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ABSTRACTS

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ABSTRACTS
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1281. Human and Physical Infrastructure: Public Investment and Pricing Policies in Developing Countries

Emmanuel Jimenez
(April 1994)

Just as market failures necessitate government intervention in the infrastructure sectors, so government failures should be considered in deciding the extent and depth of that intervention.

Almost by definition, the basis for development is infrastructure — whether services for human infrastructure (health, education, nutrition) or physical infrastructure (transport, energy, water).

Although the infrastructure sectors are diverse, what they have in common is that public policy has had a great deal to do with how these services are provided and financed in almost all countries. Jimenez reviews the recent literature on two key aspects of that involvement: investment and pricing.

While the quality of the econometric evidence varies, recent literature reinforces the view that human and physical infrastructure are critical for economic growth and the reduction of poverty. And the state is recognized as playing a key role in ensuring the efficient, equitable allocation of resources for infrastructure.

Despite many sound theoretical reasons for such public involvement, however, recent studies have shown that it leaves much to be desired in efficiency and equity. One symptom is underinvestment in key subsectors that have high economic returns and that help the poor the most, such as primary education and rural health clinics, in relation to more expensive interventions, such as tertiary education and urban hospitals. Another common malaise is the poor use of scarce resources, leading to low quality (students learning little) and reliability (irregular power and water flows), poor maintenance (dilapidated roads), and inappropriate input use (too many school administrators or health workers and not enough books or drugs in producing education health outcomes). Just as market failures necessitate government intervention in the infrastructure sectors, so government failures should be considered in deciding the depth and extent of that intervention.

The literature has made some advances in diagnosing these problems in poor countries and proposing solutions. But information gaps remain, particularly in developing robust methodologies for:

- Making intersectoral comparisons across the wide range of infrastructure services.
- Crafting more diverse policies about the public-private balance in infrastructure investment, depending on the nature of "public goods" characteristics for various types of infrastructure services, or even across activities for the same service (for example, power transmission versus distribution).
- Taking issues of political economy into account, such as the vested interests of those with large financial interests in infrastructure.

Jimenez also highlights public pricing as a policy initiative that has recently gotten much attention. After briefly reviewing the basic concepts of pricing, he focuses on the literature about pricing reform. Most commonly, the public sector is the main provider of infrastructure services, usually free or at subsidized prices. But the recent literature has aired a rethinking of the balance between public and private financing of infrastructure.

The debate in this area is often heated. Health and education are traditionally provided free and some recent literature argues for positive prices, at least for higher tiers of service. The principle of public pricing has been more widely accepted in transport, energy, and to a lesser extent water, but often the levels are too low and do not provide the appropriate incentives for efficient and equitable use.

This paper — a product of the Poverty and Human Resources Division, Policy Research Department — was prepared as chapter 47 of *Handbook of Development Economics,* volume 3, edited by J. Behrman and T. N. Srinivasan. Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Liliana Longo, room N5-049, extension 37786 (96 pages).

1282. Copper and the Negative Price of Storage

Donald Frederick Larson
(April 1994)

Just as the price of a call option contains a premium based on price variability, so the shadow price of inventories contains a dispersion premium associated with the unplanned component of inventories. When inventory levels are low, the value of the premium increases to the point where inventories will be held even in the face of a fully anticipated fall in price.

Commodities are often stored during periods in which storage returns a negative price. Further, during periods of "backwardation," the expected revenue from holding inventories will be negative.

Since the 1930s, the negative price of storage has been attributed to an offsetting "convenience yield." Kaldor, Working, and later Brennan argued that inventories are a necessary adjunct to business and that increasing inventories from some minimal level reduces overall costs. This theory has always been criticized by proponents of cost-of-carry models, who argue that a negative price for storage creates arbitrage opportunities. Proponents of the cost-of-carry model have asserted that storage will occur only with positive returns. They offer a set of price-arbitrage conditions that associate negative returns with stockouts. Still, stockouts are rare in commodity markets, and storage appears to take place during periods of "backwardation" in apparent violation of the price-arbitrage conditions.

For copper, inventories have always been available to the market regardless of the price of storage. This is true whether the market is broadly defined at the U.S. or world level, or more narrowly defined as the New York Commodities Exchange or the London Metal Exchange.

Larson argues that although inventories may provide a Kaldor cost-reducing convenience yield, inventories also have value because of uncertainty. Just as the price of a call option contains a premium based on price variability, so the shadow price of inventories contains a dispersion premium associated with the unplanned component of inventories.

Larson derives a generalized price-arbitrage condition in which either a Kaldor-convenience and/or a dispersion premium may justify inventory holding even during an expected price fall. He uses monthly observations of U.S. producer inventories to estimate the parameters of the price-arbitrage condition. The estimates and simulations he presents are ambiguous with regard to the existence of a Kaldor-convenience but strongly support the notion of a dispersion premium for copper. And although the average

value of such a premium is low, the value of the premium increases rapidly during periods when inventories are scarce.

This paper — a product of the International Trade Division, International Economics Department — is part of a larger effort in the department to understand international commodity markets. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Anna Kim, room S7-038, extension 33715 (78 pages).

1283. Interest Rates in Open Economies: Real Interest Rate Parity, Exchange Rates, and Country Risk in Industrial and Developing Countries

Dipak Das Gupta and Bejoy Das Gupta
(April 1994)

Policymakers must address the central questions: How much do world interest rates influence domestic rates? And what are the respective roles of monetary policy, real interest parity, expectations of change in the exchange rate, and "country risk?"

Das Gupta and Das Gupta test whether the integration of the international capital market is more important than domestic factors in determining interest rates, in a broad sample of industrial and developing countries.

The recent turbulence in industrial financial markets has underscored concerns about what shapes interest rates. Some believe an independent national policy on interest rates to be possible. Others believe there is little room for managing interest rates in open economies — without destabilizing effects on exchange rates — given the massive volumes of capital market transactions that force interest-rate parity across countries.

Much less attention has been paid to the formation of interest rates in developing countries, although the issue is increasingly important as more and more countries undertake financial liberalization. Policymakers must address the central question: To what degree are domestic interest rates influenced by world interest rates?

A separate concern is domestic rates that are higher in some developing countries than world interest rates.

Das Gupta and Das Gupta propose a model of real interest rate parity as the main test for capital market integration — that is, that nominal interest rate differences across countries are explained largely by inflation differentials (rather than by covered or uncovered nominal interest parity).

The evidence suggests strongly that although domestic monetary policies play a significant role, real interest parity is a dominant factor in both industrial and developing countries.

But expectations of changes in the exchange rate also significantly influence interest rates.

A third key factor is the apparent presence of significant "country risk," unexplained by macroeconomic balances, for some developing countries (for example, Chile, Indonesia, Mexico, and the Philippines). Such country risk pushes real domestic interest rates higher than would otherwise be predicted.

They discuss possible reasons for such country risk in Indonesia.

This paper — a product of the Country Operations Division, East Asia and Pacific Region, Country Department III — is part of a larger effort in the region to analyze the impact of international interest rates and capital flows on domestic interest rates and monetary policies in open capital account economies such as Indonesia. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Boonsri Kim, room D9-097, extension 82467 (22 pages).

1284. The Soviet Economic Decline: Historical and Republican Data

William Easterly and Stanley Fischer
(April 1994)

What led to the relative Soviet decline was reliance on capital accumulation and a low elasticity of substitution between capital and labor. Planned economies are apparently less successful at replacing labor effort with capital. Tentative evidence indicates that the burden of defense spending also contributed to the Soviet debacle.

Soviet growth for 1960–89 was the worst in the world, after controlling for investment and human capital. And relative performance worsens over time.

Easterly and Fischer explain the declining Soviet growth rate from 1950 to 1987 by the declining marginal product of capital. The rate of total factor productivity growth is roughly constant over that period.

Although the Soviet slowdown has conventionally been attributed to extensive growth (rising capital-to-output ratios), extensive growth is also a feature of market-oriented economies like Japan and Korea. One message from Easterly's and Fischer's results could be that Soviet-style stagnation awaits other countries that have relied on extensive growth. The Soviet experience can be read as a particularly extreme dramatization of the long-run consequences of extensive growth.

What led to the relative Soviet decline was a low elasticity of substitution between capital and labor, which caused diminishing returns to capital to be especially acute. (The natural question to ask is why Soviet capital-labor substitution was more difficult than in Western market economies, and whether this difficulty was related to the Soviets' planned economic system.)

Tentative evidence indicates that the burden of defense spending also contributed to the Soviet debacle.

Differences in growth performance between the Soviet republics are explained by the same factors that figure in the empirical cross-section growth literature: initial income, human capital population growth, and the degree of sectoral distortions. The results Easterly and Fischer got with the Soviet Union in the international cross-section growth regression indicate that the planned economic system itself was disastrous for long-run economic growth in the Soviet Union.

This point may now seem obvious but was not so apparent in the halcyon days of the 1950s, when the Soviet case was often cited as support for the neoclassical model's prediction that distortions do not have steady-state growth effects. Since a heavy degree of planning and government intervention exists in many countries, especially developing countries, the ill-fated Soviet experience continues to be of interest.

This paper — a product of the Macroeconomics and Growth Division, Policy Research Department — is part of a larger effort in the department to study the determinants of long-run growth. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Rebecca Martin, room N11-043, extension 31320 (56 pages).

1285. Capital Fundamentalism, Economic Development, and Economic Growth

Robert G. King and Ross Levine
(April 1994)

Should our research and policy advice be guided by a modern version of capital fundamentalism, in which capital and investment are viewed as the primary determinants of economic development and long-run growth? No. Capital accumulation seems to be part of the process of economic development, not its igniting source.

Few economic ideas are as intuitive as the notion that increasing investment is the best way to raise future output. This idea was the basis for the theory of "capital fundamentalism."

Under this view, differences in national stocks of capital were the primary determinants of differences in levels of national product. Capital fundamentalists viewed capital accumulation as central to increasing the rate of economic growth. Evidence to support this view was based mostly on case studies of less developed countries.

Since the rise of capital fundamentalism, problems of economic growth and development twice thrust themselves onto center stage of the economic research agenda. In the first episode, neoclassical growth theory and growth accounting research (in the 1950s and 1960s) indicated that differences in patterns of investment and capital formation were *not* the main factors that led nations to be rich or poor, fast-growing or slow. Technology, rather than capital accumulation, appeared to drive improvements in living standards in the long run. Evidence to support this view was based mostly on data from advanced countries.

In the second episode, recent research on growth and development has lent support to two conclusions that capital fundamentalists would find attractive: that differences in national patterns of physical capital accumulation can explain many differences in levels of national product, and that increases in national investment rates can produce major increases in rates of economic growth.

King and Levine found that although the capital-output ratio varies positively with the level of per capita income, there is little support for the view that capital fundamentalism should guide the agenda for research and policy advice. Extending standard growth accounting procedures to a broad sample of 105 countries, they find:

- Differences in capital-per-person explain few of the differences in output-per-person across countries.
- Growth in capital stocks account for little of output growth across countries.
- The ratio of investment to GDP is strongly and robustly associated with economic growth — but there is more reason to believe that economic growth causes investment and savings than that investment and savings cause economic growth.

This paper — a product of the Finance and Private Sector Development Division, Policy Research Department — is part of a larger effort in the department to understand the role of savings in economic development. The study was funded by the Bank's Research Support Budget under the research project "Patterns of Growth" (RPO 678-26). Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Paulina Sintim-Aboagye, room N9-059, extension 38526 (47 pages), April 1994.

1286. Economic Transformation and the Fiscal Crisis: A Critical Look at the Central European Experience of the 1990s

Luca Barbone and Domenico jr. Marchetti
(April 1994)

The fiscal crisis in central Europe in the early 1990s is attributable mainly to increased social spending rather than to the collapse in profitability of state-owned enterprises.

Barbone and Marchetti argue that traditional explanations of the fiscal crisis in reforming ex-socialist economies overlook crucial connections between key components of the deficit — particularly between reductions in spending and declines in revenues.

Almost all studies of the fiscal aspects of the transition stress the impact on the fiscal budget of the performance crisis in state-owned enterprises. Barbone and Marchetti contend that this aspect of the fiscal crisis has been overstated.

The enterprise sector's net contribution to the government budget — that is, net income from profit taxes after subtracting subsidies — has *increased* during the transition in Czechoslovakia and Poland and has not changed substantially in Hungary.

After reexamining the data, Barbone and Marchetti argue that although the fiscal crisis is certainly structural, the main blame should be attributed to the explosion in spending (especially social spending) rather than to the crisis in revenues.

Many of the social costs of adjustment were previously hidden within the state-owned enterprises system. These social costs include unemployment benefits and the cost of supporting — through pensions or social assistance — the people displaced from the work force by the transformation.

It is important to continue reforming the tax system and tax administration — to deal with the widespread hiding of profits and cheating on taxes — but all three countries already have relatively high levels of taxation. Society in the three countries may not be willing to provide the resources required to support or extend current spending levels.

This paper — a product of the Country Operations Division, Europe and Central Asia, Country Department II — is part of a larger effort in the region to draw cross-country lessons on the issues raised by the economic transformation of former socialist economies. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Sahra Harbi, room H11-121, extension 37143 (34 pages).

1287. Unstable Inflation and Seignorage Revenues in Latin America: How Many Times Can the Government Fool People?

Jacques Morisset
(April 1994)

Governments adopt monetary policies known to be unsustainable in the long run because, in the short term, they can fool people and therefore maximize seignorage revenues. But over time, this strategy backfires as private agents learn to anticipate the relationship between unstable inflation and monetary policy and progressively reduce their real monetary balances.

In the past 20 years, high and extremely volatile inflation rates in Latin America have generally been associated with unstable monetary policies and the (temporary) use of inflationary revenues to finance fiscal deficits.

There seems to be a consensus that high inflation is bad for economic development and growth, so it is unclear why governments have adopted unstable monetary policies they have known to be unsustainable in the long run.

Morisset argues that Latin American governments have followed unstable monetary policies principally to maximize their inflationary revenues. Explanations based on irrationality or on institutional and political shocks (a recent trend in the literature) are only partially convincing, he says.

A government maximizes inflationary revenues by adopting temporary unstable monetary policies because people tend to revise their expectations (slower) faster in periods of (dec-) accelerating inflation as the cost of collecting information (rises) falls compared with other welfare losses. When the rate of inflation is relatively high, a restrictive monetary policy is implemented so people can reconstitute monetary balances. When the inflation rate is low, an expansive monetary policy is adopted to confiscate existing real balances.

Governments may appear for some time to succeed in *fooling* people, by adopting temporary reforms and restoring confidence, but their reputation is damaged when they repeatedly do so. Ultimately, private agents react so quickly and with such sophistication that even small fiscal gaps — or other shocks — produce precipitous declines in money demand.

Over time, private agents learn to anticipate the relationship between unstable inflation and monetary policy and progressively reduce their real monetary balance. In the end, the optimal inflation rate tends toward its steady-state value, as Friedman found 20 years ago.

Morisset develops a small dynamic model to stylize these facts and applies it to Argentina.

This paper — a product of the Country Operations Division, Latin America and the Caribbean, Country Department IV — is part of a larger effort in the region to understand inflation and monetary policies in Latin American countries. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Dorothy Jenkins, room Q7-082, extension 37890 (16 pages).

1288. The Public Finance of Infrastructure: Issues and Options

Vinaya Swaroop
(April 1994)

Because it is difficult to raise funds through general taxes, self-financing of publicly provided infrastructure services is a desirable second-best policy — one that almost all developing countries endorse. But the experience of developing countries suggests that, except in telecommunications, full cost recovery is more the exception than the rule. The private provision of infrastructure, an often-suggested alternative, will work only if an appropriate rate of return is assured — and only if user charges cover costs.

Using economic principles, Swaroop provides criteria for financing infrastructure services where consumption-related user charges can be levied effectively.

In light of the suggested criteria, Swaroop examines the experience of developing countries in financing publicly provided infrastructure services in transport (road), water, telecommunications, and power.

In developing countries, most infrastructure is provided by the public sector, although the private sector has become increasingly involved. Because it is difficult to raise funds through general taxes, self-financing of these services remains a desirable second-best policy, one that almost all developing countries endorse.

But experience suggests that, except in telecommunications, full cost recovery is more the exception than the rule. Financing remains inadequate. The political economy of tariff setting is an important element in low and improperly designed user charges, infrequent adjustments for inflation, and poor enforcement.

Such sectors as water, power, and transport drain funds from the treasury, although their impact varies from sector to sector. When it is difficult to get budget transfers to materialize — especially during a fiscal crisis — there is often a reduction in nonwage operations and maintenance expenditures. As a result, services deteriorate.

The private provision of infrastructure services is often suggested as an alternative. The private provision of services can certainly reduce the public sector's financing requirement. For infrastructure services for which technological advances have made competition possible, the market system could ensure efficient private provision of services, which would be a relief to the public sector. But for services that require a single provider to achieve economies of scale and similar benefits, the private provision of services will work only if an appropriate rate of return is assured — and only if user charges cover costs.

This paper — a product of the Public Economics Division, Policy Research Department — is part of a larger effort in the department to analyze methods of financing and pricing infrastructure. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Carlina Jones, room N10-063, extension 37699 (27 pages).

1289. A Fiscal Needs Approach to Equalization Transfers in a Decentralized Federation

Anwar Shah
(April 1994)

A simple framework for objectively reviewing aggregate and sectoral public spending, assessing the fiscal needs of subnational governments, and determining fiscal equalization transfers to overcome fiscal inefficiencies and regional fiscal inequities in a decentralized federation.

Shah reviews the conceptual basis for fiscal equalization transfers, analyzes the theoretical implications for optimal design of equalization transfers, and suggests quantitative approaches for assessing the fiscal needs of subnational governments and determining their entitlement to equalization transfers.

Shah illustrates proposed methods using data for local and provincial Canadian governments. The proposed methods could be useful tools, he says, for undertaking systematic objective reviews of aggregate and sectoral public spending in developing countries.

Shah argues that in a decentralized federation, fiscal inefficiencies and inequities arise because of subnational governments' differing levels of ability to provide comparable public services at comparable tax rates.

Fiscal equalization transfers that reduce or eliminate differentials in net fiscal benefits create a rare instance in eco-

nomics when considerations of equity and efficiency coincide. These transfers must allow for differences in the spending needs and revenue-raising abilities of the various subnational governments.

Shah argues for a two-tiered approach to equalization. The first tier would be a federal responsibility to equalize the burden of federal taxes.

The second tier would be an interprovincial equalization fund to be administered by the Council of Provincial Finance Ministers. It would entail a comprehensive equalization system that takes into account provincial fiscal capacities as well as provincial spending needs. The standard of equalization would be negotiated.

This paper — a product of the Public Economics Division, Policy Research Department — is part of a larger effort in the department to develop tools for analyzing public expenditures and policies to reform fiscal systems in developing countries. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Carlina Jones, room N10-063, extension 37754 (35 pages).

1290. Oil Price Instability, Hedging, and an Oil Stabilization Fund: The Case of Venezuela

Stijn Claessens and Panos Varangis
(April 1994)

Venezuela could use market-based risk management instruments to reduce short-run risk on oil prices and to complement an oil stabilization fund. Using such instruments would decrease the probability that the stabilization fund would run out of funds, and the fund could be significantly smaller.

The Venezuelan government and PDVSA (Venezuela's state oil companies) are both exposed to oil price instability. Given the existing tax structure, PDVSA has a higher exposure than the government, especially when prices drop below $18–20 a barrel.

Claessens and Varangis show that the volatility of prices for crude oil is higher (but not significantly) than the volatility of prices for refined oil products. And both prices are highly correlated. So, there is not much strength to the argument that Venezuela, being now mainly an exporter of refined products, faces less volatility than when it was exporting mainly crude oil.

The basis risk for hedging Venezuelan crude oil was found to be higher than for other crudes of comparable quality in the region. One explanation could be the pricing policies Venezuela follows, which leads Venezuelan crude oil prices to deviate for long periods from international prices. The basis risk in Venezuelan refined products is much lower and at acceptable levels for doing risk management.

The issue of liquidity in the hedging markets is crucial, as Venezuela is a major oil producer. Oil futures and options markets are liquid, but the liquidity is concentrated in contracts for periods of less than a year. For products, the liquidity is concentrated in the nearest 4–5 months. So, for short-term hedges (6–9 months ahead), there is sufficient liquidity for Venezuela to hedge a substantial part of its exports. For longer-term hedges, the over-the-counter market is the more appropriate vehicle. In either case, it will not usually be the case that all production or exports should be hedged.

Claessens and Varangis also examined the issue of an oil stabilization fund. For an oil stabilization fund to be effective, several preconditions must be met. Most notably: oil prices should not follow a random walk; financial markets are incomplete; and there are large adjustment costs. These conditions do likely apply in Venezuela.

Venezuela's best strategy would be to remove as much short-term oil price risk as possible by using short-dated hedging instruments (such as futures, options, or short-dated swaps) and to also do some longer term hedging (using mainly over-the-counter options and long-dated swaps). They also find that an oil stabilization fund should be complemented by using market-based risk management tools. The oil stabilization fund could then be used to manage any remaining interperiod oil price risk to the extent considered necessary.

This paper — a joint product of the International Trade Division, International Economics Department, and the Finance and Private Sector Development Group, Europe and Central Asia/Middle East and North Africa Regions Technical Department — is part of a larger effort in the Bank to study how developing countries can better manage commodity price risk. Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Dawn Gustafson, room S7-044, extension 33714 (52 pages).

1291. A Survey of Viet Nam's Legal Framework in Transition

Natalie G. Lichtenstein
(April 1994)

A survey of the laws and decrees that Viet Nam has begun to enact in company law, contract law, banking law, laws on foreign investment, and other priority areas.

Viet Nam is trying to preserve its sociopolitical system while moving gradually toward a different economic system, recognizing that law is a valuable instrument for effecting orderly change.

It has begun to enact the laws and decrees needed in such areas as company law, contract law, banking law, and, especially, laws on foreign investment. Further progress toward a market system will require more legislative activity. Lichtenstein highlights four areas of special priority:

- Thoroughly implementing the new *land law*, by issuing detailed regulations to "marketize" the leasehold system, clarify land-use rights in liquidating state enterprises or making them corporations, and establish a firm basis for mortgage financing.
- Deepening state enterprise reform through a new *legal framework for state enterprises*, to be established under a revised company law, to permit state enterprises to operate under the same framework as nonstate enterprises. This should be accompanied by a new state enterprise law and regulations for the state's management of its shares in enterprises.
- Revising the framework of *company law* and *foreign investment law* to implement and expand pilot corporatizations.
- Finalizing the *civil code and commercial law* to provide rules of the game for everyday business transactions and for resolution of the disputes that will inevitably result from them.

Other areas less far-reaching in impact but important for market development include regulations to implement bankruptcy law, competition law, and securities law.

In addition, Lichtenstein notes the need to guard against separate legal regimes for state enterprises, nonstate enterprises,

and foreign-invested enterprises, as this would interfere with efficient competition among enterprises with different ownership structures.

It is also important to coordinate foreign legal assistance and to accommodate Viet Nam's legal traditions and preferences, especially in such areas as dispute resolution.

This paper — a product of the East Asia and Pacific Division, Legal Department — is part of a larger effort in the department to share with interested parties legal research done as part of the department's operational work. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Malini Rangarajan, room MC6-367, extension 81710 (61 pages).

1292. Services as a Major Source of Growth in Russia and Other Former Soviet States

William Easterly, Martha de Melo, and Gur Ofer
(April 1994)

Russia and the other former Soviet states have little experience with private services and a historically negative view of their role in the economy. A good argument can be made for the international community's strong involvement in services.

Private services could contribute greatly to economic growth in Russia and the other former Soviet states. Easterly, de Melo, and Ofer use econometric analysis to identify the gap between expected and actual levels of service activities in these countries and simulate the effect on GDP and employment of closing the gap. The gap is particularly wide for business and consumer services. Transport and publicly provided services are comparable to, or higher than, those in other countries.

Traditionally, the Marxist doctrine of socialist economies has labeled services "nonproductive." And there is continuing evidence that national policies in these countries favor producers of goods over producers of services. In Russia, for example, there was until recently a 25 percent ceiling on trade margins for some products, and the enterprise profits tax is higher for producers of services than for producers of goods. Also, coefficients for real estate lease payments are sometimes higher for service firms.

It will be important for Russia and the other former Soviet states to identify a policy agenda to facilitate the rapid expansion of services. The policy agenda should entail legal, economic, and institutional changes to eliminate the current bias against services, so that service firms can operate on a level playing field. It should also include proactive programs to stimulate a rapid increase in the level of service activity.

Appropriate measures may include:

- Changes in the tax law, the regulatory framework, and other economic incentives.
- Government programs to accelerate private sector development and the privatization of government distribution and service activities.
- Training for enterprise employees to facilitate their transfer from production to service activities.
- Action to support the orderly development of input and output markets.
- Creation of a modern banking system that will use appropriate criteria to provide credit to service enterprises.
- Consideration of service activities as priorities for international technical assistance and direct foreign investment.

This paper — a product of the Transition Economies Division, Policy Research Department — is part of a larger effort in the department to address issues of economic reform and growth in the former socialist countries. The study was funded by the Bank's Research Support Budget under research project "Business and Consumer Services in the Former Soviet Union" (RPO 677-43). Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Chris Rollison, room N11-029, extension 84768 (64 pages).

1293. Product Standards, Imperfect Competition, and Completion of the Market in the European Union

Glenn Harrison, Thomas Rutherford, and David Tarr
(April 1994)

Modeling the static and steady-state effects on trade, production, and market structure of completion of the European Union's internal market.

Harrison, Rutherford, and Tarr model the static and steady-state effects on trade, production, and market structure of completion of the European Union's (EU's) internal market.

The impetus for change comes from the removal of border costs and the costs of producing to different national standards. It also comes from consumers' greater ability to substitute among the products of producers in different EU countries, once the European Union adopts its program on standards.

In the analysis of the static scenario, removing border costs and the costs of supply-side standards improves the welfare of EU countries by only about 0.5 percent of GDP. Results vary greatly across the countries of the European Union, however, because the benefits to a country are roughly proportional to its share of intra-EU trade in its GDP. This is the first model to identify these country differences because of the greater country disaggregation.

The additional effect of the program of standards on consumer demand elasticities increases the competition and reduces markups in imperfectly competitive industries. Then there are additional gains from rationalization, as well as consumer efficiency gains in imperfectly competitive sectors, that result in an increase in the estimated gains to about 1.2 percent of GDP (again with wide differences across EU countries).

The steady-state results let the capital stock in each country adjust to its new higher equilibrium value, which acts as an additional endowment of capital, allowing the European Union to produce a higher level of income. The gains to the European Union then rise to about 2.6 percent of GDP.

This paper — a product of the International Trade Division, International Economics Department — is part of a larger effort in the department to assess the impact of changes in the global trading environment on developing countries. The study was funded by the Bank's Research Support Budget under the research project "The Impact of EC 1992 and Trade Integration in Selected Mediterranean Countries" (RPO 675-64). Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Nellie Artis, room N10-037, extension 38010 (42 pages, plus 46 pages of appendices).

1294. Regulations, Institutions, and Economic Performance: The Political Economy of the Philippines' Telecommunications Sector

Hadi Salehi Esfahani
(April 1994)

The private delivery of infrastructure can fail in the absence of adequate background institutions, which may need to be fostered before a credible regulatory system can be put in place.

Esfahani addresses the puzzle of sluggish investment in the Philippines' dominant telecommunications firm, PLDT. This case allows a study of the underlying causes of success or failure in a privately owned infrastructure sector in a developing country.

Since its inception, PLDT has been privately owned and has had direct access to international capital markets. But its services have been deficient, in quality and quantity, since the early 1960s.

Using a transaction costs approach, Esfahani hypothesizes that contracting problems between various economic players are important determinants of observed outcomes. Poor services are attributed to factors that impede implementation of performance-improving implicit or explicit contracts, including regulatory rules and regulations.

After reviewing PLDT's responses to events in the last six decades, Esfahani demonstrates that the problem can be traced to lack of commitment to regulatory policies beyond the term of each administration — because a relatively weak legislature and judiciary are dominated by the executive branch. This system of governance is linked to the nature of Philippine society: a small elite engaged in competitive politics among themselves tries to bar the rest of the population from active participation, without actually denying their citizenship. (This social structure is beginning to change.)

The president of the country has great leeway in setting and implementing regulations, so the elite group associated with the president can unilaterally modify telecommunications policy in a way that serves its interests. Those in control of PLDT find investing in the company's highly capital-intensive facilities risky if they are not connected to the president's circle. As a result, the government has an incentive to redistribute quasi-rents through regulatory mechanisms. This imposes a strong "political business cycle" on PLDT's growth pattern: Investment rises only in the early years of "friendly" administrations and remains low at all other times. Esfahani establishes this relationship by empirical analysis.

Despite the failure of cyclical investment, no attempt has been made to reform the regulatory system because most solutions require an institutional commitment to a set of rules and procedures that are either infeasible or contrary to the interests of the elite. Certain reforms are becoming increasingly feasible, however, as a new middle class develops and elite alliances shift.

This paper — a product of the Finance and Private Sector Development Division, Policy Research Department — is part of a larger regulatory research effort in the department. The study was funded by the Bank's Research Support Budget under the research project "Regulations, Institutions, and Economic Efficiency" (RPO 676-94). Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Bill Moore, room N9-055, extension 35261 (78 pages).

1295. Why Higher Fiscal Spending Persists When a Boom in Primary Commodities Ends

Bruno Boccara
(April 1994)

After the initial boom in fiscal spending that accompanies a commodity boom, why do commodity-exporting countries tend to maintain higher spending levels despite a drop in commodity prices? Probably because of liquidity constraints and the costs of policy reversal.

Boccara analyzes the fiscal policy of primary commodity exporters.

After the initial boom in fiscal spending that accompanies a commodity boom, he asks, why do commodity-exporting countries tend to maintain higher spending levels despite a drop in commodity prices? He identifies three factors that might explain the tendency: a pressure (from political constituents, for example) to keep spending, the difficulty of reversing policy (or disinvesting — the costs of firing people, for example), and the effects of limited indebtedness, or credit-rationing constraints.

Fiscal policy must be developed with these three factors in mind.

Using a fiscal policy optimizing model, Boccara examines evidence for the existence of these three factors. He uses the model's unconstrained and constrained Euler equations to estimate the Lagrange multipliers associated with the limited indebtedness constraint. The empirical work is done using data from Africa's franc zone countries.

The persistence of pressure to spend may not play an important role, says Boccara. More important in explaining the tendency to maintain spending levels after a commodity boom ends are liquidity constraints and the costs of policy reversal.

This paper is a product of the Country Operations Division, Africa — Sahelian Department. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Mather Pfeiffenberger, room J9-261, extension 34963 (39 pages).

1296. Earnings-Related Mandatory Pensions: Concepts for Design

Salvador Valdés-Prieto
(April 1994)

The relative merits and drawbacks of various options for insurance design, privatization, and degree of public funding in the design of mandatory earnings-related pensions.

Valdés-Prieto offers a framework for economic policy on mandatory earnings-related pensions.

He does not discuss the gains and losses from mandating insurance and savings, nor the use of this policy as a vehicle for income redistribution. Instead, he concentrates on areas that are less well understood: the microeconomics, the macroeconomics, and the political economy of mandatory pensions. His analysis focuses on three main areas: insurance design, privatization, and degree of funding. In each area, he provides a checklist of design issues, drawn from international experience and economic analysis.

For insurance, there are two sets of choices: between flat actuarial factor or individual actuarial factor and between

defined benefit or defined contribution (in the sense of financial guarantee).

For privatization, the essential choices are between private or nationalized provision, and between private or national demand.

For funding, the choices are between funding or not funding, and between apparent funding or pay-as-you-go financing.

Some combinations can be discarded. Privatization should not be combined with flat actuarial factors, for example, because private suppliers will compete for access to rents that accrue to workers who are awarded implicit subsidies. Privatization is compatible with apparent funding, but not with pay-as-you-go financing, because in the latter there are no funds to invest in the capital market.

The policy choice is ultimately between two coherent designs whose relative advantages and drawbacks Valdés-Prieto discusses:

- An individual actuarial factor with privatized production and demand, with risk explicitly allocated to pensions, and with partial funding.
- Or a flat actuarial factor coupled with nationalized production, pay-as-you-go financing, and statutory promises of fixed real pensions (defined benefit).

This paper — a product of the Macroeconomic and Growth Division, Policy Research Department — is part of a larger effort in the department to understand the underpinnings of old-age security systems. The study was funded by the Bank's Research Support Budget under the research project "Old Age Income Security Report" (RPO 677-45). A previous version of the paper appeared under the title "State Pensions: Concepts for Reform." Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Hoda Rizkalla, room N11-041, extension 84766 (58 pages).

1297. How Relative Prices Affect Fuel Use Patterns in Manufacturing: Plant-Level Evidence from Chile

Charles C. Guo and James R. Tybout
(May 1994)

Fuel taxes will induce fuel substitution and reductions in pollution. But evidence from manufacturing firms in Chile suggests that the response will be very uneven — and that the costs of adjustment may be borne more by some sectors and types of producers than others.

Some economists have urged reliance on fuel taxes and other fiscal incentives to reduce air pollution in semi-industrialized countries. They argue that policies that act on relative prices are easier to enforce than those based on emission monitoring, create less misallocation of resources, and are relatively free of the rent-seeking and corruption that accompany regulations administered at the plant level.

To be effective, however, fuel-specific taxes and subsidies must inspire manufacturers to significantly adjust their input use as relative prices change. Moreover, these policies must not create politically unacceptable income redistribution.

Guo and Tybout shed light on both issues by analyzing detailed panel data on Chilean manufacturing plants.

Overall, their estimates suggest that there is substantial scope for fuel taxes to encourage fuel substitution, but that the response will be very uneven — not only across sectors but across producers of different sizes. Although Eskeland and Jimenez (1990) may be correct in arguing that fiscal incentives are easier to implement than are direct emission controls, the costs of adjustment are likely to be concentrated fairly narrowly for some fuels.

The authors found bakeries, for example, to be very responsive to changes in the relative prices of alternative fuels. By contrast, energy demand in metal products plants appears to be very insensitive to relative prices, no matter what estimates are used. Meatpackers fall somewhere between the two — with little price responsiveness in electricity demand, but more in the demand for energy from other sources, especially if coherency-constrained figures are used.

It seems that the effects of fuel taxes would depend in significant measure on the sectoral composition of manufacturing, since input composition varies and some sectors have little flexibility.

This paper is a product of the Public Economics Division, Policy Research Department. The study was funded by the Bank's Research Support Budget under the research project "Pollution and the Choice of Economic Policy Instruments in Developing Countries" (RPO 676-48). Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Carlina Jones, room N10-063, extension 37699 (38 pages).

1298. Capital Goods Imports, the Real Exchange Rate, and the Current Account

Luis Serven
(Mary 1994)

Capital goods account for a major share of international trade, yet trade in capital goods is typically ignored in conventional macroeconomic models of open economies. As a consequence, such models may provide an incomplete — and misleading — assessment of the macroeconomic effects of policy changes and external shocks.

Conventional aggregate models of open economies typically rule out trade in capital goods. But capital goods account for a major share of world trade. In 1990, they represented more than 40 percent of U.S. merchandise exports and more than 30 percent of its imports. In the same year, capital goods imports represented an average of roughly 30 percent of total imports for 82 industrial and developing countries, and almost 9 percent of their GDP.

Serven shows that the presence of imported capital goods greatly changes the short- and long-run effects of macroeconomic policies and external shocks on key macroeconomic variables. Using a rational-expectations aggregate model with intertemporally optimizing agents and with trade in both consumption *and* capital goods, he finds that the long-run equilibrium of the economy displays a negative relationship between the real exchange rate and real output — that is, a real appreciation is associated with an increase in long-run output and the capital stock. With investment subject to adjustment costs, the response to unanticipated permanent disturbances involves a changing real exchange rate and a non-zero current account.

Serven analyzes the macroeconomic consequences of changes in fiscal policy and of transfers of wealth from abroad. He shows that both have well-defined long-run effects on the capital stock and real output. Fiscal expansion, in particular, may have a long-run crowding-in effect on investment.

By contrast, the impact of disturbances on the current account is ambiguous. Serven shows that it depends critically on the degree of intertemporal substitutability in both consumption *and* investment — with the latter measured by the magnitude of investment adjustment costs.

This paper — a product of the Macroeconomics and Growth Division, Policy Research Department — is part of a larger effort in the department to understand the effects of macroeconomic policies and external shocks. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Emily Khine, room N11-061, extension 37471 (28 pages).

1299. Fiscal Policy in Classical and Keynesian Open Economies

Klaus Schmidt-Hebbel and Luis Serven
(May 1994)

In this model of classical and Keynesian open economies, both permanent and *transitory disturbances cause changes in long-run output and capacity — and transitory and permanent shocks may have opposite effects on the current account. In the Keynesian economy, money-financed fiscal expansion causes real exchange rate depreciation; and non-money-financed fiscal expansion, appreciation.*

Schmidt-Hebbel and Serven analyze the impact of fiscal policy changes in open economies, using a rational-expectations framework that nests two prototype economies: a neoclassical full-employment benchmark economy, with intertemporally optimizing consumers and firms and instant clearing of asset, goods, and factor markets; and a Keynesian economy, with liquidity constraints and wage rigidity, which results in transitory deviations from full employment.

The model is forward-looking in that the economy's short-run equilibrium depends on current and anticipated future values of all exogenous variables, and displays hysteresis (that is, its long-run equilibrium is path-dependent).

Using parameters for a representative open economy, the model is simulated to compare the dynamic effects of increases in public spending financed by taxation, debt, and money. The results illustrate four points:

- Both permanent *and* transitory disturbances cause changes in long-run output and capacity.
- Transitory and permanent shocks may have opposite effects on the current account.
- Liquidity constraints and wage rigidities tend to amplify the cyclical adjustment to fiscal policy changes.
- The Keynesian economy's response to fiscal shocks depends critically on the way the budget is financed: money-financed fiscal expansion causes real *depreciation;* non-money-financed fiscal expansion causes *appreciation.*

This paper — a product of the Macroeconomics and Growth Division, Policy Research Department — is part of a larger effort in the department to model macroeconomic adjustment in open economies. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Emily Khine, room N11-061, extension 37471 (47 pages).

1300. Dynamic Response to External Shocks in Classical and Keynesian Economies

Klaus Schmidt-Hebbel and Luis Serven
(May 1994)

Transitory and permanent shocks may have opposite effects on the current account. In particular, an increase in foreign transfers or a terms-of-trade windfall, if permanent, can result in a current account deficit. But if temporary, they cause a surplus. Liquidity constraints and wage rigidities tend to amplify the cyclical adjustment to external shocks.

Schmidt-Hebbel and Serven analyze the impact of three classes of external shocks in open economies, using a rational expectations framework that nests three prototype economies: a neoclassical full-employment benchmark, with intertemporally optimizing consumers and firms and instant clearing of asset, goods, and factor markets; a full-employment case with partly liquidity-constrained consumers and investors; and a Keynesian economy, with liquidity constraints and wage rigidity, which results in transitory deviations from full employment.

Using parameters for a representative open economy, they simulate the model to compare the dynamic effects of foreign transfers, a terms-of-trade windfall in the form of a lower price for an imported production input, and a decline in the foreign real interest rate.

They contrast the roles of Keynesian and neoclassical factors in determining the dynamic adjustment to shocks, by analyzing the effects of permanent/transitory and anticipated/unanticipated disturbances in the three prototype economies. The results illustrate three main points:

- Both permanent *and* transitory disturbances cause changes in long-run capacity and output.
- Transitory and permanent shocks may have opposite effects on the current account. In particular, a permanent increase in foreign transfers or a permanent terms-of-trade windfall result in a current account *deficit;* if temporary, they cause a surplus.
- Liquidity constraints and wage rigidities tend to amplify the cyclical adjustment to external shocks.

This paper — a product of the Macroeconomics and Growth Division, Policy Research Department — is part of a larger effort in the department to model macroeconomic adjustment in open economies. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Emily Khine, room N11-061, extension 37471 (58 pages). May 1994.

1301. Estimating the Health Effects of Air Pollutants: A Method with an Application to Jakarta

Bart Ostro
(May 1994)

How does one assess the health benefits of air pollution control? Does-response functions applied to data on Jakarta reveal that air quality improvements will reduce illness, premature death, and learning disabilities in children. Lead and respirable particles are the most important problems.

To develop efficient strategies for pollution control, it is essential to assess both the costs of control and the benefits that may result. These benefits will often include improvements in public health, including reductions in both morbidity and premature mortality.

Until recently, there has been little guidance about how to calculate the ben-

efits of air pollution controls and how to use those estimates to assign priorities to different air pollution control strategies. Ostro describes a method for quantifying the benefits of reduced ambient concentrations of pollutants (such as ozone and particulate matter) typically found in urban areas worldwide. He then applies the method to data on Jakarta, Indonesia, an area characterized by little wind, high population density (8 million people), congested roads, and ambient air pollution.

The magnitude of the benefits of pollution control depend on the level of air pollution, the expected effects on health of the pollutants (dose-response), the size of the population affected, and the economic value of these effects.

The results for Jakarta suggest that significant benefits result from reducing exposure to both outdoor and indoor air pollutants. For example, if annual concentrations of particulate matter were reduced to the midpoint of the World Health Organization guideline (and former U.S. ambient standard), the estimates indicate a reduction per year of 1,400 premature deaths (with a range of 900 to 1,900), 49,000 emergency room visits, 600,000 asthma attacks, 7.6 million restricted-activity days (including work loss), 124,000 cases of bronchitis in children, and 37 million minor respiratory symptoms.

In the case of Jakarta, the methodology suggests that reducing exposure to lead and nitrogen dioxide should also be a high priority.

An important consequence of ambient lead pollution is a reduction in learning abilities for children, measured as I.Q. loss. Apart from that, reducing the proportion of respirable particles can reduce the amount of illness and premature mortality.

Clearly, air pollution represents a significant public health hazard to residents of Jakarta and other cities consistently exposed to high levels of air pollution, such as Bangkok, Mexico City, and Santiago, Chile.

This paper — a product of the Public Economics Division, Policy Research Department — is part of a larger effort in the department to analyze the economics of pollution control in developing countries. The study was being funded by the Bank's Research Support Budget under the research project "Pollution and the Choice of Economic Policy Instruments in Developing Countries" (RPO 676-48). Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Carlina Jones, room N10-063, extension 37699 (63 pages).

1302. Sustainability: Ethical Foundations and Economic Properties

Geir B. Asheim
(May 1994)

Sustainability is about intergenerational distribution. So, public policy aimed at sustainable development should strengthen the mechanisms for redistribution from the present to the future.

Asheim interprets development to be sustainable if it involves a nondecreasing quality of life. He introduces a concept of justice, and shows that a development path must be sustainable to prevent injustice.

He argues, and illustrates through growth models, that altruism alone does not — even in the context of an economically efficient market economy — ensure sustainability. In particular, technologies with complementarity between manmade and natural capital represent cases where sustainability need not result. Thus, policies aimed at economic efficiency, such as internalizing external effects, need not generate sustainable development.

Asheim argues that a positive interest rate is not inconsistent with sustainable development. He also maintains that, even in a perfect market economy, prices may not convey whether investments in manmade capital are sufficient to compensate for the depletion of natural capital. In particular, a non-negative market value of net investment is not sufficient for the present quality of life to be sustainable. Finally, he emphasizes that public policy aimed at sustainable development should strengthen the mechanisms for redistribution from the present to the future.

This paper — a product of the Public Economics Division, Policy Research Department — is part of a larger effort in the department to analyze environmental problems in a welfare economic perspective. The study was funded by the Bank's Research Support Budget under the research project "Pollution and the Choice of Economic Policy Instruments in Developing Countries," (RPO 676-48). Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Carlina Jones, room N10-063, extension 37699 (27 pages).