggesting that competition remains limited, despite free entry.

The findings suggest that a much more measured and nuanced approach to liberalization would have been better. Eliminating the most severe interest rate distortions did not necessitate complete and immediate removal of interest rate controls, especially in the presence of insolvent or fragile banks. Removal of controls on foreign capital (especially those affecting short-term flows) could have been phased in later than it was. Adequate capitalization and appropriately qualified management should have been required for firms entering the financial sector. A longer lead-in would have allowed more thorough training and professional preparation of regulatory personnel, though political interference might still have limited their effectiveness. Even after liberalization some of the lost ground can be regained by moving beyond supervised capital requirements to blunt instruments of intermittent effect.

The study's results were discussed at a World Bank workshop in March 1999 (the papers from the workshop are available on the Web at http://www.worldbank.org/research/projects/finliber.htm). The study contributed to the World Bank Policy Research Report *Finance for Growth: Policy Choices in a Volatile World* (New York: Oxford University Press, 2001).

Responsibility: Development Research Group, Finance—Patrick Honohan (phonohan@worldbank.org) and Asli Demirgüç-Kunt; Corporate Finance Department—Irfan Aleem; Financial Sector Strategy and Policy Department—Gerard Caprio Jr. and James A. Hanson; and Latin America and the Caribbean Region, Mexico Country Office—Luis Landa and Fernando Montes-Negret. With Yoon Je Cho, Sogang University, Seoul; David Cole; Betty Slade; Fabrizio Coricelli, University of Siena; Enrica Detragiache, International Monetary Fund; Louis Kasekende, Central Bank of Uganda; Charles Wyplosz, Graduate Institute of International Studies, Geneva; Charles Calomiris, Columbia University; S. Janjua, State Bank of Pakistan; Edward Kane, Boston College; H. Pill, European Investment Bank; and Paolo Vieira da Cunha, Lehman Brothers.

Completion date: December 2000.

Reports

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Caprio, Gerard, Jr., Patrick Honohan, and Joseph E. Stiglitz, eds. Forthcoming. *Financial Liberalization: How Far, How Fast?* Cambridge: Cambridge University Press.

Honohan, Patrick. 2000. "How Interest Rates Changed under Financial Liberalization: A Cross-Country Review." Policy Research Working Paper 2313. World Bank, Development Research Group, Washington, D.C.

Bank Insolvency

This research, using data on banking crises from more than 60 countries and data on country responses to crisis from 39 countries, examined two crucial issues. First, since government decisions have a significant impact on the causes of banking crises, and the institutions through which decisions are made vary greatly among countries, do the causes of banking crises depend on a country's institutional environment? The research found that the effects of most financial and economic variables thought to influence the probability of crisis—ranging from economic growth to the liberalization of interest rates—differ significantly in the presence of political checks and balances. At the mean level of checks and balances, for example, liberalizing interest rates increases the probability of a banking crisis by 19 percent; at the lowest level of checks and balances the probability rises to 35 percent. These results indicate the potential for improving the design of financial sector regulation in institutionally diverse countries.

Second, do institutions influence governments' responses to crisis and therefore the size of the crisis? For example, do the institutional environment and the incentives facing government decisionmakers have a strong influence on government decisions to forbear in the face of insolvent institutions or to intervene quickly and comprehensively? The research found that bank crises are systematically larger, and the probability of forbearance systematically greater, in countries with few checks and balances. The larger the financial sector, however, the smaller this effect becomes. Independent media (press and television) also seem to create a strong incentive for governments to intervene more quickly in insolvent institutions, but only in the presence of competitive elections.

Responsibility: Development Research Group, Regulation and Competition Policy—Philip Keefer (pkeefer @worldbank.org).

Completion date: June 2001.

Reports

Keefer, Philip. 2001. "When Do Special Interests Run Rampant? Disentangling the Role in Banking Crises of Elections, Incomplete Information, and Checks and Balances." Policy Research Working Paper 2543. World Bank, Development Research Group, Washington, D.C.

———. Forthcoming. "Political Institutions and Crisis: The Effects of Political Checks and Balances on the Dynamics of Financial Sector Distress." In Leonardo Hernández and Klaus Schmidt-Hebbel, eds., *Banking, Financial Integration, and International Crises*. Santiago: Central Bank of Chile.

Incentives in Banking

This project synthesized the key findings of an extensive new wave of empirical research, conducted at the World Bank and elsewhere, to examine how to make finance effective, how to prevent or minimize financial crises, what kind of record the state has as an owner in the financial sector, and how globalization in finance is leading to a world of finance without frontiers. The research was based on a variety of methodologies, but much of it drew on cross-country databases.

The findings are outlined in the World Bank Policy Research Report *Finance for Growth: Policy Choices in a Volatile World* (New York: Oxford University Press, 2001). The report highlights the policy choices that will maximize growth and restore the financial sector to its intended role as a key sector for helping to cope with, rather than amplify, volatility. The main findings are as follows:

• *Finance contributes to long-term prosperity.* It is obvious that advanced economies have sophisticated financial systems. What is not obvious, but is borne out by the evidence, is that the services delivered by these financial systems have contributed in an important way to the prosperity of those economies. Getting the financial systems of developing countries to function more effectively in providing the full range of financial services is a task that will be well rewarded with economic growth.

• *Governments are not good at providing financial services.* Government ownership of banking continues to be remarkably widespread, despite clear evidence that the goals of such ownership are rarely achieved and that it weakens rather than strengthens the financial system. The desirability of reducing, even if not necessarily eliminating, state ownership follows from this evidence. But privatization has to be designed carefully to reap the benefits it offers and minimize the risks of an early collapse.

• *Not even when a crisis hits.* Even governments averse to an ownership role in banking may find it foisted on them in a crisis. The authorities' focus then must be on getting out as quickly as possible, using the market—rather than government agencies—to identify winners and losers. Drawing on public funds to recapitalize some banks may be unavoidable in truly systemic crises, but they must be used sparingly, to leverage private funds and incentives. Procrastination and half measures—as reflected in lax policies involving regulatory forbearance, blanket guarantees, and their ilk—carry a large price tag that will affect the financial system and the economy for years to come.

• *But well-functioning markets need legal and regulatory underpinning.* Creating an efficient and secure financial market environment requires an infrastructure of legal rules and practice and timely and accurate information, supported by regulatory and supervisory arrangements that help ensure constructive incentives for financial market participants. Success in this area will promote growth that favors the poor and stabilize the economy around the higher growth path. It will also expand direct access to finance for many now excluded from the market.

• *They also need a strategy based on harnessing incentives.* Incentives are key to limiting undue risk taking and fraudulent behavior in the management and supervision of financial intermediaries—especially banks, which are prone to costly failure. Instability and crashes are endemic to financial markets, but need not be as costly as they have been in recent years. They reflect the results of risk taking that goes well beyond society's tolerance for risk. The costs are very real: they represent a potentially persistent tax on growth. This can increase poverty in the near term, and can have longer-term effects on the poor, through lower growth and through lower spending in such areas as health and education.

• *Diversity is good for stability.* Banks, securities markets, and a range of other types of intermediary and ancillary financial firms are all needed for balanced financial development. A radical preference for either markets or banks cannot be justified by the extensive evidence now available. Instead, the development of different segments of the financial system challenges the other segments to innovate, to improve quality and efficiency, and to lower prices.

• *Open markets can spur development.* Most developing countries are too small to be able to do without the benefits of access to global finance, including financial services from foreign or foreign-owned financial firms. The entry of reputable foreign financial firms to the local market should be welcomed. They bring competition, improve efficiency, and lift the quality of the financial infrastructure—and are thus an important catalyst for the kind of financial development that promotes growth. Governments need to remember that access to financial services is what matters for development, not who provides the services.

• *So can technology.* The financial sector has long been an early adopter of innovations in information and communications technology. The internationalization of finance has been one consequence. This trend has helped to lower the cost of equity and loan capital on average, even if it has also heightened vulnerability to capital flows. The precise future role of e-finance in accelerating internationalization is not easy to predict, but it will surely be substantial.

The research is expected to sharpen the Bank's focus on financial sector infrastructure, to dissuade financial sector staff from advocating deposit insurance except in more advanced countries, to encourage more vigorous pursuit of bank privatization but with thorough preparation of the infrastructure and of the banks, and to encourage less direct government involvement in restructuring decisions and greater focus on the broad policy framework for restructuring.

The results of the research have been widely distributed to academics, market specialists, the media, and the policy community through dissemination activities for the report. The findings have also been incorporated in World Bank Institute courses.

Responsibility: Financial Sector Strategy and Policy Department and Development Research Group, Finance—Gerard Caprio Jr. (gcaprio@worldbank.org) and Patrick Honohan.

Completion date: June 2001.

Report

World Bank. 2001. *Finance for Growth: Policy Choices in a Volatile World.* World Bank Policy Research Report. New York: Oxford University Press.

Corporate Governance, Corporate Finance, and Economic Performance in Developing Countries

Issues relating to corporate governance in developing countries have assumed special significance since the East Asian financial and economic crisis. This study looks at corporate behavior in a set of six Asian developing countries in an attempt to understand the implications of some corporate governance variables for corporate capital structure.

The study analyzes corporate finance and economic performance in India, Indonesia, the Republic of Korea, Malaysia, the Philippines, and Thailand. It compares debt-equity ratios among developing and industrial countries and over time and uses multivariate analysis to investigate the determinants of debt-equity ratios in the six Asian markets. Finally, it analyzes the cross-sectional and international variation in debt ratios and investigates links between debt ratios and corporate ownership structures. The study uses Hong Kong (China), Japan, Singapore, the United Kingdom, and the United States as benchmarks.

Findings on the implications of corporate governance variables for corporate decisionmaking, as expressed in corporate capital structure, should prove helpful in World Bank policy advice on matters relating to corporate governance structures. In addition, by shedding light on the implications of different policy regimes for corporate decisionmaking, findings on the link between corporate governance and capital structure should be helpful for policymakers. These implications could be significant in the development of domestic corporate bond markets, which remain largely absent in most developing countries.

Responsibility: International Finance Corporation, Economics Department—Guy Pfeffermann (gpfeffermann@ifc.org), and Corporate Portfolio Management Group—Jack Glen; and Private Sector Development Department, Business Environment Unit—Rughvir K. Khemani. With Ajit Singh, Cambridge University. Cambridge University has provided staff time and use of its facilities.

Completion date: September 2001.

Twin Crises and Government Policy

Recent events in Southeast Asia, the Russian Federation, and Latin America have underlined the need to understand the causes and consequences of currency crises. In the post–Bretton Woods era currency crises have often coincided with banking crises—most prominently in Chile in 1982, in Finland and Sweden in 1992, in Mexico in 1994, and in Southeast Asia in 1997. This research project investigates twin banking and currency crises, examining the mechanisms by which banking crises cause and exacerbate currency crises and the channels through which currency crises cause banking crises.

The study has developed theoretical macroeconomic models that include an explicit banking sector and can help in identifying the reasons that currency and banking crises might occur simultaneously. It has applied these models to real world data to see whether they are useful in explaining events in emerging economies that have experienced such crises. In particular, the study has tried to explain the price and exchange rate dynamics after the 1994 crisis in Mexico and the 1997 crisis in the Republic of Korea. Through a detailed analysis of these countries' fiscal accounts in the postcrisis period, it has also examined how they have paid for these crises. The analysis has drawn on data from a variety of sources, including Bankscope, Datastream, the International Monetary Fund's International Financial Statistics database, and central bank and finance ministry Web sites.

The analysis has led to four main findings. First, government guarantees to bank creditors can explain the lack of hedging against currency risk observed in emerging markets despite the availability of hedging products. Second, models developed by the study show that this lack of hedging can lead to a risk of self-fulfilling speculative attacks against managed exchange rate regimes. Third, models also show that crises driven by agents' self-fulfilling expectations of future government deficits are consistent with low inflation, but rapid currency depreciation, in the wake of twin banking and currency crises. Finally, the detailed analysis of postcrisis Korea and Mexico has found that neither country has paid as much as 50 percent of the fiscal costs associated with its banking sector bailout. Both countries have relied on new borrowing for short-run financing. The postcrisis outcomes in these countries can be rationalized by making assumptions about their future financing choices.

The findings of the research point to a conclusion that governments need to be very careful when issuing guarantees to bank creditors. This conclusion has already begun to affect some of the thinking about government guarantees.

The findings have been presented at many conferences and workshops attended by academics, policymakers, and market participants. These include the Centre for Economic Policy Research conference on Exchange Rates and Prices in General Equilibrium: Theories, Evidence, and Policy Implications, in Barcelona, Spain (May 2000); the National Bureau of Economic Research (NBER) International Seminar on Macroeconomics at the Bank of Finland, in Helsinki (June 2000); the NBER conference on Management of Currency Crises, in Cambridge, Massachusetts (July 2000); an NBER meeting in Cambridge, Massachusetts (July 2000); a seminar at the Bank of Croatia (September 2000); the Seventh Dubrovnik Economic Conference, at the Bank of Croatia (June 2001); a seminar at the CESifo Summer Institute, in Venice, Italy (July 2001); a seminar at the Economic Planning Institute, Japan; and seminars at the World Bank and at several universities in the United States.

Responsibility: Poverty Reduction and Economic Management Network, Economic Policy Division—Craig Burnside (cburnside@worldbank.org). With Martin Eichenbaum and Sergio Rebelo, Northwestern University

Completion date: September 2001.

Reports

Burnside, Craig, Martin Eichenbaum, and Sergio Rebelo. 2000. "Government Guarantees and Self-Fulfilling Speculative Attacks." World Bank, Poverty Reduction and Economic Management Network, Economic Policy Division, Washington, D.C.

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———. 2001. "On the Fiscal Implications of Twin Crises." NBER Working Paper 8277. National Bureau of Economic Research, Cambridge, Mass.

Institutional Investors

This research project examines second-generation issues involved in setting up private pension funds, promoting annuity markets, and developing mutual funds. Much of the work on pension funds has been completed. This work has looked at the impact of stock market volatility on personal pension plans and the insulating effect of various investment strategies; the design, structure, and performance of the Swiss multipillar pension system; and the "feasibility" and "impact" preconditions for launching funded pension plans and realizing the potential benefits of such plans for capital market development.

The work on annuities has investigated issues relating to the development of annuity markets and the economics of annuities. The work on mutual funds has focused on expanding a database, which covers 40 countries, and on completing quantitative work. Papers on mutual funds are under preparation.

Responsibility: Financial Sector Development Department—Dimitri Vittas (dvittas@worldbank.org); Development Research Group, Regulation and Competition Policy—Victor Sulla; and International Finance Corporation, Global Financial Markets Group—Deepthi Fernando.

Completion date: December 2001.

Reports

Alier, Max, and Dimitri Vittas. 2000. "Personal Pension Plans and Stock Market Volatility." Policy Research Working Paper 2463. World Bank, Development Research Group, Washington, D.C.

James, Estelle, and Dimitri Vittas. 1999. "The Decumulation (Payout) Phase of Defined Contribution Pillars." Policy Research Working Paper 2464. World Bank, Development Research Group, Washington, D.C.

———. 2000. "Annuity Markets in Comparative Perspective: Do Consumers Get Their Money's Worth?" Policy Research Working Paper 2493. World Bank, Development Research Group, Washington, D.C.

James, Estelle, James Smalhout, and Dimitri Vittas. 2000. "Administrative Costs and the Organization of Individual Account Systems: A Comparative Perspective." Policy Research Working

Paper 2554. World Bank, Development Research Group, Washington, D.C.

James, Estelle, Gary Ferrier, James Smalhout, and Dimitri Vittas. 1999. "Mutual Funds and Institutional Investments: What Is the Most Efficient Way to Set Up Individual Accounts in a Social Security System?" Policy Research Working Paper 2099. World Bank, Development Research Group, Washington, D.C.

Queisser, Monika, and Dimitri Vittas. 2000. "The Swiss Multi-Pillar Pension System: Triumph of Common Sense?" Policy Research Working Paper 2416. World Bank, Development Research Group, Washington, D.C.

Vittas, Dimitri. 2000. "Pension Reform and Capital Market Development: 'Feasibility' and 'Impact' Preconditions." Policy Research Working Paper 2414. World Bank, Development Research Group, Washington, D.C.

Bank Supervision and Regulation

This project investigates whether a particular mix of financial regulations and supervisory standards is closely associated with successful banking operations and, more generally, with well-functioning financial systems. It also traces the effect, initially on the financial system and then on overall economic performance, of different regulatory and supervisory features. The findings will allow the World Bank to fine-tune its recommendations on key improvements in regulation and supervision at different levels of financial sector development. And they will allow countries to see how they compare with others.

The research uses a variety of approaches, though primarily cross-country empirical work based on regression, logit, and probit analysis. The project is collecting comprehensive data on financial regulations and supervisory standards, the structure of regulatory and supervisory agencies, and the capabilities of regulatory and supervisory authorities in a broad cross-section of developing and industrial countries. Information on supervision includes the data and information collected by supervisors, supervisory powers, the number of on-site exams, the budget for supervisory work, and supervisors' compensation relative to that of private sector counterparts.

The data collected cover the broad financial system, not only because the definition of banking varies widely across countries but also because financial crises can originate among nonbank financial intermediaries, as seen most recently in Thailand. Moreover, World Bank research has shown that both bank and nonbank financial development matters for growth.

Early findings suggest that attempts to strengthen bank supervision have no measurable effect on financial sector development or the likelihood of banking crises. Greater supervisory powers in countries in which checks and balances within government are poorly articulated appear to lead to no better outcomes in the financial sector but are associated with a higher level of corruption. Private sector monitoring, transparency, and asset diversification appear to be most important in determining the level of financial sector development and in reducing the odds of banking crises.

The early findings have been disseminated in seminars relating to the World Bank Policy Research Report *Finance for Growth: Policy Choices in a Volatile World* (New York: Oxford University Press, 2001). These have included seminars for academics, policymakers, financial market participants, and representatives of governments and nongovernmental organizations in Tokyo, Shanghai, Beijing, Sydney, Canberra, and Adelaide. Results have also been presented at Harvard University and at the 2001 Annual Bank Conference on Development Economics.

The research is expected to influence the Bank's policy advice and improve its ability to diagnose financial systems as part of the Financial Sector Assessment Program. Moreover, it will enable operational staff to point to areas needing improvement in countries' financial systems.

Responsibility: Financial Sector Strategy and Policy Department and Development Research Group, Finance—Gerard Caprio Jr. (gcaprio@worldbank.org). With Ross Levine, University of Minnesota; and James Barth, Auburn University.

Completion date: June 2002.

Taxation of Financial Intermediation

Several countries have recently adopted special financial transaction taxes. These taxes quickly yielded a substantial impact, refocusing attention on financial sector taxation more generally. Many commentators have criticized financial sector taxes as arbitrary and distorting. But such taxes need to be assessed within a broad framework, with credible criteria for what constitutes a good system of financial sector taxation, especially within the administrative limitations of developing countries.

This research project is developing a framework for thinking about financial sector taxation, to produce guidelines on what a good tax system would look like. A "good" tax system is one that, to the extent possible, corrects known distortions (such as those resulting from imperfect and asymmetric information); minimizes the distortions it imposes (for a given amount of revenue collected), especially by causing agents to bypass the formal financial sector in favor of untaxed or differently taxed competitors; and does not push tax collection from the sector beyond the point at which marginal distorting costs exceed those elsewhere in the economy.

The project has three parts. First, a theoretical treatment will unify existing material and bring fiscal considerations to bear on financial issues. Second, a fact-finding exercise will attempt to characterize financial sector taxation worldwide through a selective review of practices and trends in both advanced and developing countries. Third, half a dozen papers will look at the most important and controversial issues in financial sector taxation today: special financial taxes (transaction taxes), the treatment of loan-loss reserves, value added and other forms of indirect taxation, the inflation tax and its cousins, and corrective financial taxes and tax expenditures (subsidies). Each paper will consider experience and propose good practice.

The results will be presented at a workshop in the first half of 2002 and published in a book-length study directed to tax and financial sector policymakers and operational staff of the World Bank and International Monetary Fund. Intermediate and final results will also be made available on the Development Research Group's financial sector research Web site.

Responsibility: Development Research Group, Finance—Patrick Honohan (phonohan@worldbank.org). With Philip Brock, University of Washington; Tullio Jappelli, University of Salerno, Italy; Ramon Caminal, Universitat Autònoma de Barcelona, Spain; Satya Poddar, Ernst & Young; and Robin Boadway, Queens University, Kingston, Ontario, Canada.

Completion date: January 2003.

Bank Privatization in Developing Countries

State-owned banks have typically performed poorly in terms of return on assets and portfolio quality, and public ownership of banks has been shown to retard financial sector development. Still, privatizing state-owned banks has not been universally successful. In fact, in several countries (including Chile, Mexico, and Portugal) post-privatization performance was so poor that renationalization was necessary.

This research project is summarizing the experiences with bank privatization in a broad cross-section of countries. It analyzes the political economy factors that have encouraged policymakers to privatize banks and that have affected the method and timing of privatization. It then links these factors with the performance of the privatized banks.

The research is based on detailed country case studies and econometric analyses of bank-level panel data in Argentina, Brazil, the Czech Republic, Egypt, Hungary, Mexico, Nigeria, and Poland. These studies are complemented by a cross-country study of the effect of state ownership on bank performance, an analysis of the political economy of bank privatization in the transition economies of Eastern Europe and the former Soviet Union, and a theoretical model describing the features of privatization contracts. Data from the country case studies are used to test whether outcomes are consistent with the theoretical model. The variety of approaches tested should provide World Bank task managers with useful information on when it is most advisable to pursue bank privatization, how different transaction designs affect outcomes, and how to avoid common obstacles.

A study on the potential benefits and pitfalls of bank privatization in Egypt provides guidelines on the regulatory conditions needed for a robust banking sector and shows how well Egypt is meeting those conditions relative to selected other economies.

Responsibility: Development Research Group, Regulation and Competition Policy—George R. G. Clarke (gclarke@worldbank.org) and Robert Cull.

Completion date: June 2003.

Reports

Caprio, Gerard, Jr., and Robert Cull. 2000. "Bank Privatization and

Regulation for Egypt." World Bank, Development Research Group, Washington, D.C.

Clarke, George R. G., and Robert Cull. 1998. "The Political Economy of Privatization: An Empirical Analysis of Bank Privatization in Argentina." Policy Research Working Paper 1962. World Bank, Development Research Group, Washington, D.C.

———. 1999. "Why Privatize? The Case of Argentina's Public Provincial Banks." *World Development* 27(5): 865–86.

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———. 2001. "The Political Determinants and Economic Effects of Bank Privatization in Argentina." In Frank Columbus, ed., *Political Science and Economics of Latin America*. Huntington, N.Y.: Nova Science Publishers.

———. Forthcoming. "Political and Economic Determinants of the Likelihood of Privatizing Argentine Public Banks." *Journal of Law and Economics*.

Financing of Small and Medium-Size Enterprises

Many small and medium-size firms are believed to lack adequate access to external sources of financing—a concern because these firms are seen as important in expanding employment and promoting technological innovation. This project is aimed at providing a greater understanding of how small firms are financed and what business environments best promote their growth

The project includes a number of studies. Country-specific and cross-country studies examine the sources of outside capital available to small and medium-size firms and identify the factors affecting their access to external credit. They look at both bank and nonbank sources of financing, such as leasing, factoring, and trade credit. The cross-country studies include data on about 55 countries for which published statistics are available, including countries in East Asia, Eastern Europe, and Latin America. They also use data from Firm Analysis and Competitiveness Surveys.

Another study uses data on initial public offerings in India to investigate the use of private equity and identify the relationship between firm performance and foreign ownership. And another examines the relative size and output of the small business sector across Eastern and Western Europe and the factors that influence its growth. This study includes an analysis of the role of small and medium-size enterprises in transition economies. By identifying country and firm characteristics that promote the growth of such enterprises, the study will devise a road map of policies for developing the small business sector.

Responsibility: Development Research Group, Finance—Leora Klapper (lklapper@worldbank.org).

Completion date: Ongoing.

Industry and Private Sector Development

The Economics of Ethnicity and Entrepreneurship in Africa

Recent contributions to the literature on cross-country differences in economic performance suggest that ethnic diversity is associated with slower growth and poorer macroeconomic management. In particular, Sub-Saharan Africa's dismal growth record over the past three decades has been linked to its relatively high ethnolinguistic fractionalization. But the reason for this association remains unclear. Understanding the mechanisms by which the ethnic composition of societies may influence economic outcomes seems to require investigating the interaction of ethnicity and institutions at the microeconomic level. This project investigated two questions in this context: Do the behavior and performance of entrepreneurial businesses in Africa vary with the ethnicity of their owners? If they do, could this have something to do with cases of market or institutional failure?

Aimed at generating hypotheses for further work on these questions, the study estimated productivity, growth, and wage determination equations based on the fifth wave of the Ghanaian Manufacturing Enterprise Survey and the first and second waves of the Addis Ababa Industrial Enterprise Survey in Ethiopia.

In Ghana ethnic variations in enterprise productivity are observed in the pooled sample of manufacturing enterprises, and these persist even after controlling for variations in inputs, industry, location, and ownership. In Ethiopia persistent ethnic variations in enterprise productivity cannot be observed in the pooled sample because the ordering of ethnic groups with respect to productivity varies between industries. But in some industries there are significant variations in productivity between ethnic groups.

In Ethiopia some ethnic groups perform less well in some industries because they have relatively poor access to good business locations and credit. In Ghana institutionally complex trading arrangements and access to formal credit and the formal legal system are associated with higher productivity, but these factors do not explain any of the variations in productivity between ethnic groups.

In neither country is there any indication that variations in networking behavior cause the variations in productivity between ethnic groups, although more networking (greater diversity of contacts in Ghana, more intensive interaction in Ethiopia) is associated with higher productivity in both. Indeed, the analysis of productivity growth in Ghana confirms that co-ethnic contacts (those within the same ethnic group) become less valuable as the institutional environment improves.

In Ethiopia the particularly low productivity of some ethnic groups in certain industries is explained in part by their relatively limited prior experience in family businesses. In Ghana entrepreneurs with reasonable access to formal, market-supporting institutions face a negative return to co-ethnic contacts, possibly because maintaining such contacts reduces the time available to cultivate more diverse networks. For entrepreneurs with poor access to formal, market-supporting institutions, this negative effect is offset by a positive effect that may be due to the support that co-ethnic networks can provide.

The analysis of earnings found that entrepreneurs hire a large share of their employees from their own ethnic and kin groups. In Ethiopia 42 percent of workers were of the same ethnicity as their employer, and 24 percent were related. In Ghana 32 percent of workers were of the same ethnicity as their employer, and 11 percent were related. In both countries employers favor their kin group in terms of pay, but not their ethnic group. Relatives earn 23 percent more than other employees in Ghana and 10 percent more in Ethiopia.

In both countries some ethnic groups earn more than others, even after controlling for education, gender, experience, and occupation. In Ghana most of the earnings differences appear to be related to the tendency of members of different ethnic groups to work for enterprises of different sizes. In Ethiopia the pattern of differences in earnings varies from one industry to the next—that is, the ethnic group earning the most differs among industries.

These results suggest that there is labor market segmentation along ethnic lines in both Ghana and Ethiopia.

Some of the findings were presented at a conference, Opportunities in Africa: Micro-Evidence on Firms and Households, organized by the Centre for the Study of African Economies at Oxford University on April 9–10, 2000, and attended by researchers from Africa, Europe, and North America. The findings on Ghana were presented to staff of the World Bank's Africa Region.

Responsibility: Development Research Group, Regulation and Competition Policy—Mary Shirley (mshirley@worldbank.org), and Macroeconomics and Growth—Taye Mengistae. With Abigail Barr, Oxford University; and Abena Oduro, Centre for Policy Analysis, Ghana.

Completion date: November 2000.

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Corporate Governance in East Asia

Before the East Asian crisis the distinctive features of the region's corporations were viewed as one of the reasons for the success of its economies. The crisis has substantially altered that view, and many scholars now argue that the weak corporate governance and financing structures of East Asian corporations were partly to blame for the crisis.

Building on recent theoretical and empirical work on corporate governance and the importance of the legal framework for financial sector development, this project analyzed the role of ownership concentration in firm performance and firm valuation. The main source of data was the Worldscope database, which provides corporate financial data (balance sheet and profit and loss statements) as well as the names and holdings of large owners. That source was supplemented with many others to derive data on the ultimate ownership of corporations.

Robust results show that voting rights deviate from cash flow rights as a result of the use of pyramiding, cross-holdings, and dual-class shares. Some East Asian countries are also characterized by weak corporate governance frameworks, including poor minority rights protection. As a result, control by a single shareholder has a significant negative effect on corporate valuation, with greater cash flow rights by the controlling shareholder partially offsetting this effect. The risk of expropriation is the major principal-agent problem for public corporations in East Asia.

The results have been used at the World Bank Institute and presented in workshops and conferences at a large number of international organizations, research institutions, and universities in Asia, Europe, Latin America, and the United States. Material from the research has also been used in World Bank reports, including *East Asia: Road to Recovery* (Washington, D.C., 1998) and *East Asia: Recovery and Beyond* (Washington, D.C., 2000).

Responsibility: Financial Sector Strategy and Policy Department—Stijn Claessens (cclaessens@worldbank.org) and Simeon Djankov. With Larry H. P. Lang, Chinese University of Hong Kong.

Completion date: December 2000.

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East Asian Competitiveness Study

This study examined the microeconomic underpinnings of competitiveness in East Asia following that region's financial crisis, building on a regional database containing the results of a firm-level survey conducted between October 1998 and February 1999. The survey covered 4,000 firms in Indonesia, the Republic of Korea, Malaysia, the Philippines, and Thailand.

The resulting database is the first of its kind for the region. Comparable across countries, the survey data provide insight into categories of firms on which little information had been available—most of the firms are unlisted private companies, and two-thirds are small or medium size. The survey had two areas of focus: short-term issues relating to the impact of the crisis and the constraints to recovery, and the determinants of competitiveness and productivity. It generated information on a broad set of firm practices relating to production, employment, training, corporate finance, corporate governance, and technology acquisition as well as information on the business environment and feedback on government programs.

The survey results indicate that while more than 70 percent of firms in the five countries were adversely affected by the crisis, at the time of the survey credit constraints were less important than the difficulty in selling goods due to the fall in demand, even among exporting firms. With half the exports destined for other countries in Asia and with devaluations widespread, increasing export volumes still resulted in flat or declining export values for most exporting firms. While the results show that overall credit availability is not the main concern, issues of credit misallocation, transparency, and governance remain. Continued corporate restructuring must keep pace with financial restructuring if many of the weaknesses in the corporate and financial sectors are to be avoided in the future.

Research examining the patterns of productivity across firms found that more outward-oriented firms (exporters, importers of intermediate inputs, and firms with foreign ownership) not only are more productive, they also make systematically different decisions on investment, technology sources, worker training, corporate governance, and research and development expenditures. A striking finding is that productivity gaps between firms are greatest in the least developed countries (Indonesia and the Philippines) and smallest in the more developed ones (especially Korea). In more in-depth work carried out on Thailand, with two completed rounds of surveys, analysis of investment patterns and resource allocation leading up to the crisis revealed that imbalances in the manufacturing sector were apparent before the crisis began.

Local counterparts were instrumental in all stages of the project—preparing the questionnaires, administering the survey, and preparing country reports. The World Bank provided technical assistance and capacity building, including three training sessions on the use of the database and methods of productivity analysis. There is interest in all five countries in continuing the survey and regularly publishing results. The multicountry survey is serving as a blueprint for the larger Firm Analysis and Competitiveness Surveys (FACS) initiative by the Development Research Group.

The database has been used by researchers in the World Bank and across East Asia. Results were presented at a conference in Bangkok on March 31–April 2, 1999, where high-ranking government officials and private sector representatives discussed the prospects for recovery and the extent to which credit availability remains a principal constraint. In addition, dissemination seminars were held at the World Bank and in Hong Kong (China), Jakarta, Kuala Lumpur, Manila, Seoul, Singapore, and Tokyo, and at a meeting of the Association of Southeast Asian Nations (ASEAN) Chambers of Commerce and Industry. And survey results and related research have supported lending and other operational work in all five countries.

The database can be downloaded from the Web at http://wbln0018.worldbank.org/eap/eap.nsf.

Responsibility: Development Research Group, Macroeconomics and Growth—Mary Hallward-Driemeier (mhallward@worldbank.org), David Dollar, Giuseppe Iarossi, Dennis Tao, Hairong Yu, and Albert Zeufack; and East Asia and Pacific Region, Poverty Reduction and Economic Management Sector Unit—Dominique Dwor-Frecaut. With Atchana Waiquamdee, Bank of Thailand; Francis Colaco, Asia Pacific Management; Ronald Duncan, Australian National University; Ken Sokoloff, University of California at Los Angeles; and Dee Sutthiphisal. The Japan and Asia-Europe Meeting (ASEM) Trust Funds contributed funding for the research.

Completion date: June 2001.

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An Empirical Study of the Surgical Instrument Cluster of Sialkot, Pakistan

Families are extensively involved in the ownership and management of firms in the surgical instruments industry in Sialkot, Pakistan. This research project examined the reasons for the extensive family involvement and the implications of this pattern of ownership and management for the industry's growth. It also investigated a policy question: What measures could help alleviate the labor market distortions reflected in the family involvement?

The research was based on data collected from 350 firms (90 percent of the industry) in Sialkot in January and February 2000. The resulting comprehensive data set is the first of its kind for any industry in Pakistan. The data include detailed information on family demographics, production, finance, and marketing for each firm. The analysis involved modeling family and nonfamily labor as inputs in the production process and estimating the firm production function, which yielded the relative productivity of the two inputs.

The findings reveal a strong link between family size and firm size. In particular, firm owners who started out with large families (measured by number of brothers) ended up with larger firms. Industrial espionage is common in the industry, and marketing information, crucial for success in the industry, is closely guarded. For these reasons, firm owners are reluctant to hire outsiders for management positions. They trust only close relatives, such as brothers and sons, with management responsibilities. As a result of the distrust of outsiders, family size became an important determinant of firm size.

The results suggest that the business environment is an important determinant of growth for firms, especially small and medium-size enterprises. What is needed to improve the business environment goes beyond ensuring macroeconomic stability and developing infrastructure—to alleviating the microeconomic and institutional constraints that hamper the growth of firms. For the surgical instruments industry, establishing an effective legal system that protects firms' business and intellectual property could play a significant role in reducing industrial espionage. Similarly, providing marketing information on foreign buyers and distribution channels could address the problem of firms stealing business from one another.

The study's results have been sent to the Surgical Instrument Manufacturers Association and Chamber of Commerce and Industry in Sialkot and presented to the Lahore University of Management Sciences and Pakistan Institute of Development Economics.

Responsibility: South Asia Region, Poverty Reduction and Economic Management Sector Unit—John Wall (jwall@worldbank.org). With Nauman Ilias, University of Pennsylvania.

Completion date: June 2001.

Firm Analysis and Competitiveness Surveys

Based on a model survey developed with inputs from both World Bank staff and outside experts, the Firm Analysis and Competitiveness Survey was designed to collect comparable, firm-level data across countries. The survey is a tool for monitoring firms' performance, evaluating the investment climate, and studying firms' productivity. An earlier version was fielded in Indonesia, the Republic of Korea, Malaysia, the Philippines, and Thailand. The more comprehensive Firm Analysis and Competitiveness Survey has now been conducted in three countries: Bolivia, India, and Morocco.

In Bolivia the survey was administered jointly by the Bolivian National Institute of Statistics and the World Bank. It covered a random sample of 659 formal manufacturing firms in the departments of Cochabamba, La Paz, and Santa Cruz that represent 85 percent of Bolivian firms, weighted by employment. The sample firms represent about 40 percent of the formal manufacturing firms in the country.

In India the survey was administered by the Confederation of Indian Industry with technical assistance from the World Bank. It covered a random sample of more than 1,000 firms in 10 states, in eight sectors (software, garments, textiles, machine tools, auto components, electrical white goods, electronic consumer goods, and drugs and pharmaceuticals). The 10 states are Andhra Pradesh, Delhi, Gujarat, Karnataka, Kerala, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh, and West Bengal.

The Moroccan survey was conducted jointly by the Ministry of Industry and the World Bank. Data were collected from 859 randomly selected firms, and from 8,375 employees, in several industries (leather, plastics, garments, textiles, pharmaceuticals, food processing, and electric and electronic products). Sixty percent of the sample firms are located in and around Casablanca, consistent with the national distribution of manufacturing; about 17 percent are in the rapidly growing Tangier-Tétouan region; and some 11 percent are in Fès. The rest are distributed across Rabat, Settat, and Oriental (Nador/Oujda).

The resulting databases, along with the survey instruments and documentation of the sampling methodologies, are available on the Web at http://www.worldbank.org/research/facs. For information on research based on these databases see the abstract in this volume on Firm Analysis and Competitiveness Research.

Responsibility: Development Research Group, Macroeconomics and Growth—David Dollar (ddollar@worldbank.org), Mary Hallward-Driemeier, Giuseppe Iarossi, Taye Mengistae, and Albert Zeufack, Regulation and Competition Policy—Mary Shirley, Luke Haggarty, Philip Keefer, and Colin Xu, and Finance—Leora Klapper. With Marcel Fafchamps, Oxford University; John Sutton, London School of Economics; K. A. Arun, G. Srivastava, and O. Goswami, Confederation of Indian Industry; and Y. Wang, Georgetown University.

Completion date: June 2001.

Privatization and Corporate Governance in Transition Economies

Establishing effective corporate governance in transition economies has proved difficult. Large-scale voucher privatization was the preferred vehicle for achieving rapid changes in ownership at many formerly state-owned enterprises. But the widely dispersed shareholdings that resulted have not coincided with substantial improvements in performance.

This project documented the evolution of shareholding since privatization in the Czech Republic and described corresponding changes in firm performance. Using panel estimation techniques, the study provided econometric evidence on the relative capability of different ownership structures to improve firm performance. The results provide insight into the longer-term advantages and drawbacks of different privatization methods, especially large-scale voucher privatization.

Other studies have argued that the Czech voucher privatization led to poor firm performance because it produced a dispersed structure of ownership that induced bad corporate governance in a country with only weak protection of minority owners. But these studies were unable to establish a clear link between ownership structure and firm performance, and they do not explain why a one-shot activity like asset stripping became a dynamic process.

Using a new data set on firms privatized between 1993 and 1996 and controlling for size and structure, this study found that joint stock companies privatized with vouchers did indeed perform worse than firms with concentrated shareholdings that had to be purchased for cash (that is, limited liability companies and foreign joint stock companies). Joint stock companies had privileged access to credit from state-controlled banks that had little incentive to enforce debt contracts, so static asset stripping was combined with dynamic looting—borrowing heavily with no intent to repay and using the loans for private purposes. Controlling for firm performance, the study found that liabilities increased at a much faster rate in joint stock companies than in limited liability companies. If the problems stemming from ownership structures were compounded by looting, as the study's findings suggest they were, financial incentives and regulation are as important as ownership structure in privatization design.

The findings were presented at the annual meetings of the International Society for New Institutional Economics in Tübingen, Germany, in September 2000. The results were also incorporated in "Progress with Privatization: The Experience in Eastern Europe and Central Asia," prepared by the World Bank's Europe and Central Asia Region for presentation at the World Bank's annual meeting in Prague in fall 2000.

Responsibility: Development Research Group, Regulation and Competition Policy—Mary Shirley (mshirley@worldbank.org) and Robert Cull; and Executive Director's Office, Austria, Belarus, Belgium, Czech Republic, Hungary, Kazakhstan, Luxembourg, Slovak Republic, Slovenia, and Turkey—Jana Matesova.

Completion date: June 2001.

Report

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Firm Analysis and Competitiveness Research

This research project uses the information collected in the Firm Analysis and Competitiveness Surveys in Bolivia, India, and Morocco to address policy and research questions relating to firm activities and the determinants of competitiveness (for more on the surveys see the abstract in this volume on the Firm Analysis and Competitiveness Surveys).

Two of the most striking results from the Bolivian survey work relate to entry procedures and obstacles to timely delivery of supplies. On average, acquiring the permits needed to open a new business takes more than 60 days, while getting the permits needed to continue a going concern each year takes more than 40 days. (This finding has led to a government initiative for administrative simplification in 2001.) In addition, long delays to clear customs and uncertainties in transport led businesses to hold large stocks, at a financial cost equal to 12 percent of annual sales.

The initial work on India focused on measuring the impact of the investment climate on firms' performance. While the overall macroeconomic environment is the same across the country, there are important differences across states in policies for exploiting the potential benefits of greater globalization. The analysis estimated that these differences in investment climate account for a 30 percent gap in productivity between states with a strong investment climate and those with a weak one. The extent of the regulatory burden, the reliability of electricity supply, and access to modern telecommunications are all important in explaining this gap.

Additional work linked the data from the Indian survey with similar firm-level data from five East Asian countries, again focusing on the productivity differences among firms and the role of the investment climate in these differences. The analysis also paid attention to firms' characteristics: their export status, ownership structure, accounting practices, and source of technology, and the extent to which they train workers and conduct research and development. The results show that firms that are more engaged with larger foreign markets (through exporting, importing, and foreign ownership) not only have significantly higher productivity, they also make systematically different choices in investment and technology that help account for their higher productivity.

The research using the Moroccan data has focused on firms' export practices. The manufacturing export response to market liberalization in the 1990s came primarily from newly established firms and from new products. Controlling for sector, region, year of production, and experience, the analysis found that 42 percent of exporting firms export within a year of initiating production, and 75 percent within three years. Among products that are exported, 80 percent are exported within a year of production. For firms, the conditional probability of exporting drops significantly after two to three years of existence. Obstacles to the creation of new firms are bound to reduce the manufacturing export response to changes in relative prices.

The streamlining of port and customs procedures in Morocco in the past three years seems to have benefited exports as well as imports of raw materials. Moroccan firms spent less than two days on average in 1999 to process their exports of finished goods through port and customs, and it took three days on average to process imported goods. This performance compares favorably with that in East Asian countries. Most manufacturers (82 percent) import inputs themselves rather than going through intermediaries, in contrast with the practice of most Sub-Saharan African manufacturing firms.

While Morocco enjoys a relatively sound investment climate, its competitiveness in manufacturing is hindered by high labor and energy costs, poor financial leverage, a poorly qualified workforce, and a low incidence of in-firm training.

Additional ongoing research topics include corporate finance, contract enforcement, corporate governance, government regulations, business associations, technology and investment, and labor and human resources.

Responsibility: Development Research Group, Macroeconomics and Growth—David Dollar (ddollar@worldbank.org), Mary Hallward-Driemeier, Giuseppe Iarossi, Taye Mengistae, and Albert Zeufack, Regulation and Competition Policy—Mary Shirley, Luke Haggarty, Philip Keefer, and Colin Xu, Trade—Anthony Venables, Office of the Director—Paul Collier, and Finance—Leora Klapper. With Marcel Fafchamps, Oxford University; Raymond Fisman, Columbia School of Business; John Sutton, London School of Economics; Mark Gersovitz, Johns Hopkins University; Fabio Schiantarelli, Boston College; and James Tybout, Georgetown University.

Completion date: June 2002.

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 program is designed to improve the understanding of the constraints on enterprise development in Africa and to develop recommendations to ease those constraints.

The program is investigating these issues in three ways. First, it is collecting survey data through interviews conducted periodically with a panel of 200 large and small manufacturing firms in Cameroon, Côte d'Ivoire, Ghana, Kenya, Mozambique, Tanzania, Zambia, and Zimbabwe. The survey focuses on four manufacturing sectors: woodworking, metal working, food processing, 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, the program is carrying out a series of case studies of firms selected from a stratified subsample of the panel firms. These case studies focus on selected aspects of the research agenda, such as finance, business strategy, and technological capability, and are conducted to complement quantitative information gathered in the survey.

Third, the program 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 links its findings to the World Bank's operational work in Africa through participation in the design of regional and national private sector development strategies and programs. It disseminates its findings in the Bank through such activities as Bank seminars, distribution of research papers, and publication of the Findings newsletter. Outside the Bank, the program has hosted seminars and conferences in Africa, Europe, and North America. In addition to the publications listed below, the program has produced more than 100 country studies, analytical reports, case studies, and discussion papers.

Responsibility: Africa Region Technical Families, Private Sector Development and Economics Division—Ibrahim A. Elbadawi (ielbadawi@worldbank.org) and Melanie Mbuyi. With John Nasir; Vijaya Ramachandran; Manju Kedia Shah; Lan Zhao; Alfred Robinson; Gerald Tyler; and Ata Mazaheri and Dipak Mazumdar, University of Toronto. Assistance in the field surveys and country reports has been provided by the Ecole des Hautes Etudes Commerciales, Canada; Centre Universitaire de Douala, Cameroon; Centre d'Etudes et de Recherches sur le Développement International, France; Ivoirian Center for Economic and Social Research (CIRES) and ORSTROM, Côte d'Ivoire; Oxford University; University of Ghana; University of Göteborg, 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. Funding for the research has been provided by the Belgian Administration for Development Cooperation, Canadian International Development Agency, Danish International Development Agency, Finnish International Development Agency, French Ministry of Cooperation, French Ministry of Foreign Affairs, German Federal Ministry of Economic Cooperation, Italian Ministry of Foreign Affairs, Netherlands Ministry of Foreign Affairs, Norwegian Agency for Development Cooperation, Swedish International Development Cooperation Agency, Swiss Agency for Development and Cooperation, and U.K. Department for International Development.

Completion date: June 2004.

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Raturi, Mayank, and Anand Swamy. 1997. "Explaining Ethnic Differentials in Credit Market Outcomes in Zimbabwe." RPED Paper 78. World Bank, Washington, D.C.

Governance and Public Sector Management

Agency Independence and Political Institutions

The incentives confronting political decisionmakers are sometimes insufficient to produce stable and predictable macroeconomic policy, ensure adequate service delivery to the poor, or attract investors. Economists and policy advisers have tended to recommend two solutions to this problem: delegating policymaking to independent agencies (central banks, social funds, or regulatory agencies), and adopting fixed rules that cannot be changed in any circumstances. This research project investigated the conditions under which these strategies have succeeded, using cross-country data sets on the independence of central banks and on exchange rate regimes and the cross-country Database of Political Institutions developed by the Development Research Group.

The research found that delegation seems to work when political checks and balances are in place and political actors have differences of opinion. Fixed rules—such as fixed exchange rates—seem to work best when the public is uncertain about the motives of government officials and the policies they are pursuing. Where the appropriate political conditions are present, delegation seems to strengthen a government's promises that it will not reverse policies in the future. Fixed rules do not have this effect. But when the credibility of a government's promises is threatened by a lack of transparency and by incomplete information for the public, rules do have an effect and delegation does not.

The results of the research are being presented at conferences around the world. They have also contributed to operational discussions by World Bank staff in countries considering the establishment of independent agencies to manage government activities in areas ranging from maintaining highways to controlling corruption.

Responsibility: Development Research Group, Regulation and Competition Policy—Philip Keefer (pkeefer @worldbank.org). With David Stasavage, London School of Economics.

Completion date: June 2001.

Reports

Keefer, Philip, and David Stasavage. 2000. "Bureaucratic Delegation and Political Institutions: When Are Independent Central Banks Irrelevant?" Policy Research Working Paper 2356. World Bank, Development Research Group, Washington, D.C.

———. 2001. "Checks and Balances, Private Information, and the Credibility of Monetary Commitments." Policy Research Working Paper 2542. World Bank, Development Research Group, Washington, D.C.

Analyzing Problems in Public Hospital Corporatization Using Information Economics

Using a case study of a Lebanese public hospital over seven years, this research examined institutional design issues in corporatization, a hybrid organizational form that combines public and private ownership. The research addressed two main questions: Given the objectives of a corporatized hospital, is the right management structure being implemented? And do the institutions being put in place generate the intended incentives for efficient service delivery?

Using the decision rights approach and contract theory, the research studied the effects of corporatization on decision rights in the hospital. The results pointed to two main lessons:

- Complementarities in decision rights that provide the most complete and flexible contract possible are the key to good institutional design.
- It is important that mechanisms of risk sharing and high-powered incentives be created from the bottom up.

This work also developed a new framework for analyzing institutional design that can be generalized to study the policy implications of corporatization.

A second analysis used Dixit's multitasking common agency model to examine the effects of incentive misalignments in Lebanese law on the autonomy of public hospitals. It focused on the design of corporatized hospital boards and their responsiveness to health sector regulators, community members, and hospital users. The analysis found that:

• Community membership and social sanction (de facto representation) are as effective as formal (de jure) representation in aligning the incentives of principals (regulators, community members, and hospital users) with those of the agent (hospital boards of directors).

• Randomness in board appointments results in outcomes inferior to "first best" in some instances but not others, as a result of reputational factors.

The project's findings on the effects of corporatization on incentives for responsiveness could be useful in designing policies for joint public-private ownership, especially in cases of transition from public to joint ownership. In addition, the framework developed in the study could help in designing public-private partnerships with appropriate incentive structures.

The research results have been presented at a World Bank conference on Latin America and at conferences in Europe and the United States and disseminated to World Bank and developing country staff.

Responsibility: Operations Evaluation Department, Country Evaluation and Regional Relations—Anwar Shah (ashah @worldbank.org). With Florence Eid, American University of Beirut; and David Cutler, Stanford University.

Completion date: June 2001.

Reports

Eid, Florence. "Hospital Governance and Incentive Design: The Case of Corporatized Public Hospitals in Lebanon." American University of Beirut.

———. "Understanding Good Institutional Design in Hospital Corporatization: A Decision Rights Approach." American University of Beirut.

Migration, Decentralization, and the Provision of Local Public Goods to the Poor

In most developing countries with large informal sectors, redistribution occurs primarily through subsidized public services (health, education, and water and sanitation) rather than through direct transfers. Thus to evaluate the welfare of the poor, researchers, policymakers, and donors need to determine whether public services are allocated to the areas that most need them.

In Brazil the government funds a large share of the health and education services, and the less affluent use these publicly provided services rather than private ones. This study investigated what influences the allocation of public health, education, and water and sanitation services in that country, using 1991 and 1996 data on a panel of municipalities. It assembled a large data set combining information on average incomes, poverty, income inequality, ethnic diversity, availability of water and sanitation services, availability and quality of education and health facilities (private and government), the extent of fiscal decentralization, political competition, and political participation.

Using instrumental variable estimation techniques, the study then investigated the effects of politics, decentralization, affluence, migration, race, and income inequality on the allocation of public services across municipalities. After controlling for municipality size and per capita income, the study found that greater levels of public services per capita are provided where income inequality is greater, where political participation is greater, where in-migration is lower, and where private facilities are less common. The study found no evidence that decentralization (to the municipal level) leads to the provision of more public services. In fact, it found that the opposite is often true. Results on the link between public good provision and racial diversity or the intensity of political competition were mixed.

The results of the study, one of the most detailed micro-level studies of its kind for Brazil, should help in formulating the World Bank's lending activities in that country, particularly in health and education. In addition, the municipal-level database created by the project will be useful for further work in this and related areas.

Responsibility: Development Research Group, Infrastructure and Environment—Maureen Cropper (mcropper @worldbank.org). With Andrew Sunil Rajkumar, Georgetown University; and Ahmed Mushfiq Mobarak, University of Maryland.

Completion date: June 2001.

Service Delivery

Removal of market and external distortions has exposed poor public sector performance as one of the most important constraints on growth and poverty reduction in many low-income countries. A large body of microeconomic literature on households and firms suggests that delivery of public services is important for reducing poverty and stimulating private sector growth. But another strand of literature finds that the link between public spending and growth and social outcomes is ambiguous at best. This contradiction points to an identification problem: public spending is not necessarily the same as public assets or services.

This research explored the process by which public expenditure is transformed into public goods. The work was based on public expenditure tracking surveys of service facilities and, in some cases, surveys of firms that focused on infrastructure services. Public expenditure tracking surveys typically collect information on facility characteristics, financial flows, outputs, accountability arrangements, and the like. These data can be used for multiple purposes, such as helping to diagnose operational problems and supporting empirical research on capture and cost efficiency.

Results show that information and transparency can be cost-efficient means of overcoming systemic problems in service delivery. In Uganda, where the public expenditure tracking survey was pioneered in 1996, surveys revealed that nonwage primary education spending was being captured by local bureaucrats. In response, the central government launched an information campaign, both nationally and at the district and school levels. A repeat survey in 1999–2000 showed that schools were receiving 90 percent of the nonwage education spending, up from just 20 percent in 1995. This remarkable improvement was achieved by the government's dissemination of information, both through the media and by posting public spending information at schools and in districts.

This project provided technical support to World Bank country teams in Ghana, Honduras, the former Yugoslav Republic of Macedonia, Rwanda, Tanzania, and Uganda, which have implemented public expenditure tracking surveys. In addition, the project set up a cross-country database for empirical analysis.

Responsibility: Development Research Group, Public Services for Human Development—Ritva Reinikka (rreinikka @worldbank.org). With Jakob Svensson; Jan Dehn; Delius Asiimwe, Makerere University, Kampala, Uganda; and Magnus Lindelow, Oxford University, Centre for the Study of African Economies.

Completion date: June 2001.

Reports

Ablo, Emmanuel, and Ritva Reinikka. 1998. "Do Budgets Really Matter? Evidence from Public Spending on Education and Health in Uganda." Policy Research Working Paper 1926. World Bank, Development Research Group, Washington, D.C.

Reinikka, Ritva. 2001. "Recovery in Service Delivery: Evidence from Schools and Health Centers." In Ritva Reinikka and Paul Collier, eds., *Uganda's Recovery: The Role of Farms, Firms, and Government*. Regional and Sectoral Studies Series. Washington, D.C.: World Bank.

Reinikka, Ritva, and Jakob Svensson. 2000. "Explaining Leakage of Public Funds." World Bank, Development Research Group, Washington, D.C.

———. 2000. "How Inadequate Provision of Public Infrastructure and Services Affects Private Investment." Policy Research Working Paper 2262. World Bank, Development Research Group, Washington, D.C.

———. 2001. "Coping with Poor Public Capital." World Bank, Development Research Group, Washington, D.C.

The Causes of Corruption

Corruption is popularly regarded as among the most serious obstacles to development. Economists have recently found that it does seem to matter for several important economic outcomes, showing, for example, that it reduces private investment and thus economic growth. And even if specific methodologies may raise doubts about issues of causation, corruption is strongly correlated with several critical economic variables and, despite the presence of feedbacks, seems to have independent effects. Understanding and fighting corruption could thus have real economic returns.

This study examined empirically the determinants of corruption, paying particular attention to political institutions that help determine the extent to which policymakers can be held accountable for the actions of their staff. The role of political institutions had not been analyzed by earlier empirical studies, though both the political science and the theoretical economics literature indicated the importance of such institutions. The study was based on a time-series and cross-country data set on corruption and political institutions drawn from various sources. Its use of a panel to investigate the determinants of corruption is new in the literature.

The main theoretical hypothesis that guided the empirical investigation is that political institutions affect corruption through two channels: political accountability and the structure for the provision of public goods. Political mechanisms that increase accountability, by encouraging the punishment of corrupt individuals or reducing the informational problem related to government activities, tend to reduce corruption. In addition, institutions that generate a competitive environment in the provision of public services tend to reduce the extraction of rents, thereby reducing corruption.

The results suggest that political institutions are extremely important in determining the prevalence of corruption: democracy, parliamentary systems, political stability, and freedom of the press are all associated with lower corruption. Moreover, common results of earlier empirical studies of the determinants of corruption—related to openness and legal tradition—do not hold once political variables are taken into account.

Responsibility: Latin America and the Caribbean Region, Office of the Chief Economist—Daniel Lederman (dlederman@worldbank.org) and Rodrigo Reis Soares; and Development Research Group, Macroeconomics and Growth—Norman Loayza.

Completion date: August 2001.

Report

Lederman, Daniel, Norman Loayza, and Rodrigo Reis Soares. 2001. "Accountability and Corruption: Political Institutions Matter." World Bank, Latin America and the Caribbean Region, Office of the Chief Economist; and Development Research Group, Washington, D.C.

Database on Institutions for Government Decisionmaking

A wealth of recent research has shown that taking a country's institutional environment into account can radically change the policy recommendations and priorities previously considered optimal. This research has been hindered, however, by the lack of detailed, systematic, objective data on the nature of countries' decisionmaking institutions.

This project addresses that lack. Using several different sources (political almanacs and Web sites), the project has collected data on more than 100 variables in more than 150 countries for the period 1975–97. Variables include whether systems are parliamentary or presidential, how competitive their elections are, which parties are in the governing coalition and in the opposition and how many seats each holds, whether the electoral system is based on proportional representation or "first past the post," how many years the executive has been in power, and whether the executive and the defense minister are from the military.

All these variables are expected to inform future research on institutions and development. They are also expected to aid operational work, making it easier, for example, to compare the institutional environment in a country considering possible reforms with the institutional environment in countries that have proved the usefulness of particular practices.

The database has been distributed to more than 150 scholars and will soon be in Harvard University's Datavine Archive, whose development was partially funded by the World Bank. Plans are to extend the database in the summer of 2001 to cover the years 1998–99.

Responsibility: Development Research Group, Regulation and Competition Policy—Philip Keefer (pkeefer@worldbank.org) and Robert Cull, and Public Economics—George R. G. Clarke; and Financial Sector Strategy and Policy Department—Thorsten Beck. With Patrick Walsh.

Completion date: June 2002.

Reports

Beck, Thorsten, George R. G. Clarke, Alberto Groff, Philip Keefer, and Patrick Walsh. 2000. "New Tools and New Tests in

Comparative Political Economy: The Database of Political Institutions." Policy Research Working Paper 2283. World Bank, Development Research Group, Washington, D.C.
———. 2001. "New Tools in Comparative Political Economy: The Database of Political Institutions." *World Bank Economic Review* 15(1): 165–76.

The Economics of Political and Criminal Violence

This research seeks to answer the following questions: Why do civil wars occur? What are the determinants of violent crime? What are the economic causes and consequences of political and criminal violence? Can we predict and prevent outbreaks of violence? What economic policies are appropriate in countries that have undergone periods of large-scale violence and political conflict?

To address these questions, the project has developed a large database on crime and violence in 161 countries (including most developing countries), combining economic, social, and political indicators. This database draws on other World Bank databases and related projects in academic institutions. The research uses several methodologies, including game-theoretic modeling, econometric modeling, and hypothesis testing. Its multidisciplinary approach combines perspectives from economics, political science, criminology, law, and sociology.

The project's findings are expected to contribute to the World Bank's advice on microeconomic and macroeconomic management of countries under risk of civil war and on policies during postconflict reconstruction. In addition, the project will attempt to identify sets of optimal policies for countries under different levels of risk of war and for countries with different backgrounds of conflict. Toward this goal, the project has developed a close working relationship with the World Bank's Post-Conflict Unit and has begun to develop a set of conflict indicators that World Bank country teams can use to determine the optimal allocation of funds among countries that are or may be affected by violent conflict.

The project organized a conference at Princeton University where findings on the causes of civil war were presented. The papers from that conference will be published as a special issue of the *Journal of Conflict Resolution.* Two more conferences are planned, one on the duration of war and postconflict issues, at the London School of Economics, and the other on the final results of the project, in Oslo, Norway.

Two research workshops have also been held. The first, focusing on war duration and postconflict issues, was held at the University of California at Irvine and cosponsored by the university's Center for Global Peace and Conflict Studies. The papers from that workshop will be published in a special issue of *World Politics.* The second workshop, sponsored by the government of Norway and co-organized by the International Peace Research Institute in Oslo, was held in Oslo on June 11–12, 2001. This workshop, which launched the project's case study phase, involved more than 30 researchers, who presented outlines for 22 case studies.

The project has built local research capacity in developing countries by incorporating researchers from those countries and, especially in the case study phase, by pairing U.S.-based researchers with scholars in the countries studied. The project has also built a network of researchers through its Web site (http://www.worldbank.org/research/conflict/), which disseminates information and research findings and facilitates communication among researchers around the world. All the publications from the project are posted on the Web site.

Responsibility: Development Research Group, Office of the Director—Paul Collier (pcollier@worldbank.org), Public Economics—Shantayanan Devarajan, Ibrahim Elbadawi, and Nicholas Sambanis, and Macroeconomics and Growth—Norman Loayza, William Easterly, and David Dollar. With Anke Hoeffler, Oxford University; Jeffrey Herbst and Michael Doyle, Princeton University; Patrick Regan, State University of New York at Binghamton; Robert Bates, Harvard University; Gregory Hess, Oberlin College; Njuguna Ndung'u, University of Nairobi; Mwangi Kimenyi, Kenya Policy Research Institute; Jean-Paul Azam, University of Toulouse; Barbara Walter, University of California at San Diego; James Fearon and Stephen Stedman, Stanford University; Michael Gilligan, New York University; Joshua Epstein and John Steinbruner, Brookings Institution; and Nils Peter Gledisch, Havard Hergre, and Scott Gates, International Peace Research Institute (PRIO), Oslo, Norway.

The Norwegian Ministry of Foreign Affairs Trust Fund is contributing funding for the research.
Completion date: June 2002.

Reports

Azam, Jean-Paul. Forthcoming143. "Looting and Conflict between Ethno-Regional Groups: Lessons for State Formation in Africa." *Journal of Conflict Resolution.*

Bates, Robert. 2000. "Organizing Violence: Wealth, Power, and Limited Government."

Collier, Paul. 2000. "Causes of Civil Conflict and Their Implications for Policy." In Chester A. Crocker and Fen Osler Hampson, with Pamela Aall, eds., *Managing Global Chaos.* Washington, D.C.: U.S. Institute of Peace.

———. 2000. "The Challenge of Ugandan Reconstruction, 1986–98." World Bank, Development Research Group, Washington, D.C.

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Collier, Paul, and Anke Hoeffler. 2000. "Greed and Grievance in Civil War." Policy Research Working Paper 2355. World Bank, Development Research Group, Washington, D.C.

Doyle, Michael W., and Nicholas Sambanis. 2000. "Building Peace: Challenges and Strategies after Civil War."

———. 2000. "International Peacebuilding: A Theoretical and Quantitative Analysis." *American Political Science Review* 94(4): 779–801.

Elbadawi, Ibrahim, and Njuguna Ndung'u. 2000. "External Indebtedness, Growth, and Investment in Conflict and Post-Conflict African Countries." World Bank, Development Research Group, Washington, D.C.

Elbadawi, Ibrahim, and Nicholas Sambanis. 2000. "External Interventions and the Duration of Civil Wars." Policy Research Working Paper 2433. World Bank, Development Research Group, Washington, D.C.

———. 2000. "Why Are There So Many Civil Wars in Africa? Understanding and Preventing Violent Conflict." *Journal of African Economies* 9(3): 244–69.

———. 2001. "How Much War Will We See? Estimating the Incidence of Civil War in 161 Countries." Policy Research Working Paper 2533. World Bank, Development Research Group, Washington, D.C.

Fearon, James, and David Laitin. 2000. "Work States, Rough Terrain, and Large-Scale Ethnic Violence since 1945."

Gates, Scott. Forthcoming. "Recruitment and Allegiance: The Microfoundations of Rebellion." *Journal of Conflict Resolution.*

Herbst, Jeffrey. 2000. "The Organization of Rebellion in Africa."

Hess, Gregory, and Brock Blomberg. Forthcoming. "Is There Evidence of a Poverty-Conflict Trap?" *Journal of Conflict Resolution.*

Regan, Patrick. Forthcoming. "Third Party Interventions and the Duration of Intrastate Conflicts." *Journal of Conflict Resolution.*

Sambanis, Nicholas. 2000. "Partition as a Solution to Ethnic War: An Empirical Critique of the Theoretical Literature." *World Politics* (July). (Also issued as Policy Research Working Paper 2208, World Bank, Development Research Group, Washington, D.C., 1999.)

———. 2001. "Do Ethnic and Non-Ethnic Civil Wars Have the Same Causes? A Theoretical and Empirical Inquiry (Part 1)." *Journal of Conflict Resolution* 45(3): 259–82.

The Impact of Institutions

This research focuses on the following questions: What is the relationship between institutions and the efficiency of public investment? What is the relationship between institutions and fiscal policy? And what is the relationship among institutions, social polarization, conflict, and economic development? The research addresses each of these questions using cross-country data, averaged over time, for 60–80 countries.

Results from a first phase of work show a negative relationship between the security of property rights and the extent of social polarization, as measured by inequality in the distribution of land and income and by ethnolinguistic fractionalization. The results also indicate that the negative effects of inequality on growth are due at least in part to the intermediate effects of inequality on the security of property rights.

Current work, relying on the Development Research Group's new Database of Political Institutions, has examined the link between public investment and the security of property rights. It shows that public investment, widely found to have no effect on economic growth, has a strongly negative effect on growth in the absence of secure property rights, and a positive effect in the presence of such rights. These results are consistent with an institutional theory of property rights, in which the security of property rights is a function of the political institutions within which government decisionmakers operate; they are inconsistent with a "policy" approach to property rights, in which the security of property rights is a function of government policy and spending decisions (for example, on police and the judiciary).

The results of the research are expected to influence the World Bank's macroeconomic advice, its advice in postconflict societies, and the design of Bank-supported infrastructure projects.

Responsibility: Development Research Group, Regulation and Competition Policy—Philip Keefer (pkeefer @worldbank.org) and Stephen Knack.

Completion date: June 2002.

Reports

Keefer, Philip, and Stephen Knack. 2000. "Polarization, Politics, and Property Rights: Links between Inequality and Growth." Policy Research Working Paper 2418. World Bank, Development Research Group, Washington, D.C. (Also forthcoming in *Public Choice.*)

———. 2001. "Boondoggles and Expropriation: When Are Property Rights Secure and Public Investment Growth-Promoting?" World Bank, Development Research Group, Washington, D.C.

Managing Windfalls: Institutional Strategies for Avoiding the Voracity Effect

Although natural resource windfalls might seem to be a stroke of luck for a poor country, theory and evidence suggest that the opposite is true: there is often a curse associated with such windfalls, and there is little evidence that they set the stage for sustained economic development. This research project will investigate the institutional determinants of windfall management, ranging from the institutions that govern political competition and decisionmaking to the administrative institutions through which windfall resources are managed.

The project will investigate whether rules governing how political actors are selected and how they make decisions control the "voracity effect," in which a terms of trade windfall or other shock generates a more than proportionate increase in fiscal redistribution and reduces growth. The rules governing the state's budgetary decisionmaking have been said to be the proximate determinants of the voracity effect. The project will research the "micro" institutional details of the management of natural resource revenues, compare them with general budget management, and analyze the effects of management on outcomes.

The project has both qualitative and quantitative components. The qualitative work, relying largely on secondary data and interviews with experts, will analyze the interaction of windfalls and institutions in about 20 major oil-producing countries. These case studies will draw on detailed information on budget management, oil fund management, and political dynamics. The quantitative work will use cross-country information on commodity earnings, political institutions, and spending to construct and test different hypotheses about the influence of institutions on country responses to windfalls, taking advantage of statistical tests at the expense of institutional detail.

The joint product of this qualitative and quantitative work will inform donor advice to new commodity producers as well as institutional changes that are a prerequisite to growth-enhancing management of windfalls.

Responsibility: Development Research Group, Regulation and Competition Policy—Philip Keefer (pkeefer@worldbank.org), and Office of the Director—Paul Collier; and International Finance Corporation, Oil, Gas, and Chemicals Department—Charles McPherson.

Completion date: June 2002.

An Analysis of Use Patterns for Latin American Judiciaries

This research project has collected empirical data on the use of a few Latin American judiciaries as a means of identifying who uses courts, for what purpose, and with what immediate and broader consequences. It attempts to explain the patterns of use in terms of incentive structures and to use the findings to suggest reforms that could help ensure that the resources for court systems are allocated in socially and economically beneficial ways.

Drawing from a random sample of case files, the study is creating and analyzing a database on the use of courts. In addition, it is identifying factors affecting decisions to litigate, based on informant interviews, legal analysis, review of relevant studies, and observation of court practices. Data have been collected in Argentina (for two court districts) and Mexico (one district, and only for summary debt collection proceedings), and additional work has begun in Peru. (The research will also be extended to a fourth Latin American country, still to be identified.)

Funding limitations dictated a less than national sample and conclusions cannot be extrapolated to the entire national caseload. Nevertheless, the analysis of the data sets for Argentina and Mexico and accompanying evidence (drawn from interviews, observations, document analysis, aggregate statistics, and, in Mexico, focus groups) has produced some interesting findings about use patterns and users:

- Much of the conventional wisdom about court uses and operations tends to be inaccurate (and thus a dangerous basis for reforms). Claims are much smaller than commonly thought, individual users more prominent than corporate, delays less excessive than estimated and delaying practices far less common, and appeals far less frequent.
- The conspicuous absence of large actors and large claims suggests that these actors are resolving their conflicts in other forums, which itself requires study. It also suggests that efforts to improve performance for current users should emphasize expedited procedures, simpler rules, and more use of pro se representation (self-representation) or small claims courts.
- The incidence of abandoned cases (those in which the parties cease action) is significant in both countries, but especially in Mexico (80 percent). The limited records on out-of-court settlement make it impossible to determine how many of these cases are resolved by negotiation. More information is needed, as a judiciary's role in encouraging out-of-court settlement may be as important as its role in deciding cases—and the only way to avoid impossibly large backlogs.
- Although most delays seem to be caused by the parties, judges' reluctance to more actively push cases along also contributes. This largely reflects institutional policy—judges in Mexico feared they might be punished if a displeased party complained to their superiors.
- Although the rate of appeal is far lower than commonly believed, it may still be high, especially for the summary debt collection proceedings, most of which (90 percent in Mexico) are decided in the first or second instance in favor of the plaintiff. For a more efficient use of appeals, the ratio of initial rulings upheld should be closer to 50:50—indicating that only the more problematic cases go to the second (or third) instance.
- Judicial workloads may be smaller than believed: abandoned cases require little work and thus inflate apparent workloads. Unless courts understand actual workloads, they will be hard pressed to allocate resources more efficiently.
- Although the research (especially that in Mexico) attempted to assess the effect of the judiciary on economic performance, it also found evidence of causal relationships running in the other direction. The Mexican courts' handling of debt collection procedures has an impact on the availability of credit, but lending practices affect the courts' workloads. Politics also affects courts' workloads, such as when politicians transfer to the courts a problem that might be more efficiently resolved by an administrative or legal decision.

The research project has worked with local teams, an Argentine nongovernmental organization (Foro de Estudios sobre la Administración de Justicia, or Fores), and two Mexican universities, and has encouraged exchanges between the two countries. In Peru a local private university has been contracted, and contacts with the Argentine and Mexican researchers have been used to help orient the work.

Preliminary findings were presented at the Regional Conference on Judicial Reform in Mexico in May 2001 and informally discussed in other forums in both Argentina and Mexico. They were also presented at a conference on civil law reform sponsored by the Spanish government in Madrid in October 2000.

The Argentine and Mexican findings will inform reform efforts by the World Bank, donor agencies, and the national judiciaries. In Mexico the Secretaría de Hacienda y Crédito Público is considering steps to strengthen judicial proceedings, and findings related to problems in statistical and archiving systems have already been incorporated into the work plans of the federal district courts. The research will be an important input into the design of a new Bank loan for improving access to justice in Mexico. In Argentina findings have been incorporated into recommendations by Fores for court reform and will also be used in an ongoing model court project.

Responsibility: Latin America and the Caribbean Region, Poverty Reduction and Economic Management Sector Unit—Linn A. Hammergren (lhammergren@worldbank.org); and Poverty Reduction and Economic Management Network, Public Sector Management Division—Richard E. Messick. With German Garavano, Foro de Estudios sobre la Administraci6n de Justicia (Fores), Argentina; Ana Laura Magaloni, Centro de Investigaciones en Docencia y Economía (CIDE), Mexico; Universidad de las Americas, Mexico; Gorki Gonzalez, Universidad Catolica, Lima, Peru; and Herbert Kritzer, University of Wisconsin at Madison.

Completion date: December 2002.

Public Policy toward Nongovernmental Organizations in Developing and Transition Economies

In many developing countries nongovernmental organizations (NGOs) outnumber firms, largely because donors and governments have increasingly turned to NGOs to deliver public services. Yet there has been no systematic assessment of their effectiveness as service providers. To help fill that gap, this research project will assess the effectiveness of NGOs as service providers in developing countries and analyze the implications for the policies governments might adopt toward NGOs.

The project will design a survey and administer it to a sample of 200–300 NGOs in each of two developing countries. The surveys will shed light on the activities of the NGOs, the sources of their funds, and their uses of funds. Together with focus group surveys and an analysis of the legal and regulatory framework for NGOs in each country, the survey results will allow an analysis of the effectiveness, efficiency, and sustainability of service delivery by NGOs. In addition, cross-country work based on existing household surveys (especially Living Standards Measurement Study surveys and Demographic and Health Surveys) will profile NGO service users in developing countries. Accompanying theoretical work and a literature review will identify the key areas in which NGOs could be most helpful in such countries.

The project will build capacity in developing countries by contracting local academics and consulting firms to participate in and execute the surveys.

Responsibility: Development Research Group, Public Services for Human Development—Varun Gauri (vgauri@worldbank.org), Ritva Reinikka, and Jeffrey Hammer. With Carmen Monico, University of Pittsburgh; Billy Jack, Georgetown University; and Ray Fisman, Columbia University. The Netherlands Trust Fund has contributed funding for the research.

Completion date: June 2003.

Bank Research Output

Below are listed various types of research output arising from research and policy review activities at the World 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 (for online ordering, go to http://publications.worldbank.org/ecommerce) or from 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. In addition, the full text of some working papers series can be found on the Bank's Web site (http://www.worldbank.org). Reprints of articles from the Bank's research journals (category C) may be requested from the authors; the full text of recent articles is also available on the Web at http://www.worldbank.org/research/journals. Other published material can be purchased from the publishers (categories B and D). The following types of fiscal 2001 research output are listed:

A. Research-oriented books written by Bank staff and published by the Bank or by other publishers. This list also includes periodic data publications, such as the *World Development Indicators,* 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 presents 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 are aimed at a narrower audience.

• *Other published series.* Papers in such series as Operations Evaluation Department and World Bank 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. Papers in this series are posted on the Web at http://econ.worldbank.org.

G. Other Bank working papers. These papers are produced and distributed by units throughout the Bank. They disseminate quickly findings of departmental research and are targeted primarily to specialists in the Bank.

H. Background papers to *World Development Report 2002: Building Institutions for Markets.* 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

Belshaw, Deryke, Robert Calderisi, and Christopher Sugden, eds. 2001. *Faith in Development: Partnership between the World Bank and the Churches of Africa.* Washington, D.C.: World Bank; and Oxford: Regnum Press.

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