SWP605

Links between Taxes and Economic Growth
Some Empirical Evidence

Keith Marsden

WORLD BANK STAFF WORKING PAPERS
Number 605

Links between Taxes and Economic Growth

Some Empirical Evidence

Keith Marsden

The World Bank
Washington, D.C., U.S.A.

This is a working document published informally by the World Bank. To
present the results of research with the least possible delay, the typescript has
not been prepared in accordance with the procedures appropriate to formal
printed texts, and the World Bank accepts no responsibility for errors. The
publication is supplied at a token charge to defray part of the cost of
manufacture and distribution.

The views and interpretations in this document are those of the author(s) and
should not be attributed to the World Bank, to its affiliated organizations, or to
any individual acting on their behalf. Any maps used have been prepared
solely for the convenience of the readers; the denominations used and the
boundaries shown do not imply, on the part of the World Bank and its affiliates,
any judgment on the legal status of any territory or any endorsement or
acceptance of such boundaries.

The full range of World Bank publications is described in the *Catalog of World
Bank Publications;* the continuing research program of the Bank is outlined in
World Bank Research Program: Abstracts of Current Studies. Both booklets are
updated annually; the most recent edition of each is available without charge
from the Publications Distribution Unit of the Bank in Washington or from the
European Office of the Bank, 66, avenue d'Iéna, 75116 Paris, France.

Keith Marsden is operations adviser in the Industry Department of the World
Bank.

ABSTRACT

Evidence from 20 countries shows that those with lower taxes experienced more rapid expansion of investment, productivity, employment, and government services, and had better growth rates--without discriminating against the poor. This paper examines the mechanisms by which fiscal policies may have affected their performance.

LINKS BETWEEN TAXES AND ECONOMIC GROWTH

SOME EMPIRICAL EVIDENCE

TABLE OF CONTENTS

LINKS BETWEEN TAXES AND ECONOMIC GROWTH

SOME EMPIRICAL EVIDENCE

I. INTRODUCTION

The arguments in the great tax debate are well known. Lower taxes should stimulate higher output by increasing incentives to save, to invest, to work hard, and to innovate. But, say the skeptics, will increased economic growth really occur? Moreover, since taxes are progressive, will not lower taxes mean that the rich benefit at the expense of the poor, who are more dependent upon the social services financed out of tax revenues? A review of the experience with growth and taxation in 20 countries, spanning almost the entire spectrum of world incomes, does not pretend to answer these questions, but it sheds some light on their empirical foundation. The countries in question were Brazil, Cameroon, Chile, Jamaica, Japan, the Republic of Korea, Liberia, Malawi, Mauritius, New Zealand, Paraguay, Peru, Singapore, Spain, Sweden, Thailand, United Kingdom, Uruguay, Zaire, and Zambia.

Half the countries selected had tax revenues (relative to GDP) below the average for their income groups during the 1970s, while the other half had tax/GDP ratios above. The choice of countries was constrained by data availability and by the exclusion of OPEC members and other countries which have used non-tax instruments (such as state marketing boards)

extensively for revenue purposes. The selected countries were grouped into 10 pairs with similar per capita incomes but contrasting tax levels, and their growth rates over the past decade were then compared. Data for the U.S. were added for reference. Tax levels in the U.S. were below average (although the inclusion of state and local government taxes, for which data are not available for most countries, might put it into the high-tax category).

The economic structures of the countries covered are not identical of course. Some have better tax "handles" or tax "potential" than others. But because it is administratively easier to extract higher levels of tax from certain sectors and activities does not mean that it is desirable to do so from the point of view of long-term economic development. This depends, first, on the impact of higher taxes on incentives and output in the sectors subject to tax and second, on whether government uses its additional revenues efficiently. This paper focuses primarily on the first issue.

II. COMPARATIVE PERFORMANCE OF SELECTED COUNTRIES

In all cases, the countries that imposed a lower effective average tax burden on their populations achieved substantially higher real rates of growth of gross domestic product (GDP) than did their more highly taxed counterparts (Table 1). The average (unweighted) annual rate of growth of GDP was 7.3 percent in the low-tax group and 1.1 percent in the high-tax group. In the U.S. it was 3.1 percent. Every member of the low-tax category, including three from Africa (Malawi, Mauritius, and

TABLE 1

COMPARATIVE PERFORMANCE OF SELECTED LOW-TAX AND HIGH-TAX COUNTRIES AND THE U.S.

Country	Per Capita Income Groups US dollars 1979	Real average annual growth rates, 1970-79 (in percent)							% Share of Gross Domestic Investment in GDP		Nonagricultural employment index 1970=100 1978	Life expectancy at birth in years		Share of poorest 40 percent in total income (In percent) latest years
		GDP	Consumption Public	Consumption Private	Gross domestic investment	Exports	Labor force	Labor productivity	1960	1979		1960	1979	
Malawi (low-tax)	200-300	6.3	6.1	5.7	2.3	4.6	2.2	4.1	10	29	173	37	47	21.5
Zaire (high-tax)		-0.7	-2.2	-1.8	-5.0	-1.1	2.1	-2.8	12	9	--	40	47	--
Cameroon (low-tax)	500-600	5.4	5.4	5.3	7.9	0.5	1.3	4.1	--	25	154	37	47	--
Liberia (high-tax)		1.8	2.3	4.3	5.2	2.3	2.6	-0.8	28	27	146	44	54	10.9
Thailand (low-tax)	500-600	7.7	9.1	6.9	7.7	12.0	2.7	5.0	16	28	165[1]/	51	62	19.1
Zambia (high-tax)		1.5	1.8	-2.2	-5.6	-0.7	2.4	-0.9	25	21	110[2]/	40	49	10.1
Paraguay (low-tax)	700-1100	8.3	4.8	7.4	18.7	8.4	3.1	5.2	17	29	135[3]/	56	64	--
Peru (high-tax)		3.1	6.5	2.9	2.7	1.7	3.0	0.1	25	14	126[3]/	48	58	7.0
Mauritius (low-tax)	1100-1300	8.2	13.5	9.8	16.1	--	--	--	30	38	162[3]/	60	65	14.0
Jamaica (high-tax)		-0.9	8.0	-0.6	-9.6	-6.8	2.2	-3.1	30	18	111[3]/	64	71	8.2
Rep. of Korea (low-tax)	1400-1700	10.3	8.7	8.0	14.9	25.7	2.8	7.5	11	35	172	54	63	16.9
Chile (high-tax)		1.9	-0.5	1.9	-2.0	10.7	1.9	0.0	17	16	--	57	67	13.4
Brazil (low-tax)	1700-2100	8.7	8.6	9.1	10.1	7.0	2.2	6.5	22	23	165[4]/	55	63	7.0
Uruguay (high-tax)		2.5	1.5	(.)	7.5	4.3	0.1	2.4	18	17	94[5]/	68	71	--
Singapore (low-tax)	3800-5950	8.4	6.4	7.2	6.0	11.0	2.7	5.7	11	39	150	65	71	--
New Zealand (high-tax)		2.4	--	--	--	3.4	2.1	0.3	24	22	112	72	73	--
Spain (low-tax)	4300-6350	4.4	5.6	4.4	2.5	10.8	1.1	3.3	19	20	--	68	73	17.8
United Kingdom (high-tax)		2.1	2.8	1.7	0.8	8.2	0.3	1.8	19	19	101	71	73	19.1
Japan (low-tax)	8800-11,950	5.2	5.0	5.3	3.2	9.1	1.3	3.9	34	33	114	68	76	21.0
Sweden (high-tax)		2.0	3.2	2.0	-1.1	2.6	0.3	1.7	25	20	109	73	76	19.7
United States	10,630	3.1	1.7	3.6	1.9	6.9	1.8	1.3	18	19	121	70	74	15.2

Sources: World Bank, 1981 World Bank Atlas; World Development Report, 1981; and Accelerated Development in Sub-Saharan Africa (Washington, D.C., 1981.)
IMF, International Financial Statistics Yearbook 1981 and Government Financial Statistics Yearbook, Volume V (Washington, D.C., 1981.)
International Labor office, ILO Yearbook of Labour Statistics, 1980.

-- Indicates data are not available.
(.) Indicates data less than half the unit shown.
1/ 1971=100.
2/ 1977.
3/ 1972=100.
4/ 1975.
5/ 1973=100.

Cameroon), exceeded the economic growth of the most rapidly expanding economy (Peru) in the high-tax category. Yet in most of sub-Saharan Africa (except Nigeria), GDP grew by only 1.6 percent per annum during the decade compared with 6.2 percent for Latin America and the Caribbean. Although—with three exceptions (Zaire, Jamaica and the United Kingdom)—tax/GDP ratios rose during the period under review, the year-to-year variations were small and the relative tax positions of the low-tax and high-tax countries remained unchanged. The rise seems mainly to reflect a broadening of the tax base rather than an increase in tax rates in the low-tax group, although it did coincide with a general slackening of economic growth during the second half of the decade. The average tax/GDP ratio in the low-tax group increased from 13.3 percent at the beginning of the decade to 15.2 percent at the end; it rose from 21.0 percent to 23.9 percent in the high-tax group. In the U.S. the increase was from 18.0 percent to 19.5 percent.

Higher rates of economic growth allowed a substantial rise in real living standards in the low-tax countries, shown by their higher levels of private consumption. At the same time, growth expanded the tax base and generated increased revenues, which financed more rapid expansion of expenditure on government services such as defense, health, and education in all the low-tax countries except in the Paraguay/Peru pairing. In Peru, faster growth of public services was achieved at the expense of both private consumption and investment.

Rising government expenditure on public services is no guarantee of their quality nor an indication of whether they reach those who need them most. Moreover, government does not provide all services in all

countries. Some are provided through private channels (market and nonmarket); support for the aged, the sick, and the unemployed, for instance, is a responsibility of the extended family in many societies. So the impact of different economic systems on social objectives is best measured by the end results. Life expectancy is an important basic indicator of progress in reducing poverty, because it is the poor who are most afflicted by deficient diets, polluted water supplies, and inadequate health services which cut short their lives and bring the average down. In all the countries covered, life expectancy at birth rose over the past two decades and the improvement was greatest in low-income societies. The increases averaged 8.0 years in low-tax countries and 6.2 years in high-tax countries. By 1979, the overall levels in the two groups were about the same (63.1 years and 63.9 years, respectively). Infant mortality rates as well as those for children and adults fell in both groups.

Direct information on changes in the incomes of different social groups is scarce and not very reliable. However, available data on income distribution seem to refute the argument that countries with high taxes are more equitable than those with low ones. The share of the poorest 40 percent of households in total income remained relatively high in five fast growing low-tax countries: Japan, the Republic of Korea, Malawi, Spain, and Thailand, ranging between 16.9 percent and 21.5 percent. In the U.S. it was 15.2 percent in 1972.

III. FRAMEWORK OF ANALYSIS

What accounts for the superior economic performance of the low-tax countries? The level of taxation is clearly not the only factor. Development is complex. Its pattern can be influenced by many variables, endogenous and exogenous. Growth has been retarded in some countries by political instability and by a deterioration in their terms of trade. Inflation, high interest rates, the oil price hikes and trade barriers have made progress difficult for most countries. Nations' responses to fiscal measures are influenced by the faculties, motivations, and mores of their peoples. The "quality" of the tax system is important. A country with a higher tax/GDP ratio but a favorable tax structure may outperform a country with a lower overall tax level that discourages growth-promoting activities, or imposes an excessive burden on the most productive or innovative segments of the population. Other important considerations include the complexity of the tax system, the efficiency and integrity of its administration, and the degree of horizontal and vertical equity (within as well as between income groups)

But the links between fiscal policy and economic growth are there, if mostly indirect--operating through the capital, labor, and product markets. Taxation affects the amount of capital available by encouraging or discouraging domestic savings and foreign investment. It may also divert investment and labor from one sector to another. It affects the level and productivity of employment by influencing individual choices between work and leisure (or housework), the intensity of effort on the job and employers' decisions on technology. Taxes affect a firm's

ability to diversify and expand through their impact on input costs and managerial behavior. They may also have a bearing on less tangible factors such as entrepreneurship and technical progress. Some empirical evidence suggests causal relationships between the level and types of taxes and key growth determinants in the areas of investment, exports, employment, productivity, and innovation.

This evidence is partly qualitative, based upon field surveys and observation of economic behavior by analysts and development institutions. Some econometric findings can be cited from our own analysis of the sample data and other published studies. But, as Martin Feldstein (1982) has pointed out, "the complexity of economic problems, the inadequacies of economic data and the weaknesses of the restrictions imposed by general economic theory together make it impossible to apply in practice the textbook injunction to estimate a "true" model within which all parameter values can be inferred and all hypotheses tested. Learning in economics is a more complex and imperfectly understood process in which we develop judgments and convictions by combining econometric estimates, theoretical insights and institutional knowledge." The aim of this paper is to identify some of the links that seem to be significant, to indicate the direction of the responses, to estimate their magnitude wherever possible and to discuss the nature of the relationships. The broad statistical correlation between tax levels and economic growth is examined first. This is followed by a more detailed review of the principal variables.

IV. EMPIRICAL ANALYSIS

A. Overall Tax/Economic Growth Links

The impact of taxes, taken as policy variables, on economic growth has been investigated by the use of regression analysis, based upon average tax/GDP ratios in the selected countries during the 1970s (Table 2) and the data included in Table 1. The overall results are given in Table 3. As shown in equation (1), the regression coefficient of the total tax variable is negative and significant at the 1 percent level. The coefficient indicates that an <u>increase</u> of one percentage point in the tax/GDP ratio <u>decreases</u> the rate of economic growth by 0.36 percent points. The R^2 estimate shows that 45 percent of the intercountry variance in GDP growth is explained by differences in the overall tax burden. Fitting the tax variable into a production function equation (2), incorporating gross domestic investment and the labor force, raises the R^2 to 0.78 but reduces the coefficient of the tax variable to -0.14. Its t-value is also reduced because of intercorrelation between the variables but remains significant at the 10 percent level.

Table 3 also presents the results for 10 lower income countries, with a per capita GNP of less than $1,300 in 1979, compared with 10 higher income countries with a per capita GNP of $1,400 or above. The tax coefficients are substantially larger for the first group, with values of -0.57 when regressed independently against GDP growth and -0.30 when combined with investment and labor force growth. The equivalent coefficients for higher income countries are -0.34 and -0.08. Except for the last figure, the t-values are significant at the 5 percent level or higher.

TABLE 2

AVERAGE RATIOS OF MAIN TAXES TO GDP IN SELECTED COUNTRIES, 1970s

Country	Total tax revenue[1]/ as percentage of GDP	Taxes on incomes and profits Total	Taxes on incomes and profits Companies	Social Security and payroll tax	Domestic taxes on goods and services	Taxes on international trade Imports	Taxes on international trade Exports	Other taxes
Malawi	11.8	5.2	3.3	–	3.9	2.6	–	.1
Zaire	21.5	5.8	2.4	0.8	2.7	5.5	6.2	0.8
Cameroon	15.1	2.6	0.9	1.3	3.0	5.8	1.4	1.1
Liberia	21.2	8.5	5.2	–	4.8	6.8	0.1	0.9
Thailand	11.7	2.0	1.1	–	5.9	3.0	0.6	0.3
Zambia	22.7	12.2	4.8	0.6	8.2	2.0	–	0.0
Paraguay	10.3	1.3	1.0	1.4	2.5	1.9	0.1	3.1
Peru	14.4	3.1	2.1	0.6	6.2	2.4	0.9	1.1
Mauritius	18.6	5.7	2.7	–	3.5	6.1	2.4	0.9
Jamaica	23.8	7.2	2.4	1.5	11.9	1.7	0.2	1.4
Korea	14.2	4.1	2.2	0.1	6.8	2.3	–	0.8
Chile	22.4	4.4	1.6	4.2	9.8	2.3	–	1.7
Brazil	17.1	3.0	1.2	6.9	6.1	0.7	0.3	0.1
Uruguay	20.0	1.6	0.9	6.2	8.2	1.5	0.6	2.1
Singapore	16.2	7.2	3.3	0.4	3.7	2.0	–	3.0
New Zealand	27.5	19.9	3.7	0.2	5.6	1.1	–	0.7
Spain	19.1	3.9	1.7	9.2	3.8	2.0	–	0.2
United Kingdom	30.4	14.4	2.6	6.2	8.8	0.3	–	0.8
Japan	10.6*	7.4	3.5	–	2.3	0.3	–	0.6
Sweden	30.9	7.8	1.3	11.5	10.6	0.5	–	0.5
United States	18.5	11.4	2.8	5.4	1.1	0.3	–	0.4

Sources: IMF, Government Finance Statistics Yearbook 1981 and International Financial Statistics Yearbook, 1981.
1/ Central government tax revenue only.
* Includes non-tax revenue but excludes social security contributions.
– Indicates none recorded.

– 9 –

TABLE 3

INTERCOUNTRY REGRESSION ANALYSIS OF GDP GROWTH RATES FOR SELECTED COUNTRIES, 1970-79 [a]/

Regression equations	No. of observations n	Constant	Total tax/GDP ratio T	Gross domestic investment growth rate K	Labor force growth rate L	R^2
Total Sample						
(1)	20	11.281 (6.011)	-0.361 (-3.830)			.449
(2)	20	5.267 (2.183)	-0.136 (-1.581)	0.316 (4.892)	0.221 (0.438)	.779
Lower Income Countries						
(1a)	10	13.914 (5.368)	-0.575 (-3.944)			.660
(2a)	10	9.847 (2.616)	-0.299 (-2.333)	0.246 (3.332)	-0.688 (-0.670)	.882
Higher Income Countries						
(1b)	10	11.797 (4.710)	-0.336 (-2.932)			.518
(2b)	10	3.284 (1.310)	-0.084 (-0.934)	0.335 (2.937)	1.223 (0.935)	.877

a/ The t-values are given in parenthesis below the regression coefficients.

The results suggest that taxes affect growth in two ways: first, by influencing the aggregate supply of the main factors of production by raising or lowering their net (after tax) returns and second, by influencing the efficiency of resource utilization (total factor productivity). Equations (2), (2a) and (2b) isolate the effects on factor productivity, because the impact of taxes on aggregate factor supply is already reflected in the input data for investment and labor force growth. A possible explanation for the larger and more significant coefficients for lower income countries is that these countries offer greater scope for productivity gains from the spread of modern technology, improvement in skills and the transfer of capital and labor to more productive sectors and activities. They may also benefit to a greater extent from "externality effects." The application of more efficient management and production techniques in leading sectors (such as exports) eventually results in higher productivity in the backward sectors through emulation and the dissemination of know-how. In higher income countries, productivity differences between sectors tend to be narrower and the existing levels of efficiency higher. Structural and institutional rigidities that limit the mobility of resources or retard the acceptance of new techniques may restrict their potential for tax-induced gains.

Regression analysis was also undertaken for changes in life expectancy, taken as a proxy for poverty alleviation. However, no significant correlations were found with the growth of GDP or public consumption, nor with the tax/GDP ratios. High-tax countries may have compensated for lower rates of income growth by larger transfer payments to the poor. In the long run, economic growth is likely to be decisive,

however, as the cross-sectional data show that average life expectancy
tends to rise with per capita GNP.

We turn now to a more detailed review of some of the principal
growth determinants.

B. Investment

Gross domestic investment grew at substantially higher rates in
the low-tax countries, averaging 8.9 percent annually, compared with an
annual decline of 0.8 percent in high-tax countries. Our regression
analysis relating investment growth to variations in tax/GDP ratios gives a
coefficient of -0.66, indicating that an increase in the total tax ratio of
1 percentage point lowers the rate of growth of investment by 0.66 percent-
age points (Table 4). Among the different types of tax, corporate income
tax shows the highest coefficient at -2.13, significant at the 10 percent
level. Corporate taxes and social security contributions combined were
generally lower in the low tax countries (Table 2), allowing companies to
retain a higher proportion of their earnings to finance internal
expansion. Martin Feldstein and George Fane (1973) have shown from British
data that the long-run propensity to consume out of disposable personal
income is considerably higher than for retained earnings. They estimate
that a tax policy that reduces dividends by one Pound and increases
retained earnings by an equal amount may raise total private saving by as
much as 0.6 Pounds.

Using an 800 equation model based upon U.S. experience, Otto
Eckstein (1980) estimates that a progressive reduction in corporate profit
taxes by 15 to 33 percent over a 10 year period would increase business

TABLE 4

INTERCOUNTRY REGRESSION ANALYSIS OF THE GROWTH OF INVESTMENT, LABOR FORCE,
LABOR PRODUCTIVITY AND EXPORTS IN RELATION TO TAX RATIOS IN SELECTED COUNTRIES, 1970-79 a/

Regression equations	Dependent variable	Number of observations	Constant	Total tax/ GDP ratios (Tt)	Corporate tax (Tc)	Personal income tax (Tp)	Soc.Sec. and other payroll taxes (Tss)	Dom. tax on goods and services (Td)	Foreign trade taxes (Tf)	R^2
(1)	Investment growth rate	20	16.644 (3.624)	-0.657 (-2.847)						.310
(2)	Investment growth rate	20	21.229 (3.565)		-2.127 (-1.373)	-0.298 (-0.651)	-0.373 (-0.685)	-1.338 (-2.220)	-0.601 (-1.076)	.454
(3)	Labor force growth rate	20	3.385 (5.748)	-0.076 (-2.583)						.270
(4)	Labor force growth rate	20	2.600 (3.969)		0.040 (0.236)	-0.065 (-1.284)	-0.189 (-3.150)	0.013 (0.197)	-0.032 (-0.513)	.574
(5)	Labor productivity growth rate	20	7.819 (4.133)	-0.284 (-2.989)						.332
(6)	Labor productivity growth rate	20	10.775 (4.880)		-0.803 (-1.398)	-0.154 (-0.909)	-0.075 (-0.373)	-0.638 (-2.856)	-0.580 (-2.803)	.571
(7)	Exports growth rate	20	13.444 (2.822)	-0.392 (-1.639)						.130
(8)	Exports growth rate	20	17.703 (2.753)		-0.899 (-0.538)	-0.286 (-0.578)	-0.224 (-1.139)	-0.741 (-1.139)	-1.088 (-1.804)	.253

a/ The t-values are given in parenthesis below the regression coefficients.

investment by 15.6 percent and the capital stock by 9.9 percent. In a

separate study, Roger Gordon and Dale Jorgenson (1974) estimate that an

increase in the investment tax credit from 7 percent to 15 percent would

raise the capital stock by 12.5 percent over a 10-year period. Lester

Thurow (1980) goes as far as to recommend the abolition of corporate income

tax and the integration of corporate and personal taxation, on the grounds

of both efficiency and equity. He argues that since the corporate

after-tax rate of return would approximately double, corporate managers

would have a strong incentive to increase investment. While each

shareholder, rich or poor, would pay taxes at a rate commensurate with his

own income position rather than at a common rate.

Michael Darby (1979) estimates from U.S. time series data that

social security programs have reduced total saving by between 12 and 23

percent, because individuals have less need to accumulate life-cycle assets

for their old age. Combined with effects on labor supply (through induced

early retirement), his calculations of the long-run equilibrium effects

suggest that owned capital is reduced from 5 percent to 20 percent and

income lowered by 2 percent to 7 percent. Feldstein (1974) had earlier

estimated that social security reduced U.S. saving and investment by 38

percent.

There is also evidence that tax policy has influenced the pattern

of investment with consequent effects on overall efficiency. Generous

corporate tax holidays and import duty concessions have been offered by

low-tax countries to investors in priority areas, particularly exports

where economic returns have been shown to be high. Several econometric

studies have revealed a close correlation between exports and income

growth. Bela Balassa (1978) estimated that the growth of the Republic of Korea, for example, would have been 43 percent lower than it actually was if Korea's exports had only matched the average for a sample of ten countries. William Tyler (1981) found a significantly positive relationship (a Pearson coefficient of 0.55) between the growth of manufactured exports and economic growth in 49 countries. Our own regression analysis of the growth of exports, using tax ratios as independent variables, gives coefficients of -0.39 for total taxes and -1.09 for foreign trade taxes. Production for export as well as for domestic consumption encourages efficient allocation of resources, permits the exploitation of economies of scale, generates technological improvements in response to competition abroad and contributes to increased employment. Furthermore, the strong growth and balance-of-payments positions that countries can attain by promoting exports enable them to borrow abroad to supplement domestic savings.

Trade policy analysts emphasize the importance of fiscal incentives for export promotion. Donald Keesing (1979) states that "Duty-free access to imported inputs, together with rebates of all indirect taxes, are in fact nearly universal in countries, whatever their income levels, that are successful in exporting manufactures. Any significant tax on these inputs can knock a country out of the running as a source of these goods." The ratio of total indirect taxes and duties to GDP was lower in low-tax countries in all the pairs included in our sample. Exports rose more rapidly in all the low-tax countries except Cameroon, expanding at an average annual rate of 9.9 percent compared with 2.5 percent in the high-tax group. Tax alleviation offered to exporters has proved to be

attractive to domestic and foreign sources of capital. The tax concessions provided under the Export Processing Zone Act in Mauritius, for example, resulted in a sharp upsurge in investment in manufacturing for export during the 1970's. The share of manufactures in total exports rose from 2.9 percent in 1970 to 26.7 percent in 1978. Net direct foreign investment was significant in all low-tax developing countries. It quadrupled in Brazil and tripled in Singapore between 1970 and 1977. The share of investment in GDP rose in all the low-tax countries, except Japan, reaching an unweighted average of 29 percent in 1979.

In contrast, most high-tax countries experienced a secular decline in their investment ratios, which fell to an average of 18 percent in 1979. In some cases, taxes on major export commodities deterred foreign investors and diverted domestic capital into unproductive activities, such as real estate speculation. World Bank data for 1970 and 1977 show negative direct foreign investment in some high-tax countries. Malcolm Gillis (1981) has shown that in the late 1960s and early 1970s, several governments began aggressive efforts to wrest larger shares of resource rents from the transnational corporations engaged in natural resource extraction in their countries. The liberal tax incentives that had been offered previously, such as exemptions from company tax and import duties, were abandoned. Ad valorem export taxes and windfall profits taxes were introduced. Depletion allowances and loss-carry-forward provisions were eliminated. Gillis points out that these measures were often successful in maximizing revenues in the short run but were disappointing in their long-term effects on the development of the mineral sectors in these countries. In Jamaica, for example, the real value of bauxite/alumina

production fell by 37 percent in 1975-76 following the introduction of the

bauxite production levy in 1974. Foreign aluminum producers reacted to

higher prices resulting from the levy by diversifying their sources of

supply. Jamaica's share in the world bauxite and alumina trade declined

from 18 percent and 10 percent in 1974 to 13 percent and 7 percent in 1979.

Vito Tanzi (1981) has also drawn attention to the high ratios of export

duties to export values and GDP in Zaire and some other African countries.

He notes that "the high share of export duties in GDP may be considered

particularly disturbing in view of the negative effects that these taxes

often have on production, allocation of resources and exports." These

effects may be mitigated if the taxes are temporary, but this was not

generally the case. Formal systems for providing tax exemptions or rebates

to exporters exist in some high-tax countries but are often ineffective

because of weak administration or over-complicated procedures. Trade

specialists also stress the role of overvalued exchange rates, which act as

a hidden tax on exporters, in hampering growth.

It has been suggested that the decline in real export prices for

primary products, particularly minerals such as copper, provides a more

powerful explanation for poor economic performance than does fiscal

policy. However, data for changes in the terms of trade do not support

this contention (Table 5). Among the four major copper exporters included

in the high-tax group--Chile, Peru, Zaire and Zambia--only Chile

experienced a greater long-run deterioration in the purchasing power of its

exports than did its low-tax, high growth counterpart, and it still fared

better than Japan and Thailand in this respect. The difference between the

two groups as a whole was minimal. The terms of trade index in 1979 was on

TABLE 5

CHANGES IN THE TERMS OF TRADE AND MARKET SHARES OF SELECTED COUNTRIES

Country	Terms of trade index (1970 = 100)			Market shares (exports as % of world imports)	
	1960	1979	% change 1979 over 1960	1970	1979
Malawi	115	84	-27	0.02	0.02
Zaire	122	91	-25	0.25	0.17
Cameroon	106	144	+36	0.08	0.07
Liberia	255	83	-67	0.07	0.03
Thailand	121	73	-40	0.25	0.34
Zambia	115	100	-13	0.34	0.09
Paraguay	116	101	-13	0.02	0.02
Peru	89	97	+ 9	0.35	0.21
Mauritius	65	59	- 9	0.02	0.02
Jamaica	85	93	+ 9	0.11	0.05
Korea	99	94	- 5	0.28	0.97
Chile	126	89	-29	0.42	0.24
Brazil	114	94	-18	0.92	0.99
Uruguay	132	126	- 5	0.08	0.05
Singapore	100	101	+ 1	0.52	0.91
New Zealand	135	124	- 9	0.41	0.30
Spain	124	100	-19	0.80	1.17
United Kingdom	112	107	- 4	6.48	5.54
Japan	150	98	-35	6.47	6.56
Sweden	97	90	- 7	2.27	1.77
U.S.A.	115	91	-21	14.49	11.67

Sources: World Development Report 1981, table 8, and International Financial Statistics, Supplement on Trade Statistics 1982.

the average 13 percent below the level in 1960 in the low-tax countries and 14 percent below in the high-tax group. Tyler also found no readily apparent relationship between terms of trade changes and economic growth in his larger sample of countries. However, the low-tax countries succeeded in expanding and diversifying their exports. With one exception (Cameroon), they increased or maintained their share of world markets. On the other hand, the share of the high-tax countries dropped in all cases. The sharpest falls coincided with negative GDP growth. Tax policies have influenced their ability to compete in world markets by squeezing profits, by making it more attractive for entrepreneurs to concentrate on protected home markets, by raising costs in potential export areas and by discouraging foreign investors who would have brought marketing, technological and managerial know-how needed for export success.

In some countries, dividend taxes acted as a "double tax" on corporate income, reducing the total amount of investment funds available and discouraging corporate investment. This has been confirmed by a recent econometric study by James Poturba and Lawrence Summers (1981) using U.K. data. The authors conclude that "the data decisively refute the hypothesis that by raising the cost of paying out funds to shareholders, dividend taxes encourage investment through retentions."

There is also econometric evidence of a shift in investment flows from plant and machinery to owner-occupied housing, which is more favored by tax rules. Martin Feldstein (1981, 1982) has demonstrated that this diversion has been accentuated by inflation. Because nominal interest payments are deductible, the tax advantages of investment in owner-occupied housing rise substantially with inflation. In contrast, inflation tends to

increase the tax burden on business capital. First, because deductions for
fixed investment are calculated according to historic costs, a higher rate
of inflation reduces their real value and understates the costs of replace-
ment. Second, the owners of the equity of business firms often pay capital
gains tax on the rise in the nominal value of the capital stock. Feldstein
concludes that the heavier tax burden resulting from the interaction
between tax rules and inflation explains most ot the decline in the share
of GNP devoted to investment in plant and machinery in the U.S since 1965.
He estimates that the reduction exceeds 40 percent of the rate of business
investment in recent years.

It has also been suggested that interest rates have been driven
up in countries that allow interest rate deductions for tax purposes, while
taxing interest and dividend income. The demand for funds is increased by
the interest subsidy, while the supply of financial capital is dampened by
the tax on "unearned" income. It is widely believed that economic growth
has been negatively affected by the high interest rates in recent years.
Eckstein (1980) shows that the rental price of capital rose rapidly in the
1970's due to the response of long-term interest rates to inflation. This
had a substantial negative effect on investment in plant and equipment.
The mean elasticity of investment in plant and equipment in 24 industries
with respect to the rental price of capital was found to be 0.8. Inflation
rates were higher in high-tax countries in seven out of the ten pairs
during the decade.

C. Employment and Labor Productivity

Nonagricultural employment rose more rapidly in low-tax
countries. So did productivity (GDP per member of the labor force), by

5.0 percent a year on the average compared with a decline of 0.1 percent in high-tax countries. This latter figure probably reflects growing unemployment and underemployment but data are lacking for most countries.

Policies providing exporters with duty-free imported inputs facilitated the growth of exports in low-tax countries, particularly labor-intensive manufactures where competitive material costs are critical for successful penetration of international markets. This accelerated the transfer of underemployed agricultural workers into more productive jobs in industry and related services. Employment and productivity also responded positively to higher levels of investment noted earlier, spurring the process of capital deepening (higher capital/labor ratios) and allowing wider adoption of modern technology. Our regression analysis of labor productivity growth against total taxes gives a coefficient of -0.28, significant at the 1 percent level. The highest coefficients among the individual taxes are -0.80 for corporate tax, -0.64 for domestic taxes on goods and services and -0.58 for foreign trade taxes.

Productivity has also been raised through education and training. Government expenditure on education increased faster (in constant dollars per capita) in low-tax countries in five out of the six pairings for which data are available. It actually declined in three high-tax countries--Peru, Uruguay, and Zambia. Moreover, growth-promoting strategies encourage individual families to contribute to the cost of their members' education directly, because better-paying jobs are created rapidly. George Psacharopoulos (1980) has shown that private returns to education are high in several countries. Similarly, faster growing markets induce firms to finance their own training programs.

In high-tax countries, on the other hand, high tariff protection, mostly on finished goods, often removed the competitive stimulus for efficiency in the production of domestic substitutes and frequently led to failure to achieve economies of scale in areas of potential comparative advantage. This has been recognized by trade and fiscal experts. For instance, Aguirre, Griffith and Yucelik (1981), in their review of African experience, state that the mixing of revenue and protective functions has led to excessive levels of protection, resulting in damaging effects on resource allocation. In Zaire, for example, import duties represented 21-28 percent of the total value of imports during the 1970s, compared with 6-10 percent in Malawi. The standard rate was 40 percent in the former, 15-20 percent in the latter. Moreover, a proliferation of exemptions or lower tax rates on imported intermediate goods and capital goods has meant that the effective protection of import substitutes is a good deal higher than immediately apparent protection. This is particularly true for industries producing batteries and cosmetics, and for assembly plant enterprises where the nominal tariff on the imported final product is high and the share of domestic value added tends to be low. Paradoxically, efficiency in some import-substitution industries has also been undermined by smuggling which is often rife in countries with high tariffs and quantitative controls on imported consumer goods. Smuggling reduces demand for domestic production and can be a major cause of under-utilization of plant capacity and consequent waste of capital. Low capacity-utilization rates and high incremental capital/output ratios have been noted frequently in the reports of international agencies. Manufacturing output grew more slowly in high-tax countries in all but one of the pairs

(Cameroon/Liberia), averaging only 1.5 percent annually compared with 9.1 percent in low-tax countries. In the U.S. it averaged 2.9 percent during the decade.

A further consequence of distorted tariff structures is that the domestic production of essential food items has been discouraged by negative effective protection resulting from low or zero nominal duties on imported food and high domestic value added, combined with overvalued currencies which, in effect, subsidize imports. Agricultural output growth averaged 3.1 percent in low-tax countries compared with 1.5 percent in the high-tax group, although there were obviously other factors involved, including pricing policy and climatic conditions.

Employment growth has been retarded in some high-tax countries by payroll and sales taxes, which have pushed up the cost of labor. In Zambia, for instance, sales and excise taxes on cigarettes, beer, and gasoline reached 10.5 percent of GDP in 1978. The bargaining power of workers with scarce skills allowed them to demand increased wages to compensate for the higher prices of such "luxuries," thus making their products less competitive on world markets and limiting their opportunity to diversify output into manufactures to lessen their dependence on agriculture and mining. The data gathered by the International Labor Office (ILO) show that average monthly earnings in nonagricultural sectors were $164 for Zambians and $738 for expatriates in Zambia in 1976, compared with $129 in Korea which had a per capita income nearly three times that of Zambia.

A similar phenomenon has been noted in industrialized countries. Assar Lindbeck (1982) points out that not only are various types of

indirect taxes shifted onto the prices of final output, but private agents try to compensate themselves, in the form of higher nominal factor prices, for reductions in real after-tax income due to actual or expected tax increases. These first and second round effects have been baptized "tax-shift inflation." Total indirect taxes on goods and services averaged 7.4 percent in low-tax countries and 10.8 percent in high-tax countries. Lindbeck argues that not only increased tax rates, but also high tax rates can contribute to cost inflation. In particular, in societies with high marginal tax rates, very large money wage increases are necessary to achieve even quite modest increases in real disposable income, or to compensate for even quite modest price increases. He also suggests that higher taxes depress output through negative effects on productive effort --- "the ambition to strive for promotion, the willingness to shift from one job or geographical region to another, the desire to invest in human capital."

Our regression results indicate significant relationships between labor force growth and tax levels. For the total tax/GDP ratio, a coefficient of -0.08 is found significant at the 1 percent level. Social security and other payroll taxes have the highest coefficient (-0.19) among the individual taxes, with a t-value of -3.15. The coefficient is -0.06 for personal income tax, but the t-value of -1.28 falls just below the 10 percent level.

In the poorer countries, relatively small differences in the income tax/GDP ratio can have a substantial impact on individual tax burdens and work incentives because its incidence is generally confined to a relatively small group engaged in the modern sector. As Aguirre,

Griffith, and Yucelik (1981) have noted, withholding income tax at source
tends to create a de facto tax bias against employees, particularly
government workers. If wage and salary earners feel that they are being
discriminated against, both productivity and the availability of national
technical manpower may be adversely affected. The tax.bite taken from
relatively low public sector salaries also encourages "moonlighting" by
civil servants in unofficial activities. This slows down the machinery of
government, with negative repercussions on efficiency in the private
sector, especially in economies where licenses and other government
controls are pervasive. Heavy taxation of the professions has also
contributed to the brain drain from developing countries.

There is some evidence from more affluent societies that people
will work more if income taxes fall, but may prefer leisure if taxes rise.
Otto Eckstein (1980) estimates that the elasticity of the labor force with
respect to the personal tax burden is -0.04 in the U.S, indicating that a 1
percent rise in the real tax burden discourages 0.04 percent of U.S.
workers from the labor force. He estimates that a 50 percent increase in
the real tax burden since 1965 has driven 1.9 million from the labor
force. L. Godfrey (1975) reviewed several econometric studies of the
effects of taxation on the supply of labor in OECD countries. He found an
elasticity of substitution between 0.20 and 0.25 for males and between 0.5
and 1.5 for females. An increase in the net wage (resulting from a
decrease in taxes) increases the cost of leisure in terms of foregone
income. This change in the cost of leisure causes individuals to
substitute work for leisure. The substitution effect is a positive one in
that it brings about changes in labor supply in the same direction as the

change in the net (after-tax) wage. Richard Goode (1976) also has

suggested that with high tax rates, labor can be expected to shift toward

occupations and working arrangements that are subject to relatively light

taxation. This may result in a maldistribution of labor in terms of its

contribution to development goals. Assar Lindbeck notes that high tax

rates can foster an "underground economy" where incomes are not reported at

all to the tax authorities and encourage zero-sum games of search for tax

loopholes and profitable financial speculation. Ratios of personal income

tax to GDP were higher in all the high-tax countries except Uruguay.

Personal incentives are of course particularly affected by high marginal

rates. But because of a variety of allowances and the variable incidence

of income tax in most systems, the only macroeconomic indicator available

on the effective burden of this tax is the average ratio. This is still a

useful measure of the magnitude of this particular tax "wedge." An

econometric study conducted by Martin Beenstock (1979) in the United

Kingdom found that taxation also affects the demand for labor by firms. He

estimates that a 1 percent rise in employment surcharges (such as

Selective Employment Taxes and national insurance) eventually has the

effect of reducing employment by about 1.4 percent.

D. __Innovation__

Several studies have shown that a substantial proportion of

economic growth can be attributed to "technical change," in addition to the

contributions of capital and labor inputs. Technical change encompasses

improvements in technology and managerial techniques and product

innovations. Dale Jorgenson (1981) estimates that out of an average annual

growth of US output of 3.5 percent between 1948 and 1976, technical change

accounted for 1.14 percentage points compared with 1.61 percentage points by capital inputs and 0.75 percentage points by labor inputs. The rate of technical change fluctuated considerably during this period however and Jorgenson found that "the pattern of increases and decreases in the aggregate rate of technical change ... is inversely correlated with changes in the price-effective rate of taxation on capital. High effective rates of taxation are associated with low rates of technical change, while low effective tax rates are associated with high rates of technical change."

Lower corporate and personal income taxes provide entrepreneurs with the resources and stimulus to launch new firms and new products and to introduce or develop new technology. In the Republic of Korea, for example, the number of manufacturing establishments rose by 76 percent between 1958 and 1975 and their total employment increased fivefold. This period witnessed a substantial broadening and deepening of the industrial structure. Peter Heller (1981) has shown that, even assuming that none of the incidence of corporation tax is shifted to workers or consumers, the effective burden of direct taxes on the top three income deciles (from which most entrepreneurs are drawn) was only 1.8 percent, 3.6 percent, and 11.7 percent of their total incomes in 1976. Exemptions from indirect taxes and tariffs for exporters also played a critical role in the diversification of the Korean economy. Licensed exporters could also deduct a reserve fund from their taxable income for the development of new foreign markets. Further incentives encouraging innovation in Korea include tax-exemption of royalty payments under technical agreements for a period of five years, an additional 50 percent depreciation allowance for research facilities and a tax credit of 8 percent for investment in

buildings and training facilities for technical development. This credit is increased to 10 percent if locally made machinery and equipment is used in these facilities.

Of course, cause and effect relationships may run in both directions. If a rapid growth momentum is established in response to fiscal and other incentives, incomes rise and new opportunities are created in the domestic market, thus stimulating further growth of output. This, in turn, brings in higher tax revenues and allows government to expand its public services and investment while maintaining tax rates and ratios at relatively low levels.

A rapidly expanding domestic engineering (machine building) industry has provided a strong impetus to technological innovation in countries such as Brazil, Japan, Republic of Korea, and Singapore. This has been encouraged further by favorable tax provisions for this industry. In other countries, however, the emergence of an indigenous capacity for technological development has been held back by the granting of import duty exemptions or rebates to purchasers of imported machinery in other sectors. With overvalued currencies, this has resulted in negative protection for domestic machinery producers and undue dependence on foreign technology, which is often poorly adapted to the needs and factor endowment of the host country. This tendency has been reinforced by cascading sales taxes which penalize subcontracting relationships between independent, specialist producers of engineering components and the machine assemblers. Subcontracting has been a prominent feature of Japanese industrial development. Large-scale, vertically integrated engineering firms, specialized by finished product rather than by process, are a less viable alternative in small, lower income countries.

As Carl Shoup (1981) has stressed, calculations of the net tax burden on a given sector must take into account the ways tax revenue is used. Industry may have benefited in some countries by government-funded research and training programs. But in-house research and in-plant training seem to have been generally more cost-effective than similar activities undertaken by government institutions. The latter tend to be too remote from practical realities of production and marketing. Nestor Terleckyj (1974), using a sample of thirty three industries in the US, found a strong direct effect of privately financed research and development (R&D) on growth of total factor productivity, but no discernible effect by government financed R&D. The contribution of firm-financed R&D to growth of productivity was calculated to be about 0.36 percent. D.C. Mueller (1967) has shown that R&D expenditures are affected by corporate liquidity, which is partly determined by tax incentives available to the firm. Furthermore, since much innovation is embodied in new capital equipment, measures that stimulate investment speed the rate at which the benefits of innovation spread throughout the economy.

V. CONCLUSIONS

The evidence summarized in the preceding pages suggests that tax policy has affected economic performance via two basic mechanisms. First, lower taxes have resulted in higher real (after tax) returns to savings, investment, work and innovation. Higher returns have stimulated a larger aggregate supply of these factors of production and thus raised total output. Second, the focus and types of fiscal incentives provided by low-tax countries appear to have shifted resources from less productive to

more productive sectors and activities, thus increasing the overall efficiency of resource utilization. The reverse seems to be true for some high-tax countries.

Statistically significant negative relationships between taxes and GDP growth, and critical growth determinants (investment, labor supply, labor productivity and exports) were found in our sample of countries. Overall, an increase of 1 percentage point in the total tax/GDP ratio is estimated to decrease the rate of economic growth by 0.36 percentage points. The response seems to be greater in low-income societies, perhaps because they offer wider scope for productivity gains from the spread of modern technology, improvement in skills and intersectoral transfer of labor. Structural and institutional rigidities and higher existing levels of technology and productivity in industrial economies may limit their potential for tax-induced gains. A different sample, drawn from countries in the medium tax ranges, might yield lower coefficients. But it is unlikely that their sign would change, as several independent studies point in the same direction.

The impact on government revenue is also important. Expansion of the tax base allowed low-tax, high growth countries to increase expenditure on government services rapidly. Social indicators for life expectancy and income distribution suggest that the poor shared in the benefits of more rapid growth. It is possible that low-tax countries, being less interventionist generally, devote a higher proportion of their revenue to essential public goods and to services which enhance efficiency as well as welfare. Balassa (1982) has shown that African countries he classifies as "interventionist" experienced significantly higher incremental

capital-output ratios and lower growth rates than did "market-oriented"
African countries during the period 1963-79.

The findings do not imply that tax changes would bring immediate
results. The timing and context of tax reform is probably critical.
Recent experience in the industrial countries indicates that tax cuts may
not stimulate output sufficiently while deflationary monetary policies and
overvalued exchange rates are pulling strongly in the opposite direction;
or when extensive government borrowing to meet large budgetary deficits
"crowds-out" private sector investment by raising real interest rates. Nor
does a global recession provide the most propitious occasion for tax policy
initiatives. Even in more favorable circumstances, the responses of
investors, workers, entrepreneurs, and consumers may take years to take
full effect.

The gestation period for investment is long but the evidence
cited suggests that long-term benefits will accrue. No inferences can be
drawn about the short-term effects of tax changes in any particular
country. It is doubtful if tax cuts could ever serve as a "quick fix" for
a sick economy. A more pragmatic approach for high-tax, low growth
countries might be to seek progressive improvements in the "quality" of the
tax structure. Fiscal incentives may generate faster growth and increased
revenues in the long run if they are focused on areas with high incremental
income yields (such as exports). Further study of many aspects of
tax/growth relationships should be rewarding. But, at least, these
preliminary findings indicate that lower taxes are compatible with a
pattern of development that raises output and reduces poverty
significantly.

REFERENCES

Carlos A. Aguirre, Peter S. Griffith, and M. Yucelik, Tax Policy and Administration in Sub-Saharan Africa (International Monetary Fund, March 1981).

Bela Balassa, "Exports and Economic Growth: Further Evidence," Journal of Development Economics, vol. 5 (1978), pp. 181-89.

Bela Balassa, "Adjustment Policies and Development Strategies in Sub-Saharan Africa, 1973-78" (World Bank, Development Research Department Discussion Paper No. DRD41, November, 1982).

Michael Beenstock, "Taxation and Incentives in the U.K., "Lloyds Bank Review, October 1979, Number 134, pp. 1-15.

Michael R. Darby, The Effects of Social Security on Income and the Capital Stock (American Enterprise Institute Studies in Social Security and Retirement Policy, 1979).

Otto Eckstein, Tax Policy and Core Inflation, A Study Prepared for the Use of the Joint Economic Committee, Congress of the United States (Washington, Government Printing Office, 1980).

Martin Feldstein, "Social Security, Induced Retirement and Agregate Capital Accumulation," Journal of Political Economy, vol. 82 (September/October 1974) pp. 905-26.

Martin Feldstein, "Inflation, Tax Rules and the Accumulation of Residential and Non-residential Capital" (Seminar Paper No. 186, Institute for International Economic Studies, University of Stockholm, November 1981).

Martin Feldstein, "Inflation, Tax Rules and Investment: Some Econometric

Evidence, "Econometrica, vol. 50, No. 4, July 1982.

Martin Feldstein and George Fane, "Taxes, Corporate Dividend Policy and

Personal Savings: The British Postwar Experience," Review of Economics

and Statistics, 1973.

Malcolm Gillis, "Evolution of Natural Resource Taxation in Developing

Countries," (Development Discussion Paper No.126, Harvard Institute

for International Development, December 1981).

Richard Goode, The Individual Income Tax, (Washington, Brookings Institute

1976).

Roger H. Gordon and Dale Jorgenson, "The Investment Tax Credit and

Countercylical Policy," (Cambridge, Massachusetts, Harvard Institute

of Economic Research Discussion Paper No. 373, June 1974).

L. Godfrey, Theoretical and Empirical Aspects of the Effects of Taxation on

the Supply of Labour, (Paris, Organization for Economic Co-operation

and Development, 1975).

Peter S. Heller, "Testing the Impact of Value-Added and Global Income Tax

Returns on Korean Tax Incidence in 1976: An Input-Output and

Sensitivity Analysis," IMF Staff Papers, June 1981, Vol. 28, No.2,

pp. 375-410.

Dale W. Jorgenson, "Taxation and Technical Change," in Ralph Landau and N.

Bruce Hannay. edits., Taxation, Technology and the U.S. Economy (New

York, Pergamon Press, 1981).

Donald B. Keesing, "Trade Policy for Developing Countries" (World Bank

Staff Working Paper No. 353, August 1979).

Assar Lindbeck, "Budget Expansion and Cost Inflation" (paper presented to the American Economic Association Meeting, New York, December 1982).

D.C. Mueller, "The Firm Decision Process: An Econometric Investigation," Quarterly Journal of Economics, February 1967.

James M. Poturba and Lawrence H. Summers, "Dividend Taxes, Corporate Investment and "Q," (National Bureau of Economic Research, Working Paper No.829, December 1981).

George Psacharopoulos, "Returns on Education: An Updated International Comparison," in Timothy King (edit.), "Education and Income" (World Bank Staff Working Paper No. 402, July 1980).

Keith Marsden, Trade and Employment Policies for Industrial Development (Washington, World Bank, 1982).

Carl S. Shoup, "Economic Limits to Taxation," Atlantic Economic Journal, Volume IX, Number 1, March 1981, pp. 9-23.

Vito Tanzi, Taxation and Price Stabilization (International Monetary Fund, October 1981).

Vito Tanzi, Taxation in Sub-Saharan Africa: A Statistical Evaluation (Washington, IMF, October 1981).

Nestor Terleckyj, The Effects of R&D on Productivity Growth of Industries: An Exploratory Study (Washington D.C. National Planning Association, 1974).

Lester C. Thurow, The Zero-Sum Society: Distribution and the Possibilities for Economic Change (New York, Basic Books, 1980).

William G. Tyler, "Growth and Export Expansion in Developing Countries: Some Empirical Evidence," Journal of Development Economics, vol. 9 (August 1981), pp. 121-30.

World Bank Publications of Related Interest

Adjustment Experience and Growth Prospects of the Semi-Industrial Countries
Frederick Jaspersen

This background study for *World Development Report 1981* examines the successful process of adjustment to external "shocks" of the 1970s (rising prices of oil imports, reduced demand for exports, slower economic growth in the OECD countries) in the semi-industrial developing countries. Presents an analytical framework for quantifying the effects of demand management and structural adjustment in forty-two countries, with particular reference to Uruguay, Brazil, Republic of Korea, and Turkey.

World Bank Staff Working Paper No. 477. August 1981. 132 pages (including 3 appendixes).

Stock No. WP-0477. $5.00.

Adjustment in Low-Income Africa
Robert Liebenthal

This background study for *World Development Report 1981* analyzes the adjustment to external shocks during the 1970s made by a group of middle-income and low-income African countries, with particular reference to Kenya, Tanzania, Senegal, and Sudan.

World Bank Staff Working Paper No. 486. August 1981. vi + 56 pages (including bibliography).

Stock No. WP-0486. $3.00.

Aggregate Demand and Macroeconomic Imbalances in Thailand: Simulations with the SIAM 1 Model
Wafik Grais

Focuses on the demand-side adjustments of the Thai economy to lower agricultural growth and to higher energy prices. Discusses policy measures and structural changes that might enable the economy to overcome these problems and continue to maintain high GDP rates of growth.

World Bank Staff Working Paper No. 448. April 1981. 70 pages (including 2 appendixes).

Stock No. WP-0448. $3.00.

An Analysis of Developing Country Adjustment Experiences in the 1970s: Low-Income Asia
Christine Wallich

This background study for *World Development Report 1981* examines low-income South Asia's adjustment to the external shocks of the 1970s, especially those factors that helped make the effects of these external developments less severe in the region than in other parts of the developing world.

World Bank Staff Working Paper No. 487. August 1981. iv + 39 pages (including references).

Stock No. WP-0487. $3.00.

Aspects of Development Bank Management
William Diamond and V. S. Raghavan

Deals exclusively with the management of development banks. The book is divided into eight sections, each dealing with one aspect of management of its problems, and of the various ways of dealing with them.

EDI Series in Economic Development. The Johns Hopkins University Press, 1982. 311 pages.

LC 81-48174. ISBN 0-8018-2571-7, $29.95 hardcover; ISBN 0-8018-2572-5, $12.95 paperback.

Capital Market Imperfections and Economic Development
Vinayak V. Bhatt and Alan R. Roe

World Bank Staff Working Paper No. 338. July 1979. 87 pages (including footnotes).

Stock No. WP-0338. $3.00.

The Changing Nature of Export Finance and Its Implications for Developing Countries
Albert C. Cizauskas

World Bank Staff Working Paper No. 409. July 1980. 43 pages (including 3 annexes).

Stock No. WP-0409. $3.00.

Compounding and Discounting Tables for Project Evaluation
J. Price Gittinger, editor

Easily comprehensible, convenient tables for project preparation and analysis.

The Johns Hopkins University Press, 1973; 7th printing, 1982. 143 pages.

LC 75-186503. ISBN 0-8018-1604-1, $6.00 paperback.

Arabic: World Bank, 1973. (Available from ILS, 1715 Connecticut Avenue, N.W., Washington, D.C. 20009, U.S.A.)

$4.00 paperback.

French: Tables d'intérêts composés et d'actualisation. Economica, 4th printing, 1979.

ISBN 2-7178-0205-3, 36 francs.

Spanish: Tablas de interés compuesto y de descuento para evaluación de proyectos. Editorial Tecnos, 1973; 4th printing, 1980.

ISBN 84-309-0716-5, 380 pesetas.

A Conceptual Approach to the Analysis of External Debt of the Developing Countries
Robert Z. Aliber

World Bank Staff Working Paper No. 421. October 1980. 25 pages (including appendix, references).

Stock No. WP-0421. $3.00.

Development Banks
William Diamond

Operating experiences that serve as a practical guide for developing countries, with a selected list and summary description of some development banks.

The Johns Hopkins University Press, 1957; 5th printing, 1969. 141 pages including 2 appendixes, index).

LC 57-13429. ISBN 0-8018-0708-5, $5.00 (£3.50) paperback.

Development Finance Companies: Aspects of Policy and Operation
William Diamond, editor; essays by E. T. Kuiper, Douglas Gustafson, and P. M. Mathew

The Johns Hopkins University Press, 1968. 130 pages (including appendix, index).

LC-68-27738. ISBN 0-8018-0166-4, $5.00 (£3.25) paperback.

French: Les sociétés financières de développement: quelques aspects de leur politique et de leurs activités.
Available free from the World Bank, Washington, D.C.)

Spanish: Las compañías financieras de desarrollo: algunos aspectos de su política y de sus actividades. Editorial Tecnos, 1969.

500 pesetas.

Development Prospects of Capital Surplus Oil-Exporting Countries: Iraq, Kuwait, Libya, Qatar, Saudi Arabia, UAE
Rudolf Hablützel

This background study for *World Development Report 1981* discusses the production strategies and the development policies of the capital-surplus oil-exporting countries.

World Bank Staff Working Paper No. 483. August 1981. 53 pages (including statistical tables).

Stock No. WP-0483. $3.00.

Developments in and Prospects for the External Debt of the Developing Countries: 1970–80 and Beyond
Nicholas C. Hope

This background study for *World Development Report 1981* analyzes the debt situation and its implications for future borrowing.

World Bank Staff Working Paper No. 488. August 1981. 70 pages (including 2 annexes, references).

Stock No. WP-0488. $3.00.

Energy Prices, Substitution, and Optimal Borrowing in the Short Run: An Analysis of Adjustment in Oil-Importing Developing Countries
Ricardo Martin and Marcelo Selowsky

Develops a short-term model for evaluating the adjustment (particularly, external borrowing) of oil-importing developing countries to the increases in oil prices during the 1970s. Discusses the borrowing strategies that can be expected in the future and the demands that will be made on multilateral institutions.

World Bank Staff Working Paper No. 466. July 1981. 77 pages (including footnotes, references).

Stock No. WP-0466. $3.00.

Exchange Rate Adjustment under Generalized Currency Floating: Comparative Analysis among Developing Countries
Romeo M. Bautista

Examines the experiences of twenty-two developing countries in adapting to the generalized floating of the world's major currencies since 1973 and discusses the implications that currency floating has on policymaking in these countries and indicates directions for further research.

World Bank Staff Working Paper No. 436. October 1980. 99 pages (including appendix).

Stock No. WP-0436. $3.00.

Food Policy Issues in Low-Income Countries
Edward Clay and others

A background study for *World Development Report 1981*. Discusses food distribution—especially its insecurity in the face of external economic pressures and potential conflicts with internal production concerns—in general and with reference to Bangladesh, Zambia, and India.

World Bank Staff Working Paper No. 473. August 1981. vii + 115 pages.

Stock No. WP-0473. $5.00.

A General Equilibrium Analysis of Foreign Exchange Shortages in a Developing Economy
Kemal Dervis, Jaime de Melo, and Sherman Robinson

Examines the consequences of alternative adjustment mechanisms to foreign exchange shortages in semi-industrial economies. Compares devaluation to two forms of import rationing and finds that adjusting by rationing is much more costly in terms of lost gross domestic product.

World Bank Staff Working Paper No. 443. January 1981. 32 pages (including references).

Stock No. WP-0443. $3.00.

NEW

Growth and Structural Adjustment in East Asia
Parvez Hasan

Analyzes the economic performance of the five large market economies of East Asia—Korea, Thailand, the Philippines, Malaysia, and Indonesia—during the last two decades; focuses on the key factors explaining their remarkable economic and social progress; and identifies the main economic issues for the 1980s.

World Bank Staff Working Paper No. 529. 1982. 42 pages.

ISBN 0-8213-0102-0. $3.00.

International Adjustment in the 1980s
Vijay Joshi

A background study for *World Development Report 1981*. Analyzes the macroeconomics of international adjustment. Highlights potential market failures and areas for intervention.

World Bank Staff Working Paper No. 485. August 1982. 57 pages.

ISBN 0-8213-0062-8. $3.00.

The Nature of Credit Markets in Developing Countries: A Framework for Policy Analysis
Arvind Virmani

The central purpose of the paper is to analyze various forms of government intervention in the loan market in terms of their effect on efficiency.

World Bank Staff Working Paper No. 524. 1982. 204 pages.

ISBN 0-8213-0019-9. $5.00.

The Newly Industrializing Developing Countries after the Oil Crisis
Bela Balassa

World Bank Staff Working Paper No. 437. October 1980. 57 pages (including appendix).

Stock No. WP-0437. $3.00.

Notes on the Analysis of Capital Flows to Developing Nations and the "Recycling" Problem
Ralph C. Bryant

A backgound study for *World Development Report 1981*. Summarizes and criticizes the conventional analysis of the interrelations between financial markets in the industrialized countries and capital flows to the developing nations.

World Bank Staff Working Paper No. 476. August 1981. 67 pages.

Stock No. WP-0476. $3.00.

Notes on the Mechanics of Growth and Debt
Benjamin B. King

A practical model to explore the way in which capital inflow from abroad affects economic growth.

The Johns Hopkins University Press, 1968. 69 pages (including 4 annexes).

LC 68-8701. ISBN 0-8018-0338-1, $5.00 (£3.00) paperback.

The Policy Experience of Twelve Less Developed Countries, 1973–1978
Bela Balassa

Uses the methodology applied in the author's "The Newly Industrializing Developing Countries after the Oil Crisis" (World Bank Staff Working Paper No. 473, October 1980) to examine the policy experience of twelve less developed countries in the period following the quadrupling of oil prices in 1973–74 and the world recession of 1974–75.

World Bank Staff Working Paper No. 449. April 1981. 36 pages (including appendix).

Stock No. WP-0449. $3.00.

The Political Structure of the New Protectionism
Douglas R. Nelson

This background study for *World Development Report 1981* presents a political-economic analysis of what has been called the "new protectionism."

World Bank Staff Working Paper No. 471. July 1981. 57 pages (including references).

Stock No. WP-0471. $3.00.

Pricing Policy for Development Management
Gerald M. Meier

Presupposing no formal training in economics, it explains the essential elements of a price system, the functions of prices, the various policies that a government might pursue in cases of market failure, and the principles of public pricing of goods and services provided by government enterprises. It also provides the would-be practitioner with an appreciation of the underlying logical structure of cost-benefit proj-

ect appraisal. To give substance to the applied and policy dimensions, many of the readings are drawn from the experience of development practitioners and relate to such important sectors as agriculture, industry, power, urban services, foreign trade, and employment. The principles outlined are therefore relevant to a host of development problems.

The Johns Hopkins University Press. February 1983. About 304 pages.

LC 82-7716. ISBN 0-8018-2803-1, $35.00 hardcover; ISBN 0-8018-2804-X, $12.95 paperback.

Private Bank Lending to Developing Countries
Richard O'Brien

A background study for *World Development Report 1981*. Describes the evolution of relationships between private banks and developing countries.

World Bank Staff Working Paper No. 482. August 1981. vi + 54 pages (including appendix, bibliography).

Stock No. WP-0482. $3.00.

Private Capital Flows to Developing Countries and Their Determinations: Historical Perspective, Recent Experience, and Future Prospects
Alex Fleming

A backgound study for *World Development Report 1981*. Discusses the nature and determination of recent private capital flows to developing countries. Focuses on those flows passing through the international banks and examines the prospects for and constraints on developing countries' continuing access to the international capital markets.

World Bank Staff Working Paper No. 484. August 1981. 41 pages.

Stock No. WP-0484. $3.00.

Private Direct Foreign Investment in Developing Countries
K. Billerbeck and Y. Yasugi

World Bank Staff Working Paper No. 348. July 1979. iv + 97 pages (including 2 annexes).

Stock No. WP-0348. $5.00.

Short-Run Macro-Economic Adjustment Policies in South Korea: A Quantitative Analysis
Sweder van Wijnbergen

An analysis of the startling reversal of performance of the South Korean economy in 1979 and 1980 compared with the preceding fifteen years, and an exploration of the short-run macro-economic policy options available to Korea in 1981. Highlights the role of commercial banks, foreign capital inflows, and money markets and the use of credit obtained from these sources to finance fixed and working capital.

World Bank Staff Working Paper No. 510. November 1981. iv + 178 pages (including 3 appendixes).

ISBN 0-8213-0000-8. $5.00.

State Finances in India

A three-volume set of papers that explores a range of issues relating to the nature of intergovernmental fiscal relations in India.

Vol. I: Revenue Sharing in India
Christine Wallich

Deals specifically with the principles of revenue sharing in India.

Vol. II: India—Studies in State Finances
Christine Wallich

Examines in detail the implications of revenue sharing for project finance.

Vol. III: The Measurement of Tax Effort of State Governments, 1973–1976
Raja J. Chelliah and Narain Sinha

Attempts to evaluate the tax performance of particular states in terms of the average tax effort of all states.

World Bank Working Paper No. 523. September 1982. vol. I, 85 pages, vol. II, 186 pages, vol. III, 85 pages.

ISBN 0-8213-0013-X. vol. I, $3.00, vol. II, $5.00, vol. III, $3.00.

Structural Adjustment Policies in Developing Economies
Bela Balassa

Examines structural adjustment policies (policy responses to external shocks, such as the quadrupling of oil prices and the world recession of the 1970s) of developing countries. Considers reforms in production incentives, incentives to save and to invest, public investments, sectoral policies, and monetary policies, and comments on the interdependence of the various policy measures and on the international environment in which they operate.

World Bank Staff Working Paper No. 464. July 1981. 36 pages.

Stock No. WP-0464. $3.00.

Structural Aspects of Turkish Inflation: 1950–1979
M. Ataman Aksoy

Inflation has been one of the major problems of the Turkish economy during the postwar period. This paper develops alternative inflation models and analyzes their performance in light of the Turkish experience in order to provide a framework on which a more realistic macro model can be developed.

World Bank Staff Working Paper No. 540. 1982. 118 pages.

ISBN 0-8213-0098-9. $5.00.

Thailand: An Analysis of Structural and Non-Structural Adjustments
Arne Drud, Wafik Grais, and Dusan Vujovic

This study was prepared as a background paper for the preparation of a structural-adjustment loan to Thailand and is a follow-up to a previous paper entitled "Aggregate Demand and Macroeconomic Imbalances in Thailand." Comparative statistics are used, within the framework of a four-sector macroeconomic model, to assess alternative ways of macroeconomic adjustment in the Thai economy. Discusses specifically fiscal policy interventions, manipulations of the exchange rate, and productivity improvements and their

implications in terms of income generation, external deficit, and inflation.

World Bank Staff Working Paper No. 513. June 1982. 93 pages (including appendix).

ISBN 0-8213-0023-7. $3.00.

World Debt Tables

A compilation of data on the external public and publicly-guaranteed debt of 101 developing countries plus eighteen additional tables of private and nonguaranteed debt from the World Bank Debtor Reporting System. Describes the nature, content, and coverage of the data; reviews the external debt of 101 countries through 1981; contains tables on external public debt outstanding, commitments, disbursements, service payments, and net borrowings of 101 developing countries, by country, 1972–1981.

(EC-167/81). December 1982. Annual. About 300 pages.

ISSN 0253-2859. $75.00.

Computer tapes containing the data bases for the World Debt Tables are available from the Publications Distribution Unit, World Bank. The tapes are available to international agencies and official nonprofit agencies of member governments at a nominal fee. For information concerning fees for *other organizations, please write to the addressee listed above.*

Supplements to *World Debt Tables* are issued periodically as information becomes available; the current updates are included with orders for *World Debt Tables.*

Policy Responses to External Shocks in Selected Latin American Countries
Bela Balassa

World Bank Reprint Series: Number 221.
Reprinted from Quarterly Review of Economics and Business. *vol. 21, no. 2 (Summer 1981):131-64.*
Stock No. RP-0221. Free of charge.

Restructuring the World Economy: Round II
Hollis Chenery

World Bank Reprint Series: Number 204.
Reprinted from Foreign Affairs
(Summer 1981):1102-1120.
Stock No. RP-0204. Free of charge.

Risk Assessments and Risk Premiums in the Eurodollar Market
Gershon Feder and Knud Ross

World Bank Reprint Series: Number 220.
Reprinted from The Journal of Finance. *vol. 37, no. 3 (June 1982):679-91.*
Stock No. RP-0220. Free of charge.

WORLD BANK PUBLICATIONS
ORDER FORM

SEND TO:

WORLD BANK PUBLICATIONS		WORLD BANK PUBLICATIONS
P.O. BOX 37525	or	66, AVENUE D'IÉNA
WASHINGTON, D.C. 20013		75116 PARIS, FRANCE
U.S.A.		

Name: _____

Address: _____

_____

Stock or ISBN #	Author, Title	Qty.	Price	Total

Sub-Total Cost: _____

Postage & handling fee for more than two free items ($1.00 each): _____

Total copies: _____ Air mail surcharge ($2.00 each): _____

TOTAL PAYMENT ENCLOSED: _____

Make checks payable: WORLD BANK PUBLICATIONS

Prepayment on orders from individuals is requested. Purchase orders are accepted from booksellers, library suppliers, libraries, and institutions. All prices include cost of postage by the least expensive means. The prices and publication dates quoted in this Catalog are subject to change without notice.

No refunds will be given for items that cannot be filled. Credit will be applied towards future orders.

No more than two free publications will be provided without charge. Requests for additional copies will be filled at a charge of US $1.00 per copy to cover handling and postage costs.

Airmail delivery will require a prepayment of US $2.00 per copy.

Mail-order payment to the World Bank need not be in U.S. dollars, but the amount remitted must be at the rate of exchange on the day the order is placed. The World Bank will also accept Unesco coupons.

The World Bank

Headquarters:
1818 H Street, N.W.
Washington, D.C. 20433, U.S.A.

Telephone: (202) 477-1234
Telex: WUI 64145 WORLDBANK
       RCA 248423 WORLDBK
Cable address: INTBAFRAD
               WASHINGTONDC

European Office:
66, avenue d'Iéna
75116 Paris, France

Telephone: (1) 723-54.21
Telex: 842-620628

Tokyo Office:
Kokusai Building
1-1, Marunouchi 3-chome
Chiyoda-ku, Tokyo 100, Japan

Telephone: (03) 214-5001
Telex: 781-26838