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# Report on the World Bank Research Program—Part II

December 1990

Office of the Senior Vice President, Policy, Research, and External Affairs

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**THE WORLD BANK  
RESEARCH PROGRAM  
1990**

**ABSTRACTS OF CURRENT STUDIES**

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# 1 ADJUSTMENT AND DEBT

## The Political Economy of Agricultural Pricing Policies

Ref. No. 673-64C

This study systematically examined the evolution of agricultural pricing policies and their effects over time on output, consumption, trade, income distribution, resource transfers, and the budget, for 18 countries representing all the World Bank regions. The study examined the impact of both sector-specific policies and economy-wide policies on the agricultural sector. By examining these issues for each country within a common framework, the study sought to identify some guidelines for agricultural pricing policies.

The relationship between short-term and long-term effects of agricultural pricing policies, as well as the role of initial conditions, was emphasized. Political economy aspects of agricultural pricing policies, such as the dynamic interaction between policy decisions and the economic and political forces motivating or reacting to those policy decisions, were also analyzed. Finally, by evaluating the costs and benefits of typical agricultural price policy packages in selected countries, the study attempted to identify alternative policies that achieve the same ends but at lower efficiency costs and to assess the possibilities for their implementation based on the historical experience of administrative feasibility.

The study found that taxation of agriculture in developing countries is principally due to economy-wide (macroeconomic and industrial protection) policies. Many of the taxes do not generate governmental revenue (for example, price controls on food and quantitative restrictions on industrial imports), so that removing them will not create fiscal problems. Agricultural price interventions have not achieved the objectives of improved income distribution, higher growth based on ISI development strategies, or compensation of agriculture through higher public investments. They did, however, stabilize producer and consumer prices.

To be successful, agricultural sector reform must be part of a comprehensive reform of the economy (including of trade and fiscal policy). To avoid a negative effect on stabilization objectives, taxes that have little or no budgetary effect (quantitative restrictions, price controls) should be removed first. In the medium and long term, such reforms will improve the distribution of income because the higher

agricultural terms of trade will lead to higher investment and employment in rural areas, where most of the poor in developing countries live.

The countries selected for the study, the authors (in parentheses), and, in some cases, collaborating institutions are as follows: Argentina (Adolfo Sturzenegger and Wylia Otrera), Fundacion Mediterranea; Brazil (Jose Luis Carvalho and Antonio Brandao); Chile (Hernan Hurtado, Eugenia Muchnik, and Alberto Valdes); Colombia (Jorge Garcia Garcia and Gabriel Montes); Dominican Republic (Terry Roe and Duty Greene); Egypt (Jean-Jacques Dethier); Ghana (Dirck Stryker), Associates for International Resources and Development; Côte d'Ivoire (Achi Atsain, Sylvestre Ehouman, and Allechi M'Bet); Republic of Korea (Pal Yong Moon and Bong Soon Kang); Malaysia (Andrew Lai and Glenn Jenkins); Morocco (Hasan Tuluy and Lynn Salinger), Associates for International Resources and Development; Pakistan (Ijaz Nabi and Naved Hamid); Philippines (Ponciano Intal and John Power); Portugal (Timothy Josling, Francisco Avillez, and Timothy Finan); Sri Lanka (Surjit Bhalla), The Policy Group; Thailand (Ammar Siamwalla and Suthad Setboonsamg), Thailand Development Research Institute; Turkey (Hasan Olgun and Haluk Kasnakoglu); and Zambia (Doris Jansen).

The country studies have been completed. These are being published in the World Bank Comparative Studies series. The main findings, by country, will be published as chapters in three volumes. The findings of a comparative analysis based on the country studies will be presented in two synthesis volumes in late 1990. The main findings will also be presented at a Bank-wide seminar in December 1990 and in a series of seminars in Latin America and Asia.

*Responsibility:* Country Economics Department, Trade Policy Division—Maurice Schiff. With Anne O. Krueger, Duke University; and Alberto Valdes, International Food Policy Research Institute.

*Closing date:* December 1989.

*Reports:*

Krueger, Anne O., Maurice Schiff, and Alberto Valdes. 1988.

"Agricultural Incentives in Developing Countries: Measuring the Effect of Sectoral and Economywide Policies." *World Bank Economic Review* 2(3):255-71.

\_\_\_\_\_. 1990. "Agricultural Incentives in Developing Countries: Measuring the Effect of Sectoral and Economywide Policies." *Entwicklung und Landlicher Raum* (24 January).

\_\_\_\_\_, eds. Forthcoming. *The Political Economy of Agricultural*

*Pricing Policies in Africa and the Mediterranean*. Vol. 3.

Baltimore: Johns Hopkins University.

\_\_\_\_\_. Forthcoming. *The Political Economy of Agricultural Pricing Policies in Asia*. Vol. 1. Baltimore: Johns Hopkins University.

\_\_\_\_\_. Forthcoming. *The Political Economy of Agricultural Pricing Policies in Latin America*. Vol. 2. Baltimore: Johns Hopkins University.

## Macroeconomic Policies, Crisis, and Growth in the Long Run

Ref. No. 673-99

This project attempts to understand the comparative macroeconomic performance of countries avoiding and responding to economic crises, and the relationship between the response to these crises and long-term growth. The research will make it possible to distill a set of generalizations on the nature of crises, the impact of different macroeconomic policies on the resolution of crises, and the impact of different modes of adjustment on long-term growth.

The study focuses on three questions: (1) Why have some countries succumbed to crisis and others have not? (2) How best can countries get out of crisis and return to a viable growth path? (3) What is the relationship between short- and medium-term macroeconomic management and long-term development?

The comparative study approach is used in the study. A macroeconomic history of each country is developed, and different crisis episodes (and their avoidance) are identified. Policies used to deal with the crises are analyzed to evaluate their success or failure in relation to performance criteria. Although no single macroeconomic model is applied to all the countries, the common framework of an open economy macroeconomic model underlies the analysis. Some country studies develop counterfactuals through specific macroeconomic models to identify responses to policy change. Others use the common framework without explicit modeling exercises. From the 17 countries, a synthesis study is being prepared to generalize the country experiences.

Because the country studies are still being finalized, generalizations from comparative country experiences are highly tentative at this stage. But some preliminary conclusions can be drawn. The studies show that economic shocks can have a diversity of origins—and a diversity of responses—and that the choice of policy instruments to deal with the crisis depends on the country's past experience, its ideological positions, and the policymakers' evaluation of the nature of the shock.

Although the studies are not yet complete, some lessons can be drawn from the countries' experiences:

(1) A country must be committed to a noninflationary policy. This does not require a nominal exchange rate

commitment, and usually such an exchange rate commitment is not enough to achieve the objective, although it may help.

(2) Real exchange rate misalignment and variability should be avoided through appropriate nominal exchange rate adjustment, preferably frequent and small, rather than large and discrete, changes.

(3) It is undesirable to have devaluation without appropriate monetary restraint policy and firm commitment to such policy. In general, policy packages involving monetary, fiscal, and exchange rate policies are preferred.

(4) Unsound investment during booms and inflation financing play a role in reducing growth.

The countries selected for study and the authors (in parentheses) are as follows: Argentina (Juan Carlos de Pablo), Brazil (Donald Coes and Marcelo Bianconi), Cameroon (Michael Connolly), Chile (Hernan Cortes), Colombia (Jorge Garcia-Garcia), Costa Rica (Claudio Gonzalez-Vega), Côte d'Ivoire (Jean-Claude Berthelmy and François Bourguignon), India (Vijay Joshi and Ian Little), Indonesia (Bruce Glassburner and Wing Thye Woo), Kenya and Nigeria (Paul Collier, David Bevan, and Jan Gunning), Mexico (Francisco Gil-Diaz), Morocco (Emil Claassen), Pakistan (Nadeem Ul Haque and Mohsin Khan), Sri Lanka (Premachandra Athukorala and Sisira Jayasuriya), Thailand (Peter Warr), and Turkey (James Riedel and Ziya Onis).

*Responsibility:* Latin America and the Caribbean Technical Department, Trade, Finance and Industry Division—Sarath Rajapatirana. With Ian Little, Nuffield College, Oxford University; Max Corden, Johns Hopkins University; and Richard Cooper, Harvard University.

*Closing date:* June 1991.

*Reports:*

Cooper, Richard. 1988. "Macroeconomic Adjustment and Growth." Ohlin Lectures. Stockholm School of Economics.

Corden, W. Max. 1987. "The Relevance for Developing Countries of Recent Developments in Macroeconomic Theory." *World Bank Research Observer* 2(2):171-88. (Also in G. Calvo and others, eds. 1989. *Debt, Stabilization and Development: Essays in Memory of Carlos Diaz-Alejandro*. Oxford: Blackwell.)

\_\_\_\_\_. 1989. "Macroeconomic Adjustment in Developing Countries." *World Bank Research Observer* 4(1):51-64. (Also in M. Scott and D. Lal, eds. 1990. *Public Policy and Economic Development*. Oxford: Clarendon.)

Garcia-Garcia, Jorge, with Lia Guterman. 1988. "Medición del déficit del sector público colombiano y su financiación: 1950-86." *Ensayos Sobre Política Económica* 14. Banco de la República Departamento de Investigaciones Económicas, Bogotá, Colombia.

Gonzalez-Vega, Claudio. 1989. "Debt, Stabilization, and Liberalization in Costa Rica: Political Economy Responses to a Fiscal Crisis." In Philip Brock, Michael Connolly, and Claudio Gonzalez-Vega, eds. *Latin American Debt and Adjustment:*

- External Shocks and Macroeconomic Policies.* New York: Praeger.
- Gonzalez-Vega, Claudio, with V.H. Cespedes and R. Jimenez. 1990. *Costa Rica Frente a la Crisis: Políticas y Resultados.* San Jose: Academia de Centroamérica.
- Gonzalez-Vega, Claudio. Forthcoming. "Trade, International Payments, and Brazil's Economic Growth." *Latin American Research Review.*
- Little, I.M.D., and Vijay Joshi. 1987. "Indian Macroeconomic Policies." *Economic and Political Weekly* 22(February):371-78.
- \_\_\_\_\_. 1989. "Indian Macroeconomic Policies." In G. Calvo and others, eds., *Debt, Stabilization and Development: Essays in Memory of Carlos Diaz-Alejandro.* Oxford: Blackwell.
- \_\_\_\_\_. 1989. "Les Politiques Macroeconomiques Indiennes." *Revue Tiers Monde* 30(October-December):797-821.

### Stopping High Inflation: Four Case Studies, Phases I and II

#### Ref. No. 674-24

Price stability is a precondition for the success of structural adjustment programs. The strategy for stopping inflation in general will depend on the diagnosis of the underlying reasons for inflation as well as on some basic characteristics of the inflation process. This study examines the effectiveness of the orthodox approach for stopping inflation and whether income policies, an integral component of the so-called heterodox stabilization programs, can have a useful role in the programs.

The research is based on an analysis of selected stabilization episodes in Latin American countries and Israel. Starting from the stylized facts in the various orthodox and heterodox stabilization programs considered in the project, the study examines the regularities and differences observed in the various episodes. Attempts are then made to provide an analytical foundation for the outcomes. The study finally explores the implications for design and implementation of stabilization programs.

The study finds that orthodox stabilization policies—policies based on a tight fiscal stance and restrictive domestic credit—are successful for stopping hyperinflation. The success is usually less in countries suffering chronic inflation, where inflation then displays downward rigidity and persistence. The heterodox approach is more effective in the short run. Income policies were a central component for the drastic initial reductions in inflation in the shock programs of the 1980s in Latin America and Israel. The short-run success, however, is the easy part of a heterodox problem. The difficulties and costs usually arise at a later stage when the authorities attempt to sustain the stabilization effort and include overvaluation of the currency and unemployment. The findings of this study will be relevant for stabilization issues in socialist economies.

*Responsibility:* Country Economics Department, Macroeconomic Adjustment and Growth Division—Miguel A. Kiguel, and Latin America and the Caribbean Country Department II—Sweder van Wijnbergen. With Nissan Liviatan, Hebrew University, Jerusalem; Leonardo Leiderman, Tel Aviv University; Raul Ramos Tercero, Banco de Mexico; Enrique Szewach, FIEL, Argentina; Luis Viana, CEDES, Uruguay; and Peter Montiel, International Monetary Fund.

*Closing date:* December 1990.

#### *Reports:*

- Kiguel, Miguel A. 1989. "Inflation in Argentina: Stop and Go Since the Austral Plan." PRE Working Paper 162. World Bank, Washington, DC.
- Kiguel, Miguel A., and Nissan Liviatan. 1988. "Inflationary Rigidities and Orthodox Stabilization Policies: Lessons from Latin America." *World Bank Economic Review* 2(3):273-98.
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- \_\_\_\_\_. 1989. "Some Implications of Policy Games for High Inflation Economies." PRE Working Paper 379. World Bank, Country Economics Department, Washington, DC.
- Kiguel, Miguel A., and Pablo Andrés Neumeyer. 1989. "Inflation and Seigniorage in Argentina." PRE Working Paper 289. World Bank, Washington, DC.
- Leiderman, Leonardo, and Nissan Liviatan. 1989. "Macroeconomic Performance Before and After Disinflation in Israel." PRE Working Paper 311. World Bank, Country Economics Department, Washington, DC.
- Liviatan, Nissan. 1988. "Israel's Stabilization Program: A Three-Year Perspective." PRE Working Paper 91. World Bank, Washington, DC.
- Montiel, Peter. 1988. "Empirical Analysis of High-Inflation Episodes in Argentina, Brazil, and Israel." IMF Working Paper 88/68. International Monetary Fund, Washington, DC.
- Viana, Luis. 1988. "The Stabilization Plan of 1968." Banco Central del Uruguay.
- van Wijnbergen, Sweder, and Tosten Persson. 1988. "Signalling, Wage Controls, and Monetary Disinflation Policy." World Bank, Latin America and the Caribbean Country Department II, Washington, DC.

### Agricultural Supply Response in Sub-Saharan Africa

#### Ref. No. 674-28

Crop supply in Sub-Saharan Africa results from a variety of unique technical socioeconomic systems. Both food and nonfood crops are produced by households that allocate labor and other limited physical resources. While many estimates of country-level aggregate supply exist, little is known about crop-specific responses, particularly

for food crops and for food/nonfood crop interaction. Past models have not been closely tied to salient characteristics of observed systems. By considering these issues, this project will provide estimates of crop-specific and aggregate supply responses with enhanced usefulness for policy analysis.

A microeconomic model of smallholder household production and consumption decisions is extended to incorporate the effects of macroeconomic factors (for example, exchange rates). Time series data are utilized for specific production subsectors, such as mechanized rainfed agriculture in Sudan and smallholders in Malawi. Econometric models are estimated to determine the role of prices, wages, and macroeconomic factors in determining crop choice and the aggregate agricultural supply response.

Results indicate: (1) there is a strong preference for allocation of labor to agricultural activities; (2) expected relative output prices are significant determinants of crop response, and strong cross-crop effects exist; (3) cross-crop interactions between food and nonfood cash crops are substantial; (4) cross-crop interactions between annuals and perennials are substantial; and (5) wages and consumer goods prices affect crop supply choices.

Results are particularly valuable for determining price policy and predicting the effects of projects on relative prices. Given a prediction of a project's impact on relative prices, changes in the mix of crop production can be predicted. Of particular interest should be the use of the model to analyze changes in food relative to nonfood crops and subsistence relative to cash crops.

*Responsibility:* International Economics Department, International Commodity Markets Division—Ron Duncan. With Robert Weaver, Agricultural Economics.

*Closing date:* March 1991.

*Report:*

Weaver, Robert. 1989. "An Integrated Model of Perennial and Annual Crop Production for Sub-Saharan Countries." PRE Working Paper 175. World Bank, Washington, DC.

### **Industrial Competition, Productive Efficiency, and Their Relation to the Trade Regime**

**Ref. No. 674-46**

This project is designed to yield new stylized facts on the effect of changes in a trade regime on industrial competition and efficiency. These findings will help policymakers recognize the conditions under which trade reforms are likely to generate significant intra-industry improvements in performance, and which reforms are likely to yield the largest gains. They will help analysts recognize the circumstances under which trade liberalization will not affect industrial competition and efficiency.

The project will also advance the literature on trade

and efficiency in several ways. First, the analysis tracks changes in market structure and efficiency that take place within countries undergoing trade reforms. The results control for country-specific factors and avoid the criticism common to cross-country studies—that the results basically reflect idiosyncratic performance of a few super-exporters. By looking at intra-industry changes in market structure, the project avoids problems of interpretation inherent in cross-country analyses. Finally, the methodology permits isolation of different types of efficiency changes from one another, and provides a basis for generalization regarding which types of efficiency changes are the most important.

The analysis is based on plant-level data from five countries that have undergone trade regime changes: Chile, Turkey, Morocco, Côte d'Ivoire, and Colombia. Work is broken into two phases. First, nontechnical papers summarize the regime changes that took place, and the associated changes in price cost margins, factor productivity, average scale, and entry and exit rates. The papers will indicate which dimensions of industrial performance adjust most to regime changes, and under what circumstances. Second, technical papers estimate the production technologies and behavioral models of competition, relating each to trade regime. By identifying behavioral relationships between trade regime and efficiency, these papers should help policymakers predict reactions to contemplated reforms. Throughout, special attention is given to econometric issues arising from missing data, errors-in-variables, and the panel format of the data.

The descriptive work of Phase I is nearly complete for Chile and Colombia, but is still under way for the other countries. The studies conclude that, relative to Chile, Colombia has a more restrictive trade regime and a less competitive industrial sector. Moreover, in keeping with the "import discipline" hypothesis, Colombia appears relatively sensitive to marginal changes in the degree of foreign competition. To a greater extent than in Chile, Colombian price-cost margins fall and Colombian factor productivity rises when import penetration increases, controlling for industry effects and other factors. Entry and exit patterns are less responsive to trade regime, although there is some evidence from both countries that increased international competition is associated with reduced net entry rates and increases in average plant size.

Thus far, the results have been used in the dialogue between the Bank and the Colombian government on possible trade reforms. Portions of the findings have been incorporated into a recent World Bank report on the Colombian industrial sector; it is anticipated that findings for other countries will also support operational work as they emerge. As Phase II studies reach completion, they will be disseminated as Bank working papers and academic journals.

*Responsibility:* Country Economics Department, Trade Policy Division—Jaime de Melo and James Tybout (consultant). With Mark Roberts, Pennsylvania State University; James Levinsohn, University of Michigan, Suleyman Ozmumr, Bogazigi University, Turkey; and Dani Rodrik, Harvard University.

*Closing date:* January 1991.

## Currency Management of External Debt

### Ref. No. 674-64C

Fluctuations in cross-country exchange rates have caused major capital gains and losses for countries holding parts of their external debt in currencies other than the US dollar. Such fluctuations complicate interpretation of year-to-year changes in debt, since the fluctuations are not related to standard measures of national income and expenditure. They highlight the fact that many debtor countries are exposed to exchange risk because of such cross-currency fluctuations. There are also other channels through which countries are exposed to exchange risks because of such cross-currency fluctuations. Composition of production and expenditure rarely match in any country, even if the aggregate levels are close. The differences are made up through international trade. The net trade position with any individual country is often unbalanced. This implies that relative price changes between trading partners may have substantial income effects on the debtor country under consideration. Empirical work on exchange rates and prices widely supports the view that relative prices are influenced by nominal exchange rate fluctuations.

Exposure to exchange risk raises the question whether active management of the external debt currency composition could help reduce exchange risk exposure. Existing work suffers from several defects. First, it has largely focused on management of Central Bank debt and assets, not liabilities. Net debt (total debt minus foreign debt) is the relevant variable from the welfare point of view. This deficiency is simple to remedy. Second, existing work has looked at currency management of debt (reserves) in isolation, attempting to derive a portfolio strategy that minimizes the variance of the rate of return expressed in an arbitrary vehicle currency (typically the dollar) subject to a constraint on the expected value of the rate of return. The relationship of debt to exchange risk exposure through international commodity trade has not been explored.

It is easy to tell, with the benefit of hindsight, what an optimal currency composition of external debt should have been. Capital gains and losses due to exchange rates could have been avoided by matching in the right fashion the currency composition of external liabilities with the effective currency composition of cash flows. But such hindsight does not provide practical policy rules on how a country, given its external debt situation, can hedge the

economy against future exchange movements.

This study developed a framework to assess the optimal currency composition of a country's external debt taking into account exchange risk exposure through commodity trade and the exposure arising directly out of the currency composition of the debt itself. To what extent can the composition of debt be altered to achieve insurance against terms of trade shocks? While theoretical work is needed, the ultimate aim of the study was practical: What rules can be used to manage a country's currency composition of external debt? The framework was then applied to two actual case studies, Turkey and Indonesia.

The study consisted of five phases: (1) development of the model that captures the determinants of an optimal currency composition of a nation's external liabilities; (2) analysis of the current structure of Indonesia's and Turkey's external debt; (3) analysis of the effects of exchange rate and commodity price movements on Indonesia's and Turkey's debt; (4) derivation of the optimal currency composition of external debt for Indonesia and Turkey; and (5) recommendations to the governments of Indonesia and Turkey regarding their external liability management in the short and long term.

The empirical findings are that optimal currency portfolios can result in substantial risk reduction as movements in the country's terms of trade influence the effect of currency movements on their debt service. To the extent that the relationship between terms of trade and exchange rates is stable, a successful risk-minimizing strategy can be pursued. This was the case for Indonesia, but less so for Turkey.

The study concluded that there is some scope for some developing countries to change their liability composition to reduce the impact of external shocks. However, the instability of important relationships can make the required changes volatile over time. The study's answers serve to mitigate some of the concerns in the development community and the Bank over the impact of external uncertainty on countries. The study also provided much of the strategic underpinnings for the recent work in the Bank on financial technical assistance.

The findings have been disseminated at the Canadian Econometric Study Group in Bariff, Canada, in October 1988; at the Central Bank, Ankara, Turkey, in September 1989; and at the World Econometric Society in Barcelona, Spain, in August 1990.

*Responsibility:* International Economics Department, Debt and International Finance Division—Stijn A. Claessens, and Latin America and the Caribbean Country Department II, Country Operations Division—Sweder van Wijnbergen. With Ken Kroner, University of Arizona.

*Closing date:* September 1989.

*Reports:*

Claessens, Stijn A. 1988. "The Optimal Currency Composition of

External Debt." PRE Working Paper 14. World Bank, Washington, DC.

Kroner, Ken, and Stijn Claessens. 1989. "Improving the Currency Composition of External Debt: Applications in Indonesia and Turkey." PRE Working Paper 150. World Bank, Washington, DC.

### Response of Firms in Developing Countries to a Change in Trade Regimes: The Export Subsidy *cum* Import Tax in Côte d'Ivoire

#### Ref. No. 674-68C

As a member of the West African Monetary Union, Côte d'Ivoire's currency is linked to the French franc at a fixed parity that has not changed since the late 1950s. As Côte d'Ivoire's terms of trade deteriorated in the early 1980s, the government adopted, with the support of the World Bank, a new program consisting of an increase in import tariffs coupled with export subsidies of equal magnitude. This project attempted to assess the likely effects and achievements of this program.

The approach taken in this study was a partial equilibrium micro analysis, modeling firm behavior and estimating output, domestic demand, and export responses to exogenous price and demand shocks. The estimated supply elasticities provided information on the potential response of firms to the subsidy program. The estimated domestic demand price elasticity provided information on the magnitude of the decline in domestic demand as the price increases due to the tariff increase and the subsidy. The increase in export included both the additional output and the net decline in domestic consumption. Firm-level data of a panel nature was used in the empirical work.

The objective of the research was to provide empirical evidence on export and output supply responses that could inform policy discussions on the tariff *cum* subsidy program introduced in Côte d'Ivoire in 1986. The main result was that manufacturing producers are able to expand their exports in the short run in response to an increase in export prices. However, most of this expansion comes at the expense of sales in the domestic market. The net short-run output and employment responses are small. A second result was that the domestic supply curve is much more sensitive to price changes than the export supply function. This implies that any exogenous shocks that lead to an increase in domestic demand, such as an increase in import prices, would have a sizable effect on domestic sales and output and an opposite effect on exports. Finally, increases in export prices alone were estimated to have a much smaller effect on output and employment than would increases in both export and import prices, as would occur in a devaluation or in the tariff *cum* subsidy program.

As the success of adjustment programs is predicated on supply response, the finding that exports do respond is

important. The finding that, in the short run, much of the export supply response comes from a substitution effect away from the domestic market suggests that generating an export response is not sufficient to increase output and employment. This implies that the adjustment process may take longer than expected and that new investment is necessary to resume growth. The estimation procedure used in the paper could be applied in other countries with similar data to yield quantitative estimates of the likely responses.

The findings were presented at the Africa Economics Workshop in Nairobi in May 1990 and at a Bank seminar in the summer of 1989.

*Responsibility:* Population and Human Resources Department, Welfare and Human Resources Development Division—John Newman. With Victor Lavy, Hebrew University, Israel.

*Closing date:* October 1989.

#### *Reports:*

Lavy, Victor, John Newman, and Raul Salomon. "The Response of Firms to a Change in Trade Regimes: The Export Subsidy *cum* Import Tax in Côte d'Ivoire." World Bank, Population and Human Resources Department, Washington, DC.

Newman, John, Victor Lavy, and Philippe de Vreyer. 1990. "The Response of Firms to Relative Price Changes in Côte d'Ivoire: The Implications for Export Subsidies and Devaluations." Processed.

### Evaluation of Tax and Pricing Policies Toward Perennial Crop Producers

#### Ref. No. 674-77C

Many developing countries are heavily dependent on perennials for export and tax revenue, leading to a close nexus between the state of the economy and the health of the perennial sector. Especially noteworthy is the dependence of IDA countries on coffee and cocoa. The shares of world prices going to producers and to the government is a critical issue, and the question of the appropriate export tax on these crops is one of the main issues discussed in adjustment packages. Prior to the report produced in this research project, there was little solid economic analysis applied to this question.

The project addressed the task of constructing and applying a flexible framework for evaluating the impact of changes in pricing policies for perennial crops. A computerized model was constructed that examines the impact of changes in producer prices on the government and the producers under alternative assumptions about exchange rates, productivity growth, input costs, and so forth.

The approach of the research was to construct a computerized model using the GAUSS programming language. This model embodies many of the real-life complexities, in particular the dynamics of production and

the interaction between the world price and domestic production for cocoa.

The computerized framework is capable of simulating the timepaths of cocoa and coffee prices, producer revenues, and government revenues to the year 2000. The framework is flexible and permits the user to vary the assumptions underlying any scenario simulated.

The base "no change" scenario is characterized by massive deficits on the government cocoa account. Under the assumptions of the model, a 40 percent cocoa price reduction and 10 percent coffee price reduction would eliminate the government deficit by the year 2000 at unchanged exchange rates. To generate positive tax revenue, the cuts would have to be larger.

The framework should find application in structural adjustment packages. The software provides a basis for the development of similar frameworks for other countries and crops.

The detailed findings of the research are presented in a comprehensive Bank report. A shorter version has been submitted for publication to the *World Bank Economic Review*.

*Responsibility:* International Economics Department, International Commodity Markets Division—Ron Duncan, Takamasa Akiyama, Panayotis Varangis, and Suan Tan. With Pravin Trivedi, Indiana University.

*Closing date:* December 1989.

### Household Labor Supply Response to Economic Change

#### Ref. No. 674-87C

This project was the first phase of a two-phase research project. The overall objective of the larger project was to measure the supply responses of households to price changes that arose from structural adjustment programs and external shocks. One of the major ideas behind structural adjustment is that an increase in incentives will increase the supply of work effort and, thus, output. Estimates of the supply responses help quantify the gains from structural adjustment programs.

The disadvantages of structural adjustment programs consist mainly of reducing the welfare of certain groups in the population. The project indicated to what extent households can be expected to maintain their income levels by increasing their labor supply. This information not only will help ascertain whether the aims of a program are sufficient to outweigh its losses, but also whether government action is needed to ameliorate the harmful effects through special assistance programs or by gradual introduction of the structural adjustment.

The project's concentration on labor market adjustment was motivated by the fact that, particularly with tree crops in rural households, adjustment in output level and

mix can be expected to take place over an extended period. In contrast, it is likely that changes in labor supply and allocation will provide an earlier indication of household responses to changed incentives.

The approach used was microeconomic: looking at decisions of individuals and households. Using panel data from the Living Standards Measurement Survey (LSMS) of Côte d'Ivoire, individual household division price indices were constructed to reflect the relative importance of different crops in each household's total output. An econometric model was then specified to estimate how changes in labor supply are affected by the changes in price.

The first phase demonstrated the feasibility of using household-specific price indices to estimate price effects from only two years of data and the value of using panel data to estimate dynamic models of choice that allow for differences in experience, opportunities, and preferences. Important changes were identified in the level and intensity of work effort during 1985-86 in Côte d'Ivoire. In particular, labor supply appears to have increased in rural areas between 1985 and 1986.

The reports listed below were presented at a Welfare and Human Resources Division Seminar in July 1989, at the World Bank Conference on Labor Markets under Structural Adjustment in Warwick, England in August 1989, and at the World Bank Conference on Developing Countries' Labor Markets in Toronto, Canada in November 1989.

*Responsibility:* Population and Human Resources Department, Welfare and Human Resources Division—John Newman. With Rob Alessie, Paul Baker, Richard Blundell, Chris Heady, and Costas Meghir, University College.

*Closing date:* March 1990.

#### *Reports:*

Alessie, Rob, Paul Baker, Richard Blundell, Christopher Heady, and Costas Meghir. Forthcoming. "The Working Behavior of Young People in Rural Côte d'Ivoire: Evidence from the LSMS Panel." *World Bank Economic Review*.

Blundell, Richard, Christopher Heady, and Costas Meghir. Forthcoming. "Labor Markets in an Era of Adjustment: The Case of Côte d'Ivoire." In R. Kanbur and D. Mazumdar, eds., *Labor Markets in an Era of Adjustment*.

### Costs and Benefits of Market-Based Debt Reduction

#### Ref. No. 674-89C

This research had two primary goals: to review and consolidate the recent academic literature on market-based debt reduction and to bridge the gap between analytical models and tools that are amenable to specific policy recommendations.

The academic literature has provided a host of reasons for and against market-based buybacks of external debt by indebted countries. But there was no consensus on the benefits that debtors could derive from such schemes. The Bulow and Rogoff critique of such operations loomed large; Sachs was advocating buybacks associated with an energetic bargaining stance; and Williamson and Cline were emphasizing the merits of the market approach. Finally, the financial engineering became so complex that simple economic intuition was lost.

The first part of the study consolidated the arguments used by these authors in a unified framework. This will allow an economist to perform a truly case-by-case analysis of the costs and benefits of buybacks. In this part, the emphasis was on the characteristics of the debtor country.

The second part of the study innovated by considering the menu approach as a means of taxing the banks that gain from market-based debt reduction. It concentrated on differences among banks and showed how to construct a menu that leaves the banks at their initial status quo pay-off level. It reconciled the arguments of Sachs with those of Williamson and those of Bulow and Rogoff. The study also derived and estimated operational concepts such as the Debt Value Function and the Debt Reduction-New Loans Frontier that can be extremely helpful in evaluating menu-driven debt restructuring agreements.

The benefits and costs of market-based schemes differ depending on the bargaining strengths of the debtor country and the banks. Buybacks can be valuable when negotiation cost and the costs of default are large and when there are no valuable investment opportunities in the debtor country. The study also showed that there can be gains from a market menu of options adapted to the differences among banks.

The tools that were developed will be extremely helpful for both debtor governments and the Bank. For the debtor, a framework is provided with which to evaluate the proposals made by commercial banks and to compute whether a better deal can be obtained. For the Bank, the framework allows a concrete evaluation of burden-sharing. Equally important are the study's ideas about how to "leverage" the Bank's financing for debt reduction operations so that the new official loans ultimately benefit largely the debtor rather than the commercial banks.

The findings were disseminated through a seminar at the Bank in May 1990 and at the Economist Training Course on debt management offered by the Debt and International Finance Division in November 1989.

*Responsibility:* International Economics Department, Debt and International Finance Division—Stijn Claessens and Ishac Diwan. With Paul Krugman and Kenneth Froot, Massachusetts Institute of Technology.

*Closing date:* November 1989.

#### Reports:

- Claessens, Stijn, and Ishac Diwan. 1989. "Market-Based Debt Reduction." In Ishrat Husain and Ishac Diwan, eds., *Dealing with the Debt Crisis*. Washington, DC: World Bank.
- Claessens, Stijn, Ishac Diwan, Kenneth A. Froot, and Paul R. Krugman. Forthcoming. *Market-Based Debt Reduction for Developing Countries: Principles and Prospects*. Policy and Research Series 16. Washington, DC: World Bank.

### Currency, Commodity Price, and Interest Rate Risks

#### Ref. No. 674-94C

Increased volatility in interest rates, exchange rates, and commodity prices have adversely affected the ability of many developing countries to service their debt. Lack of diversification and imperfectly matched expenses and revenues have seriously affected income and welfare levels of many of these countries.

Recent developments in the international financial and commodity markets have shown the importance of frameworks for managing exposure to interest rate, exchange rate, and commodity price risks, and of devising practical policy rules for managing these risks.

The aim of this project was to highlight the interaction of currency, interest rate, and commodity price risks and to come up with optimal hedging rules for a governmental budget and for a firm that are dependent on minerals and fuels. While some theoretical work was necessary, the ultimate aim of the study was practical: to develop rules that can be applied in practice for all World Bank financing related to commodities. A pilot case study, covering commodity-producing firms and the government budget in Papua New Guinea, was chosen to this end.

The project developed an economic model that captures the important determinants of the joint currency, commodity, and interest hedging decision. The model was designed to allow derivation of practical policy rules at a micro- and macro-level. The next step was the derivation of practical short- and long-term hedging strategies for the firm or government budget involved, taking into account the constraints the local and international financial markets impose. These optimal strategies will be disseminated to the firms involved and to the government of Papua New Guinea.

The answers obtained were that there are, in theory, substantial benefits to be obtained from treating these risks in an integrated fashion, but that, in practice, these gains are more difficult to substantiate, given the instability of relationships between commodity prices, exchange rates, and interest rates. This implies that a nonintegrated approach to these three risks can be justifiable in some cases. In general, optimal portfolios of external liabilities and optimal risk management strategies will consist of debt in

different currencies and commodity-linked bonds, and a mixture of short-term hedging instruments.

The study was used as an input for the work of the newly established Commodity Risk Management and Finance Unit. Given the rapidly developing markets for commodity risk management and the Bank's technical assistance in commodity exchange and interest rate management, the answers were highly relevant for Bank operations and development policy in general.

The study's findings were included in the Economist Training Course in Baltimore in November 1989.

*Responsibility:* International Economics Department, International Commodity Markets Division—Theophilus Priovolos, and International Economics Department, Debt and International Finance Division—Stijn Claessens.

*Closing date:* July 1989.

*Reports:*

- Claessens, Stijn. "Integrating Commodity and Exchange Risk Management: Implications for External Debt Management." In Theophilus Priovolos and Ron Duncan, eds., *Commodity Risk Management and Finance*. Oxford: Oxford University Press.
- Claessens, Stijn, Toshi Masuoka, and Theophilus Priovolos. 1990. "Financial Risk Management in Papua New Guinea." World Bank, International Economics Department, Washington, DC.
- Qian, Ying, and Jonathan Coleman. 1990. "Optimal External Debt Structure: The Case of Papua New Guinea." World Bank, International Economics Department, Washington, DC.

### Consequences of Temporary Trade Shocks in Developing Countries

Ref. No. 674-98

Most developing countries experience substantial "shocks" or movements in the world prices of their main exports and imports from time to time. When such a shock occurs, the affected parties usually have enough information about its causes to make a judgment about its likely duration. If a sizable increase in the world price of coffee were related to a severe frost in the producing area of southern Brazil, for instance, the judgment might be that the higher price would last only one or two years. A decline in the price of another commodity, however, might be perceived as a change not likely to be reversed soon because of a continuing imbalance between world production and consumption as well as the substitution of other materials due to technological advances. When a price movement is perceived as temporary, people react differently than if it is seen as permanent. A temporary upswing in the world price of a major export commodity, causing a significant rise in producer incomes, should induce rational economic agents to save an exceptional share of their "windfall." The institutional arrangements and policies in place when the shock occurs may discourage such rational

behavior, however, or make it difficult for savings to flow toward efficient investments. This research project is designed to identify the kinds of economic policies that are conducive to the maximization of country gains from positive shocks, reducing wastage and destabilizing effects, and to the minimization of losses from negative shocks.

The country researchers have been working for many months to prepare detailed descriptions and analyses of shock episodes. The essence of the prescribed methodology is the careful elaboration of economic scenarios, with and without external shocks, to permit quantification of shock effects on income, savings, trade, and growth. Work done on Kenya is being used as a prototype for the other countries.

A conference is scheduled for September 1990, at Oxford University, to review and discuss the draft country papers and to identify country- and commodity-specific findings and general policy implications of the research effort. It is expected that the project will yield several publications, including a book and journal articles. Policy highlights will also be presented to Bank staff and others through dissemination conferences.

*Responsibility:* Country Economics Department, Macroeconomic Adjustment and Growth Division—Gary L. Hyde, and Africa and Latin America and the Caribbean Country Departments—Chief Economists. With David Bevan and Paul Collier, Oxford University; Jan Gunning, Free University, Amsterdam; J.A. Morales; J.B. Knight; S. Derarajan; C. Gonzalez-Vega; S. Appleton; J.R. Harrington; M.K. Gavin; J.P. Azam; T.A. Oyejide; G. Chambas; R. Hausmann; and J. Aron.

*Closing date:* June 1991.

*Reports:*

- Bevan, D.L., P. Collier, and J.W. Gunning. 1987. "Consequences of a Commodity Boom in a Controlled Economy: Accumulation and Redistribution in Kenya, 1975-83." *World Bank Economic Review* 1(3):489-513.
- \_\_\_\_\_. 1989. "Fiscal Response to a Temporary Trade Shock: The Aftermath of the Kenyan Coffee Boom." *World Bank Economic Review* 3(3):359-78.

### Inflation, Price Controls, and Fiscal Adjustment in Africa

Ref. No. 675-08C

This research project addressed the concerns of many developing countries over the inflationary consequences of adjustment programs due to exchange rate devaluation and other price adjustments. The research examined whether the programs should be designed differently to take account of these concerns.

The research involved in-depth case studies for Ghana, Malawi, Zimbabwe, Côte d'Ivoire, and Algeria. The work involved close cooperation with the World

Bank's country economists and researchers in the country's central bank or ministry of finance. The Zimbabwean case study is completed and shows that the concerns over the inflationary consequences are very valid, requiring a slower, managed decontrol process. The Ghana study has significant implications for managing reform in Africa. It shows that in countries with parallel markets, official devaluation lowers inflation and leads to a deceleration of the parallel exchange rate if the fiscal deficit improves. The case studies on Algeria, Malawi, and Côte d'Ivoire are being written.

*Responsibility:* Development Economics, Office of the Vice President—Ajay Chhibber, and Africa Country Department VI, Country Operations Division—Michael Walton. With Andrew Feltenstein, Kansas University; Nemat Shafik, University of Oxford; Graham Chipade, Malawi Ministry of Finance; Philip Nthinda, Malawi Ministry of Planning; Mr. Cisse, University of Abidjan; and S. Devarajan, Harvard University.

*Closing date:* June 1990.

### Trade Policy Simulation Package

#### Ref. No. 675-18C

This study aimed to develop a short- to medium-run model to analyze the resource pull and macroeconomic implications of changes in trade policy (level of quantitative restrictions, tariffs, and export taxes). The simulation package is to provide guidance on the likely economic effects of trade reforms under a variety of assumptions about the functioning of goods factor and asset markets.

The project developed a model that combines explicit microeconomic optimizing behavior characteristics of computable general equilibrium models with asset portfolio behavior of macroeconomic models in the tradition of Tobin. The project will result in a user-friendly simulation package that is easily used on microcomputer.

*Responsibility:* Country Economics Department, Trade Policy Division—Jaime de Melo. With François Bourguignon and Akiko Suwa, Ecole Normale Supérieure, Paris.

*Closing date:* June 1990.

#### *Report:*

de Melo, Jaime, François Bourguignon, and William Branson.

Forthcoming. "Adjustment and Income Distribution: A Counterfactual Analysis." *Journal of Development Economics*.

### Poverty and the Social Dimensions of Adjustment in Côte d'Ivoire: A Policy-Oriented Analysis

#### Ref. No. 675-26

While adjustment programs of the early 1980s may have succeeded in their internal and external balance

objectives, the design of these programs should have taken into account the protection of the poor and the poor's participation in the growth process. Adjustment programs of the 1990s must integrate a concern for poverty and the social dimensions of adjustment. But before this can be done, a detailed analysis of how the poor interact with the processes of adjustment is required. The object of this research project is to provide just such an analysis, using Côte d'Ivoire as a case study.

Côte d'Ivoire has undergone a classic pattern of stabilization followed by adjustment in the 1980s. Each of the three World Bank adjustment loans has put progressively greater emphasis on structural adjustment issues and poverty consequences.

The project's central task is to trace through the income, expenditure, and basic needs fulfillment of the poor in Côte d'Ivoire during the second half of the 1980s. Côte d'Ivoire has a rich data base from which links and detailed disaggregations can be drawn. The Living Standards Measurement Survey provides household-level data on income, expenditure, employment, health, housing, agriculture, education, and so forth for 1985-88.

The project analysis will use the full run of data for the four years to identify persistent patterns of poverty. The data also contain three two-year panels (1985/86, 1986/87, and 1987/88) since half the sample households are the same for adjacent years. This allows the examination of variations in the income, expenditure, and basic needs fulfillments of the same households over three periods. These data can address the question of whether, and in which groups, poverty persists.

A central tenet of the project is that the output of the project be available in a timely fashion and in usable form to Ivorian and Bank policymakers. The project will work closely with a specially formed group of Ivorian policymakers and analysts in the context of the social dimensions of adjustment national project. The research output will be fed into government deliberations through two major seminars in Abidjan. The project will produce working papers as different research tasks are completed. A summary volume will also be produced, presenting papers and the summaries of the Abidjan meetings.

*Responsibility:* Africa Technical Department, Social Dimensions of Adjustment Division—Christiaan Grootaert. With R. Kanbur, G. Pyatt, and J. Round, University of Warwick; A. M'bet and J.Y. Yao, Centre Ivoirien des Recherches Economiques et Sociales.

*Closing date:* February 1992.

### Macroeconomic Aspects of Foreign Exchange Markets

#### Ref. No. 675-30

This project analyzes the macroeconomic impact of

multiple exchange rate systems and their implications for structural adjustment programs. In particular, the following will be explored: the most common circumstances that lead to the adoption of multiple exchange rates; the conditions required for a successful unification of the foreign exchange market; and the implications of the use of multiple exchange rates for inflation, monetary policy, the current account, the overall balance of payments, domestic interest rates, the real exchange rate, and budget deficits.

Case studies for Turkey, Mexico, Ghana, Sudan, Zambia, Tanzania, Argentina, and Venezuela will be generated using a common framework that exploits the fundamental macroeconomic similarities between alternative multiple exchange rate systems. This common framework increases the scope for learning from cross-country and cross-regional comparisons. For example, the experience with dual markets in Latin America has important lessons for the determinants of the parallel rate and the pitfalls associated with unification for African economies with black markets. The African and Middle Eastern experiences with black markets have implications not only for Latin American black markets, but also for unification of dual systems and for the operating characteristics of multiple markets in which some commercial transactions occur at the parallel rate.

*Responsibility:* Country Economics Department, Macroeconomic Adjustment and Growth Division—Miguel A. Kiguel and Ibrahim El-Badawi, Eastern Africa Department, Country Operations Division—Yaw Ansu. With José Saul Lizondo, International Monetary Fund and University of Tucuman, Argentina; Stephen O'Connell, University of Pennsylvania; Steve Kamin, Federal Reserve Board; Sule Ozler, University of California, Los Angeles; Graciela Kaminsky, University of California, San Diego; Ricardo Hausmann, IESA, Venezuela; and Janine Aron, Oxford University.

*Closing date:* December 1992.

## Macroeconomics of Public Sector Deficits

### Ref. No. 675-31

Reduction of the public sector deficit is usually at the center of adjustment programs. But analysis often lacks an explicit framework to evaluate how much or what kind of fiscal adjustment is necessary. This project aims to develop, refine, and apply a simple theoretical framework to relate fiscal deficits to key macroeconomic variables. Specific research questions to be addressed include: How have fiscal deficits affected inflation? How have they affected interest rates and, consequently, investment? And how have they affected the real exchange rate? This project is part of the Macroeconomic Adjustment and Growth Division's broader work on the causes and consequences of macroeconomic imbalances.

A common analytical framework and methodology will be applied to 10 country case studies (Argentina, Chile, Colombia, Côte d'Ivoire, Ghana, Mexico, Morocco, Pakistan, Thailand, and Zimbabwe). Empirical macro models are used in each country study to analyze the deficit—its decomposition, its effects on key macro variables, and its financing.

Preliminary findings were presented in a workshop held in Washington, DC, July 11-13, 1990. Individual country studies were presented at the workshop and were open for discussion with Bank economists and developing country policymakers. Empirical results and findings from the case studies provide a simple analytical framework for stabilization and adjustment programs. A conference volume and journal articles will be published.

*Responsibility:* Country Economics Department, Macroeconomic Adjustment and Growth Division—William Easterly, Klaus Schmidt-Hebbel, and Roumeen Islam; and Hafez Ghanem (World Bank Abidjan office). With Carlos Rodriguez, CEMA, Argentina; Jorge Marshall, ILADES/Georgetown University and Ministry of Economics, Chile; Christophe Chamley, Boston University; Deborah Wetzel, Oxford University; Jose Alberro, El Colegio de Mexico and CEPAL, Mexico; Riccardo Faini, Università di Brescia and CEPR, Italy; Peter Montiel and Nadeem Ul. Haque, International Monetary Fund; Virabongsa Ramangkura and Bhanupongse Nidhiprabha, TDRI, Thailand; and Felipe Morande, ILADES/Georgetown University, Chile.

*Closing date:* June 1992.

### Reports:

- Alberro, Jose. "Macroeconomics of the Public Sector Deficit—The Case of Mexico." World Bank, Washington, DC.
- Chamley, Christophe, and Hafez Ghanem. "Macroeconomics of the Public Sector Deficit—The Case of Côte d'Ivoire." World Bank, Washington, DC.
- Easterly, William. "Macroeconomics of the Public Sector Deficit—The Case of Colombia." World Bank, Washington, DC.
- Easterly, William, Carlos Rodriguez, and Klaus Schmidt-Hebbel. 1989. "Research Proposal: The Macroeconomics of the Public Sector Deficit." World Bank, Country Economics Department, Washington, DC.
- Faini, Riccardo. "Macroeconomics of the Public Sector Deficit—The Case of Morocco." World Bank, Washington, DC.
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### Trade Reforms in SALs: A Positive Analysis of Performance and Sustainability

#### Ref. No. 675-32

Developing countries have been forced to adjust during the 1980s to financing shortages for current account deficits. Policy success must be evaluated both in terms of short-run stabilization and medium-term structural adjustment. This research addresses the issue of the extent to which short-term performance may have been bought by jeopardizing the capacity of the economy to adjust its structure to encourage and sustain economic growth. Performance is measured by effectiveness in attaining quantifiable goals, including economic growth, low inflation, current account improvement, and persistent investment. In turn, short-term performance is linked to policy choices. Sustainability defines the ability of the government to ensure persistence of short-term performance. The research will try to provide a framework for improving the design of structural adjustment programs when conflicts arise between short-term and long-term objectives.

The research focuses on three dimensions of sustainability: (i) the distributional impact of adjustment; (ii) the revenue implications of trade reforms; and (iii) investment behavior in tradables during adjustment. The distributional effects of adjustment are evaluated by relying on counterfactual simulation analysis. Revenue and investment implications of adjustment are handled by the application of statistical techniques to a large sample of countries that includes countries which have received adjustment loans and countries which have not. In addition, the project will collect data on private and public investment for a group of countries to test the extent to which the shortfall in investment was accounted for by the higher cost of capital or by issues of sustainability such as the debt overhang.

The "adjustment-with-growth" packages advocated by adjustment lending programs have been much more successful in developing countries that export manufactures than in those that concentrate on primary exports; the latter have not resumed sustainable growth, and most of their external adjustment has arisen from expenditure reduction, not from an increase in supply. The longer term prospects for manufacturing exporters are also brighter: in these countries there are signs of increased efficiency and a smaller decline in investment than in primary exporters.

But a high external debt burden and an unstable economic environment impede investment in all developing countries. In the longer term, adjustment-with-growth packages will succeed if they are accompanied by a more stable macroeconomic environment and appropriate debt relief.

*Responsibility:* Country Economics Department, Trade Policy Division—Jaime de Melo. With François Bourguignon and Akiko Suwa, Ecole Normale Supérieure; Dani Rodrik, Kennedy School of Government; Patrick Conway, University of North Carolina; and Riccardo Faini, Johns Hopkins University, Bologna.

*Closing date:* June 1991.

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### Industrial Reforms and Productivity in Chinese Enterprise

#### Ref. No. 675-38

The central objective of this research is to reach an understanding of the factors affecting the productivity and efficiency of Chinese enterprises of different types and to evaluate the impact of selected reform measures. Three key questions concerning industrial reforms and their relationship to industrial productivity in China will be addressed. To what extent and in what industries have reforms led to substantial increases in total factor productivity? What sorts of enterprise behave best from an economic point of view in the Chinese context? How do specific indirect policy instruments influence the production and investment behavior of enterprises?

An equally important objective of the project is to help Chinese researchers to undertake quantitative analysis based mainly on modern techniques and to use more effectively the data being collected on the industrial sector.

The final research study will be based on three substantive, detailed panel data sets for some 1,400 enter-

prises that will cover the period of recent reforms (1976-86) and the census of manufacturing industries (1985). The 1,400 enterprises will be surveyed again for 1987 and 1988 to include data on the most recent years of reform.

Results of the research will be disseminated through interim and final reports (in both English and Chinese) and an integrated research monograph and through two seminars to be held in Beijing and Washington, DC.

*Responsibility:* Country Economics Department, Socialist Economics Reform Unit—I.J. Singh. With Gary Jefferson, Brandeis University; V.K. Chetty, Indian Statistical Institute; Zvi Griliches, Harvard University; Richard Day, University of Southern California; Zhang Xuejun, Institute of Economics, China; Luo Xiao Peng and Dr. Ying, Research Center for Rural Development, China; and Lin Qingsong, Institute of Economics of the Chinese Academy of Social Sciences.

*Closing date:* June 1993.

### **Debt Renegotiation, Commodity Risks, and Sovereign Risk**

#### **Ref. No. 675-47C**

The lack of collateral for sovereign debt means that the usual financial theory for evaluating credit risk does not apply for sovereign lending. In the absence of collateral, a widely recognized penalty for default is withdrawal of the facilities of international capital markets otherwise available for income-smoothing. It has been shown that commodity bonds with a put option can be used to form optimal income-smoothing and prevent default. However, the implications of potential opportunities for commitment by the creditors during contract negotiation for consumption-smoothing has not been investigated. The purpose of this research was to identify what constitutes a credible method to provide consumption-smoothing opportunities to sovereign lenders while avoiding the problem of their inability to commit.

The research was part of a larger effort in PRE to understand the determinants of repayment and to define better international finance contracts.

The project examined the nature of optimal income-smoothing contracts when default is possible, and there is an existing overhang of debt and the parallel problem of the evolution of debt contracts under renegotiation. Comparison of the two contractual forms should assist in evaluating the contribution of new instruments, given that "conventional" loans have some of the characteristics of contingent contracts. Particular attention was paid to the details of institutional structure which are likely crucial to the nature of the feasible contracts. These include the operation of seniority provisions to policy borrowing and lending by the debtor, the willingness of countries to enforce seniority, and the nature of renegotiation offers and the implications

for rent sharing. The role of a multilateral organization in coordination and intermediation is an important issue here.

The implications of output variations, both exogenous and endogenous, and of market power for the optimal contractual design were also briefly examined to provide a basis for further work in that area.

The research found that the optimal lending contract in the case of a sovereign exporter facing commodity price risks can be approximated by a commodity bond with a put for the seller (borrower). The main advantage of this structure is that the ability of the creditor to commit itself to some actions (through the legal structure in the developed country) is exploited to the benefit of both parties.

This research effort will provide some input for the Bank's work on debt management and contract renegotiation in general and the work of the Commodity Division on assisting countries with technical advice on commodity risk management and commodity-linked finance in particular.

A Bank seminar to discuss the findings of the research was held June 7, 1990.

*Responsibility:* International Economics Department, International Commodity Markets Division—Theophilos Priovolos. With David M. Newbery, Cambridge University; Kenneth Kletzer, Yale University; and Brian D. Wright, University of California, Berkeley.

*Closing date:* June 1990.

#### *Report:*

Kletzer, Ken, David M. Newbery, and Brian D. Wright. "Financial Instruments for Smoothing the Consumption of Primary Dependent Exporters." World Bank, Washington, DC.

### **Trade Policy and Resource Allocation in Indian Agriculture**

#### **Ref. No. 675-50**

The net impact of the many government interventions that affect the profitability of different agricultural crops in India has not previously been measured. This project will provide some indication of how government policies affect how much of each crop is produced and the level of imports and exports. It will also show the extent to which incentives differ among regions and between irrigated and nonirrigated production and, in conjunction with related studies, the extent to which agriculture is on balance favored or disfavored by comparison with manufacturing. The research considers environmental effects so that any conclusions about efficient or inefficient production or techniques can be appropriately qualified.

A number of consultants are estimating the effects of protection, taxes, and subsidies for individual crops in four or five principal producing regions in India. Others are working on more general issues that affect all crops, such as the extent of the subsidy due to the underpricing of

irrigation water, the effects of domestic transport and marketing costs, and environmental aspects. All these studies will be brought together in an overall synthesis study.

Of the crops so far studied, net incentives for wheat, rice, and cotton are low. Cotton appears to be an economically efficient export crop. Incentives for oilseeds and rubber are high, suggesting that some part of total production is high cost and economically inefficient. Among non-trade-related interventions, the underpricing of irrigation water provides by far the biggest subsidy.

The research provided a more informed perspective than previously available on Indian agriculture, which is important in world agriculture, that is, in the Uruguay Round discussions on liberalizing agricultural trade. It is also relevant for agricultural policies in India, including policies on agricultural subsidies, which add to the budget deficit.

It is expected that the findings of the research will be published in a monograph or book.

**Responsibility:** Country Economics Department, Trade Policy Division—Garry Pursell. With Ashok Gulati, Institute of Economic Growth, India; B.N. Goldar, National Institute of Public Finance and Policy, India; R. Chaddha, Delhi University; P.K. Sharma, Ministry of Finance, India; S. Mani, Institute of Public Enterprise, Hyderabad; R.P. Sinha, Commission for Agricultural Costs and Prices, India; and P.K. Joshi and D.H. Diwakar, Central Soil Salinity Research Institute, Kannal, India.

**Closing date:** June 1991.

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### Regulations Against Unfair Imports: Effects on Developing Countries

Ref. No. 675-52

This project looks into the interaction and interrelatedness of the effects of antidumping and countervailing duties on both the developed and developing countries, dealing with specific industries in specific countries. Some of the questions addressed are:

1. What is the contribution of the industry to the country's economic development, and how has the indus-

try been affected by these restrictions?

2. What are the economic causes and effects in the "enforcing" countries of such regulations?

3. What are the economic criteria implicit in antidumping and countervailing duty rules?

4. Do restrictions based on these criteria advance the overall economic interest of the restricting country?

The project covers six industry studies: cut flowers in Colombia, consumer electronics in Korea, frozen concentrated orange juice in Brazil, chemicals in Poland and Hungary, steel in Sweden, and petrochemicals in Middle-Eastern Europe. Each industry study will document the industry's contribution to the country's overall economic development, then analyze how this contribution was affected by unfair trade cases and actions.

It will also review the economics of antidumping in the four major users of GATT formal antidumping regulations: Australia, Canada, the European Community, and the United States. Each of these "enforcement" studies will document the industry-country incidences of each country's recent unfair import restrictions and will analyze the economic factors that trigger such restrictions.

It will examine in a modelling framework the industry- and economy-wide effects of forcing exporters to price to avoid antidumping problems — and simultaneously, allowing import-competing firms to price in a complementary manner. The researchers who conduct this work will draw on the other studies for relevant parameters, such as the scope of exporting or import-competing industries whose pricing strategies are affected.

Examination of United States and European Community antidumping administration supports two findings: (1) The definitions of "dumping" are so broad that virtually every complaint brought against a foreign exporter passes this screen. The test for injury to competing domestic producers proves to be the only effective screen. Thus antidumping mechanisms are, in effect, selective safeguard mechanisms. (2) The threat of antidumping action often leads to the negotiation of a voluntary export restraint (VER). Antidumping cases are brought most often against the more successful exporters — both developed and developing countries. And antidumping cases are more often superseded by VERs when the exporter is a successful exporter — a VER is the outcome of a conflict between two powerful countries, not between a powerful one and a weak one. In the latter case the more powerful country usually takes unilateral action — the antidumping action that its national regulations prescribe.

Export success will almost routinely lead to antidumping complaints and these to pressures to negotiate a VER. Exporters should be aware of this inevitability and with their governments develop a strategy to respond in the most profitable way. VERs often support the domestic price (and simultaneously the export price) above a com-

petitive level, and allow the agreed level of exports to be based on the level existing at the time the agreement is negotiated. The optimal strategy for an exporter might be to expand his exports as rapidly as possible, spend minimal money on a legal defense against the antidumping complaints that will follow (as he will almost inevitably lose), and organize his government to negotiate hard to achieve a VER that provides maximum export revenue.

In connection with the research project, a workshop will be held for Bank staff September 17-19, 1990. In addition, the project will generate a book and background studies.

*Responsibility:* Country Economics Department, Trade Policy Division—J. Michael Finger, and International Economics Department, International Trade Division—Patrick A. Messerlin. With Taeho Bark, Korea Institute for International Economic Policy; Carlos A. Primo Braga, Fundacao Instituto de Pesquisas Economicas; Patrick Conway, University of North Carolina; Sandy Cuthbertson, Centre for International Economics; Mark Dutz, Princeton University; Gunnar Fors, Stockholm School of Economics; Jose Mendez, Arizona State University; and Andrej Olechowski, National Bank of Poland.

*Closing date:* September 1991.

### **The Political Economy of Fiscal Policies in the Developing Countries: A Pilot Study**

#### **Ref. No. 675-56**

In recent years there has been a dramatic development in the literature on the political economy of macroeconomic policy. A number of authors have designed models that try to explain why certain policies, such as fiscal expansions, devaluations, and the like are undertaken by different countries. This literature has focused on such issues as institutions, strategic behavior of governments, and credibility in an effort to endogenize macro policies. Most of the work on this area has been theoretical, and does not try to establish the empirical and historical relevance of the new theories. Only recently have there been some serious efforts to empirically implement these ideas. Most of the recent existing empirical work, however, has dealt with the advanced nations and has tended to concentrate on broad cross-country studies.

The purpose of this research is to provide a very general framework for implementing country studies based on the new political economy framework. The most important principle that will guide the country studies is the necessity to focus on specific episodes within the economic history of a particular country. This means that important events, such as a major stabilization, presidential elections, a major tax reform, a dramatic change in the political system (a coup, for example), or high inflations will be the focus of the analysis. This also means that

country studies should be selective in their emphasis and, in general, should not try to use the political economy perspective to provide broad and sweeping fiscal histories.

The research will be conducted following two complementary approaches for dealing with the country experiences. The first approach consists of the analysis of the possible existence, and of the nature, of political and budget cycles in a specific country and will be based on two analytical tools. First, a regression analysis trying to explain the evolution of different policy variables—government expenditure, domestic credit, fiscal deficit, and composition of government expenditure, among others—will be undertaken. Here, dummy variables that will make a distinction between the political and ideological persuasion of the government in office will play an important role. The purpose of this econometric analysis is twofold: it seeks to determine whether in the country in question any kind of political business cycle can be perceived; and, if the answer to the first query is affirmative, it will try to discriminate between the three types of political cycles theories—Nordhaus's contention, asymmetric information, and partisan-ideological cycles. Second, the analysis of the (possible) existence of political business cycles will also use detailed historical investigations of the way economic policy was conducted in the periods immediately surrounding elections. These two approaches—econometric and historical—will complement each other, helping generate more persuasive and robust interpretations of important economic events.

The second approach investigates the role of credibility in the outcome of stabilization programs. From a case study perspective the interesting and almost ideal setup would be to compare stabilization programs that are similar in design, but that differed in outcome (on successful stabilization and one failed stabilization). Under these circumstances an effort can be made to assess the relative roles played by credibility and political circumstances in the programs' results. This type of study might allow us to understand why some programs that were technically poorly designed enjoyed (short-run) credibility, and why some programs that were technically sound had little credibility and, thus, failed.

In this type of comparative study a number of steps should be undertaken. Some of the most important are: (1) to analyze carefully the initial economic conditions, including the sources and magnitude of the macroeconomic disequilibrium; (2) to evaluate the initial political conditions, including the nature of the party or parties in power, their relative strength, degree of political polarization, violence, and possible strategic behavior (this political analysis will help to understand both the political causes of the macroeconomic disequilibrium and the actual constraints faced in designing and implementing the stabilization program); and (3) to analyze the technical stabiliza-

tion program initially proposed to the executive by the professional staff of, say, the Finance Minister, and compare it to the program actually implemented by the government.

The principal subject of the study would be two (or at most three) stabilization episodes for each country—ideally, both failed and successful stabilization episodes. Contrasting the policies followed and their outcomes can yield some potentially important lessons regarding the role of institutions and credibility. Although this is a difficult task, a number of methods for measuring credibility, including the effect and the behavior through time of the term structure of interest rates, black market exchange rates, the demand for money, and asset prices, will be implemented. The findings of this stage should be related to the political analysis, through trying to understand why particular programs seem to be credible (at least initially) and others do not.

Using regression analysis on data for a score of countries it has been found that political variables, such as political instability and polarization, help to explain cross-country differences in fiscal policy. Institutional variables also play an important role in explaining the determination of fiscal imbalances, the reliance on the inflation tax, and government borrowing. This is the first time this type of empirical verification of the political economy theories is undertaken.

These findings suggest that the Bank should pay particular attention to institutions when designing adjustment and stabilization programs. Institutions are related to political pressures and to credibility; without the appropriate institutional support many adjustment programs are likely to fail.

The first paper related to this project was presented at the Arizona State Conference on Political Economy. It was also presented at the Econometric Society Meeting in August 1990 in Barcelona and at the World Bank in October 1990. The paper has not yet been published in a scholarly journal.

*Responsibility:* Country Economics Department, Public Economics Division—Chad Leechor. With Sebastian Edwards, University of California, Los Angeles.

*Closing date:* June 1991.

### **Productivity, Competitiveness, and Economic Policy**

**Ref. No. 675-58**

Many developing countries, especially highly indebted countries, face capital shortage, in that industries of these countries are confronted with very high real interest rates. This research project first addresses both theoretically and empirically the competitiveness implication of investment.

Second, the research examines why successfully industrializing countries tend to experience real appreciation even in tradable goods prices. A hypothesis tested in this research is that countries catch up more quickly in high-price-elasticity sectors (the correlation effect).

Third, the project assesses the impact of imperfect competition on the measurement of total factor productivity as well as the Hall's method of measuring markups.

A general equilibrium model based on a monopolistic competition framework has been developed to conduct a theoretical analysis of the linkage between investment, competitiveness, and comparative advantage as well as the correlation effect on changes in the real exchange rate. A trade and industry data base covering four developing countries (Turkey, Korea, Hungary, and Mexico) and two developed countries (the United States and Japan) has been developed to conduct an empirical analysis of competitiveness and comparative advantage. It has 13-17 industrial subsectors for each country. And a macroeconomic data base covering about 25 major exporters of industrial goods has been developed to analyze empirically the importance of saving and investment in determining productivity and competitiveness.

Two papers discussing theoretical findings of the research have been completed. They show that capital shortage can hurt the competitiveness of a country, which in turn necessitates real devaluation not only by increasing the cost of production of existing industries but also by reducing the diversity of industrial structure. When a positive correlation exists between change in competitiveness and the price elasticity of demand, a real exchange rate based on tradable goods prices must appreciate.

Three papers on the empirical findings of the research are near completion. Investment matters significantly in determining both the competitiveness and the comparative advantage of industry, but no clear evidence exists on the effect of investment on technical progress. Capital-intensive industries fared relatively worse in terms of technical progress. Price and quantity measures of total factor productivity behave very similarly both in the short run and in the long run, suggesting the importance of technology shocks in short-run changes of total factor productivity.

These findings highlight the importance of enhancing national saving available for industry and of correcting the capital-intensity bias of industrial policy.

The research findings are being disseminated in working papers, which, after revision, will be submitted for publication to professional journals.

*Responsibility:* Industry and Energy Department, Industry Development Division—Sadao Nagaoka, and Industry and Energy Department, Industry Development Division—Deborah Bateman. With Peter Petri, Brandeis University.

*Closing date:* December 1990.

*Reports:*

- Nagaoka, Sadao. 1990. "Cost Reduction, Product Development and the Real Exchange Rate." Industry Series Paper 26. World Bank, Washington, DC.
- \_\_\_\_\_. 1990. "Investment, Productivity and Comparative Advantage." Industry Series Paper 25. World Bank, Washington, DC.
- Nagaoka, Sadao, and Deborah Bateman. Forthcoming. "Quantity and Price Measures of Total Factor Productivity Change: What Do They Tell?" Industry Series Paper. World Bank, Washington, DC.
- \_\_\_\_\_. Forthcoming. "Technical Progress and Capital Deepening as Sources of Industrial Competitiveness." Industry Series Paper. World Bank, Washington, DC.
- Petri, Peter. Forthcoming. "Saving, Investment and Productivity Growth: A Macroeconomic View." Industry Series Paper. World Bank, Washington, DC.

### The Impact of EC-1992 and Trade Integration in Selected Mediterranean Countries

#### Ref. No. 675-64

The European Community (EC) plans to become a fully integrated common market in 1992, with Greece, Spain, and Portugal incorporated. As 1992 approaches, concern is mounting among many countries of the world, but especially among Mediterranean countries in a significant trading relationship with the EC. There is fear that as a result of 1992, opportunities for trade with the EC will be reduced.

These fears derive from a number of considerations. The original nine EC members may substitute the products of the three newest members of the EC, who produce a product mix closer to that of the Mediterranean developing countries, for those of the Mediterranean countries. The removal of intra-EC border controls will lower transportation costs for EC firms selling in the EC relative to firms outside the EC. There is uncertainty regarding the impact of the harmonization of standards within the EC for extra-EC firms. And the EC may restrict the mobility of labor from countries outside the EC.

On the other hand, the Mediterranean developing countries have reasons for optimism. The accession of Spain, Portugal, and Greece to the EC will mean that the Mediterranean developing countries will have greater (tariff-free) access to the markets of these three countries. Harmonization of standards may represent an opportunity rather than a threat for the developing countries that adapt to the new standards. EC-92 is likely to result in greater specialization in the EC along the lines of comparative advantage, which will allow greater opportunity for benefits of trade in the developing countries along the lines of comparative advantage. And EC-92 will likely increase the long-run growth of the EC, presenting further opportunities for the developing countries.

This study will quantify these different aspects of EC-92 and thereby assess its impact on Turkey, Morocco, Algeria, and Tunisia.

The study will develop a multi-region, computable, general equilibrium model and data set to assess the impact of EC-92 on the selected Mediterranean developing countries. The data set will include a quantitative assessment of the impact of the changes in the EC, by industry, including an assessment of the impact of increasing returns to scale. As a first step, the impact of EC-92 on the EC countries and the United States, Japan, and the rest of the world will be assessed.

The result from the EC-rest-of-the-world model will then be used in models of the selected Mediterranean developing countries. The trade regimes of these countries will be quantitatively assessed, and the models will simulate the different impact on the countries of EC-92 depending on the trade policies adopted by them.

*Responsibility:* Europe, Middle East and North Africa Technical Department, Trade and Finance Division—David TAY. With Glen Harrison, University of New Mexico; and Tom Rutherford, University of Western Ontario. The State Planning Organization of Turkey is also participating in the project.

*Closing date:* June 1992.

### African External Finance in the 1990s

#### Ref. No. 675-63

This project will attempt to answer a series of questions regarding future external finance of Sub-Saharan African development. All questions relate to the central theme of the likely necessary amounts and most useful forms of external financial support for adjustment and growth in Sub-Saharan Africa over the next decade. The project is part of the Africa Research Initiative undertaken jointly by the Office of the Vice President, Development Economics and Chief Economist, and the Africa Regional Office, Office of the Regional Vice President. The point of departure is the recent long-term perspective study of Sub-Saharan Africa, produced by the African Region. An accurate and fair assessment of the likely access of Sub-Saharan countries to external finance will play a major part in determining the maximum growth rate that these economies can achieve. With low levels of consumption, further cuts to fuel investment will be difficult to achieve, meaning that additions to investment will come from external sources. Economic policies will, of course, play a major part in determining the efficient use of new and existing investment and in determining the extent to which available external resources are channeled into investment. If the assessment of external resource availability in Sub-Saharan Africa is, overall, negative, policymakers will need to make compensating adjustments.

The above issues are addressed in a series of research papers commissioned from authors in the World Bank, the IMF, the OECD, and from academic and research institutions. Most papers look at a particular form of external finance and assess its suitability and likely availability for African countries. The analytical tools used in these papers vary from econometric analysis to projections based on parameters deemed realistic by the authors to careful interpretation of available data gathered by the authors. Each author was chosen on the basis of expertise in compiling and analyzing data and on applying existing forms of analysis to data on Africa.

The outlook for concessional external finance for Africa may be brighter than anticipated at the start of the project. Bilateral concessional assistance flows from DAC countries to Sub-Saharan Africa at rates deemed necessary in the long-term perspective study, *Sub-Saharan Africa: From Crisis to Sustainable Growth*, are a possibility, although at the upper end of realistic projections of possible development assistance flows. The outlook for nonconcessional flows, including those with risk characteristics more suited to the African situation—foreign direct investment and commodity-linked liabilities, for example—is less favorable. One paper measures capital flight from Sub-Saharan Africa and finds evidence that capital flight has taken place, notable in one large country in the study.

These findings mean several things. If official development assistance flows to Sub-Saharan Africa are not protected from competing demands on industrial country budgets, the incipient economic recoveries in adjusting African countries will be at risk. If Sub-Saharan African countries are to attract private external finance and to avoid excessive private capital outflows, they need to commit to, and maintain, more liberal policies with regard to internal financial markets and private sector access to foreign exchange.

The results of the research will be presented at a symposium in Washington, DC, on September 17-18. The papers presented there will be submitted for publication to the World Bank's PRE Working Paper Series and to the *World Bank Economic Review*.

*Responsibility:* International Economics Department, Debt and International Finance Division—John Underwood and Ishac Diwan, Africa Regional Office, Office of the Chief Economist—Michelle Guerard, and Africa Technical Department, Trade and Finance Division—Charles Humphreys. With Robert Cassen and Machiko Nissanke, University of Oxford; Kevin Chang and Robert Cumby, New York University; Richard Fairberg and Anthony Killick, Overseas Development Council; Muhammad Jalaluddin, ANZ Grindlays Bank; Mohammed Mah'Moud, African Centre for Monetary Studies; Francis Nyirjesy and Ellen Johnson Sirleaf, Equator Advisory

Services; Roger Riddell, Overseas Development Institute; Clifford W. Papik; and David Stewart.

*Closing date:* March 1991.

### **The Market-Based Menu Approach: An Analysis of Commercial Bank Choice Behavior**

**Ref. No. 675-75**

The goal of this study is to analyze empirically bank choice behavior when confronted with a "menu" of debt service reduction and new money options. Results are expected to link both conceptually and statistically commercial banks' characteristics to their portfolio choice of elements of a financing menu. The general purpose of the study is much broader: to be able to predict the response of different banks to different financing packages based on the characteristics of the institutions involved in these deals. Insights gained will help structure and analyze future financial packages, such that they are attractive to bankers while meeting the needs of the debtor countries.

Important questions arise in structuring "menus" of financial options. How do banks make their choices? Which banks are more likely to relend, exit, or do both? Which bank characteristics statistically determine this behavior? To what extent is banks' choice linked to their nationality, size, capital to assets ratio, size of operation in the debtor country, tax characteristics, accounting practices? Which kinds of financial options appeal to different groups of financial institutions? Can we learn from past experiences to shape and structure new financial packages? More specifically, can we look at the characteristics of a country's creditors and prepare a financing package that would appeal to most of them?

Although much has been said about bank preferences, a systematic study of various hypotheses brought forward does not exist. This study attempts to answer the above questions using an empirical assessment of individual bank choices within a menu of options. One crucial aspect of the "menu" approach is that the success of each financial package designed depends on the attractiveness of the options included in the package. A better understanding of bank choice behavior would undoubtedly improve the chances of success of each new package.

First, the roles of deposit insurance, capital adequacy rules, regulatory treatment, and tax laws on individual bank choice are theoretically analyzed within an optimizing framework. Second, based on this theoretical framework, an empirical model is built to analyze bank choices. Since the dependent variable indicates the choice of the institution, the behavior is described in probabilistic terms. The logit probability model is used as the estimation technique. In these models the estimated coefficients explain the effect of individual bank characteristics on the

probability of making a choice.

The analysis of the 1988 Brazil Financing Plan is completed. Empirical results of the research show that bank characteristics can explain more than 80 percent of the choice behavior of U.S., Japanese, and European banks. The next step is to analyze the 1989 Mexican Package. Comparison of results for the two financing packages should also help in understanding the effect of regulatory, tax, and accounting changes on bank behavior.

It is also possible to look at the same problem from the market's viewpoint. By analyzing the stock price reaction of individual banks it may be possible to detect whether market reaction has differed for institutions that chose different options.

The findings of the research will be disseminated through the World Bank PRE Working Papers Series and through journal articles.

*Responsibility:* International Economics Department, Debt and International Finance Division—Asli Demircuc-Kunt and Ishac Diwan. With Haluk Unal, University of Maryland; and Mark Spiegel, New York University.

*Closing date:* November 1990.

## Distributive Aspects of Debt Adjustment

### Ref. No. 675-76C

How do domestic politics affect debt external repayments by highly indebted countries? The recent literature on sovereign debt sheds little light on this question. Instead, it has produced important conceptual insights about the incentives of an apolitical country to service its foreign loans. However, external debt policy can have important distributional implications in the debtor country.

The theoretical work in this research project highlights three factors that contribute to conflicts of interests in the formulation of the national debt policy. First, it explored the effect of conflicts of interest that are due to two features of public choice specific to debt adjustment policies. (i) Because the traded goods sector needs to expand in order to generate the foreign resources needed for the external transfer, a real devaluation is required. This leads to conflicts of interest between the traded and nontraded goods sectors. (ii) Default and the economic consequences in terms of trade orientation and market access affect the export and the import substitution sectors differently, creating additional conflicts. The extent of capital mobility turns out to be a decisive factor in the analysis.

Second, the research focused on the distributional effects of austerity. When the foreign debt is government-owned (as in most developing countries), the internal transfer from the private and to the public sector that is required for debt service imposes austerity in ways that

affect different interest groups differently. The research focused on the conflict of interest between capital and labor that stem from the different abilities of these factors of production to move abroad and thus to evade taxes. Besides constraining government action, potential capital mobility can generate powerful forces in the economy through its effects on expectation. In particular, the expectation of higher taxes on capital can become self-fulfilling, thus reducing capital stocks considerably. However, good equilibria can also exist. An example developed in the research shows that the multiplicity of equilibria can disappear when the policymakers are perceived to be sufficiently pro-capital.

Third, the nature of the debtor's government can affect its ability to bargain with its creditors. Governments that support interest groups with greater incentives to default can ultimately obtain better deals with creditors than governments supported by groups that favor more debt adjustment.

The main theoretical findings of the research were that governments backed by constituencies from the nontraded goods sectors of the economy will tend to default more. Without capital mobility, capitalists in the import-substitution sectors will tend to oppose the repayment sought by the capitalists of the export sectors; workers' interests will depend on the share of imports in their consumption basket. With capital mobility, labor will oppose the extent of debt repayment sought by capitalists in both the export and the import-substitution sectors. Self-fulfilling external default with large capital flight is more likely to occur when the default penalty is inelastic and when a left-wing government is in power. With perfect bargaining, governments with constituencies that oppose large debt repayments get a better debt settlement.

The principal empirical results of the research, using the recent cross-country debt servicing experience, were that the debt repayment behavior of Latin American and African governments differed drastically. Net transfers by Latin American regimes are better explained by economy-wide measures of the cost and benefit of default than are those of African regimes. Official lending tends to accommodate government deficits, but it is not affected by the level of poverty in the debtor country. While part of the aid is confiscated by the private creditors, more aid tends to be associated with lower repayments to the official creditors. Latin American countries tend to devalue only when offered additional loans from the official sector. Private net transfers are significantly correlated with debt prices for Latin American but not for African countries.

Two papers are being produced in connection with the research. Both have been submitted to the World Bank PRE Working Papers Series and will be submitted to academic journals for publication.

*Responsibility:* International Economics Depart-

ment, Debt and International Finance Division—Ishac Diwan. With Thierry Verdier, Delta, Paris.

*Closing date:* June 1990.

*Reports:*

Demirguc-Kunt, Asli, and Ishac Diwan. "Determinants of Debt

Repayments: Africa and Latin America."

Diwan, Ishac, and Thierry Verdier. "Distributive Aspects of Debt

Adjustment."

### **Private Investment and Macroeconomic Adjustment—Phase I**

**Ref. No. 675-83**

The correction of external imbalances in many developing countries during the 1980s has resulted in a reduction in investment ratios (both public and private) and in a growth slowdown. In many cases the adjustment measures and economic reforms have not been rewarded by an adequate response of private investment. Without a recovery of investment and growth, the sustainability of the adjustment effort will be endangered.

This project investigates the effects of adjustment policies on private investment and, in particular, the causes of the slow and weak response of investment to the improvements in economic incentives brought about by adjustment programs. Its goal is to assist in the design of growth-enhancing, sustainable adjustment policies. It is part of the research on the transition from adjustment to growth under way in the Macroeconomic Adjustment and Growth Division of the Country Economics Department.

Phase I of the project is devoted to the development of an analytic and methodological framework for the study of private investment. Hence, in this stage, the research involves mainly analytical work, complemented by the study of specific country experiences and by econometric work on cross-country data.

Some typical adjustment measures can have a strong anti-investment bias. For example, sharp real depreciation may reduce private investment because of the high import content of capital goods; likewise, fiscal adjustment that takes the form of reduced public infrastructure investment also has a negative effect on private capital accumulation.

Adequate economic incentives are necessary but not sufficient for the recovery of investment and growth. Uncertainty and instability are powerful deterrents for private investment, and they may be responsible in many cases for the lack of investment response to incentive changes. Lack of credibility of policy reforms, and perceptions of policy inconsistency, are two especially harmful forms of policy-related uncertainty that can prevent the investment takeoff.

These findings indicate that macroeconomic stability is a prerequisite for the success of adjustment in terms of investment recovery. Incentive changes are unlikely to

promote investment if large macroeconomic imbalances still persist. Policies that result in stable and predictable incentives, together with adequate public investment in infrastructure, can play a key role in promoting the resumption of private investment and growth.

*Responsibility:* Country Economics Department, Macroeconomic Adjustment and Growth Division—Luis Servén and Andrés Solimano. With Robert S. Pindyck, Massachusetts Institute of Technology; Eliana Cardoso, Tufts University; and Felipe Larrain, Harvard University.

*Closing date:* April 1991.

*Reports:*

Servén, Luis, and Andrés Solimano. 1990. "Adjustment Policies and Investment Performance in LDCs: Theory, Country Experiences and Policy Implications." Paper presented at the Conference on Adjustment Lending, Washington, DC, September.

\_\_\_\_\_. 1990. "Macroeconomic Adjustment and Private Investment: An Overview." PRE Working Paper 339. World Bank, Washington, DC.

### **Stopping Twenty Percent Inflation**

**Ref. No. 675-89**

Many countries that have stabilized their economies from high inflation rates find the inflation rate sticking at a rate of about 20 percent per annum; recent examples include Mexico, Bolivia, and Israel. Other countries that did not reach extremely high inflation rates also experience annual inflation rates of about 20 to 30 percent. It appears to be very difficult in these countries to reduce inflation to single-digit levels. Governments frequently must run tight monetary policies even to hold inflation constant, but these tight money policies produce high real interest rates that slow the return of growth.

The aim of this research is to understand why 20 to 30 percent per annum inflation is so persistent, and what measures can and have been taken in different countries to reduce it.

The research is important because it deals with a phenomenon that appears to inhibit the transformation from stabilization to growth in a number of countries.

The research project uses statistical methods to isolate the relevant countries, and then conducts case studies of some of the successful and unsuccessful countries. An attempt will then be made to draw general lessons from these case studies.

*Responsibility:* Development Economics, Office of the Vice President—Stanley Fischer. With Rudiger Dornbusch, Massachusetts Institute of Technology.

*Closing date:* October 1990.

## Effects of the Liberalization of the Grain Market on Smallholders in Southern Malawi

### Ref. No. 675-91

This research will assess the effects of the liberalization of the grain market on the income, production, food security, and nutrition of smallholders in Southern Malawi. The longitudinal data will help monitor the effects of the policy change, and allow the responses and impact on different socioeconomic types of households to be differentiated by the households' status as net food buyers or sellers, whether they are labor-constrained, and whether they have surplus land. It will provide much more detailed information on household production and consumption decisions than is usually available, and enable the testing of hypotheses about the impact of changing food prices. The analysis will try to suggest what actions could be taken to enhance the positive effects and reduce the negative impact on households of grain trade liberalization. A parallel study in three areas of Malawi is being done by the Center for Social Research of the University of Malawi, and the Bank has studied related issues in Malawi and other countries (the MADIA" study). This research will be comparable with studies done by the International Food Policy Research Institute in African and other countries, and contribute to a broader understanding of the effects of policy reforms on food security, income, and nutrition.

Data collected in 1986-87 will be used as a baseline. A new data set will be collected for 200 households in six villages by trained interviewers who will live in the villages during the fieldwork. Income and expenditure data will be collected every two weeks during the months July 1990-June 1991, or once every one to two months, depending on the data. Data will include income, expenditure, crop production and sales, off-farm employment, food storage, nutrition status (anthropometric measures), and morbidity. Household calorie intake will be measured. Grain traders will be interviewed to find out who is trading, the quantities traded, and the market organization. Grain prices will be recorded. Data will also be collected in January 1992 to provide a third data point. Ethnographic data on the households will be collected. Appropriate quantitative methods will be used to analyze the data.

The research findings will be disseminated through research reports and seminars in the Bank and in Malawi, organized by the Center for Social Research. At least one journal article will be written and a monograph on household food security will present a comparative analysis of the 1988/89 and 1990/91 data.

*Responsibility:* Southern Africa Department, Population and Human Resources Operations Division—Joy de Beyer, Southern Africa Department, Agriculture Operations Division—Robert Christiansen, and Southern Africa

Department, Country Operations Division—Kathie Krumm. With Pauline Peters, HIID. The Center for Social Research, Malawi, is also collaborating in the research.

*Closing date:* June 1992.

### *Report:*

Peters, P.F., and M.G. Herrera, with T.F. Randolph. 1989. "Cash Cropping, Food Security and Nutrition: The Effects of Agricultural Commercialization Among Smallholders in Malawi."

## The Social Cost of Non-Adjustment: Changes in Poverty in Peru from 1985 to 1990

### Ref. No. 675-93

An important recent issue in economic development is the impact of structural adjustment programs on the quality of life in developing countries, especially that of the poorest groups. But the counterfactual case — what would have happened if structural adjustment were deliberately avoided — is usually a matter of conjecture. This research examines the changes in living standards among households in Lima, Peru, from 1985 to 1990. Peru is chosen because it has avoided structural adjustment throughout this period.

In 1985-86, a nationwide living standard survey was undertaken that gathered detailed information from 5,000 households in Peru. In the summer of 1990, a second survey was conducted in Lima only, using a similar questionnaire. Many of the Lima households interviewed in 1985-86 were reinterviewed in 1990. Using both descriptive and more sophisticated analyses, a comprehensive assessment will be done on the changes in living standards in Lima from 1985-86 to 1990. The causes of these changes will also be examined to the extent possible.

Findings of the research will be disseminated through the Living Standards Measurement Survey working papers series, seminars at the World Bank and, possibly, in Lima, and one or two journal articles.

*Responsibility:* Population and Human Resources Department, Welfare and Human Resources Division—Paul Glewwe. With Gillette Hall (consultant). Cuanto, Peru, is also participating in the research project.

*Closing date:* June 1991.

## Research Symposium on Military Expenditures in Developing Countries

### Ref. No. 676-01

This research attempts to improve our understanding of the relationship between military expenditures and economic development. The high military expenditure in many developing countries, especially relative to social expenditure, its resilience to budgetary stringency, and its importance for external debt are among the issues that must

be examined more systematically in the light of development priorities. There has not been a firm empirical and analytical base from which the Bank could get some direction in its policies and approaches to this difficult issue. This research will be a step toward forming such a base.

A number of topics in this area have been selected, on which papers will be prepared by experts outside the Bank. The papers will be the main subject of a two-day symposium in December 1990, which will bring together the authors, outside experts, and Bank staff with relevant responsibilities and interests. The symposium will offer an opportunity for informal discussion and identification of appropriate topics for possible Bank-supported research in this field.

The papers will be revised after the symposium and collected for publication in a special issue of one of the Bank's research journals. An overview paper will also be produced that summarizes what has been learned in terms of guidance for future research and implications for further policy and operational work.

*Responsibility:* Policy and Review Department, Policy Development Division—Geoffrey Lamb. Other departments that are collaborating in the project are the Research Administration, International Economics, and Country Economics Departments, and departments in the Africa Regional Office and the Europe, Middle East and North Africa Regional Office. With Nicole Ball, National Security Archive; Somnath Sen and Saadet Deger, Stockholm International Peace Research Institute; Robert West, Tufts University; and Michael Brzoska, Hamburg University. The International Monetary Fund may also participate in the project.

*Closing date:* March 1991.

### **International and Macroeconomic Policies in the Agricultural Development of Mexico**

#### **Ref. No. 676-06**

This research extends the research begun under RPO 674-42 to encompass linkage from the trading partner (that is, U.S.) macropolicy, to domestic (that is, Mexican) macroeconomic response to domestic (Mexican) agricultural markets and development.

The research performs simulation experiments using an experimental framework that consists of a set of recursively interlinked models at macroeconomic and sectoral levels of Mexico and the United States (and enough specification of the rest of the world to close the system). The experiments generate response elasticities from upstream variation in domestic and trading partner trade, and macroeconomic and agricultural policies.

Under trade liberalization, Mexican agricultural markets respond significantly to upstream policy changes—

either domestic or trading partner. Responses to macroeconomic policy change are significantly stronger than sectoral policy change elasticities.

Countries such as Mexico need to take into account policy changes by trading partners at trade, macroeconomic, and sectoral levels in formulating domestic policies. Consistency between domestic trade and macroeconomic policies and agricultural policies is necessary if the latter are to be effective.

*Responsibility:* Agriculture and Rural Development Department, Agricultural Policies Division—Gerald O'Mara (consultant). With Alfred Verschoor, consultant.

*Closing date:* December 1990.

#### *Reports:*

Just, Richard. 1990. "Analysis of the Effects of U.S. Macroeconomic Policy on U.S. Agriculture Using the USAGMKTS Model." PRE Working Paper 449. World Bank, Washington, DC.

O'Mara, Gerald. 1990. "Analyzing the Effects of U.S. Agricultural Policy on Mexican Agricultural Markets Using the MEXAGMKTS Model." PRE Working Paper 447. World Bank, Washington, DC.

\_\_\_\_\_. 1990. "A Model of U.S. Corn, Sorghum, and Soybean Markets and the Role of Government Programs (USAGMKTS)." PRE Working Paper 448. World Bank, Washington, DC.

O'Mara, Gerald, and Merlinda Ingo. 1990. "MEXAGMKTS: A Model of Crop and Livestock Markets in Mexico." PRE Working Paper 446. World Bank, Washington, DC.

### **Closed-End Country Funds: Theoretical and Empirical Investigation**

#### **Ref. No. 676-07**

Closed-end country funds are becoming increasingly popular vehicles for investments in developing country stock markets. In many countries, such funds are the only avenue for portfolio investments by foreign investors. Country funds may offer important trading gains to the originating country and to foreign investors. For the originating country, country funds represent external finance that avoids problems of foreign control and that has a valuable pro-cyclical risk profile—unlike debt obligations, for example. In addition, country funds lead to a larger and more liquid domestic stock market. They also typically involve transfer of technologies, principally in portfolio management and corporate auditing processes. For foreign investors, country funds offer new securities that may not be spanned by the set of existing securities in their organized exchanges. As a result, they offer means for added portfolio diversification and capital market integration.

However, the experience with country funds is still limited, and there are several unresolved and poorly understood issues. In this project the following questions are addressed:

What has been the risk/return behavior of country funds, and how do they respond to international shocks?

Is there a rigorous explanation for the behavior of the discounts/premia from their net asset values? Is part of the price behavior a common factor pervasive across country funds but not shared by either host or originating countries' indices, and what is the effect on country funds of the identity of the trading place? How do discounts/premia relate to capital movement restrictions, to exchange rate risk, to sovereign country risk, and to the various institutional, regulatory, and tax factors?

What is the role of country funds in international market integration?

What are the effects of country funds on the domestic stock markets of developing countries and on capital formation in the real sector?

Are there some rules that country fund managers should follow in picking domestic stock that would increase the price of the fund?

Under what conditions would the initial public offering be successful?

Using the experience of all the country funds that are publicly traded, this project attempts to shed light on important issues relating to country funds, both from a theoretical perspective as well as from an empirical point of view. The study will consist of three parts.

The first part, which addresses the behavior of country fund asset prices, is purely empirical. It reviews the statistical evidence about rates of return, risk, and correlation with various indexes of all country funds.

The second part consists of a theoretical model of securities pricing under incomplete segmentation, followed by empirical tests. The statistical analysis is intended to separate the various tax, regulatory, and sovereign risk factors in the formation of country fund prices.

The third part, on strategies for promoting country funds and other policy issues, uses the results of the other two parts to draw policy implications.

*Responsibility:* International Economics Department, Debt and International Finance Division—Ishac Diwan, and International Finance Corporation—Peter Wall. With Lemma Senbet, University of Maryland; and Vihan Errunza, McGill University.

*Closing date:* June 1991.

### **Implications of Agricultural Trade Policy Reforms for Developing Countries**

#### **Ref. No. 676-11**

This project addresses one of the most critical issues in agricultural trade—the implications for developing countries of a substantial reduction in farm subsidies and agricultural trade protection. With the food-importing developing countries importing about \$37 billion of food

(\$27 billion net), and many of them heavily indebted, a permanent rise in food prices could have substantial repercussions on some of the more food import-dependent countries.

Some of these countries in the GATT have asked the Bank to assist in determining the implications for them. The Bank has referred these countries to the results of other modeling efforts and tried to focus these models more on developing countries. In October 1989 the Bank and OECD jointly sponsored a symposium to assess the modeling results for developing countries. It became clear that the current models are both dated and inadequate in representing developing countries. At the brink of perhaps the most historic turning point in agricultural policy, the Bank is unable to advise its borrowers in any concrete manner on what these negotiations might mean for their economies. And the Bank cannot really develop a clear strategy for agricultural lending without some idea of what the effects of international policy for agriculture might be. This is clearly an untenable position for the World Bank, the largest lender for agricultural development and the leading proponent of agricultural policy reform in developed and developing countries.

This research will be based on two levels of modeling, one at the global level through an upgraded model named RUNS and the other through archetype models of classes of developing countries. The RUNS model will address global issues—the effect on prices, on relatively aggregate categories of trade, on broad intersectoral changes and possible effects of capital transfers to compensate for adverse impacts. The archetype models focus on typical economies in a more detailed manner and thus are able to consider effects of policy shocks at a more disaggregated level. The project will build six archetypical models and apply the global results from the RUNS simulations. The OECD Development Center in Paris and the Australian Bureau of Agricultural and Resource Economics will collaborate in the research and extend it to specific countries.

*Responsibility:* Agriculture and Rural Development Department, Agricultural Policies Division—Odin Knudsen, International Economics Department, International Commodity Markets Division—Ronald Duncan, and International Economics Department, International Economic Analysis and Prospects Division—Paul Armington. With Sherman Robinson and Alain de Janvry, University of California; and Jean Waelbroeck, Brussels Free University. The OECD Development Center, Paris, and the Australian Bureau of Agricultural and Resource Economics are participating in the project.

*Closing date:* October 1991.

## The Political Economy of Structural Adjustment

### Ref. No. 676-23

The World Bank has increasingly recognized the importance of political support for the successful adoption and implementation of structural adjustment programs. But little is known about why political commitment to adjustment has been greater in some countries than in others. This project will try to advance the understanding of the political economy of adjustment, focusing on the effect of program design and institutional arrangements.

The project will sponsor studies of eight countries that are newly democratic or undergoing political liberalization: Chile, Mexico, Nigeria, Poland, Senegal, Spain, Thailand, and Turkey. Each country study will examine the interaction of politics and policy reform in two policy areas: stabilization and fiscal reform; and trade and exchange rate reform. The project will also include several cross-country statistical studies, each of which will focus on issues in one policy area.

The studies will examine hypotheses relating to these questions: Are governments less likely to initiate reform in the midst of political crisis, and do economic crises increase the likelihood of reform if they have proceeded far enough to curtail seriously domestic consumption? What are the effects of program design, coalition building, and compensation on the sustainability of the reform effort? What are the effects of institutional structures on the political ability of governments to implement reforms and sustain them in the face of opposition? And what are the effects of external actors—particularly bilateral donors and the international financial institutions—on the domestic decision-making process for structural adjustment?

This study of the political economy of adjustment is important because of the wave of political liberalization and democratization in the developing world and Eastern Europe. New governments frequently have the opportunity to launch initiatives, but at the same time they also face political constraints.

*Responsibility:* Country Economics Department, Macroeconomic Adjustment and Growth Division—Steven B. Webb. With Stephan Haggard, Harvard University; and Alex Cukierman, Tel Aviv University.

*Closing date:* June 1993.

*Report:*

Haggard, Stephan, and Robert Kaufman. "The Political Economy of Inflation and Stabilization in Middle-Income Countries."

## The Macroeconomics of Real Exchange Rate in the CFA

This research is important because of the current difficulties of adjustment in the CFA. The questions

addressed in this project are: What is the extent of overvaluation in the CFA? What are the major determinants of the real overvaluation in the CFA? What role can devaluation play in facilitating real depreciation in the CFA?

It was found that the CFA franc is overvalued, but the experiences of different countries in the CFA differ considerably. A fundamental review of the CFA arrangement, leading to, among other things, a devaluation of the CFA franc, may be in order.

*Responsibility:* Country Economics Department, Macroeconomic Adjustment and Growth Division—Ibrahim Elbadawi. With Stephen O'Connell, Swarthmore College.

*Completion date:* March 1990.

## Adjustment Policies and Debt in Africa

In late 1987, the World Bank and 18 bilateral and other multilateral donors and creditors launched the three-year Special Program of Assistance (SPA) for low-income, debt-distressed countries in Sub-Saharan Africa, based on a joint report of the Bank and the IMF to the Development Committee in the fall of 1987. The SPA has become the major mechanism for donors to mobilize and coordinate high quality, quick-disbursing aid and more concessional debt relief to support adjustment in Africa. The World Bank monitors the progress under the SPA, including policy reforms, economic performance, adjustment assistance, and debt relief. In 1989, SPA donors agreed to continue the SPA into the 1990s and requested the Bank to prepare a report evaluating progress during the first SPA and proposing funding and content of the second SPA.

The evaluation of progress under the first SPA was based on policy and economic data for eligible countries and on debt and aid data provided by recipient countries, donors, and the Paris Club creditors. The link between policy actions and macroeconomic performance was assessed by grouping countries according to the strength and duration of their reform efforts and comparing performance among groups. Financing requirements for the second SPA were projected using an accounting framework covering basic relationships among aggregates of national accounts, trade flows, the balance of payments, government finance, indebtedness, and the growth of population. Key parameters were set in line with objectives of reform programs. Targets and assumptions were similar to those in the Bank's *Sub-Saharan Africa: From Crisis to Sustainable Growth* (the long-term perspective study).

Reform progress continued and deepened with support from the SPA. Reforms, donor support, and debt relief have helped GDP, exports, investment, income, and consumption grow faster in recent years in SPA countries, on average, than in other African countries. Countries with the earliest reform programs and better economic manage-

ment have tended to have stronger macroeconomic performance than those where reforms are more recent or weaker. Within the SPA framework, donors and creditors mobilized about \$15 billion in adjustment support, including the value of debt relief, in 1988-90 for the 22 countries eligible for the SPA, which enabled them to restore the import growth needed to strengthen the impact of reforms and increase investment and consumption. Total adjustment support and debt relief to countries eligible under the first SPA amounted to \$18 billion, or more than 95 percent of estimated requirements. The SPA helped move toward a workable solution to the debt problems of low-income Africa by achieving a consensus that concessional debt relief, together with aid, should be part of a coordinated strategy to assure adequate adjustment resources. For the second phase of the SPA, about \$22.5 billion in adjustment financing and debt relief is projected to be required for countries that are, or may become, eligible for the SPA, although the actual amount will depend on future policy performance and the evolution of many exogenous factors.

These findings show the importance of continued balance of payments financing in sustaining consumption, raising investment, and making investments more productive. The research suggests that discussions of aid policy should focus less on the mix between adjustment and project financing and more on raising domestic savings and productive investment in a more liberal and decentralized policy environment.

*Responsibility:* Africa Technical Department, Trade and Finance Division—Charles Humphreys, with collaboration of the International Economics Department, Debt and International Finance Division; Africa Regional Office, Office of the Chief Economist; and Country Economics Department. With funding from the UK Overseas Development Association.

*Completion date:* April 1990.

### MFA Model

By 1989 more than 60 percent of the developing country exports were manufactures, and a quarter of that was clothing and textiles. Yet clothing and textile exports from developing countries to most OECD markets have been restrained by the Multi-Fibre Arrangement (MFA), a framework for “voluntary” export restraints used to limit these exports to developed country markets. Eliminating the MFA has become one of the most important and contentious issues of the ongoing Uruguay Round.

Because the MFA generates rents for restrained exporters as well as “guarantees” a market share for less efficient exporters, some developing country exporters feared that doing away with the MFA would drastically reduce their exports. This research was an effort to estimate the effect of removing constraints by one or both of the major OECD MFA-restricting markets—the EC and

the United States—on both severely restrained and unrestrained exporters.

This work is part of a larger effort to develop a broader data base (used in this research), provide a book on the MFA for developing country negotiators, analyze the effect of different proposals to do away with the MFA, and estimate who captures the MFA rents—the exporter, as assumed so often, or the importer. The goal of the International Trade Division’s MFA work has been to provide an objective analysis of the MFA for the Uruguay Round negotiators.

A general equilibrium trade model with two markets (the United States and the EC) and six groups of suppliers was developed. The model has been used to estimate the trade-suppressing effect of the MFA, its trade diversion effect, and, most important, the spillover effect. The latter is an estimate of how much unrestricted developing countries have benefited from the restrictions imposed on other developing countries.

The spillover effect is much smaller than often alleged. The unrestricted developing countries seemed to have gained only US\$200 million in increased exports of clothing shipments—a mere 2 percent of total shipments from developing countries. Thus the removal of the MFA would have only a very limited effect on the usually smaller unrestrained exporters of clothing.

The trade suppression effect has been much larger. The restrained exporters have lost more than US\$1 billion in shipments, even in the short run. In the longer run, after supply expansions, they could have increased shipments by more than US\$2 billion. And the U.S. market seems far more restricted than that of the EC.

The cost of the MFA in lost trade is substantial for developing countries. But this has been relatively well known. What is not so well known, and what this research seems to show, is that relatively unrestrained exporters may lose little in exports if the MFA is eliminated. This gives all the more reason for the developing country negotiators to push for the end of the MFA at the Uruguay Round and expect that the cost of this would be limited to very few exporters while most exporters—including most unrestrained ones—would gain.

The findings of the research were discussed at a seminar held at OECD in Paris on July 2, 1990.

*Responsibility:* International Economics Department, International Trade Division—Junichi Goto and Paula Holmes.

*Completion date:* May 1990.

*Report:*

Goto, Junichi. 1990. “A Formal Estimation of the Effect of the MFA on Clothing Exports from LDCs.” PRE Working Paper 455. World Bank, Washington, DC.

## Foreign Direct Investment from the Newly Industrializing Economies

Direct foreign investment (DFI) from newly industrializing economies (NIEs) represents a significant source of capital, exports, technology, know-how, and employment for developing countries. This research focused on two central issues that have emerged as the NIEs have expanded their direct investment in developing countries. First, what are the characteristics of this new wave of NIE DFI, and how does it differ from past DFI flows? Second, what are the main factors motivating the choice of NIE foreign investment location?

Most NIEs invest offshore to regain competitiveness in major markets. The main factors motivating NIE DFI are currency appreciation and increased labor costs in the home country, access to major markets, the seeking of competitive advantage by upgrading technology, and procurement of raw materials. All these factors, except raw material procurement, distinguish the recent wave of NIE DFI from the first surge of developing country DFI in the 1960s and 1970s.

Many NIEs have dual strategies: investing in OECD countries to upgrade technology and investing in developing countries as export platforms. The NIEs have concentrated their developing country DFI in East Asia, mainly China, Thailand, Malaysia, and Indonesia, because of political stability, proximity, ethnic ties, labor costs and supply, and favorable investment incentives.

These findings suggest that developing country policymakers can increase their chances of attracting DFI from NIEs by making macroeconomic improvements and political stability top priorities. They should focus on improving physical infrastructure, human resources, local support industries, and information dissemination to inform NIE firms about local investment opportunities.

*Responsibility:* Industry and Energy Department, Industry Development Division—Carl Dahlman, Katherine Whitmore, and Jung-Taik Hyun. With Sanjaya Lall, Oxford University.

*Completion date:* May 1990.

## Analysis of the Cereals/Meat Economy in Developing Countries

As per capita incomes increase, consumption of meat and livestock products in developing countries rises much faster than consumption of foodgrains because of the higher income elasticity of demand for livestock products. Due to the high value added in production and preference for fresh products, developing countries have met the increased demand for meat largely by stepping up domestic production. As a result, the derived demand for grains, including imported feedgrains, has also increased. Look-

ing toward the future developments in the livestock sector in developing countries will likely be a major determinant in world grain demand.

This research addressed the following questions:

How does food consumption change when a country undergoes rapid economic growth?

How does the market demand for such staple cereals as rice change as average per capita incomes increase?

How does the market demand for other nonstaple cereals and for meat change as average per capita incomes increase?

What are the implications for food policy and food development strategy for developing countries?

Time-series and cross-section data on food consumption, expenditures, and prices were used in estimating changes in income elasticities for cereals and meats. The demand systems approach was used in the empirical analysis. Unlike most previous work, this analysis disaggregated different cereals into staples and nonstaples. Per capita consumption data indicate significant increases in wheat and wheat flour consumption, and higher consumption of meat and dairy products. Per capita consumption of rice has been declining in several rapidly growing developing countries. The research also tested the effects of urbanization on, and forecasted changes in, food consumption patterns.

In the Republic of Korea, both the increases in per capita income and the increasing urbanization explain the declining role of rice and barley and the increasing importance of beef, pork, chicken, and wheat flour in the diet. The demand estimation results have interesting implications. The income elasticity for rice shows a declining trend and became negative in the 1980s. This implies that the rice surplus will grow if production is not adjusted downward.

Given the declining trend in the income elasticity of rice and per capita rice consumption, the restructuring of grain production to adjust to these changes will be an important issue in farm policy. The elasticity estimates and forecasts should provide a basis for calculating the costs and benefits of policies that would affect the production and consumption of these important foodstuffs.

*Responsibility:* International Economics Department, International Commodity Markets Division—Don Mitchell. With Merlinda Ingco, consultant.

*Completion date:* June 1990.

## EC-92 and Sub-Saharan Africa

Sub-Saharan African countries have expressed grave concerns about the possible effects on them of the EC's Single Market Act. No research on all potential effects was under way; thus this study was undertaken. It is part of the ongoing effort by the International Economics Department

to evaluate the effect of the global environment on developing countries.

The research consisted of several steps. A list of Single Market Act changes, both announced and likely, was compiled and supplemented by discussions with EC officials and a literature review. The possible effect of these actions on African countries, or groups of African countries, was estimated using partial equilibrium techniques, with a priority ranking. Recommendations were then made for changes to domestic or EC policies and programs to ameliorate the adverse effects or to take advantage of positive effects.

For the most part EC-92 will have only a limited impact on African countries, despite the close trade ties. But decisions on bananas, some excise taxes, and government procurement (for aid contracts) could affect some countries positively. Environmental and health standards will adversely affect some phosphate and food exporters.

African policymakers may be able to influence EC-92 choices on bananas and some tax and visa decisions to ensure a positive effect. They should also move to upgrade standards of many food exports and phosphate refineries and insist on EC-wide bidding on European bilateral aid projects.

*Responsibility:* International Economics Department, International Trade Division, and Africa Technical Department, Trade and Finance Division—Charles Humphreys. With Alfred Toviias, Hebrew University, Jerusalem.

*Completion date:* June 1990.

*Report:*

Toviias, Alfred. 1990. *The European Community's Single Market: The Challenge of 1992 for Sub-Saharan Africa*. World Bank Discussion Paper 100. Washington, DC.

### How Did Workers Benefit from Bolivia's ESF?

Bolivia's Emergency Social Fund (ESF) was one of the first World Bank-funded efforts to address the social costs of adjustment by including a separate compensatory program. The desirability of implementing such programs as the ESF cannot be judged solely on the basis of administrative records: these provide only measures of the inputs of the program. To judge the effectiveness of the ESF's institutional structure, its role in compensating those adversely affected by the structural adjustment, and its contribution to protecting the poor during adjustment requires information on the outputs of the program—on the value of the infrastructure created and the impact of the program on beneficiaries. This research concerned measuring the effect of the ESF program on the employment and income of workers in the ESF projects.

Data from a 1988 household survey of ESF workers

and the population at large were analyzed, yielding information on the characteristics of the ESF workers relative to the population at large. An econometric model was then used to answer a counterfactual question: what would the position of the ESF workers have been without the program?

The average ESF worker received a 32 percent increase in wages, an increase of 15.5 hours of work a week, and a 42 percent increase in earnings. Those who would have been least well-off without the program received the greatest benefits from participating in the program. Although most workers still received low incomes even with the program, there was some leakage; some individuals in the higher earnings deciles benefited from the ESF. The ESF did not target former miners and former employees of the public sector.

The information from the survey helped to demonstrate what was and was not accomplished. An employment generation program that used private subcontractors was seen to generate rapidly temporary benefits to a mostly low-income group with low administrative costs. If the targeting is acceptable, then this type of temporary employment scheme may be a viable alternative to programs in which the government hires workers directly.

*Responsibility:* Population and Human Resources Department, Welfare and Human Resources Division—John Newman and Menno Pradhan, and Southern Africa Department, Population and Human Resources Operations Division—Steen Jorgensen.

*Completion date:* June 1990.

*Report:*

Newman, John, Steen Jorgensen, and Menno Pradhan. Forthcoming. "How Did Workers Benefit from Bolivia's Emergency Social Fund?" *World Bank Economic Review*.

### Nontariff Barriers of Industrial Countries

This research analyzed the direct costs of developed countries' nontariff barriers and their effects on developing countries' trade and growth prospects. The costs of protection for the countries imposing nontariff barriers were also analyzed. The findings have direct relevance for negotiations such as the Uruguay Round because detailed records are presented on trends, the incidence, and effects of industrial countries' nontariff barriers. A theoretical analysis is also presented on approaches for quantifying the effects of NTBs. The study is part of a larger effort in the World Bank dealing with problems of trade and protectionism.

The research was based on detailed analysis of records on NTBs in the UNCTAD Data Base on Trade Measures. These computerized files allow computation of trade coverage and frequency indices for OECD countries' NTBs and trends in their application. Partial equilibrium

models were also developed and used to simulate the trade effects of these restrictions.

Although tariffs have been steadily reduced through a series of multilateral trade negotiations, such as the Uruguay Round, there has been a major increase in OECD countries' NTBs. These measures are often concentrated in sectors of special export interest to developing countries.

*Responsibility:* International Economics Department, International Trade Division—Alexander Yeats and Samuel Laird.

*Completion date:* June 1990.

*Reports:*

Laird, Samuel, and Alexander Yeats. 1990. *Quantitative Methods for Trade Barrier Analysis*. London: Macmillan Press.

\_\_\_\_\_. 1990. "Trends in Developed Countries' Nontariff Barriers, 1966-1986." *Weltwirtschaftliches Archiv* (June).

### **Analysis Plans for Understanding the Social Dimensions of Adjustment**

Improved poverty-conscious macroeconomic and sectoral policy management requires the development of analytical instruments to deal with the identified difficulties and to guide country-based research and economic and sector work. The Analysis Plans were developed for this purpose. The Analysis Plans present detailed conceptual and methodological treatises on how to analyze key social dimensions on the basis of cross-section household survey data. They are meant to guide researchers in the countries participating in the Social Dimensions of Adjustment Project, and they form the basis for training materials to be developed as part of the capacity-building activities. The Analysis Plans bring the conceptual, empirical, and policy framework, developed earlier to link macroeconomic and sectoral policies to household-level outcomes, closer to practical application. This is accomplished in the Analysis Plans through methods of descriptive, tabular analysis, and multivariate investigations likely to be required in country-based research.

Social dimensions of adjustment are identified along three broad axes: the markets in which the poor trade (labor and credit markets and markets for goods and services produced and consumed by the poor); the human resource sectors (education, health, food security, and nutrition); and the livelihood conditions of selected socioeconomic groups likely to harbor a particularly large fraction of people below the poverty line. In line with the three axes, the Analysis Plans focus on the nature, extent, and—to a degree—cause of poverty; labor markets and food markets; human resource effects of structural adjustment in health and education; and the effect of adjustment on women and smallholders. The analysis strategy posits a two-step analytical approach: macro-meso analysis to determine the effects of macroeconomic policy reform on

the meso-economy (markets and infrastructure) and meso-micro analysis to trace household-level effects and responses to meso changes.

*Responsibility:* Africa Technical Department, Social Dimensions of Adjustment Unit—Marco Ferroni, Lionel Demery, Christiaan Grootaert, Michel Noel, Lemma Merid, and Jorge Wong-Valle. With Joseph Mullen, IFAD; Richard Pearce; Tony Addison, University of London; Paul Collier, Institute of Economics and Statistics, Oxford University; Mark Pitt, Brown University; Jere Behrman, University of Pennsylvania; John Hoddinot; Roger Hay; and Graham Eck.

*Completion date:* July 1990.

### **Impact of Direct Foreign Investment on Japan's Imports**

Japan is now the second largest economy, and its imports of manufactures have been expanding rapidly in recent years. And yet, the ratio of manufactured imports to GNP for Japan is unusually low compared with other industrial countries. Many studies have pointed out marketing difficulties as a major reason for the low ratio. The finding that high percentages of Japanese affiliates' sales are directed to the Japanese market in certain manufacturing subsectors points to the possible usefulness of Japanese direct foreign investment (DFI) in promoting developing countries' exports to Japan.

This research was based on relevant data from published primary sources (ministries of finance and international trade and industry) and UN trade statistics, collated to show trends in Japan's subsectoral imports from DFI affiliates in developing countries during 1972-86.

Japan's DFI in developing countries has been export market-oriented. Exports have been the dominant sales destination for the affiliates. In manufacturing, although local markets have been the main destination, the share of exports increased steadily between 1972 and 1986. The share of Japanese affiliates in Japan's imports of manufactures from Asia has been particularly high in electrical, transport, precision, and general machinery. One way for developing countries to penetrate the Japanese market, alleged to be difficult to break into, could be to rely on the expansion of Japan's intra-firm imports—particularly for machinery production—from Japanese manufacturing affiliates in these countries.

The findings of the research were presented at the Second Conference of the East Asian Economic Association, held in Bandung, Indonesia, August 27-28, 1990.

*Responsibility:* International Economics Department, International Trade Division—Kenji Takeuchi.

*Completion date:* July 1990.

*Report:*

Takeuchi, Kenji. 1990. "Does Japanese Direct Foreign Investment

Promote Japanese Imports from Developing Countries?" PRE Working Paper 458. World Bank, Washington, DC.

## Two-Track Development

Divergence in the growth performance of the developing countries has persisted for nearly a decade. Its continuation into the 1990s could bring about instability in the global economic system. Understanding the principal causes of the divergence is crucial for projecting economic growth in the developing countries in the 1990s. This study is part of a larger research effort in the Analysis and Prospects Division for its long-term prospects paper.

Although theoretical considerations relating factor productivity to growth performance form the framework, the study is mainly empirical. More than 80 developing countries have been classified as either "low" or "high" performers, using long-term per capita income growth and investment-to-output ratios as the relevant indicators. Countries were classified as "high performers" if they had average per capita income growth of 2.0 percent or more in 1980-89 and were able to raise or maintain an investment-to-GDP ratio equal to or average for the group in the 1980s. Countries were classified as "low performers" if their performance failed to satisfy both the above conditions (they had falling or stagnant growth and disappointing investment performance in the 1980s).

Of 88 developing countries, only 14 could be considered "high performers" in the 1980s. Compared to high performers, the average low performer has a heavier external debt burden, a smaller manufacturing base, a less open economy, a lower ratio of manufacturing exports to output, high population growth, and less productive investment.

Dealing with the problems of "low performing" countries in the 1990s would mean paying far more attention to human resource development, controlling population growth, and raising investment efficiency. Transferring new technology to developing countries is likely to become even more crucial to their growth performance in the 1990s.

*Responsibility.* International Economics Department, Analysis and Prospects Division—Shahrokh Fardoust and Ashok Dhareshwar.

*Completion date:* July 1990.

## The Size and Role of the Parallel Economy

Artificial controls of prices and quantities create distortions that people try to bypass unofficially. This causes gaps in data and the generation of official statistics that do not properly reflect development and economic progress. This has implications for analysis and for Bank operations and policy—in the first place because the per capita income data is affected. This research tries to

identify how markets change as adjustment takes place and suggest indicators systematically to monitor such changes.

The study formulates an economic theoretic framework to define coherent, standard measurement procedures for parallel market activities and applies them to selected case studies chosen on the basis of the size of the deviation of the black market exchange rate from the reported official currency rate and the relative differentiation between the domestic and international price level.

The unrecorded part of the economy can account for more than a quarter of all economic activity in such seriously distorted economies as Syria, Tanzania, Zaire, and Myanmar. Failure to take this into account has serious implications for Bank and UNDP lending, understanding domestic and international linkages and institutional bottlenecks, and developing appropriate prices and employment policies.

*Responsibility:* International Economics Department, Socio-Economic Data Division—Michael Ward and Michael Hee, and International Economics Department, International Economic Analysis and Prospects Division—Nemat Shafik. With Ann Chadeau, OECD, Paris.

*Completion date:* July 1990.

## Structural Adjustment and Poverty: A Conceptual, Empirical and Policy Framework

In the 1970s Sub-Saharan African countries encountered a combination of internal and external shocks that led their economies to chronic imbalances and a deterioration in the well-being of their populations. The adverse effects of exogenous shocks were also exacerbated by inappropriate domestic economic policies. In many cases, even after the recognition of the unsustainable macroeconomic conditions, corrective policy response was at first slow in coming; where response was fast and sustained, the social conditions have continued to falter as the unintended and unexpected results of the process. Through both the pre- and post-adjustment processes, newly poor and vulnerable groups have been created, adding to the number of those persistently poor. But some of the poor have been largely bypassed during the recession or by government policy prior to adjustment, and they may be relatively unaffected by recent policy changes.

Against this background, this paper attempted to improve understanding of the links between macroeconomic and sectoral policies and household welfare in Sub-Saharan Africa. The study is perceived as the start of ongoing research on these issues in the Social Dimensions of Adjustment (SDA) Unit.

The paper is divided into three main sections. The first discusses the conceptual framework of the SDA program, which establishes the broad theoretical underpin-

nings of the policy approach and the main concepts that will be used. The section explores the causes and the diversity of the macroeconomic disequilibria encountered by Sub-Saharan African countries, identifies the channels through which macroeconomic and sector policies are mediated to produce household-level outcomes, and provides the underlying rationale for taking the household as the unit of analysis. Because economic processes and policies can affect household members differently, it underscores the necessity for understanding the characteristics of household members, who continue to be adversely affected by policies and circumstances. This section sets the stage for further investigative studies and provides the necessary economic rationale for empirical work to be both consistent across countries and helpful for policy design.

The paper's second section applies this conceptual framework in a real-world setting by outlining an empirical framework for data analysis. This section aims to provide guidelines to participating country teams in assembling and analyzing the necessary data to achieve the objective of the SDA initiative. Besides macroeconomic data, the section emphasizes the need for meso-data (on markets and infrastructures) and micro-data as the basis of analysis and as an ingredient in the hierarchical information system required for tracing the effects of policies on household welfare. It also introduces the three data instruments to be implemented in participating SDA countries—the Integrated Survey, Priority Survey, and Community Survey.

The third section explores the main policy issues that must be faced by governments in integrating social dimensions in the design of their structural adjustment programs and development plans. Following the identification of socioeconomic groups, this section addresses the key policy problems of assisting target groups without at the same time causing distortions in the economic mechanism. It discusses the main policy instruments—those employed in the recent past and those most likely to be used in the future—and suggests appropriate policy design for halting the spread of poverty and improving the situation of the poor. It underlines the importance, in designing poverty-sensitive adjustment, of modifying policy so as not to undermine the attainment of efficiency and growth and the reduction of macro imbalances.

The paper has been discussed at several workshops and seminars in and outside of Africa, and it is planned to be published as a book.

*Responsibility:* Africa Technical Department, Social Dimensions of Adjustment Unit—Christiaan Grootaert, Timothy Marchant, Michel Noel, Lionel Demery, Tom Stephens, and Marco Ferroni. With Tony Addison, University of London; and Jeffrey Round, University of Warwick.

*Completion date:* July 1990.

## **Bank-GEM: A Global Model for IEC Use**

Bank-GEM is needed to improve the quality of the products of the Analysis and Prospects Division of the International Economics Department (IECAP), including materials for the World Development Report and the Short-Term Outlook and Long-Term Prospects papers. And it will provide a framework for IECAP's exchange of information with the Organization Planning Staff through the annual Unified Survey.

Today, the Global Economic Model (GEM) from NIESR is applied in IECAP's model-based forecasts. This model—and most other world models—lacks satisfactory developing country models. The aim of the research is to develop a global, intertemporally consistent system with North-South feedbacks.

A survey will be made of earlier approaches to developing country modelling. This includes research by the Bank, the International Monetary Fund, and the consultants to the Bank-GEM project. To identify the prototype developing country model, suggestions from the survey will be put into the IECAP context—that is, the objectives of IECAP's products and the constraints on the manufacture of these products, especially the data availability. Institutional and statistical criteria for pooling data will be used for estimation purposes.

*Responsibility:* International Economics Department, Analysis and Prospects Division—Christian Petersen and Karsten Pedersen. With W. McKibbin, Brookings Institution; and D. Vines, University of Glasgow.

*Completion date:* August 1990.

## **Japan's Direct Investment in Asia**

Japan's direct foreign investment (DFI) has grown with spectacular speed in recent years. Asia has been a main destination of Japan's DFI. It is no coincidence that the fast-growing countries in East Asia are major recipients of Japan's DFI.

Other researchers have argued that Japan's DFI differs from conventional DFI from the United States and Europe. Are they really different? If so, why? Understanding Japan's DFI in Asia is useful not only for foreseeing the future flows of DFI from Japan but also for understanding newly emerging flows of DFI from Asia's newly industrializing economies (NIEs).

This study compares Japan's DFI with that of other countries and points out a few basic characteristics. Then, looking back in history, it tries to explain the background. Special emphasis is given to analyzing DFI by small and medium-sized companies. The study also discusses the theoretical explanation of the characteristics of Japan's DFI and tries to provide some insight into future trends.

Japan's DFI has been characterized by its "reluc-

tance." Many Japanese companies did not go overseas willingly, but were forced to by economic and political reasons, even at premature stages. This premature nature explains most of the distinct features of Japan's DFI.

The current surge in Japan's DFI to Asia consists of two types: the traditional "reluctant" DFI motivated by a drastic shift in Japan's currency, which will lose steam before long, and a more positive type of DFI, similar to those by conventional multinational corporations, which will make up the loss.

This study provides clues for forecasting the flow of Japan's DFI to Asia. The recent surge of DFI from Asian NIEs seems to resemble Japan's traditional DFI. If so, this study will also give some insight into the prospects of this DFI.

*Responsibility:* International Economics Department, Analysis and Prospects Division—Shuichi Ono.

*Completion date:* August 1990.

### **Lending to Developing Countries as Part of a Wider Risk to U.S. Commercial Banks**

The future of U.S. commercial bank lending to the developing countries depends on the financial condition of all the major borrowers, not only on the creditworthiness of the developing countries or on bank exposure to developing country debt. A major reason is that loan losses on lending to domestic borrowers may lead banks to build capital/asset ratios. This works to restore bank creditworthiness and to offset greater uncertainty in lending. The other major reason is that the growth of commercial bank lending is cyclical. The downturn in the cycle is typically accompanied by a reduction in lending to relatively risky borrowers—so that some developing countries lose part of their share of lending.

The condition of the loan portfolio of U.S. commercial banks suggests that a cyclical downturn is imminent. This implies that growth of lending to the developing countries will weaken in the short term. Therefore, the developing countries should seek alternative sources of finance: foreign direct investment, equity securities, government-guaranteed lending, and, most important, domestic savings. But a cyclical upturn in bank lending is likely to develop over the medium and long term, offering renewed opportunities to creditworthy developing countries.

The state of the overall loan portfolio of the U.S. commercial banks exposes them to the risk of high losses relative to capital. This provides an incentive to build capital, partly by limiting the growth of lending. The process is accentuated by the introduction of higher and risk-based capital requirements. The result is an unfavorable environment for lending to developing countries over the short term. The U.S. economy appears to be near the peak of a leverage cycle. The downturn, if it develops, is

likely to be characterized by financial stress, credit rationing, and weaker lending to developing countries. If this cycle follows its historical pattern, there will be an upswing in bank lending over the longer term, providing new opportunities for creditworthy developing countries.

*Responsibility:* International Economics Department, Analysis and Prospects Division—Menahem Prywes.

*Completion date:* August 1990.

### **Phasing Out the Multi-Fibre Arrangement**

About 10 percent of world trade is in textiles and clothing. More than half the textiles and clothing exported comes from developing countries, for which they are the most important manufactured product. Most of these exports are subject to quotas in industrial country markets under the Multi-Fibre Arrangement (MFA), which is a derogation of the General Agreement on Tariffs and Trade (GATT). Under the Uruguay Round of Multilateral Trade Negotiations, ways of dismantling the MFA are being negotiated. Just as the MFA has affected different exporting countries differently, so too will any negotiated phaseout of the MFA have different effects. These depend on the type of phaseout and the parameters chosen for that purpose.

This research reviewed the different phaseout proposals. An MFA-based phaseout and a transitional global quota-based phaseout are the two leading approaches. The main instruments were investigated and parameters of the two methods suggested by exploring their implementation with actual data, with all the detail and practical problems that are involved. The numerical exercise draws on the International Trade Division's MFA data base, which contains detailed information on quotas and shipments.

Under both leading scenarios, accelerated quota growth is the main device for phaseout. Country quotas, in the first approach, and global quotas, in the second, will have to expand in such a way as to avoid a "shock" when they are abolished at the end of the phaseout. The guideline in the MFA was a 6 percent annual quota growth. But there were large variations in quota growth across products and suppliers and across markets, and on the whole quotas expanded at a significantly lower rate. Growth in highly utilized (that is, filled and binding) quotas was significantly lower compared with unfilled quotas.

Global quotas introduce nonselectivity to the system. But they allow the importing countries to continue exercising their "historical rights" by determining the volume of trade, while denying (or diluting) the "guaranteed" market shares of individual exporters. This is a loss mainly for the inefficient suppliers whose performance is closely related to the existence of country quotas. Although some exporters would be considerably worse-off under the U.S. proposal based on global quotas, the overall restric-

tiveness of this transitional regime is related to its suggested parameters rather than the inherent nature of this modality. Global quotas could be set up quite generously, with a significant margin above the current import levels.

An MFA-based phaseout appeals to many developing countries because, in principle, the "acquired rights" of the exporters can be preserved—although not for long. When substantial quota expansions take place, as the quotas on efficient suppliers are relaxed, quota holdings will be worthless. This is desirable for efficiency.

Given the large variations in historical quota growth rates, the negotiating parties may consider allowing some differentiation in quota growth rates during the phaseout, particularly across product categories.

The second most important element in the phaseout proposals—besides expanding quotas and abolishing them at the end of the phaseout period—is scrapping them along the way according to some predetermined criteria and scheme. In this context, scrapping unfilled quotas in stages, depending on their use record, would hasten the dismantling of the MFA by allowing the concentration of efforts to deal with binding quotas.

There is an additional virtue in a phaseout based on the current structure of the MFA. Not only are the mechanisms in place familiar to the negotiating parties, but so are the magnitudes of most of the parameters: current quota levels, quota growth rates over the last few years, and their use ratios. If this approach is adopted, however, the parties must make a concerted effort to keep in mind that this is not an extension of the MFA, but its abolition.

*Responsibility:* International Economics Department, International Trade Division—Refik Erzan.

*Completion date:* August 1990.

*Reports:*

Erzan, Refik, and Paula Holmes. 1990. "An Evaluation of the Main Elements in the Leading Proposals to Phase Out the Multi-Fibre Arrangement." PRE Working Paper 483. World Bank, Washington, DC.

\_\_\_\_\_. Forthcoming. "Phasing Out the Multi-Fibre Arrangement." *World Economy*.

## RMSM-XX

This research intends to improve the modelling capabilities at the Bank. It seeks to construct empirical macroeconomic models that can be used for policy analysis. The models will include a behavioral structure that describes the interactions between key relative prices (the real exchange rate, the real interest rate, and the real wage) and the internal and external balances of the economy, and a consistent accounting framework that guarantees the consistency of its policy simulations.

The task is part of the ongoing modelling exercise in the Macroeconomic Adjustment and Growth Division of

the Country Economics Department. The previous step in this exercise was developing the RMSM-X model.

Several pilot models, based on a common framework, are being constructed. Each is applied to a country. The models are econometrically estimated and then used to perform policy experiments.

The RMSM-XX family of models will provide a very useful tool for evaluating policy alternatives and economic prospects. It is expected that they will be widely used by the Bank's operational staff.

*Responsibility:* Country Economics Department, Macroeconomic Adjustment and Growth Division—Luis Servén.

*Completion date:* September 1991.

## Inflation and Stabilization in Socialist Economies

A range of socialist economies is undertaking structural reforms in the transition to a market economy. Such reforms appear invariably to be associated with the translation of repressed inflation into open inflation and the rapid acceleration in open inflation. Such inflation threatens the role of prices as an allocative tool and undermines the political sustainability of reform. This research has sought to answer the following questions: What factors drive inflation in socialist economies? How can they be measured? What policies can be used to weaken inflationary pressures in the reform economy?

The research work on Poland and Hungary has been combined with other work by consultants and World Bank and IMF staff on inflationary experiences in other socialist economies (for example, Yugoslavia) and presented at an Economic Development Institute conference on "Managing Inflation in Socialist Economies," in March 1990 in Laxenburg, Austria and Warsaw.

The research is based on detailed country-specific analysis relying mainly on aggregate data provided by central bank authorities, ministries of finance, and the standard Bank and IMF data bases. Price and wage equations have been estimated using error correction models. The final estimations have been simultaneous, exploring the price-wage dynamics in these economies. Estimations have been made following the set-up of a structural inflation model for socialist economies and its reduced form. The work has concentrated on the macroeconomic effects of price reforms in economies in which two-tier pricing systems operate. A macro-dynamic model is developed that looks at the effects of changes to controlled or market prices in such an environment and demonstrates the inflationary outcomes that can result.

The underlying mechanisms for sustaining inflation in socialist economies are no different from those operating in other economies. Shifts in the price level attributable

to price reforms have been validated by underlying fiscal-monetary factors. But the inflationary outcome has depended also on the interaction of price movements in administered and market prices. Demand-side pressures matter because they act on the relative price of controlled and noncontrolled goods and hence ultimately affect the timing and scale of adjustments to controlled prices. A feature of these economies has been the way in which enterprises price their outputs: cost-plus pricing rules establish a straightforward transmission mechanism for costs to prices. The absence of market discipline and competition has facilitated this procedure.

The research indicates the mechanism by which inflation is propagated in socialist economies. It indicates the way in which certain institutional features (including concentration, absence of competition, and social ownership) couple with particular rules for price and wage formation to drive inflation once decentralization of decision-making is begun. The research indicates the way in which price liberalization measures need to be complemented in the transition by institutions and incomes policy measures if inflation is to be controlled.

The papers from the seminar "Managing Inflation in Socialist Economies" will be published in a volume by the Economic Development Institute.

*Responsibility:* Economic Development Institute, National Economic Management Division—Simon Commander, and Country Economics Department, Macroeconomic Growth and Adjustment Division—Fabrizio Coricelli.

*Completion date:* November 1990.

### Adjustment Without Response

This research project examines barriers to production response to adjustment measures in less developed African economies, addressing the following questions:

Are markets missing, or are they too thin to generate a supply response?

Are there few agents with business or technical skills or with sufficient financial resources to enter production? Or are economic agents unable to convert these endowments into productive resources because of barriers to entry?

What is the nature of those barriers? Are they policy-related, or are they more tacit, linked to the political economy of the business landscape (for example, special ties and deals between government elites, and well-connected business groups and business communities unwilling to absorb, train, and promote indigenous personnel)?

If the latter, is the exploitation of existing opportunities preempted by monopolistic practices and other strategic barriers set up by private agents (and governments)? Or is the problem one of constrained demand, with few

"trading" opportunities available?

Is market development constrained by difficulties of enforcing contracts?

The purpose of the project is to establish a set of hypotheses about factors blocking production response. These hypotheses will then be field-tested during micro-oriented missions relying on in-depth interviews with traders and producers in more dynamic rural and urban areas and with government officials and aid workers.

It was found in Malawi that barriers to investment for larger producers and traders are related to administrative practices and bureaucratic habits. Small and micro producers lack access to finance and to larger and quickly growing markets. A proposed strategy would include speedier decisions and the facilitating of investment, combined with less stringent location rules and improved market connections.

More attention needs to be paid in the design of adjustment policies and lending operations to the nature of markets and the barriers to their development in the least developed economies, including different traits of agents by size of operation, ethnic background, and so on.

*Responsibility:* Southern Africa Department, Country Operations Division—Kathie Krumm, and Industry and Energy Department, Industry Development Division—Claudio Frischtak.

*Completion date:* December 1990.

### EMENA Manufactured Exports and the EC

This research aims to help identify elements of export development strategy for EMENA countries in the EC markets for manufactured products. Research questions addressed include the following: (i) What is the significance of the EC as a market for EMENA manufactured exports? (ii) What are the opportunities and challenges posed by the EC-92 program for EMENA exporters and export products? (iii) Which marketing strategies have been or are likely to be successful in the EC markets?

The study is based on (i) desk studies of EMENA countries' trade and adjustment policies; (ii) a review of trade flows to assess past export performance; (iii) discussions with Bank staff to assess factors affecting export performance and prospects; (iv) a review of Bank operational experience with export development in EMENA countries; (v) inputs by other Bank experts on such topics as EC nontariff barriers against EMENA exports, the role of bilateral agreements between EMENA and EC countries, and trends and prospects for financial flows; and (vi) a review of marketing arrangements and the EC-92 program by consultants based in Europe.

Changes under the EC-92 program will have important implications for EMENA manufactured exports. Trade policies in EMENA countries have not been fully responsive

to international markets and competition.

Bank operations must take account of both supply and demand factors in export development. Policies and institutions in developing countries must adjust to growing market competition in trade. Marketing strategies and trade liberalization must receive greater emphasis.

*Responsibility:* Europe, Middle East and North Africa Technical Department, Industry and Energy Division—Dhananjaya Kumar, and Policy, Research and External Affairs. European Research Associates, Brussels; LBM Mennes, Rotterdam; Jacob Kol, Rotterdam; and Trade Development Institute, Dublin are participating in the study. Funding is also being provided by the Belgian, Dutch, and Irish Trust Funds.

*Completion date:* December 1990.

### **Poverty and Price Measurement**

This research project is designed to provide an overview of the extent to which average per capita income exceeds the cost of basic sustenance (including fuel) over a 20-year time span for 60 developing countries. This "basket" is assumed to be a proxy for the income level of the poorest in a country. This study compiles a "cost of basic sustenance" measured at international prices that, together with Atlas GNP per capita estimates, is used to gauge economic progress over the years. The differences between urban and rural prices and between formal and informal markets are analyzed separately.

Each country's food supply and use account for 1980, as compiled by the Food and Agriculture Organization, was linked to its corresponding FAO time series on calorie supply per capita, identifying only those food items that make substantial contributions to calorie supply. These items were then assigned nominal US dollar values based on world wholesale market prices or their nearest equivalent on the assumption that countries always have the option to acquire goods at such international prices if they so choose when their own prices are higher. To this was added the cost of average energy consumption to define the basic basket of sustenance.

By comparing GNP per capita and "basic commodity cost," it is possible to determine which countries were developing in the 1970s and 1980s and which were regressing.

Apart from issues of broad macroeconomic analysis, the numbers highlight possible deficiencies in the national accounts that form the basis of development modelling. Comparing commodity baskets at domestic prices as well as world wholesale prices also throws up interesting policy issues.

*Responsibility:* International Economics Department, Socio-Economic Data Division—Michael Ward, David Cieslikowski, Donna See, and Daniel Achamorfa, and International Economics Department, Systems

Division—Barbara Kaminska. Eurostat, Luxembourg, and the FAO are participating in the study.

*Completion date:* December 1990.

*Reports:*

O'Connor, John. "Who Was Developing in the 1980s?" IECSE Working Paper. World Bank, Washington, DC.

Ward, Michael. 1988. "Prices and Their Effects on Household Expenditures in Developing Countries." Presented at the UNDP North-South Roundtable "Development: The Human Dimension," Amman, Jordan, 3-5 September.

### **Price Dynamics in Turkey in the 1980s**

Turkey has had persistent macroeconomic imbalances, the prime symptom of which is high inflation. This research examines the short-run factors that determine the inflation process in Turkey. The research is based on statistical analysis of aggregate and disaggregate price data and interviews with government officials and industry experts on the process of price setting.

Money supply growth and exchange rate depreciation both exerted inflationary pressure in the short run. Wage increases, which were generally less than inflation in the 1980s, contributed to somewhat lower inflation than would otherwise have prevailed.

Policy strategy to stop inflation must take account of inflation inertia, but monetary policy can be the leading instrument for disinflation. Policies for exchange rates, wages, and public prices can play a supporting role, but do not need to play a leading role that would get them out of line in relative terms.

*Responsibility:* Europe, Middle East and North Africa Country Department I, Country Operations Division—Paulo Vieira da Cunha and Shideh Hadian, and Country Economics Department, Macroeconomic Adjustment and Growth Division—Steven Webb and Heidi Zia. With Alan Isaac, American University. The Turkish Central Bank is also participating in this research.

*Completion date:* December 1990.

### **Price Formation**

To improve commodity price forecasts, it is crucial to gain better understanding of commodity price behavior and of formation of price expectation. Research in this area falls under two broad categories: the main determinants of commodity prices and the evaluation of commodity price forecast performance.

Research under the first category attempts to establish the relationship between commodity prices and such key determinants as income, exchange rate, and interest rate, as well as between different commodity prices. Establishing such relationships can lead to improvements in the forecasts of commodity prices. The main focus of the second category of research has been to establish the extent

and nature of biases in the formation of commodity price forecasts. Forecasts can be improved by reducing biases.

The methodology of this research project is based on regression, analysis, and tests for integration and cointegration.

Changes in macroeconomic variables greatly affect commodity prices, particularly movements in exchange rates, interest rates, and industrial production. And commodity prices tend to move together in the long run due to the common macroeconomic shocks affecting the commodity markets.

The Bank's short-term commodity price forecasts show systematic errors, but they are not necessarily irrational, nor are they inferior to naive forecasts on futures prices. The forecasts can be improved by weighing in more heavily the latest changes in prices.

*Responsibility:* International Economics Department, International Commodity Markets Division—Takamasa Akiyama.

*Completion date:* December 1990.

*Reports:*

- Choe, B.J. 1990. "Commodity Price Forecasts and Futures Prices." PRE Working Paper 436. World Bank, Washington, DC.
- \_\_\_\_\_. 1990. "Rational Expectations and Commodity Price Forecasts." PRE Working Paper 435. World Bank, Washington, DC.
- Ghura, D. 1990. "How Commodity Prices Respond to Macroeconomic News." PRE Working Paper 354. World Bank, Washington, DC.
- Palaskas, T., and P. Varangis. 1989. "Primary Commodity Prices and Macroeconomic Variables: A Long-Run Relationship." PRE Working Paper 314. World Bank, Washington, DC.
- \_\_\_\_\_. Forthcoming. "The Relationship Between Primary Commodity Prices and Macroeconomic Variables." In the Proceedings of the NCR-134 Conference on Applied Commodity Price Analysis, Forecasting and Market Risk Management, in Chicago, Illinois, April. Iowa State University.
- Qian, Y. 1990. "Do Steel Prices Move Together? A Cointegration Test." PRE Working Paper 453. World Bank, Washington, DC.
- Varangis, P. Forthcoming. "How Integrated are Tropical Timber Markets?" PRE Working Paper Series. World Bank, Washington, DC.
- Varangis, P., and R. Duncan. 1990. "The Response of Japanese and US Steel Prices to Changes in the Yen-Dollar Exchange Rate." PRE Working Paper 367. World Bank, Washington, DC.

### Research on GEM (Global Economic Model)

The Analysis and Prospects Division of the International Economics Department (IECAP) assesses the state of development from a global perspective and connects this information with research and policy advice at the country level. IECAP is unique in the Bank in monitoring the OECD and high-income countries. Its main responsi-

bility is to help articulate the Bank staff's view on the global state of development. To do this, IECAP requires state-of-the-art modelling tools. In ongoing efforts to develop these tools, research is needed to answer vital questions concerning global linkages, particularly in merchandise trade, capital, and factor income flows.

This project is directed toward addressing two important research questions: (i) What is the feasibility of constructing a consistent framework for linking small, country-specific models of LMICs with those of the high-income countries through flows of merchandise, capital, and factor income? (ii) What are the specifications for prototype sets of LMIC models?

The conceptual and technical aspects related to implementation of country- and region-specific linkages are being investigated, and consistency frameworks for the merging of economic, trade, debt, and factor service flows are under development. The simulation properties of the existing GEM system are being examined to gauge the appropriateness of this model as the foundation for an expanded global forecasting system. Alternative specifications for prototype models of LMICs are being investigated.

Research so far suggests two principal findings: (i) Given the Bank's data and computing facilities, it is feasible to construct country-specific data sets applicable to modelling and analysis—matrices covering merchandise trade linkage mechanisms relating to capital income flows are required. (ii) A hierarchical structure for segmenting groups of LMICs—based on such attributes as income levels, constraints, trade orientation, and institutional characteristics—is likely to offer valuable insight into the design of appropriate prototype model structures for LMICs.

These early findings suggest an increased likelihood of success in constructing a consistent, linked global model; an improved capability to simulate "baseline" and "alternative" scenarios; and improved capabilities for refining and imposing consistency on Bank projections.

The findings of the research are to be disseminated through an internal Bank seminar, the IEC Global Prospects Conference (1990-91), and a working papers or discussion papers series.

*Responsibility:* International Economics Department, Analysis and Prospects Division—Robert E. King and Christian Petersen, and International Economics Department, Socio-Economic Data Division. With T.G. Srinivasan, University of Glasgow; and David Vines, University of Glasgow and CEPR. The National Institute for Economic and Social Research, the United Kingdom, is also participating in this research.

*Completion date:* December 1990.

## Sub-Saharan African Adjustment Lending

This research focuses on how adjustment lending for industry affected different African countries and attempts to draw lessons for future policy dialogue. It addresses these questions:

Are there differences in the implementation of policy conditions between country groups (Sub-Saharan African countries compared to non-Sub-Saharan African countries)?

Are there differences in the relative emphasis of specific policy areas, and have these made any difference to recovery rates?

What has been the impact of industrial adjustment on industrial output, capacity utilization, exports, and industrial structure?

The research is based on an analysis of the Adjustment Lending Conditionality and Implementation Data Base of the Industry and Energy Department, Industry Development Division (IENIN), a review and analytical synthesis of country studies and industry impact studies from industry sector operations divisions in the Bank's Africa Region, and an analysis of IENIN surveys of small- and medium-scale enterprises in Ghana and Malawi.

Sub-Saharan African countries embarked on adjustment from a position of lower income, greater policy distribution, and more severe economic distress than most adjustment lending countries in other regions of the world. Industrial adjustment has met with mixed results. A few countries (Mauritius, Ghana, Kenya, Madagascar, and Senegal) have achieved credible recovery in response to sustained and consistent liberalization policies, though credit constrains further growth, especially of small- and medium-scale enterprises. In others, policy reversal and weak administrative capacity have delayed recovery. Significant structural changes at the subsectoral and firm levels may not be visible in aggregate data.

Well-designed industrial adjustment programs work in the long run when there is local ownership and commitment; policy is sustained, reviewed, and improved in stages; and external shocks (droughts, regional conflicts, and so on) are minimal or absent. The recently increased attention to financial system restructuring and other complementary policies in support of industrial adjustment programs should continue. It takes much longer than three to five years for industrial investment to recover.

*Responsibility:* Industry and Energy Department, Industry Development Division—William F. Steel and Mala Hettige. With John Wayem, consultant.

*Completion date:* December 1990.

## Tax Policy in Developing Countries: Conference Proceedings

The reform of tax systems is of fundamental importance for the success of macroeconomic and structural reform policies. The aim of this conference was to exchange views on the lessons from tax reform in developing countries, to discuss selected tax policy issues that will dominate discussions in the coming years, and to suggest a future research agenda for the Bank.

The conference drew on research carried out or sponsored by the Public Economics Division. The conference papers used a wide variety of methodologies, from qualitative judgment to computable general equilibrium analysis, for examining different issues.

Tax reform should be a key element of any comprehensive strategy for structural reform in developing countries. Particular policy lessons drawn from the conference are as follows:

(1) The value added tax should be an instrument of choice for most developing countries contemplating reform of their sales taxes.

(2) Base broadening of existing taxes should be pursued with concurrent tax administration reform.

(3) Use of the tax system for nonrevenue objectives should generally be avoided.

(4) Tax reform must recognize initial conditions at home and abroad.

(5) The credibility of a tax regime is the key to the success of any tax reform.

(6) Coordinated tax reform offers significant advantages over isolated piecemeal tinkering with the tax system.

*Responsibility:* Country Economics Department, Public Economics Division—Javad Khalilzadeh-Shirazi and Anwar Shah.

*Completion date:* December 1990.

*Report:*

Shirazi, Javad K., and Anwar Shah, eds. Forthcoming. *Tax Policy in Developing Countries*. Washington, DC: World Bank.

## Measuring the Social Dimensions of Adjustment in Ghana

After experiencing chronic macroeconomic imbalances caused by domestic and external shocks, Ghana launched comprehensive adjustment policies through the Economic Recovery Program (ERP) in 1983. But adjustment has caused short-term hardships for certain vulnerable groups, and many other households and individuals remain in poverty. Past studies on Ghana relate to the period before the ERP. More recent research on poverty has generally been based on "stylized facts." Designing a poverty-sensitive strategy of short-run adjustment and long-run growth necessitates understanding the nature,

magnitude, and determinants of poverty from different perspectives and identifying the channels through which macroeconomic policies are mediated to affect households.

This research aims to trace the links between economic policies and social conditions and poverty in Ghana. This task is facilitated by the Ghana Living Standards Survey (GLSS), which generates detailed information on incomes, expenditures, basic needs fulfillment, and other dimensions of the standard of living. The data for 1987/88, the first year of the GLSS, have been used in four papers establishing a poverty profile, identifying the status and determinants of the level of nutrition, and determining the gender dimensions of poverty and the implications of ERP for the labor market. Other studies that will address the status and determinants of basic needs fulfillment—such as education, health, and housing—are planned.

The studies are policy-relevant and available on a timely basis for policy decisions. The key to their relevance has been the availability of disaggregated household-level data through the GLSS. A family of decomposable poverty indices, supplemented by basic needs-based poverty indices, is used for the poverty profile. The nutrition study uses reduced-form econometric methods to identify the determinants of nutritional status. In cases requiring an understanding of the underlying behavioral response and parameter values, household models are specified and the corresponding parameters are estimated.

The four completed studies have found that poverty in Ghana is overwhelmingly a rural phenomenon: the incidence of poverty in rural areas is 11 times that in Accra. The disparity is even more marked in poverty measures that emphasize the depth of poverty. The poor fare badly in access to basic needs; they rely less on health consultations when ill; and literacy, numeracy, and school attendance rates are much lower for the poor. Malnutrition in Ghana remains high compared to other African countries. Nutritional status shows a strong regional pattern, with malnutrition increasing from south to north. Chronic malnutrition, but not acute malnutrition, decreases as income rises. Strong household composition and intergenerational effects have also been revealed. Gender is an important difference by which to disaggregate poverty. Females and female-headed households experience greater "moderate" poverty and fare badly in basic needs fulfillment. The labor market study found that there have been substantial gains for agricultural and industrial workers relative to service sector workers.

The studies address the policy concerns in Ghana and contribute to the policy dialogue with the country. They support an improvement in the rural/urban terms of trade through raising the producer prices of key agricultural commodities. They furnish an empirical framework for assessing the effect on poverty of the pricing of key

commodities. The findings on the poor's limited access to basic needs suggest more detailed sectoral or subsectoral interventions. Nutrition can be improved through geographic targeting and targeting women.

*Responsibility:* Africa Technical Department, Social Dimensions of Adjustment Unit—Marco Ferroni, Christiaan Grootaert, and Ravi Kanbur. With Harold Alderman, Cornell University; E. Oti Boateng, Ghana Statistical Services, Accra; Paul Beaudry, Boston University; and Lawrence Haddad, University of Warwick. The Ghana Statistical Services is participating in this research.

#### *Reports:*

- Alderman, Harold. 1990. *Nutritional Status in Ghana and its Determinants*. Social Dimensions of Adjustment Working Paper 3. Washington, DC: World Bank.
- Beaudry, P., and N.K. Sowa. Forthcoming. *Labor Market Policy and Structural Adjustment in Ghana*. Social Dimensions of Adjustment Working Paper 7. Washington, DC: World Bank.
- Boateng, E. Oti, Kodwo Ewusi, Ravi Kanbur, and Andrew McKay. 1990. *A Poverty Profile for Ghana, 1987-88*. Social Dimensions of Adjustment Working Paper 5. Washington, DC: World Bank.
- Haddad, Lawrence. Forthcoming. *Gender and Poverty in Ghana*. Social Dimensions of Adjustment Working Paper 9. Washington, DC: World Bank.

## Multi-Fibre Arrangement Rent Analysis

Available estimates of tariff equivalents of quotas and welfare calculations on the costs of Multi-Fibre Arrangement (MFA) quotas for developing countries assume perfect competition in both the product and the license markets. It is also assumed that the exporting countries that administer the MFA quotas receive the associated rents. In the presence of market power in product and license markets, the importing countries might retain part of this rent. Although the effect of imperfect competition on "rent-creation" has been analyzed in literature, "rent-sharing" has so far been ignored in both analytical and empirical work. Rent-sharing would substantially affect the estimated size of welfare losses suffered by developing countries due to MFA quotas. This argument is equally important for many other areas where quotas are in use.

U.S. imports of apparel products from Hong Kong serve as the pilot case for this study. A particular model of imperfect competition was not specified. The research investigated whether data conform to the predictions of the competitive model. The research starts with homogenous goods, the test is modified to take into account compositional differences, and, finally, differentiated goods are considered.

The work on license price paths is still very preliminary. Monthly Hong Kong license prices, quota availability, and the concentration of license holdings are the main elements of this analysis.

Historical data on U.S. imports of apparel products from Hong Kong do not conform with the predictions of the competitive model. There is evidence that importers retain a large part of the rents because of the MFA.

For price formation in the license market, a dynamic framework emphasizing the option value of licenses seems appropriate.

The losses of developing countries from MFA quotas can be substantially greater because, besides having reduced export volumes, they do not get the full amount of quota rents. This has wide implications for all welfare evaluations when quotas are involved.

A simple interpretation of license prices for policy formulation can be misleading. The proper framework is a dynamic option value model.

*Responsibility:* International Economics Department, International Trade Division—Refik Erzan. With Kala Krishna, Harvard University.

*Completion date:* February 1991.

### **Commodity Models**

To perform its tasks of evaluating the outlook for the primary commodities and analyzing the effect of interventions in the trade of primary commodities, the International Commodity Markets Division has an ongoing program of building, updating, and improving a set of global commodity models. Research is concentrated on improving the specification of supply and demand responses, improving the specification of the price formation process, and including in the models the scope to analyze the effect on specific countries and on the world market of domestic trade and taxation policies.

The division keeps up with the latest theoretical developments relevant to the specification and estimation of commodity models and their applications. Models are continuously revised to improve performance. The division has made advances in this area, particularly in the specification of the supply response of perennial crops.

Considerable effort has been devoted to converting existing models from WEFA to SORITEC software and to updating the data base and the models. Emphasis in the last fiscal year was placed on building and refining global commodity models on grains, cocoa, fiber, sugar, copper, petroleum, and vegetable fats and oils.

The models are used for forecasting and for the division's support of Operations in policy-reform work. Producer price and exchange rate simulations have been carried out for particular countries. And the models are used in marginal revenue analysis of the impact of World Bank projects.

*Responsibility:* International Economics Department, International Commodity Markets Division—Ron Duncan.

*Completion date:* June 1991.

*Reports:*

Gilbert, C. 1990. "The Rational Expectations Hypothesis in Models of Primary Commodity Prices." PRE Working Paper 384. World Bank, Washington, DC.

Ingco, M. "Demand for Meat and Foodgrains in the Republic of Korea and Japan." World Bank, Washington, DC.

\_\_\_\_\_. "Livestock Markets and Feedgrain Demand in the Republic of Korea." World Bank, Washington, DC.

Larson, D. "Modelling the Global Vegetable Oils and Meals Markets."

### **Debt Strategy Module**

The Debt Strategy Module (DSM) is a software package intended to be used by World Bank economists as a tool in analyzing the external debt of developing countries. It produces projections for future debt stocks and flows based on assumptions, including future new borrowings, future debt reorganizations, and future movements in the interest and exchange rates.

The Debt and Debt Service Reduction (DDSR) operations, designed to reduce a country's debt service or debt stocks, are implemented in DSM at fairly detailed levels. The linkages between the debt and the macroeconomic variables in the context of the DDSR are also built in some detail. Thus a DSM user is able quickly to produce alternative DDSR scenarios for the country and measure the implications of each scenario, including the cash flow and the macroeconomic implications. These implications can be analyzed for the short term (five to 10 years) or for the long term (15 to 30 years).

The effects of future changes in interest and exchange rates are captured by DSM with some detail and flexibility, enabling the economist to analyze the interest and exchange rate risks of the country.

*Responsibility:* International Economics Department, Debt and International Finance Division—Aysel Basci. With Deba Patnaik, consultant.

*Completion date:* June 1991.

### **Macroeconomic Adjustment in Reforming Socialist Economies**

The success of economic reform depends on a stable macro framework. The study of the impact and interactions between macro policies and structural reform is a main focus of this project.

The project addressed the following questions:

How should controlled prices be deregulated in a reforming socialist economy? Should they be deregulated all at the same time or gradually?

What is the impact on real economic activity of freeing prices in the short run? What is the role of the

market structure and the rules of behavior of enterprises?

What are the determinants of medium-term growth in economies being transformed from centrally planned to market-oriented?

The research is being conducted through the analysis of country experiences, development of simple, issue-oriented analytical models, and comparisons between reforming socialist and nonsocialist economies.

The deregulation of controlled prices may entail a protracted inflationary period if monetary policy is accommodating and fiscal deficits are not reduced. The response of output to stabilization and reform measures may take some time, perhaps more than expected.

*Responsibility:* Country Economics Department, Macroeconomic Growth and Adjustment Division—Andrés Solimano and Fabrizio Coricelli.

*Completion date:* June 1991.

*Report:*

Solimano, Andrés. 1990. "Macroeconomic Adjustment, Stabilization and Growth in Reforming Socialist Economies: Analytical and Policy Issues." PRE Working Paper 399. World Bank, Washington, DC.

### Macroeconomic Developments in Reforming Socialist Economies

This research analyzes the issues characterizing programs of macroeconomic adjustment in socialist economies. It is part of a larger research task that tries to analyze, both analytically and empirically, the main macroeconomic aspects of the transition from a centrally planned to a market economy.

The research analyzes the experiences of countries—Poland, Yugoslavia, and Bulgaria thus far—through descriptive information on development in these countries and through econometric analysis of some key aspects, such as price and wage formation and demand for money. The project has included participation in operational missions.

The absence of markets, both for capital and labor, typical in socialist economies, tends to increase the costs of stabilization programs in terms of output and unemployment. Certain structural reforms must precede stabilization programs and liberalization of the economy.

*Responsibility:* Country Economics Department, Macroeconomic Growth and Adjustment Division—Fabrizio Coricelli, Andrés Solimano, and Roberto Rocha, and Economic Development Institute, National Economic Management Division—Simon Commander. With Roman Frydman, New York University.

*Completion date:* December 1991.

*Reports:*

Calvo, Guillermo, and Fabrizio Coricelli. "Stagflationary Effects of Stabilization Programs in Reforming Socialist Countries: Supply

Side vs. Demand Side Factors." World Bank, Washington, DC.

Commander, Simon, and Fabrizio Coricelli. Forthcoming. "The Macroeconomics of Price Reform in Socialist Countries: A Dynamic Framework." PRE Working Paper. World Bank, Washington, DC.

Frydman, R., and S. Wellisz. "The Ownership Control Structure and the Behavior of Polish Enterprises During the 1990 Reforms: Macroeconomic Measures and Microeconomic Response." World Bank, Washington, DC.

### Tariff Reforms

This research project addresses some of the central issues in the design of tariff policy. In doing so, it seeks to answer the following questions:

When is tariff uniformity good? What are the political economy arguments for tariff uniformity?

When should inputs be subject to tariffs? What is the role of duty drawbacks on inputs used in exportables?

How should tariffs on inputs be treated in the course of partial tariff reforms?

The project will provide clear guidelines on what trade policy changes are desirable under given circumstances.

This research uses partial and general equilibrium models. As work progresses, one or two country applications may be carried out.

Tariff uniformity cannot be justified on the basis of conventional efficiency criteria. The case for uniform tariffs must be based on political economy arguments and administrative simplicity. If revenue is a constraint, tariff reform should be accompanied by an increase in tariffs on inputs. But it is a good idea to exempt exports from duties on inputs.

These findings put Bank policy advice on more solid analytical footing. They will help the developing-country policymakers in designing better trade policies. The research will also stimulate more thinking among other development and international trade economists about the issues addressed in the project.

*Responsibility:* Country Economics Department, Trade Policy Division—Arvind Panagariya and Ramon Lopez.

*Completion date:* December 1991.

### Modeling Policy Reform

This research project aims to quantify the impact of proposed policy reforms in the agricultural sector (envisaged in sector adjustment operations), such as price and taxation reforms, on producers, consumers, the government budget, and foreign exchange markets. This project is the continuation of the Multi-Market Modeling efforts initiated several years ago. So far, some 14 multi-market

models have been completed.

The research is being conducted through the development of user-friendly computer models to help government and operational staff in the Bank.

It is essential to evaluate quantitatively trade-offs between efficiency gains and losses for different actions before implementing policy reforms. The findings of this research will enable policymakers to achieve an easy understanding of the trade-offs between different instruments that they use.

*Responsibility:* Agriculture and Rural Development Department, Agricultural Policies Division—Jean-Jacques Dethier, Avishay Braverman, and Antonio Salazar, and Population and Human Resources Department, Population, Health and Nutrition Division—Jeffrey Hammer. The Ministry of Agriculture, Rabat, Morocco, is participating in the research.

## 2 PRIVATE AND PUBLIC SECTOR REFORM

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### Rural Land Tenure, Credit Markets, and Agricultural Investment in Sub-Saharan Africa

Ref. No. 674-32C

Rapid population growth and liquidity requirements for more input-intensive agriculture in Sub-Saharan Africa will necessitate important adaptation in existing land rights systems. There is, however, little agreement on the implications of various institutional and legal systems relevant to land ownership, tenancy, and other usufructuary rights. With only a few exceptions, the distribution of land in Africa is not yet as skewed as in many Latin American countries. The fundamental question in Africa is the extent to which indigenous tenure arrangements constrain agricultural development. There is widespread belief, generally not based on empirical evidence, that existing tenure systems tend to induce insecurity and, by implication, discourage long-term investment, thereby constraining increased farm productivity. But evidence from several microstudies in Kenya, the only Sub-Saharan African country with a national land registration and titling program, does not indicate any direct causal relationship between conversion to freehold title and increased productivity. Thus, there is serious doubt concerning conventional expectations about the cost-effectiveness and productivity responses to land tenure reform in the African context.

There are very few empirical studies on the influence of land tenure on factor markets and farm productivity in Sub-Saharan Africa. Existing land policies are severely hampered not only by lack of adequate and reliable data, but also by the absence of coherent and informed debate on the economic interplay between land tenure security, labor, credit, and farm productivity. Not surprisingly, dialogue between development agencies, including the World Bank, and African governments on issues affecting agricultural credit, rural labor markets, and farm productivity has remained less effective than desirable.

This study built on an extensive review of literature already undertaken in the Agricultural Policies Division by Raymond Naronho. The main objective of this study was to provide empirical description and establish the facts about the security of rights over land enjoyed by African farmers, existence of markets for leasing and selling land, access to and use of credit (especially those predicated on

land as collateral), the incidence of land disputes, and investments in land improvement. The second objective was to show how increased security of landholding affects farm productivity. While the first objective relied on analysis of descriptive statistics, the second was tackled with the aid of econometric modelling. To ensure generality of implications for most Sub-Saharan countries, it was important that the study be conducted in a number of countries representing major agroclimatic zones as well as different legal and political orientations. The countries selected for case studies were Ghana, Kenya, Rwanda, and Burkina Faso. The study was undertaken in collaboration with local institutes to contribute to local institutional capacity building. Information on farm household characteristics and a broad range of basic farm-level data were gathered. In Burkina Faso, arrangements were made to use data collected by the International Crop Research Institute for Semi-Arid Tropics in a comprehensive farm-level survey.

Based on the country case studies, it was found that the customary tenure systems are not rigid, but have evolved toward greater privatization of land rights under the twin pressures of population growth and increasing commercialization of agriculture. Moreover, there is at best a weak relationship between the rights farmers hold over land (including land titles) and their access to credit, the long-term improvements they make to the land, their use of modern inputs, and the yields they obtain. The customary tenure systems appear to be adjusting efficiently to changes in relative factor prices and are providing farmers with sufficient tenure security to exploit available economic opportunities. Tenure reform, especially land titling programs, would therefore yield little in the way of economic benefits at this stage of Sub-Saharan Africa's economic development, and policymakers and the Bank should give greater priority to public investment in rural infrastructure, agricultural research and extension, and improving credit, input, and product markets. But there are situations where land titling may be worthwhile (for example, in irrigation project areas) and cases where governments can usefully strengthen customary tenure systems (for example, by recording and enforcing contractual arrangements in areas with high incidence of land disputes).

The results of the study and their implications will be discussed with policymakers and representatives of aid agencies. Book-length manuscripts and seminar papers

will be produced. Based on the experience gained during this study, a more refined methodological design will be proposed. It is envisaged that this work will be extended to other African countries.

**Responsibility:** Agriculture and Rural Development Department, Agricultural Policies Division—Shem Migot-Adholla, Peter Hazell, and Benoit Blarel. With Lawrence Lau, Stanford University; Frank Place; and Peter Mation, WARDA, Côte d'Ivoire.

**Closing date:** February 1990.

**Reports:**

Blarel, B. 1989. "Land Tenure and Agricultural Production Under Land Scarcity: The Case of Rwanda." World Bank, Agriculture and Rural Development Department, Washington, DC. (Summary also available in French.)

Blarel, B., P. Hazell, S. Migot-Adholla, and F. Place. 1989. "Land Tenure Reform of Agricultural Development in Sub-Saharan Africa." Paper presented at the Conference on Agricultural Development Policies and the Theory of Rural Organization, Annapolis, Maryland, June 14-16.

Migot-Adholla, S., P. Hazell, B. Blarel, and F. Place. 1989. "Land Tenure Security and Agricultural Production in Sub-Saharan Africa." In L. Richard Meyers, ed., *Innovation in Resource Management: Proceedings of the Ninth Agriculture Sector Symposium*. Washington, DC: World Bank.

\_\_\_\_\_. Forthcoming. "Land Tenure Reform and Agricultural Productivity in Sub-Saharan Africa." In Karla Hoff, Avishay Braverman, and Joseph Stiglitz, eds., *Agricultural Development Policies and the Economics of Rural Organization*.

## **Transport Taxation and Road User Charges in Sub-Saharan Africa**

### **Ref. No. 674-37**

Transport taxes are traditional and important sources of public revenue in most countries of Sub-Saharan Africa, with road transport yielding the greatest revenue. Practically all African countries face severe shortages of public resources while the road infrastructure is already severely deteriorated, or will soon begin to decay, failing substantial and regular expenditures. Road deterioration is due to varying combinations of neglect and unexpectedly heavy or inappropriate use of roads, yet the costs are generally not transmitted to users through pricing. Transport taxation thus appears as an important policy issue for purposes of both efficient resource use and resource mobilization.

The main objective of this research is to provide a shortcut method for establishing road user charges and transport taxes in data-poor countries. It builds on earlier research supported by the World Bank, in engineering economics and the economics of transport taxation, and seeks to improve the design of transport taxation and road user charges in Sub-Saharan Africa.

The research is being conducted through case stud-

ies. The exploratory stage of the research, using Ghana as a test case, was devoted to ascertaining the adequacy of available information and tax instruments for the development of simple and administratively practicable schemes for assessing road user charges. The follow-up stage includes two detailed case studies: the first to complete the research in Ghana and the second to replicate the work in Zimbabwe.

The exploratory phase of the research showed that even drastic shortcuts in assessing an appropriate level of road user charge lead to fairly robust results. In Ghana, it was shown that the charges from road users fell short of marginal cost, thus there was no taxation element in what the Ghanaian road users pay. The initial study also showed that congestion is too important a determinant of road user costs and of near-efficient road user charges to be omitted from the analysis, as Bank practice tends to do.

The main findings of the research suggest that greater attention needs to be paid to cost recovery from road users in Sub-Saharan Africa to ensure efficient resource use and resource mobilization, while minimizing the adverse distributional and price effects of road user taxes. More important, analysis of road user charges can be carried out even in data-poor countries to obtain practical and fairly robust policy recommendations.

The findings of the research will be disseminated through seminars in Zimbabwe and Ghana and through interim reports to be distributed to Bank staff.

**Responsibility:** Infrastructure and Urban Development Department, Transport Division—Asif Faiz, Southern Africa Department, Infrastructure Operations Division—Imogene Burns, and Western Africa Department, Infrastructure Operations Division—Thampil Pankaj and Anil Bhandari (consultant). With Reuben Gronau, The Maurice Falk Institute for Economic Research, Israel, and Esra Bennathan (consultant).

**Closing date:** December 1991.

**Reports:**

Newbery, David M., Gordon Hughes, William Paterson, and Esra Bennathan. 1988. *Road Transport Taxation in Developing Countries*. World Bank Discussion Paper 26. Washington, DC: World Bank.

Gronau, Reuben. 1989. "Transport Taxation and Road User Charges in Sub-Saharan Africa: A Case Study—Ghana." World Bank, Infrastructure and Urban Development Department, Washington, DC.

## **Reforming Taxes in Developing Countries**

### **Ref. No. 674-52C**

Many developing countries are searching for ways to improve the performance of their tax systems in terms of revenue adequacy, administrative ease, economic efficiency, and equity. This research project asked how

specific tax reforms in 10 developing countries have contributed to the achievement of these objectives. Which tax measures work well and why? Which do not work so well and why? In addition, the research probes into the political economy of tax reform and inquires why reforms occurred when they did, what motivated them, and what political circumstances encouraged some reform measures and deterred others.

Each country study addressed the same set of research questions and tried to answer the questions in roughly the same manner. The analysis is both quantitative, where permissible, and impressionistic, when judgments are required in the absence of readily available data.

The similarities in problems affecting tax systems and the responses to these problems have made it possible to delineate the major elements of a model tax reform. Most countries have simplified their tax systems and imposed a more uniform distribution of tax burden across different firms and households. The agenda for reform includes applying the company tax to all forms of business; integrating the personal and corporate income taxes; aligning the single company tax rate with the top bracket personal rate; eliminating tax incentives; taxing income on a worldwide basis; flattening personal tax rate schedules; including interest income and capital gains in the personal tax base; adjusting income taxes for high inflation rates; and replacing numerous excise taxes with a broadly based sales tax.

The World Bank is involved in policy-based lending that requires it to make judgments and to offer recommendations on how countries can best proceed with refashioning and redesigning their tax systems. Yet no set of guidelines or useful reference points exist that Bank personnel can call upon to assist them in suggesting and supervising tax reforms in developing countries. This study has tried to fill that gap.

Countries included, and their principal investigators (in parentheses), are as follows: Columbia (Charles E. McLure, Jr. and George Zodrow), Jamaica (Roy Bahl), Indonesia (Mukul Asher), Mexico (Francisco Gil-Diaz), Korea (Kwang Choi), Turkey (Kenan Bulutoglu and Wayne Thirsk), and Bolivia, Morocco, Zimbabwe, and Malawi (Zmarak Shalizi and Wayne Thirsk).

The case studies and overview material will be gathered in a volume on tax reform in developing countries. The papers on Korea, Indonesia, Colombia, Turkey, and Malawi were presented at the World Bank Conference on Tax Policy in Developing Countries, Washington, DC, March 28-30, 1990.

*Responsibility:* Country Economics Department, Public Economics Division—Wayne Thirsk and Javad K. Shirazi. With Charles McLure, Stanford University; George Zodrow, Rice University; Roy Bahl, Georgia State Uni-

versity; Kwang Choi, Hankuk University, Seoul; Mukul Asher, University of Singapore; and Francisco Gil-Diaz, Minister of Finance, Mexico City.

*Closing date:* June 1990.

*Reports:*

McLure, Charles, Jr., and George Zodrow. Forthcoming. "Tax Reform in Colombia: Process and Results." PRE Working Paper Series. World Bank, Washington, DC.

Shalizi, Zmarak, and Wayne Thirsk. Forthcoming. "Tax Reform in Malawi." PRE Working Paper Series. World Bank, Washington, DC.

Thirsk, Wayne. Forthcoming. "Lessons from Tax Reform: An Overview." PRE Working Paper Series. World Bank, Washington, DC.

Thirsk, Wayne, ed. Forthcoming. *Reforming Taxes in Developing Countries.*

### **New Technologies, Location, and Trade: An Empirical Analysis**

**Ref. No. 674-69C**

New microelectronic technologies are creating both an opportunity and a threat for developing countries. Policymakers will need to make choices regarding the extent, mechanisms, and timing of promoting such technologies. This study addresses these questions: (1) What are the patterns of technology diffusion in different sectors? (2) What are the organizational prerequisites for their adoption? (3) Are these technologies modular? (4) What are the options for low-income countries? (5) What are the skill and infrastructure requirements for emerging technologies?

A survey of factories in four sectors (footwear, bicycles, printed circuit boards, and steel mini-mills) in Japan, Korea, Singapore, Mexico, Indonesia, and the United States was conducted. The survey and relevant engineering information were used to develop prototype factory models. Simulations were performed to assess the impact of varying managerial practices and specific technologies.

Findings suggest that the rate of technology diffusion and the impact of emerging technologies is extremely significant even in traditional sectors. But the role of appropriate organizational changes is critical both to gain immediate efficiency increases and also to lay the basis for the introduction of new hardware.

Technical papers will disseminate preliminary findings, and a summary book is planned.

*Responsibility:* Industry and Energy Department, Industry Development Division—Ashok Mody.

*Closing date:* June 1990.

## Land Fragmentation in Rwanda

Ref. No. 674-72C

Farm fragmentation in Rwanda is among the highest in Sub-Saharan Africa (5.4 parcels per farm), and the government is considering a number of alternative approaches to land consolidation. These proposals of alternatives are based on the assumptions that fragmentation is inefficient, and that agricultural production and social welfare can be increased through consolidation.

But little is known about farm fragmentation in Rwanda: about its actual incidence by region and farm type, its origins and causes, and its impact on land productivity. Although some of the negative aspects of fragmentation are well known, there are also reasons farm fragmentation may be beneficial to farmers (for example, risk reduction and reduced seasonal labor bottlenecks). In fact, some degree of farm fragmentation may be desirable, and might best be viewed as the rational response of farmers to the economic and institutional environment in which they live. If so, attempts to consolidate holdings beyond some optimal degree could actually lead to a loss in farm productivity, and efforts should be focused instead on improving the efficiency of the land and labor markets to increase the options available to farmers.

This study used farm survey data collected by a related project (Rural Land Tenure, Credit Markets, and Agricultural Development in Sub-Saharan Africa, see p. 49) and the Ministry of Agriculture to undertake a quantitative analysis of the causes and consequences of land fragmentation. The analysis should provide the foundations to evaluate the need for government intervention.

The study has found that fragmentation is a rational response to risk, seasonal bottlenecks, and food self-sufficiency in an environment where credit, labor, and food markets are incomplete. The appropriate policy response is to improve these markets, not to consolidate holdings through fiat.

A policy workshop was held in Rwanda in April 1989, where senior government officials were briefed.

*Responsibility:* Agriculture and Rural Development Department, Agricultural Policies Division—Peter Hazell and Benoit Blarel.

*Closing date:* December 1989.

*Report:*

Blarel, Benoit. 1989. "Summary Report. Land Tenure and Agricultural Production Under Land Scarcity: The Case of Rwanda." World Bank, Agriculture and Rural Development Department, Washington, DC. (Also available in French.)

## Conference on Rural Development Policies and Theory of Rural Organization

Ref. No. 674-80

This research project intends to draw out the implications of the modern theory of rural organization for rural development policies in credit, property rights, pricing, and technological change. The project draws on the intense research effort of the last decade on agricultural development under conditions of missing and imperfect markets. By exploring the problems of information and incentives that give rise to market failures, the project has provided microfoundations for a number of rural organizations that had been difficult to fit into neoclassical analysis. The research has also offered insights into why many attempts by developing countries to promote access to credit, to reform tax and price policies, and to increase the rate of technological change have been less than successful, or less successful than hoped. Yet in many cases, the policy implications of the theoretical work in rural organizations and the extent to which there exist phenomena that models of rural organizations do not explain are still unclear.

The project addresses these questions: What are the essential ingredients of successful rural credit schemes? How important is the simultaneity of reforms in land ownership, credit markets, and extension services in successful land reform programs? What are the benefits of establishing a well-defined set of property rights through, for example, titling? Are regional food subsidies an effective way to target transfers to the poor? What are the best ways to deliver extension services? How should organizations be designed to maintain investments in irrigation and other public services? What role does tax policy play in promoting technological innovation by firms, or in offsetting distortions caused by missing risk markets?

Thirty papers by World Bank and academic economists were presented and critiqued at a conference held in June 1989. Four policy areas were highlighted, and the theoretical discussions were informed by case studies. Each author identified the key facts of the developing country that were incorporated into their analysis, the market failures that provide a motivation for government action, the extent to which the proposed policies alleviate market failures, and the extent to which the proposed policies give rise to political economy and administrative problems.

The conference cast doubt on several conventional notions about causality in development, and about the microstructure of markets that have shaped traditional approaches to development. For example, new production opportunities have accelerated the evolution of property rights, whereas government intervention to create western

systems of rights, without increases in investment opportunities, may have been ineffective. New investment opportunities may increase savings and the capacity of the informal credit market, so that the savings rate and scope of formal credit markets may not be the constraints on development that they appear to be.

Several institutional designs were also discussed and evaluated in terms of missing markets and imperfect information, peer monitoring in credit markets, incentive schemes for extension workers, agricultural cooperatives, legal restrictions on tenancy, and administrative constraints on taxation.

Other papers used the theory of rural organization to shed new light on recent or ongoing government interventions, such as land titling programs in Thailand and Africa and their impact on the effectiveness of credit markets; Indian and Chinese agricultural credit programs and their effect on informal markets; price stabilization in Brazil; and land reforms in Colombia.

*Responsibility:* Agriculture and Rural Development Department, Agricultural Policies Division—Avishay Braverman.

*Closing date:* December 1990.

*Report:*

Hoff, K., A. Braverman, and J. Stiglitz, eds. Forthcoming. *Agricultural Development Policies and the Economics of Rural Organization*.

### **Electric Power Utility Efficiency Study, Phase I**

**Ref. No. 675-06**

Diesel power plants in developing countries operate very poorly compared to similar plants in developed countries. This project focuses on the underlying causes of poor diesel power plant performance in developing countries.

Relevant data is collected by missions to the participating countries (Peru, Mali, Belize, Senegal, Mauritania, Sudan, Guinea, Gambia, Mozambique, Barbados, Mauritius, Guinea-Bissau, the Philippines, Guatemala, Somalia, Tanzania, Indonesia, Sierra Leone, Burkina Faso, Equatorial Guinea, Central African Republic). Index number and nonparametric techniques using linear programming models are used to determine efficiency measures. The necessary linear programming models, originally developed at the University of British Columbia, have been adapted for use at the World Bank using the General Algebraic Modeling Systems.

Possible underlying causes of poor power plant performance are investigated by studying correlations of the efficiency measures with country institutional and economic factors.

Tentative findings are available. They include a comparison of efficiencies of 42 power plants (with data

for several years for most plants) which strongly suggests that privately owned and operated power plants are on average much more efficient than publicly owned power plants. It is also shown that overall efficiency correlates most strongly with fuel use efficiency and capital use efficiency. The investigation suggests that the most important factor in determining the sustainability of a power plant is the institutional relationship between the government and the utility.

The Energy Development Division has written a draft Core Report that has been reviewed by the Steering Committee for the study. Lessons learned from the study were presented at a Bank seminar on July 26, 1990, and the Core Report will be published in December 1990. A paper on new methods for calculating power plant efficiency has been written and is under review.

*Responsibility:* Industry and Energy Department, Energy Development Division—Gautier, Jean-Yves; Wolf, Erwin Diewert, University of British Columbia; and Jamshid Heidarian (consultant).

### **An Evaluation of Tax Incentives for Industrial and Technological Development**

**Ref. No. 675-10**

Tax policy instruments are often used by developing countries to foster industrial and technological development objectives. While tax policies are actively pursued, there is little guidance to policymakers in developing countries on the effectiveness of such policies in meeting stated policy goals. A quantitative assessment of past practices will provide much needed data for an optimal design of such policies for future use. This work is part of a larger task on the reform of fiscal incentives in developing countries.

The study will survey approaches to tax incentives for industrial and technological development in selected developing countries for use by domestic and foreign investors. The design of various programs will be examined, and their impact at the conceptual and empirical levels will be studied. The study will focus on Turkey, Mexico, and Pakistan.

The quantitative work will focus on the following questions: What impact (direct and induced) has the investment stimulation of the tax policy measures had per dollar of forgone revenues? Do taxes matter for foreign investment in developing countries? Do they influence foreign business location decisions? If they do, what are the best instruments to achieve the maximum degree of foreign investment stimulation per dollar of revenue loss to the home country? What are the impacts of taxes on the structure of industrial production? What have been the effects of tax instruments on the use of labor and on physical, research, and development capital? What have

been the effects of business taxes and tax expenditures (forgone revenues) on technological change, private output expansion, and after-tax profits? Are there tax-induced distortions preventing firms from holding optimal levels of fixed factors? Given the empirical estimates obtained in this study on factor substitution, technical change bias, and scale economies, what revenue-neutral alternate tax policy environment would best enhance productivity and growth?

The project will use three methods—the user cost of capital, the variable profits, and computable general equilibrium model—in a sequential manner. In each case, the project will develop new methodologies, which represent major departures from the developed country approaches, by paying close attention to the type of policies and the institutional structure in place in developing countries. The variable profits method will be used for industry-specific time-series data. Empirical models will provide estimates of the simulative effects of public policy measures for each dollar of forgone revenues.

The revenues forgone because of certain tax incentives outweigh their beneficial impacts (additional domestic and foreign investment). The tax holiday is a particularly unsuitable tool for promoting new investment. All tax expenditures should be closely scrutinized for their benefits and costs.

**Responsibility:** Country Economics Department, Public Economics Division—Anwar Shah. With Alan Auerbach, University of Pennsylvania; Jeffrey Bernstein, Carleton University; Andrew Feltenstein, University of Kansas; John Whalley, University of Western Ontario; Robin Broadway, Queen's University; Joel Slemrod, University of Michigan; Andrew Lyon, University of Maryland; Dagmar Rajagopal, Ryerson Polytechnical Institute of Canada; Ramon Clarete, University of the Philippines; and John Halvorsen, University of Washington.

**Closing date:** December 1990.

**Reports:**

- Auerbach, Alan. 1990. "The Cost of Capital and Investment in Developing Countries." PRE Working Paper 410. World Bank, Washington, DC.
- Mintz, Jack. 1990. "Corporate Tax Holidays and Investment." *World Bank Economic Review* (January):81-102.
- Shah, Anwar, and Joel Slemrod. Forthcoming. "Tax Sensitivity of Foreign Direct Investment: An Empirical Assessment." In *World Bank Economic Review* and in Javad K. Shirazi and Anwar Shah, eds., *Tax Policy in Developing Countries*. Washington, DC: World Bank.
- Trela, Irene, and John Whalley. Forthcoming. "Taxes, Outward Orientation and Growth Performance in Korea." In Javad K. Shirazi and Anwar Shah, eds., *Tax Policy in Developing Countries*. Washington, DC: World Bank.

## Diamond and Gold in Sierra Leone: The Small-Scale Sector and Its Role in the Economy

Ref. No. 675-12C

Sierra Leone has sufficient mineral wealth to generate significant inflows of foreign exchange, but the government is unable to service its external debt and has accumulated substantial arrears to the World Bank. This apparent anomaly is explained by the fact that most of the precious mineral exports over the past 10 years have taken place through unofficial channels. The combination of inappropriate macroeconomic policies and weak overall performance by the government fostered a parallel market that is thriving. A significant factor in the explanation was a highly overvalued exchange rate.

A solution to this problem may be sought in a change in the foreign exchange system. Sierra Leone floated its currency in 1986 as part of an International Monetary Fund program and has done so again in April 1990. This study investigated how best to extract budgetary resources from the mineral sector. This approach also requires exchange rate adjustments, but the primary focus is on transferring resources from the mineral sector to the government by means of fiscal policy. If this can be done, the government could, if necessary, purchase foreign exchange in the market. Without the budgetary resources, however, there is little the government can do to obtain foreign exchange whatever the foreign exchange system. The policy issue, therefore, is to devise a system of taxing a large, dispersed, complex, unofficial market of diamond and gold producers and traders.

The results of the study could be an important ingredient in any future reform program for Sierra Leone. Work has been undertaken with support of the Ministry of Finance and the Bank of Sierra Leone. The participation of the latter makes the prospects of absorbing and implementing the policy implications more likely. In fact, the preliminary findings of the study have already had a major influence on governments' revised mining and external trade policy set out in a July 1990 Policy Framework Paper. Several countries—including Liberia, Guinea, Tanzania, and Ghana—face similar problems of extracting revenues from a mineral-producing sector operating outside the official economy. Moreover, the issue of generating foreign exchange within the hands of the government has immediate implications for payment to international institutions and reestablishment of more normal international financial relations.

The findings of the research were that export tax levels need to be kept low (possibly not higher than 2.5 percent) to retain diamond export flow through regular trade channels. Competition between a small number of reputable international traders when the exchange rate is at

market-clearing level maximizes exports and government revenues. A foreign exchange surrender policy is ineffectual in the medium term in giving government access to greater foreign exchange resources. Administrative controls do not enhance official government revenues. There are clear limits to the extent to which artisanal alluvial diamond mining can be taxed. Maximum competition between traders and openness of transactions would probably maximize the receipts of the producers and therefore national income.

The findings of the research will be presented in a technical paper in the fall of 1990.

*Responsibility:* Africa Country Department IV, Country Operations Division—Ron Fennell and Lyn Squire. With Brian van Arkadie, University of Dar es Salaam; and Samura Kamara, Bank of Sierra Leone.

*Closing date:* June 1990.

### Taxation in Mexico

#### Ref. No. 675-20

This research project will focus on three related issues: (1) What are the determinants of poverty in Mexico? This analysis will use income-generating activities, consumption patterns, access to assets, and characteristics of regions of domicile to identify poverty determinants. This analysis will relate poverty determinants to appropriate poverty alleviation policies. (2) In poverty alleviation, how important is support for the poor's directly productive activities compared to the provision of social services? Simulation exercises will be carried out to trace income effects of price changes, such as increased food prices, removal of fertilizer subsidies, postponement of yield-increasing investments in rural areas, and reduction in social (education and health) and infrastructure expenditures. (3) Household income and expenditure surveys will enable a comprehensive definition of income brackets for building tax credits and other progressive measures into the personal income tax code. Simulations will be carried out to estimate revenue yields of alternative tax rates and to evaluate poverty alleviation impacts of tax credit schemes. The equity impact of trade taxes will be evaluated using consumption data.

The research is facilitated by the Mexican government's donation of a copy of the tape of the Household Income and Expenditure Survey, 1983-84, the most recent such data in Mexico. It is the first time that the government has released such data to the World Bank. The data will be used to carry out the above analyses using the probit method.

*Responsibility:* Latin America and the Caribbean Country Department II, Country Operations Division—Sweder van Wijnbergen.

*Closing date:* December 1990.

### Labor Redundancy in the Transportation Sector

#### Ref. No. 675-21

The issue of what to do with excess labor is critical to the success of any endeavor to improve the transport sector. Failure to reduce overstaffing leads to excessive wage bills, budget deficits, and, eventually, cuts in investment or in the purchase of needed materials. Moreover, because transport employs so many people, labor redundancy in the sector affects not only the agencies or enterprises concerned, but the public sector as a whole.

The goal of this project is to develop an operational methodology to help in designing and evaluating schemes used to reduce labor redundancy in the transport sector. Questions to be answered include: Is technical redundancy at the enterprise level equivalent to redundancy in a broader economic sense? What are the main causes of labor redundancy in transportation? Is a direct, but perhaps costly, solution—such as layoffs or forced retirement—preferable to attrition as a means to reduce the labor force? Is the solution chosen responsive to the causes? Are additional steps needed to prevent a recurrence? When falling demand for labor is inevitable, what changes are necessary to facilitate management response? What are the implications for choice of technology and organization of the labor force?

The core of the project is a set of case studies of schemes to reduce labor redundancy in six or seven countries (among them Brazil, Chile, Ghana, Mauritius, Sri Lanka, and Yugoslavia). The case studies will be used to draw some general conclusions about the relative importance of the various causes of labor redundancy. The schemes to reduce labor redundancy will be evaluated using a criterion function framework (employing a number of partial criteria) and, where appropriate, a social welfare function to rank them. A principal goal will be to identify which factors are likely to be most conducive to a successful long-term elimination of labor redundancy. Ultimately, the study will synthesize and draw lessons from the various schemes in order to provide needed guidelines for policy work in public sector reform.

*Responsibility:* Infrastructure and Urban Development Department, Transport Division—Alice Galenson. With Jan Svejnar and Katherine Terrell, University of Pittsburgh; and Alan Harding, the United Kingdom.

*Closing date:* July 1991.

#### *Reports:*

Terrell, Katherine, and Jan Svejnar. 1990. "How Industry-Labor Relations and Government Policies Affect Senegal's Economic Performance." PRE Working Paper 271. World Bank, Washington, DC.

Harding, Alan. Forthcoming. "Review of Restrictive Practices in Seaports." PRE Working Paper. World Bank, Washington, DC.

## Lessons from the Chilean Privatization Experience

Ref. No. 675-25

The Chilean privatization experience has been one of the most serious privatization efforts in the developing world. The lessons learned from this experience are thus useful to any country embarking on a privatization program. This research addresses macro- and firm-level questions of particular relevance to Brazil.

Macro-level issues. (i) Saving-investment: There is an apprehension that privatization has a negative effect on total saving and investment. The research will examine the impact of privatization on total saving and investment. (ii) Property concentration: The first privatization episode in Chile contributed to the concentration of equity. The research will examine the impact on property concentration of adopting various modes of divestiture. (iii) Foreign ownership and debt conversion schemes: The research will study the extent of foreign ownership permitted in the Chilean case and the impact of this on the speed of privatization and on debt reduction through debt conversion schemes. (iv) The relevance of capital markets in undertaking major privatization efforts. (v) Regulatory and legislative changes that must accompany privatization.

Firm-level issues. (i) Pricing: While pricing firms that are to be privatized is mainly a distributional issue, it becomes particularly controversial when public firms are sold to foreigners. (ii) In what manner was the privatization in Chile conducted, in terms of decision-making and autonomy, contract renegotiations, severance payments, assets valuation, method of sale, and buyers?

The research uses a standard macroeconomic framework for a small open economy to analyze the theoretical impact of different privatization modes used in 1985-88 in Chile. The research will then confront empirical evidence with the theoretical results to confirm or reject the hypothesis of the framework. The study uses a comparative balance sheet ratio analysis at the firm level, using samples of state-owned, private, and privatized enterprises. The research measures the overall efficiency of privatized firms by analyzing the changes in their stock prices. Employment issues are investigated by comparing employment for individual firms, clustering them in three groups of companies (public, private, and privatized), and comparing the evolution of employment for these three types.

*Responsibility:* Latin America and the Caribbean—Country Department I, Country Operations Division—Demetris Papageorgiou, and Latin America and the Caribbean—Country Department I, Energy and Industry Division—Samia El Baroudy. With Dominique Hachette, Catholic University, Chile.

*Closing date:* November 1990.

## Tunis and Rabat Water Demand Study

Ref. No. 675-40

A central problem in investment and pricing choices is the estimation of demand. Only sketchy information is available on residential demand for urban water (mostly extrapolation based on population change) and little on income and price elasticity.

This research project has two objectives: (1) the estimation of residential demand and key elasticities as a function of household characteristics and supply characteristics, and (2) estimation of willingness to connect to a system where there is no supply constraint.

This work is related to a study of willingness to pay for rural water, partially funded as a Bank research project. If successful, the methodology may be tested in other countries.

The research is based on investigation of utility records and on field surveys of customers and potential customers. Using both sources, a large data base will be constructed and then econometric techniques will be used to estimate single-equation demand functions and the resulting income and price elasticities.

*Responsibility:* Infrastructure and Urban Development Department, Water and Sanitation Division—Harvey A. Garn. With Alex McPhail, consultant. USAID is also participating in this research.

*Closing date:* June 1991.

## Heavy and Chemical Industry Policy in Large NICs

Ref. No. 675-41

Heavy and chemical industry (HCI) expansions have in general represented a major misallocation of capital, the servicing of which has contributed significantly to the debt problems of many countries. This research compares the South Korean experience with that of Brazil and Mexico. It focuses on the following issues:

Are there any market failure arguments, in practice, that justify state intervention to create HCIs?

What has been the experience of HCI development in South Korea, Mexico, and Brazil from a policy perspective? The research will document the main types of support received from governments. The analysis will include estimates of effective rates of protection, both within industries over time and across sectors within the countries. The study will provide a judgment on how quickly the HCI projects have become competitive and the costs and benefits of protection.

What have been the effects of the development of domestic steel and petrochemical industries on such downstream users as autos and plastics?

Where should HCIs appear in the structural change

of newly industrializing countries?

*Responsibility:* Industry and Energy Department, Industry Development Division—Ashok Mody. With Richard Auty, Lancaster University.

*Closing date:* February 1991.

### **Ex-Post Performance of Divested State-Owned Enterprises**

**Ref. No. 675-42**

Transferring ownership and control of enterprises from the public to the private sector — divestiture — has recently been utilized intensively as a tool of public policy with the expectation that it will improve productive efficiency, reduce the budgetary burden of the state-owned enterprises, and make firms more responsive to consumers. However, little empirical analysis exists, particularly about developing country experience, to substantiate the promises of divestiture or to construct empirically based conditions under which divestiture may or may not reach its objectives.

Responding to this need for verification, a core team from the World Bank and Boston University, with country collaborators, are undertaking a 22-month project to assess the divestiture experience in four countries (the United Kingdom, Malaysia, Chile, and Mexico), and to determine the factors that led to observed changes in outcomes. The findings of the project will allow policymakers to form more realistic expectations regarding the consequences of undertaking divestiture decisions and the conditions under which this decision is advantageous to society. The findings will also improve Bank staff's ability to advise borrowers on the desirability and appropriateness of divestiture.

The research will measure, at the level of the firm, the changes in economic efficiency by using the producer's and consumer's surplus, the Total Factor Productivity technique, and standard financial profitability analysis. It will quantify the fiscal impact of divestiture, calculating the change in the net flow of funds between an enterprise and the government's budget. It will examine the factors leading to observed changes in performance by combining quantitative and qualitative techniques. In particular, the project will examine the effect of the change of ownership on the performance of the firm by documenting any observable changes internal to the firm—those having to do with adjustment in output and input mix, marketing, capacity utilization, technological rehabilitation, worker's incentives, and managerial contracts and compensation. It will conduct inter-firm, inter-sector, inter-country, and counterfactual comparisons to isolate the effect of the change of ownership from other exogenous concurrent factors, and to determine simultaneously the effect of sector variations, country macroeconomic characteristics,

and the nature of the transaction on observed variations in performance.

The research will produce five self-contained, publishable reports, one for each country and a summary volume. The final reports are expected in June 1991.

*Responsibility:* Country Economics Department, Public Sector Management and Private Sector Development Division—Ahmed Galal. With Leroy Jones Ingo Vogelsang, and Pankaj Tandon, Boston University; Raul Saez, Ministry of Economy, Chile; Fadi Abbas, Prime Minister's Department, Malaysia; Inder Ruprah, CIDE, Mexico; and Chris Doyle, Cambridge University.

*Closing date:* December 1991.

### **Practical Framework for Evaluating Mineral Payment/Taxation Schemes**

**Ref. No. 675-45**

Many developing countries are still heavily dependent on mineral extraction to generate fiscal revenue and to earn foreign exchange. In more than 30 developing countries, mineral exports account for 25 to 75 percent of total exports. Unlike other export-oriented sectors, however, mineral sectors tend to be enclaves with few inter-industry linkages. Therefore, for mineral wealth to become a major endowment for financing development, it is necessary not only to extract it but also to ensure a positive net fiscal impact over and above that required to replace the asset.

When minerals form a significant proportion of a developing country's asset base, it is particularly important to have a framework to evaluate the adequacy of compensation schemes in terms of the opportunity cost to the country of extracting the resource and the costs to the country associated with risk-sharing arrangements. The recent economic and fiscal difficulties faced by many poorly diversified mineral-rich developing countries may be traced, at least in part, to deficiencies in the design of current mineral payment/tax schemes, particularly the de-emphasis of production-related charges in favor of income-related charges.

At present there is no practical framework with which to evaluate different payment/tax arrangements in terms of: (a) the signals generated for the development of the sector and the rest of the economy; and (b) the timing, stability, and value of public revenue flows from the mineral sector.

The design of mineral payments/tax policy must address a number of objectives, including: (a) developing an appropriate time profile of extraction (based on the opportunity costs of extraction and depletion); (b) generating adequate savings for replacement investment; (c) developing appropriate signals for diversification into other sectors; and (d) making appropriate risk-sharing arrange-

ments. One instrument can hardly be expected to address them all. Thus, a framework that clearly delineates the role of each type of mineral payment/tax is necessary to develop a more consistent set of signals to foster intertemporal and intersectoral efficiency. The framework to be developed will consist of several modules. The first module will be used to compute a price for the resource (unadjusted for risk) to determine an endogenous extraction profile for the resource. The second module will use a simple cash-flow model to illustrate how different revenue-generating instruments share risk between the resource owner and the resource extractor, taking the extraction profile as exogenously determined. Other modules will address issues such as general equilibrium effects and intersectoral taxation.

The research should help to clarify the role of each mineral tax/payment relative to particular targets and to provide practical guidelines for evaluating these contract arrangements relative to the specific characteristics of an economy. The fact that each country has different endowments and faces different risks must be taken into account when selecting instruments and determining rates. In some cases, where assets are not and cannot be diversified, royalties may be justified and should not be systematically de-emphasized as they are now. In other cases where the asset base is diversified, resource rent taxes may be more appropriate.

The project is expected to produce discussion papers on the theoretical framework; specific modules and case studies; and the policy implications and guidelines for contract design.

*Responsibility:* Country Economics Department, Public Economics Division—Zmarak Shalizi, Heng-Fu Zou, and Janet Syme. With Robert Conrad and Teresa C. Malyshev, Duke University; Maxim Engers, University of Virginia; and Diderik Lund, University of Oslo, Norway.

*Closing date:* December 1991.

### **Reform Dilemmas and Strategies in Agriculture in Socialist Countries**

#### **Ref. No. 675-48**

The importance and urgency of this research is unquestionable. The Eastern European countries are entering an historical period through their political and economic reforms. The path and speed to their objective, a market economy, is at best unclear, since they are venturing into unknown economic territory. The combination of current institutional and nonmarket rigidities, property rights dilemmas, high external debt, nonconvertible currency, and few or no safety nets, poses severe problems. The policies to be implemented will have significant distribution and efficiency impacts on each of those countries and alter the agricultural economy in the 21st century.

The research question to be answered in this project is what the path and speed of reform in the agricultural sector should be. This involves particularly the extent and timing of (1) changes in property rights, farm organization, land tenure, and incentive; (2) change in the marketing and pricing of both inputs and outputs; (3) change in financial institutions; (4) introduction of safety nets; and (5) clarification of the linkage between agriculture and the rest of the economy through employment, price level, balance of trade, and exchange rate.

There are two stages. The first one develops a framework of analysis conducive to formalizing the issues and dilemmas embodied in the transition from a centralized economy to a market-oriented one. Such a framework would allow one to analyze different strategies that can be pursued in the transition process. The second part presents a number of case studies for each one of the countries going through the transition. Since the status quo and socio-political constraints vary from country to country, the strategies now being followed also differ. Their analysis and cross-comparison can provide significant benefits because of the learning-by-doing factor. That is most important in this context where there is little precedent to fall back on.

*Responsibility:* Agriculture and Rural Development Department, Agricultural Policies Division—Avishay Braverman and Gershon Feder, China Country Department, Agriculture Operations Division—Richard Burcroff, Country Economics Department, Socialist Economies Reform Unit—Alan Gelb, Country Economics Department, Trade Policy Division—Andras Inotai, and Policy and Review Department, Policy Development—Geoffrey Lamb. The Hungarian National Bank, Karl Marx University, Hungary, and the Ford Foundation are participating in the research.

*Closing date:* August 1991.

### **Subcontracting and the Informal Sector in the Philippines**

#### **Ref. No. 675-63**

The purpose of this study will be to assess the role of subcontracting activities in the manufacturing industry in the Philippines. There are strong indications that subcontracting plays a very important role both for formal sector establishments and households in the informal sector. It appears that the role has been growing in recent years. Subcontracting has led to new labor practices in large firms, which may increase firms' flexibility in adjusting to changing market conditions. It may have serious implications for the government's employment and income policies. To the extent that subcontracting is an important source of income and employment for households, this raises the question of how effective subcontracting is as a

vehicle for income and employment generation.

Very little is known about subcontracting in the Philippines beyond anecdotal evidence. The study will therefore attempt to characterize the subcontracting activity in terms of its output structure, location, and size. An attempt will also be made to determine the competitiveness of subcontracting as a mode of production and determine whether the competitiveness is the result of real economic factors or market distortions. Other specific objectives of the study are to ascertain the main losers and gainers from subcontracting to judge the potential of subcontracting for expansion and to determine the scope for economic policies to encourage or discourage subcontracting activities.

Information about subcontracting in the Philippines is fragmentary and highly limited in scope and value, and even basic data are unavailable. Thus generating sufficient information about subcontracting necessitates conducting a survey. This survey will focus on the subcontractors—that is, households. It is intended to cover the contractors in a later phase of the research.

The survey will be nationwide. The sample barangays (regions) for the survey are taken from the Integrated Listing of Households and Establishments prepared in 1988. The sample barangays are also the primary sampling units of the labor force survey, and they were selected on the basis of a sampling procedure designed for this survey. The results of this survey will be combined with information from three other sources—Survey of Household-Operated Activities, Labor Force Survey, and Census of Establishments—conducted by the government of the Philippines.

*Responsibility:* Asia Country Department II, Country Operations Division—Zdenek Drabek. With A. Berry, Toronto University, Canada. The National Statistics Office and the Department of Labor, Manila, Philippines, are participating in this research.

*Closing date:* March 1991.

### **The Determinants of Foreign Direct Investment in Developing Countries: The Case of West Germany**

**Ref. No. 675-68**

Foreign direct investment (FDI) has become the most important private source of capital inflows to developing countries. FDI in industrialized countries has, however, been much more buoyant than FDI in developing countries. This is especially true for the source country, Germany, where the share of FDI stocks in developing countries decreased from 20 percent in 1976 to 12 percent in 1988. This study tries to identify the major determinants of German FDI in developing countries, such as market size, export linkages, labor costs, stability, and risk, but also policy factors, such as host countries' FDI regulations and Germany's measures to support foreign investors in

developing countries. The project fits into a broader attempt to explain FDI in developing countries from the perspective of the source countries.

The analysis is empirical and based on two pooled data sets: FDI stocks (book value reported at the end of the year) by country between 1976 and 1987 and FDI transaction data (as compiled for the balance of payments) by country for the same time horizon. (The pros and cons of the two data sets are discussed.) With respect to specification errors, whenever possible, comparable regression equations for German FDI outflows to developing countries and total FDI inflows of the developing countries were estimated to identify particular "German" characteristics.

Market size and import penetration are major driving forces for German FDI in developing countries, while existing FDI abroad does not significantly affect exports to the recipient countries. As a consequence trade barriers are an obstacle rather than a supportive element for German FDI. Empirical evidence for a negative effect of host countries' investment policy on German FDI is mixed. One source country instrument, the federal guarantee scheme, has a significant positive impact on FDI. The relatively high coverage of FDI by guarantee of about 20 percent also explains at least in part the findings that German investors are, in contrast to the "world" average investor, not risk averse. Thus an efficient guarantee scheme might be a better way to encourage FDI in developing countries than generous tax exemptions, which are very costly for some developing countries.

Part of the research results will be incorporated into a MIGA report to the Board. The main research report will be submitted for publication as a World Bank monograph, and a summary will be submitted to the *World Bank Economic Review*.

*Responsibility:* International Economics Department, Debt and International Finance Division — John Underwood and Andrea Gubitz. The Kiel Institute for World Economics, West Germany, is also participating in the research project.

*Closing date:* September 1990.

### **The Role of the Private Sector in Providing Social Services**

**Ref. No. 676-02**

The purpose of this project is to prepare a large-scale research program on the role of the private sector in providing social services. This will contribute to the Research Committee's private sector development special emphasis program. The key research questions that the project will address include: What financing role can and does the private sector play with regard to the provision of social services? Which social services should be financed and produced by the government and which by the private

sector, on grounds of efficiency and equity? What do we know about: the cost and quality of public compared with private education and health services? What has been the experience of developing countries with such privatization mechanisms as vouchers, contracting-out, subsidies, loans, matching grants, and tax incentives? What regulatory schemes should be imposed for quality control and financial accountability of private provisions of social services?

The research will include empirical studies of key issues and case studies of Indonesia, Kenya, Nigeria, and Thailand. A conference to plan the research agenda is scheduled for September 1990.

*Responsibility:* Population and Human Resources Department, Welfare and Human Resources Development Division—Jacques van der Gaag, and Latin America and the Caribbean—Country Department I, Population and Human Resources Operations Division—Nancy Birdsall. With Estelle James, State University of New York at Stony Brook. The Rockefeller Foundation is also participating in the research.

*Closing date:* December 1990.

### **Political Economy and Public Management of State Mining and Oil Companies**

Ref. No. 676-05

An appropriate policy-and-control regime for state-owned enterprises in the mining and oil sectors is vital because these companies often account for a huge proportion of export revenues and borrowing capacity. Poor policies and inappropriate government-enterprise arrangements frequently result in poor accountability, ill-chosen investments, inadequate capitalization, and poorly paced exploitation of the natural resource endowment. This research is designed to develop a framework for understanding how state mining and oil companies respond to four aspects of governmental control:

- (1) government enterprise authority arrangements;
- (2) restrictions and control over international borrowing;
- (3) restrictions and control over diversification;
- (4) the fiscal regime applied to the companies.

The study results will be useful in advising governments and state enterprises on structural arrangements and control policies, since the "independent variables" are all policies under governmental control. The framework for understanding the reactions to alternative policies will facilitate structural adjustment program design whenever state-sector reform is involved.

The framework will be developed through a case study approach supported by a broader, comparative and theoretical analysis of each policy topic. A first stage will examine three case studies chosen because of each company's operational significance for the World Bank or its status as a demonstrable success or failure. Each case

study will assess the performance record of the mining or oil company in light of the macroeconomic context in which it has functioned. The profile of each company will be developed in terms of formal structural arrangements and the perceptions of responsibility and accountability; fiscal regimes; investment and diversification patterns; and international borrowing patterns with special attention to identifying changes in performance that could be linked to changes in these arrangements and policies.

Based on the outcome of the first stage, a second stage will extend the work to a broader range of case studies, including oil industry examples, and will provide for more extensive treatment of the policy topics.

*Responsibility:* Africa Technical Department, Industry and Energy Division—John Strongman. With William Ascher, Robert Bakes, and Y. Aharoni, Duke University.

*Closing date:* June 1991.

### **Financial Management in Africa**

The purpose of this survey was to identify for the UN Intergovernmental Working Group of Experts on International Standards of Accounting and Reporting (ISAR), the commissioning agent, the accounting needs in Africa. Information was obtained on the current and future demand for accountants; the accountancy profession; education and training of accountants; the legal and regulatory framework; and private and public sector management. There is a generally held belief that accountancy in Africa is poor and needs improving. This is the first survey of financial management to cover the whole of Africa and to provide accurate data to confirm the problems Africa faces in this area. Unlike some previous studies, the survey actively encouraged African participation, and the findings are based on the problems and needs identified in the questionnaire responses and surveys.

The research was carried out mainly through a questionnaire sent to governments, national professional accounting bodies, accounting firms, educational providers, donor agencies, and persons prominent in the accounting field in their countries. Information was also obtained through interviews and from other surveys and reports.

The shortage of financial management is evident in almost all countries in the region. Most countries remain overly dependent on expatriate assistance, which has inhibited the development of qualified indigenous accountants and national expertise. The education of accountants is frequently inappropriate or unavailable. Accounting staff is often in acutely short supply, and the needs of small and medium-sized business enterprises for appropriately trained staff go unmet. There is too much dependence on accounting systems and standards developed in France and the United Kingdom, and they need to be revised to be relevant to the needs in Africa. Low priority is given to

accounting standards and their enforcement. In the public sector in particular, institutions need to be reinforced to enable improvement of planning and monitoring of resource utilization. Many of the donor-financed projects in accountancy in Africa have been unsuccessful. In those that have achieved some success, donors have provided long-term finance.

Of immediate benefit to the Bank is the up-to-date information on all aspects of financial management in Africa—the establishment of the profession, number of personnel, training needs, and the regulatory and legal framework for both the private and public sectors. The survey identifies areas of weakness where assistance is needed and reinforces the need for long-term aid to ensure project success.

The survey was considered at an ISAR meeting in March 1990, and a report was circulated within the Bank and sent to governments, professional accounting bodies, and educational providers in Africa and to donor agencies worldwide.

*Responsibility:* Africa Technical Department, Trade and Finance Division—John Graves, and Africa Country Department III, Infrastructure and Operations Division—Richard Senou. With Sonia Johnson, consultant. The United Nations Center on Transnational Corporations and the ILO also participated in the research.

*Completion date:* February 1990.

### Informatics Research

This project sought to improve understanding of and responses to policy issues stemming from developments in information-related fields and areas of application (informatics). Developments in informatics will have a growing effect on the economic and social prospects of all countries. Client countries are expected to seek guidance on how best to respond to the threats and opportunities of informatics. They are also expected to seek advice on such areas of informatics as telecommunications and information services and applications updated to take account of recent informatics developments. Small studies have been begun to help guide the Bank's advice in key policy areas.

Some policy areas that have been analyzed are the potential of personal communications networks as alternatives to local networks in developing countries; the impact of informatics on business in developing countries; and the potential of new telecommunications network-based services and advanced communications services for developing countries.

Ideas from the program are being incorporated in new work—for example, in response to a request from Côte d'Ivoire to review its national informatics policies and areas of application. This is expected to lead to projects in areas that show the most promise.

*Responsibility:* Africa Technical Department, In-

dustry and Energy Division—James Cowie. With Logica Consultants and the Science Policy Research Unit, the United Kingdom.

*Completion date:* June 1990.

### Lessons of Experience with Public Enterprise Reform

This study was an attempt to synthesize knowledge about the effect of public enterprise reforms. It examined the issues of what works—and what does not—in trying to improve public enterprise efficiency and economic contribution.

The study was based on prior investigations of results with performance evaluations (case studies of Korea and Pakistan), contract plans (France, Africa), and divestiture (global, with a focus on Bank projects). Country cases based on operational work (covering Thailand, Zambia, Tanzania, Kenya, Brazil, Mexico, Chile, Peru, Malawi, Togo, Morocco, Portugal, and others) were also examined.

Success in public enterprise reform depends on a clear strategy that faces frontally choices of privatizing, liquidating, or reforming public enterprises and that is an integral part of a broader set of reforms designed to increase competitive pressures. Performance evaluation schemes show considerable promise. There has been less success with contracts.

*Responsibility:* Country Economics Department, Public Sector Management and Private Sector Development Division—Mary M. Shirley and John R. Nellis.

*Completion date:* July 1990.

#### Reports:

Nellis, John R. 1986. *Public Enterprises in Sub-Saharan Africa*.

World Bank Discussion Paper 1. Washington, DC.

\_\_\_\_\_. 1989. *Contract Plans and Public Enterprise Performance*.

World Bank Discussion Paper 48. Washington, DC.

\_\_\_\_\_. 1989. "Public Enterprise Reform in Adjustment Lending."

PRE Working Paper 223. World Bank, Washington, DC.

Nellis, John R., and Sunita Kikeri. 1989. "Public Enterprise Reform,

Privatization and the World Bank." *World Development* 17(5):659-72.

Shirley, Mary M. 1989. "Improving Public Enterprise Performance:

Lessons from South Korea." PRE Working Paper 312. World Bank, Washington, DC.

\_\_\_\_\_. 1989. *The Reform of State-Owned Enterprises: Lessons from*

*World Bank Lending*. Policy and Research Series 4. Washington, DC: World Bank.

Shirley, Mary M., and Elliot Berg. 1987. *Divestiture in Developing*

*Countries*. World Bank Discussion Paper 11. Washington, DC.

\_\_\_\_\_. 1989. "Evaluating the Performance of Public Enterprises in

Pakistan." PRE Working Paper 160. World Bank, Washington, DC.

### **Monopoly Pricing Study**

This research attempted to identify factors that might lead to some developing countries in Sub-Saharan Africa paying excess prices for capital goods and other imports. A preliminary attempt is made to suggest policy initiatives that might reduce these price premiums and thereby lead to a more optimal use of foreign exchange. The study is part of a larger research task that will lead to an evaluation of potential savings associated with the use of pre-shipment inspection services.

The research was conducted through a statistical analysis of unit value (price) data drawn from United Nations Series D Trade tapes.

It was found that former colonies pay more for imports from their former developed country associates than do other developing or developed countries. These findings hold for the former colonies of France, Belgium, the United Kingdom, and Portugal. These developing countries are not getting optimal use from their foreign exchange, which is needed for financing capital goods and food imports or for debt service and repayment.

*Responsibility:* International Economics Department, International Trade Division—Alexander Yeats.

*Completion date:* July 1990.

*Reports:*

Yeats, Alexander. 1989. "Do African Countries Pay More for Imports? Yes." PRE Working Paper 265. World Bank, Washington, DC.

\_\_\_\_\_. 1990. "Do African Countries Pay More for Imports?" *World Bank Economic Review* (January).

### **Analysis of Financing Sources for Power Development During the 10-Year Period (1978-87)**

This research reviews sources of financing for power in developing countries during 1978-87, with the aim of providing background research on issues for financing power development during the 1990s. Data have been compiled from Bank Staff Appraisal Reports, Project Completion Reports, and financial analysts' projections.

The levels of internal cash generation achieved over the 10-year period were inadequate for financing power development. The highest levels of cash generation were achieved in African countries and the lowest in the EMENA region. More than half the utilities studied did not achieve adequate debt service cover.

These findings reflect inadequate tariff levels for electricity. Power utilities in developing countries will be unlikely to obtain sufficient financing in the 1990s for their development programs.

*Responsibility:* Industry and Energy Department, Energy Development Division—Peter Cordukes and Daisy

Hurt, consultant.

*Completion date:* August 1990.

### **Environmental and Natural Resources Management Institutes in Developing Countries**

This study examines the question of how to strengthen institutional capacity so that environmental policies and programs can be effectively implemented in developing countries.

The research is being conducted through case studies in selected countries, prior desk studies, use of local experts, and close collaboration with country operations divisions in the Bank on the selection of countries and the analysis of case studies.

*Responsibility:* Environment Department, Environmental Assessments and Programs Division—Kenneth Piddington, Legal Department, and Country Economics Department.

*Completion date:* December 1990.

### **Study on Development of Productivity Indicators in the Tax Administration for Latin America**

This study is aimed at developing productivity performance indicators for monitoring efficiency and effectiveness of the tax administration system in selected Latin American countries, with a view to generating a useful methodology that will allow ministries of finance and tax directorships to appraise and follow up their performance on administrative efficiency. The need for this research stems from the importance now attributed to tax administration as a determining factor in the success of any macroeconomic policy. The reform of tax administration agencies is central to the revenue mobilization effort. The effectiveness of the tax reform efforts will depend on the capacity of the tax administration to enforce them.

Research questions address the recurring use of the legislative capacity as an instrument to solve short-run problems of tax collection, the types of measures appropriate for exploring the productivity in tax administration given the availability of data for each case study, and the potential compared with the actual tax yield and voluntary compliance rates in the countries studied.

Developing productivity indicators in tax administration requires generating a data base with information on Latin American and Caribbean countries. These indicators should enable the Bank to build up a comparative data series on tax administration for the LAC Region that could be replicated for other regions.

An extensive analysis of the tax administration systems of Colombia, Argentina, Mexico, and Ecuador is

being conducted. Information on the tax systems in these countries, the adequacy of their tax laws, and the efficiency of their tax administration agencies is being evaluated to collect all quantitative information needed to construct a consistent and comparable set of tax productivity indicators and information on the recent evolution of the tax legal system.

For Colombia, a large data base permitted the development of productivity indicators useful for analyzing the efficiency of tax administration and its reform. In Argentina, lack of consistent information processes and organization has made efficiency measures of the tax administration agencies difficult. A consistent and comparable set of tax productivity indicators will be adopted for Mexico and Ecuador. In most of these countries, it is not an explicit policy systematically to evaluate tax compliance behavior and more often than not, the recurrent use of the legislative capacity to solve short-run problems of tax collection has been inefficient and has in some instances aggravated the problems of the administration.

These findings provide a basis for monitoring the tax administration reform processes financed by the Bank in these countries. Over the longer term, the elaboration of a consistent and comparable set of tax productivity indicators will be useful for Bank loan operations that make revenue performance a conditionality. For tax administrators, a comparative data series on tax administration will induce them to adopt a more rational approach to management.

*Responsibility:* Latin America Technical Department, Public Sector Management—Jaime Vazquez and Shahi Chaudry, and Latin America Country Department IV, Country Operations Division—Luca Barbone. With Jorge Cortiz, Cesar Tobo, Gary Reid, Constanza Valdes, Richard Bird, Viviana Duran, and Jose Eidelman, consultants.

*Completion date:* March 1991.

### **Agricultural Biotechnology Study**

This research brings to the attention of developing countries and donor agencies the possible uses of biotechnology in advancing agricultural technology and production. It seeks to provide information on the socioeconomic consequences of application in both the industrialized and developing worlds, and it provides information on environmental protection aspects of the technology and the legal and control methods necessary to encourage biotechnological development.

Papers were commissioned on biotechnology's application to a series of agricultural commodities and in a range of disciplines. Policy issues covered include intellectual property rights, private and public sector collaboration, and regulatory control. Country reports were pro-

duced for Brazil, India, Singapore, Thailand, Philippines, Mexico, Malaysia, Indonesia, Syria, Egypt, Morocco, and Tunisia. These were discussed at a series of seminars in Melbourne and Washington, and final reports were produced.

The biotechnology industry is dominated by the private sector, and intellectual property rights are essential for biotechnology application. Biotechnology covers a range of technologies, the more sophisticated of which are expensive to develop and apply, but simple techniques could be introduced in developing countries.

Without some positive action, the developing world might not be able to participate equitably in the benefits to be expected from biotechnology. The World Bank needs expertise in the subject. Developing country policymakers need to create an environment that encourages public and private sector collaboration.

*Responsibility:* Agriculture and Rural Development Department, Agriculture Production and Services Division—A.J. Pritchard. With P. Brumby; P. Dart, University of Queensland; C. James, CIMMYT; and M. Reeves, INRA. The Australian Centre for International Agricultural Research (ACIAR); ISNAR, the Netherlands; and the UNDP are participating in the research. With funding by ACIAR and UNDP.

*Completion date:* March 1991.

#### *Reports:*

Brumby, P., V. Giddings, G. Persley, and A. Pritchard. 1989.

"Agricultural Biotechnology and the World Bank: A New Challenge."

Persley, G. 1990. "Agricultural Biotechnology: Opportunities for International Development." CABI.

### **Institutional Development and the World Bank**

Major institutional weaknesses exist in less developed countries. Far too many public sector organizations either do not carry out their officially assigned tasks, or carry them out poorly, at excessively high cost. Managerial and administrative deficiencies are increasingly acknowledged as critical obstacles to socioeconomic development. In recognition of this fact, the Bank has long expended efforts to improve the competence, cost-effectiveness, flexibility, and sustainability of key public sector institutions in its borrowers. The Bank's experience in this broad and admittedly difficult field has been reviewed and analyzed in a set of specially commissioned papers (listed below). These papers deal with a range of institutional issues, from the theoretical to the instrumental. They examine what the Bank and borrower governments have attempted in this field, with what results, and recommend changes in approach to improve institutional performance. The papers formed the basis of a December 1989 conference on institutional

development and the World Bank. Two further major outputs will be produced in FY91: (i) a volume of the edited papers, with new introductory and concluding chapters, titled *Institutional Development and the World Bank*, and (ii) a short paper on the more technical public sector management aspects of the topic—civil service reform, budgeting and financial management, and public enterprise performance improvement—to be distributed to Bank staff and senior management. It is expected that this technical paper will be tabled at the Board.

The exercise will conclude with the production of an operational directive on public sector management in FY92.

*Responsibility:* Country Economics Department, Public Sector Management and Private Sector Development Division—John Nellis.

*Completion date:* October 1991.

*Reports:*

- Buyck, Beatrice. 1990. "Technical Assistance for Institutional Development." World Bank, Washington, DC.
- Galal, Ahmed. 1990. "Public Enterprise Reform: A Challenge for the World Bank." World Bank, Washington, DC.
- Gray, Cheryl. 1989. "Institutional Development Work in the World Bank: A Review of 84 Bank Projects." World Bank, Washington, DC.
- Israel, Arturo. 1990. "The Changing Role of the State." PRE Working Paper 495. World Bank, Washington, DC.
- Kikeri, Sunita. 1990. "Bank Lending for Divestiture: A Review of Experience." PRE Working Paper 338. World Bank, Washington, DC.
- Levy, Brian. 1990. "The Design and Sequencing of Trade and Investment Policy Reform." PRE Working Paper 419. World Bank, Washington, DC.
- Nellis, John, and Barbara Nunberg. 1990. "Civil Service Reform and the World Bank." PRE Working Paper 422. World Bank, Washington, DC.
- Paul, Samuel. 1990. "Institutional Development in World Bank Projects: A Cross Sectoral Review." PRE Working Paper 422. World Bank, Washington, DC.
- Salmen, Lawrence. 1990. "Institutional Dimensions of Poverty Reduction." PRE Working Paper 411. World Bank, Washington, DC.
- Stevens, Michael. 1990. "Bank Experience and Emerging Issues in Public Expenditure Management." World Bank, Washington, DC.
- Sullivan, Roger. 1989. "Institutional Development Work in the World Bank: Management Systems, Organization and Incentives." World Bank, Washington, DC.

### **Study of Bank-Supported Extension in Africa**

Extension has been assigned a central place in the Bank's strategy for agricultural growth in Africa, and Bank-supported extension projects are in place in 34 countries on the continent. Concerns are being voiced in the

Bank and by other donors about the effectiveness of this approach.

This research addresses the following questions: (i) What has been the effect on farmers' productivity and incomes? (ii) How can that effect be improved? (iii) How can the cost-effectiveness and sustainability of extension be increased? (iv) What are the returns to extension compared to other complementary inputs and services (price policies, input supplies, institutional credit, irrigation, markets, feeder roads, and so on)?

This research is part of the Africa Region's regional studies program.

Quantitative measures of the impact of extension on production will be based on farm-level data. Other studies will be commissioned to elicit the effectiveness of extension. These will focus on, among other things: (i) the appropriateness of extension messages; (ii) the availability of technologies; (iii) the knowledge, training, and workload of extension staff; (iv) the effectiveness of the contact between extension workers and farmers; (v) the effectiveness of alternative forms of extension (commodity-oriented extension compared with general extension); (vi) the costs and sustainability of extension; and (vii) cost recovery.

The findings of the study will have implications for the role that should be assigned to extension relative to other complementary inputs and services in the Bank's and national governments' future agricultural growth strategies. They will have particular implications for the distribution of agricultural expenditures between extension and these other inputs and services that contribute to the effectiveness of extension but compete with it for scarce public resources. The findings will help to identify ways to improve the future impact, cost-effectiveness, and sustainability of extension.

*Responsibility:* Africa Technical Department, Agriculture Policy Unit—Uma Lele, and Africa Technical Department, Agriculture Division—Vishva Bindlish and Mathurin Gbetibouo. With Robert Evenson, Yale University. The Ministry of Agriculture and Central Bureau of Statistics, Kenya, are participating in this research.

*Completion date:* June 1992.

### **Africa Mining Policy Study**

Africa has fallen well behind other regions in exploration and mining investment and has much untapped mineral potential. If successful, this research will result in increased mineral exploration and investment in Africa, which can offer important economic benefits in exports and tax and, in small-scale mining, in employment.

Given the knowledge about resource endowment and the economic and political structure of different African countries, what are the key policy reforms required that

should result in new exploration and investment by private mining companies? What are the likely benefits? To what extent is there scope for improving the efficiency and competitiveness of state mining enterprises and for moving them toward the private sector?

The research includes six component studies on key themes (such as exploration, taxation, legislation, and so on) and on the attributes of specific African countries. The six studies consist of (a) the geological potential of different African countries; (b) the decision-making criteria of international mining companies for exploration and investment decisions; (c) mining legislation, investment code, and tax regimes in selected African countries; (d) mineral taxation; and (e) state mining enterprises. The results of the component studies will be synthesized in a final report.

Work to date has confirmed that Africa has good mineral potential and that many international mining companies would be prepared to invest in Africa if legal, fiscal, economic, and political constraints can be overcome. The work on legislative aspects has revealed that most major foreign mining investment in Africa has involved some type of contractual agreement between the investor and the government. The findings support the need for initiatives to improve the mineral policy and legislative environment to encourage new mining development in Africa.

*Responsibility:* Africa Technical Department, Industry and Energy Division—John Strongman, With P. Daniel, Sussex University.

*Reports:*

"Industry Mining and Energy." 1990. In World Bank, *From Crisis to Sustainable Growth: A Long-Term Perspective for Sub-Saharan Africa*. Washington, DC.

Frozzard, Peter M. 1990. "Mining Development in Sub-Saharan Africa." In *Natural Resources Forum*. New York: Butterworth.

## Agricultural Marketing Systems

Agricultural commodity exporting in Sub-Saharan Africa faces many difficulties that severely limit income

growth and development. The structure of export marketing and pricing systems, under strict government control, often distorts farmers' incentives for producing export crops. The inflexibility of those marketing and pricing systems renders them inappropriate for competing in the dynamic international market for the major export crops produced in Sub-Saharan countries, such as cocoa, coffee, and cotton. This project will examine the prevailing marketing and pricing systems, determine the changes being made in response to the increased competitiveness in export markets, and draw conclusions about how parastatal marketing organizations can be changed to improve their operational efficiency and cope with changes in world commodity prices.

The research is based on information on export commodity marketing and pricing systems obtained from a literature search, Bank personnel, and mission experience. Market system performance was analyzed by mean/variance comparison of real producer prices with real world prices obtained from different systems.

General conclusions are drawn about the kinds of changes in parastatal marketing organizations that most effectively improve their ability to market crops efficiently and cope with changes in world market prices. The path a country should take toward more private sector participation depends heavily on the form of its marketing and pricing systems and the time needed to develop necessary skills in the private sector. Complete or increased privatization of marketing and adoption of free-market pricing is easier under the *caisse* system than the marketing-board system.

*Responsibility:* International Economics Department, International Commodity Markets Division—T. Akiyama.

*Report:*

Varangis, P., T. Akiyama, and E. Thigpen. 1990. "Recent Developments in Marketing and Pricing Systems for Agricultural Export Commodities in Sub-Saharan Africa." PRE Working Paper 431. World Bank, Washington, DC.

### 3 FINANCIAL INTERMEDIATION

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#### Rural Credit Markets, Investment, and Agricultural Productivity in China

Ref. No. 674-34C

Inadequacy of institutional credit supply to farmers, especially smallholders, is often raised as a justification for government-sponsored intervention in rural credit markets. The World Bank has been a significant contributor of funds for on-lending to farms in numerous projects. However, empirical evidence on the extent to which credit is a binding constraint on farmers' operations has been scant. Furthermore, methodological difficulties hampered attempts reliably to estimate the output effect of credit. These difficulties stem from the fact that credit is only part of farmers' liquid resources and that credit is typically fungible across consumption and production. Many farmers, whether they borrow or not, are not actually constrained by liquidity, but typically researchers do not know which farmers are affected by shortage of credit. This research aimed at quantifying the extent of credit constraints in four study areas in China, devising an appropriate methodology for estimating the impact of credit on output and investment, and utilizing it for case study areas. The study also aimed to gain insights regarding the nature of credit transactions undertaken by Chinese farmers, as there is very limited micro-level information on these aspects of Chinese agriculture.

This study is part of a wider effort to clarify the factors determining the performance of rural financial markets and to design appropriate policies in this subsector.

The research was based on farm-level surveys in four study areas in China, providing detailed information on agricultural households' input use, output, investments, and financial transactions and assets. The data provide descriptive information on the structure of financial markets and on the importance of credit as a constraint on farmers' activities. The analysis of credit impact utilized disequilibrium econometric procedures, based on the classification of farmers as credit-constrained or unconstrained. The classification was based on farmers' responses to specific questions regarding their credit transactions.

The findings indicate that in China commercially oriented informal transactions are quite limited among farmers. Such transactions usually involve loans among relatives for which no interest is charged. The uses of such

loans are quite specific (such as social ceremonies or residential construction), and they cannot be easily diverted for productive purposes. The short-term credit provided by institutional lenders is ostensibly for production, but much of it is fungible. In practice about a third is used for consumption and 40 percent for investment. In areas where input supplies are limited (especially fertilizer), credit transactions are limited as well, and credit is a relatively minor constraint on production and investment. In areas where input supplies are abundant, about a third of the farmers were credit-rationed. In such an area, credit-rationed farmers had about 20 percent less output than that of non-rationed farmers. In areas with limited input supplies, additional credit is shifted to nonagricultural production. However, in an area with abundant inputs, an increase in the availability of credit would induce higher farm investments.

The findings from the four study areas in China indicate that credit is not necessarily an important constraint on agricultural production and investment by households. The availability of other inputs is an important determinant of credit's role in agriculture. This implies that a development strategy that relies on the channeling of a large volume of official credit to farmers may not necessarily have the expected development effect. Bank operations based on credit provision thus need to consider carefully the likelihood that credit is a major constraint on agricultural production and investment. The calculation of the expected output effect should take into account the fungibility of credit, causing a significant leakage into consumption. The methodology developed in this study for estimating the effect of credit on productivity is replicable and can be utilized in assessments of the efficacy of credit projects.

Results of the research were presented in seminars at Iowa State University and Princeton University in April 1990. A seminar was held in the World Bank, and selected results were presented at a conference on Land Tenure Issues in Nairobi, Kenya, in May 1990. Research results were presented at the annual meeting of the American Agricultural Economics Association in Vancouver, Canada, in August 1990. A dissemination seminar will be organized in China in 1991.

*Responsibility:* Agriculture Department, Agricultural Policies Division—Gershon Feder, China Country Department, Country Operations Division—Anthony Ody,

and China Country Department, Agriculture Operations Division—Richard Burcroff and Ramesh Deshpande. With Justin Lin, the Research Center for Rural Development of the State Council of the People's Republic of China, and Lawrence Lau, Stanford University.

*Closing date:* May 1990.

*Reports:*

Feder, Gershon. Forthcoming. "Land Tenure Systems in Thailand and China." In the *Proceedings of the Conference on Land Tenure Systems in Africa*.

Feder, Gershon, Lawrence Lau, Justin Lin, and Xiaopeng Luo. 1989. "Agricultural Credit and Farm Performance in China." *Journal of Comparative Economics* 13(4):508-26.

\_\_\_\_\_. Forthcoming. "The Determinants of Farm Investment and Residential Construction in Post-Reform China." PRE Working Paper Series. World Bank, Washington, DC.

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### Taxation of Financial Assets and Financial Intermediation

#### Ref. No. 674-88C

There are so many ways of imposing taxes on the financial sector—through inflation, reserve requirements, interest rate ceilings, indirect taxes on interest receipts—that it is hard to assess their severity and likely distorting effect. By putting these taxes on a common basis and calculating their magnitude, this project provided a framework for considering the benefits of reform.

Information was gathered on the nature and scale of fiscal and quasi-fiscal impositions in Ghana, Kenya, Zambia, Nigeria, and Côte d'Ivoire and compared on a common basis. A methodology was developed for assessing the distorting effects of financial sector taxes.

The study found that, even when the existence of financial sector taxes is recognized, researchers commonly underestimate the size of the tax, which has varied widely over time and among countries. But financial sector taxes have been a significant element in total governmental revenues, especially during fiscal crises induced by commodity slumps. By any reckoning, the financial sector has been more heavily taxed than other sectors, with taxes collected averaging several times the value added of the banking system in some countries. Different types of tax

distort behavior differently. In relatively less-developed financial markets, such as the five studied, interest rate ceilings may impose higher welfare costs than explicit taxes or reserve requirements.

*Responsibility:* Country Economics Department, Financial Policy and Systems Division—Patrick Honohan. With Christophe Chamley, Boston University.

*Closing date:* March 1990.

*Report:*

Chamley, Christophe, and Patrick Honohan. 1990. "Taxation of Financial Intermediation: Measurement Principles and Application to Five African Countries." PRE Working Paper 421. World Bank, Washington, DC.

### Stock Market Development and Corporate Finance, Phase I

#### Ref. No. 675-84

For almost all developing countries promotion of domestic capital formation to accelerate economic growth will remain a major policy challenge in the 1990s. Faced with the reality of a much reduced supply of foreign funds from previous sources such as commercial banks, policymakers in developing countries are discovering that equity markets may constitute an important mechanism for enhancing the supply of long-term capital, making the financial system more efficient, and for attracting equity rather than debt from abroad—principally from international pension and investment funds, which are on their way to becoming major sources of international capital. Yet very little is known about the policy, regulatory, and institutional requirements of stock market development in developing countries, and our understanding of how corporations finance themselves outside the OECD is incomplete. Study of these issues would yield returns in the form of better policy formation at both the micro and macro levels, and would also identify areas where investments and technical assistance through both the Bank and the IFC would be desirable.

This research is being conducted through a mix of theoretical and empirical investigation. Arrangement has been made through the Center for Pacific-Basin Capital Markets Research of the University of Rhode Island to have access to a large body of data on company finance and market returns for the Korean economy. The data is available in the Bank's Country Economics Department, Finance Policy and Systems Division.

The research has shown that the stock market constitutes an important mechanism for supplying risk capital to the corporate sector in some developing countries. The experiences of Korea and India highlight such an important role for the stock market in the processes of company finance and financial sector reform. In 1988 Korean-listed companies, for instance, raised a sum of US\$10.6 billion

through the stock market; this is estimated to have risen to US\$20 billion in 1989.

To the extent that the prevailing problems of the banking sector in developing countries originate from unbalanced capital structures at the corporate level and the lack of development of equity markets, it is clear that capital market development needs to be viewed as an essential ingredient in the reform of the banking sector. This element of complementarity between the banking sector and the securities markets deserves serious consideration in the design of financial sector reform programs.

A paper produced in connection with this project is scheduled for presentation at the Korea-America Economic Association meeting in October 1990. Another paper is to be presented at the International Trade and Finance in the 1990s conference to be held in France May 31 to June 2, 1991.

*Responsibility:* Country Economics Department, Finance Policy and Systems Division—Mansour Dailami, and International Finance Corporation, Economics Department—Michael Atkin. With E. Han Kim, University of Michigan; and Terry M. Chuppe, U.S. Securities and Exchange Commission.

*Closing date:* December 1990.

*Report:*

Dailami, Mansoor, and Michael Atkin. 1990. "Stock Market in Developing Countries: Key Issues and a Research Agenda." PRE Working Paper 515. World Bank, Washington, DC.

## **Market Power and Financial Structure**

This research addressed an aspect of the degree of efficiency in credit intermediation in developing countries—whether firm-level efficiency plays an important role in the distribution of credit.

It is generally found that larger firms in developing countries are more leveraged. On the basis of this stylized fact, the research asked the following questions: Does this fact reflect imperfections in credit markets whereby large and dominant firms have better access to credit markets at the expense of smaller but not necessarily less efficient firms? Or are larger firms also more efficient and hence less afraid of the possibility of default implied by high levels of debt?

The research was conducted through an econometric analysis of firm-level data from Colombia.

*Responsibility:* Industry and Energy Department, Industry Development Division—Izak Atiyas.

*Completion date:* June 1990.

## **Venture Capital Operations and Their Potential Role in LDCs' Financial Markets**

This research was prompted by the many concerns in the Bank about the most adequate mechanisms for providing financial support for developing the productive sector. Until now Bank operations attempted to do this mostly through long-term loans channeled through development finance corporations. This approach has been far from satisfactory. Efforts are being redirected toward the search for a new financial paradigm.

This research focused on a narrow segment of the broad topic of financing the productive sector. It concentrated on the financing of new operations or start-ups and the financing of the expansion of existing operations by adding new stages in the production or distribution process. Venture capitalists claim to have found the answer to the peculiarities of the financial and managerial needs of such new operations: (i) an equity participation of the investors through a direct purchase of stock, or through warrants, options, or convertible securities; (ii) a long-term investment horizon; and (iii) an active, ongoing investment in the investee company.

A large number of papers have been written in the last 10 years on venture capital. Many reflect venture capitalists' experience; some are the result of academic research focused on narrow issues. The main objective of this research was to provide Bank staff and policymakers in developing countries with complementary evidence on key issues in this area. The research was conducted through a survey of relevant literature and interviews with practitioners in the area.

Venture capital activities appear to be intrinsically small-scale, thus at this stage it is impossible to visualize them as the center of major Bank operations. Unloading large amounts of resources onto newly created venture capital institutions functioning in incipient financial markets in a frequently unstable economic environment is a temptation that must be avoided. The Bank has an important role to play, however, in disseminating the lessons learned in countries where venture capital has been active now for a few years, and in bringing to the attention of governments the policy issues that would enable a more or less "spontaneous" emergence of venture capital activities.

*Responsibility:* Country Economics Department, Financial Policy and Systems Division—Silvia Sagari. With Gabriela Guidotti and Anthony Saunders, consultants.

*Completion date:* July 1990.

## Financial Policy and Private Investment

In many developing countries corporations rely heavily on bank borrowing to finance their long-term investment expenditures. This has reflected mostly the effects of past governmental policy to encourage debt financing through a variety of measures, including low interest rates, generous tax allowances for interest payments, and a tacit commitment against bankruptcy and business failures. The result has generally been an over-indebted corporate sector, a low efficiency of resources, and, often, financial distress of the banking sector.

An important component of adjustment measures geared toward promoting investment and growth is thus the need to encourage companies to rely increasingly on equity rather than debt in their financing strategies. This project analyzes companies' financial policies and practices and how these policies can be influenced through changes in taxation, interest rate, and credit policy.

The research in this project was conducted by gathering information from companies' balance sheets and income accounts in Colombia, Korea, and Zimbabwe and developing a methodology to integrate firms' financing and investment decisions in the financial environment of developing countries.

It has been found that firms' financial policies and practices are central to the effectiveness of taxation and interest rate measures geared toward investment recovery—that is, firms' financial policies are integral to their investment decisions.

In designing measures to strengthen investment incentives, it is critical to analyze the circumstances under which firms finance their investment. Under credit constraint, for example, generous tax depreciation allowances, or low interest rates, will not result in higher productive investment in fixed assets.

*Responsibility:* Country Economics Department, Financial Policy and Systems Division—Mansoor Dailami.

*Completion date:* June 1991.

### Reports:

Chhibber, A., and Mansoor Dailami. Forthcoming. "Fiscal Policy and Private Investment in Developing Countries: Recent Evidence on Key Selected Issues." *Ricerche Economiche*, Symposium Issue on Fiscal Issues in Adjustment in Developing Countries.

Dailami, Mansoor. 1989. "The Impact of the Tax Reform of 1986 on Corporate Cost of Capital." In *Banca & Finanzas* (July/August). Asociacion Bancaria de Colombia, Bogota.

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Washington, DC. (Also forthcoming in Chhibber, Dailami, and Shafik, eds., *Public Policy and Private Investment in Developing Countries*.)

\_\_\_\_\_. "Optimal Corporate Debt Financing and Real Investment Decisions under Controlled Banking Systems." In K.P. Fischer and G.J. Papaioannou, eds., *Business Finance in Less Developed Capital Markets*. New York: Greenwood Press.

\_\_\_\_\_. "Financial Policy and Corporate Investment in Imperfect Capital Markets: The Case of Korea." PRE Working Paper 409. World Bank, Washington, DC.

Dailami, Mansoor, and Hin Dinh. 1990. "Interest Rate Policy in Egypt: Its Role in Stabilization and Adjustment." World Bank, Washington, DC.

Dailami, Mansoor, and Michael Walton. 1989. "Private Investment, Government Policy, and Foreign Capital in Zimbabwe." PRE Working Paper 248. World Bank, Washington, DC. (Also forthcoming in Chhibber, Dailami, and Shafik, eds., *Public Policy and Private Investment in Developing Countries*.)

## Contractual Savings

Contractual savings can make a significant contribution to the development of long-term debt and equity markets. This research project will review the progress of contractual savings in developing countries, assess their impact on the economy, and evaluate policies for their promotion. A major objective will be to review the economic and regulatory issues involved in promoting contractual savings.

The first part of the project is based on desk research. The second part will involve commissioning a small number of in-depth country studies from local experts.

Contractual savings will be of major importance for the mobilization and allocation of long-term savings, but their promotion also involves important issues relating to economic efficiency and equity.

Many countries are increasingly focusing on the need to develop domestic sources of long-term finance. The contractual savings industry will play a central part in this, and Bank operations will address the policy issues involved.

The findings of this research project will be disseminated through a series of working papers, to be followed by a conference and a book.

*Responsibility:* Country Economics Department, Financial Policy and Systems Division—Dimitri Vitas, Patrick Honohan, Andrew Sheng, and Millard Long.

*Completion date:* June 1992.

## 4 HUMAN RESOURCES DEVELOPMENT AND POVERTY REDUCTION

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### Returns to Investment in School Quality in Rural Brazil

Ref. No. 672-93C

Little evidence is available to help financially strapped governments of developing countries make informed choices on investment in rural primary schooling. Yet these governments continue to invest in rural primary education to the extent possible, more from a sense of equity than from confidence in the returns to the investment. This research project was a modest effort to provide some of the information needed for policy evaluation.

As part of a World Bank loan to Brazil (EDURURAL), primary schools in 268 counties in nine northeastern states were earmarked for investments in quality improvements, such as textbooks and classroom materials, more training and better pay for teachers, and better school administration. About \$1.1 million of the loan (1.2 percent of total project costs) was allocated for an evaluation of the project's contribution to improved primary school enrollment, to reducing repetition and dropout rates, and to learning.

The goal of the evaluation was to determine which improvement in educational quality or mix of improvements introduced by the project was most cost-effective in terms of gains in learning. An important aspect of the study was the development of measurements of changes in learning over a limited time as a result of the improvements.

The project's sample was randomly chosen from second- and fourth-grade pupils in rural primary schools in three Brazilian states (Pernambuco, Ceara, and Piaui) in the nine-state project area. Data were collected biennially from 1981, a pre-project year, through 1987, when investments were complete. Some pupils feature in more than one round of data.

Analysis of the data through 1985 shows that material inputs, such as textbooks and writing materials, appear to be the most cost-effective way to raise achievement, followed by formal education of teachers. Achievement gains per dollar invested in teacher education were higher for completed primary education than for secondary education. With the exception of water projects, investment in infrastructure, such as school buildings and furniture, was more costly in raising achievement.

Findings from the 1985 data and an update of earlier findings were presented at the Comparative and Interna-

tional Education Society meetings in 1987. The study was completed in January 1990, and its findings will be presented in the forthcoming book: *Educational Performance of the Poor: Lessons from Rural Northeast Brazil*.

*Responsibility:* Europe, Middle East and North Africa Technical Department, Population and Human Resources Division—Ralph W. Harbison. With Eric A. Hanushek and Joao Batista, University of Rochester; J.B.F. Gomes-Neto and Raimundo Helio Leite, Federal University of Ceara in Fortaleza, Brazil. The Brazilian Ministry of Education and the Carlos Chagas Foundation also collaborated in the evaluation project as a whole.

*Closing date:* June 1990.

#### Reports:

- Armitage, Jane, J.B.F. Gomes-Neto, Ralph Harbison, Donald Holsinger, and R. H. Leite. 1986. "School Quality and Achievement in Rural Brazil." Education and Training Department Discussion Paper EDT25. World Bank, Washington, DC.
- Harbison, Ralph, and Eric A. Hanushek. 1989. "Educational Performance of the Poor: Lessons from Northeast Brazil." World Bank, Europe, Middle East and North Africa Technical Department, Washington, DC.
- EDURURAL Evaluation Research Team. 1985. "Avaliacao da Educacao Rural Basica no Nordeste Brasileiro." 4 vols. Relatorio Tecnico 7, Versao Definitiva. Fortaleza, Brazil.
- Gomes-Pereira, A., and J.B.F. Gomes-Neto. 1987. "Academic Performance and Family Variables in Rural Areas of Northeast Brazil." Paper presented at the Comparative and International Education Society annual meeting, Washington, DC, March.
- Therrien, A. "Selectividade Social e Escola Rural: Comparacao Entre Alunos de 2 e 4 Serie."

### The Political Economy of Poverty, Equity, and Growth

Ref. No. 673-73

What has been the experience of developing countries with growth and income distribution in recent decades, and how has their experience been affected by public policy decisions? Under what circumstances is a policy package likely to lead to better equity and growth outcomes than another policy package? How do initial conditions—physical and human resource endowments, trade orientation, agricultural systems, socioeconomic institutions— affect the growth and equity outcomes?

Previous studies have examined the experience of

individual countries to derive guidelines and policy lessons relating to growth and equity. But useful generalizations and policy lessons with wider relevance than those emerging from individual country studies are still needed. This study is attempting to find broadly applicable answers to these questions, within a political economy framework, through a comparative analysis of experience in 21 developing countries.

Researchers are recording each country's recent economic history and evaluating alternative interpretations of the "facts" of the case to show the processes at work in the economy. They are also assessing the relative importance of three sets of factors: initial conditions, institutional influences, and public policy interventions.

After the historical experiences of individual countries have been accounted for, the findings will be analyzed comparatively for "paired" countries. By comparing the experiences of two countries with similar or contrasting experiences, the study should provide a new perspective on the development experience even for countries that have been frequently studied individually.

Finally, the findings of the country studies and the paired studies will be pulled together in a synthesis report so that any further generalizations applicable to larger clusters of countries may be considered. This gradual expansion of the network of comparisons should capture broadly applicable guidelines for policymaking while avoiding any arbitrary forcing of the experiences of individual countries into a preconceived theoretical framework.

The results of the country case studies have been pooled in a synthesis volume by Deepak Lal and Hla Myint. The draft volume was discussed at a conference in Washington, DC, in May 1990.

The countries selected for the study and the principal authors (in parentheses) are as follows: Brazil and Mexico (Angus Maddison); Colombia (Mauricio Carrizosa and Alberto Urdinola); Costa Rica and Uruguay (Simon Rottenberg); Hong Kong, Singapore, Mauritius, Malta, and Jamaica (Ronald Findlay and Stanislaw Wellisz); Madagascar and Malawi (Frederic Pryor); Nigeria and Indonesia (Paul Collier, David Bevan, and Jan Gunning); Peru (Richard Webb); Sri Lanka and Malaysia (Henry Bruton); Thailand and Ghana (Oey A. Meesook, Douglas Rimmer, and Gus Edgren); and Turkey and Egypt (Bent Hansen). These country studies and the synthesis volume by Deepak Lal and Hla Myint have been accepted by the Bank for publication through university press.

**Responsibility:** Latin America Technical Department, Human Resources Division—George Psacharopoulos. With Deepak Lal, University College, London; and Hla Myint, London School of Economics.

**Closing date:** September 1990.

#### **Reports:**

- Hansen, Bent. 1989. "Unemployment, Migration, and Wages in Turkey, 1962-85." PRE Working Paper 230. World Bank, Washington, DC.
- Pryor, Frederic. 1988. *Income Distribution and Economic Development in Madagascar: Some Historical Statistics*. World Bank Discussion Paper 37. Washington, DC.
- \_\_\_\_\_. 1988. *Income Distribution and Economic Development in Malawi: Some Historical Statistics*. World Bank Discussion Paper 36. Washington, DC.
- Psacharopoulos George, ed. Forthcoming. *Essays on Poverty, Equity and Growth*. Oxford: Pergamon.
- Tilak, J. 1989. *Education and its Relation to Economic Growth, Poverty, and Income Distribution: Past Evidence and Further Analysis*. World Bank Discussion Paper 46. Washington, DC.

### **Public and Private Transfers in Peru**

#### **Ref. No. 674-49C**

Public transfers are an important component in governments' attempts to insulate the poor in the adjustment process. These transfers include subsidized provision of public services and direct monetary payments. They generally move resources from higher to lower income households. But looking at only public transfers can be deceptive. Suppose that widespread, altruistically motivated private "safety nets" exist, and that any change in public transfers simply causes corresponding offsets in private transfers. If public transfers are reduced, private ones take up the slack; if they are increased, private ones are crowded out. With a pervasive private transfer network, public transfers might have more limited effects in fighting poverty.

The motive for private transfers—altruism versus exchange—determines private responses to public income redistribution. If the motive is altruism, the impact of public transfers will be dampened or neutralized by private behavioral responses. But economists have recently begun to consider nonaltruistic transfers—payments exchanged for in-kind services or future cash transfers. If the motive is exchange, the public-transfer impact can actually be amplified by private responses. For a person relying on private transfer income in an exchange relationship, an increase in public transfers buys two things: increased consumption and increased power and independence in the exchange relationship.

While the connection between public transfers and some aspects of private behavior (savings, labor supply) have been studied extensively, the links between public transfers and private family transfers remain virtually unexplored. This research addressed the interaction between public and private transfers in developing countries. It used micro-level data available in the Peru Living Standards and Informal Sector Study.

The Peru data set is well-suited to the task: it contains details on both private transfer income (for example, remittances given and received) and public transfers (such as unemployment insurance), as well as a comprehensive set of demographic, labor market, consumer-balance-sheet, and expenditure variables. Initial results indicate that private transfers have an equalizing effect on income distribution; act as social insurance in the event of old age, disability, and illness; and are not given for purely altruistic reasons. Private transfers also mitigate some (but not all) of the effect of public transfers, such as social security and health coverage.

*Responsibility:* Country Economics Department, Public Economics Division—Emmanuel Y. Jimenez, and Donald Cox (consultant).

*Closing date:* July 1989.

*Reports:*

Cox, Donald, and Emmanuel Jimenez. 1989. "Private Transfers and Public Policy in Developing Countries: A Case Study of Peru." PRE Working Paper 345. World Bank, Washington, DC.

\_\_\_\_\_. Forthcoming. "Social Objectives Through Private Transfers: A Review." *World Bank Research Observer*.

## **Quality and Socioeconomic Impact of Education in Sub-Saharan Africa**

### **Ref. No. 674-57**

Education plays a critical role in the development process, both in terms of costs incurred and anticipated benefits. In Sub-Saharan Africa, governments have spent large amounts of money to raise educational levels. This effort has resulted in improvements in educational attainment, but recent economic stagnation has been accompanied by stagnation in school enrollments and significant deterioration in the quality of schooling. This study constitutes a comprehensive investigation of both the process by which education is obtained and the benefits provided to individuals who become educated. The study complements recent research on East Africa (Kenya and Tanzania) by focusing on a West African country, Ghana.

The research contributes to the stock of knowledge from previous research in two ways. First, the study clearly distinguishes between years of school attendance—one input in the production of educated individuals—and learned cognitive skills—or relevant outputs of education. Second, the study examines the contribution of education to economic development within a broader framework than has been used in the past. These two approaches contribute to a deeper understanding of education in economic development and have the potential to provide clear recommendations on the design of effective education policies.

A great deal of money, time, and effort is saved by building on the Living Standards Measurement Survey now in place. Additional data are being collected in three

short tests: a reading test, a mathematics test, and an abstract test that attempts to measure innate ability (Raven's Progressive Matrices). These tests were held in Ghana from October 1988 to August 1989. Four questions can be answered with the data from these tests: (1) the extent to which reading and mathematics skills are acquired in school; (2) the retention of these skills by adults; (3) the contribution of these skills to economic productivity, measured by earnings, agricultural productivity, and so on, and (4) the effects of these skills on noneconomic outcomes, such as fertility and the nutritional status of children. This knowledge will provide policymakers with information on the effectiveness of present education policies and will also have implications for the design of future policies.

Preliminary results indicate that in the private wage sector cognitive skills are rewarded, while actual years of schooling have little direct effect on wages. In contrast, in the government sector, years of schooling have a direct impact on wages over and above the impact of cognitive skills. It also appears that reading skills in English are very low for most students who finish six years of primary school.

Several products will emerge from this research. First, individual papers will appear in the World Bank's Living Standards Measurement Study working papers series. At a later stage, revised versions of these papers will be submitted for publication in academic journals to allow for broader dissemination of the findings. Finally, a monograph will pull together the various studies in a comprehensive assessment of the role of education in the development process.

*Responsibility:* Population and Human Resources Department, Welfare and Human Resources Division—Paul W. Glewwe, and Africa Technical Department—Peter R. Moock.

*Closing date:* December 1990.

*Report:*

Glewwe, Paul. "Schooling, Skills and the Returns to Education: An Econometric Exploration Using Data from Ghana." World Bank, Population and Human Resources Department, Washington, DC.

## **Expansion of Female Employment in the EMENA Region, Phase I: Cross-Country Study**

### **Ref. No. 674-81**

This project explores the feasibility of expanding female employment in the Islamic countries of the Europe, Middle East and North Africa (EMENA) region. Female labor force participation rates in these countries are among the lowest in the world, and with rising numbers of female-headed households in recent years, the issue of the feasibility of expanding female employment is especially relevant. An understanding of women's activities and of factors

conducive to and constraints on the expansion of female employment is important for Bank policy dialogue with the countries concerned.

The project examines female labor force participation, along with detailed studies of labor market structure and dynamics in six countries—Egypt, Turkey, Jordan, Kuwait, Morocco, and Tunisia. The study addresses both economic and sociocultural aspects. Since education is an important influence on employment, the project focuses on education and assesses how much increasing educational opportunities for girls can increase female labor force participation. Or, are the sociocultural norms and practices such severe constraints that there is little likelihood of expansion and diversification of female employment despite greater access to education?

The project also includes an analysis of the demand for female employees and of the availability of jobs for women in the formal sector. This analysis involves a cross-country investigation of regulatory constraints, such as labor laws and wage legislation, related to women's employment. Relating the institutional constraints to the level of participation of women in wage employment and the types of occupations women enter in each country, as well as comparing experiences between countries, is of policy interest.

Lessons can be learned from the experiences of countries reflecting different degrees of female employment expansion and diversification. The project identifies characteristics of the process of change and of the stages within change and develops feasible policy proposals that will assist countries in advancing through the stages.

Although the cross-country phase can be considered as an entity in itself, it is intended to be the preparatory stage for an eventual Phase II. The investigation in Phase I identifies the gaps in existing information and the additional data necessary for statistical analyses of the determinants of female employment. This identification will help in the design of surveys and detailed data collection efforts planned for Phase II.

In the case of Morocco, the ongoing Living Standards Measurement Survey presents an opportunity for testing a sample survey design to be used in Phase II. Given the low female labor force participation rates, the household survey approach is likely to include few working women, especially women with formal wage employment. A cost-efficient approach to increasing the sample size of working women is to conduct an establishment survey at the same time as the household survey. This integrated household-establishment survey design is a new approach that has not been applied before in developing countries. A pilot survey of establishments is planned for Casablanca, Morocco, and will be conducted toward the end of 1990. Existing econometric techniques will be used for merging the establishment-household data sets for statistical analyses.

Of the six country studies, four (Kuwait, Egypt, Jordan, and Turkey) have been received; the studies for Morocco and Tunisia are expected shortly. Preliminary findings show an improvement in female educational status in these countries during 1976-86, but women still lagged behind men in both literacy rates and levels of educational attainment. Urban and rural differentials are wide; however, male-female differences in educational achievement are much less in urban than in rural areas.

For most of the countries the trends show an increase in the percentage of women in the work force, supporting the general expectations that female labor force participation rates will rise with development. In Turkey, a small decline is recorded for the period, which can be attributed to the increased enrollment of young women in education. Women are spending more time in education, and this is reflected in the upward shift in the average age of employed females.

One of the issues of interest is the extent to which women are concentrated in particular occupations or sectors—that is, are there recognizable “women’s jobs?” The preliminary results show considerable diversity among the countries, with women concentrated in agriculture in some countries and a very high percentage working in scientific, technical, and professional occupations in others.

Further investigation will provide insights into the operation of labor markets in the Islamic countries. Laws and regulations benefiting female employees may prove to be barriers to women’s access to employment. In Egypt, the labor laws passed in 1981 ensuring the rights of employed mothers have depressed employment opportunities for women in the private sector. Employers in private enterprises, and in some cases in governmental organizations, are reluctant to recruit women given the laws guaranteeing their right to take long leaves from work to bear and rear children.

*Responsibility:* Europe, Middle East and North Africa Technical Department, Population and Human Resources Division—Maurice Boissiere and Anthony Wheeler. With Jere R. Behrman, University of Pennsylvania; Robert A. Moffitt, Brown University; Suan Ying, EMTPH; Birks & Sinclair, Ltd.; Juan P. Munoz, Sistemas Integrales Desarrollo, Chile; Sulayman Al-Qudsi, Kuwait Institute for Scientific Research, Kuwait; Mohamed Salahdine, University of Fes, Morocco; and Aykut Toros, Institute of Population Studies, Hacettepe University, Turkey. The UNDP Regional Bureau for Arab States is cofinancing the research project. The Royal Scientific Society, Jordan; Central Agency for Public Mobilization and Statistics, Egypt; and Ministère du Plan, Tunisia are participating in the research.

*Closing date:* February 1991.

## **National Education Achievement in Brazil**

**Ref. No. 674-84C**

This project was the first systematic assessment of secondary school student achievement in Brazil. It was designed to measure differences in student cognitive achievement (on a standardized test of math and Portuguese) at different types of schools and across regions in Brazil, and to examine the determinants of differences in achievement. Because students' backgrounds, such as family income, parents' occupations, and parents' level of education, are known to have important influences on cognitive achievement, comprehensive socioeconomic information was collected from all the students who participated in the test. Information was also collected about characteristics of the schools.

The standardized test, developed and administered by the Carlos Chagas Foundation in Sao Paulo, was taken by more than 2,600 students in their third year of secondary school in a stratified sample of 70 different schools in three regions in November 1988. The kinds of schools included public and private, general and technical, and teacher training. Test results and questionnaires were computer coded and tabulated by researchers at the foundation. In the second phase of the work, conducted at the Bank, a hierarchical linear model was used to analyze the relative importance of student background and school variables in student achievement.

Researchers found significant differences in student performance in different types of schools (private, public, general education, and technical education), but little variation across regions. Consistent with results in other countries, school differences were more important in explaining differences in students' math scores than in explaining language (Portuguese) scores. A second result was that in any given school, socioeconomic differences among students had little effect on their test scores; the implication of this is that a low-income student attending a school in a high-income area would perform close to the average for that school.

It was also very clear from the data that different types of students appear to be "tracked" into different types of secondary schools in Brazil. Students in the highly selective government technical schools (approximately 3 percent of total secondary enrollments in Brazil) were disproportionately male and from high social class backgrounds; students in private schools were next highest in average family income; students in general public schools were of low average family income; and students in teacher training schools were almost exclusively female and also of low average family income.

The test results showed a "private school effect": controlling for student background, students in private schools outperformed students in public schools in mathematics. (There was no significant difference in Portu-

guese performance, however.)

Researchers also tried to analyze what underlying characteristics of the successful schools were most important in determining their students' performance. Characteristics examined were: school size, number of shifts, average teacher salaries, average class size, and hours per week of Portuguese and math instruction. As expected, hours of math and Portuguese were positively correlated with student performance. Surprising results were that class size was positively correlated with performance, and there was no significant correlation between teacher salary levels and school performance, despite the large range in average salaries across the schools sampled. Researchers believe that positive effects of class size may be spurious and related to the fact that the private schools tended to have larger average classes.

This research provided some valuable insights into the state of Brazilian secondary education, at a time of sharp debate in the country over government policy toward private schools and the priority of technical compared with general secondary education. It also contributed to the small but important body of existing international research analyzing the effectiveness of successful schools.

A monograph on the research results is under preparation. Discussions have been held with the Brazilian government on holding a seminar in Brazil to discuss secondary education issues and to disseminate the results of the research.

*Responsibility:* Latin America and the Caribbean Country Department I, Population and Human Resources Operations Division—Barbara Bruns and Nancy Birdsall, and Population and Human Resources Department, Education and Employment Division—Marlaine Lockheed. With Heraldo Vianna, Carlos Chagas Foundation, Sao Paulo.

*Closing date:* June 1990.

## **Nigeria: Health Care Cost, Financing, and Utilization**

**Ref. No. 674-93C**

Health care in Nigeria suffers from problems familiar to many developing countries: misallocation of resources, with too little spent on cost-effective measures; inefficient public health care programs, with an imbalance between personnel and nonpersonnel costs; and inequitable distribution, with, for example, a concentration of facilities in urban areas. Empirical work in this relatively new field of economics has been limited, and there is very little analysis of the issues in Africa. This study addressed conditions in Nigeria, but it also contributes to the Bank's understanding of health care and related problems in other developing countries.

Nigeria has considerably expanded its health care system, both public and private, in the past 20 years.

However, although the ratio of facilities and personnel to population has risen significantly, there has been a marked deterioration in the quality of those facilities and a falloff in use since the beginning of the 1980s. Infant mortality and child death rates, although lower than formerly, are still high compared with rates in countries at similar levels of development. Nigeria's Federal Ministry of Health is now emphasizing the expansion and strengthening of the primary health care network, in part to support the nation's newly adopted national population policy. These efforts have renewed attention to questions of resource generation and allocation.

The study focused on how efficiently public and private services are provided, evaluated significant cost differences between the public and private sectors, and identified variables that explain those differences. This is one of the first such comparative facility cost studies done for a developing country.

The study's findings will support policy options that point to cost-effective improvements in public health care facilities. The data set comes from sample surveys, conducted in Ogun State in 1987, that inventoried more than 400 public and private health facilities (68 in detail) and about 4,700 households (sampling about 20,000 people). Data on facilities include figures on user fees, drug charges, and personnel and nonpersonnel costs. The analysis used a generalized translog, multiproduct, short-run, variable-cost function, and a generalized translog multiproduct function. The household surveys took a detailed illness history of each resident to identify the use of public, private, traditional, and pharmacist health care; the order in which each type of care is selected; and the distance traveled for and the cost of the type of care selected. The study examined the demand for health care in the context of the socioeconomic household data (including income, education, employment, and various measures of wealth). The analysis looked not only for usage and expenditure patterns but also for the factors that determine the choice of various types of care (as well as the choice of no care). The data also permit assessment of users' sensitivity to fee increases for each type of service.

The effect of price changes on health care use is of central interest to policymakers. The study's derived demand and price elasticities support projections of how various fee levels would affect use of both public and private facilities. Policymakers can see simulations of the results, in terms of revenues and usage, if specific fees are raised or lowered (given the alternatives chosen for use of the collected funds). They can then decide whether a given improvement in quality would make people more likely to choose a facility or service, or less likely to do so because of the increased cost.

The results highlight the major role that perceived facility quality plays in the decisions that patients make. But quality change can have very large cost implications,

which could swamp revenue effects. Therefore, quality improvements need to be carefully selected for cost-efficiency. Making this selection requires adequate information systems at the facility level, which are now lacking.

The results were presented at a National Health Policy Workshop in Nigeria in April 1990.

*Responsibility:* Western Africa Department, Population and Human Resources Operations Division—Hazel Denton. With Anne Marie V. Wouters, Johns Hopkins University; John S. Akin, University of North Carolina; and Ronald J. Vogel, University of Arizona.

*Closing date:* December 1989.

### **Econometric Study of Food Aid in Africa**

#### **Ref. No. 675-01C**

In recent years, Sub-Saharan Africa has received about 3 million tons of food aid a year, or more than a third of its food imports. The annual cost of this aid is about \$750 million. This amounted to about 10 percent of total ODA. For some donors and recipient countries, the share of food aid in total aid is much higher, reaching about 30 percent for Ethiopia.

Food aid is additional aid in the sense that it is provided in addition to financial aid rather than as a substitute. At a time when Africa needs all the resources it can get and needs to transform resources into as much development as possible, it is pertinent to ask how well food aid is used and what can be done to use it more efficiently. There is a growing realization that food import requirements will be high in Africa for some time and that food aid needs to be better integrated with financial aid if food aid is to contribute to development and if it is to be prevented from having negative incentive effects on production and trade.

The econometric study was part of a comprehensive study of options for improving the cost-effectiveness of food aid in Africa. The purpose of the study was to ascertain whether there are causal relationships between food aid and food production, consumption, and imports.

On the dynamic relationship between food aid and food production, the study's findings contradict the conventional wisdom (at least for Africa) that presumes a negative effect of food aid on domestic food production. The observed tendencies of countries that receive food aid to import excessively or to neglect opportunities to develop their own agriculture is considerably overshadowed by the positive development effect achieved by the additional resource transfer embedded in food aid. The econometric analysis captured the net dynamic effect by regressing annual food production on food aid receipts in several prior years.

Another widely held belief, that variations in food aid shipments occur in response to supply pressures in the donor countries rather than in response to the changing

needs of the recipient countries, is also contradicted by the study's findings. The study concluded that in Africa food aid shipments have compensated consumers on average for 50 percent of consumption losses that otherwise would have occurred as a result of shortfalls from trend in their own production. Another 25 percent of the shortfalls is compensated through commercial imports. The data are not precise enough to investigate the timeliness of food aid receipts.

*Responsibility:* Africa Department, Office of the Vice President—Shlomo Reutlinger, and Agriculture and Rural Development Department, Agricultural Policies Division—Martin Ravallion. With Victor Lavy, Hebrew University, Jerusalem.

*Closing date:* September 1989.

*Report:*

Lavy, Victor. 1990. "Does Food Aid Depress Food Production? The Disincentive Dilemma in the African Context." PRE Working Paper 460. World Bank, Washington, DC.

### **Adult Health in the Americas**

#### **Ref. No. 675-02C**

Many developing countries are undergoing epidemiologic and demographic revolutions. Populations are aging rapidly, and chronic and degenerative noncommunicable causes of illness and death are becoming much more important than infectious and parasitic diseases. These changes imply major changes in priorities for prevention, and in health financing.

This study addressed: (1) the importance of non-communicable disease among the poor; (2) the growing importance of deaths due to intentional and unintentional injuries; and (3) the disproportionate increases in disability and sickness as populations live longer.

The research drew on background papers from a recent Brazilian sector study. These data were supplemented by selective use of data on other Latin American countries available from Bank and Pan American Health Organization data bases.

The study found that the poor are at much greater risk of chronic diseases than the rich. This risk means that programs for health promotion and disease prevention must be targeted to the poor. Deaths due to violence have increased rapidly in the last decade of economic stagnation. During periods of economic adjustment, and probably during subsequent periods of adjustment, attention to public security is a pressing health and development need. In North America, increases in life expectancy have been accompanied by only small increases in years of healthy life, but very large increases in years of sick or disabled life. Preventive strategies may help increase the number of healthy years lived for a given level of increase in life expectancy and should, therefore, be given priority.

*Responsibility:* Infrastructure and Urban Development Department, Water and Sanitation Division—John Briscoe. With Aloysio Achutti, Federal University of Rio Grande do Sul, Brazil; and Roberto Macedo, University of Sao Paulo, Brazil.

*Closing date:* December 1989.

### **Policy Analysis of Poverty: Applicable Methods and Case Studies, Phases I and II**

#### **Ref. No. 675-04/675-96**

This project has been concerned with the economic analysis of policies that aim directly to reduce absolute poverty in developing countries. The twin goals of Phase I have been (i) to develop theoretically sound and applicable methodologies for quantifying poverty alleviation impacts and (ii) to apply these methods to new data for Indonesia. The empirical work on Indonesia has included a detailed analysis of the country's progress in poverty alleviation during the 1980s, emphasizing the effects of agricultural policies and nonfarm rural development.

Phase II of the project aims to enhance our knowledge about the past performance and future potential of poverty alleviation schemes in South Asia, a region with a long history of such schemes. Building on the lessons from Phase I, Phase II will be particularly concerned with rural public employment schemes. The empirical work on Phase II will be primarily for India.

The policy analysis of poverty thus merits an analytical framework. This framework should be capable of consistently describing the effects of policy changes on living standards of the poor. The project's approach uses household-level data guided by microeconomic theory, emphasizing the need for realistic specifications of the constraints facing policymakers.

The study's approach to the measurement of poverty draws on recent theories on the use of dominance conditions to establish social welfare orderings. Thus, the method is not restricted to a single well-defined "poverty line" or "poverty index." Rather, whenever possible, the entire distribution of individual welfare is studied, and distributions are partially ordered according to a broad class of social welfare indicators, including conventional poverty measures.

The methodology of Phase II also entails modelling the second-round income effects of poverty alleviation schemes, operating through labor markets and by asset generation.

Phase I has thrown new light on the effects of various policies, including macroeconomic adjustment programs, on the poor. In the empirical work on Indonesia, it was found that favorable initial conditions, a timely adjustment program, and care in protecting public expenditure pro-

grams benefiting the poor allowed Indonesia to maintain the momentum of its progress in poverty alleviation through the difficult 1980s. However, there is further potential for policy reforms capable of sustaining the momentum in the 1990s.

A lesson from Phase I has been that information and related incentive constraints can severely restrict the quantitative possibilities for poverty alleviation through direct policy intervention. With limited redistribution instruments, leakage to the non-poor from even well intentioned poverty alleviation schemes is inevitable. The problems involved in simply reaching the poor in the rural sectors of many developing countries is daunting.

The most promising key to improving targeting performance and, hence, the terms of the trade-off against other policy objectives, is to build incentives into the poverty alleviation scheme that discourage participation by the non-poor and limit leakage from corruption. Penalty schemes may help, but they too are plagued by informational and administrative problems in this context. An attraction of labor-intensive rural public works programs from this point of view is their capacity to screen the poor and raise their incomes. Phase II aims to compare the performance of these programs to that of feasible policy alternatives.

*Responsibility:* Agriculture and Rural Development Department, Agricultural Policies Division—Martin Ravallion, Gaurav Datt, and Monika Huppi. With Stephen Coate, Harvard University; and Alok Bhargava, University of Houston.

*Closing date:* December 1991.

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- \_\_\_\_\_. Forthcoming. "Reaching the Poor through Rural Public Employment: Arguments, Evidence, and Lessons from South Asia." *World Bank Research Observer*.
- Ravallion, Martin, and Gaurav Datt. Forthcoming. "Regional Disparities, Targeting, and Poverty Alleviation in India." In M. Lipton and J. van der Gaag, eds., *Proceedings of the World Bank/IFPRI Poverty Research Conference*.
- Ravallion, Martin, Gaurav Datt, Dominique van de Walle, and E.

Chan. 1990. "Quantifying the Magnitude and Severity of Poverty in the Developing Countries." Background paper to the *World Development Report 1990*. World Bank, Washington, DC.

Ravallion, Martin, and Monika Huppi. Forthcoming. "Poverty in Indonesia During the Recent Adjustment Period: A Case Study in Methodology." *World Bank Economic Review*.

Ravallion, Martin, and Dominique van de Walle. Forthcoming.

"Poverty Orderings of Food Pricing Reforms: A Demand Consistent Welfare Analysis for Indonesia." *Journal of Policy Modeling*.

## Poverty in Nepal

### Ref. No. 675-05C

This research is key to identifying workable strategies to reduce poverty in Nepal—one of the world's poorest countries. It sought to build a better understanding of the constraints and potential for alleviating poverty in a resource-scarce economy in the absence of robust growth. It tried to answer the following questions: (i) What are the characteristics of the poor in Nepal? (ii) What are the binding constraints that prevent the poor from increasing their incomes? (iii) How effective have existing programs been at reaching the poor and raising incomes? What interventions would be more effective? (iv) What policies can the government follow (in a broader sense) to reduce the incidence of poverty over the next 10 to 20 years?

The research drew on an extensive Multi-Purpose Household Budget Survey conducted by the Central Bank, and on local consultants who reviewed available data and literature on incomes, the dynamics of poverty, and the effectiveness of existing poverty alleviation programs.

Poverty in Nepal is chronic, rooted in excessive population on a limited resource base. The solution lies in population control plus growth. The only area for significant growth in the medium term is agriculture, which could double its absorption of labor. In the longer run, however, Nepal must look to strategies that involve (i) a higher skilled and educated work force and (ii) greater integration into the Indian economy in industry and energy.

The findings of the research show that the need for population control is critical and that labor-absorbing growth is very important. The findings also reveal that subsidies and formal sector interventions are irrelevant. There is significant scope for more cost-effective poverty alleviation programs, including public works, food security measures, hygiene, and education. Credit programs and targeted food programs appear not to be feasible interventions.

*Responsibility:* Asia Country Department I, Population and Human Resources Operations Division—W. James Smith, Environment Department, Environmental Operations and Strategy Division—Christopher Gibbs, and Population and Human Resources Department, Women in

Development Division—Lynn Bennett. With Jack Dalog, Australia; Neil Walton, Action Aid; Sanjay Sinha, India; Meena Acharya, Nepal; John Elder, United States; and Bhaskar Rizal, Nepal.

*Closing date:* March 1990.

### **Poverty Alleviation and Adjustment in Malaysia**

#### **Ref. No. 675-09**

Distributional outcomes have played a key role in the choice of a development strategy and of government policies in Malaysia. Ethnic inequalities in incomes and occupations in 1970 formed the basis for a variety of programs and policies designed to alleviate poverty and remove inequalities. An assessment of the experience of the last 20 years is vital to understanding whether the government should intensify targeted programs or should decide for growth as a way of more rapidly reducing poverty. One objective of this study is to analyze the impact of the adjustment made in 1984-87 on absolute poverty and income inequality. This adjustment featured a major cutback in public development expenditure, a sequence of exchange rate devaluations, a sharp slowdown in economic growth, and a buildup of unemployment. Overall, however, programs targeted to the poor were maintained. This research assesses whether such efforts sufficed to overcome the negative impact of the macro-economic environment. The research also examines the role of education, particularly of females, in explaining the evolution of income distribution in Malaysia. And the research includes a cross-country comparison assessing the evolution of living standards in Malaysia.

The research is based on Household Income Surveys for 1973, 1984, and 1987. It involves econometric estimates of wage formation, labor force participation, and sector choice based on micro and macro data. The results of these estimations will be used in accounting equations explaining aggregate growth, poverty, and income distribution outcomes. The relationships among growth, education, and income distribution will be modelled. And the research will draw on detailed studies of the impact of targeted programs governing support to padi farmers, rubber smallholders, fishermen, and estate workers.

Absolute poverty has radically declined and income distribution improved in Malaysia during 1973-87. An important determinant of this improvement was the education of females and their participation in the labor force. In the adjustment process during 1984-87 absolute poverty declined and income distribution improved in Malaysia.

There is little evidence of labor market segmentation in Malaysia; therefore growth was broadly based. Rates of return to education were about 15 percent for the period 1973-87, despite large increases in the educational

achievement of the population.

*Responsibility:* Asia Country Department II, Country Operations Division—Homi Kharas and Surjit S. Bhalla. With Ishaak Shaari, University Kebangsaan, Malaysia; and Shubhashio Gangopadhyay, India Statistical Institute, New Delhi, India. The Economic Planning Unit, Malaysia, is participating in the research.

*Closing date:* December 1990.

### **Women, Public Services, and Income Generation**

#### **Ref. No. 675-14**

Women, especially in Africa, play a major economic role, and yet have disproportionately inadequate access to productive inputs and services. What determines their access to (or use of) public services (such as extension, credit, education, health, piped water)? How does this access affect their participation and productivity in various economic activities, and how does it affect children's welfare?

This research is part of a larger research effort in PRE to determine if and how women's productivity and family welfare are improved when women are given more access to public resources.

Based on household and labor force survey data, the study uses econometric methods to identify who (women or men) actually makes greater use of public services and to suggest why. The study also uses Sen's "cooperative conflict" and Deaton's "outlay equivalent" models to estimate whether women's increased access to public services increases their income and productivity and their influence on intra-household resource allocation and consumption.

It is too early to report on findings with any degree of certainty, but a preliminary analysis suggests that if public expenditures in education were made neutral with respect to gender in Kenya (rather than discriminating against girls, as they currently do), this would call forth additional resources for families, who now appear to invest more in private education for boys. Women's increased cash income increases household expenditure on food and clothing, but reduces expenditure on alcohol and cigarettes.

These preliminary findings seem to suggest that the Bank and the developing country officials should try to improve women's access to public services so as to increase women's cash income. This in turn improves family welfare, especially welfare of the children.

*Responsibility:* Population and Human Resources Department, Women in Development Division—Shahidur Khandker. With Paul Collier, David Bevan, and Jan Gunning, Oxford University.

*Closing date:* July 1991.

## **Poverty, Female-Headed Households, and Welfare of Children and Youth**

### **Ref. No. 675-22**

Female-headed households, although a small percentage of the total population in Brazil, have been rapidly increasing over the last decade as a percentage of poor households. Experience from other countries suggests that those in this population group require special assistance to lift them out of poverty. One reason for this is that the households have a high dependency ratio, and earners in these households are concentrated in low-wage jobs. In addition, these households have difficulty getting access to social services and poverty programs. Initial studies in Brazil have confirmed these trends and indicated a dependence of this type of household on child labor. This dependence on child labor is especially worrisome, as it limits the opportunities for future generations to break the cycle of poverty through human capital accumulation.

This project studied the characteristics of urban female-headed households in Brazil—their composition, income, income structure, members' labor participation, and the implications for human capital formation. The study used annual cross-section data from a Brazilian household survey (for urban areas only). Standard statistical techniques were used to identify the difference between female-headed households and other poor households. This analysis will result in recommendations on how Brazilian anti-poverty programs could be tailored to meet the needs of these households.

*Responsibility:* Latin America and the Caribbean Country Department I, Country Operations Division—Louise Fox.

*Closing date:* August 1990.

## **Collection of Community Data on Access to Family Planning in Zimbabwe**

### **Ref. No. 675-23C**

Sub-Saharan Africa has the highest fertility rates of any major region of the world and prospects for fertility declines in the near future are not good. There are, however, a couple of exceptional cases where fertility decline has begun. Zimbabwe is the largest of these countries. The lessons learned about fertility decline there will be extremely useful for Africa as a whole. A major question about the Zimbabwean situation is how much has the program stimulated fertility decline and how much of that decline resulted from favorable socioeconomic preconditions. This issue was addressed by examining the current constraints on expanded contraceptive use and fertility decline and the extent to which the relative importance of these constraints differs among socioeconomic groups and across regions.

Demographic and Health Surveys (DHS) are being conducted in about 30 countries. These surveys routinely collect data on fertility and contraceptive behavior, family size preferences, and socioeconomic background of women of reproductive age. A survey of 4,200 women was conducted in Zimbabwe in late 1988. While this survey had rich evidence on women and their knowledge, it had no objective data on their access to contraception. To determine the extent to which program access is constraining fertility, it is necessary to supplement the survey with data on accessibility of family planning services. This research project collected community data on family planning and health services in the 167 primary sampling units used in the DHS survey. These data were combined with data collected from individual women to analyze the determinants of contraceptive use and fertility. This project provides a descriptive report of the access.

*Responsibility:* Population and Human Resources Department, Population, Health, and Nutrition Division—Susan Cochrane. Demographic and Health Surveys conducted by a division of IRD, Columbia, MD.

*Closing date:* June 1990.

## **Income Change and Savings: Côte d'Ivoire and Thailand**

### **Ref. No. 675-27**

Very little is known about saving behavior in developing countries despite many years of research and the central position of saving in the theory of economic development. Many observers believe that the acceleration of economic growth requires more saving, and that it is important that governments design policies that will encourage saving, or at least not distort it. But there is little hard empirical evidence, either on the determination of microeconomic saving at the household level, or on the relationships between savings and growth at the macroeconomic level.

Saving means the transferring of purchasing power from one period to another, either for individuals or for a nation as a whole. For many poor in developing countries, incomes are uncertain and consumption is never far above subsistence, so that variations in income pose a serious and ever present threat. Many poor households do not have access to credit, at least to credit that is available to maintain consumption during periods of low income, so that the only way consumption can be protected is by the precautionary accumulation of assets. Many developing country governments also face great volatility in their revenues. Exports of primary commodities are an important source of government revenue, so that fluctuations in international commodity prices pass through into fluctuations in government revenue. Dealing with these fluctuations is a problem in allocating purchasing power over

time—in other words, it is a savings problem.

At the theoretical level, this project has developed models on the theory of household behavior with borrowing restrictions (such as imperfect credit markets). The study has developed models in which households accumulate assets as buffers against uncertain income, and manage to achieve a good deal of consumption smoothing without having to hold many assets. Models to handle the case where there is income growth will also be developed. At the empirical level, the project is using data from Thailand and Côte d'Ivoire. A third household survey has been obtained from Bangkok to look at the extent to which farmers can and do smooth out fluctuations in their incomes. The buffer model will be tested using Ivorian data, including three years of Living Standards Measurement Survey data and generated income and expenditure data for 1987.

Although the project is not yet completed, the theoretical research has borne some fruit that is interesting in its own right. The traditional focus on savings and growth has been given too much attention relative to the issues of consumption smoothing and the securing of living standards. Empirical evidence shows, contrary to general belief, that the cross-country correlation between savings and growth cannot be attributed to life-cycle effects. Policymakers in developing countries should pay more attention to the savings problems that are involved in handling fluctuations in commodity prices in the presence of agricultural taxes and subsidies.

*Responsibility:* Population and Human Resources Department, Welfare and Human Resources Division—Jacques van der Gaag. With Angus Deaton and Christina Paxson, Princeton University.

*Closing date:* September 1990.

*Report:*

Deaton, Angus S. 1989. "Saving in Developing Countries: Theory and Review." Paper presented at the First Annual Bank Conference of Development Economics, April 27-28, 1989, Washington, DC. (Forthcoming in *World Bank Economic Review*.)

### **Human Capital Accumulation in Post-Green Revolution Rural Economies: Pakistan**

**Ref. No. 675-28**

The 1981 Pakistan Population Census recorded a literacy rate of 18 percent in rural areas. In 1986, little over 50 percent of primary school-age children were enrolled in school, and boys outnumbered girls by more than three to one. In recent years, the government established the education of the rural population as a high priority, but an unfavorable fiscal situation will keep expenditures on a tight rein. In the medium to long term, a massive injection of human capital into rural Pakistan will have important

economic, social, and equity implications. Against this background this project is studying the determinants and consequences of human capital accumulation in rural Pakistan.

The first phase focuses on the determinants of human capital accumulation; specifically on the demand for and access to quality education and the production and retention of cognitive skills. In a subsequent phase, the focus will shift to the relationship between human capital and productivity (raised incomes), as well as other dimensions of human behavior (such as better nutrition, lower fertility, and reduced morbidity and mortality).

The data base for the research is a panel of 800 households drawn from three of Pakistan's four provinces. There are 12 rounds in the survey, spanning a three-year period, and a specially designed education and employment module was administered in the tenth round. The module included a cognitive and technical skills questionnaire. Detailed information on schools and teachers was also gathered. To test the sample, a second, larger (3,000 households) data set will also be analyzed. In the first phase of the research, these data will be analyzed: (1) using a bivariate probability model testing the following variables (presumed to influence the probability that a child is in school): distance to school, school quality, parental education, household income and assets, and child's sex, age, sibling position, and ability; and (2) focusing on the observed variance in cognitive skills among individuals with the same number of years of schooling. The education production function will be examined. Sources of variance are hypothesized to include native ability, household environment (education of parents, income, nutrition and health status of children), school quality (physical facilities, ability of teacher, availability of nonteacher inputs), and a variety of postschool influences that enhance or erode cognitive skills. For those engaged in agriculture, further analysis will be undertaken to explore the interaction between cognitive and technical skills.

*Responsibility:* Europe, Middle East and North Africa Country Department I, Country Operations Division—Regina Bendokat and Christine Allison. The International Food Policy Research Institute is also participating in the research.

*Closing date:* June 1991.

### **Poverty, Growth, and Adjustment in Pakistan**

**Ref. No. 675-29**

Since 1977, Pakistan's economy has been growing at a sustained rate of 6 to 7 percent per year. Despite this impressive rate of growth, recent estimates suggest that as many as 35 to 40 percent of the country's population currently live below the poverty line, and levels of popula-

tion in poverty have fallen very little over the past 10 years. Pakistan's demographic and social indicators remain matters of grave concern: population growth is at 3.1 percent a year; life expectancy at birth is only 54 years; and infant mortality is an estimated 100 per 1,000 live births. According to the 1981 Population Census, only 26 percent of the population was literate (35 percent of males and 16 percent of females). The persistence in poverty levels in light of social and demographic indicators is particularly worrying: if the poor have not benefited from recent economic growth, additional and better targeted measures may be necessary to achieve the Pakistan government's poverty alleviation objectives.

This project addresses three questions: (1) Has the incidence of poverty fallen as a result of Pakistan's recent, sustained economic growth? (2) What specific actions have been undertaken in Pakistan to improve the status of the poor? Why have they been, or why have they not been, successful? (3) In light of constraints imposed by the new adjustment program, how can design, targeting, and implementation of existing poverty alleviation programs be more effective? What new programs might be in order to mitigate the adverse impacts of adjustment on the poor?

The research program has two major components. The first two research questions are taken up in Phase I, which entails a retrospective assessment of how the benefits of Pakistan's recent economic growth have been distributed over the population, focusing on the poor. A determination will be made as to why certain groups received a disproportionate share of benefits while others received very little. This information will be used to assess the impact of future growth strategies on poverty levels, and to recommend remedial measures.

The final questions are addressed in Phase II. This phase requires an analytic framework to evaluate the budgetary and distributional consequences of Pakistan's new structural adjustment program. A consumer demand system will be estimated to capture own and cross-price effects of major commodities. Drawing on recent developments in the theory of taxation and building on work completed in the Welfare and Human Resources Division on similar issues, the research will assess the impact of various price reforms resulting from alternative tax and subsidy scenarios under consideration in Pakistan.

*Responsibility:* Population and Human Resources Department, Welfare and Human Resources Division—Jacques van der Gaag. With Sandy Mackenzie, International Monetary Fund; Harold Alderman, International Food Policy Research Institute; Angus Deaton, Princeton University; and Aly Ercelwan, Anjum Ataf, and Kaiser Bengali, University of Karachi.

*Closing date:* March 1992.

## Education, Growth and Inequality in Brazil

### Ref. No. 675-61

Brazil's implicit strategy of human capital accumulation, characterized by low levels of public investment at the primary and secondary levels of the school system, and low enrollments and school quality, is not typical of middle-income developing countries. Has this strategy limited the country's economic growth? Has it exacerbated income inequality? The primary task of this research project is to assess the costs and benefits of the Brazilian pattern of investment in education in order to draw lessons from the Brazilian experience for policymakers in Brazil and other low- and middle-income countries facing choices about the level and nature of educational investments.

A second task of the research project is to analyze the role of the private sector in delivery of education in Brazil, especially in secondary and undergraduate education, where the private sector is most developed. Results from this research will provide a sound empirical basis for proposing changes in policy toward the private sector in Brazil that could improve the efficiency and effectiveness of public policy and investments in education.

The research program consists of almost 20 research papers on education, economic growth, and income distribution in Brazil. Several of the Brazilian scholars and outside experts are basing their analyses on rich lodes of data, such as the annual national household surveys conducted since 1976 and the monthly household employment surveys conducted since 1982. In some cases the studies are comparative, drawing on cross-national sources of data or micro-data from other countries. A few of the studies highlight differences among regions or states within Brazil.

Preliminary results will be discussed with Brazilian policymakers and academics at a workshop in Brazil in 1991. Following this workshop, all the papers will be finalized and collected in a single volume; overview essays will analyze the links between the essays and will highlight the implications of the research for education policy in Brazil and other developing countries. If the results warrant it, the papers and overview essays may be published in book form.

*Responsibility:* Latin America and the Caribbean Technical Department, Environment Division—Nancy Birdsall, Latin America and the Caribbean Country Department I, Population and Human Resources Operations Division—Barbara Bruns and Robert Kaplan, and Latin America and the Caribbean Technical Department, Public Sector Management Division—Donald Winkler. The Mellon Foundation, United Nations Development Programme, and the Brazilian Ministry of Economy, Finance and Planning are participating in the research.

*Closing date:* June 1992.

### **The Economic Impact of Fatal Adult Illness from AIDS and Other Causes in Sub-Saharan Africa**

Ref. No. 675-71

The AIDS epidemic presents an additional burden of mortality to an African population already afflicted with high mortality rates. According to World Health Organization estimates, adult AIDS cases (and deaths) in Sub-Saharan Africa from 1987 to 1991 are projected to grow at a compound rate exceeding 40 percent per year. Since these cases derive entirely from existing infection, they will occur regardless of the effectiveness of recently initiated programs to prevent the spread of the disease. This project seeks to answer two broad research questions: (1) What are the economic costs and impacts of AIDS illness and death among adults on households and communities? (2) How can the government target patient and survivor assistance programs in order to maximize the benefit to survivors for a given government budget? This project is complementing other research by the Bank's Population and Human Resources Department in the field of adult health, including the Disease Priority Study and the Adult Health Study. The project will also complement the regional studies program of the Bank's Africa Technical Department, which includes several studies on prioritizing expenditures for AIDS treatment and prevention.

The research project will conduct a socioeconomic survey of households in an area of high AIDS prevalence. A sample of both "healthy" and severely affected households will be followed longitudinally over 18 months, at six-month intervals. Because it enables the use of techniques to control for certain unobserved variables and it captures the time-path of household responses, the longitudinal design will yield more complete estimates of the costs and impact of fatal illness than could be gleaned from a single cross-section. Furthermore, by comparing severely affected to relatively untouched areas, the project will document the stress imposed by the epidemic on local coping mechanisms and the consequently higher burden on the affected households and individuals.

The results of the research will be disseminated jointly by the local and international researchers through a workshop and a policy conference, international meetings such as the Global Conference on AIDS, and a book addressed to practitioners and policymakers. It is also planned to submit papers for publication in the World Bank PRE Working Papers Series and the Living Standards Measurement Survey Working Papers Series and in academic journals.

*Responsibility:* Population and Human Resources Department, Population, Health and Nutrition Division—Mead Over, and Africa Technical Department, Population, Health and Nutrition Division—Martha Ainsworth. With

Juan Munoz, Sistemas Integrales; Godlike Koda, University of Dar es Salaam; Phare Mujinja; George Lwihula; and Innocent Semali.

*Closing date:* June 1993.

### **Impediments to Contraceptive Use and Fertility Decline in Different Environments**

Ref. No. 675-72

The United Nations Fund for Population Activities has recently revised its projection of when the world's population will double from its current size to 10 billion. Previously, they had predicted that this would happen at the end of the next century. They now are predicting it will occur in 2025. The reason for this revision is that despite substantial success in reducing fertility in some countries, contraceptive usage has not expanded as fast as expected. Fertility decline has been particularly slow in some parts of south Asia, the Middle East, and Sub-Saharan Africa. The major focus of this research is to identify the impediments to contraceptive use and fertility decline in several different environments. The impediments to be studied are the lack of desire to limit the number of children and the lack of motivation to space births, which together constitute fertility intentions, and the lack of access to clinical and non-clinical family planning services, which constitute the supply of family planning. These impediments are expected to have different impacts depending on the density of services, the level of contraceptive use, and the cultural environment.

Household and service availability data will be used to test a model of contraceptive use and fertility. The model has been refined from existing work by Rosenzweig and Schultz for developed countries and Easterlin for developing countries and has several different, interrelated dependent variables: child survival, desired family size, motivation to limit fertility, motivation to space births, breastfeeding, contraceptive use, and recent fertility. Neither of the other models in the literature deal explicitly with modeling the other determinants of fertility intentions. Much of Schultz's work has used only reduced-form specifications while Easterlin assumes that the desire to limit fertility is exogenous. Neither approach is appropriate for answering questions that arise in targeting fertility programs to groups with different intentions. A major component of the project will be to model the components, test for endogeneity, and simulate the impact of changes in policy variables throughout the system.

*Responsibility:* Population and Human Resources Department, Population, Health and Nutrition Division—Susan Cochrane, Eduard Bos, and Jane Nassim. With David Guilkey, University of North Carolina; and Dov Chernichovsky, Ben Gurion University.

*Closing date:* June 1992.

## The Study of Household-Level Demand for Micronutrients

Ref. No. 676-08

Nutrition research in recent years has found that, although calories may appear to be the most limiting nutrient, the lack of essential micronutrients in the diet may hamper utilization of that energy and may also contribute to human functional deficiencies independent of energy deficiency. (For instance, iron and iodine deficiencies reduce learning, and vitamin A deficiency impairs the immune system and can cause blindness.) Moreover, the nutrient density of a food may be so low that children and pregnant women, in particular, may not be able to eat enough food to satisfy their nutritional needs. So purchasing additional cheap, bulky calories may not be a rational consumer decision. People buy more expensive (possibly more dense) nutrients.

The objective of the proposed research is to estimate household-level demand functions for a sample of Philippine farm households and to compare these micronutrient income elasticities with income elasticities already estimated for calories. Besides income, the demand analysis will look at the effects of formal education, nutritional knowledge, prices, and the extent to which "backyard" production of vegetables, fruits, and livestock influences intakes of different micronutrients.

The data to be used for the regression estimations are taken from surveys of rural households in Bukidnon province on the island of Mindanao in the Philippines. Households were surveyed four times at four-month intervals, and data were collected on a wide range of topics, including landholdings, income sources, expenditure patterns, calorie intakes, and heights and weights. The analysis uses data for 406 households—which households were present for all survey rounds and whose livelihood depended primarily on production of corn or sugarcane.

If the research concludes that increased income is being used preferentially for micronutrient-rich foods, that will suggest that poverty alleviation programs centered on food subsidies and transfers should include some micronutrient-rich foods. If increased income is not spent preferentially on micronutrient-rich foods where most nutrients are deficient, this argues for direct micronutrient interventions.

*Responsibility:* Population and Human Resources Department, Population, Health and Nutrition Division—Judith S. McGuire. The International Food Policy Research Institute is participating in the project.

*Closing date:* November 1990.

## Education and Science in Africa

The economic development of Sub-Saharan Africa

depends in large part on the ability of its societies to introduce technical change. This in turn depends on a confluence of many factors: scientific and technical knowledge, management, institutions, and an appropriate economic and social environment. This research project is the first effort to measure scientific output in Africa. The research was conducted through a bibliometric study of scientific research and analysis of the scientific manpower output of universities. The study suggests a new approach to science and engineering in Africa.

*Responsibility:* Africa Technical Department, Education Division—Manuel Zymelman.

*Completion date:* June 1990.

*Report:*

Zymelman, Manuel. 1990. *Science, Education, and Development in Sub-Saharan Africa*. World Bank Technical Paper 124, Africa Technical Department Series. Washington, DC: World Bank.

## Regional Review of Vocational Training in Latin America

Latin American vocational training by semi-autonomous agencies outside formal education is a dynamic model of training. It is apparently linked well with employment demand and highly innovative. A thorough analysis of this model is important to the World Bank's policy study on vocational training. The questions addressed in this research are organizational, financial, and institutional:

(i) What is the organizational model, and how has it evolved?

(ii) What financing schemes are used, and what is the evidence on their economic efficiency?

(iii) What is the policy base for these institutions?

(iv) What are the most effective institutional practices (links with employers, instructional models)?

(v) How are training systems adapting to new production technologies?

(vi) What strategies are used for training the disadvantaged and for the informal sector? What is the evidence on their costs and effectiveness?

Research methods included reviewing studies, commissioning papers by experts, using survey questionnaires for training systems and institutions, and conducting field interviews with systems managers and experts.

Vocational training institutes have responded to increased economic uncertainty by improving responsiveness to market forces; in-service training of the workforce, for example, has become the main line of business, replacing pre-employment training. This has required increased decentralization of services, a large share of which are now delivered in enterprises. Services have been diversified to include productivity assistance to small and medium-sized firms, including management training and acquisition and adaptation of new technologies. Financing has also be-

come increasingly diverse, moving from sole reliance on earmarked payroll taxes to a wide range of direct contracts with employers. Training services are highly innovative in a continuing search for efficiency.

Preliminary findings of the research have been distributed in a brochure to international agencies and through conferences in Latin America.

*Responsibility:* Population and Human Resources Department, Education and Employment Division—John Middleton. Participating institutions were the National Technical Education Council, Argentina; National Training Institute, Costa Rica; National Technical Centre and Training Institute, Chile; National Institute of Technical-Vocational Training, Dominican Republic; Ecuadorean Occupational Training Service; National Training Service, Colombia; National Commercial Training Service, National Industrial Training Service, and National Rural Vocational Training Service, Brazil; National Service of Occupational Training in Industry and National Service of Training for the Construction Industry, Peru; and Polytechnic Schools of Uruguay. With funding by the International Development Research Center, the German Agency for Technical Cooperation, and the Inter-American Development Bank.

*Completion date:* June 1990.

### **Research Components in World Bank Education Projects 1982-89**

Research and evaluation components are features of most Bank education projects, accounting for an estimated \$98 million (2.2 percent) of the \$4.5 billion budgeted for loans and credits to education projects during 1982-89. Yet research implementation has been poor. As early as 1982, a study found that only 20 percent of 272 identified, previously funded research activities yielded obtainable documents. This study took stock of project-funded research activities since 1982 to determine the extent to which they have yielded information that contributes to knowledge development and strengthened in-country research capacity. By assessing the conditions under which research yields information and affects policy decisions, the study provides the foundation for a broader program to initiate work on developing research improvement in developing countries to better enable them to design, implement, and evaluate education policy.

The project description, objectives, agreements, and annexes of Staff Appraisal Reports (SARs) for 146 education projects were examined, and 436 planned studies were identified. Studies were grouped regionally, and a survey form was sent to division chiefs of the 13 subregions in the Bank, asking that their staff indicate the status of the listed studies, identify related documents if completed, and provide information on any studies not identified. Project

Completion Reports were also examined for information on studies. Regional Information Centers were asked to search for any identified documents. From these activities a comprehensive list of all planned, completed, and available studies in education projects in 1982-89 was compiled. Budgeted expenditures on research components were taken from cost tables in SARs or were estimated from planned man-months of technical assistance. Finally, to provide further insight into the conditions under which research components were completed, 18 project officers were interviewed and asked to explain why the research components of their projects were or were not successfully completed.

Of 436 identifiable planned studies in 116 education projects, 184 (22 percent) had been completed at the time of this review. Documents were identified for 84 of these completed studies. Further breakdown shows similar completion rates across regions and a slight improvement in completion rates for more recent projects. Why? Studies originally proposed may be dropped or replaced to meet changing needs. But studies are also poorly designed, failing to take into account institutional weaknesses or to meet the demands of decisionmakers. Inadequate capacity to gather and analyze data in a timely manner also contributes to high noncompletion rates.

For policy research to be effective, countries must have both a monitoring system that allows the continued evaluation of implemented projects, and the ability to incorporate those findings into broader policy research. The Bank can ensure a greater completion of research components in the short run by increasing emphasis on supervision missions. But the Bank must also develop the capacity and demand for monitoring and evaluation systems through the provision of technical support to establish and encourage the use of such systems.

*Responsibility:* Population and Human Resources Department, Education and Employment Division—Marlaine E. Lockheed. With Alistair Rodd, consultant.

*Completion date:* June 1990.

### **Food Aid in Sub-Saharan Africa**

This research project focused on the future of food aid to Sub-Saharan Africa, addressing these questions: How much can be used? In what way should it be used? And what actions need to be taken to ensure that food aid is used well in the 1990s?

The study concentrated on Africa because of its special and pressing development problems. Despite Africa's great diversity, its countries have some important common characteristics that are particularly relevant to this study: low economic growth and rapid population growth, leading to increasing poverty; the precariousness of rainfed agriculture and hence of the food supply situa-

tion: severe logistical constraints; and weak markets and administrative structures. There is a crucial need to rethink the different roles of food aid in addressing each of these problems according to the circumstances of each country.

*Responsibility:* Africa Technical Department, Food Security Division—Shlomo Reutlinger, Robert Hindle, and Barry Riley. With Simon Maxwell, IDS/Sussex. The World Food Program, Italy, also participated in this research.

*Completion date:* July 1990.

### **The Informal Sector in Zimbabwe: The Role of Women**

The purpose of this research is to analyze the structure and functioning of the informal sector in Zimbabwe, and the role of women in it, in order to enhance the effectiveness of government and donor policies affecting economic activity in that sector. Because women constitute a majority of those engaged in the informal sector, these policies must at least be gender-neutral, and at best be able to compensate for the social constraints that women face in maximizing their output and income.

The informal sector in Zimbabwe generates employment and income for many persons who have no alternative employment opportunities or income source. The formal sector, historically an important source of employment in Zimbabwe, cannot absorb the increases in the labor force that have taken place since independence in 1980. The medium-term prospects are that the informal sector will have to be relied on to absorb an increasing proportion of the labor force. In these circumstances the challenge is to introduce policies, programs, and projects to facilitate the orderly expansion of that sector, help raise the productivity of those engaged in it, and ensure a more equitable structure of employment.

The research will identify (i) the impediments preventing women from maximizing productivity in their current activities and from moving into other, more productive activities; and (ii) a program of action for the consideration of the government and donors, including the World Bank, to reform regulations and institutional policies and practices and provide needed resources to enable the informal sector to expand and improve its economic performance.

This research is part of the Women in Development Division's work on the informal sector and women and will contribute to the development of sector guidelines.

The study was based on a survey of informal sector activities, conducted by a local research team, which covered 225 informal sector respondents in the capital, in a secondary town, and in a rural "growth center." The study also drew on the results of other, related research.

Preliminary findings indicate that the legal and regu-

latory framework is a major impediment to the growth of the informal sector; that financial institutions extend almost no assistance to the informal sector; and that entrepreneurs in this sector would benefit from training in basic bookkeeping and management skills and a business information service.

*Responsibility:* Population and Human Resources Department, Women in Development Division—Katrine Saito. With Meine Pieter van Dijk. ENDA, Zimbabwe is also participating in the research.

*Completion date:* September 1990.

### **Labor Migration**

The research will attempt to examine the explanatory variables of household migration behavior in developing countries and outline the divergent policy implications for assessing internal and international migration under different configurations of explanatory variables.

The research will use absolute income versus relative deprivation migration decision models.

*Responsibility:* Population and Human Resources Department, Welfare and Human Resources Division—Jacques van der Gaag. With Oded Stark, consultant.

*Completion date:* December 1990.

#### *Reports:*

Stark, Oded. Forthcoming. *On the Economics of Nonmarket*

*Transfers: The Role of Altruism.* Living Standards Measurement Study Working Paper. Washington, DC: World Bank.

Stark, Oded, and O. Galor. Forthcoming. *Migrants' Savings, the Probability of Return Migration, and Migrants' Performance.* Living Standards Measurement Study Working Paper. Washington, DC: World Bank.

\_\_\_\_\_. Forthcoming. *The Probability of Return Migration, Migrants' Work Effort, and Migrants' Performance.* Living Standards Measurement Study Working Paper. Washington, DC: World Bank.

### **PAG on Poverty**

The poverty research group was established to promote research on poverty in developing countries. The group enhanced the Bank's collaboration with external researchers and scholars in exploring cost-effective and sustainable interventions for poverty reduction. The key research questions include: What are the policy implications underlying the different concepts and measures of poverty? How are the poor affected by technical progress in agriculture, rural commercialization, migration, population growth, economic shocks, and adjustment? What has been the experience of developing countries with poverty reduction?

Internal and external researchers were commissioned to prepare papers on these questions, which papers will be

published as conference proceedings in book form.

*Responsibility:* Population and Human Resources Department, Welfare and Human Resources Division—Jacques van der Gaag, and members of PAG on Poverty. The International Food Policy Research Institute is also participating in this project.

*Completion date:* December 1990.

*Report:*

Lipton, Michael, and Jacques van der Gaag, eds. Forthcoming. *World Poverty: Research and Policies*. World Bank/International Food Policy Research Institute Poverty Research Conference.

### **Women's Economic Productivity**

Women account for 45 percent of family income in Peru. They carry the main responsibility for child care and heavily influence family decisions on children's education and family size. Improving women's economic productivity helps slow population growth and improve human capital and, above all, family income.

This research seeks to identify possible ways in which women's productivity can be enhanced and the possible consequences of this enhanced productivity on family welfare.

This research is part of a larger effort in PRE to determine whether and how women's economic productivity and, hence, family welfare are improved when women are given more access to education, extension, training, credit, health care, and other public resources.

Using the Peruvian Living Standards Survey, the researchers have applied econometric tools to identify the factors important in determining women's productivity and its consequences on family size, children's education, and family income. The analytical model is the standard neoclassical household model of production, consumption, and investment.

The principal way to expand women's economic productivity is through human capital investments, notably through education beyond the primary level. Education increases women's labor force participation, wage income, and income earned from informal activities. Women's education reduces family size and increases children's education. Improving access to credit also improves women's income from self-employment. Expanding women's job opportunities in the formal and informal sectors increases returns to female education and thus encourages parents to educate their daughters. Elements of school quality such as supply of textbooks and the number of teachers also increase girls' education.

Policymakers must identify ways to expand women's economic opportunities. Because a large proportion of women is involved in the informal sector, measures to strengthen the sector should be undertaken in parallel with measures to open up women's opportunities in the wage

sector. The Bank and donor community can help the Peruvian government expand opportunities for women.

*Responsibility:* Population and Human Resources Department, Women in Development Division—Shahidur Khandker and Marcia Schafgans (consultant), and Population and Human Resources Department, Education and Employment Division—Elizabeth King. With John Dagsvik and Rolf Aaberge, Central Bureau of Statistics, Norway; Morton Stelcner, Concordia University; and Indermit Gill, State University of New York, Buffalo.

*Completion date:* December 1990.

### **Manpower Development and the Economic Environment**

Incentives for individuals and enterprises to invest in training are shaped by a country's economic environment. The design of effective training strategies requires an understanding of the interaction between economic policies and training incentives.

This research attempted to answer these questions: (i) How does the choice of an inward-focused compared to an outward-focused development strategy affect efficiency in human capital formation? (ii) What impact do economic policies that distort the price of capital and labor have on incentives for human capital formation? (iii) What impact do economic policies that encourage wage compression have on incentives for human capital formation? (iv) Do competitive markets stimulate efficiency in human capital formation by encouraging the adoption of demand-driven financing schemes?

This research is an extension of the work done by the Education and Employment Division on the vocational education and training policy paper and is related to the division's new work program on employment and labor market issues.

The research uses a comparative case study methodology. Five countries (Malaysia, Thailand, Tunisia, Nigeria, and Togo) were chosen for study on a continuum of income levels and development strategies. Each study describes the macroeconomic policies of a country and changes in these policies over a 10-year period from the late 1970s into the 1980s. The structure and performance of the country's education and training system are described for the same period, and an effort is made to correlate shifts in economic policies and changes in the structure and performance of education and training. A comparative study of the research questions will be based on these case studies.

Outward-focused economies experience faster rates of economic growth and demand greater efficiency in human capital formation to support this growth. Effective training strategies require careful consideration of the incentive structure for human capital formation. This incentive structure is shaped by economic policies. Gov-

employment training interventions should be designed to counteract economic policy distortions.

*Responsibility:* Population and Human Resources Department, Education and Employment Division—Arvil Van Adams and Antoine Schwartz. With Michael Hopkins, MH Consulting; Gary Fields, Cornell University; Robert Goldfarb, George Washington University; Peter Brimble; M'Hamed Cherif; and Clive Sinclair, Birks and Sinclair, Ltd.

*Completion date:* January 1991.

### Education and Training for Skills and Income in the Urban Informal Sector in Sub-Saharan Africa

An ever larger number of young people in Africa find that they have no alternative but to work in the urban informal sector. Current education and training systems are not fully equipped to provide skills needed to generate an income for these individuals. Nor is it clear how investments in education and training can be redirected so that they are more effective. This project addresses the question of how—and if—education and training can enhance productivity and incomes from the urban informal sector in Sub-Saharan Africa in order to inform policymakers in this area.

Structured interviews have been conducted with owner/operators of informal sector establishments involved in a limited number of carefully selected economic activities. The approach, the reverse of a tracer study, has focused on job and training histories to reveal the processes of acquiring the necessary knowledge and skills at each stage of the respondent's career. Questions regarding the role of entrepreneur as trainer have been included, as well as interviews with apprentices. Questions on the need for interventions in training and the merits of alternative scenarios of interventions have also been included.

Preliminary findings are that interventions for the informal sector must be carried out with careful attention to design. Basic education has been found to be very important to informal sector success, but formal vocational training has little impact. A promising approach consists of providing training that responds directly to identified needs with the use of a flexible funding mechanism.

*Responsibility:* Africa Technical Department, Education and Training Division—Bernard Salomé, and Population and Human Resources Department, Education and Employment Division. With F. Fluitman, ILO; S. Russell, Harvard University and Massachusetts Institute of Technology; Birks and Sinclair, Ltd., Mountjoy Research Centre; X. Oudin, ORSTOM; Lubell; Zarour; Demol; and McLaughlin. With funding by ODA, CIDA, FAC, and the governments of Norway and Switzerland.

*Completion date:* June 1991.

#### Reports:

Fields, Gary S. 1989. "Urban Labor Market Modeling and the Informal Sector." PHREE Background Paper PHREE/89/08. World Bank, Washington, DC.

King, Kenneth. 1989. "Education, Training and the Informal Sector. What Have We Learned in Africa?" PHREE Background Paper PHREE 89/10. World Bank, Washington, DC.

\_\_\_\_\_. 1989. "An Evaluation of Research and Policies on Informal Sector Employment in Developing Countries." PHREE Background Paper PHREE/89/12. World Bank, Washington, DC.

McLaughlin, Stephen. 1989. "Skills Training for the Informal Sector: Analyzing the Success and Limitations of Support Programs." PHREE Background Paper PHREE/89/07. World Bank, Washington, DC.

Salomé, Bernard, ed. 1989. *Fighting Urban Unemployment in Developing Countries*. Development Centre Seminars, Development Centre. OECD.

Turnham, David, Bernard Salomé, and Antoine Schwartz, eds. 1990. *The Informal Sector Revisited*. Development Centre Seminars, Development Centre. OECD.

### Improving Women's Education

Improving and widening access to education has been an important goal of education policy in most developing countries in the past two decades because of the gains that education brings in higher productivity and better lives. The evidence also shows that when schools open their doors wider to girls and women, the benefits multiply.

This project, which has consisted of different components, has examined the returns to education and training for women in the labor market (for employment and earnings); investigated the factors that explain the lagging schooling levels of girls; and reviewed the experiences of different intervention programs that were designed to affect school enrollment and achievement.

The project included surveys of the literature for each region of the developing world, econometric analyses of household survey data, and analysis of a time-series, cross-country data base.

The evidence points to the benefits of education and training in the labor market, by increasing the probability that better-educated women will find employment in the paid sector. There is a fairly common set of factors that affect girls' education across regions and cultures. One lesson learned is that to reach those not in school, programs must go beyond just building a school. The availability of learning materials, female teachers, and sanitary facilities in the school appears to matter more for girls than for boys. But little is known about which programs are most cost-effective.

To incorporate these research findings into operations necessitates strengthening the monitoring capacity of ongoing education. Empirical research has had to rely on

limited data on policy or program instruments.

*Responsibility:* Population and Human Resources Department, Education and Employment Division—Elizabeth King and Rosemary Bellew. With M. Anne Hill, Baruch College.

*Completion date:* June 1991.

*Reports:*

King, Elizabeth. 1990. *Educating Girls and Women: Investing in Development*. Washington, DC: World Bank.

King, Elizabeth, and Rosemary Bellew. Forthcoming. "Gains in the Education of Peruvian Women in 1940s-1980s: Patterns and Explanations." PRE Working Papers Series. World Bank, Washington, DC.

King, Elizabeth, and M. Anne Hill. 1990. "Women's Education in Developing Countries: Benefits, Barriers and Policy."

### **Land Acquisition and Resettlement**

Delays in implementing Bank-financed development projects are often attributed to unexpected difficulties in land acquisition and consequent resettlement operations. To gain a better understanding of the legal and administrative frameworks within which land acquisition and resettlement normally take place, the Bank has begun several country-specific studies in the Asia Region. Land acquisition policy is believed by many to be well developed and uniform throughout a country, but this may be an inaccurate perception. Courts in India, for example, have repeatedly found in favor of displaced people who sue the government because valuation and compensation values are insufficient to purchase replacement assets. In Indonesia displaced people have claimed that land acquisition on several Bank-financed projects was not conducted legally, but under executive orders that conflict with legislation on land acquisition. In many countries there are difficulties in the timing and method of compensation. And in many countries resettlement arrangements following acquisition of land and property are ad hoc and fragmentary. The work in India, Indonesia, and Nepal is part of a larger research task that will address regional patterns and solutions to obstacles the Bank confronts with land acquisition.

Bank staff experienced in the field with land acquisition policies and procedures in India, Indonesia, and Nepal provide case studies that identify the kinds of problems encountered. Consultants in each country assemble legal and policy materials related to the problems identified, examine some of the cases identified, and analyze obstacles and bottlenecks most often encountered in land acquisition. A preliminary profile of the problems is the output. Bank staff then review recent experience with successful approaches for overcoming the obstacles, and recommendations are made for country-specific strategies for addressing the problems documented and to introduce the successful approaches into the country and relevant

sectoral dialogues. A Land Acquisition Profile will be the outcome of this stage of the research.

*Responsibility:* Asia Region Technical Department, Environment Unit—William Partridge and David A.P. Butcher, Resident Staff in Indonesia—Trayambkeshwar Sinha, Asia Country Department V, Agriculture Operations Division—Dirk Leeuwrik, Asia Country Department IV, Country Operations Division—Margaret Talwitz, Asia Country Department IV, Agriculture Operations Division—Thomas Blinkhorn, and Asia Country Department I, Industry and Energy Operations Division—Donal O'Leary. With Sumit Bose, Bhopal, India; Tod Ragsdale, Washington, DC; and TBA, Indonesia.

*Completion date:* June 1991.

### **State of the Art Papers, Case Studies and Data Base in Higher Education**

The governments of developing countries, often with the assistance of aid agencies, including the World Bank, have invested substantial resources in building and developing their higher education systems. The goal of this research is to (i) take stock of the major challenges and opportunities in the subsector, (ii) identify what is known and not known in the critical issues in higher education, such as internal and external efficiency, role of the state, and equity, and (iii) strengthen the Bank's analytical ability to help borrowers address the major issues they face in higher education.

The studies are divided into background, thematic, and regional case studies. It is planned not to embark on large-scale efforts to collect new data, but to review and synthesize existing literature and the Bank's sector work and lending operations. The regional case studies are being developed in collaboration with the Bank's technical and sector operating divisions. Efforts will be made to keep policymakers concerned with higher education informed of the studies.

In collaboration with the Economic Development Institute, a "linchpin" seminar will be organized to examine key issues of higher education policies and strategies for reform and innovation. This will be followed by regional seminars in collaboration with divisions of the Population and Human Resources Department.

*Responsibility:* Population and Human Resources Department, Education and Employment Division—Adriaan Verspoor. With V. Selvaratnam and M. Kourouma, consultants.

*Completion date:* March 1992.

### **Education and Economic Adjustment**

Economic adjustment, whether uncontrolled or channeled through a concerted national restructuring strat-

egy, severely constrains the pursuit of basic educational objectives. In turn, stagnating investment in human capital threatens countries' development potential, particularly among the poorest countries, where initial schooling levels are still unacceptably low. There is a need for a systematic assessment of the impacts of adjustment on educational processes, of the ways sector institutions are managing the adjustment process, and of lessons to be learned from relevant experiences.

This research focuses on the following questions: (i) What are the ultimate effects of adjustment processes on the output, quality, efficiency, and equity of educational services? (ii) How can the poor be most effectively sheltered from these effects? (iii) What are appropriate strategies in adjusting countries to bring human resource development back on course?

The research comprises three approaches: (i) reviews of sector-specific adjustment literature and Bank experience; (ii) special studies (effects of adjustment on education finance, cross-country analysis of domestic studies of basic educational inputs); and (iii) approximately 12 country case studies, selected to be representative of typical sector adjustment mechanisms (in collaboration with the ILO-UNESCO task force on education and training under economic restructuring).

The research is still at an early stage. The main conclusions thus far are that: (i) the complexity of policy reform in education is not yet matched by quality and evenness of analysis, particularly concerning the integration of the sector in the macroeconomic context; (ii) the assessment and design of sector financing strategies are relatively weak with respect to social and political factors, equity implications, and institutional capabilities; and (iii) the relationship between adjustment and public resource allocation to social sectors is much more complex than can be observed from aggregate intersectoral allocation percentages, which are sometimes targeted in policy-based Bank lending for education.

*Responsibility:* Population and Human Resources Department, Education and Employment Division—Antoine Schwartz. With Gail Stevenson and Andrew Noss, consultants. UNESCO and the ILO are collaborating in this study.

*Completion date:* June 1992.

## Causes and Consequences of Poverty

Poverty alleviation is often stated to be the ultimate goal of the World Bank. This research is a "catch-all" category which includes several different studies that attempt to gain a deeper understanding of the nature of poverty, including its causes and consequences, and that examine ways to design policies to reduce it.

Household data from Living Standards Measure-

ment Surveys are used in each research paper in this project.

This research has found that the poor are predominantly rural and in agricultural occupations. Different definitions of poverty select different households as poor. And targeting transfers to the poor is rather difficult, especially in rural areas. More creative thinking needs to be done to design effective poverty alleviation policies.

*Responsibility:* Population and Human Resources Department, Welfare and Human Resources Division—Paul Glewwe.

### *Reports:*

Glewwe, Paul. 1988. *The Distribution of Welfare in Côte d'Ivoire in 1985*. Living Standards Measurement Survey Working Paper 29. Washington, DC: World Bank.

\_\_\_\_\_. 1988. *The Distribution of Welfare in Peru in 1985-86*. Living Standards Measurement Survey Working Paper 42. Washington, DC: World Bank.

\_\_\_\_\_. 1990. *Efficient Allocation of Transfers to the Poor: The Problem of Unobserved Income*. Living Standards Measurement Survey Working Paper 70. Washington, DC: World Bank.

\_\_\_\_\_. 1990. *Investigating the Determinants of Household Welfare in Côte d'Ivoire*. Living Standards Measurement Survey Working Paper 71. Washington, DC: World Bank. (Shortened version forthcoming in *Journal of Development Economics*.)

Glewwe, Paul, and Jacques van der Gaag. 1988. *Confronting Poverty in Developing Countries: Definitions, Information and Policies*. Living Standards Measurement Survey Working Paper 48. Washington, DC: World Bank. (Shortened version appears in *World Development* 18(6).)

## Family Labor Supply and Consumption

The effects of policies designed to raise both agricultural and nonagricultural productivity in rural areas depend heavily on the family labor supply responses in both activities. Changes in the returns to work may induce a reallocation of labor not only between work activities, but also among family members. Understanding the interactions among family members and activities is necessary in deciding how best to generate the increases in the returns to work and the welfare effect of different policy options. This research is devoted to providing quantitative estimates of the productivity- and welfare-enhancing effects of different governmental interventions.

A theoretical model was developed in which the family together determines labor supply and consumption. The model allows for an arbitrary number of family members, each of whom may engage in multiple activities. The possibility of nonparticipation in one or all activities was explicitly considered.

This model was applied to family consumption and labor supply decisions of rural landholding households in Peru using data from the 1985/86 Living Standards Mea-

surement Study Survey. Coefficients of marginal returns to work were estimated in two activities—wage work and self-employed agriculture—together with the marginal rate of substitution of leisure for consumption. The estimated coefficients of the structural model were used, together with the budget constraint, to simulate the effects of increasing returns to wage work and self-employed agriculture on family consumption and hours of work in the two activities. Estimating the structural parameters of the marginal rate of substitution allows the conversion of leisure to consumption units and the calculation of compensating and equivalent variation of the change in returns.

Returns to education for prime-age males were found to be about 4.5 percent for wage work and 2.5 percent for self-employed work on the family farm. Returns to education for prime-age females are, on average, about 7 percent for wage work and 3 percent for self-employed work on the family farm. Prime-age males respond to higher producer prices by working more on the farm, with about 60 percent of the increase resulting from a reduction in leisure rather than in hours worked off the farm.

The particular findings for the case of Peru are less important than the techniques developed. The approach can be used to ascertain the determinants of productivity even in sectors such as self-employment, where no wage is observed. Welfare effects can be looked at by taking into account not only changes in family consumption, but also changes in leisure of family members. This is important, as parents may react to improved income-earning opportunities by reducing their children's labor and possibly increasing their school attendance.

*Responsibility:* Population and Human Resources Department, Welfare and Human Resources Development Division—John Newman. With Paul Gertler, the Rand Corporation, and funding by the National Institute of Aging.

*Report:*

Gertler, Paul J., and John L. Newman. Forthcoming. "Family Labour Supply Decisions in Rural Peru." In M. Nerlove, ed., *Issues in Contemporary Economics. Vol. 2. Macroeconomics and Econometrics*. Macmillan/IEA.

### Research on Effective Teaching in Developing Countries

While student achievement in many developing countries is falling behind that of the developed countries, in some low- and middle-income countries, students score on standardized tests of achievement on a par with students in higher income countries. And within developing countries, some teachers and schools are more effective than others. The key questions are: To what are these differences attributed? What characteristics of teachers and teaching are more effective in promoting student learning?

The objectives of this task are to identify teaching processes that distinguish high-achieving developing countries such as Korea and Thailand from low-achieving developing countries and, within developing countries, that distinguish more effective teachers and teaching practices from less effective ones. An important aspect of this research will be identifying differences between effective and less effective teachers and teaching that can be influenced through policy.

The approach will (a) analyze International Association for the Evaluation of Achievement data from several low- and middle-income countries (including the Philippines, Papua New Guinea, and Korea) using multi-level methods that will (i) identify more and less effective classrooms in each country and in each of three grade levels, and (ii) identify material and nonmaterial inputs (including teaching and management practices) that differentiate effective from less effective classrooms; and (b) synthesize results from the cross-national comparisons.

There are significant differences in the achievement levels of students in different classes, but much of this difference is due to selection practices and streaming by ability. Some teaching practices are related to higher achievement, but most are related to clusters of other inputs, including teachers' education.

Teacher training that emphasizes pedagogical practices may, in some cases, enhance learning, but packages of inputs—training, general education, learning materials—are likely to have more powerful effects. Effects of teaching practices differ among countries.

*Responsibility:* Population and Human Resources Department, Education and Employment Division—Marlaine E. Lockheed. With R. Bellew, C. Zhao, and M. Schaub, consultants.

*Reports:*

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## 5 NATURAL RESOURCES, ENVIRONMENT, AND FORESTRY

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### Crop-Livestock Systems in Sub-Saharan Africa

#### Ref. No. 674-06C

The World Bank has invested \$1.3 billion in livestock projects in Sub-Saharan Africa, with generally disappointing results. In most cases, the technologies and institutions promoted were inappropriate for existing farming systems and economic environments.

This research identified: (1) the conditions under which crop farmers will adopt increasingly labor-intensive technologies for producing fodder, milk, and meat and for maintaining soil fertility; (2) the nature of these technologies; and (3) the social (land tenure, population density), economic (prices, incentives), and institutional (public and group-based) mechanisms necessary for adoption.

In this research, surveys were made of farming systems in 14 Sub-Saharan African countries, focusing on land-use patterns, tenurial arrangements, and the interaction between crops and livestock. An extensive literature search was also carried out.

Competition for land between crops and livestock is not yet a serious limiting factor to livestock development in Sub-Saharan Africa. Intensification of production attenuates land competition between crops and livestock. Even stronger, in those areas where disease challenge is low, increased cultivation is accompanied by an increase in the stocking rate. Competition between crops and animals for labor leads to intensification, although maximum physical product is rarely attained in the two main crop/livestock linkages—the use of manure and crop residues—as these high-bulk, low-value materials do not repay labor-intensive management, except in densely populated areas.

Population density and the level of disease challenge are the key factors in determining the evolution to mixed farming. The most intensively productive mixed farming systems occur in the East African and Malagasy highlands, where the highly productive environments lead to more intensive animal production techniques, with more sophisticated feeding, housing, and breeding techniques. A further transition to specialized livestock enterprises hardly appears yet in Sub-Saharan Africa.

With exogenous factors such as population density and disease challenge strongly determining the degree of crop/livestock integration, technologies should be intro-

duced that aim at improving livestock production, rather than attempting to introduce collateral techniques such as animal traction or manuring or crop residue-based fattening, as is frequently done in development projects. The research outlines the opportunities for improvements and the implications for research for each main ecological zone of Sub-Saharan Africa.

The project produced a report that has been submitted to Johns Hopkins University Press for publication as a book.

*Responsibility:* Agriculture and Rural Development Department, Agricultural Production and Services Division—Cornelis de Haan, and Latin America and the Caribbean Country Department II, Agriculture Operations Division—John McIntire. With Daniel Bourzat, the International Livestock Center for Africa; and P. Pingali, the International Rice Research Institute.

*Closing date:* July 1989.

### Agricultural Research in Africa and Asia: Comparative Lessons from Rice in Sierra Leone, Sri Lanka, and Elsewhere

#### Ref. No. 674-29C

Agricultural research in Sub-Saharan Africa receives more national and foreign resources (per unit of land, labor, or output in agriculture) than in other developing regions, yet the economic rates of return are much worse, and the disparities are increasing. Unless the policy processes leading to these poor returns in Sub-Saharan Africa can be understood and corrected, efforts to improve African agricultural research may well collapse in waste and disillusionment.

This research project was concerned with the question of how to improve the design and performance of agricultural research in Sub-Saharan Africa, particularly in the light of Asian experience. The study focused on public policy on agricultural research and on the balances within agricultural research between adaptive research and technology transfer, between project-linked and national systems, and between research-station work and farmers' own experiments and smallholder testing of proposed innovations.

To improve complementarity with Bank research and operations, and to make the question addressed by the research manageable, the study examined agricultural re-

search processes in two small rice-based food systems—those of Sri Lanka and Sierra Leone—to identify any transferable lessons on improving agricultural research. These countries' agricultural research systems capture much of the diversity of Asian and Sub-Saharan African systems, while the commonalities between their agricultural systems suggest the feasibility of mutual learning. The project attempted to determine whether differences in, for example, agroclimate, person-land ratios, incentives, human capital, or central and local power structures between Asia and Africa limit the scope of the transfer of agricultural research approaches. The in-depth case study of Sierra Leone-Sri Lanka was complemented by a review of experiences in other countries (Mali, Guinea, Senegal, Liberia, Côte d'Ivoire, and parts of India) that helps to establish the relevance of the case study to other countries.

The project surveyed rice farmers and researchers in Sri Lanka to identify the relations among varietal adoption, household type, farming system, and agro-ecology and related these findings to agricultural research policy, organization, procedures, and processes of technology generation relevant to plant breeding. For Sierra Leone, interviews, village-level participant observation, and literature review were used to gather information on the connections between rice research and agricultural policy, the costs and benefits of rice research initiatives, adoption and impact of improved rice varieties, the requirements of specific client-groups, and the prospects for reorienting rice research to these requirements. For other countries, desk reviews and brief field visits were conducted to collect information on national rice research and dissemination of new varieties.

The results of the research will be presented in journal articles or working papers, an issues paper on Afro-Asian transfers in agricultural policy, and a book.

*Responsibility:* Africa Region, Office of the Chief Economist—Gurushri Swamy. With Michael Lipon, Institute of Development Studies, Sussex University and the International Food Policy Research Institute; Adam Pain, University of East Anglia; and Paul Richards, University College, London. The Peredeniya Post-Graduate Institute of Agriculture, Sri Lanka, and the Rice Research Institute, Rokupr, Sierra Leone, also participated in this research.

*Closing date:* May 1990.

### Incentives for Smallholder Forestry, Phase I

#### Ref. No. 674-47C

Working toward the objectives of the Tropical Forest Action Plan, the Environment Department has carried out research on incentives to encourage smallholder involvement in tree planting. These incentives include cash payments or subsidies in kind (free seedlings, tools), food

for work (particularly under the World Food Program), land tenure reform (to provide security of tenure to groups of landless people or individual farmers for tree growing), agricultural credit, fiscal incentives (such as tax exemptions), price guarantees, and contracts for production. The research program is intended to develop a better understanding of farmer responses and the effectiveness of different types of subsidies in various agroecological situations. The initial field work for this project was undertaken in Kenya. It is linked to a wider research project on the same issue conducted by the Oxford Forestry Institute.

*Responsibility:* Environment Department, Environmental Policy and Research Division—John English.

*Closing date:* June 1990.

### Agricultural Diversification in Asia

#### Ref. No. 674-61C

Policymakers in Asia are interested in agricultural diversification for three reasons. First, a well-diversified and flexible agricultural economy provides more stable farm incomes when commodity prices, especially rice prices, are highly unstable. Budgetary costs of price-stabilization programs can be reduced with substantial savings. Second, diversifying a rural economy can be a significant source of income growth for rural inhabitants, providing better living standards and reducing the flow of migrants to urban areas in search of jobs. Third, a diversified cropping pattern may prove more sustainable in the long run than intensive cultivation of a single crop. A balanced and shifting array of crops presents a much more difficult target for pests and diseases, thus extending the effective usefulness of crop varieties with natural disease resistance.

There is sharp debate about the relative scarcity of specialization versus diversification at the farm level. Mixed farming may reduce risk, but it requires more diverse management skills. The debate suggests that Asian rice subsector diversification will take place at the farm level as mixed farming enterprises proliferate to include multiple cropping and integrate livestock-feedgrass enterprises.

The development of modern technology in agriculture and other sectors—pesticides, irrigation, agroindustry, marketing, and communications—has produced an economic and technological environment conducive to more specialized or developed farming operations. How have farmers reacted to the new environment of declining commodity prices? How did public sector services, research, extension, credit, and marketing information respond to this situation? What role can the government's agricultural policies play in influencing the farmer's decision to diversify or specialize?

This study addressed the technical, economic, and

institutional issues of diversification at the farm level, within a framework that links these issues with public agricultural policies and services. The main objectives of the study were to: (1) provide information on technical, economic, financial, and institutional factors affecting the diversification process; (2) assess how farmers in different ecological zones address the problem of diversification and how they adjust to a changing economic, financial, and incentive environment; (3) study how agricultural institutions (mainly research, extension, credit, and marketing) have responded to changing needs observed at the farm level; (4) analyze public policies in agricultural support and investment, and how resources allocated to agriculture have affected the links between agriculture and other sectors; and (5) identify action programs required to develop flexible and efficient farming systems.

To achieve these objectives, the study, in cooperation with the International Rice Research Institute (IRRI), used field-level data (collected by the IRRI, the Indonesia, Thailand, and Philippines National Research Programs) from 750 farm families—250 from each country. These families have been studied by the IRRI for several years. In cooperation with Kasetsart University in Bangkok, the Thailand Research Institution, and the Agro-economic Research Center in Bogor, Indonesia, the project collected policy-level data on the agricultural sector, its institutions, and the policy performances related to the process of diversification in these communities.

The results of the study are being synthesized in order to build a reliable framework of analysis of the diversification process based on the experience of the three countries. The study will inform decisionmakers concerned with agricultural development in the World Bank and other donor agencies and in the Asian rice-producing countries, and managers and scientists at the IRRI and other national and international agricultural research centers. The results will be presented in four sections: one for each country and a synthesis section. A series of seminars and workshops will be organized in the three countries to articulate action programs required to ensure efficient evolution of the diversification of agricultural systems in these countries.

*Responsibility:* Agriculture and Rural Development Department, Agricultural Policies Division—Shawki Barghouti, and Asia Department V, Agriculture Operations Division—Dirk Leeuwrik and William Cuddihy.

*Closing date:* February 1990.

*Reports:*

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## The Impact of Rural Capital and Labor Availability on Smallholder Tree Growing in Kenya

Ref. No. 674-73

Concerns about deforestation and potential of timber products have led to emphasis on community and social forestry efforts as means to encouraging tree growing. While it is often argued that population growth and agricultural intensification are incompatible with the conservation and management of tree cover, this is not always the case. There is, however, a transition in the type of tree cover that predominates as population pressures increase. Little is known about the efficiency of smallholder tree planting, the levels of investment by farmers, and the

constraints to expanded investment.

The objective of this research project has been to explore the relationship between tree growing, labor and capital availability, and the malfunctioning of rural factor markets, particularly to test the hypotheses that:

—Tree growing, as a labor-extensive cash-cropping activity, complements urban wage employment as a strategy for overcoming malfunctioning factor markets and eases land-use constraints imposed by labor migration; and

—Tree growing, as a capital-extensive income-generating activity, is pursued where malfunctioning factor markets have made it problematic for farmers to plant other, capital-intensive cash crops.

Three types of data have been collected and form the basis for further analysis and discussion. *Descriptive information* and, particularly, the historical record, have been used to discuss the evolution of land tenure systems and their impact on tree growing, the relationship between pricing and policy processes that brought about innovations in land-use, and how these processes may have encouraged particular types of tree-growing practices. *Land-use inventories*, based on aerial photography and on other imagery, recorded in 1967 and 1989, have been used to characterize the extent to which particular tree-growing strategies and other land-use practices have been adopted or maintained. A structured *household survey* was carried out in 1989/90 to collect information about household factor endowments and use.

This survey covered a sample of 123 households that operated woodlots in 1967, identified from the aerial photography. Of these, 63 still operated these woodlots in 1989, and 60 did not. Analysis of these data is still being carried out.

Because analysis is in its early stages, any findings are tentative. Initial review of data on household size, composition, and land and labor use suggests that households continuing to maintain woodlots (primarily of acacia) have male members living elsewhere to pursue full-time employment and therefore have a higher female/male ratio on the farm. They also have larger and more fragmented land holdings. Use of land for tree growing is relatively labor-extensive and flexible in timing of labor requirements, a clear benefit to this type of household.

Tree growing is an attractive land use to a significant share of land-owning households, even under conditions of small holding size and heavy population pressure. It is anticipated that further analysis will shed more light on particular aspects of these crops and can be used to encourage greater attention to them by farmers.

It is expected that the findings of this research will be made available as a Bank technical paper.

*Responsibility:* Environment Department, Environmental Policy Research Division—John English. With Peter Dewees, Oxford Forestry Institute.

*Closing date:* March 1991.

## Consumption Smoothing and Investment in Animal Traction

**Ref. No. 674-91C**

This project tested the feasibility and the reliability of new econometric methods that combine explicit optimizing models for each unit of observation with estimation of the structural parameters of the models. Such techniques, if successful, could be useful in the estimation of structural parameters for investment, stock holding, and borrowing behavior. Because capital markets in rural areas are imperfect, bullocks may be used as a financial asset to cover unanticipated shortfalls in income or increase in the demand for consumption goods.

The project specified and estimated a dynamic model of the demand for smoothing consumption. It used 10 years of longitudinal data from six villages in semi-arid India. It estimated, in the context of the model, how risks such as bad weather or low prices influence the number of bullocks, the most important production asset in these regions other than land. Comparisons were made with other means of consumption smoothing, including interhousehold transfers and debt.

The method requires a dynamic programming model of the demand for bullocks. Estimation of such a model requires a numerical dynamic programming model and the calculation of a likelihood function at each set of parameters for which the dynamic program is solved. The likelihood function is then maximized over the parameter space. The advantage of this method is that it allows for policy experiments to be performed within an internally consistent optimizing framework, some of which would otherwise be impossible in a less structural approach.

*Responsibility:* Latin America Country Department II, Agriculture Operations Division—Hans P. Binswanger.

*Closing date:* October 1989.

## Management of Instability in Agricultural Export Prices: The Case of Costa Rica

**Ref. No. 675-07**

World prices for agricultural commodities are notoriously volatile. This poses difficult problems for developing countries that depend on only a few agricultural commodities for the bulk of their export earnings. Unstable export prices can have adverse macroeconomic effects—on inflation, savings, investment, government budget, balance of payments, exchange rate, debt service—that may slow or even reverse the rate of national economic growth. Unstable prices can also be an important source of risk for agricultural producers, and that reduces the producers' willingness to expand production.

Given well-developed credit, futures, and insurance markets, the potential economic losses arising from export price instability can be largely avoided. The problem for many developing countries is that these markets are poorly developed and are often inaccessible to small-scale producers. Recognizing the inadequacies of existing risk-sharing arrangements, many governments have stepped in with publicly funded alternatives, such as buffer stocks and crop insurance. But these interventions are not cost-effective.

This project aims to identify and evaluate the economic viability of alternative risk management strategies that could be implemented at the farm or market level. Attention will be given to ways in which world futures and options markets might be used to hedge risks for producers in developing countries.

The study will also evaluate the value of world futures, options markets, commodity swaps, and bonds as a way for governments to better manage their budgetary risks. In a small and specialized country, variability in export prices can adversely affect the tax base and hence the ability of the government to meet its expenses. Part of this risk can be diffused through domestic credit and insurance markets, but because risks tend to be covariate in a small specialized economy, strategies for spreading risks internationally may be more efficient.

The study is built around a case study of the coffee and beef sectors in Costa Rica, and involves surveys of and modeling work on farms, marketing cooperatives, and the Central Bank. The results should be of direct value to policymakers in their efforts to promote the development of export earnings, in providing better protection to small-scale farmers against the vagaries of world markets, and in helping to stabilize the country's foreign exchange earnings and hence its ability to service its debt.

*Responsibility:* Agriculture and Rural Development Department, Agricultural Policies Division—Peter Hazell. With Rigoberto Steward and Mario Vedova, Prodesarollo, Costa Rica; Tim Besley, Princeton University; Stan Thompson and Bob Myers, Michigan State University; and Mauricio Jaramillo (consultant).

*Closing date:* September 1990.

*Report:*

Hazell, P., M. Jaramillo, and A. Williamson. 1989. "How Has Instability in World Markets Affected Agricultural Export Producers in Developing Countries?" PRE Working Paper 263. World Bank, Washington, DC.

### **Economic Growth and Trade Policy in Western Africa: Implications of the Degradation of the Vegetation Cover**

**Ref. No. 675-33**

This research tries to establish empirically the im-

portance of resource degradation for agricultural productivity in Western Africa. The findings could have important implications for policy evaluation.

The research addresses the following questions: (i) What is the role of vegetation cover in agricultural growth? (ii) To what extent is there an externality? (iii) What policy instruments would improve the social value of natural vegetation cover? (iv) What effects have trade policy had in Western Africa on agricultural productivity, considering its impact on the evolution of the vegetation cover?

A theoretical model is being used to guide the empirical work. The availability of data and the data's suitability for the required empirical work are being analyzed. A pilot study in 10 villages in Côte d'Ivoire will be conducted, followed by studies in Côte d'Ivoire and Ghana.

The theoretical analysis shows the potential importance of considering the changes in vegetation cover associated with price policies. No empirical findings are available.

*Responsibility:* Country Economics Department, Trade Policy Division—Ramon Lopez, Environment Department, Environmental Operations and Strategy Division—Wayne Luscombe, and Environment Department, Environmental Policy Research Division—Ernst Lutz. With staff of EarthSat.

*Closing date:* July 1990.

*Report:*

Lopez, Ramon, and Mario Niklitschek. Forthcoming. "Dual Economic Growth in Poor Tropical Areas." *Journal of Development Economics*.

### **Improved Accounting of Natural Resources and the Environment for More Sustainable Resource Management**

**Ref. No. 675-43**

The general objective of this research is to improve accounting of natural resources and the environment so that they can be managed in a more efficient and sustainable way. National income accounting does not take into account many effects of production and consumption of the natural resource base nor, in the case of exploitable resources, distinguish between true value added and sale of assets. The main question the research will address is whether methods for improved accounting of natural resources and the environment can be developed and integrated accounts established that are flexible enough to be applicable for most major resource issues that countries face and that are useful for application by national income accountants and economists.

To carry out proper accounting and to measure more accurately what is true income are important. But perhaps even more important is what is being done with the improved information. Faulty policy advice may result from

the inaccuracies of accounting for natural resources. Policy advice should emerge from this research that better contributes to environmentally sound development.

The research consists of four tasks:

(i) preparing a preliminary draft manual based on the draft framework prepared by the United Nations Statistical Office;

(ii) reviewing and evaluating natural resource accounting approaches in Australia, Canada, the Federal Republic of Germany, France, Japan, the Netherlands, Norway, and the United States;

(iii) performing pilot case studies in two developing countries where the preliminary draft manual will be tested (tentatively Mexico and Papua New Guinea); and

(iv) holding a working group meeting and an expert meeting (organized jointly by the UNSO and the World Bank) to develop the draft manual into a Handbook on Environmental Satellite Accounting in the Handbook Series of the System of National Accounts (SNA), based on the information and experiences from steps (ii) and (iii).

Among the approaches surveyed, there is so far no clearly superior system that could be recommended for adoption. Accounting approaches chosen by industrialized countries differ considerably. Besides historical reasons, this reflects (i) different emphases on improving one of the two main functions of the national accounts—measuring economic performance and providing a coherent data base to support economic policy, research, and modeling; (ii) different policy objectives; and (iii) different structures (although many of the approaches have similar data requirements).

*Responsibility:* Environment Department, Policy and Research Division—Ernst Lutz. With Graham Pyatt, Warwick University; and Henry Peskin. The United Nations Statistical Office and the National Institute of Statistics, Mexico City, are participating in this research.

*Closing date:* June 1992.

*Report:*

Ahmad, Yusuf J., Salah El Serafy, and Ernst Lutz, eds. 1989.

*Environmental Accounting for Sustainable Development. A*

UNEP-World Bank Symposium. Washington, DC: World Bank.

## Urban Interfuel Substitution Study

### Ref. No. 675-81

The dramatic growth of urban populations in developing countries has caused a rise in the demand for energy, food, water, and other resources. More than 1.25 billion urban dwellers live in 360 cities with populations over 500,000. Population growth rates for rural areas have been high—between 1.5 and 4 percent a year, but urban growth rates are even higher—between 3 and 7 percent a year. The high urban growth rates result from high birth rates and extensive migration from rural areas to cities.

The migrants from rural areas bring their traditional patterns of energy use, based mainly on the use of wood as fuel. In urban areas demand for wood products is highly concentrated, creating difficulties, such as the environmental problems associated with harvesting around urban centers.

The purpose of this research is to analyze systematically the dynamics of interfuel substitution and the transition from traditional to modern fuels in urban areas of developing countries. It will also explore the feasibility of substituting kerosene, LPG, or electricity for wood-based fuels. To accomplish this task, the study will examine the causes of interfuel substitution and the impact of interfuel substitution on urban equity and quality of life. The main hypotheses of the study are that urban income, urban area type and location, wood fuel resources around the city, and type of government policy will all affect the use of fuels of urban classes in different ways.

This study moves in a new direction to deal with many of the inherent weaknesses in past research on interfuel substitution. The research is organized in two parts. The study uses existing surveys to analyze cross-urban and income class patterns of energy use. For about 40 urban locations, a data base will be assembled that has significant variation in the main variables in the study—government policies, market conditions, urban location and type, and fuel use by urban households. Data on resource conditions will be gathered for each country. As a consequence, the study will be able to analyze statistically the causes of urban interfuel substitution, including the effect of such factors as government policy or resource conditions on urban fuel use.

The outcome of the research will shed some light on the effectiveness of policies being applied, the conditions under which transitions can be expected to occur, and the socioeconomic impact and consequences of interfuel substitution. The research will address such issues as appropriate policies depending on the socioeconomic conditions of the urban environment, the equity implications of such policies, the implications of availability of local resources surrounding urban areas for energy use, and the foreign exchange implications of importing or producing commercial forms of energy for household use.

Understanding the transition from wood fuels in urban areas will help place the experiences of countries and urban areas in the context of overall socioeconomic forces that drive the transition. Policies and projects that run counter to prevailing socioeconomic forces are bound to encounter problems. For instance, encouraging tree planting for producing fuelwood in economies rapidly making the transition to commercial fuels may be a good environmental policy but may do nothing to help alleviate energy problems in urban areas. Likewise, encouraging poor households to rely on expensive modern fuels early in the transition when fuelwood is very cheap may do nothing but

strain the budgets of the urban poor and national governments.

*Responsibility:* Industry and Energy Department, Household Energy Unit—Douglas Barnes, Jeffrey Dowd, and Qion Liu. With William Hyde, Kerry Kritilla, and Mark Pitt, consultants.

*Closing date:* June 1991.

### **WIDER Program—The Environment and Emerging Development Issues**

#### **Ref. No. 675-97**

Environmental resources have been on the agenda of all societies that one can think of. But the incorporation of such resources into mainstream economic thinking has been a recent and intermittent phenomenon. Even today, basic economics courses make only perfunctory references to them. Until environmental resources become a part of day-to-day economic thinking, we will be a long way from adopting a coherent outlook on environmental issues.

The environmental research program supported in part by this RPO is based at the World Institute for Development Economics Research in Helsinki. Keeping environmental resources as its focal point, the program recognizes that commodity exchanges among individuals and groups occur not only through well-established market channels, but also through numerous nonmarket resource allocation mechanisms—for example, in the case of intrahousehold allocations of food and tasks.

The studies commissioned as part of this program fall into eight broad categories (paper topics are indicated in parentheses): (1) the Economic and Legal Framework (Sustainable Development; Environmental Resources, Contract Theory, and Property Rights; International Environmental Law); (2) Accounting for Environmental Degradation (National Accounting; National Accounting and the Environment—The Japanese Experience; CGE Modeling and Environmental Resources); (3) Microeconomic Behavior and Sectoral Changes (Women and the Household; Household Production and Environmental Resources; Agricultural Development and Resource-Use); (4) Decision-Making under Uncertainty and Environmental Resources (Environmental Resource Use under Uncertainty and Microeconomic Behavior; Decision-Making under Uncertainty—The Role of Increasing Information); (5) Reciprocal Externalities (Common Property Resources and Incentives; Incomplete International Treaties; CO<sub>2</sub> and the Greenhouse Effect—A Game Theoretic Exploration; Common Property Resource Management in Traditional Societies); (6) Unidirectional Externalities (Watershed Management; Urban Pollution; Coastal Wetlands); (7) Political Failures (Side-Effects of Macroeconomic Policies—A General Formulation; Macroeconomic Policies and Deforestation; Macroeconomic

Policies and Soil Erosion); and (8) Valuation Problems and the Management of Environmental Resources (Valuation of Tropical Rain Forests; Management of Wildlife, Game Parks, and Other Protected Areas; Management of Drylands and Rangelands).

Besides research papers on environmental resources, the project also has an outreach and dissemination component consisting of the preparation of a textbook on the economics of environmental resources, aimed at universities in developing countries, and a series of summer schools on environmental economics for younger lecturers from developing country universities.

*Responsibility:* Environment Department, Environmental Policy and Research Division—Jeremy Warford and Mohan Munasinghe. With the World Institute for Development Economics Research (WIDER); Partha Dasgupta, Stanford University and WIDER; and Karl-Goran Maler, Stockholm School of Economics and WIDER.

*Closing date:* December 1990.

### **Transfer of Petroleum Fuel Pollution to Developing Countries**

#### **Ref. No. 676-26**

The broader refinery fuel pollution issues have far-reaching implications for developing countries and for the global community; refinery fuels represent one-half the world's energy consumption. This research will concentrate on whether the stringent environmental standards imposed by the OECD countries, in combination with market factors and technical constraints, have the net effect of transferring the pollution problem back to the developing countries. The research will complement the work under way on global warming at the Bank and in environmental agencies; it could lead to a broader study of the local and global pollution effects of the petroleum fuel pollution problems throughout the developing countries and the costs to remedy them.

The study will be conducted by examining the historic oil product trading patterns, including volumes and prices, between selected developing and developed countries to determine whether the trade patterns and the differentials between higher and poorer grade oil products have changed as a result of the imposition of fuel quality standards by selected OECD countries. The study will also provide a basic understanding of refinery economics and technologies as part of the discussion of viable options and their costs for the developing countries for upgrading and modifying their refineries.

Based on preliminary data and knowledge of the industry, it appears that, with few exceptions, the export of environmentally high quality fuels from developing countries is minimal because of the inability of their refineries to produce these fuels. There appears to be an

increase in the export by OECD countries of poor quality fuels to the developing countries.

The study will alert Bank staff and the development community to the environmental and economic significance of the petroleum fuel pollution problem. It will point to policy and investment options available to the developing countries to produce environmentally higher grade fuels. The study results could provide the basis for future policy and research work by the Bank, perhaps in conjunction with other international organizations, and could lead to the design of future refinery projects by the Bank.

Findings will be disseminated to Bank management and staff through the Working Paper Energy Series published by the Industry and Energy Department. Results will be submitted for publication by the International Association of Energy Economists and will be discussed with relevant environmental and energy agencies in key countries.

*Responsibility:* Industry and Energy Department—Anthony A. Churchill and Kay McKeough, Asia Technical Department, and Environment Department. With Petroleum Economics Ltd. and Energy Security Analysis.

*Closing date:* April 1991.

### **Sustainable Development—Issues in Adjustment Lending Policies**

Adjustment policies can have a positive effect on the environment: they address deep-rooted institutional constraints that block the workings of markets and they remedy inappropriate domestic policies. They are also needed for effective environmental policies to enable markets to respond flexibly to external stimuli and to enable economies to internalize—and reduce—the social costs of environmental degradation.

This research sought to define categories and links between short-term adjustment policies underlying restructuring of economic institutions and potential long-term effects on environmental policy variables. It addressed the following questions: Have adjustment operations caused environmental degradation? Do the policy objectives of structural adjustment loans (SALs) make them a likely cause of degradation? Do SALs take into account environmental implications? The research is part of long-term work on sustainability.

The research was carried out as a desk exercise, consisting of a review of SALs and sectoral adjustment loans in some 53 countries. The method applied is a frequency analysis of the incidence of specific economic policy measures with known potential environmental effects.

Population growth poses a serious threat to the environment in developing countries. Economic measures that restructure are needed to put economies on a balanced

growth path and to assure that markets are functional under conditions of properly functioning economies. One can start to formulate long-term economic policies to internalize the social costs of environmental degradation. If environmental protection is to be embraced as a goal by the World Bank, some sociopolitical issues can no longer be regarded as irrelevant to proper economic performance.

*Responsibility:* Environment Department, Environmental Policy Research Division—Iona Sebastian and Adelaida Alicibusan. With Stein Hansen and Herman van der Tak, consultants.

*Completion date:* October 1989.

*Report:*

Sebastian, Iona, and Adelaida Alicibusan. 1989. "Sustainable Development: Issues in Adjustment Lending Policies." Divisional Paper 1989-6. World Bank, Environment Department, Washington, DC.

### **Poverty and Resources Management**

In developing countries poverty and environmental deterioration are often visible in proximity to each other, leading many to infer that a two-way causality exists between the two. But the apparent association may draw the attention of policymakers away from more substantive causal factors. The factors causing environmental degradation may lie elsewhere, such as in public policy actions, through the expansion of consumption demand for natural resources by growing populations, and by the spread of urbanization. The poor are merely one of several actors who respond to changing incentive structures by altering their use of renewable natural resources.

This research analyzed the association between poverty and land resource degradation in three small regions. A broader research project drawing upon this work has been initiated on the use of geographically based resource information in the analysis of economic and development policies.

The exercise has two main elements:

(i) identifying land areas where obvious changes in natural resource attributes have occurred over a 10- to 15-year period in selected case studies; and

(ii) tracing the causes of observed land use changes to public policies and demographic factors by matching the results of the first step with available socioeconomic data sets.

At the first stage, gross changes in land use between two points in time (one in the 1970s and one in the 1980s) are identified. These changes are then traced back to their likely causes in available data bases. If systemic causes could be attributed to either specific policies or economic variables identified from available data sets, the direct causal role of poverty would (by inference) be proportionately lower. Three subregions, Sukabumi (West Java),

Gombe (Northern Nigeria), and Ekiti-Akoko (Southern Nigeria), were selected for the initial analysis because of the ready availability of data sets on the physical and economic systems.

The linkages between poverty and the environment have been largely influenced by economic and institutional policies. These policies have shaped incentive structures and improved social and physical infrastructure, through which natural resource usage has been affected. The poor, like the nonpoor, have used opportunities created by the spatial integration of economic activities, sometimes to the detriment and at other times to the benefit of long-term renewable natural resource usage. As economic and spatial integration of markets occur, several new marginal income-earning opportunities become available in the informal sector of the economy, and the dependence of the poor on the natural resource base for livelihoods may actually be reduced.

This study showed that data sources could be combined for a more aggregative, regional analysis of linkages among natural resource use, poverty, and public policy. It provides policymakers with techniques that are useful in both project and sector work. As the quality of data sets improves, the analysis could generate more precise information that could serve the needs of infrastructural planners as well.

*Responsibility:* Environment Department, Policy and Research Division—V.J. Jagannathan, and Environment Department, Environmental Operations and Strategy Division—Hideki Mori. With B. Agunbiade, Nigerian Institute for Social and Economic Research.

*Completion date:* December 1989.

*Reports:*

Jagannathan, N. Vijay. 1990. "Poverty-Environment Linkages in West Java." Environment Division Working Paper 7. World Bank, Washington, DC.

\_\_\_\_\_. 1989. "Poverty, Public Policies and the Environment." Environment Department Working Paper 24. World Bank, Washington, DC.

Jagannathan, N. Vijay, and A.O. Agunbiade. 1990. "Poverty-Environment Linkages in Nigeria: Issues for Research." Environment Division Working Paper 8. World Bank, Washington, DC.

### Dryland Degradation Measurement Techniques

The world's drylands, an important marginal area, harbor millions of people, to whom both national governments and the world community have responsibilities. These people are vulnerable, as demonstrated by the recent drought in the Sahel. If the trend toward greater marginality continues and is irreversible, the drylands offer little scope for reasonable returns on investment. Yet the costs of doing nothing inflict another burden that only relief aid

can alleviate. Assessing whether the drylands are really gone, or just suffering a temporary setback from which they will recover, is crucially important.

This study was based primarily on a review of published and unpublished material.

The study focused on the importance of the concept of resilience in assessing degradation of dryland areas. Resilience is the ability of land to return to its previous state after having been subjected to a shock. Land degradation occurs when resilience is damaged. Estimates of resilience are normally obtained through time series of productivity. Other approaches to measurements of resilience include comparisons of degraded and unaffected test areas in larger areas (by ground survey), both for vegetation and soil profile development. Air photo interpretation is a cost-effective way of extrapolating ground reference data to larger areas. The measurement of resilience by the monitoring of green biomass from low-resolution weather satellites seems to be the most cost-effective method.

A major international effort should be undertaken to secure one methodology for use by international agencies. It will then become most important that major environmental data bases, such as the UNEP's GRID system, give priority to the collection of data that constitute input in this methodology.

*Responsibility:* Environment Department, Environmental Policy Research Division—John English, Europe, Middle East and North Africa Technical Department, Agriculture Division—Jeffrey Lewis, and Asia Country Department IV, Agriculture Operations Division—Ridley Nelson. With Stein W. Bie, University of Oslo, and funding by Norwegian Aid.

*Completion date:* February 1990.

*Report:*

Bie, Stein W. 1990. "Dryland Degradation Measurement Techniques." Environment Department Working Paper 26. World Bank, Washington, DC.

### Environmental Management in Centrally Planned Non-Market Economies of Eastern Europe

Environmental degradation in Eastern Europe is a serious problem. The principal goal of this study was to assess why in a command economy, where government in theory has the power to impose measures and could therefore decree environmentally benign measures, the government appeared powerless to tackle the problem.

The study was based on a review of literature and the analysis of original and published data.

The state of environmental quality in Eastern Europe is a consequence of economic policies pursued by the region's communist governments since they came to power after World War II. A policy of forced industrialization,

with an emphasis on heavy industry, created an economic structure that has caused extensive environmental damage. The intensive use of energy and resources throughout the region was one of the main causes of environmental problems and a barrier to economic restructuring.

The price structure used for natural resources, energy, fuel, and raw materials has led to their inefficient use. The "low" price level for energy consumption and the subsidies given to enterprises, which encourage ecologically unsound behavior, also helped to create environmental problems.

Communist governments in Eastern Europe did not take environmental problems seriously. Combined with centralized decision-making, this attitude prevented regional and municipal authorities from taking action to improve environmental quality locally and, although pollution control policies were in place, they failed to maintain national standards of environmental quality.

These findings reinforce the general thrust toward decentralization of decision-making and support emphasis on economic rather than legal approaches for environmental policy.

*Responsibility:* Environment Department, Environmental Policy Research Division—John English, and Europe, Middle East and North Africa Technical Department, Environment Division—Richard Ackerman. With Piotr Wilczynski, Oscar Lange Institute of Economics, and funding by the government of Norway.

*Completion date:* May 1990.

*Report:*

Wilczynski, Piotr. 1990. "Environmental Management in Centrally-Planned Non-Market Economies of Eastern Europe." Environment Department Working Paper 35. World Bank, Washington, DC.

## Energy Demand in Developing Countries

Despite the increasing role of developing countries in the global energy markets, the understanding of their energy sectors is limited. The need for more data and analysis on energy developments in developing countries—recently heightened by concerns about developing countries' contribution to global greenhouse gas emissions—is repeatedly expressed in international conferences.

By highlighting the key factors that have contributed to the historical increases in energy consumption in developing countries and presenting a view of likely changes, this research helps in reducing some of the uncertainties associated with future energy paths in developing countries. This research focused on the following questions: Will developing countries follow the same consumption patterns as in the past, and will the intensity of energy consumption in developing countries continue to grow at the past high rates for a substantial period? Will the oil

import gap widen over time? How much, and in which sector, is the potential for energy savings?

An analytical method and econometric demand model have been used to arrive at a view of the future for each country covered by the study (Brazil, China, India, Indonesia, Malaysia, Pakistan, Philippines, and Thailand). In assessing each country's future demand and supply of energy, scenarios were developed that take into account the changing relationship between economic growth and energy demand, technology changes, and the potential for fuel substitution. The evaluation of these elements has been based on careful sectoral analyses of energy demand in the key markets and supply limitations on fuel use in investment plans and energy policies in different countries.

While increased levels of motorization, urbanization, and rising incomes will continue to support increases in energy use in developing countries, the rate of growth in energy demand is expected to slow compared with past years. The growth rate of energy and oil use does not have to be as high as in the past to maintain a steady level of economic growth. The pattern of fuel use will change. The potential for energy savings is very large.

Bank staff and policymakers should be cautious in projecting past trends into the future. Extrapolating past trends would introduce upward bias in demand projections. To induce fuel switching and to slow the growth in energy demand, policies should focus on demand management and market-related energy pricing. Significant improvements in energy efficiency can be achieved by upgrading the energy-using stock of capital. Reduction in energy-related greenhouse gas emissions can also be achieved by improving existing capital stock.

The findings of the research have been presented at a number of international conferences.

*Responsibility:* International Economics Department, International Commodity Markets Division—Ron Duncan. With Philip M.L. Barnes, Shell London. Shell International Petroleum Company Ltd., the U.K., participated in this research.

*Completion date:* June 1990.

*Report:*

Imran, Mudassar, and Philip M.L. Barnes. 1990. "Energy Demand in the Developing Countries: Prospects for the Future." World Bank Staff Commodity Working Paper 23. Washington, DC.

## Pollution Control Policies

Increased public interest and concern over environmental conditions and the desire to improve them have resulted in a bewildering variety of policy measures attempting to do so. These can be broadly divided into two approaches: those based on legal requirements and those using economic instruments. Countries borrowing from the Bank are starting to develop measures. Little material

is available to Bank staff attempting to advise borrowers. The objective of this research was to review the experience of different types of measures. The research was conducted through a review and analysis of relevant literature.

The "tax approach" to environmental policy will generally be the better instrument in many circumstances, regulation (for example, of toxic wastes) in others, public investment (for example, in afforestation and soil conservation) in others, and sometimes a combination of the three. But developing countries would be better served by following the tax and investment approaches to environmental policy in most situations, rather than the regulatory route that the industrial countries have followed—often exclusively—over the past century.

Policies can be designed to be both socially and environmentally beneficial. This should be the primary aim in setting environmental standards and deciding on the policy instruments to be used to meet them.

*Responsibility:* Environment Department, Environmental Policy Research Division—John English, and Country Economics Department, Public Economics Division. With Dennis Anderson, consultant.

*Completion date:* June 1990.

*Report:*

Anderson, Dennis. 1990. "Environmental Policy and the Public Revenue in Developing Countries." Environment Department Working Paper 36. World Bank, Washington, DC.

## Study of International Fisheries Research

Extended fishery jurisdiction and growing demand for fish and fishery products present new opportunities for developing countries' fishery sectors. But these opportunities are accompanied by problems and potential problems resulting from the common property nature of fishery resources; the growing costs of public regulation; the rising costs of fuel and of some inputs for harvesting, processing, and distributing fish products; and fragmented and poorly funded research and information transfer. The shared frustration of donor organizations in identifying fishery research priorities gave rise to calls for new procedures to coordinate the use of limited funds.

This study has tried to determine how much the lack of information was a cause of failure; identified the high priority research needs; examined the capacity of developing countries to undertake the desired research; and proposed a strategy and scheme of action for improved donor support to the strengthening of fisheries research in developing countries. Following a donor consultation scheduled for April 1991, an implementation program will be launched.

A steering committee comprising representatives of the World Bank, CEC, UNDP, and FAO was responsible for the execution of the study. The study was conducted by consultants under the guidance of an advisory committee

comprising 25 members of the scientific community. Six missions to different regions, involving more than 100 participants, were undertaken. These missions have resulted in 11 reports, from which a final draft and digest report were prepared for review by the steering committee and advisory committee before their submission to the donors and eventual circulation to donor agencies, the scientific community, and governments.

The study found that research has developed knowledge and methodologies, but this capacity is not properly used. Structural changes in the sector have created new opportunities and needs for research, but this is not reflected in the research institutions' agendas. Research capacities in developing countries are not used effectively and must be strengthened. Strengthening national research capacities requires support for institution building, along with excellence in results. The effectiveness of foreign aid would be significantly improved by increased cooperation between institutes in the same region, by interregional cooperation, South/South cooperation, and North/South cooperation.

The 29 donor agencies that participated in the First Fisheries Development Donor Consultation in 1986, under the auspices of the World Bank, UNDP, FAO, and AfDB, expect to use the study report as a guide for future support of capture and culture fisheries research activities leading to improved development projects. The study report would define a strategy and plan of action redirecting the current approach to improve the use of financial support to fisheries research (presently estimated at more than US\$15 million a year).

*Responsibility:* Agriculture and Rural Development Department, Agriculture Production and Services Division—Eduardo Loayza, Agriculture and Rural Development Department, Agricultural Policies Division—Gershon Feder, and Europe, Middle East and North Africa Technical Department, Agriculture Division—Gert Van Santen. With Jean Paul Troadec, F.T. Christy, Jr., and Lucian Sprague, consultants. With funding by the Australian International Development Assistance Bureau; Commission of the EC; Danish International Development Agency; Food and Agriculture Organization; French Ministère de la Coopération; German Agency for Technical Cooperation; Icelandic International Development Agency; International Centre for Ocean Development; Ministries of Foreign Affairs of Italy, the Netherlands, and Norway; UK Overseas Development Administration; Swedish International Development Agency; United Nations Development Programme; and U.S. Agency for International Development.

*Completion date:* June 1990.

## Wastewater Reuse in the Middle East and North Africa

Wastewater is causing major environmental degradation throughout the Middle East and North Africa. For many countries it is a potentially valuable water resource. There has been no strategy identified for reusing wastewater that is based on an analysis of technical, economic, and institutional considerations and the experience in the region. This study has filled that gap.

The study was carried out in two phases. Phase I comprised a desk study of all relevant literature and the identification of the scope of Phase II. In Phase II, visits were made to eight countries in the region to test Phase I findings. These visits were made by a team of five specialists: an agricultural economist, a wastewater treatment specialist, an institutional expert, a health specialist, and a rural development specialist.

A strategy for wastewater reuse in a country should be identified through a step-by-step approach similar to that followed for any proposed agricultural, industrial, or infrastructure project. The proposed steps are: (i) agreeing on the potential need for reuse; (ii) establishing a strong institutional framework; (iii) evaluating technical, financial, economic, environmental, health, and institutional aspects; (iv) agreeing on the scope and other issues; (v) implementing the project; and (vi) operating the reuse project.

The study has identified an overall strategy that will assist in the efficient development of reuse. For each of the six steps in the strategy, major issues have been identified and recommendations made for their resolution.

*Responsibility:* Europe, Middle East and North Africa Technical Department, Infrastructure Division—David A. Howarth, and Infrastructure and Urban Development Department, Water and Sanitation Division—Nadim Khouri. With K. Baum, U.S. Department of Agriculture; and M. Suleiman and F. Yanez, consultants. The Food and Agriculture Organization (FAO) and World Health Organization participated in this study, and the FAO and United Nations Development Programme provided funding.

*Completion date:* June 1990.

## Watershed Development in Asia

This research program on watershed development issues arose from the realization that many current and planned World Bank-supported projects in the Asia Region deal with the linkages between upland productivity and environmental conditions and are, in various ways, motivated by concern with such downstream impacts as flooding and sedimentation. From the start, it focused on deepening the Bank's collective understanding of watershed development. High priority was attached to identify-

ing discrete operational problems that could be better understood from a review of data and analysis. And the work was to provide guidance to the Bank's dialogue with borrowers on strategies for resource management.

A colloquium on watershed management was held at the Bank in October 1988. Experts from research organizations and other agencies presented results of their work on many topics, including the impact of erosion on crop yields, sedimentation processes, and the impact of land tenure on development investments. Studies were then undertaken to address priority concerns identified at the colloquium. These involved review of literature and of the experience of relevant Bank projects on other interventions and analysis of data collected as part of ongoing preparation work.

There is no single watershed problem in the Asia Region, but a complex of issues related to increasing soil and moisture loss, land degradation, sedimentation, and irregular stream flows that can best be understood in the framework of watersheds as physical planning units.

Despite the availability of a wide range of options, most development projects have relied on a limited and generally high-cost set of interventions, which may be easier to manage for an agency, but which are frequently unattractive to the farmer.

Greater emphasis should be placed on methods of soil and water management with low capital requirements (for example, vegetative methods and cropping systems) that support small farm development.

Watershed management projects are complex interventions that require effective multidisciplinary collaboration, commitment by governments and local communities, and sustained efforts. For development agencies to be effective partners in this process, it is necessary to recognize that watershed projects, although not necessarily large or expensive, require heavy inputs of staff, particularly in preparation and supervision. Agencies also need to recognize and act on the need for government commitment in resolving watershed problems. Without serious commitment by governments and their field staff, investments are unlikely to succeed.

*Responsibility:* Environment Division, Environmental Policy and Research Division—William B. Magrath, and Asia Technical Department, Agriculture Division—John B. Doolette.

*Completion date:* June 1990.

### *Reports:*

- Doolette, John B., and William Magrath, eds. 1990. *Watershed Development in Asia: Strategies and Technologies*. World Bank Technical Paper 127. Washington, DC: World Bank.
- Magrath, William B. 1989. "Economic Analysis of Soil Conservation Technologies." Environment Division Paper 1989.4. World Bank, Washington, DC.
- Magrath, William B., and John B. Doolette. 1990. "Strategic Issues

for Watershed Development in Asia." Environment Department Working Paper 30. World Bank, Washington, DC.

## Interfuel Substitution and Changes in the Way Households Use Energy: Estimating Changes in Cooking and Lighting Behavior in Urban Java

An important shortcoming of standard methods for estimating household fuel demand as a function of fuel choice is that end-use services are treated as constant, without taking into account behavioral changes that accompany interfuel substitution. In this research a statistical procedure was developed to quantify the effects of interfuel substitution based on the behavior of urban households. When it is applied to data from a recent household energy survey of urban Java, substitution ratios, or the amount of energy substituted when similar households use different types of fuel, can be estimated. The analysis of fuel use by urban households on Java generally confirms technical efficiency estimates for cooking as a basis for projections of the substitution potential of kerosene for wood and LPG for kerosene, but also finds that the traditional assumptions about lighting are far off the mark. It was found that lighting households with electricity is less costly to the country and to households than kerosene and allows households roughly six times more light.

Households change behavior when they change fuels. The policy of making kerosene universally available and to subsidize it has both positive and negative effects for urban Java. The poor cook with kerosene, a clean-burning fuel that cuts down on the problem of indoor air pollution. The environmental problems caused by deforestation in the urban hinterland may also be partly alleviated because so many people cook with kerosene. But the subsidy policy holds upper-income groups in kerosene longer than might be expected. Only 12 percent of the highest-income households use LPG, which is generally thought to be a better fuel for cooking than kerosene.

The notion of fixed energy demand calculated through technical efficiencies of stoves for each fuel does not necessarily account for the behavioral changes involved in switching fuels. When the lighting behavior of households with electricity is compared with that of households without it, the benefits of electrification may be significantly underestimated when evaluated based on traditional applications of consumers' willingness to pay. The traditional estimates for cooking are better than those for lighting, but could be improved through empirical analysis of changes in behavior when people switch fuels.

*Responsibility:* Industry and Energy Department, Household Energy Unit—Kevin Fitzgerald and Douglas Barnes.

*Completion date:* July 1990.

### Report:

Fitzgerald, K., D. Barnes, and McGranahan. 1990. "Interfuel Substitution and Changes in the Way Households Use Energy: The Case of Cooking and Lighting Behavior in Urban Java." Industry and Energy Department Working Paper 29. World Bank, Washington, DC.

## Soil Degradation

Soil degradation is the diminution of the soil's current or potential capability to produce goods and services. Because of soil's role in the human food chain, its degradation is a significant issue. But there is a paucity of basic research information on crop growth in relation to the degree of soil degradation caused by such changes as soil compaction, depletion of organic matter, reduction in rooting depth, acidification, deterioration of soil structure, and reduction of soil fauna and flora.

The objectives of this study were to determine the extent of soil degradation in the southern states of Nigeria, the causes of this degradation and the measures being taken to combat it, and to provide guidelines for preventive and restorative measures and resource management strategies.

Relevant information on soil degradation in 10 southern states of Nigeria was collected through (i) a review of available literature published in Nigeria and elsewhere; (ii) discussions with scientists at Nigerian universities, the International Institute of Tropical Agriculture, and International Livestock Center for Africa who are concerned with soil degradation; (iii) discussions with scientists in the agricultural research institutes in southern Nigeria and with relevant personnel in the Federal Ministry of Science and Technology in Lagos; and (iv) discussions with staff of River Basin Development Authorities and other government and private agencies.

Investigations confirmed the lack of data on the extent and impact of soil degradation and conditions in farmers' fields and the potential of indigenous plant species for use in sustainable land use systems. There is also very little knowledge of critical limits of soil properties beyond which crop growth and economic yields are seriously jeopardized. Care should be taken to avoid superficial judgments on resource degradation. Considerably more research is required in alternative land use and farming systems as a means of avoiding soil degradation under tropical conditions where agriculture is primarily subsistence-oriented.

*Responsibility:* Environment Department, Environmental Policy and Research Division—John English, Western Africa Country Department, Agriculture Operations Division—Ashok Seth, and Africa Technical Department, Agriculture Division—Stephen Carr. With Rattan Lal, Ohio State University; and Bede Okigbo, Michigan State University; and funding by the government of Nor-

way. The International Institute of Tropical Agriculture, Ibadan, Nigeria, also participated in this research.

*Completion date:* July 1990.

*Report:*

Lal, Rattan, and Bede Okigbo. 1990. "Assessment of Soil Degradation in the Southern States of Nigeria." Environment Department Working Paper 39. World Bank, Washington, DC.

## Air Quality and Health

This study examined the relationships between urban air pollution and health and between air pollution control policies and the economy. It looked at the direct and indirect causes of air pollution. It reviewed existing institutions and pollution monitoring and control measures in urban areas in China, Mexico, and Turkey.

The study was conducted through reviews of literature and field missions and interviews of government and research staff involved in air pollution control in Ankara and Mexico City.

Although the main source of air pollution is generally the burning of fossil fuel, the solutions vary from place to place. Options vary depending on the type of pollutants, the characteristics of the area where they are generated and their effects are most noticeable, and the community's perception of the trade-offs between the health risks of pollution and the economic consequences of implementing control policies. Community involvement is necessary in identifying environmental issues, damages, and control strategies.

*Responsibility:* Environment Department, Environmental Policy and Research Division—Iona Sebastian and Adelaida Alicibusan, consultant. With Robert D. Hamrin, Robert D. Nathan Associates; Alan Krupnick, Resources for the Future; Henk de Koning, Sam Ozolins, Isabelle Ramieu, and Gunnar Nordberg, World Health Organization; Haynes Goddard, University of Cincinnati; and Michael Walsh and Neeloo Bhatti, consultants. The World Health Organization participated in the research.

*Completion date:* August 1990.

*Reports:*

- Hamrin, Robert D. 1990. "Policy Control Options for Comparative Air Pollution Study in Urban Areas." Environment Department Working Paper 28. World Bank, Washington, DC.
- Krupnick, Alan, and Adelaida Alicibusan. 1990. "Estimation of Health Benefits on Reduction in Ambient Air Pollutants." Environment Divisional Working Paper 1990-11. World Bank, Washington, DC.
- Krupnick, Alan, and Iona Sebastian. 1990. "Issues in Urban Air Pollution: Review of the Beijing Case." Environment Department Working Paper 31. World Bank, Washington, DC.
- Sebastian, Iona. 1990. "Issues in Urban Air Pollution: Ankara Diagnostic Report." Environment Department Working Paper 37. World Bank, Washington, DC.

## Smallholder Tree Farming

Rural smallholder tree farming programs have been initiated in many countries to counteract the many problems associated with a shrinking forestry biomass resource base and consequent loss of fuelwood sources. This research will examine the reasons for the success and failure of the tree farming, or *ziliushan*, program for farmers in three poor rural counties in China. The goal of China's *ziliushan* program is to improve the availability of forest products for sale or local consumption through planting efforts of individual farm households. The program aims to alleviate shortages of such resources as fuelwood and poles in rural areas as well as establishing systems of land use on nonagricultural land that will preserve the environment. For instance, denuded hillsides can be planted with trees to produce poles and fuelwood while preventing erosion. Mountain plots can also be used to produce fodder and grasses for livestock and building purposes. The program has been organized to allocate land to farmers for purposes of afforestation. Although the goals of the program are commendable, the results have been sporadic. For different reasons, many farmers have chosen not to plant on land allocated to them. This research focuses on the reasons for problems in the program, including poor technical extension, lack of economic incentives, and poor planting conditions.

The Chinese literature on the *ziliushan* program was reviewed, including a draft paper on smallholder tree farming and the responsibility system in China. The responsibility system is similar to land tenure systems in other developing countries. The results of a rural energy survey of three poor counties in China were analyzed. The international experience in smallholder tree farming as it relates to the Chinese experience was also reviewed. The empirical findings are based on a survey of households in Hengnan, Xiushi, and Kezuo counties. The sample consisted of 1,650 rural households in the three counties. The results are being analyzed through tabular presentation of the differences between those who have planted trees and those who have not.

The types of problem that China is encountering in its broad-based afforestation efforts and its search for new approaches are not unique to China. The same type of problems have been encountered in programs in other countries. The economic system framing development efforts involving the interaction of the individual, collectives, and state sectors may be unique to China, but the root problems faced in getting villagers to plant and manage trees are not. The different types of regional programs seem to have more effect on farmers' participation and perception of tree growing than do the farmers' interest or perception of resource problems in the area. This is reasonable, as some of the basic factors affecting tree

growing have much to do with the local problems, local markets, and the expectations of being able to reap the benefits from one's labor.

The factors that are important in encouraging farmers to grow trees include many of those reviewed in the international experience. First, land tenure or long-term rights to the trees or other plants grown must be secure and relatively long. Second, the program's support for the farmers should not end with seedling distribution. Forestry extension will be necessary to solve any problems that arise during the trees' life cycle. Third, except under extreme conditions farmers will not grow trees to improve the environment, but must have such incentives as cash benefit or own use of the product. The benefits valued by the farmer may vary depending on markets and local fuelwood availability. Thus the markets and biomass resources of wood should be examined closely before determining the type of growing that is best.

*Responsibility:* Industry and Energy Department, Household Energy Unit—Douglas Barnes, Robert Taylor, and Qian Liu, and Europe, Middle East and North Africa Country Department IV, Country Operations Division—Hong Chen.

*Completion date:* September 1990.

### **Land Tenure and Environmental Management**

Land is a basic factor of production for food and other agricultural products. With population growth increasing at the same or at higher rates as food production in many countries, there is growing pressure on land resources to increase or, at the very least, to maintain output. But environmental degradation is threatening the productive capacity of land in many developing countries, and population growth and inequalities in land distribution are forcing people onto increasingly fragile areas. Within this framework, patterns of land use and ownership may have significant effects on investments by users in protecting the productive potential of land. Land tenure may in many cases be seen as a tool to encourage enhanced land management practices and thus to maintain or even increase agricultural productivity.

The basic question addressed in this research concerns the effects on resource management of indigenous institutions that regulate access to land and other natural resources. The study explores the belief that lack of formal individual title to land is an impediment to investments in protecting and increasing the productivity of land. The ultimate aim is to clarify the role of indigenous institutions in environmental management and to identify the characteristics that contribute to the strengths and weaknesses of these institutions in the face of changing economic and social conditions.

The study has been based largely on a review of literature and three country case studies. A field mission was undertaken for one case study. A review of Bank projects with land tenure or land reform components is also under way.

Provisional findings suggest that formalization and individualization of tenure may not be necessary to enhance investments in land. Indigenous systems often seem to provide adequate security until they begin to compete with formal systems—as in the case of “projectized” areas or areas with heavy governmental and other external involvement. Even then, formalization of tenure may not always be the appropriate solution. The costs, both financial and social, need to be carefully evaluated.

The study is not yet complete, and the findings are still only general. Broadly, in formulating land tenure policy, it is necessary to understand fully the functions of indigenous tenure systems before changing them. Any externally imposed changes in the system of land tenure must provide for the performance of these functions, guaranteeing, for example, economic opportunity and economic security to the individual. In proposing changes in the land tenure rules, the costs and benefits of alternative systems must be considered and compared to other means of overcoming bottlenecks caused by indigenous tenure systems.

*Responsibility:* Environment Department, Environmental Assessments and Programs Division—Raymond Noronha, and Environment Department, Office of the Director—Zeinab Partow.

*Completion date:* December 1990.

### **People and Parks: An Analysis of Projects Linking Protected Area Management with Local Communities and Economic Incentives**

The protection of natural ecosystems in parks and reserves is the most important method of conserving biological diversity. Many of these areas are acutely threatened by human activities. Efforts to minimize human impacts on these protected areas have historically focused on patrolling by guards and imposing penalties to discourage encroachment and illegal activities. But there is growing recognition that the successful management of protected areas ultimately depends on the cooperation and support of local people.

A new generation of projects attempts to link the conservation of biological diversity in protected areas with local social and economic development. These projects, collectively referred to as Integrated Conservation-Development Projects (ICDPs), aim to promote development and provide local people with alternative income sources that do not threaten to deplete the flora and fauna of

protected areas. Existing and future ICDPs, many of which are being implemented by NGOs, should benefit from an understanding of experience to date and an identification of the approaches that show potential for success, particularly since there is virtually no analytical literature in this area.

Twenty-three case study projects were examined in Asia, Latin America, and Africa, of which 19 were visited, usually for one to two weeks. Site visits provided extensive information on project design and implementation. Whenever possible, discussions were held with (i) past and present project managers and their staffs; (ii) protected area managers and their staffs; (iii) senior representatives of national agencies charged with protected area administration; (iv) staff of national and international NGOs participating in the projects; and (v) individuals with relevant knowledge and experience.

The case study projects included some promising and innovative initiatives, although few of the development components have so far had a significant positive conservation effect. This is partly because many of the projects were hindered by (i) strategic design and implementation flaws; (ii) a lack of clarity in defining objectives; (iii) a lack of support from governments; (iv) inadequate funding; and (v) limited local community participation. A cooperative approach based on one or more of the ICDP approaches will be essential to the effective long-term management of protected areas.

*Responsibility:* Environment Department, Environmental Policy and Research Division—Mohan Munasinghe and Mary Dyson, and Asia Technical Department, Environment Unit—Gloria Davis. With Michael Wells, consultant. The World Wildlife Fund and U.S. Agency for International Development also are participating in the research.

*Completion date:* December 1990.

### **Longitudinal Study of Natural Resource Management in Machakos District, Kenya**

This research is part of the Environment Department's larger effort on the problems of desertification and dryland management. Concerns about land degradation in the Machakos District and steps to promote measures to prevent it date at least from the 1930s. Many interventions have been attempted in this semi-arid area during the intervening period of more than 50 years, most of which interventions have been well documented. Although concerns continue, the population has increased from about 250,000 in 1930 to 1,250,000 now (a five-fold increase). Clearly many changes in production systems have been made to enable the area to support this growing population.

The objective of the research is to establish, through

the study of an environment where degradation seems to have been checked or slowed despite very high rates of population growth, both the technologies that have been most successful in promoting sustainable increases in the value of production and the conditions necessary for their success. The research will test the following hypotheses:

(i) The progress of degradation in Machakos District has been checked since the 1940s by interventions that have enabled the District to support a larger population. This hypothesis will be thoroughly examined as it is fundamental to the rest of the research. The consensus among informed observers is that soil erosion has been slowed in the agricultural areas but remains a problem in grazing areas.

(ii) Timing is important: technologies that require additional inputs of labor or capital will not be adopted until changes in the population/land ratio compel it.

(iii) Community participation in the design, implementation, and benefits of interventions is required to ensure that they are appropriate to the needs, resources, and aspirations of the beneficiaries.

(iv) Investment of family labor or capital in resource conservation depends on secure access rights to the benefits of such investments.

(v) Increases in productivity and income are a necessary incentive for the sustained adoption of improved environmental management practices.

The research will be based on data from reports and air photo materials dating from 1948, 1967, and 1976 and from satellite imagery. If possible, soil analyses conducted earlier will be used. The validity of the physical and socioeconomic data obtained in this way will be tested by field surveys in five representative sample areas.

The results are expected to have immediate value for those planning the development of Machakos District and for those responsible for neighboring districts. The results are also expected to contribute to the wider debate on the management of the environment and to provide a methodology for assessing its effectiveness over the long term.

*Responsibility:* Environment Department, Environmental Policy and Research Division—John English, and Tom Allen (Nairobi office). With Mary Tiffen, ODI, the United Kingdom; Michael Mortimer, University of Birmingham, the United Kingdom; and D. Thomas, University of Nairobi, Kenya. The Ministry of Reclamation, Kenya, is also participating in the research. Funding has been provided by the Rockefeller Foundation.

*Completion date:* May 1991.

### **Agricultural Policies and the Environment**

Environmental effects have been given too little attention in agricultural policy-making. It is important to know what the shortcomings have been and how environ-

mental concerns can best be incorporated into agricultural policies.

Agricultural policies can have unintended negative effects on the natural resource base and the environment. Market-based incentives appear to be superior to the regulatory approach except in certain circumstances, such as when dealing with toxic substances.

It needs to be recognized that agricultural policies may not be neutral with respect to the environment but may have unintended negative consequences. These consequences need to be analyzed qualitatively and, where possible, quantitatively and considered in agriculture sector loans or in project loans with policy components.

In Phase I of this project, a survey of the literature was conducted to determine the experiences so far of integrating environmental concerns into agricultural pricing policies. At the next stage a small meeting of experts may be convened to develop a medium-term research strategy.

*Responsibility:* Environment Department, Environmental Policy and Research Division—Ernst Lutz, John English, and Herman Daly, and Agriculture and Rural Development Department, Agricultural Policies Division—Jock Anderson and Peter Hazell. With Michael Young, CSIRO. SEPSA, Costa Rica, is also participating in the research.

*Completion date:* June 1991.

*Reports:*

Lutz, Ernst, and Herman Daly. 1990. "Incentives, Regulations, and Sustainable Land Use in Costa Rica." Environment Department Working Paper 34. World Bank, Washington, DC.

Lutz, Ernst, and Michael Young. 1990. "Agricultural Policies in Industrial Countries and Their Environmental Impacts: Applicability to and Comparisons with Developing Nations." Environment Department Working Paper 25. World Bank, Washington, DC.

### Natural Gas Strategy Study

Since FY73 the Bank has loaned only about \$2 billion for natural gas projects. Given this slow pace in gas lending and the potential contribution that domestic gas projects could make to satisfy urgent energy demands at least cost, the Bank needs to examine whether its current institutional structure and lending policies with respect to gas are appropriate. Many developing countries have large natural gas reserves that can be developed as a lower-cost, environmentally benign substitute for some oil demand, especially to generate electric power. But gas resources are not being developed for a variety of reasons. International markets for gas are lacking because of the high cost of gas transport and the current low oil prices. International markets for gas-derived fertilizers and agrochemicals are also saturated and subject to stiff world-wide competition. Thus, realistically, usually only domestic markets are available for utilizing these gas resources.

The main research questions this study addresses are: (i) How can the Bank promote domestic gas development and help create the necessary financial and institutional structures for its success? (ii) What are the appropriate contractual arrangements between producers, distributors, and users? (iii) What are optimal pricing policies for gas? (iv) How can the environmental benefits from using gas rather than more polluting fuels be included in economic evaluations?

The research is being conducted in the form of component studies on gas policy; environmental benefits and costs; advantages and disadvantages of using gas in the power sector; appropriate ways of technology transfer; interregional gas development and its economic, institutional, and political dimensions; and an integrating gas development policy for Bank use.

New, gas-specific, dynamic pricing rules must be developed to take into account the high capital intensity of gas development, the large economies of scale, the depleting characteristics of gas deposits, and the multiplicity of separable markets for gas.

*Responsibility:* Industry and Energy Department, Energy Development Division—Gunter Schramm, and Industry and Energy Department, Natural Gas Development Unit. With Stein Hansen, consultant, and funding by the U.S. Agency for International Development.

*Completion date:* July 1991.

*Reports:*

Schramm, Gunter. 1989. "The Development of Natural Gas Resources in Developing Countries." *Gaz du Monde* (9/July).

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### Red Sea Gulf of Aden Regional Hydrocarbon Study Project

The development of indigenous sources of oil and gas will relieve the heavy foreign currency requirements of Northern African countries that import petroleum products. This development must be undertaken by international oil companies, not international donor agencies. To attract oil industry to the Red Sea Gulf of Aden, basic questions of generation and entrapment of hydrocarbons must be addressed and the results made known to companies capable of exploring in this frontier environment. Public sector data need to be made available to the industry.

This research is being conducted through the synthesis of existing data provided by the participating governments (Egypt, Sudan, Ethiopia, Djibouti, Somalia, Yemen, and Saudi Arabia). Using these data, an interpretation was made of the formation of this multinational sedimentary basin, its geological history, and the evolution of hydro-

carbon deposits contained in it.

It was found that the tectonic origin of the basin is much more complicated than previously thought; the southern part is older than the rest. The heat flow is not excessive and in most cases is equal to or lower than that in the adjacent Gulf of Suez, where commercial production is well established. Multiple sources of petroleum source rocks are present in the pre-basin sediments, and in the basin they are present both above and below the salt series.

The project represents seed money for the development of petroleum subsector technology transfer projects and the development of infrastructure required for the production, distribution, manufacture, and consumption of petroleum and natural gas products. National policy-making staffs are trained in data interpretation and negotiation of work programs for petroleum exploration and production-sharing contracts. Petroleum legislation is revised to reflect more accurately the risks and rewards of petroleum exploration in each country. Regional dialogues are established between petroleum ministers of participating countries.

**Responsibility:** Africa Technical Department, Industry and Energy Division—Thomas E. O'Connor and Hakim Sikander (seconded from PCIAC). With T.J. Gorton; Z.R. Beydoun, American University of Beirut; A.J. Abouzakim; and R.B. Allen, Carolina Research Foundation. The UNDP, PCIAC of Canada, Ministry of Foreign Affairs of France, and Overseas Development Administration, the United Kingdom, are participating in the research.

**Completion date:** September 1991.

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O'Connor, Thomas E. 1990. "Petroleum Evaluation of Multinational Sedimentary Basins: The Red Sea/Gulf of Aden Regional Hydrocarbon Study Project." Paper presented at the 1990 Annual Convention of American Association of Petroleum Geologists, San Francisco, June 5.

Savoyat, E., A. Shiferaw, and T. Balcha. 1989. "Petroleum Exploration in the Ethiopian Red Sea." *Journal of Petroleum Geology* 12(2):187-204.

### Use of Geographical Information in Natural Resource Management

This research is an important step in incorporating spatial information in policy work. The project examines how spatially referenced natural resource and socioeconomic data could be made compatible and used in diagnostic and simulation work.

Relevant spatial and temporal information on a country's natural resource stock will be collected for selected case studies from Africa, Asia, and Latin America. Then these data sets will be related to matching socioeconomic data so that the process in which economic growth and economic policy variables affect natural resource use can be analyzed. Once the causal processes at work—covering public policies, demographic factors, and environmental factors—are understood, the probable consequences of policy interventions for natural resource use will be evaluated.

**Responsibility:** Environment Department, Environmental Policy and Research Division—V.J. Jagannathan, Environment Department, Environmental Operations and Strategy Division—Hideki Mori, and Environment Department, Environmental Assessments and Program Division—Hassan M. Hassan. The OAS is also participating in this research.

**Completion date:** June 1992.

**Report:**

- Jagannathan, N. Vijay, H. Mori, and H.M. Hassan. 1990. "Applications of Geographical Information Systems in Economic Analysis: Case Study of Uganda." Environment Department Working Paper 27. World Bank, Washington, DC.

## 6 BASIC INFRASTRUCTURE AND URBAN DEVELOPMENT

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### Demand for Rural Water Supply

Ref. No. 674-35C

About \$1.5 billion is spent annually on the construction of rural water supplies in developing countries, but the efficiency of these investments is generally low. Often, water systems are neither used correctly nor properly maintained. It is estimated that at least 25 percent of rural water supplies in developing countries are not working, and in some countries construction of new facilities is not even keeping pace with the rate of failure. The number of people using improved supplies is much less than the number ostensibly served. In Kenya and Côte d'Ivoire, for instance, surveys have shown that only one third of the population reported to have access to improved facilities actually used these facilities.

A major impediment to improved performance is inadequate information on the response of consumers to new service options. It is commonly assumed that so long as the financial requirements of an improved water system do not exceed 5 percent of income, rural consumers will choose to abandon their existing water supply in favor of the new water system. In many instances, however, such rules of thumb have led to poor choices of service levels and inappropriate investments.

The principal objectives of this research project were: (1) to investigate the determinants of households' willingness to pay for improved water supplies in a variety of socioeconomic and cultural settings in different developing countries, and (2) to develop valid yet relatively rapid and inexpensive procedures for assessing households' demand for improved water services so that communities, governments, and donor agencies can make better choices on technical issues (such as level of service) and financial issues (such as cost-recovery mechanisms, tariff levels, and subsidies).

Case studies of willingness to pay for water were undertaken in six countries: Brazil, India, Pakistan, Zimbabwe, Nigeria, and Tanzania. In most of these country studies, household surveys were conducted at six sites. In each country, the sites selected include villages in which improved water supplies are in operation and villages in which improved water supplies are to be installed. For villages with improved water supplies, inferences were based on observed behavior. For villages without improved water supplies, contingent valuation surveys were

carried out in which households were asked a series of structured questions designed to determine how much they are willing to pay for access to improved water supplies. The researchers examined the effect of family socioeconomic characteristics and the characteristics of different water sources (including type of service, monetary cost, reliability, and perceived quality) on how many households choose to use the new water service, and the maximum they are willing to pay for the service. The research was designed to assess the reliability of the contingent valuation method in the context of household water demand in developing countries.

The study was undertaken in collaboration with the Institute of Resource Assessment, University of Dar es Salaam; the Department of Economics, University of Nigeria, Nsukka; the Applied Economics Research Centre, University of Karachi; Zimconsult Economic and Planning Consultants, Harare; the Institute for Economic and Social Planning of the Secretariat for Planning of the Government of Brazil; and the Centre for Social and Technological Change, Bombay.

The case studies lead to many new insights into household water demand behavior and about the determinants of households' willingness to pay for improved supplies. The results support the use of a standard microeconomic, utility-maximizing framework for understanding household water demand and source choice decisions. The variables suggested by demand theory were generally significant determinants of households' willingness to pay for improved water supplies in all countries. For example, connection charges and tariffs were important determinants of households' decisions on whether to connect to a piped distribution system. Households with higher incomes and higher education levels were more likely to connect to piped water systems, and such households said that they were willing to pay more for improved supplies than households with lower incomes and lower education levels.

Other factors were also important, particularly the availability of alternative water supplies. The amount of money or time a household spends on water often emerged as a key determinant of its willingness to pay for improved supplies. This research found little support for the assumption that a household will pay 3-5 percent of its income for improved water supplies. When water is scarce and alternative supplies are expensive, households are

often willing to pay much more than this; when water is easily available, households are often willing to pay much less.

The results of this research suggest that the reliability of a water supply system is of central concern to a household. When a system is unreliable, people often make other arrangements to obtain water, and thus are unwilling to pay much for a connection to an unreliable system. In Kerala, for instance, those who have house connections will pay almost twice as much for a reliable system than they currently pay for a system that operates only a few hours a day.

A common concern with increasing water tariffs is that the poor will be unable to afford the improved service. In both India and Brazil the effects on the demand for yard taps of the availability of free water from public taps were assessed. In both cases, there was little substitutability between taps and private connections. In other words, if both private connections and public taps are offered, the price of water from a private connection can typically be raised without large numbers of users switching from a private connection to a public tap. Thus, where the demand for private connections is high and most of the community desire a piped connection, water can be provided free without jeopardizing the financial viability of the water utility.

This finding—of the lack of substitutability between yard taps and public taps—was not universal. In Nigeria, a large part of the population could not afford a private connection. In this case, free public taps may involve substantial revenue losses for the water utility, and kiosks may be necessary to mobilize sufficient financial resources to provide reliable service.

Finally, in both Pakistan and India the relative effects of connection costs and tariffs could be assessed. In India payments for a connection were a major barrier for many interested in yard taps, but the "connection cost" problem was not a simple cost problem, but a reflection of the high cost of credit facing villagers in India. It was estimated that the effective cost of a connection could be reduced 50-70 percent if the water authority offered credit for connections at standard interest rates and repayment periods.

This research was the first attempt rigorously to apply contingent valuation techniques in developing countries; its findings are thus of widespread interest to development planners for valuing public goods. The results of the case studies indicate that contingent valuation surveys can be conducted in developing countries and that policy-relevant information can be obtained about households' preferences for improved services.

In all studies, special attention was paid to testing the reliability of households' responses to contingent valuation questions. Multivariate analyses of the determinants of the WTP bids were carried out in all the case studies. The

predictive power and statistical significance of these models varied, but the results consistently supported hypotheses derived from a utility-maximizing framework.

Tests were also conducted in selected case studies on possible sources of bias in the WTP bids, including starting-point bias and strategic bias. These biases were evident in some case studies. Even where these biases were considerable, this did not negate the usefulness of the information collected or substantively modify the policy implications of the findings. Additional tests were carried out to see whether the order of the WTP questions affected the responses (it did not), and to see whether the time respondents were given to consider the WTP questions affected their answers (sometimes it did).

Generally, the series of analyses of the WTP bids that were carried out indicated that the information obtained from the contingent valuation survey was of comparable or even higher quality than that reported in the literature for industrialized countries.

*Responsibility:* Infrastructure and Urban Development Department, Water and Sanitation Division—John Briscoe. With Paulo Furtado de Castro, Institute of Social and Economic Planning, Brasilia; Orjan Olsen, Brazilian Institute of Public Opinion and Statistics, Sao Paulo; Wilton Bussab, University of Sao Paulo; Bhanwar Singh and Radhika Ramasubban, Centre for Social and Technological Change, Bombay; Ramesh Bhatia, Delhi University; Apia Okorafor and Augustine Okore, University of Nigeria; Anjum Altaf, University of Karachi; Mark Mujwahuzi, University of Dar es Salaam; Dale Whittington, University of North Carolina; V. Kerry Smith, North Carolina State University; Charles Griffin, University of Oregon; and Peter Robinson, ZIMCONSULT, Harare.

*Closing date:* December 1989.

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## Transportation and Agricultural Supply Response in Africa

### Ref. No. 674-75

The goal of this research is to understand the effects of transport policy on agriculture in Africa through a model relating transportation, state marketing, taxation, and agro-industry. In particular, the study examines the impact of panterritorial pricing and related transport patterns on the incentives to farmers to produce cotton in Côte d'Ivoire and the effect of panterritorial pricing on the benefits from investment in transport services and infrastructure.

Parameters for an analytical model of rural transport are being obtained from a detailed data set for Côte d'Ivoire based on 56 cotton-producing zones. A numerical solution of the model will yield benchmark values for the benefits from alternative policies affecting the pricing, timeliness of harvest evacuation, siting of collection depots, and infrastructural investment. The scope of the study has been scaled down because of an inability to obtain a survey-based data set on individual farmers as planned.

*Responsibility:* Infrastructure and Urban Development Department, Transport Division—Alice Galenson. With Mark Gersovitz, Princeton University.

*Closing date:* December 1990.

## Impacts of Infrastructure Deficiencies on the Nigerian Industrial Sector

Virtually no research has been done on the relationship between infrastructural services (as inputs in the production process of manufacturing firms) and the productivity of industries. This issue is important for policy and lending operations because infrastructure investment affects economic growth and development in general and provides services to meet the basic needs of households.

This research addressed issues including the extent of public infrastructure service deficiencies, the response of private manufacturing firms to deficiencies and related private costs of private provisions, and policy options for the most efficient participation of the private sector in the supply of infrastructure services. This research is part of the Urban Development Division's research program on infrastructure investment and productivity.

The research was conducted through a survey of manufacturing establishments in five Nigerian cities. The survey results on 179 establishments were used for the empirical work, which included extensive descriptive analysis and econometric estimations of such key parameters as elasticities of input substitutions, economies of scale, shadow prices, and demand elasticities with translog specification of cost functions. Strong policy conclusions were obtained in deregulation and contestable markets, pricing policies, and potential efficiency gains from econo-

mies of scale and scope in private provision of services.

The firms incur heavy costs for capital investment in private services to substitute for poor public services. The burden is greater for small firms than for large firms. The evidence shows the firms' willingness to pay for reliable services. The findings demonstrate how infrastructural deficiencies affect the productivity of manufacturing firms and their growth and employment generation.

The main message of the research is that infrastructural services are not merely final goods and services for household consumption, but also important "intermediate inputs" in productive activities of manufacturers. Inefficient infrastructure provision will affect economic growth and development.

The research findings have been presented at many seminars and conferences, including at the African Economic Issues Conference held in Nairobi in June 1990.

**Responsibility:** Infrastructure and Urban Development Department, Urban Development Division—Kyu Sik Lee, and Africa Country Department IV, Infrastructure Operations Division. With Alex Anas, Northwestern University; S. Verma, University of Maryland; and M. Luger, University of North Carolina. The Nigerian Industrial Development Bank and the Center for Econometric and Allied Research, University of Ibadan, Nigeria, also are participating in the research, and the UNNP, Lagos, Nigeria, is providing funding.

**Completion date:** December 1990.

**Reports:**

Anas, Alex, and Kyu Sik Lee. 1989. "Infrastructure Investment and Productivity: The Case of Nigerian Manufacturing—A Framework for Policy Study." *Review of Urban and Regional Development Studies* 1(2):65-76.

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## Environmental Sanitation

The goal of this research is increased coverage of middle- and low-income urban and peri-urban communities with improved sanitation services. The technological bottleneck to the supply of sanitation services to this group, whose population everywhere is rapidly growing, is thought to be the gap between top-of-the-line conventional sewerage, which is too expensive, and low-cost sanitation technologies, which are often inappropriate for social reasons (high population or housing densities, in-house water supplies) or for environmental reasons (low permeability of soils or high groundwater tables). Technical

information on appropriate intermediate solutions is inadequate—hence the need for research on intermediate sanitation. The introduction of intermediate sanitation widens the range of technologies that must be considered for matching the supply of technologies with the demand for specific technologies. To put the planning methodology into practice requires the development of analytical tools as well as institutional and organizational models.

The research addresses the following questions: What planning method can be used to match the supply of sanitation technologies with consumer demand? On the supply side, what are the costs, technical performance, and institutional requirements of intermediate sanitation technologies? On the demand side, how can it be determined what services people want and are willing to pay for? What are the appropriate roles of government, communities, and the private sector in the planning and implementation of sanitation projects that entail the use of a mix of two or more technologies?

A strategic sanitation planning model has been developed under this project and is being field-tested in Kumasi, Ghana, under the UNDP/World Bank Water and Sanitation Program. The results will be incorporated into the first edition of a strategic planning manual under preparation. Desk and field studies will be conducted on intermediate sanitation technologies, on willingness to pay, and on institutional and organizational models.

Preliminary findings indicate that there are a number of sewerage systems being used in the United States, Brazil, Australia, and elsewhere that are intermediate in cost between on-site sanitation and conventional sewerage but are technically just as effective as or even more efficient than conventional sewerage. The contingent valuation method can be used in strategic sanitation planning to find out what types of sanitation technologies people want and are willing to pay for. These findings imply that urban and peri-urban sanitation projects need not be based on conventional sewerage alone, and that in all projects consideration should also be given to intermediate technologies.

**Responsibility:** Infrastructure and Urban Development Department, Water and Sanitation Division—Albert M. Wright and Harvey A. Garn, and Infrastructure and Urban Development Department, Water and Urban Development Technology and Assessment Unit—Alexander E. Bakalian. With Dale Whittington and Donald T. Lauria, University of North Carolina, Chapel Hill; and John M. Kalbermatten, Kalbermatten Associates, Washington, DC. Funding is being provided by the UNDP/World Bank Water and Sanitation Program.

## 7 ECONOMIC MANAGEMENT

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### Testing for Systematic Differences in Initial and Final Project Evaluations

Ref. No. 675-15

For the past few years there has been an increasing interest in the so-called gap between initial project performance evaluations and subsequent evaluations at project completion. Many papers circulating in the Bank have addressed the "gap" problem.

In the first phase of this research project, the authors concentrate on completed agricultural projects, which numbered 594 through 1988. As evidence of the gap, the average economic rate of return calculated before approval was 21.5 percent, while the reestimated economic rate of return after completion averaged 11.8 percent. Thus, on average, there is a gap for these projects.

The primary objective of the research project is to investigate whether there are systematic explanatory factors of the variations in the rate of return. The authors are exploring several approaches, using a two-equation linear model with the two rates of return as dependent variables.

A secondary objective anticipates that there are systematic differences and that one such subset involves country characteristics. The secondary objective seeks to replace area-of-the-world dummy variables with objective measures of salient country characteristics.

One would expect the two unobservable random variables, listed among the other variables on the right-hand side of the two-equation model, to be correlated. Since it is a matched sample across the same set of projects, the model is a two-equation, "seemingly unrelated," sys-

tem in the Zellner mold.

A complicating factor arises because the completion ERR is censored. A significant number of failed projects are assigned an ERR of -5 percent in the final appraisal. For (asymptotically) unbiased estimation and testing, this requires a modified Tobit procedure developed for a two-equation SUR model where the censoring occurs in only one of the equations. A maximum likelihood procedure for handling the problem is being developed.

A demanding part of the research is to represent the sets of right-hand-side explanatory variables. Experience so far suggests that the more promising approach is to search for indicators of a favorable climate for investment, which may vary systematically from country to country and from time to time.

Based on preliminary analyses, there is a substantial difference in the test statistics for checking equivalence of coefficients across the two equations. Ignoring the censor points yields an insignificant F statistic. This leads one to distrust standard procedures of ordinary least squares and seemingly unrelated regression techniques for handling estimation and testing with these data. At the same time, these preliminary analyses reveal an unpromising performance of the country indicator variables used. Other formulations are being tried.

*Responsibility:* International Economics Department, International Commodity Markets Division—Ron Duncan, and Operations Evaluation Department—Paul Duane. With T. Dudley Wallace, Duke University; and J. Lew Silver, Emory University.

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