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The Design and Diffusion of Improved Cooking Stoves

*Douglas F. Barnes, Keith Openshaw,
Kirk R. Smith, and Robert van der Plas*

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of Economic Policy Reform?**

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- The Design and Diffusion of Improved Cooking Stoves**
*Douglas F. Barnes, Keith Openshaw, Kirk R. Smith,
and Robert van der Plas* 119
- What Do We Know about the Political Economy
of Economic Policy Reform?**
Stephan Haggard and Steven B. Webb 143
- Using Auctions to Allocate and Price Long-Term Credit**
J. Luis Guasch and Thomas Glaessner 169
- Wage Controls during the Transition from Central Planning
to a Market Economy**
Fabrizio Coricelli and Timothy D. Lane 195
- Fiscal Deficits and Macroeconomic Performance
in Developing Countries**
William Easterly and Klaus Schmidt-Hebbel 211
-
- OBSERVATIONS
- Recent Lessons of Development**
Lawrence H. Summers and Vinod Thomas 239
-
- Cumulative Index, 1986–93** 255

THE DESIGN AND DIFFUSION OF IMPROVED COOKING STOVES

*Douglas F. Barnes
Keith Openshaw
Kirk R. Smith
Robert van der Plas*

The poorer half of the world's people have long relied for their energy needs on woodfuels. Since the oil shocks of the 1970s, pressure on forest resources has increased and the costs of traditional use of woodfuels have been growing—to the householder, in cash or collection time, and to society in inefficient energy use, deforestation, and local and global harm to health and the environment. Modern, efficient stoves can alleviate some of these problems; programs to design and disseminate them would seem a worthwhile pursuit for development activity.

But do such programs in fact warrant the investment? Why have so many failed to catch on as expected? The authors find that programs have been most successful when targeted to specific areas where woodfuel prices or collection times are high. Field testing, consumer surveys, and involvement of local artisans from the outset have been critical to the ultimate adoption of the stoves. With these elements in place, external support from governments and donors can be useful; lacking them, subsidies may succeed only in distributing stoves that ultimately molder away unused. This article's review of what makes for success and failure is instructive for the design of stove programs in particular, and of development projects that propagate improved methods and technologies in general.

Although much attention is devoted to efforts to establish the macro-economic conditions conducive to rapid growth and improved income distribution, inevitably some nations and groups within them will remain poor for a generation or more. For these households, significant improve-

ments in welfare may come from innovations that allow some of their principal daily needs to be met in a less costly way. Improved access to clean water, better waste disposal, and more efficient cooking stoves have received particular attention in this regard. The discussion of stove improvement that follows highlights several problems relevant for all such efforts, especially the importance of responding to the specificity of local circumstances.

For the poorer half of humanity who must rely for their basic energy needs on biomass fuels—wood and charcoal when these are available; straw crop residues, and the like when firewood is scarce—the efficiency of fuel use is of considerable importance. Most traditional biomass stoves are not very efficient for heat transfer; in fact, in controlled tests they have been found to use up to six or seven times more energy than nonbiomass stoves (Openshaw 1979). In a study of forty-five urban areas in developing countries, Barnes and Qian (1992) found that one-third of all household energy expenditures was on fuelwood or charcoal and that energy expenditures accounted for about one-tenth of all household expenditures. The urban poor sometimes spend as much as one-fifth of their cash income on energy, more than half of it on biomass fuels; for the rural populace, the time and effort needed to collect fuel exacts significant costs, and hundreds of millions of them now have to rely on biomass fuels even less desirable than wood (Scurlock and Hall 1990). These are the people—along with those of the urban middle class that use woodfuels—for whom programs to improve cooking stoves are primarily intended.

Fuel savings can reduce cash outlays for purchasing wood or charcoal, shorten collection times, alleviate local pressure on wood resources, and diminish air pollution. So why have so many people decided not to buy or use improved stoves when given the opportunity? Worldwide, hundreds of stove programs have been implemented; some prospered, but a great many floundered. Could they be better organized and targeted to benefit enough people to warrant further investment?

The research summarized in this article attempted to answer these questions. International experience with stove improvement and dissemination was reviewed to investigate what common characteristics might distinguish the successful from the failed programs.¹ The findings confirm that scarcity and costliness of the fuels are more effective inducements for using the improved stoves than subsidies, which may help disseminate the stoves but do not necessarily guarantee that they will be used.

The Benefits of Improved Stoves

Two classes of benefits are at the core of most programs to improve stoves: those internal to the household—money and time saved on acquiring fuel, reduced smoke in the home, and various conveniences in use—and those external to households—principally, diminished pressure on forest and energy resources

and reduced greenhouse gases. The main direct beneficiaries of the programs are women and people in the middle- and lower-income levels of society (Eckholm 1982).

Benefits Internal to Households

Household decisionmakers should favor adoption of improved stoves if the benefits to the household exceed the costs of the stoves, assuming that the benefits are fully recognized and that the interests of all household members taken together are considered by those who decide. Prominent among benefits internal to the household are financial gains from direct cash savings to the family and from the freeing of time to earn cash income, particularly in the case of women.

In Niamey, Niger, the typical amount of wood used in a traditional stove is 0.7 kilogram per person per day; with an improved stove the amount declines to about 0.4 kilogram. The total family savings for a year are about 335 kilograms of wood, valued at just over \$15 per year (World Bank/UNDP 1991a).² In Rwanda a family that adopts improved charcoal stoves saves about 394 kilograms of charcoal worth \$84, while reducing daily consumption from 0.5 to 0.3 kilogram per person. Both in Niger and Rwanda, fuel savings were estimated in the laboratory and verified in practice through surveys. Similar, though not as thorough, tests in Kenya indicated an average decline in daily charcoal consumption from 0.7 kilogram to 0.4 kilogram per person with an improved stove (Jones 1989), adding up to a total yearly saving of 613 kilograms per family, with a value of about \$65. Such savings are substantial for families in these countries where average incomes per person range from just \$300 to \$370 per year. Since changes in cooking behavior were not measured, these numbers from the field encompass two effects—a possible decline in fuel consumption for a fixed level of cooking services along with a possible increase in cooking services.

In rural areas where most people collect fuelwood, more efficient stoves might significantly reduce the time spent in collection—an advantage particularly for women, who do most of the collecting. A survey in the hill areas of Nepal estimated that women spend about 2.5 hours a day collecting fuelwood, fodder, and grass (Kumar and Hotchkiss 1988) and even more in deforested areas, where the collection time increased to 3.6 hours a day, while time spent on farming decreased by about 1 hour a day. As a consequence, women work longer and labor is drawn away from agriculture.

As well as saving money and collection time, improved stoves can have other less quantifiable but nonetheless important attractions for households (see Jones 1989: 39–41), among them reduced cooking and tending time (from higher power output and thermal efficiency) and increased convenience (many have mechanisms to control the power output, spare parts for quick repairs, a handle for carrying, and sometimes two burners). They are often more attractive

than traditional stoves and may be considered a status symbol as well as a better cooking device. They can also reduce smoke inside the house, with advantages for health and cleanliness.

Most biomass fuels release large amounts of air pollutants—respirable particulates, carbon monoxide, nitrogen oxides, formaldehyde, and hundreds of other simple and complex hydrocarbons—when burned in simple household stoves. In many parts of the world, these pollutants are released from stoves in unventilated or partially unventilated conditions. Studies in recent years (see Ramakrishna, Durgaprasad, and Smith, 1989; Smith 1991a) have associated health problems with such smoke exposure. For instance, a study of 500 children under five years in the Gambia (Armstrong and Campbell 1991) found that the risk of acute respiratory illness was six times higher for children who were carried on their mothers' backs as they cooked in smoky huts than for other children, and substantially higher than the risk from parental smoking.

At present these findings on health are only suggestive; more research is needed to provide quantitative estimates of how much health would be improved by smoke abatement. But accumulating scientific evidence supports the numerous anecdotal accounts that relate high biomass smoke levels to important health effects. As well as causing respiratory diseases, exposure to cooking smoke seems to affect eyes and to cause difficulties for newborns. Improved stoves with chimneys or other means to reduce smoke may make an important contribution to a safer and healthier environment—particularly for women and children (see Smith 1987, 1991a for a review).

If wood-fired cooking is made less expensive or in other ways more desirable, people may use their stoves more frequently—as has been observed in Sri Lanka (Bialy 1991a)—or revert to biomass from nonbiomass fuels—as happened in Kenya, where some households switched back to charcoal when efficient charcoal stoves were introduced (Jones 1989: 42). For the individual household, this expansion of fuel options is perceived as a net benefit, even though it is obviously realized at the expense of some fuel saving. (Outside the household, by contrast, the result will be to diminish the potential energy and resource-conserving benefits of the stoves; this point is discussed further in the next section.)

Benefits External to the Household

The other benefits of improved stoves are almost all realized by individuals outside the household that use the stove. The household members therefore have no direct interest in considering these benefits when deciding whether to adopt an improved stove (Foley and Moss 1983). These external benefits—to the local community, the economy as a whole, and the environment—can also be quite significant and include the mitigation of deforestation and greenhouse gas emissions.

Preventing (or at least slowing) deforestation has been seen as a solid benefit to be derived from programs to make stoves more efficient and thus reduce

demand for wood. The pressure on wood resources for fuel, although not itself generally the principal cause, has added considerable momentum to deforestation (Anderson and Fishwick 1985; Barnes 1990; Hammer 1977; Gorse and Steeds 1987; Hosier and Dowd 1987; Myers 1980; Repetto and Holmes 1983). Furthermore, as the resource is depleted and woodfuel becomes increasingly difficult to gather, people turn to crop residues and dung for fuel, with the result that these are no longer being returned to the soil—an added reason for programs that would lessen the pressure on wood resources.

The deforestation problem is more severe in some places than in others, a consideration that should have significant implications for the location of stove programs. It is in regions where existing patterns of biomass use are unsustainable—and such areas exist in most countries (Bajracharya 1983)—that increased efficiency of fuel use might be a promising route to restoring supplies to sustainable levels.

More recently, concern has been growing about the effect of changes in energy supply on greenhouse gas emissions and their repercussions for global warming (Smith 1991b; Floor and van der Plas 1992). From the point of view of greenhouse effects, the contribution improved stoves can make to increasing the efficiency of combustion while promoting sustainable biomass harvesting could be a decided benefit. As well as lessening the pressure on biomass resources, improved stoves reduce the emissions of carbon dioxide to the atmosphere. Also important (and less well known), they can reduce emissions of products of incomplete combustion (PIC), which can be released in large amounts by traditional biomass stoves with low combustion efficiencies. Most of these PIC gases are also greenhouse gases with even higher potential for global warming than carbon dioxide.

Of course, if households use the improved stoves more than their old ones, their consumption of fuel will not fall in proportion to the increase in stove efficiency. Households will perceive this additional consumption of fuel as a benefit (as mentioned in the preceding section), but the effect on forest cover and the atmosphere may not be as positive as expected, even if the stoves have been designed to reduce emissions. In this situation, alternative incentives to reduce pollution would be preferable to the introduction of improved stoves.

Lessons from Stove Programs

Stoves have been developed and marketed for centuries without the intervention of governments and donors. With increasing urbanization, efficiency of woodfuel use became a more important element in such improvements, as woodfuel prices rose and supply zones became relatively more distant from the market. But energy efficiency did not become a paramount consideration until after the large rise in oil prices in the 1970s. Until then, as biomass fuels became more expensive and difficult to obtain, households in many countries—

for instance, the Republic of Korea and Jamaica in the 1960s—had been able to shift from biomass to modern fuels. This shift became much harder after the oil shocks, and around 1980 there was an upsurge of activity as governments and donors first instituted programs to make stoves more energy efficient. Since then many governments and donors have helped to fund projects or components of projects to improve stoves (see Barnes and others forthcoming; appendix, for a list). The lessons from their successes and failures may profitably be used to inform future efforts.

Expectations and Objectives

Perhaps the most common reason for failure among the early programs was unrealistic expectations about fuel saving—first, that huge efficiency gains would be easy to effect, and, second, that fuel saving alone would make the stoves irresistible to users (for critical reviews of these early efforts, see Agarwal 1983; Foley and Moss 1983; Manibog 1984; Baldwin and others 1985; Gill 1987; Krugmann 1987).

Conventional wisdom in the early days considered traditional, “three stone,” biomass stoves to have energy efficiencies of only 5 to 10 percent. Initial predictions, “proven” in laboratory or other controlled settings, were that fairly simple design changes could create biomass stoves with three to six times the efficiency of the simple traditional stoves, typically 20 to 30 percent for wood and up to 35 percent for charcoal. Most people in the stove community now agree, however, that an average 50 percent reduction in fuel consumption should be considered a major achievement and that most stove programs should be content with savings of 25 percent or even less.

This profound change in expectations of fuel savings has several causes. First, the early predictions about fuel consumption were based too often on estimates unsupported by scientific tests using appropriate methodologies. More consistent measures of efficiency are being applied as sufficient literature on testing guidelines becomes available. Second, it is now recognized that traditional stoves used in fuel-scarce areas often have efficiencies substantially above 10 percent, instead of the 5 to 10 percent efficiencies assumed in the early days. Finally, experience has shown the presumption that stoves would perform as well in households as in laboratories to be unfounded. In the meantime, despite the relatively small amount of research and development funding available (Chomcharn and Gujral 1991), significant progress has been made in understanding the most important technical design principles (Prasad, Sangen, and Visser 1985; Baldwin 1987; Stewart and others 1987; Nijaguna and Uppin 1989; Bussmann 1990).

The second, equally uncritical assumption of the early programs was that a more efficient stove is superior to a traditional stove. In fact, traditional stoves often have benefits that may explain their lack of energy efficiency, including space heating, protection from insects provided by smoke, accommodation of different pan sizes, and ability to use different fuels in different seasons.

Improved fuel efficiency cannot be the sole objective of a program; it must compete and interact with other goals, such as heat control (usually a door to modify air inflow), increased power output, smoke abatement (through the use of a chimney in woodstoves), safety features (including insulation to cool outer surfaces), convenience of use, and attractiveness. Obviously, too, the exercise will be self-defeating if the cost of fuel saved over the lifetime of the stove is outweighed by the higher costs of materials or manufacturing entailed. Improved stoves have to compete with traditional stoves, which are typically made of local or scrap material with no associated cash expenditures (Baldwin 1987); even if local material is used, improved stoves may require machines in the manufacturing process.

An example of how achieving one benefit can build in an offsetting cost is that some of the design changes made to increase the efficiency of heat transfer through decreasing air flow can actually increase smoke emissions (Prasad 1983). Conversely, the addition of chimneys to reduce smoke exposure can act to reduce efficiency. Thus, a balance must be sought among the perceived and real social benefits, which depend on the nature of the stove that is introduced and the cooking customs of those who use it. In some areas the benefits may not justify the costs.

These lessons from trial by error have substantially changed the definition of success from that assumed in the early 1980s. Designing stoves with high fuel efficiency turned out to be a more challenging technical goal than originally thought (Ahuja 1990); the quantifiable goals, such as changes in fuel use, are now more modest, and a range of qualitative indicators, such as improved convenience and awareness of environmental problems, have more legitimacy (Clarke 1985; Caceres, Ramakrishna, and Smith 1989; Viklund 1989; Wood 1987).

Along with modified expectations and objectives, some more specific lessons have been learned about successful implementation: principally, the importance of identifying the market, that is, targeting the groups that will benefit most from improved stoves; field testing and surveying to establish regional and consumer needs and preferences; involving local artisans in the design, production, and marketing of the stoves; and establishing prices that will facilitate adoption.

Selecting Suitable Markets

Many programs have failed because the target groups are not short of wood or do not perceive shortages and thus see no reason to adopt improved stoves. The best market for improved stoves will be found in areas, generally urban and peri-urban, where people already buy both the fuel and the stove. Programs may also have a place in rural areas that have few remaining trees, in areas where fuelwood has already been harvested for urban consumption, or in very arid regions where trees grow back very slowly or where use of agricultural residue for fuel decreases the soil fertility.

Field Testing and Consumer Surveys

Field testing is crucial in the design process. First, it helps determine what gains in energy efficiency will be realized in practice. The fuel savings possible under actual field conditions usually bear little relation to those that can be attained in a laboratory. A 10 to 20 percent efficiency improvement in controlled settings is likely to turn out to be a negligible improvement when the stoves are used under normal household conditions, because natural variations in construction, operation, and maintenance tend to degrade performance. The first Lorena-type stoves introduced into Central America, for example, did not save much fuel, and most were abandoned, although some were retained because of their convenience and smoke reduction. Moreover, some initial efficiency improvements may be attributable to better and more careful cooking practices, often a result of the stove dissemination efforts rather than the improved design. It may take a 25 to 50 percent improvement in controlled settings to be sure of a substantial energy savings in the home.

The second important reason for field testing is to arrive at a design that will be acceptable to the prospective consumers and producers. Regional requirements, different styles of cooking in various countries, and consumer preferences predicate different stove designs. For instance, in the Punjab in India, people use low heat for warming, but not scalding milk, whereas in China the stove must be able to stir-fry food quickly. In Madagascar, the Rwandan improved stove did not perform very well because the stove was suited to saving fuel in the methods needed for cooking beans (a staple of the Rwandan diet) but not for Malgache dishes (which depend on rice in sauce). An improved stove design should be tried out in households early in the program and monitored at the development stage to make sure that it is acceptable to the prospective consumers, especially women who are the principal users. Over time, the design can be modified and improved in light of the response (Hyman 1987; Stewart and others 1987). If men are the principal buyers of equipment, they also need to be persuaded of the money-saving advantages of the stove to them.

To help assess consumer needs and preferences, field tests can be supplemented by surveys, consumer panels, and other techniques to determine existing patterns of stove use, the most important criteria people use when purchasing new stoves, who in the household makes the decision to purchase a stove, and whether income and fuel savings will provide adequate incentives for stove adoption (Baldwin 1987).

Women already overburdened by the demands of household and informal labor, for example, will resist a stove that takes more time to light and manage than the old stove. A new design that introduces complicated features or requires extra work is less likely to be adopted. For this reason, stoves similar to traditional stoves in appearance and function are sometimes adopted more quickly by consumers. In Kenya a custom-made, improved wood stove was unsuccessful despite its greater efficiency because women did not have the time

or the tools to cut the wood in small pieces to fit into its physically restricted fire box (Openshaw 1982; Jones 1989). In fact, many people who adopted the stove ended up enlarging the fire box, gladly sacrificing some energy efficiency in doing so. By contrast, the Kenyan Ceramic Jiko (KCJ), an improved charcoal stove, whose design and handling were similar to the existing stove, was quickly adopted (Karekezi and Walubengo 1989). An example of a design that ran into trouble because it took insufficient account of regional differences was a stove distributed all over Nepal, but whose design was not adapted to differences in altitude (Pandey 1991). Although the dissemination component of the program was considered quite good, the stove was simply not technically suited to the various environments in the country.

Another illustration of the drawbacks of trying to produce a viable stove in the laboratory without extensive field tests occurred in East Africa (Openshaw 1982, 1986). In the Umeme charcoal stove, the cooking pan sits inside an insulated collar, so various sizes of stoves had to be made to fit different pan sizes. In addition, the insulation and extended collar made the stove heavy, and because of the efficient insulation the inside metal became extremely hot and did not last very long because of metal fatigue. This stove was promoted by the same organization in one country after another, and failed in most of them, mainly because of the high cost of metal work in making the stove. Another example of the need for regional testing is the contrast between the success of the KCJ in Kenya and its failure in other countries such as Senegal, Tanzania, and Rwanda (as reported, among others, by Hyman 1987), until it was field tested and redesigned to fit local preferences. In Tanzania the reason for initial failure was that stove manufacturers started production before the stove was adapted to local conditions.

The most acceptable design will be arrived at only if users, principally women, actively participate in the process (Cecelski 1984; Tinker 1985; Agarwal 1986; Sarin, in Joseph, Prasad, and van der Zaan 1990). Differences among programs in the extent of user-participation have proven to be even more important than the actual differences in local conditions in explaining the level of stove dissemination (Fraser 1987).

Involving Local Artisans

Experience has taught that the involvement of local stove makers from the outset is vital for the success of a program. The profit motive has often proved critical, even in China where many stoves are made in locally organized companies.

At the design stage, an important issue is designing for ease of production: the artisan or stove maker should have input into the design to make sure that improved efficiency does not make the stove too complicated to produce profitably. The improved Zambian charcoal stove had a straight sliding door that took eight different pieces of metal to make, whereas a hinged door, albeit one

that did not have as good air control, only had four metal pieces and was much easier to assemble (Walubengo, Kimani, and Ndiangui 1988; World Bank 1991c; Zambia Department of Energy 1988). The ash box occupied two-thirds of the stove when, in fact, the amount of charcoal ash is negligible; a small ash box built on legs would have saved about one-third of the metal. This stove was designed in the laboratory without inputs from artisans.

At the production stage, programs have found that stoves mass-produced by a group of individual artisans or a small stove factory are adopted much faster than custom-built models, for which artisans fabricate the entire stove in the home. The rate of dissemination of a custom-built model, which may take one to three days to install, depends on the number of trained installers. A metal-smith can make many more mass-produced stoves per day, and a potter can produce clay stoves in batches of 50 to 100. Thus, 2,500 to 5,000 stoves can be made by two or three people each year; a comparable number of custom-made stoves would require twenty to forty trained installers. China's stove program was initially slow to take hold because of delays associated with custom building.

Another objection to home-built stoves is that the quality control necessary to achieve reliable fuel savings is difficult to maintain. This is certainly true for stoves built by the householders themselves and is even likely to be so when trained installers are used. Small changes in the stove dimensions, for example, can lead to big drops in efficiency. As a result, most owner-built stove programs in the world, including the two largest in China and India, are moving toward centralized, artisan production for the interior parts of the stove, usually made of ceramic or metal, where dimensions are most critical (Qiu, Gu, and Huang 1990; Ramakrishna 1991a; Tata Energy Research Institute 1987; Joshi, Sadaphal, and Ramchandra 1989; Operations Research Group 1989). Installers and householders, however, still have an important role in building the rest of the stove around these critical parts.

As for the marketing stage, sales are likely to be higher if artisans have a direct stake in sales than if they are given orders to produce a given quantity without being involved in the selling or distribution. For example, in many countries artisans demonstrate the stoves as a way to market them. An illustration of this point is the contrast between the successful program in Tanzania, where the stove makers were involved in the sale of stoves (Kinyanjui 1991) and the effort in Botswana, where the government paid stove producers on a piece rate basis and, as a result, is now having to store many of the stoves that were produced (Openshaw 1986).

Pricing to Encourage Adoption

The price of new stoves can be a significant barrier to adoption. Improved woodfuel stoves are typically about twice as expensive as the local traditional stoves and, although in the long run an improved stove should save money on fuel, people may be unable to afford the initial cash outlay for buying it. By

Table 1. Costs of Traditional and Improved Stoves for an Average Urban Family in Rwanda, 1991
(U.S. dollars)

<i>Present value of costs</i>	<i>Imbabur traditional stove</i>	<i>Rondereza improved</i>	<i>Cost savings of improved stoves</i>
Cost of two stoves	10	12	-1
Cost of fuel	332	217	116
Total cost	342	228	115

Source: World Bank (1991b).

the same token, improved stoves should be as durable as traditional stoves, with replacement parts such as grates readily available and inexpensive. In most of Africa, surveys suggest that middle-income families have adopted improved stoves much more quickly than poor families (Jones 1989). This is one area in which governments and donors could assist, but heavily subsidizing stoves is generally a risky way to promote them: people will accept even a badly built stove if it is free. To be attractive to low-income households, improved stoves must have a quick payback period.

In urban Rwanda, where the price of charcoal is quite high, the payback period for improved stoves as derived from user surveys is less than one month (table 1). With the incremental investment of \$1.48 for improved rather than traditional stoves, a family saves \$114 over eighteen months. These figures are for the present value of the investment and savings, using a discount rate of 12 percent. The figures presented in table 1 are based on surveys of stoves under actual use by families in urban areas. A traditional stove in Rwanda lasts about nine months, and an improved stove lasts about eighteen months with some maintenance. The cost savings were calculated over eighteen months, or the useful life of one improved stove. Because most urban families in Rwanda use two stoves, the calculation for both the improved and traditional stoves is based on two stoves.

Because of the KCJ's success in Kenya and because a manufacturer in Rwanda was already producing it, the KCJ was included in the first round of household testing. But households overwhelmingly selected a different model, although its fuel savings were only slightly higher, because of its price, portability, and power output characteristics. This model, the Rondereza, was subsequently disseminated after some minor modifications based on responses during a second round of household tests. Again, the reintroduced KCJ fared better in Tanzania the second time around. This was because full-time staff were employed, dedicated to commercial stove production. They learned from previous mistakes by first field testing and then modifying the improved stove. The "Jiko Bora" is now a considerable commercial success in the capital,

Dar-es-Salaam, and is spreading to other urban areas (Tanzania, Ministry of Water, Energy, and Minerals 1992).

Intervention: The Role of Governments, Donors, and Nongovernmental Organizations

Stove programs have not received a great deal of money from donors or governments. The response to a global survey of various stove programs outside of India and China indicated that the total amount spent on 137 programs was about \$20 million spread over five years (Ramakrishna 1991b). Even the huge Chinese program, with 120 million improved stoves, and the greatly subsidized Indian program, with 8 million stoves, have not spent large amounts by most standards. Program costs per stove in use run from less than \$2 for the Chinese program to a somewhat higher cost for the average non-Chinese program responding to the global survey—for example, just over \$4 a stove in India.

From an institutional point of view, the most successful programs are those in which the government was not involved in producing or selling the improved stove. China and India, which have the largest stove programs by far, illustrate this point dramatically (table 2). Between 1982 and 1990 the Chinese National Improved Stoves Program reported the installation of improved stoves in more than 120 million rural households. These were mainly biomass stoves for cooking, but included dual-use stoves for cooking and heating in the northern states where temperatures are very low during winter. Perhaps as many as 90 percent of all the improved stoves installed worldwide were installed in China. Improved stoves are quite affordable—about \$9—and the government contribution—an average of \$0.84 per stove—is very low compared with some other programs. After some initial problems, the benefits of recent improved stove programs in China have been substantial. Although the results are not conclusive, a recent study (World Bank 1993) of energy use in six different counties in China found that the counties with a very large number of stoves used substantially less energy than the others.

The Indian National Programme on Improved Chulhas was initiated in 1983. So far, about 8 million improved stoves have been disseminated to rural households, and the target for 1992 was 1.8 million. The stoves have a minimum 50 percent government subsidy, or about \$4.30 a stove. Dissemination levels have been impressive, but follow-up surveys indicate that only about half the improved stoves are still in use. This adoption rate reflects contradictory opinions in responses to the surveys about whether the stoves did indeed save energy and reduce smoke and whether they were compatible with cooking habits. Obviously, such mixed perceptions indicate that there must be a wide diversity of results in implementation of the program. The attempt to apply the same program throughout India has resulted in too thin a spread of efforts in some regions, and inappropriate strategies in others.

Table 2. A Comparison of Stove Programs in China and India

<i>China</i>	<i>India</i>
<ul style="list-style-type: none"> • The program concentrated efforts on areas of greatest need and selected pilot counties with biomass fuel deficits. • Direct contracts between the central government and the county cut out much bureaucracy. This arrangement generated self-sustaining rural energy manufacturing and service companies that installed and serviced stoves and provided other energy technologies. • Local rural energy offices are in charge of technical training, service, implementation, and monitoring for the programs. • Recent improved stoves are not only suitable for fuel savings, but have been designed for convenience and attractiveness, unlike in early programs that mainly stressed fuel savings. • Stove users pay the full cost of materials and labor. The government helps producers through stove construction training, administration, and promotion support. 	<ul style="list-style-type: none"> • The program was implemented countrywide, resulting in dispersed effort and watered down financial resources. • Administration is cumbersome, moving from the center to six regional offices, to the state, to the district, and finally to the taluka, where the stove program is just one among many national programs being implemented locally by the same people. • Monitoring was a real weakness in early programs, where the responsibility fell on local officials with many other responsibilities. Recently, actions have been taken to correct this problem. • Many attempts have been made to integrate efficiency and convenience, but they have suffered from the top-down structure of the program. • Stove users pay for about half of the cost of stoves, while the government pays the rest. The producer's incentive to construct stoves is, therefore, oriented toward the government.

Source: This table was developed from papers by Smith, Gu, and Qiu (forthcoming) and Ramakrishna (1991).

Central planning and reliance on numerous layers of bureaucracy have hindered many programs in India (Ramakrishna 1991a), whereas in China small government inputs concentrated on providing vital technical and management support to local stove producers have proved much more successful (Smith, Gu, and Qiu forthcoming). The lesson seems to be that the primary goal of a program should be to promote self-sustained dissemination of improved stoves, using existing commercial distribution and retail marketing channels where possible. India, learning from its experience, has been modifying its program accordingly.

The discussion of stove development and diffusion in the preceding sections provides the background for an analysis of the role of government in these programs. One classic way for governments to promote economic efficiency is to gather and disseminate information; another is to modify incentives so that individuals take into account the external consequences of their decisions. Gov-

ernments may also want to address economic equity as well as efficiency, by providing resources to its poorest citizens.

Governments and donors can provide stove makers or stove sellers with technical and managerial assistance, including support for applied research and testing of clay and insulation materials. Authorities also can monitor implementation, through surveys of the effects of fuelwood consumption and tests of stove quality.³ In China and India both governments provided extensive applied research on stoves and stove-making materials. In Rwanda the government helps publicize stove programs and is preparing a household energy sector policy that will include criteria for stoves that may be sold (World Bank/UNDP 1991b). In Nepal, by contrast, a big obstacle has been the sparseness of resources available for technical assistance (Shrestha, Gorkhali, and Smith 1991).

International donors can serve an important purpose by facilitating the exchange of information on technical and managerial issues. A common complaint about past donor assistance, for example, has been that surveys and other research done in the context of a particular stove program have never been put into a form that makes the information easily available and useful for other programs. This has resulted in the frustrating paradox that senior managers of donor organizations feel that they have already funded enough research, whereas program managers and stove designers often feel a strong and realistic need for more field testing and data gathering. Every donor-assisted program should include the extra funds and staff to collect and publish survey information in a timely and accessible manner.

Governments may also intervene beneficially by an initial subsidy to the sale of the stoves. The rationale is again one of providing information. It may be that consumers need to see the stoves in day-to-day use before they will be persuaded of their effectiveness. Given the problems with some of these programs in moving from laboratory to field, such skepticism would seem amply justified. By making the stoves available initially at subsidized prices, consumers can gain information through their own first-time use, and especially by learning about the experiences of their neighbors, who may have been targeted by the program as pioneer recipients of subsidized stoves. Of course, this assumes that the stove has already been thoroughly tested and is superior to existing stoves.

This rationale for subsidization loses its force once consumers are acquainted with the stoves. In this case, stove programs are obliged to plot out a course that leads to eventual self-reliance (Jones 1988). Indeed, as the global survey revealed, some programs have developed a practical definition of sustainability to be the extent to which people actually buy their second improved stove (Ramakrishna 1991b). This action seems unlikely to be greatly influenced by factors other than the household's judgment of the stove's relative costs and benefits.

These are a few examples of ways that governments and donors can support stove programs, without resorting to continuing subsidization of the sale of stoves themselves. Previous programs indicate, however, that although this support can be at modest levels, the effort must be sustained over a long period (at least five years and probably more) to reap the maximum benefit from the financing. It took more than twenty-five years after the now-traditional charcoal stove in Kenya was introduced by railway workers from India for it to achieve dominance—purely through market forces without any intervention. The conclusion is that the form of organization may not be as important as the long-term commitment of funds in an integrated way, as opposed to short-term bursts of aid from many different donors that have characterized many programs.

If benefits internal to the households are the only benefits, then the rationale for subsidizing the purchase of stoves on a continuing basis is limited to equity considerations. Providing subsidized stoves to poorer consumers may be an effective way to redistribute resources to them because the benefits may be large and because the acquisition of the stoves, even at subsidized prices, is unlikely to be attractive to better-off consumers.

If, however, improved stoves are an effective way to garner benefits external to the household, then there is an additional rationale for continuing to subsidize the purchase of improved stoves. The size of the subsidy should reflect the size of these benefits, which the household would not otherwise consider in its purchasing decision.

In almost every case, programs initially offering stoves at no cost have found that use and maintenance rates were unacceptably low, although some programs, for example in parts of India, have been able to reach significant numbers of poor people with nearly free stoves. As a result, less than 10 percent of programs now offer full subsidies (Ramakrishna 1991b). The low adoption rate for free stoves cannot be fully accounted for by the observation that people do not highly value things that are given to them. There is clearly more to be learned about this difficult problem. Part of the answer is that the groups in question often have other much more pressing priorities than improved stoves—such as obtaining cash for buying food and fuel every day—that any stove program might have to consider to be successful. Stove programs need to heed the important lessons that have been learned elsewhere—for example, about the advantages of professional production of critical components, the need for quality control of stove production, and the basic requirement of having incentives for producers to maintain their production. Even then it may be difficult through market forces to reach local people who do not have enough cash resources and who suffer from having to spend a significant amount of time collecting fuel.

The issues of which are the best conditions for stove promotion and adoption, and whether subsidies are necessary for reducing the cost of stoves for users, are illustrated in table 3. It should be understood that donor support is needed for programs in all sections of the table for training, dissemination of

Table 3. Conditions Favorable and Unfavorable for Stove Adoption

<i>Source of stove</i>	<i>Unfavorable: Fuel gathered</i>	<i>Favorable: Fuel purchased</i>
Unfavorable: Constructed by family	<ul style="list-style-type: none"> • Most unfavorable area for stove adoption unless fuel deficit is perceived. • Subsidies for stove purchase may be necessary. • Long-term effort and extended external involvement is necessary. Favorable short-term results should not be expected. 	<ul style="list-style-type: none"> • Somewhat favorable area for stove adoption. • Offer incentives or partial subsidies. • Fuel price should reflect full value of biomass resources. • Assess potential for fuel substitution.
Favorable: Purchased	<ul style="list-style-type: none"> • Somewhat favorable for stove adoption. • Encourage conservation of biofuels through education about environmental benefits. • Determine alternative uses of biofuel resources. 	<ul style="list-style-type: none"> • Most favorable area for stove adoption. • Commercialization of improved stove should be possible. • No subsidies should be considered for stoves or fuel. • Assess potential for fuel substitution.

Source: Smith and Ramakrishna (1991); see also Karekezi and Walubengo (1989) and Fraser (1987).

information, and assistance with testing. What distinguishes the sections from each other is the degree to which direct subsidies for stove purchase will be useful. The situation in which the stove is constructed by the family and the fuel is gathered is the most likely to require a subsidy to encourage stove adoption. By contrast, the situation in which the stove and the fuel are purchased is least likely to require a subsidy.

A final issue in the discussion of interventions is the role of nongovernmental organizations (NGOs). Stove programs are generally not expensive, and many have consequently turned to NGOs to implement small projects. The advantages of these organizations are that they are not dominated by large bureaucracies, are quick to react to problems, are committed to energy conservation, and are sympathetic to the main users of wood or charcoal, including rural women and the urban poor and middle class. But these strengths have brought some problems. In Nepal, for instance, the involvement of as many as seven different institutions has fragmented the effort; over a nine-year period, about eighteen different projects were involved in stove dissemination, a problem now being

remedied through closer coordination among agencies (Shrestha, Gorkhali, and Smith 1991). In India, by contrast, where NGO involvement has mostly been confined to small, local programs, they have had many successes. In China the stove program has functioned well without any NGOs. Finally, in Kenya, a rural, NGO-run woodstove program became successful in forging close links with an existing government extension network of home economists (Klingshirn, Crewe, and Karekezi 1991).

Conclusions

The estimate of current worldwide trade in woodfuel is on the order of \$7 billion annually, and about 2 million people are involved in full-time employment in woodfuel production and marketing (for a discussion of the value of traditional fuel production, see Peskin, Floor, and Barnes 1991). Although in the long term, people will probably switch to cooking with modern fuels, such as gas and electricity, hundreds of millions will be using biomass, and biomass stoves, for many years to come.

But not all of these people can or should be reached with improved stove programs. Some are better encouraged to move up the energy ladder to more modern fuels. Others may not be subjected to fuel shortages or high indoor smoke levels. To decide whether an improved stove program is a good idea in a particular area, we return to the two main questions from the introduction. First, are the potential economic, social, and environmental benefits sufficient to be worth pursuing? Second, given the problems encountered in the past, can viable strategies for adoption be designed for implementation in this area?

This review found that the potential benefits of stove programs are considerable. This is so even though fuel savings are less than once thought, because of the other benefits that come with the package. For example, rough estimates (World Bank 1991b) of the economic value of the environmental and health benefits of improved stoves typically show potential savings for each stove that annually surpass the stove's initial cost several times over, a payback to society in only a few months for most stove programs of any duration, even at modest rates of acceptance and use. In Rwanda, the cost of the program was \$320,000 over three years, and the estimated savings per year thereafter, excluding environmental benefits, were \$895,000.

Given the problems encountered in many stove programs, the second question is harder to answer. The programs need to solve problems encountered in the past of coordinating different goals in the context of differing regional constraints, needs, and aspirations—in other words, the programs need to understand the role of the improved stove in the energy transition. In a sense, the improved biomass stove can be considered a new rung in the energy ladder, inserted to fill the quite substantial gap between the use of traditional stoves and the adoption of modern fuels.

In answering this second question it may be helpful to put the stove programs in perspective. Most of the major investment in stove programs has come from individual countries without much involvement of donors. The two largest programs in the world are in China and India, where essentially all the investments have been generated internally. The participation of donors in stove programs in other countries has been significant but modest, with funding spread over many programs. Because of the fragmented nature of these efforts, there has been little ability to learn from mistakes. In fact, a review of many of the project documents indicates a tendency to reinvent the wheel. Although this results partly from the many different institutional and country settings, it also is a result of the lack of cooperation and communication among programs.

The programs that have been successful in disseminating a significant number of stoves that are frequently used by a majority of adopting households have shared several characteristics.

- The programs have concentrated on users who would most likely benefit from, and consequently adopt, the improved stove—generally (but not always) those who purchase biomass fuels or have difficulty in collecting their fuels, and usually not the very poorest groups in society, but those who are spending a substantial portion of their limited cash income on cooking fuel.
- The stove itself is not heavily subsidized, certainly not after the initial testing phases. This ensures that the program can be self-sustaining without extensive government support and that people are willing to pay for the benefits of the improved stove.
- External support, not large but sustained, is limited to factors that support the production and distribution of stoves, such as design, laboratory testing, consumer surveys, information access, publicity campaigns, and perhaps credit.
- The programs are characterized by a significant interaction between designers, producers, and users. This interaction can be fostered in several different ways, including formal surveys, focus groups to identify problems and prospects for a particular stove design, and actual household testing of stove designs.
- Programs rely on commercial production of the stoves or stove parts, either by small-scale informal sector artisans or more formal sector entrepreneurs, rather than producing custom-built stoves.
- Recognizing that stoves that are not valued very highly by the consumers are not purchased, the programs have put pressure on the stove producers and designers to meet the needs of consumers for efficient and useful stoves.

A wide range of agencies have run successful programs. Given the variety of conditions within individual countries, it is hard to generalize that one form of project or program organization is better than another. Although

governments tend to be bureaucratic and cumbersome and often do not understand market dynamics, they have managed several successful programs. By contrast, NGOs may be more flexible, more committed, and closer to the users, but their projects have often suffered from short-term bursts of money and support, with little long-term direction. The lesson to be learned from these examples is that programs can be successfully implemented in a variety of institutional settings, if they are carefully chosen to reflect actual conditions of potential users and of actors in the production and marketing chain of traditional stoves.

The modern improved stove can be an important bridge for the millions of people who either do not have access to low-cost, readily available biomass from local woodlands or are unable to afford the higher-cost, more expensive modern fuels. To perform that function, stove programs must identify the groups that can benefit most from improved stoves and determine if it is technologically feasible to design and produce a stove that is both efficient and meets their cooking needs. The social, economic, and environmental benefits of promoting improved stoves under the right circumstances are quite large, and the existing successes demonstrate the usefulness of well-managed programs.

Notes

Douglas Barnes and Robert van der Plas are on the staff of the Industry and Energy Department of the World Bank, Keith Openshaw is a consultant in that department, and Kirk R. Smith is on the staff of the East-West Center and is affiliate professor at the University of Hawaii. The authors are listed in alphabetical order, and all contributed equally to this article. For their useful comments, the authors wish to thank Anthony Churchill, Willem Floor, Joseph Gilling, Robert Saunders, Gunter Schramm, Ernesto Terrado, and Maurizia Tovo at the World Bank. We would especially like to thank Eric Hyman for the insights that improved the final version of this paper. Most of the ideas presented here are based on material from a project to evaluate improved stoves conducted by Kirk Smith at the East-West Center, Honolulu, Hawaii, as well as the staff of the Energy Sector Management Assistance Program (ESMAP). This project was funded by the United Nations Development Programme, managed by ESMAP, and contracted to the East-West Center.

1. Topics reviewed included the importance of stoves for people in developing countries, progress and problems encountered in stove programs, experience from field trips to review programs in many developing countries, a survey of 137 programs worldwide, and four in-depth case studies.

2. Dollars (\$) are U.S. dollars throughout.

3. During the period of the study reported here, two other international groups have been trying to improve monitoring and evaluation. The Food and Agriculture Organization has sponsored the development of guidelines (Joseph 1990; Joseph, Prasad, and van der Zaan 1990), which have been reviewed and may be revised. With funding from the German government, the Gesellschaft für Technische Zusammenarbeit and the Intermediate Technology Development Group have undertaken to draft guidelines (Crewe 1991) and test them within ongoing stove programs in developing countries (Klingshirn, Crewe, and Karekezi 1991). These guidelines are to be tailored to specific economic, social, and environmental objectives, so that each stove program can choose a mix of objectives to suit its needs.

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WHAT DO WE KNOW ABOUT THE POLITICAL ECONOMY OF ECONOMIC POLICY REFORM?

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The recent wave of democratization in developing countries and in formerly communist ones has sparked renewed interest in the relation between politics and economic adjustment. Adjustment programs, however well designed in a technical economic sense, are often politically difficult to launch and, once launched, to keep afloat. Success in implementing an adjustment program may depend on a government's skill in generating political support and holding off the opposition. This article explores the politics of economic reform, drawing on country studies by political scientists and country specialists, the growing theoretical literature by economists, and the findings of a World Bank research project on the political economy of adjustment in new democracies. The article examines three broad clusters of variables: institutional characteristics of the political system, aspects of the internal and external economy, and the design of the reform program. It also considers the relevance of political analysis for policymakers and for international financial institutions.

The recent wave of democratization in developing countries and in formerly socialist countries has sparked renewed interest in the politics of adjustment. Economic reforms, regardless of their aggregate effects, have distributive consequences, creating benefits for some while imposing hardship and loss on others. Whether reform succeeds and endures can thus hinge on the ability of the government to mobilize political support for the program and to manage the opposition.

This survey explores the politics of economic reform, drawing on the literature from both economics and political science and the results of a World Bank research project on structural adjustment in new democracies (Haggard and Webb forthcoming). We examine the influence of political institutions on the adjustment process, the links between economic conditions and the politics of reform, and the way in which the design of the program influences the pattern of political support or opposition.

Political Interests and Institutions

The obstructionist influence of “vested interests” is a recurrent theme in analyses of failed reform efforts. For most policy reforms, the interests of different groups are easy to identify: the nontradable goods sector opposes devaluation, firms producing import substitutes balk at trade liberalization, farmers object to cutting agricultural subsidies. Because politicians and bureaucrats rely on interest groups for political support, votes, and money, they are sensitive to such pressures. Although highly stylized, this picture is characteristic not only of journalistic accounts, but also of the literature on rent-seeking behavior, by economists (Krueger 1974; Bhagwati 1982) and political scientists (Bates 1981; Rogowski 1990; Frieden 1991).

Despite its popularity, interest-group analysis has important limitations (D. Nelson 1988). Individuals, households, and firms occupy several positions in the economic structure simultaneously—as producers, consumers, and recipients of transfers—with interests that often do not coincide. In times of rapid economic change, people may not know in advance whether they will benefit or lose from a reform. Fernandez and Rodrik (1991) and Przeworski (1991) emphasize that such uncertainties can lead to biases in favor of the status quo: even groups that end up benefiting from the reform may not initially support it if they fear it will make them worse off. Yet, wide-reaching reforms in Spain in the late 1970s and in Poland in recent years show that interest group pressures need not block reform even in democracies. Under the right institutional conditions, astute political leaders can build new coalitions of winners that crowd out those with an interest in maintaining the status quo. Indeed, reform in a democracy could not occur otherwise (Waterbury 1989).

Authoritarian and Democratic Regimes

Any political analysis of reform demands attention to the interests at stake, but institutional factors also influence the policy process. One of the most contentious debates in comparative political economy concerns the implications of the type of political regime for reform and, more generally, for economic performance. In the 1980s numerous studies probed the relative capacity of authoritarian and democratic governments to maintain stable macroeconomic

policies or to initiate broader market-oriented reforms (Skidmore 1977; Pion-Berlin 1983; Kaufman 1979, 1985; Haggard 1986, 1990; Haggard and Kaufman 1989a, 1989b, 1990; Bienen and Gersovitz 1985; J. Nelson 1984, 1989, 1990; Remmer 1978, 1986, 1990; Siddell 1987; Snider 1990). Several lines of argument suggested that authoritarian regimes might be more successful in initiating reform than democratic ones, particularly given the weaknesses of democratic institutions in most developing countries. We find, however, that the theoretical support for this claim rests on crucial assumptions about the nature of authoritarian leadership and that the empirical evidence for the advantages of authoritarianism is inconclusive.

Why might authoritarian regimes succeed when democratic ones fail? First, rent-seeking groups may have greater influence in democracies. An influential early study of post-World War II experience in Latin America noted that democratic regimes permit the formation of alliances “in which each [element] thinks it can best protect its fortunes if stabilization is scrapped” (Skidmore 1977: 149; see also Olson 1982). Models of budgeting in democracies have shown how legislators face interest-group pressures to increase transfers to their districts (Shepsle and Weingast 1984) or to provide side payments to sustain coalition governments (Sachs and Roubini 1988). The influence of interest groups on trade policy in democracies is thoroughly documented (D. Nelson 1988). Authoritarian leaders, by contrast, can override interest-group demands by fiat.

Partly because of their ability to dominate interest groups, authoritarian governments also have longer time horizons. Many economic reforms, such as fiscal adjustment or trade liberalization, entail short-term costs while the benefits take longer to unfold. If the democratic politician cannot count on being in power long enough to reap the political gains from reform, optimal policies will be abandoned as interest-group lobbying or electoral pressures intensify. Authoritarian leaders might find it easier to take a longer-term perspective because they encounter weaker interest-group and electoral constraints.

The hypothesis that authoritarian regimes do better is not without empirical support—countries in Latin America and East Asia are often cited as examples. In a stylized sequence: weak democratic governments are unable to resist pressures to boost wages and pursue other populist but unsustainable fiscal and monetary policies. Inflation mounts and stabilization efforts founder. As the crisis deepens, the military seizes power and imposes the costs of adjustment on labor and other groups (Collier 1979). This pattern is visible in the so-called bureaucratic-authoritarian regimes in Latin America (Argentina in 1966 and 1976, Brazil in 1964, Chile in 1973, and Uruguay in 1973) and elsewhere (Indonesia in 1966 and Turkey in 1971). The developing economies of East Asia—the Republic of Korea, Taiwan, Singapore, and Hong Kong—also undertook crucial policy reforms under authoritarian or administrative auspices (Deyo 1989; Haggard 1990; Wade 1990), and China’s recent reforms were undertaken

on the explicit premise that economic and political liberalization need not go hand in hand.

The model of the authoritarian regime as a boon to developmental reform has two theoretical shortcomings. First, it assumes an enlightened leadership. A rational dictator might seek to maximize the present value of consumption through policies to enhance growth or through tax increases that are inimical to growth—the “leviathan” of Findlay and Wilson (1987). The possibility of these diametrically opposed strategies of enlightened despotism and predatory behavior helps explain why economic performance seems to vary more among authoritarian governments than among democratic ones. Military governments in Latin America made policy mistakes as egregious as their democratic predecessors, and in some authoritarian countries, including Albania, Iran, Myanmar, and Romania, policies contributed to economic blight so severe that only a dictator could have sustained them.

The second difficulty concerns the assumption that authoritarian governments are immune to interest-group pressures and therefore have longer time horizons. Authoritarian governments may not be accountable to electorates, but they may nonetheless remain vulnerable to interest-group pressures. Indeed, Olson (1990) has shown how the absence of regularized turnover and political competition can give rise to corruption more pervasive and intractable than would be possible under accountable forms of rule. The Philippines under Marcos, Haiti under the Duvaliers, and Zaire under Mobutu are cases in point.

The few systematic comparisons of performance and policymaking in authoritarian and democratic regimes have yielded ambiguous results. Sirowy and Inkeles (1990) review thirteen quantitative, cross-national studies by sociologists and political scientists. They underline the indeterminacy of the findings, but note that these studies provide little support for the thesis that democracy promotes growth. Remmer (1978, 1986, 1990) finds either that the type of regime has no correlation with macroeconomic policy and performance or that democracies do better than authoritarian regimes. Recent research by economists on the importance of secure property rights also supports a positive relation between democracy and growth (Scully 1988). These studies have not always controlled for other economic and political factors that may affect performance, but more sophisticated research designs also do not find systematically better policy performance by authoritarian regimes (Haggard, Kaufman, and Webb 1991).

The ambiguity of these findings suggests that the debate should move beyond simple distinctions between authoritarian and democratic regimes to greater differentiation within each category (J. Nelson 1990). For example, Haggard and Kaufman (1992b) argue that stable two-party democracies have a better record on macroeconomic policy than do authoritarian governments but that authoritarian regimes are more likely to stabilize when inflation and social conflict are high (see also Kaufman 1986). These findings suggest, however, that optimism about the effect of democratization on economic perfor-

mance may not be warranted either. Whether economic performance improves depends very much on the nature of democratic institutions.

Transitions to and from Democratic Rule

The global wave of political liberalization and democratization since the mid-1970s has increased interest in the economic consequences of changes in regime (J. Nelson 1989, 1990; Haggard and Kaufman 1989a; Remmer 1990; Przeworski 1991). An incumbent regime that believes its days are numbered will be strongly tempted to drum up support through expansionist policies and delays of reform, even if this policy is self-defeating over the longer run. There is some empirical evidence that the political crises and stalemates that attend transitions from authoritarian to democratic regimes, and vice versa, are associated with macroeconomic instability (Haggard, Kaufman, and Webb 1991). Here we focus on the problems of transitions to democracy.

Political and economic conditions at the time of the transition have an important bearing on the ability of the new government to manage the economy. Authoritarian governments that improved economic performance through extensive and difficult reforms are better positioned to control the pace and substance of the political transition when they relinquish power; Chile in 1989 and Turkey in 1983 are examples (Haggard and Kaufman 1992c). The outgoing authoritarian leadership is also more likely to have built tacit or explicit bases of support for the new policy regime and to maintain control of the macroeconomic situation.

Many authoritarian regimes do not exit by choice, however, but rather come under pressure from popular protest, the defection of key economic elites, and internal divisions. A faltering economy seems to precipitate this type of transition. In many of the democratization experiences in Latin America, including Brazil in 1985 and Argentina in 1983, and in Poland more recently, the outgoing authoritarian leaders engaged in a last, desperate round of expansionist economic policies to shore up short-term support. Many of the economic imbalances that greeted the new democratic governments can be traced to the politically motivated actions of their predecessors.

Expectations about the policy behavior of new democratic governments may thus be somewhat contradictory. New democracies may have trouble maintaining stable macroeconomic policies and undertaking structural reforms (Haggard and Kaufman 1989a). Democratization is accompanied by an increased level of political activity, which provides the opportunity for previously repressed groups, such as labor, to press their demands. Frequently, governments respond with expansionary fiscal policies and higher wage settlements, and changed expectations then lead to higher inflation.

Transitions to democracy increase budget deficits and inflation, according to cross-section statistical evidence (Haggard, Kaufman, and Webb 1991). The evidence does not show, however, that new autocratic regimes systematically

reduce public sector deficits on coming to office, as posited by the authoritarian hypothesis outlined earlier, although inflation does typically decline. And new democracies experience more inflation for a given budget deficit than their authoritarian counterparts.

Incoming democratic governments typically enjoy a honeymoon period, when they can trade short-term economic losses against various political gains. The new government can more easily gain support for broad initiatives if the regime change occurred because of failures in economic policy (Przeworski 1991). The World Bank study on the politics of adjustment in new democracies finds several examples. The most striking is the comprehensive Polish program, initiated by a government with strong ties to the union movement. The social pact forged during the transition to democracy in Spain after 1977 also provides strong evidence that new democratic governments are more likely to succeed in initiating wide-ranging programs if they move quickly (Haggard and Webb forthcoming). By contrast, new democratic leaders in Argentina, Bolivia, and Brazil pursued more expansionist policies in their early days and delayed needed reform. When events finally forced them to adjust, the economic situation had deteriorated further, support for the government had dwindled, and its programs lacked credibility. Presidents Alfonsín of Argentina, Siles Zuazo of Bolivia, and Sarney of Brazil all left office with their economies in hyperinflation.

Electoral Cycles

A central insight of the theory of political business cycles is that timing is critical to successful reform (for reviews, see Nordhaus 1990 and Alesina 1988, 1990). Good macroeconomic and trade policies yield their payoffs gradually, but the costs of reform are borne up front. Simple models of the political business cycle thus postulate that parties in power will manipulate macroeconomic policy in the short run to maximize their electoral chances, stimulating the economy as elections approach and stabilizing immediately afterward.

Empirical evidence supporting the model has proved weak for industrial countries (Alt and Chrystal 1983: ch. 5; Alt 1985; Alesina 1988). Incumbent governments and opposition parties pitch their appeals to different segments of the electorate rather than choosing policies opportunistically to maximize the probability of election. The model has also been criticized on theoretical grounds, particularly the assumption that voters are myopic about the future consequences of electorally motivated policy. According to one succinct critic, the model assumes "a collection of rogues competing for the favors of a larger collection of dupes" (Barry 1985: 300). If voters anticipate the effects of expansionary policies and of postelection stabilization measures, efforts to manipulate macroeconomic policy in the short run should have no political or economic effect, and politicians would have no incentive to attempt such policies. The political cycle disappears.

But perhaps not in developing countries. As Rogoff and Sibert (1988) and Rogoff (1990) have demonstrated theoretically, informational asymmetries between a government and its citizens can generate a political business cycle, even if voters are assumed to behave rationally. Developing countries lack many of the institutional factors—such as independent media coverage of economic policy or histories of electoral experience—that allow voters to keep the opportunism of politicians in check. And in some developing countries, where poverty is extensive and welfare systems to cushion the costs of economic crisis are inadequate, voters may be more concerned with the short run. Under such conditions, they might support governments that deliver short-term material benefits, even at the expense of long-run welfare.

The one published cross-national study of the electoral cycle in developing countries, Ames's (1987) study of Latin America from 1947 to 1982, did find significant effects of electoral cycles. Comparative case studies by Joan Nelson and her colleagues (1990) also found some evidence of policy cycles tied to elections. An analysis with a broader sample of countries that controlled for other political variables, however, found no significant difference in the level of fiscal deficits or inflation in the year of the election, the year before, or the year after (Haggard, Kaufman, and Webb 1991).

Yet these findings on actual economic performance do not necessarily contradict the obvious intuition that reforms are more difficult to initiate before an election than immediately after. In middle-income countries with high inflation, the probability that a government will undertake a stabilization program declines significantly in election years and the preceding year (Haggard, Kaufman, and Webb 1991).

Partisan Orientation . . .

An alternative to the electoral cycle approach for exploring how elections influence macroeconomic policymaking focuses on the effects of partisan differences.¹ Such models assume that parties have macroeconomic policy preferences that reflect the material interests of their constituencies. Parties on the left appeal to labor, emphasize employment over inflation, and prefer taxation of capital; parties on the right have the opposite preferences. Pioneered by Hibbs (1977), this model has been tested empirically and refined theoretically for industrial countries by Alt (1985), Alesina (1987, 1988), and Alesina and Drazen (1991).

There is only scattered evidence from developing countries on how party orientation might affect policymaking, in part because the simple distinction between left and right—useful in understanding political cleavages in industrial countries—does not easily fit the developing world. A growing body of work describes a common pattern of economic policies associated with so-called populist governments. These governments typically come to power in countries with sharp social inequities after periods of wage control and, often, political

repression as well (Sachs 1989; Dornbusch and Edwards 1989, 1992). Populist governments seek to redress these problems through macroeconomic and structural policies intended to shift income to their core constituencies in the popular sector: a broad coalition of urban middle- and working-class groups, the informal sector, and the poor. As these heterodox experiments face mounting inflation and external imbalances, however, governments are forced to introduce stabilization measures, usually at high cost to the groups they were supposed to represent. Peru under Alan Garcia provides a classic example.

. . . And the Party System

A finding that emerges strongly from the comparative study of new democracies is the importance of the party system in organizing support for or opposition to reform. Dominant parties capable of ruling by themselves (and in presidential systems, presidents and legislatures of the same party) have the easiest time securing legislative support for their programs. Coalition governments fare less well, and minority governments and presidential systems in which the president and legislature are of different parties have the greatest difficulty. In general, fragmented party systems encourage bidding wars among contending political forces, make legislative support difficult to mobilize and ruling coalitions hard to sustain, and contribute to political instability (Haggard and Webb forthcoming).

Mexico provides an interesting example of the strong party case. Despite some political liberalization since the mid-1970s, Mexico's political system remains dominated by a powerful single party, the Partido Revolucionario Institucional (PRI), which has long controlled, co-opted, and reconciled contending social interests. The PRI's long-standing corporatist links with labor and the private sector were crucial elements in the president's ability to secure agreement and compliance with the heterodox stabilization program contained in the Solidarity Pact of 1989 (Kaufman, Bazdresch, and Heredia forthcoming).

In Poland major reforms were launched quickly when Solidarity constituted a broad movement with widespread support. Political difficulties with the program can be traced to the emergence of a highly fragmented party system, beginning in the summer of 1990. New groups challenged the program, and the proliferation of small, weak parties made governance substantially more complicated. In Spain after 1975, events unfolded in the opposite direction. The first post-transition government of the center-right (1977-82) had difficulty getting its program through the legislature because of its minority status. Disputes within the ruling coalition contributed to ministerial turnover. By contrast, the first socialist government (1982-86), with an absolute majority in the legislature, did not have to rely on coalition partners and faced little organized opposition. This dominance allowed it to push through a more comprehensive program than that of its predecessor (Bermeo and Garcia Duran forthcoming).

That the party system is important to cohesive economic policy is not simply an academic observation. Outgoing authoritarian leaders have openly altered electoral rules and party registration laws to extend their control into the next administration. Experiences in Turkey and Chile show how this can happen. In Turkey the political and economic difficulties of the late 1970s were attributed to an increasingly polarized and fragmented political system. The military-controlled election of 1983 was limited to three parties approved by the military. As the party system subsequently opened up, the constitution was amended, with electoral rules and thresholds designed to eliminate smaller parties from participating. The rules served as intended, providing a center-right, pro-reform party with a legislative majority in 1987, although it had received far less than a majority of the popular vote. The election of 1991 once again brought a coalition government to power, however, which would suggest greater difficulty in economic management than had been the case in the early post-transition period. Democratization in Chile took a different route, but Chile's experience shows how outgoing military regimes can control the transition. Pinochet was defeated in the presidential election of 1989 by a coalition of opposition parties, the Concertación. Before the transition, however, Pinochet had already established what Arriagada and Graham call "authoritarian enclaves" in the new democratic order. Pinochet directly appointed a number of senators and oversaw changes in the electoral rules designed to guarantee "adequate" legislative representation for the right.

Perhaps the most interesting experiment in shaping the party system is occurring in Nigeria. The Babangida government, seeking to avoid ethnic polarization and to circumvent traditional party politicians, announced that only two parties would be allowed to contest the transitional elections scheduled for 1992. Moreover, the government mandated that the platforms of both parties explicitly support the structural adjustment program. As the election date drew near, the government still considered the range of political discourse too broad. The election was postponed until 1993, with the added stipulation that none of the candidates who had stood in the aborted 1992 election could run again.

Governance and the Bureaucracy

The wide variation in the quality of economic policy within both democratic and authoritarian governments suggests that the prospects for policy reform also depend on characteristics of the state itself, particularly the discipline and competence of the bureaucracy (Callaghy 1989). Consequently, many structural adjustment programs require a selective strengthening of the government's role in the economy rather than a simple reduction in government intervention (Levy 1990).

An array of administrative and organizational factors contribute to the capacity of a government to function well. Among them are the efficiency with

which information is collected, decisionmaking is organized, and tasks are allocated among implementing agencies; the quality of personnel; and the integrity and transparency of the financial workings of government, including audit and review functions. Administrative reforms in these areas are clearly important for strengthening the capacity of the state over the long run.

Being able to function efficiently is not simply a matter of administrative competence, however; reform programs must also consider the milieu in which the bureaucracy operates. Pervasive corruption can make the bureaucracy itself a powerful and well-positioned interest group, aligned against reform and capable of obstructing the implementation of adjustment programs. Even in the absence of corruption, bureaucracies are subject to interference from politicians as well. A proper system of delegation is often the solution. No modern political system, including democratic ones, can function without some degree of delegation. Politicians can have an interest in transferring tasks and protecting the autonomy of the bureaucracy. Because the effectiveness of policies depends on the widespread belief that they will be sustained, politicians can fortify their commitment by delegating decisionmaking authority to autonomous institutions. This reduces the capacity to reverse their decisions in response to short-term considerations. A growing literature on central banks, for example, suggests that institutional mechanisms that permit greater autonomy of the central bank from the government have beneficial effects on inflation and real growth (Cukierman 1992; Cukierman, Webb, and Neyapti 1992; Alesina and Summers forthcoming; Grilli, Masciandaro and Tabellini 1992; Cukierman, Kalaitzidakis, Summers, and Webb forthcoming).

Developing a bureaucratic apparatus that is reasonably well insulated from corruption and political power typically requires more than short-term reform efforts. Socialization to professional norms and institutional reform are usually long-term processes (Evans 1992). But the incentives for corruption can be reduced through attention to institutional design. For example, one justification for a policy based on rules rather than discretion is to eliminate altogether agencies with discretionary powers that can serve as the locus for rent-seeking relations between the private sector and the government.

Economic Conditions

Economic conditions influence not only the policy agenda, but also the political actions of organized social groups and thus politicians' calculations about what can and what cannot be done. Three factors are especially relevant: the intensity and length of the economic crisis, the outcomes of previous reforms (or perceptions about those outcomes), and the distribution of income. External economic and political constraints also affect the adoption and implementation of programs.

Intensity of the Crisis

It seems intuitively obvious that crises trigger reform efforts (Webb and Shariff 1992). Crises increase a government's willingness to attempt remedial measures and the public's tolerance for them. Under democratic regimes, crises are likely to bring to office new governments with new programs. Economic crises also influence the balance of power among groups and the configuration of political interests by weakening some groups and strengthening others.

If the right groups are strengthened, support for reform may gather momentum. For example, the real devaluations associated with the debt crises in Chile, Mexico, and Turkey in the 1980s boosted the profitability of export-oriented activities, and those who stood to benefit developed into an important base of support for reformist governments. The same effect is possible if crises weaken the influence of obstructionist interests. A fiscal crisis can diminish the power of revenue-seeking groups and thereby serve as an impetus to reform. Waterbury's (1992) analysis of efforts to reform state-owned enterprises shows how countries experiencing profound fiscal dislocations, such as Mexico and Turkey, experimented with more radical reform of state enterprises than countries that avoided crisis in the 1980s, such as Egypt and India.

Despite these appeals to conventional wisdom, the concept of crisis is much more elusive than first appears. Governments respond differently even to balance of payments difficulties, the most strictly binding of constraints. Countries may ultimately adjust their current account by cutting back on imports, but they do not necessarily follow up with an appropriate policy response. Not all countries recognize the same crises, and no theory has yet identified a crisis threshold that all nations would recognize. At various points in the 1980s, the Thai, Colombian, and Indonesian governments responded preemptively to warning signals and undertook important economic adjustments before economic difficulties slipped into crisis. At the other end of the response continuum are several African countries—Ghana is perhaps the worst example—that experienced full-blown economic disasters year after year but failed to deal with them effectively. When the Rawlings administration finally seized power, it was certainly responding to a crisis; but this begs the question of why no action had been taken two or five or ten years earlier.

A crisis in no way guarantees that any remedial actions taken will be sustained or institutionalized. As the crisis winds down, the urgency of reform lessens and the political forces resistant to reform typically revive. The outcome can be a cycle of policy deterioration, economic crisis, temporary or partial policy reform, recovery, and relapse. Although no one has developed a theory that fully explains such cycles, their existence is recognized in several studies on the political economy of adjustment (Krueger 1980; Webb 1988; Dornbusch and Edwards 1989; Kiguel and Liviatan 1990; Fernandez and Rodrik 1991; Ranis and Mahmood 1992; Przeworski 1991).

Any analysis of the role of crisis in policy reform must pay close attention to the perceptions of politicians and policymakers about the economic difficulties they face. Joan Nelson has suggested, for example, that politicians and policymakers are less likely to take vigorous action if they attribute the conditions that constitute a crisis to external causes or consider them to be self-correcting. Her ultimate conclusion from a study of thirteen countries, however, is agnostic: "The nature of the crisis itself—its sudden or gradual emergence, its largely exogenous or substantially internal causes, even its severity—has little clear relation to the timing of policy response in many of our cases" (Nelson 1990: 325–26)

Collective Memory—Instructive and Selective

Years after any traces of a direct effect on the economy have faded, economic successes or failures of the past continue to mold politicians' views on policy reform. Economic experiences—whether "golden ages" or "nightmares"—provide elites with lessons and analogies that shape their current decisionmaking, however different the conditions. Not surprisingly, the policy decisions that spring from these influences are often questionable. For instance, in the 1920s and again in the 1950s, the British government sought to restore the prewar exchange rate, in part because policymakers associated a strong pound with prosperity. Such misapplied lessons of history are then institutionalized in policy routines or in organizational arrangements that have a persistent influence on policy.

A more positive example concerns countries that have experienced episodes of hyperinflation. West German interpretations of interwar history typically attach great importance to fiscal deficits and hyperinflation as causes not only of severe economic distress but also of the rise of fascism. Thus, West Germans tend to view price stability as a more important policy objective than full employment, even though Germany also suffered from extraordinarily high unemployment rates between the two world wars. These perceptions of cause and effect had a profound influence on postwar economic policy and institutions, such as the independence of the Bundesbank. East German leaders, by contrast, played up memories of unemployment to justify taking an anticapitalist route. In Taiwan, as in West Germany, the establishment of a strong and independent central bank was influenced by the country's experience with hyperinflation. Indonesia's fiscal policy has been bounded by a balanced budget rule since the high inflation of the 1960s. The outgoing military regime in Chile—which had taken office amid a burst of four-digit inflation—was able to gain support from the incoming opposition government for measures to increase the central bank's independence.

The institutionalization of import-substituting policies in Latin American countries following World War II similarly owed much to interpretations of past events. The policies grew out of the memory of the international environ-

ment between the wars and the mistaken belief that short-term declines in commodity prices in the 1950s represented a secular trend. The policies had an enduring influence, in part because policymaking institutions, such as those concerned with trade and industrial policy, grew up around them and provided political access for groups that stood to gain from import-substituting activities (Sikkink 1990). Reducing the influence of such muddled legacies often requires not only changes in policies, but also institutional changes that reduce the incentives and possibilities for the undesirable policy to reemerge.

Income Distribution

A third economic factor that affects the success of policy reforms is the distribution of income (Berg and Sachs 1988; Boeninger 1991). Sharply unequal income distribution creates social and political divisions that undermine consensus for economic reform, increases uncertainty about the actions of future governments, and shortens time horizons, producing such undesirable economic outcomes as tax evasion, capital flight, investment strikes, and unreasonable wage demands.

When income distribution is seriously imbalanced, agreement on any package of major reforms will be complicated by considerations of whether to broaden the reforms to include a redistribution of income or even of assets. Alesina and Tabellini (1988), for example, develop a model in which greater inequality leads to polarization of contending parties, undermining the cooperation required to sustain macroeconomic stability. Berg and Sachs (1988) find that income inequality increases the probability of default on debt, and Sachs (1989) finds that it increases the proclivity to follow counterproductive populist policies. These findings underline the importance of compensatory policies in the adjustment process and thus in program design.

External Influences

The influence of external economic and political factors on domestic policymaking in developing countries has been a subject of contentious debate for decades. Building on the structuralist economic arguments of Prebisch and Singer and a Marxist sociology, a wide-ranging literature has emerged on the (generally pernicious) role of external influences on economic development.

In a review of this literature, Stallings (1992) notes that there are at least three channels through which the external milieu might influence policy choice. First, cycles of prices and demand can influence the propensity for reform. Ranis and Mahmood (1992) expanded this line of thinking, arguing that policy changes in developing countries can be traced to fluctuations in world prices of primary products and to business cycles in industrial countries. Shifts to more outward-oriented development strategies are more likely during the

boom phase of the cycle, when external conditions favor export diversification. Returns to more inward-looking strategies recur during the down phase. Although there appears to be some evidence of this kind of cycle in the past in Latin America, the current wave of reform contradicts the argument: external shocks have pushed several countries toward liberalizing reform.

Second, policy choices are influenced by international networks and socialization that result in the transmission of policy-relevant knowledge (Kahler 1990, 1992; Hall 1990; Drake 1989; Sikkink 1990). These networks include foreign advisers, training programs for technocrats at foreign universities, government-sponsored exchange programs, and work experience in multinational corporations.

Finally, external actors seek to influence policy more directly through loan conditionality (the subject of a rapidly growing literature; see Dell 1981; Williamson 1983; Killick and associates 1984; Fishlow 1990; Kahler 1990, 1992; Polak 1991; Mosley 1987; Berg and Batchelder 1985; Haggard 1986; Remmer 1986). Mosley, Harrigan, and Toye (1991: ch. 3) portray conditionality as a bargaining game with several steps. The international financial institutions may have leverage at the outset, when the government's need of support is urgent, but the success of the program depends on its implementation. As Putnam (1988) has argued most clearly, implementation of the agreement struck internationally is always contingent on domestic political negotiation or ratification. And that brings into play the types of political factors described in this article.

At the center of the debate about the politics of conditionality—to be distinguished from the economic issue of whether programs will have the desired effects—is the extent to which outside agencies actually influence the policy process. On the one hand, unity among creditors and their power over the flow of financial resources provide them with substantial influence. Extra external resources can increase the political sustainability of reforms by allowing the country more consumption while sustaining higher levels of investment. In that way, external support can lengthen the time horizons of politicians.² There are cases in which the lack of such external support—or, more extreme, the demand for resources through debt repayment—weakens the political position of reform advocates (Berg and Sachs 1988; Kaufman 1986; Maxfield 1990; Webb 1988, 1989).

Kahler (1992), on the other hand, argues forcefully that because of several peculiar features of international credit markets and the conditionality bargain, this received wisdom about external influence should not be taken for granted. For one thing, creditor governments, the potential enforcers of these agreements, have multiple and conflicting goals with respect to debtors. The concern to support a strategically important client can easily override the interest in enforcing conditionality. Where leaders are already committed to a reform program, as in Turkey in the mid and early 1980s, additional finance may help it succeed, although usually by supporting efforts that would have been under-

taken anyway. But when nonconditional resources are made available to countries disposed against reform, such as the Philippines under Marcos or Zaire under Mobutu, the additional finance creates perverse incentives, allowing governments to postpone adjustment.

Some strategic problems arise from attempts to impose external conditions in a system with critical informational asymmetries, difficulties in effective monitoring, and no overarching enforcer of contracts (Crawford 1987). Debtor governments seek to maximize available finance, minimize servicing costs, and smooth the domestic political and economic costs of implementing reforms. Creditors seek the opposite: a minimum of finance in return for broad and swift adjustments. Debtors have an incentive to exaggerate the difficulty of undertaking reforms and to seek support for reforms they would have undertaken anyway.

Closer monitoring, splitting up loan disbursements, and insisting that some reform take place before loan disbursement or even negotiation—such changes in the operations of the international financial institutions during the 1980s can be viewed as efforts to overcome such strategic dilemmas. The adoption of reform measures before external support is secured is usually a reliable sign that reform programs will be implemented. Kahler (1992) argues that governments committed to policy reform will probably undertake them in any case and that those opposed will resist. Similarly, World Bank (1988, 1990, 1992) reports on adjustment lending have concluded that in the absence of firm and open government commitment, lending can undermine rather than fortify reform efforts. The reports nonetheless recognize that in many cases the provision of external resources with attached conditions helps pro-reform groups within the government prevail against anti-reform groups.

The empirical evidence appears to support these expectations, although all studies in this vein note methodological problems of determining compliance. Haggard's (1986) survey of IMF Extended Fund Facility programs finds a high level of noncompliance and program cancellation due to domestic political factors. Kahler (1992) finds that during the 1980s, in only nine of nineteen cases examined had the governments implemented coherent stabilization programs, and in only five were structural adjustment programs sustained. In an intensive study of nine countries receiving World Bank structural adjustment loans, Mosely, Harrigan, and Toye (1991) find that only Thailand and Turkey actually met more than two-thirds of what the authors considered key conditions attached to the loans. Ghana, Jamaica, Malawi, and the Philippines implemented between 55 and 63 percent of conditions, and Ecuador, Guyana, and Kenya less than 38 percent. The World Bank (1990, 1992) and other studies (Williamson 1990) suggest that compliance has improved and that the range of variation may have narrowed somewhat over time. However, in a study of IMF programs in Latin America in the postwar period, Remmer (1986: 21) concludes that "the power of the IMF remains a useful myth for governments seeking a scapegoat to explain difficult economic conditions associated with severe

balance of payments disequilibria, but the ability of the IMF to impose programs from the outside is distinctly limited.”

Design of the Program

Policymakers undertaking economic reform rarely have much influence over the political structure or fundamental economic situation of a country, but they have considerable control over the design and tactics of reform. Yet the optimal political design of programs is only beginning to receive attention (Przeworski 1991). A starting point is the observation that economic reform must be viewed as an exercise in coalition-building (Waterbury 1989). From a long-term perspective, the social benefits of reform outweigh the costs. The political issue is whether adequate mechanisms exist to marshal support among winners and to neutralize or compensate losers within a time frame that is relevant to a politician.

These observations suggest several hypotheses about the conditions for effective reform. Initiatives are more likely to succeed if governments, particularly the implementing agencies, are somewhat insulated from interest-group pressures. We have already explored some of the conditions conducive to such autonomy, including the type of regime, timing relative to the electoral cycle, and the nature of the bureaucracy. Over the longer run, however, consolidating reform requires building and institutionalizing a new base of political support among emerging winners. So the crucial transition is from an initial position of autonomy (usually temporary), when supporters of the status quo are politically weakened, to a new equilibrium that consolidates the new bases of support that have emerged. We consider here three elements of program design that might affect this transition path: how quickly the program is initiated, in what order the reforms are introduced, and whether and how losers are compensated.

Tortoise or Hare

Economic conditions or the nature of the reforms may give policymakers little leeway about how to pace the reforms. Hyperinflation or the depletion of foreign exchange reserves usually stimulates some immediate response. In general, the economically optimal speed for exchange rate correction, stabilization, and most domestic price reforms is as fast as is technically feasible. Delay has high economic costs and casts doubt on the sincerity of the reform effort. Privatization, financial sector reform, and trade liberalization may take longer to implement because complementary institutional changes are needed to make these policy adjustments effective.

Most, but not all, political considerations support the argument for moving quickly. The way speed affects the political balance between winners and losers argues for rapid reform. Often, the fate of a reform program depends on the

emergence of new beneficiaries to support it. A necessary, although not sufficient, condition for that to happen is rapid implementation, a condition that holds even in democracies. As Przeworski (1991: 174) argues, “radical programs are more likely to advance reforms further under democratic conditions even if most voters would have preferred to start with a more gradual strategy.” Pushing reforms rapidly through the system can also weaken interest groups that are tied to the status quo and give antireform forces little time to mobilize (Douglas 1990). This positive dynamic of rapid reform is evident in Israel’s stabilization in 1985, Korea’s reforms in 1964–65, Turkey’s exchange rate and trade reforms in 1980 (Bruno and Piterman 1987; Haggard 1990; Celasun and Rodrik 1989), and more controversially in Poland in 1989–90 (Johnson and Kowalska forthcoming).

Putting reforms in place quickly at the beginning of a new administration also means that the reforms have time to put down strong roots during the honeymoon period, when support is high and opposition muted. A new government that takes office in the middle of a severe crisis and acts immediately can blame the decline in living standards on actions of the previous government. The longer the government delays, the more likely that the costs of adjustment will be attributed to the current government, increasing the level of opposition. New democratic governments taking over from authoritarian regimes are in especially good position to trade political gains against short-term economic losses. Spain in the late 1970s and Eastern Europe in recent years demonstrate this pattern.

Yet another argument for speedy reform rests on credibility. A government that acts without delay strengthens the public’s belief that the reform will be maintained steadfastly over time (Calvo 1989; Froot 1988; van Wijnbergen 1985; Przeworski 1991; Cukierman and Liviatan 1992). Rodrik (1989), for example, develops a model in which uncertainty on the part of economic agents about the government’s future intentions affects investment behavior. He shows that a reform-minded government could signal the seriousness of its commitment by overshooting—by initiating reforms of a magnitude or at a pace that an uncommitted government would never attempt. When a program is implemented slowly, confidence in it deteriorates as anticipated benefits fail to emerge. The government retreats with its credibility diminished and in the next round must take even bolder action to signal its commitment. But even this bold approach is likely to be unconvincing, thanks to the legacy of past failures. This cycle is visible in the experience of several of the high-inflation countries in Latin America in recent years, including Argentina and Brazil.

Concerns about credibility can also support a more gradual approach. Rapid adjustments tend to provoke resistance because they are more unsettling and have higher short-run costs. Riots in response to rapid price reforms are typically cited as a cost of moving too quickly (but see Bienen and Gersovitz 1985 for another view). Because firms and households can shift into new activities only with a lag after a program is put in place, shock programs face the hurdle

of getting through an extended period of extremely limited support, because the economy has not yet responded. Going slow limits the initial costs and allows some of the front-end benefits to unfold and attract supporters before the next round of reform measures hits. This go-easy strategy seems more applicable to certain types of structural realignments than it does to macroeconomic policy, though, and has worked best in countries where macroeconomic imbalances are not severe, such as China, Indonesia, and Thailand (Doner and Laothamathas forthcoming; McMillan and Naughton 1992).

Phased or Bundled

Closely related to the pace of reform is its sequencing: whether reforms should be undertaken in stages or all at once. The lesson drawn from the experiences of the Southern Cone countries of Latin America in the 1970s is to stabilize the economy first. Recently, however, there has been greater recognition that combining trade reforms and macroeconomic reforms can increase confidence in the government's commitment to macroeconomic reform when it has a record of failing to follow through. Thus, economic considerations may not dictate a clearly superior sequence, giving political considerations a role.

Rodrik (1992) advances the idea that the political attractiveness of reforms depends on the ratio of the gain in output to the amount of redistribution. Trade reforms generally have a low ratio of efficiency gain to redistribution, macroeconomic policy reforms a high ratio. By packaging these reforms together, Rodrik argues, the gains from macroeconomic policy reform can offset the distributive costs of trade liberalization. This may help explain the large number of successful trade liberalization programs that developing countries undertook during periods of macroeconomic crisis in the 1980s.

The World Bank study on economic adjustment in new democracies finds that the strategy of bundling reforms has an additional advantage for relations with the private sector (Haggard and Webb forthcoming). In general, stabilization and structural adjustment offer mixed results for private sector groups, which are likely to gain from some aspects of adjustment and to lose from others. Bundling reforms allows a government to offset the losses associated with one component of the program with the gains from another—a form of compensation.

Compensation

The political argument for compensation has been cast in normative as well as positive terms. Governments may have clear moral reasons for assisting the poor. It has also been argued that compensation may be necessary to secure political support for reform—or at least acquiescence. This argument was

advanced by the well-known UNESCO study *Adjustment with a Human Face*, which defended compensatory programs for the poor (Cornia, Jolly, and Stewart 1987).

There are three possible counterarguments to compensation. First, a country simply may not have the funds to compensate losers; this has been a recurrent theme in the literature on poverty alleviation during adjustment and an important argument for adequate external assistance (World Bank 1990). Second, some types of compensatory measures may undermine the reform. Compensating workers for a nominal devaluation by increasing wages directly undermines the objective of increasing competitiveness. And third, the likely recipients of politically motivated compensation may not be the poor (Nelson 1992). The UNICEF study assumes that the poor are a politically significant group in resisting adjustment, but this is not typically the case. The greatest political threat to stabilization and adjustment programs are urban groups, including organized labor and the business sector generally. Compensating these groups may be difficult to justify, however, and may undermine the effectiveness of the program.

The studies in the World Bank project generally found, however, that some sort of compensation was crucial for securing support for programs (Haggard and Webb forthcoming). In the more successful cases—Chile, Mexico, Spain, and Thailand—compensation came in the form of complementary reforms, measures that provided effective compensation and enhanced welfare and economic opportunity over the longer term while minimizing inefficiencies. Typically, these measures did not include *direct* compensation schemes for losing groups.

If the optimal program economically is also the most effective program politically, the criteria for politically effective compensation should parallel those for economically effective compensation. In particular, compensation should seek to ease rather than reduce the reallocation of labor and capital in line with movements in relative prices.

The Concertación in Chile and the socialists in Spain (1982) came to power expecting to protect the interests of labor and the poor. Realizing that wage increases and direct subsidies would derail needed fiscal adjustments, they instead took measures to improve the distribution of health and education services and to widen the social safety net for the poor. International agreements with the United States and Europe to increase export opportunities helped compensate firms in Chile, Mexico, Poland, Spain, and Turkey that were accustomed to selling in protected domestic markets. So did export incentives in Thailand and Turkey, which accelerated the growth of exports and the expansion of pro-adjustment export interests.

The political effects of more direct compensation efforts proved unclear. In Turkey, organized labor and agriculture were the groups most hurt by the adjustment in the early and mid-1980s. As the expansion of democracy in the late 1980s brought these groups back into the political process, the government tried to compensate them for previous losses and win their support through

generous increases in wages and farm price supports. Wage increases in the private sector were justified by productivity growth and were coming about through market forces, especially after the rights of unions to organize and strike were reinstated. Direct government spending for wages and subsidies not only contributed substantially to the deterioration of the fiscal balance but still did not result in any political gain; labor and agriculture voted mostly for the opposition parties that won in the 1991 elections.

Direct compensation schemes worked well economically in Chile because they were well targeted, but they certainly did not win support for the Pinochet government or for the adjustment program. The schemes did work politically for the Concertación, because of the agreements that underlay the transition to democracy. Labor and the rural poor were core constituencies of the Concertación parties and knew that their interests would be addressed in the long term. Similarly, the close relationship between the socialist government in Spain and the labor movement allowed the ruling party to use limited welfare measures to win political support.

The evidence from the case studies points to the conclusion that compensation measures are usually necessary to sustain political support for adjustment. But they succeed neither economically nor politically if they offer incentives contrary to the overall thrust of the program.

Is Political Economy Analysis Relevant for Policymaking?

Prescriptive policy analysis by economists aims to identify measures that are optimal according to such criteria as efficiency, stability, or growth. Positive political analysis, however, is often concerned with why optimal policies are not adopted. The findings of political analysis involve parameters that cannot be manipulated in either the short or the long run. What practical use is it, for example, to point out that inflation or trade policy are the result of the underlying social structure or the fragmentation of the political system?

Political analysis of economic policy can be of practical use in at least three ways. One is by taking into account the likely political fallout of a program when the program is being designed. An example is the need to complement the speedy initiation of a program with the right compensatory mechanisms to build support and blunt opposition. A second area is the design of institutions and decisionmaking processes within government. Some of the difficult problems of collective action, such as reconciling spending and revenue decisions, have to do with organizational features of the government that are amenable to change. Surprisingly little systematic work has been undertaken on how the organization of decisionmaking is likely to affect the success of adjustment efforts.

The final insight of the new political economy concerns the timing and content of conditionality. A program that raises expectations, engenders domestic hostility to external agencies, but is doomed to failure for political reasons can

be worse than no program at all. Ill-timed external assistance can allow governments to continue misguided policies. Political economy has not yet devised a clear set of guidelines for making judgments about the wisdom of lending by the international financial institutions, but it can help sensitize these agencies to the likely outcomes of their efforts.

Notes

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1. No one has yet systematically considered how party orientation would affect trade policy. How parties on the right and left align on the subjects of free-trade and protectionism seems to depend on other country-specific factors, such as the openness of the economy and international competitiveness of national business.

2. Evidence from the 1980s suggests, however, that countries receiving substantial adjustment lending from the World Bank did better at sustaining consumption than investment (World Bank 1990, 1992).

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USING AUCTIONS TO ALLOCATE AND PRICE LONG-TERM CREDIT

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Most long-term credit in developing countries is allocated through negotiated agreements between government institutions and financial intermediaries or final borrowers, and often at administered rates. Yet many developing countries have no long-term credit market whose interest rates can be used as benchmarks for these loans. If credit is priced improperly, it will be allocated inefficiently and the development of capital markets may be stunted. In light of the generally disappointing experience with conventional methods of allocating development credit, some countries have introduced credit auctions as an alternative. Among the advantages are greater transparency and fairness, lower transaction costs, and increased competition and efficiency. Among the disadvantages are a greater vulnerability to collusion, which can lead to lower interest rates and revenue, and a tendency to attract the least desirable participants (adverse selection) and to lend for riskier projects (moral hazard), which can lead to lower repayment rates and a higher probability of default. All these factors can lead to inefficiency in the allocation of funds. This article suggests ways to lessen these negative effects and presents various elements of auction design that affect the efficiency of credit auctions and their suitability to specific circumstances. When properly designed, auctions can be used in a variety of environments to allocate development credit more efficiently than current methods do.

Most developing countries seeking long-term financing in world capital markets either receive less credit than they want or are charged premium rates because of their high assessed financial and political risk. Consequently, they often turn to bilateral and multilateral lending

organizations for better terms. Sometimes the funds are used directly for government programs or projects, and sometimes they are channeled to the private commercial sector as long-term credit. Governments can usually get foreign credit on better terms than can private companies because of their access to official lenders and because they offer sovereign guarantees.

Whether the funds are channeled to the commercial sector through a government institution or a financial intermediary, pricing them at each stage in the lending chain is problematic. Many developing countries have no long-term credit market whose interest rates can be used as benchmarks. If credit is priced improperly, it will be allocated inefficiently, and capital markets may remain stunted. Furthermore, differences between the borrowing rates to government and any guesstimated interest rate to final borrowers are likely to be large enough to generate rents. And because relatively large sums are involved, the rents are often substantial. That means that the incentives for corruption and wasteful rent-seeking activities are large—and so are the corresponding welfare implications.

Pricing the funds at the opportunity cost of capital (market rates) at all stages of the lending chain minimizes these problems. The result is an efficient allocation of capital that provides the right signals for capital markets and allows the government to capture any rents. What, then, is the best mechanism for inducing pricing at market rates and for allocating credit efficiently?

The traditional approach has been to establish administrative arrangements for pricing and allocating credit. A government institution either lends the funds directly to final borrowers or operates as a second-tier financial institution, allocating and pricing funds through rules and bilateral negotiations with financial institutions that then lend the funds to final borrowers. The amounts and interest rates are usually negotiated between the lender and the borrower or are based on administered rules. That arrangement allows for significant discretion on the part of the lending government agency, and insofar as the rates are not market clearing, the excess demand presents the problem of how to ration the credit. Often the mechanisms for allocating and pricing credit are obscure, and prices do not reflect the opportunity costs of capital. And all too often this system has resulted in fraud and corruption, rent-seeking activities (with a large share of the rents captured by financial intermediaries and other influential groups), arbitrary allocations of credit, pricing distortions that impede the development of capital markets, and a worsening of income distribution.

To avoid such distortions and welfare losses, developing countries and international lending organizations alike began to explore alternative mechanisms for allocating long-term development credit. One alternative that has elicited considerable interest is auctioning development credit to financial institutions that meet certain minimum eligibility requirements. Bolivia and Chile, though quite different in the sophistication of their financial markets and the development of their economies, have both introduced credit auctioning in recent years. Honduras is scheduled to begin auctioning credit in 1993. Other coun-

tries in Latin America and the Caribbean, including Argentina, Colombia, Ecuador, Jamaica, and Peru, are considering credit auctions. Mexico has recently implemented an auction that gives participants—financial institutions—the right to draw funds under certain specified conditions (credit-line auctioning).

This article looks at the rationale for credit auctions, various auction designs, and the tradeoffs involved, examining these issues within the framework of two overarching questions.

- *What is the appropriate environment for auctioning development credit?* What are the tradeoffs between allocating credit through auctions and allocating it through conventional bilateral negotiations with financial institutions?
- *How should the auction be designed so as to allocate resources efficiently?* Among the issues to be resolved: Should the objective of the auctions be to maximize expected revenue, to maximize efficiency, or to elicit high interest rates? How should participants be screened or certified? Should credit or credit lines be auctioned, and should a single product or multiple products be auctioned (products with fixed interest rates, with variable real interest rates, in various currencies and maturities)? What type of auction (oral or sealed bid) and pricing rules should be adopted? What should be done to avoid collusion or adverse selection? What information should be made public before and after the auction?

Advantages and Disadvantages of Auctioning Credit

Unlike sellers at auctions of goods, services, and securities, sellers at credit auctions do not receive the full value at the time of the transaction, and there is considerable uncertainty about the final outcome or realized net value. Risk is present because the credit is not fully collateralized and because the performance of subloans or projects is uncertain. Furthermore, inefficient financial markets may not provide accurate signals about the opportunity costs of capital or offer sufficient incentives to control for differences in information. To deal with these risks and imperfections, countries have relied on negotiated bilateral agreements to allocate credit. The great bulk of credit around the world is now allocated through bilateral negotiations that allow for assessing the risks of individual loans and borrowers and for credit rationing through quantity controls and individualized interest rates.

Relying on negotiated agreements is justified in industrial countries, where well-developed and efficient financial markets, market discipline, competition, and accountability provide the right incentives and environment to allocate credit efficiently. In developing countries, however, the use of negotiated agreements is more difficult to support because of weaker financial markets, lack of reference interest rates, less market discipline, lax accountability for financial and government institutions, and an often unstable macroeconomic en-

vironment. And, indeed, performance, as measured by contracted interest rates, loan recovery rates, and degree of compliance with allocation targets, has been quite poor. These factors seem to argue for the need for a different institutional mechanism for credit allocations.

Why have neither governments nor markets responded with better mechanisms for allocating credit? And why have development banks often opposed proposals to auction development credit? One possible reason is that government agencies and financial institutions responsible for allocating development credit worry that auctions diminish their leverage and power to share rents with certain groups. What are the advantages and disadvantages of auctions?

Advantages

Credit auctions have at least five powerful advantages over conventional methods of disbursing credit.

- *Transparency and fairness.* The criteria for allocating credit are usually clear, and funds are distributed solely on the basis of bids. Individuals and institutions have little scope for favoritism or arbitrary behavior in allocating funds, so illicit deals between officials and credit seekers are difficult to arrange. Auctions also score high on fairness since all bidders have the same opportunity to bid on funds.
- *Transaction costs.* Conventional methods of disbursing credit have long been faulted for their numbingly detailed and time-consuming bureaucratic requirements that unduly prolong the time between application and approval and disbursement. The experiences of Bolivia and Chile show that auctions reduce the time and costs involved in allocating credit.
- *Competition.* Auctions give rise to more competitive behavior than do conventional bilateral negotiations, in which the possibilities for using political influence tend to attract rent-seeking behavior. Any advantages a bidder may have in an auction come from a greater efficiency in processing loans or assessing risks, from a greater willingness to bear risk, or from legal restrictions that bear on the costs of raising funds elsewhere. In countries where there is no obvious reference interest rate for long-term funds, credit is more likely to be allocated at interest rates that reflect the opportunity costs of funds through auctions, where borrowers set the rate with their bids, than through conventional lending mechanisms, where the lender usually determines the rate. Because the borrower has better information than the lender about the opportunity costs of capital, auctions can allocate funds more efficiently.
- *Rent-seeking activities.* Auctions virtually eliminate opportunities for rent-seeking. Clear rules and the open and competitive nature of auctions leave little opportunity for wasteful rent-seeking activities, particularly if the problem of collusion is properly addressed.

- *Price discovery.* Auctions of long-term development credit are particularly appropriate in countries without an equivalent financial market instrument. Long-term credit is often intended to facilitate and promote the development of a securities market, and the prices elicited at auctions can serve as references and signals for enterprises that are considering the issuance of long-term debt.¹

Disadvantages

Auctions have several disadvantages. *Collusion* among financial institutions, difficult under conventional lending practices, is a real threat in credit auctions. In many countries the small number of banking or financial institutions—with a history of collaboration among them—and tight oligopolistic markets suggest that collusive or coordinated activities are likely to be considered.

Auctions exacerbate some problems that arise in conventional lending. One is *adverse selection*, or the tendency to attract the least desirable participants, in this case those with the highest risks. Auctions are relatively more attractive to institutions with high propensities to take risks, so those institutions will end up with a larger-than-desirable proportion of funds, increasing the probability of defaults. There are systematic reasons for supposing that institutions willing to offer the highest bids for funds present a greater-than-average credit risk. Riskier banks have higher alternative costs of funds than less risky ones, so to place new debt (bonds), or to attract new deposits, for example, riskier banks must offer higher interest rates. Thus it is consistent for high-risk institutions to bid higher rates than less risky ones. In that sense, auctions bias the allocation of funds in favor of riskier institutions. In credit auctions, then, higher rates need not reflect greater efficiency or higher expected revenue to the lender, since the probability of default can also be higher.

Another problem auctions share with conventional lending is *moral hazard*, that is, the inability of the lender to control how the borrower uses the funds. The higher the interest rates bid in an auction, the more likely the intermediate lender will feel compelled to lend for riskier projects or investments at higher interest rates, thereby increasing the probability of default. The problem looms larger in credit auctions than under conventional, negotiated agreements because in auctions there are generally no restrictions on interest rates or on the total amount of funds that can be awarded to an institution. Conventional lending practices rely on quantity rationing and the use of more extensive and complex contractual terms to protect against this problem.

Collusion leads to lower revenue and interest rates, while adverse selection and moral hazard lead to lower repayment rates (higher probability of default). And all of them generate inefficiencies in the allocation of credit. There are ways to lessen these effects, however, through the design of the auction mechanism or through complementary measures. When properly designed, auctions

can be used in a variety of environments to allocate development credit more efficiently than current methods do.

When to Consider Credit Auctions

Credit auctions are not appropriate in all environments. For one thing, development credit auctions should be part of an overall program of financial sector reform. Beyond that, credit auctions may be an appropriate option when the following conditions exist.

- *Current mechanisms do not allocate credit fairly and efficiently, and the rents are not fully captured by the intended beneficiaries.* There should be substantial evidence of arbitrariness, favoritism, or corruption in the existing scheme; large discrepancies between onlending rates to first-tier institutions (that is, lenders to final users) and final borrowers relative to some quasi-market rates or the opportunity cost of capital; and unsatisfactory repayment rates.
- *There is no reasonable proxy reference interest rate for long-term credit to use as a benchmark in negotiated agreements.* In countries where macroeconomic and political volatility are high, uncertainty about the value of long-term credit is usually so great that no market exists for such instruments. In many developing countries, the maximum term for loans is one year. When there is no obvious reference rate for long-term credit, auctions will probably come closer to reaching a true assessment of the value of long-term credit than would government agencies trying to set a rate through negotiated agreements.
- *There is evidence that competition exists or can be induced in the banking and financial sector.* The likelihood of collusion falls as the number of participants rises, but most of the gains from competition are captured when there are at least three to five participants. After that, the additional reduction in the potential for collusion that comes with each additional participant is fairly small.
- *State-owned banks do not dominate the banking sector.* Auctions of credit by the government to state-owned banks could result in more distress bidding (uncorrelated with and often above valuations) and in prices that do not reflect opportunity costs. The lack of market and financial discipline in those institutions is likely to undermine the benefits that auctions can provide. And because the government is both buyer and seller and so could manipulate the outcome, the auction loses credibility.
- *Supervisory agencies have demonstrated the competence and administrative capacity to monitor and assess the credit risk of potential participants.* Unless adequate supervisory infrastructure is in place, problems of adverse selection and moral hazard can be exacerbated, diminishing the effectiveness and efficiency of development credit auctions. The absence of this critical

institutional infrastructure would, of course, present problems for any mechanisms for allocating development credit, not just auctions.

Two other special circumstances merit mention. Governments should not use auctions to create a market for types of lending products that could develop on their own within a country's existing capital market. In countries such as Chile that have a well-developed financial system with rapidly developing capital markets and nonbank financial institutions, auctions need to be designed with special care to complement rather than retard the development of these markets. For example, when the Chile Development Bank auctions off multiple, customized products including fixed real rate loans, other lenders have less incentive to offer those types of assets, which may retard the development of domestic swap-market-like instruments for transforming floating real rate loans to fixed real rate instruments.

Controlled interest rates are another special circumstance. Although some of the benefits of auctions may be lessened when interest rates are controlled, auctions under those conditions enable the government to capture rents that would otherwise go to financial intermediaries. Under administered interest rates one rate is set for the final borrower and another for the financial intermediary, with the spread between the rates large enough to cover the costs of lending and with both rates lower than the "market" rates. On paper all parties comply with the fixed rates. But in practice some of the rents (the difference between the administered rate and the "market" rate) intended for the final user actually go to the financial intermediary, as a result of under-the-table negotiations. With an auction mechanism, only the rate to the final user is set. Financial intermediaries, in deciding what rate to bid, start from the fact that the funds will have to be lent at the controlled rate. If there are no under-the-table arrangements, the bids will reflect efficiency in intermediation only. If there are under-the-table agreements, competition for funds will push bid rates up, allowing the government to capture some of the rents that would have gone to intermediaries.² Implementing auctions under these circumstances might create greater pressure to liberalize interest rates.

Design Issues

Credit auctions can take many different forms. Among the design issues to be considered are who should be allowed to participate, what products should be auctioned, what bidding and pricing rules should apply, and what information should be made available to participants.

Who Should Participate?

The structure of the banking system and its mode of ownership are the two primary considerations for establishing participation criteria. The important

aspects of structure are the degree of competition and the performance history of the sector.

Where most of the financial institutions are privately owned and the sector operates competitively, only private institutions should be allowed to participate in auctions. In countries with a developed leasing market or other nonbank financial sector, private companies engaged in those activities could join banks as participants. Since leasing firms specialize in long-term lending, allowing them to participate would reduce financial intermediation costs and increase efficiency, as Chile's experience shows (Guasch and Glaessner 1992). The participation of other types of institutions is particularly beneficial when competition in the banking sector is weak. With a larger pool of participants and greater heterogeneity among them, the opportunities for collusive arrangements shrink.

Where there is a mixture of state and private ownership in the financial sector, credit auctions can still be an effective mechanism for disbursing credit. Only privately owned institutions should be allowed to participate directly, but state-owned institutions could be allowed an indirect role through noncompetitive bidding: state-owned institutions that meet all eligibility requirements—except, of course, private ownership—could have the option of obtaining funds at the average interest rate prevailing at the auction. This is usually done by setting aside funds. The quantity depends on the demand by state institutions and total funds available. The auction committee makes the decision, subject to publicly known guidelines.

Where most banking and financial institutions are state-owned, auctions are not an appropriate mechanism. Bid rates are likely to be meaningless in the absence of market and financial discipline. The opportunities for manipulating interest rates would cast doubt on the integrity of the process as well. Negotiated rates, based on whatever "market" indexes are available, would be preferable under those circumstances.

Once eligibility has been broadly established, finer screening will be needed to keep out high-risk institutions. An independent risk-rating agency should be used to determine which institutions should be excluded. The best control over adverse selection is to establish a clear set of certification criteria, based on external rating when available. It is also important to establish limits on the amount that any one institution can borrow, particularly the weaker ones, with the amount being adjustable over time according to the institution's performance. This feature introduces discretion to the auctioning committee, but no more than in negotiated bilateral agreements.

What Products Should Be Auctioned?

Decisions need to be made about whether to auction credit or access to credit (credit lines), whether rates should be fixed or variable, and whether a

variety of maturities and currencies should be offered. When credit is auctioned, bidders submit a two-part bid listing quantity and interest rate desired; successful bidders receive the desired quantity shortly after the auction. When access to credit (credit lines) is auctioned, the auctioneer selects an interest rate, and bidders submit a quantity bid and a nonrefundable fee for the right of access to that amount of credit at that interest rate over a specified period selected by the auctioneer. Bids are ranked from highest to lowest according to the fee per quantity bid. Any funds not drawn down by the end of the specified period revert to the auctioneer.

When credit is auctioned, bidders prepare projects or loans, usually contracted on a contingency basis, before the auction and are ready to relend the funds immediately. Credit lines allow more time for the use of funds and do not require awarded funds to be matched with loans or projects at the time of the auction. Matching is required only when the awarded credit line is disbursed.

The two alternatives are likely to elicit similar effective interest rates at the auction, but credit lines entail greater risk than credit, resulting in lower expected returns. Two opposing forces are at play here. On the one hand, with credit lines participants are bidding before contracts with final borrowers are in place, so the rates at which they will be able to place the funds are somewhat uncertain. If risk-averse behavior predominates, on average, lower rates will be bid for credit lines than for credit. On the other hand, credit lines are more attractive to participants than credit because of their loan-smoothing property. Credit lines allow for projects to be processed as they arrive, without undue delays or uncertainty about funding or about the cost of funds to the sublenders. Because credit is more constrained than credit lines, institutions should be willing to pay a premium for credit lines over credit. These two forces may cancel each other out, resulting in similar bids for credit and credit lines.

The greater risk in auctioning credit lines rather than credit arises because, as institutions lock in funds at the auction, competition among them for projects and loans is likely to increase, particularly as the expiration date for the credit line nears. The fact that the option right to the credit line is nonrefundable—a sunk cost—adds further pressure to on-lend the funds. The likely effect of these two factors is to reduce spreads or profits, perhaps below prudential levels, and to increase the temptation to accept riskier projects or loans in order to lock in some of the expected gains. Thus, the credit line alternative is likely to increase the severity of the moral hazard problem.

It is clear that there are tradeoffs between credit and credit lines. The net effect has to be determined individually for each environment. In general, however, the effective difference between the two alternatives is unlikely to be very large. If degree of risk and ease of administration are key concerns, auctioning credit is a slightly better choice than auctioning credit lines.

A second set of issues concerns the number and type of products to be offered. Products are differentiated by currency, term, and presence or absence

of indexing. For reasons of efficiency, transparency, and operational simplicity, auctions should start off with a single, fixed-rate product (but indexed for inflation), denominated in domestic currency, with a four- to six-year maturity and open to use in any sector.

Because the marginal returns vary on each type of credit product, offering multiple products requires establishing criteria for comparing rates and allocating funds efficiently across products. This is not a trivial problem. It involves assessing premiums on instruments with a variety of terms, taking into account interest rate volatility and exchange rate risks. Governments have no comparative advantage in making such assessments, nor should they play the role of market maker—the private sector is better suited to the task. Moreover, any criteria developed by a government agency for comparing rates across products would likely be indicative at best. Significant discretion would be left to those in charge of the award process, endangering the openness and credibility of the process. Indeed, there is evidence of just such a loss of transparency in the development credit auctions in Bolivia and Chile. Because auctions are held regularly, some flexibility should be built into the process of product selection. If the preferences of credit users change, the product offered should change in response. But only one product should be offered at a time, at least at first.

Fixed-rate (but indexed for inflation), long-term credit is the scarcest form of credit in developing countries, yet it appears to be the most desired; in quantities demanded and bid rates submitted, it is clearly the winner in credit auctions in Chile. High political and macroeconomic risk—and the unwillingness of borrowers to pay the risk premium—explains its absence in most developing countries. Development credit can thus make its largest contribution and produce the most value added in the form of long-term, fixed-rate credit. (Note that providing and auctioning fixed-rate, long-term credit where no market previously existed implies a *de facto* subsidy.) For efficiency reasons, credit should go wherever it can claim the highest expected return, regardless of sector—unless, of course, high rates of return reflect monopoly control or other distortions in a particular sector.

Also for efficiency reasons, the credit should be denominated in a country's own currency rather than in a foreign currency. Because the original loan or credit line is denominated in a foreign currency and the final credit is generally expressed in the local currency (unless the economy is dollarized), there is an exchange rate risk. The issue is who should bear the risk. The government is arguably the least risk-averse participant and to a large extent controls exchange rate policy, so economic efficiency argues for the government or central bank to bear the risk—particularly where there are no organized forward markets for foreign exchange. In dollarized economies, however, where there are competitive domestic interest rates for borrowing in dollars, auctioned credit should be denominated in dollars.

What Bidding and Pricing Rules Should Apply?

Most of the literature on auctions deals with single-object sales—that is, with indivisible products that can go to only one bidder—and one-time auctions, primarily for reasons of analytic tractability. The literature also generally assumes no collusion by participants. Thus, although the literature provides a base of reference, most studies are of limited value for the type of auctions proposed here because none of these conditions holds for long-term credit auctions. First, credit—the “object” of the auction—is fully divisible and can be awarded to several bidders. Second, credit auctions are repetitive. Repetition, particularly for a homogeneous good, generates an informational and strategic component related to the bids and valuations of other bidders, leading to significantly different results than with single-object auctions. And third, as mentioned, participants have significant incentives to engage in collusive practices. The analysis here concentrates on the few studies of multiple-object, repeated auctions that account for the possibility of collusion.

BIDDERS' VALUATIONS. Credit auctions typically involve the allocation of many individual blocks of credit in a process repeated through time. If one bidder has a high valuation for the credit being auctioned, others are likely to have a high valuation as well. In the vernacular of the auction literature, credit auctions are repeated multiple-object auctions in which bidders' valuations are affiliated. Affiliated valuations imply that although bidders may have different assessments about how much credit is worth to them—say, because of access to different information or because of different costs—their valuations depend on each other's. That is precisely the case for credit: as a bidder's estimate of value rises, the bidder expects others' estimates to rise as well.

Bidders' valuations largely reflect the rates at which they believe they can sublend, risk factors included. Knowledge about that information affects other bidders' valuations (if not for the present, since contracts may have been locked in, then certainly for the future). Uncertainty about valuations is slightly higher with credit lines than with credit. With credit, contracts for subloans are usually locked in before the auction, so each bidder has complete certainty about the value of credit. With credit lines, contracts have not yet been solicited or negotiated, and that generates some uncertainty about the value of credit to the bidder. But in both cases the bidders' valuations are affiliated.

Although sublending rates might generate little uncertainty or discrepancy among bidders, the risk with respect to the net value of credit or expected returns is substantial. Considering that the macroeconomic environment is often unstable and that subloans are extended for long terms, repayment rates are bound to be difficult to forecast with much accuracy. Differences in bidders' valuations are likely to come from differences in information and in alternative costs of funds, processing costs, and risk assessment of subloans. Nonuniform legal restrictions may account for some differences in valuation as well, say, if

some institutions are not allowed to accept deposits or have no access to rediscount windows. And some of the differences may stem from differences among institutions; some may be more efficient in processing loans or have better skills in assessing risks or different attitudes toward risk. All these factors will generate some dispersion in bidders' valuations or reservation interest rates.

SELLERS' OBJECTIVES. Auction theory assumes that the seller's objective is to maximize expected revenue and that efficiency, in an auction context, means allocating the products to be auctioned to the bidders with highest valuations. Efficiency is an issue because rankings of submitted bids and rankings of valuations need not coincide in an auction since participants' bids do not necessarily correspond to their valuations. Auction designs are thus assessed according to how well different types of auctions score in these objectives.

With credit auctions, the concerns are even broader, however. The objectives of credit auctions are to induce credit rediscounting rates that reflect the opportunity cost of capital, to avoid arbitrary or noneconomic biases in allocating credit, and to improve recovery rates. The government, unlike a private institution, should be concerned with efficiency rather than profit maximization: the objective of the auction should not be to elicit the highest interest rates but rather to maximize expected returns, since expected returns take into account the risk of default. With multiple winners, the issue of efficiency is usually moot, because any type of auction will likely be efficient. Even though the ranking of the winning bids may not coincide with the ranking of valuations, the rankings are likely to coincide in the aggregate—for example, the highest five bids will likely correspond to the highest five valuations. And even when they do not, the loss of efficiency is likely to be small. Thus the maximization of expected returns or revenue is a legitimate and proper objective for guiding auction design.

TYPES OF AUCTIONS. In the theoretical literature, the optimal auction design for a revenue-maximizing seller involves selecting a probability of winning and an expected-payment rule, subject to a set of feasibility conditions. For example, a sealed-bid auction that specifies that the highest bidder will win (probability of winning) and will pay the amount of the second highest bid (expected-payment rule) is optimal in certain restrictive environments. But implementing credit auctions in far less stylized environments gives rise to a host of practical questions about tradeoffs between oral and sealed bids, uniform and discriminatory price rules, and sequential and simultaneous auctions. Each has its advantages and drawbacks.

The following auction options highlight some of these dimensions. The options are not equivalent in many ways, and tradeoffs among them need to be evaluated for the particular circumstances to which they will apply.

- *Discriminatory price auction.* In discriminatory price auctions, bidders submit sealed bids, and funds are distributed to the highest bidders down to the level of the bid at which funds are exhausted or the floor price—the seller’s reservation price—is reached. Winning bidders pay the price they submitted, that is, their implicit or explicit interest rate. This procedure is used in the sale of U.S. Treasury bills. A discriminatory price auction is called a first-price auction if there is a single item to be auctioned.
- *Uniform price auction.* Uniform price auctions work in the same way as discriminatory price auctions except that all winning bidders pay the same implicit or explicit interest rate—usually the rate just below the cutoff bid or below the lowest accepted bid, whichever is greater. This procedure is used in the sale of long-term U.S. Treasury bonds and has been used by the Mexican government in placing its debt securities.³ A uniform price auction is known as a second-price auction if there is a single item to be auctioned.
- *Priority-level price auction.* Priority-level pricing may be used when there are several distinct types of bidders, each with a significantly different valuation of the object being auctioned. Different alternative costs of funds or risk classifications among classes of financial institutions could account for such differences in a credit auction. The primary purpose of a priority-level price auction is to induce “desirable” classes of bidders to bid or to bid more aggressively than they otherwise would and to handicap the classes on economic grounds. For example, for higher-risk classes, two percentage points, say, would be subtracted from their bids, and their bids would then be ranked along with the others. Of course, if awarded funds, the higher-risk bidders would pay their submitted bid. Thus, bids from those in the lower-valuation groups are favorably handicapped relative to those from higher-valuation groups through the use of assigned priority levels.
- *English auction.* English auctions, in our context, use an interest rate clock, and bids are monitored electronically. Bidders must be present at the auction. As the auction begins, the interest rate clock is set at a low level, and the rate rises continuously throughout the auction. Bidders who wish to remain active keep their buttons depressed as the rate rises, releasing the button to indicate a bid. The interest rate at which a bidder releases the button is recorded, and when all bidders but one have released their buttons, the funds are allocated from that bidder down until the funds are exhausted or the seller’s floor price is reached. Each bidder pays the interest rate shown on the clock at the time the button was released by the preceding bidder. The U.S. Forest Service has used English auctions to sell contracts for harvesting timber.
- *Dutch auction.* Dutch auctions also use an interest rate clock, but the clock runs backward from a very high initial rate. Bidders place a bid for a certain quantity of credit by pressing a button that stops the interest rate

clock at the rate they wish to bid. That quantity is assigned to the bidder, and the interest rate clock then resumes its descent until another bidder stops it. The process ends when all available funds have been allocated or the clock reaches the floor interest rate. Dutch auctions are used in several European countries for wholesale sales of fruits, vegetables, and flowers.⁴

The auctions described above are of the simultaneous form, with all funds allocated in a single round. In sequential auctions, funds are allocated one winner per round, sequentially through several distinct rounds of auctions, until the funds are exhausted. For example, in a sequential, discriminatory price auction, the bidder who submits the highest interest rate bid is allocated the requested funds in each round. The remaining bidders then submit new sealed bids, and new rounds are conducted until all funds are allocated or the highest bid is below the floor price. The auctioneer can choose whether to reveal the terms of the winning bid to the remaining bidders before the next round. The auctions are then qualified as being with or without price and quantity announcements (discussed below).

Which of these auction types is best for the kind of long-term development credit auction being considered here, with maximization of expected returns as its objective? The appendix presents some findings from a comparison of various auction types. But several caveats are in order. Theoretical studies can provide only partial rankings, with qualitative but not quantitative results on what forms of auctions are better than others. These studies also presume or indicate that differences in expected returns are likely to be small in percentage terms (of second-order effect). What scarce evidence there is for this presumption comes from imperfect comparisons of real auctions and from experimental data (Hendricks and Porter 1988; Hendricks, Porter, and Boudreau 1987; Plott 1982; Smith 1982; and Hansen 1985, 1986).

Complexity and transaction costs must also be considered. Oral auctions are more complex and have higher transaction costs than sealed-bid auctions, particularly for the bidders; the same is true of sequential auctions compared with simultaneous ones. In sequential auctions bidders must reassess their strategies and bids for the next round in light of the information and outcomes at the end of each round. That can be a complex task, requiring intellectual dexterity and sophisticated computational skills. The analysis presented in the appendix assumes that bidders fully understand the procedures and act in an optimally rational way. What still needs to be considered is how the level of complexity of an auction affects bidders' ability to submit strategically optimal bids.⁵

Perhaps the largest shortcoming in auction theory for ranking performance in frameworks similar to ours is the assumption that collusion among bidders is not a factor. Without collusion, differences in expected returns among various types of auctions are small, but with collusion the differences can be substantial. Priority should thus be given to auction designs that are the least vulnerable to collusive arrangements.

Some types of auctions tend to facilitate collusion more than others. What little is known about the issue has come largely from studies of single-object auctions (recall that credit is not a single object). The literature suggests that second-price and English auctions are vulnerable to coalitions of any size. By contrast, it is conjectured that only all-inclusive coalitions are viable in first-price auctions (discriminatory price auctions, Dutch auctions, and sealed-bid auctions) and that these coalitions appear to be inherently unstable (Graham and Marshall 1987; Graham, Marshall, and Richard 1990).⁶

The ability of bidders to subcontract among themselves appears to be important, since it provides a means of sharing the gains of collusion. Credit auctions seem to provide the right conditions for collusion. The bidders are commercial banks, whose managers are likely to know each other well and to participate in many joint ventures. Although the subcontracting of auction funds is technically forbidden, because funds are tied to projects, the inherent fungibility of money makes subcontracting a relatively simple matter. Interbank loans—subcontracting in the banking industry, if you will—are legal and common. If bidding patterns are suspect, the interbank loans or joint projects of the institutions involved should be monitored and audited.

So what is the best choice? If collusion is ignored, sequential English auctions appear to generate the largest expected revenue (see appendix). But English auctions are notorious for their susceptibility to collusive practices (Graham and Marshall 1987). Furthermore, computing optimal strategies is not a simple matter, particularly for sequential auctions. Thus, there is no assurance that the equilibrium or optimal strategies will be used, which could vitiate the results predicted from the theory. When all this is taken into account, the best (constrained) design is a sealed-bid, discriminatory price auction. Such auctions are the least vulnerable to collusion, their transaction costs are low, they require relatively little computational sophistication from bidders, and the marginal revenue loss compared to the first-best solution—sequential English auctions—is quite small. Furthermore, although the English auction seems to lead to higher revenue for the seller, empirical evidence indicates that in many settings both types of auction generate similar expected revenues.⁷

Priority-level auctions are an alternative worth exploring when the possibility of collusion among traditional banks is high or when several types of eligible financial institutions with different alternative costs of funds or risk classifications are participating. Two major benefits accrue from bringing together two different groups of bidders at a common auction: increasing the number of bidders increases expected returns, and heterogeneity of participants makes collusion more difficult (Harris and Raviv 1981). The main drawback of a system of handicapping is that it can open a Pandora's box of opportunistic favoritism and rent-seeking during the handicapping process that could jeopardize the transparency and legitimacy of the auction mechanism.

An even more basic question is why favor any group in an auction? And if a group is to be favored, should it be done through prices or quantities? There

are several reasons to favor one group over another.⁸ When risk differentials between the groups are significant, it is efficient to discriminate because loans at identical interest rates will generate different expected returns. If the two groups differ significantly in their valuation of credit, there might not be enough institutions with the higher valuations to induce competition; then favoring the bids of the group with the lower valuations could increase competition. Similarly, when collusive practices among the higher-valuation group are suspected, favoring the other group can be an effective way to encourage its participation, making collusion more difficult.

And sometimes priority auctions are desirable when the use of funds by each group differs significantly and having funds available for both uses is considered important. Chile decided it was important to allocate funds to both banks and leasing companies and so set up separate auctions for the two kinds of institutions. In Chile holding separate auctions for banks and leasing companies favors banks over leasing companies, because banks are usually awarded funds at bids lower than the losing bids by the leasing companies. In that sense, prices are used to favor the banks. An alternative would be to impose quantity constraints on the amounts leasing companies can borrow.

OTHER BIDDING AND PRICING ISSUES. Another choice in auction design is between multiple and single bids. Here the answer is clear-cut: each bidder should be allowed to submit as many bids as desired for each product auctioned. The advantages of allowing multiple bids are substantial and very likely outweigh any additional transaction costs. Multiple bids provide for portfolio diversification, as a larger number of small-quantity bids are elicited at high interest rates. Allowing multiple bids should also increase efficiency. When only single bids are allowed, participants are forced to combine their projects or loans into one average bid rather than a collection of marginal ones reflecting different expected rates of return on projects. Forcing the use of average rather than marginal bids induces distortions and inefficient allocation of funds: some projects that should have been funded on the basis of expected rate of return are not, and some that should not have been, are. Finally, permitting multiple bids makes collusion more difficult.

Frequency also needs to be considered. Spreading available funds—which are usually provided through a loan from a bilateral or multilateral institution—over a number of auctions held throughout the year offers several advantages over a single auction. Collusive arrangements have to be more complex, which makes them easier to detect and more difficult to coordinate and sustain.⁹ Theories of risk and myopic behavior also suggest that auctioning small quantities of funds over time rather than a large quantity all at once might elicit more aggressive competitive behavior from bidders, despite their knowledge that other auctions will be held some time in the near future. Estimates of excess demand around relevant interest rates should aid in determining whether that will be the case in specific circumstances. Also, increasing the number of

auctions approximates sequential auctioning, which, as argued above, should boost expected returns. Lending efficiency may also improve because sub-borrowers' projects are likely to be spread over the year as well. Finally, having a larger number of auctions allows for rolling assessments of results and fine-tuning of design to correct for observed or suspected problems, particularly collusion. Any increase in transaction costs because of the larger number of auctions should be more than compensated for by gains in efficiency.

Entrance fees are another issue. Levying a nonrefundable entrance or application fee can lower administrative costs and improve the efficiency of auctions through participant self-selection. Screening applicants to ensure that they meet established legal, financial, and risk criteria consumes the limited administrative resources. Entrance fees can cover and internalize the costs of evaluating the financial soundness of institutions applying for the auction. If the fees are high enough, they will also serve as a self-selection device, dissuading financially unfit institutions from applying. That increases efficiency, because only institutions likely to conform to the eligibility criteria will apply.

What Information Should Be Disclosed to Participants?

Before an auction bidders face four sources of uncertainty: the valuations and bids of other participants, the floor price (if any), the volume of funds to be auctioned, and the quantities demanded by other bidders. The last two—uncertain supply and uncertain demand—while appearing to be strategically equivalent, are not. Collusion could provide information on quantity demanded but not on quantity supplied. The disbursing agency has control over two of the sources of uncertainty: the floor price and the quantity to be auctioned. Should that information be disclosed to participants?

Auction theory argues for revealing information that affects bidders' valuations and thus their bidding (quality information). Because bidders know that the seller knows the total amount to be auctioned and the floor price, bidders assume answers that are the least favorable to the seller when the seller fails to reveal the information. Bidders adjust their bids accordingly. Because that would reduce expected revenue, there appears to be nothing to lose and much to gain from revealing the information.

The picture is not quite as simple as that, however. That argument has been shown to be correct for risk-neutral bidders, but not necessarily for risk-averse bidders. When bidders shun risk, uncertainty about the quantity of funds to be awarded will, on average, raise bid rates.¹⁰ Similarly, the argument may be valid for single auctions but not for repeated auctions, where there is the possibility of a credible commitment by the seller to withhold information. That is, information that would not be credible to withhold in a single auction can be credibly withheld in a repeated auction because of the learning by buyers at the end of each auction.

The possibility of collusion also weakens the argument for sharing information with bidders. Uncertainty about the amounts to be awarded at the auction or the amounts that were awarded at a previous round makes coordination more difficult and is likely to induce more aggressive bidding. And uncertainty about the floor price means that a bidders' coalition does not know by how much it can reduce the bid before falling below the seller's floor price. Announcing the floor price in advance provides the coalition with a convenient starting point for coordinating its behavior. Keeping the floor price secret has generally been shown to increase expected revenue. Bolivia's auctions underscore the point. In the ten or fifteen auctions it held between September 1990 and January 1992, more than 90 percent of the bids were at the announced floor price.¹¹ Also, to facilitate cheating against collusive agreements, the specifics of the winning bids should not be disclosed. In summary, neither the floor price nor the amount of funds to be auctioned should be made public.

A short aside on floor prices. We have argued that auctions are most useful in environments where there are no equivalent reference rates for pricing long-term funds. Yet we have advised the use of a floor price based on "market" rates, an apparent contradiction. If collusion were not a problem, competition and repetition would render the floor price issue moot. The main purpose of the floor price is to limit the loss of rents to the government as a result of collusive arrangements. But how should the floor price be set? As a start, market rates for shorter-term instruments (30- to 365-day bank deposits, prime rates, government cost-of-funds rates, and 90-day-or-more treasury bills or bonds) can be used to establish an initial floor price. Since auction rates are indexed for inflation, long-term funds should not be awarded at rates lower than those.

Even if most bids fall below the selected levels, the government should stick to the floor price. When there is no history of long-term credit rates, participants will test the waters at the beginning by bidding low rates. Chile's auctions illustrate that well. Most bids at the first auctions were below the floor price, which was a weighted average of the 90- to 365-day bank deposit rates. By the third auction, no bids were below that average, and price discovery was well under way. In Bolivia the banking sector boycotted the first auction, expecting its challenge of the new regime to affect floor rates. Eventually, the banks came to terms with the auction arrangement, recognizing the government's determination to stick to the new rules and floor price.

Experience in Bolivia and Chile

What has experience with long-term credit auctions shown? Bolivia and Chile have been holding such auctions for private banks (and for leasing companies in Chile) since June 1990. After the first two auctions, Chile began to hold separate auctions for banks and leasing companies. The Central Bank is the auctioneer in Bolivia, and the Development Bank of Chile, a government institution,

in Chile. Participants are free to set interest rates for final users. Multiple products involving several maturities, different currencies, and fixed and variable interest rates have been auctioned simultaneously in both countries.

Floor prices have been linked to an average of existing short-term rates. Participants submit sealed bids stating the product and quantity desired and the interest rate offered. Discriminatory price rules are followed. Both countries enjoin the use of funds for working capital, the purchase of imported capital goods or previously financed goods, housing, urban development, or for any form of transportation intended for personal use. Chile has no sectoral restrictions on the use of the funds, but Bolivia has some as a result of previous loan covenants. In both countries, the auctioneer analyzes the bids, compares bids across products, selects cut-off rates for each product, and then allocates funds from highest to lowest interest rates until the funds are exhausted or there are no more bids above the cut-off levels.

Between June 1990 and January 1992, Bolivia and Chile together held more than 30 auctions. Except for the first few auctions in Bolivia, in which collusion was suspected, the auctions have been, by and large, problem-free. Since Bolivia ceased its practice of informing bidders of floor prices, the quantity to be auctioned, and the auction results, performance has improved.

Overall, the results have been quite promising. The auctions have removed virtually every element of personal discretion evident in conventional credit allocation methods, making the allocation of credit fully transparent. Wasteful rent-seeking opportunities have been eliminated, and the two governments have increased their share of the rents. Participation has been high, the bidding competitive. Allowing leasing companies to participate has significantly strengthened competitiveness in Chile. Leasing companies have been more active than banks in terms of number of participants and quantity of funds demanded and awarded. The auctions have elicited prices that compare favorably with the costs of capital to financial intermediaries from alternative sources (shorter term) and have established competitive price benchmarks for the first time for some forms of long-term credit. There seems to be no evidence of collusion or adverse selection, potentially the most damaging problems in auctions, and repayments rates, so far, have been near perfect.

Some fine-tuning is still needed in such areas as criteria for comparing bids across heterogeneous products, the selection of floor prices for different products, and the number of bids allowed per participant and product. All things considered, however, the auctioning of development credit has been a clear and significant improvement over previous methods of allocating credit.

Recommendations

To summarize, auctions ought to be considered when current mechanisms do not allocate credit fairly and efficiently, when there is no proxy reference

rate for long-term credit, when there is evidence of competition or potential competition in the banking sector, when private banks play a strong role, and when competent supervisory agencies can assess the credit risks of potential participants.

Several recommendations also follow from the analysis of design issues for development credit auctions.

- *Eligibility.* Private banks and appropriately screened (adequately capitalized and managed) nonbank financial institutions such as leasing companies should be eligible to participate. Government-owned banks satisfying all eligibility requirements should not be permitted to bid but may be permitted to obtain funds at the average auction rates. Screening for creditworthiness should be conducted by external supervisory and securities rating agencies, which may need to be established for that purpose. A non-refundable application fee is also recommended as a self-screening device to increase efficiency. In some environments, constraints should be imposed on amounts that specific types of institutions can borrow.
- *Type of product.* Specific conditions in each country should determine whether credit or credit lines are auctioned. The goal should be maximum flexibility in the use of the funds, so there should be no sectoral constraints on credit use. Auctioning should begin with a single product. Selection of the product should be responsive to the preferences of participants.
- *Objective.* The objective of development credit auctions should be to maximize expected returns, taking default risk into account.
- *Type of auction.* Sealed-bid, discriminatory price auctions with multiple bidding should be considered, since they are less vulnerable to collusive behavior than other types of auction mechanisms. Auctions should be held at regular intervals to reduce the amount of funds awarded at each auction. Where private banks are few and creditworthy nonbank financial institutions have an established presence, priority-level auctions may be a desirable alternative for inducing competition between groups with different alternative costs of funds or risk classifications. Assigned priority levels are used to favor bids from lower-valuation groups relative to those from higher-valuation groups.
- *Adverse selection and moral hazard.* Setting eligibility criteria and caps on the maximum cumulative amount of credit an institution can purchase at auctions will help to diminish the risks of adverse selection (the tendency to attract the highest-risk participants), and moral hazard (the tendency to lend for riskier projects or investments at higher interest rates), thereby increasing the probability of default. The caps can be reassessed in light of the performance of the institution. Covenants can also be established to govern the use of funds.
- *Collusion.* Several steps can be taken to make collusion and other fraudulent behavior more difficult. Most important is setting a floor price and

revising it periodically to reflect changes in interest rate levels and bidding patterns. The floor price should be linked to the opportunity cost of capital to participants and should not be lower than the government's marginal cost of borrowing. Neither the floor price nor the amount of funds to be awarded at each auction should be revealed. If cheating or collusion is suspected, specific information on the winning bids should also be withheld; experimenting with increases in the floor price should also help to root out collusive behavior. Encouraging the participation of many different types of qualified financial institutions will also stifle collusive activity, and handicapping bids across groups should be considered under certain circumstances.

Not all countries that lack a market in long-term credit need to introduce credit auctions. The need may be far less pressing in countries with a well-developed market in government securities that includes some instruments with terms substantially longer than one year. Rates on those securities can be used as benchmarks for pricing development credit. Mexico has taken this approach. More broadly, auctions ought to be viewed as part of a package of reforms to foster the development of financial markets. The auctioning of long-term credit can serve as a transition mechanism to complement other reforms that facilitate the development of long-term credit and securities markets.

In sum, development credit auctions ought to be viewed as but one of several mechanisms to improve the efficiency of development credit pricing and allocation. When current practices are clearly unsatisfactory, properly designed auctions are likely to do much better. Compared with conventional methods, the chief problems that are potentially worse with credit auctions—and so need to be guarded against—are collusion and adverse selection. Auctions can be designed to overcome these problems, however. Instituting an auction also brings credibility to a government's commitment to change. It marks a radical break with the past, institutionalizes the new rules, and increases the system's transparency and fairness by taking decisions about credit allocation out of the hands of individuals. The success of auctions in Bolivia and Chile, countries with large differences in their financial markets and their economies, validates in practice the theoretical arguments for auctions as a mechanism for allocating credit.

Appendix. How Various Types of Credit Auctions Compare in Generating Revenue

This appendix presents the results from the literature on how various types of credit auctions compare in revenue-generating properties (for details, see Milgrom 1989; Bulow and Roberts 1989; Milgrom and Weber 1982, 1989; Weber 1983; McAfee and McMillan 1987; and U.S. Treasury 1992).

ORAL OR OPEN VERSUS SEALED-BID AUCTIONS. The open or English auction yields higher expected returns than the sealed-bid, uniform price auction, which in turn yields higher expected returns than the sealed-bid, discriminatory price auction. Moreover, if bidders' beliefs are correlated or statistically dependent—as is the case for credit auctions—particularly if bidders are uncertain about their valuations (as with credit lines), expected revenue for the seller is higher under an open or English auction than under a sealed-bid auction. The reason: when bidders are uncertain about their valuations, they can acquire valuable information by analyzing and incorporating into their decisionmaking the bidding behavior of their competitors during the course of an open auction. That opportunity is denied under sealed-bid auctions. The result: more aggressive bidding and higher expected rates under English auctions.

SIMULTANEOUS VERSUS SEQUENTIAL AUCTIONS. Sequential first-price and second-price auctions generally yield greater expected revenues than their simultaneous counterparts, the discriminatory price and uniform price auctions. The reason: in sequential auctions bidders are forced at each round to disclose some information to the other bidders. The result: because auctions that provide quality information (information affecting bidders' valuations and known to be known by the auctioneer) to bidders before the event generally benefit the seller (because bidders assume the worst when no information is provided), sequential auctions tend to generate more revenue for the sellers than do simultaneous auctions. Thus, with multiple objects like credit, first- and second-price sequential auctions generate greater expected revenue than their simultaneous counterparts (Milgrom and Weber 1989).¹²

UNIFORM VERSUS DISCRIMINATORY PRICING. Because of the interdependence of valuations in credit auctions (affiliated valuations), English auctions yield higher expected revenue than uniform price auctions, which yield higher expected revenue than sealed-bid, discriminatory price auctions. The reason: under discriminatory price auctions, bidders pay what they bid, whereas in an English or uniform price auction, bidders' payments depend not only on their own bids but also on their private valuation, which affects the bids of others (affiliated valuation). That extra effect tends to increase the slope of the marginal profit of the bidder under an English or uniform auction, an effect not found in sealed-bid, discriminatory price auctions.

Generally, the revenue results for English auctions and uniform second-price auctions are equivalent when bidders are certain about their value estimates, as would be the case with credit auctions. When bidders are uncertain about their estimates, as might be the case for credit line auctions, English auctions tend to induce higher rates. The reason: when bidders are uncertain, they acquire useful information by analyzing others' bids during the auction. Because that cannot occur in a uniform price auction with its sealed bids, bidding tends to be more aggressive under English auctions.

The results discussed thus far for various types of auctions assume risk-neutral bidders. With risk-averse bidders, however, there is no unambiguous ranking among types of auctions in an affiliated valuations environment.¹³

EFFICIENCY. Because they elicit true valuations, English, second-price, and uniform price auctions tend generally to result in efficient allocations, with credit allocated to bidders with the highest valuations. Under first-price or discriminatory price bidding, shading a bid below one's reservation price decreases both the probability of winning and the price to be paid. Under second-price or uniform price bidding, shading a bid below one's reservation price decreases the probability of winning but *not* the price to be paid. It is that asymmetry that induces efficiency and makes second-price and uniform price auctions superior to first-price and discriminatory price auctions. With credit auctions, however, special care is needed in defining efficiency, because higher valuations need not mean higher expected returns. Also second-price and uniform price auctions are efficient because the process for devising bidding strategies is very simple: because the optimal bid is the true valuation, complex calculations are not required. By contrast, coming up with optimal bids in discriminatory price auctions requires elaborate computations since optimal bids do not correspond to true valuations.

PRIORITY-LEVEL AUCTIONS. What little work has been done on priority-level auctions suggests that they yield higher expected revenue than any of the standard auctions, oral or sealed bid (see, for example, McAfee and McMillan 1989). However, those results were obtained for fairly restrictive settings and single objects. Nevertheless, priority-level auctions are worth exploring since they expand the pool of bidders by normalizing differences among types of bidders with different alternative costs of funds or risk classifications. Such auctions boost expected revenue and make collusive agreements more difficult by increasing the number of bidders (Harris and Raviv 1981).

Chile's experience is instructive. The most eager participants in credit auctions have been leasing companies, which have higher costs of raising funds than mainstream banking or financial institutions, mainly because they cannot offer deposit accounts or use rediscount facilities (Guasch and Glaessner 1992). That raises their reservation interest rates above those of commercial banks. Because the rates reflect opportunity costs and the differences arise from the institutional environment and regulations, priority-level price auctions are an appealing option for reducing the edge leasing companies have and increasing competition.

What about extending the argument to individual bidders as well as institutions, since there is wide variation in risks within each group? That variation means that two identical bids could have two very different expected rates of return, so some consideration should be given to assessing significant differences in risk within groups and handicapping them appropriately.

Notes

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1. These auction prices are not market prices, however. The absence of a market for long-term credit before the auctions indicates that lenders and borrowers could not agree on a market price—and so there was no market. Either the reservation price of borrowers was lower than that of lenders or the incentive effects induced by the high rates at which lenders were willing to lend made the rates unprofitable (relative to alternative terms), so that lenders preferred to ration long-term credit. Auctions *create* the market by committing the government to accept the rates offered by the borrowers. What auctions can discover, at best, therefore, is the reservation price of the borrowers. Thus auction rates are not market rates, and they imply a subsidy element equal to the difference between the auction rate and the minimum rate necessary to induce lenders to supply long-term credit.

2. An example is Mexico's auctioning of housing mortgage-finance funds. The interest rate to final users is administratively set below market rates. The high bids submitted by developers in periods of excess demand illustrate the point that the auction mechanism allows the government to capture some of the rents that otherwise would have been captured by the financial intermediaries.

3. For U.S. Treasury bills and bonds, coupon rates are set before the auction, and bidders submit their bids as total amounts they would pay in exchange for a bundle of bonds. This total dollar price implies an effective yield, like an interest rate, and is an example of implicit interest rate bidding. Recently the U.S. Treasury has begun to use a uniform price auction instead of the discriminatory price auction previously used, to reduce the possibility of a single bidder cornering the market and extracting rents in the secondary T-bill market (U.S. Treasury 1992).

4. These horticulture auctions resemble credit auctions in some ways. There is a large number of bidders who are interested in purchasing some amount of a homogeneous commodity. Like credit, fruits and vegetables can be easily exchanged among colluding bidders at the auction site—a sharing of collusive gains. To reduce the opportunities for collusion, auctioneers limit the lot sizes that can be purchased at one time and use randomized reserve strategies. A representative of the auction house roams the floor to look for obvious signs of bidder collusion, such as excessive communication between bidders during the auction. A warning is issued to such bidders, who may even be ejected from the auction.

5. Manipulation by the seller also needs to be considered. For example, in second-price or uniform price auctions, the auctioneer can gain by introducing a spurious bid that is very close to the highest bid (in a second-price auction) or to the lowest awarded bid (in a uniform price auction).

6. If collusion is feared, there is a simple reason why sealed-bid auctions are preferable to English auctions. Suppose the cartel maintains cohesiveness by threatening retaliation against defectors. With a sealed-bid auction, retaliation must wait until the next auction, because defection becomes evident only after the bidding is over. With an English auction, retaliation can come in the current auction, and the immediacy of the threat means that the collusion is more likely to succeed.

7. Hansen's (1988) results suggest that first-price auctions lead to more efficient allocations when purchase quantities are endogenous (a relevant consideration in credit auctions). This refers to settings where agents compete through price-bidding for the right to sell a quantity of product that depends on the best price bid. And in studies of results for the auctioning of con-

tracts for harvesting timber using both types of auctions, Hansen (1986) also found that the differences in revenue were statistically insignificant.

8. A relevant example is government procurement contracts. Governments often favor domestic suppliers over foreign ones. For instance, under buy-American legislation, the U.S. government offers a 6 percent price preference to domestic suppliers. That is, as long as the lowest price submitted by a domestic supplier does not exceed the lowest price submitted by a foreign supplier by more than 6 percent, the contract goes to the domestic supplier.

9. Although some people argue that repeated auctions make collusion easier to sustain because repetition allows for the possibility of retaliation in the event of defection, we would counter that, easier retaliation notwithstanding, coordinating bids over several auctions has significant problems when participants are heterogeneous and there are no side payments.

10. This argument assumes no manipulation of the amount of funds to be auctioned by the auctioneer because the amounts are determined by a committee in the Apex agency. Several key agencies are represented in that committee.

11. A word of caution: although the outcome may appear to demonstrate collusive behavior, widespread bidding of the floor price can demonstrate competitive behavior, reflecting unanimity in the unilateral valuations. Bidding the floor price is also the optimal noncollusive strategy when bidders believe that there will be an excess supply of funds awarded at rates at least equal to the floor price, which appears to be the case in Bolivia. If bidders believe that the amount of funds being auctioned is large enough, there is no point in bidding above the floor price.

12. The results were derived for a general environment characterized by symmetry, risk-neutrality, and fewer items than bidders.

13. This is not the case in an independent private valuation environment—which does not apply here—where discriminatory price sealed-bid auctions generate higher expected revenue than English or uniform price auctions.

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WAGE CONTROLS DURING THE TRANSITION FROM CENTRAL PLANNING TO A MARKET ECONOMY

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Wage controls have been integral to the stabilization programs of the formerly socialist countries of Central and Eastern Europe that are now moving toward market economies. The usual rationale for such restraints in "heterodox" stabilization efforts has been the need to break the momentum of inflationary expectations. In economies in transition the pervasive weakness of governance of state enterprises supplies an added imperative: the controls are needed to hold the line against pressures for excessive wage increases, which must ultimately be paid for by decapitalization of firms, reduction of tax revenues, or accumulation of enterprise debt.

Examination of the design and enforcement of various systems of wage control leads to the conclusion that wage controls inevitably distort decisions on employment and work effort. These distortions, moreover, are the result of the same features of state enterprises that necessitate wage controls in the first place. Ultimately, the only way to avoid such distortions is to remove uncertainty about the timing of privatization, to ensure that workers and management have a well-defined stake in the newly privatized firms, and to establish financial discipline over the enterprises.

Freeing prices to alleviate economic imbalances has been a priority in most emerging market economies. It is therefore paradoxical that wage controls have been a key component of stabilization programs in many of these countries.

There is considerable skepticism among economists about the effectiveness of wage controls in general: they are intended to suppress market forces, introducing rigidities in the structure of wages and delaying adjustment to changing labor market conditions; they are often circumvented, and they are typically costly to administer. This pessimism is borne out by the experience of many countries with wage controls, as with other centralized means of wage determination. If wage controls are recommended during the transition to a market economy, therefore, their rationale must be predicated on exceptional circumstances.

As a brake on inflationary momentum, wage controls have figured in “heterodox” stabilization programs in Latin America and elsewhere. The object was to reduce the cost of adjusting an economy to a lower rate of inflation by controlling a publicly visible price, limiting the extent to which inflationary expectations become self-perpetuating (Bruno and others 1988; Dornbusch and Simonsen 1987). Formerly centrally planned economies have had an added and even more pressing reason for integrating incomes policies into their reform programs and maintaining them as an enduring feature of the economic regime: the weakness of governance of state enterprises by their legal owner, the state.¹

The weakness of governance has been especially serious at the “no-man’s land” stage, when central planning, with its detailed control of prices and wages, has been dismantled but before market forces have become an effective replacement. At this stage enterprise managers often owe their jobs to workers’ councils; the interests of capital, by contrast, have little representation. At the same time, the “soft-budget” problem—the perception that losses will ultimately be underwritten through subsidies and credit and that the firm will not be allowed to fail—is exacerbated when privatization is impending. Workers and managers, realizing that they have limited time to take advantage of their control of a firm, have little incentive to restrain their wage demands, since the benefits of such restraint would be reaped by the future owners and the state (Commander, Coricelli, and Staehr 1991). The extent to which this occurs depends on how privatization is implemented—particularly whether existing stakeholders such as workers and managers are given a share of the privatized value of the firm.

Excessive wage increases may undermine a stabilization and reform effort in several ways. One response to the increases is to mark up prices. In formerly planned economies, where the existing structure gives managers few incentives to adjust prices to market forces and strong incentives to follow established procedures, higher wages are particularly likely to be passed on mechanically into higher prices (Commander and Coricelli 1991; Blanchard and Layard 1990).

A second channel through which wage increases may be inflationary, even without markup pricing, is money creation. In socialist economies most government revenues are derived by taxing state enterprises, and loss-making enterprises are kept afloat through budgetary subsidies and credit creation. The

government's access to domestic borrowing is limited by the underdevelopment of domestic financial markets, while its access to foreign borrowing is limited by political uncertainty and often by a debt overhang. Under these circumstances higher wages translate into lower profits, lower tax revenues and higher subsidies, a larger deficit, and thence money creation.

A third fear is that wage increases could come at the expense not only of lower profits and tax revenues, but also of decapitalization (Hinds 1991). The resources required to maintain the capital stock, and especially to undertake the new investment needed to adapt to a changing environment, may instead be paid out in higher wages. In effect the workers and managers may eat up the enterprise's capital stock before privatization even occurs.

So, to restrain inflation and to prevent enterprise decapitalization during the transition, some mechanism of wage restraint is indicated. But any system of wage controls entails some distortions, and the very features of a reforming socialist economy that necessitate controls also imply strong pressures to circumvent any system, however ingenious, that can be devised. The precise effect of the wage controls will depend on the behavior of enterprises; in particular, implicit property rights that workers have in the firms where they work (a feature captured in many models of state enterprises) are both a motive for wage restraints and a force to undermine them.

These considerations are crucial in devising a mechanism for wage control that will work in these economies. This article first looks at some models of behavior of worker-controlled firms that might shed light on the kind of response wage controls might elicit. In this context the article then discusses the design of controls—that is, how to set the norm for the allowed increase in wages—and their enforcement—that is, how to reward compliance and penalize noncompliance.

The Behavior of State Enterprises

Predicting the effects of wage controls, and indeed of any policy in an economy in transition, depends on choosing a suitable model for the behavior of state enterprises. Under central planning enterprises' behavior need not, in principle, be modeled at all, because input and output decisions are made by the planners; up to a point, allocations are dictated by production targets and by central allocations of labor, raw materials, and other inputs. There are then only "ostensible enterprises," which can be treated as part of the state hierarchy rather than as independent decision centers (Beksiak 1989). Even under these circumstances, there is some scope for enterprise managers to take actions—implicitly, a form of bargaining—that would bring pressure to soften production targets or to inject additional resources (Schaffer 1989).

The reforms that were begun in Yugoslavia and Hungary in the 1960s and in Poland in the early 1980s, gave more autonomy to the state enterprises,

although government controls continued in the form of state orders for goods, central control of raw materials, and so on (Balcerowicz 1989). Under the new arrangements, enterprise councils, in which the workers were represented, played a major part in enterprise governance. The Yugoslav experience gave rise to models of labor-managed enterprises, dubbed the theory of the “Illyrian firm” (Ward 1958; Vanek 1970). In these models there is a tendency for labor to be unemployed relative to other inputs because firms maximize profits plus wages *per worker*.

Theories of labor-managed firms may be challenged on the grounds of their realism: is it useful to model state enterprises as though they cared only about income per worker, and not at all about employment? One way to rationalize a concern over employment is to suppose that state enterprises serve the interests of their incumbent workers (Lane 1991). In this case risk aversion by the workers could result in overemployment as well as underemployment in the short run—although the model of the Illyrian firm would become relevant over a longer time horizon, as attrition takes effect. To distinguish this modified model from the classical model of the Illyrian firm, we call it a model of the worker-controlled firm. Enterprises may care about their employment for other reasons as well: employment may, for example, affect managers’ discretionary income.

The framework of the theory of the worker-controlled firm can be extended by considering the possibility that the enterprise is not fully autonomous but is subject to some state control. The enterprise’s decisions can be modeled as the outcome of bargaining between a worker-dominated enterprise and the government—where the government is concerned with the revenues that it obtains from the enterprise (Dinopoulos and Lane 1992).

A more complete picture of enterprise behavior would also take account of the asymmetry of information between enterprises and the central authorities. The authorities cannot fully and costlessly monitor the enterprises’ costs and opportunities, and it is really this inability that gives state enterprises scope for bargaining with the authorities—as well as necessitating that enterprises be given some autonomy (Schaffer 1989).

A more comprehensive model would also take account of uncertainty about the property rights pertaining to ownership and control of the firm. Uncertainty is pervasive during the transition to a market economy, a kind of limbo characterized as “neither plan nor market.” One aspect is uncertainty about both the timing of privatization and the workers’ and management’s stake in the firms after privatization. This may lead to decapitalization of the firm (see Commander, Coricelli, and Staehr 1991): if workers in a labor-dominated firm believe that the firm is likely to be privatized in the next period, it is rational for them to prefer the certainty of higher wages now to the uncertainty of investing to maintain or upgrade the capital stock—in other words, uncertainty about whether it is they or the firm’s future owners who will reap the benefits

of such investment. The resulting deterioration in the capital stock may have substantial social costs.

The authorities can use two instruments to limit decapitalization of the state enterprises pending their privatization: punishments for excess wages, associated with wage controls; or rewards for maximizing the value of the state enterprise, associated with the distribution of shares to workers. The appropriate mix of such punishments and rewards obviously depends on political economy considerations and must be taken in the context of the choice of privatization strategy.

Design and Enforcement of Wage Controls

Wage controls, then, are an important ingredient in the mix of policies designed to constrain wages below the average product of labor and to discourage decapitalization of the firm. The ultimate objective—paramount in a formerly centrally planned economy—is to protect government revenues and preserve the value of the state enterprises.

The design of wage policies contains three main elements. First is the selection of the norm for wage increases: precisely what is to be controlled—specific wage rates, the firm's total wage bill, or its average wage—and how is it to be adjusted in response to inflation and perhaps other variables, including the firm's output, value added, or profits? Second is the coverage of wage policies in terms of enterprises, distinguished by type of ownership or size. Third is the enforcement of wage controls, which involves the choices of penalties for non-compliance. The main characteristics of the wage controls adopted in several Central and Eastern European countries in 1990 and 1991 are summarized in table 1.

Determining the Norm for Wage Increases

Can a wage policy be designed that will achieve its objectives with minimum distortions? The central issue here is the method for determining the wage norm—that is, what increase in wages to permit under the wage law. Table 1 illustrates the salient features of rules that have been adopted in Bulgaria, Czechoslovakia, Hungary, and Poland. Numerous variations on the theme have been proposed, and the implications of each should be considered.

SPECIFIC WAGE CEILINGS. One type of wage rule is a ceiling on the percentage increase in each wage rate. This rule is sometimes applied as a wage freeze, but it could also allow for partial indexation to inflation (generally not *full* indexation, because that may result in indeterminacy of the price level). One drawback of a specific wage constraint is that, if it is effective, it completely ossifies the wage structure. Any exceptions allowed—on the basis of equity (catch-up for the disadvantaged groups) or efficiency (relative wage adjust-

Table 1. *Wage Policy in Four Eastern European Countries, 1990–91*

Country	Control mechanism	Period	Real wages (percent)				Profit link	Tax-based	Tax rate ^a (percent)	Private sector
			1990		1991					
			Target	Actual	Target	Actual				
Bulgaria ^b	Equal, absolute increases	6 months (adj. Q2)	None	+1	-39(Q1) -50	-55(Q1)	No	Yes	min, 60 if >1% max, 400 if >5%	Exempt
Czechoslovakia ^c	Ceiling on wage bill	Quarter	None	-3	-10(Q2)	-20(Q2)	Yes	Yes	200 if > 3% 750 if > 5%	Exempt
Hungary ^d	Ceiling on wage bill	Year	-3	-3	-10	-7(Q2)	Yes	Yes	50	Exempt
Poland ^e	Indexation of wage bill in 1990, and average wage in 1991	Month	-30	-30	+3	-15(Q3)	Yes	Yes	100 if < 3% 200 if > 3% 500 if > 5%	Exempt

Q=quarter.

a. Indicates the tax rates applied to wage increases above the ceilings. For instance, "100 if < 3%" means that the tax rate is 100 percent for an increase of wages no more than 3 percent above the ceiling.

b. For government employees, wages were controlled directly. For state enterprises and cooperatives, a ceiling was placed on the total wage bill. This ceiling provided a margin for wage increases above the absolute minimum wage.

c. The wage bill included bonuses.

d. A mandatory wage scale was removed in January 1989. Thereafter, most enterprises (except some in services) were free to set individual wages subject to an overall wage bill ceiling related to enterprise performance. For 1990 increases of the wage bill above value added were taxed at the corporate tax rate. For 1991 wage increases up to 18 percent were not taxed. Wage increases between 18 and 28 percent were taxed at the corporate rate, while wage increases above 28 percent implied a taxation of the entire increase. Labor shedding was further encouraged by exempting wage increases up to 5 percent when employment was reduced. In 1992 wage restrictions were abolished for state enterprises.

e. Mandatory wage scales were eliminated in January 1989. Commercialized firms were entitled to partial exemptions.

Source: Coricelli and Revenga (1992).

ments for workers with scarce skills)—may open the floodgates to lobbying for more exceptions. Exceptions would also allow enterprises to avoid the controls by reclassifying workers, at once weakening the controls and imposing administrative costs on the firms themselves.

WAGE BILL CEILINGS. A ceiling on the total wage bill, as opposed to the wage rate, leaves the enterprise more flexibility in determining relative wages. The rule also allows for partial indexation. An advantage that has made it popular in several countries (see table 1) is that it can be administered through the tax authorities, since wage costs must be reported in calculating an enterprise's profit tax liability.

A wage bill ceiling implies that an enterprise's wage rates can depend inversely on its total employment: a firm that sheds workers can raise wages, while one that hires additional workers must pay lower wages to its existing workers to fall within the constraint. To this extent, a wage bill ceiling creates an incentive for layoffs, especially where state-financed unemployment benefits are generous: workers as a group may be able to increase their incomes substantially through layoffs. This may not be undesirable, given the widespread featherbedding that is typical under the "guaranteed full employment" policies associated with central planning.

But, by the same token, unemployment is regarded as a problem in these economies and, in addition, much of workers' wealth is tied up with their stake in the enterprise that employs them, which may make them particularly reluctant to agree to layoffs. Furthermore, the incentives for layoffs associated with the wage controls would not result in an efficient distribution of employment across firms. So it is not clear that these layoffs would occur in practice: to the extent that enterprises serve the interests of their incumbent workers, the result might be stagnation in employment—few layoffs, but no new hiring either (Lane 1991). This result would be consistent with the experience of some countries where wage controls have been adopted. Declines in employment have been small in relation to the concomitant declines in output (Blanchard and others 1991), and unemployment has been associated mainly with new entrants to the labor force rather than with layoffs.

AVERAGE WAGE CEILINGS. An alternative would be to impose a ceiling on the average wage paid within a firm. The incentive to lay off workers is thus removed, leaving latitude for firms to hire more labor if profitable opportunities for expansion arise, provided that new workers are paid no more than the average wage of incumbent workers. The drawback is that the rule equally encourages firms to pad their work force with employees whose wage is below the firm's average, leading to uneconomical hiring of unskilled workers.

ADJUSTMENT FOR INFLATION. Most wage controls adopted in reforming socialist economies in the early 1990s included some adjustment for inflation. In

these countries inflation was either already high, as in Poland, or was expected to reflect a discrete price adjustment, as in Czechoslovakia; without some wage indexation, wage controls would have entailed an unacceptably large drop in real wages. Indexation has been the subject of an extensive literature in market economies, which can only be alluded to here (see, for instance, Gray 1978; Dornbusch and Simonsen 1983).

Most incomes policies provide for only partial indexation, adjusting wages by only a fraction of the inflation that has occurred. Wage controls with full indexation would not be a nominal anchor for the economy, because they provide no check to a wage-price spiral. The precise choice of indexation coefficient is largely a macroeconomic question: if inflation is ongoing, a lower coefficient lowers real wages; it also dampens the effects of shocks on prices and wages but may exacerbate the effects of shocks on output. There is also an important political dimension: how large a decrease in real wages would be acceptable? In most Eastern European economies, unusually low coefficients of indexation were chosen in relation to those adopted in many market economies. This can be explained by the sizable targeted reduction of real wages, considered necessary to eliminate excess demand in economies characterized by shortages in goods markets. Policymakers in these countries also recognized that, before prices were liberalized, the statistical level of real wages was in some measure fictitious, because many goods were often unavailable for purchase at the official prices (Lipton and Sachs 1990).

Another issue is the choice of the type of indexation: backward-looking adjustment to the inflation that has occurred, or forward-looking indexation based on projected inflation. To reduce inertia in the inflationary process, which could be particularly damaging in countries characterized by large jumps in the price level as a result of price liberalization, forward-looking indexation appears desirable. However, given uncertainties surrounding inflation forecasts, forward-looking indexation may result in large changes in real wages. Bulgaria, Czechoslovakia, and Hungary have opted for a forward-looking rule; Poland, for a contemporaneous indexation.

ADJUSTMENT FOR OUTPUT. Some consideration has been given to the idea of allowing firms to increase their wage bills in step with improvements in productivity—in its simplest form, making the permissible wage bill proportional to output. Rewarding productivity increases would both spur effort and help win workers' acquiescence to organizational changes that may increase productivity. The measure would also allow firms to expand to take advantage of productive opportunities, without sanctioning unproductive increases in employment.

The principal argument against linking wage increases with productivity is that the practice would encounter the same pitfalls that have beset production targets—drawbacks that have been fundamental to the failure of central planning. Rewarding enterprises for their production regardless of quality or marketability provides a built-in incentive to emphasize quantity at the expense of

quality. But too often a substantial proportion of output is unusable and the need to produce an appropriate mix of outputs is ignored. Furthermore, the pressure to use inputs that increase output, even if marginal cost of these inputs exceeds the value of their marginal product, leads to misuse of other resources such as capital, raw materials, and energy. Wage controls designed to permit higher wages to firms with higher production would create many of the same incentives and thus many of the same effects, this time under pressure from the workers. Moreover, in an economy in transition, output-based wage controls could further weaken the resolve of loss-making enterprises to scale back production and shut down unprofitable lines. There would also be administrative costs, because such productivity-based controls would put the government back into the business of monitoring the physical side of the enterprises' activities.

A ceiling based only on *sold* production would appear to avoid the problem of distorted quality and product mix, but it would not avoid misuse of other inputs. It would shift risks associated with demand fluctuations onto the workers. And enterprises could circumvent the measure's intended market test by agreeing to purchase outputs from one another.

ADJUSTMENT FOR VALUE ADDED. Allowing the wage bill to be adjusted according to the change in the enterprise's value added would encourage productivity without creating incentives to produce unstable, low-quality, or low-price outputs or to misuse raw materials. It would also provide a method of weighing different outputs for a multiproduct firm.

But a system of wage ceilings adjusted to value added also has some serious limitations. For one thing, it would still provide an incentive for decapitalization unless some appropriate adjustment were made for the use of capital during production. Another, more fundamental drawback is that a firm with market power can increase value added by increasing prices. In fact, a wage ceiling adjusted to value added requires that the firm be able to pass on wage increases in higher prices. This could still serve some useful purpose, in effect helping to harden the enterprises' budget constraints by ensuring that the only way they can offer higher wages is to raise the necessary additional revenues by borrowing, arrears, or subsidies. However, there is an associated danger: if the increase in value added of the individual firm is partially indexed, any wage increase would have to be accompanied by a greater-than-proportional price increase, implying a pass-through of more than 100 percent; any wage increase that does occur would thus be more inflationary.

Another drawback of wage controls based on value added is that, even more than productivity-adjusted wages, they shift the risk associated with an enterprise's production and sales revenues onto the workers. As well as reducing some of the risk-bearing role that firms typically perform in market economies, the policy introduces wage differentials among firms that may be regarded as inequitable, because they do not correspond to differences in the skill or effort of workers. Making the rule stick—a credibility issue crucial to any system of

wage controls—is also likely to be especially difficult for a system in which workers' allowed wage depends on actual sales performance. If the adjustment is contemporaneous, wages would initially be based on sales forecasts and would have to be clawed back if sales fell short of projections; if the adjustments are retroactive, they would be for the total change in value added. In either case, workers' remuneration in one period would depend on sales performance in the recent past. Telling workers in firms whose sales had fallen that their wages must fall correspondingly—saying, in effect, *C'est dommage, mais c'est la loi*—would be no easy matter, for governments or managers. The danger then is that a value added wage adjustment would in practice become one-sided: wages would increase for workers in enterprises whose value added had risen but would not decrease for those in firms whose value added had fallen.

ADJUSTMENT FOR PROFITS. An adjustment based on the enterprise's profits, usually in the form of a share of profits paid as a premium or bonus, is a common feature in many formerly centrally planned economies. In providing a channel through which workers can benefit from changes in productivity, such premiums may spur workers to make greater efforts on their own part, to monitor the effort of their colleagues, and to cooperate with changes in organization and management. Moreover, because at present the profits of state enterprises are typically an important part of the tax base, the temptation to underreport profits is strong; allowing a portion of taxable profits to be paid out in premiums may encourage more honest disclosure.

But excessive reliance on an adjustment for profits in an incomes policy carries some disadvantages. Even more than a value added adjustment, a profit adjustment shifts risks onto the workers, with the attendant endangering of credibility; it does, however, have the advantage of setting an explicit floor for wages, because premiums out of profits are typically not allowed to be negative. Premiums out of profits may encourage inertia in employment, because, if new workers are hired, profits paid in bonuses will be spread thinner, while incumbent workers who are laid off lose not only their wage but also their share of profits (Lane 1991). Another potential problem is decapitalization: firms that expect to be privatized would try to increase their short-term profits payable in bonuses, at the expense of their long-term productivity. However, if profits have to be reported for tax purposes in order to be paid out to the workers, at least the state budget reaps a share of the decapitalization.

This discussion of different rules that have been considered for setting wage norms illustrates a basic "trilemma": strict wage controls entail rigidity in wages that may be undesirable; but rules that allow enterprises more flexibility also give them scope for circumventing the controls, weakening control of inflation, and creating distortions; and trying to avoid the distortions by adapting controls to the details of the enterprise's circumstances impairs credibility. Adapting controls to avoid distortions may increase the strength of lobbying for further exceptions to the rules by eliminating the system's claim to uniformity,

could result in wage controls of amazing complexity, and, in some cases, could amount to reintroducing central planning through the wage control system.

What is the solution? Clearly, a case can be made for adopting a *simple* system—such as an average wage rule with a modest premium paid out of taxable profits—while recognizing that some distortionary consequences are unavoidable. Meanwhile, effort should be concentrated, not on devising a more sophisticated incomes policy, but on solving the ubiquitous problem of weak enterprise governance which at once necessitates the wage controls and at the same time is to blame for many of their distortionary effects.

What about the coverage of wage controls? Layard (1991) argues that, in the context of an anti-inflation policy it is better to have an across-the-board wage policy, with no exceptions for private firms. But this solution may not hold in a reforming socialist economy, where the need for wage controls is related specifically to the problem of governance of the state-owned enterprises. Private enterprises do not face that problem: in these economies they are generally smaller, owner-managed firms, and the interests of the owner are well represented in the decision process. Few private enterprises have any degree of market power, so they are less likely to be able to grant excessive wages. The private sector may be able to achieve higher productivity by paying “efficiency wages”—that is, by paying higher wages than the state sector but with the threat of unemployment if workers shirk their duties (Dinopoulos and Lane 1991). This conjecture is consistent with anecdotal evidence that workers in the private sector typically earn more but are expected to work harder. The potential benefits both to workers (higher wages) and firms (higher productivity) should not be discouraged. Finally, if the private sector is more productive, it should be free to offer higher wages to draw workers out of the state sector into private firms where they will be more productive. Exempting the private sector from wage controls may therefore speed economic transition (see Lane’s discussion of this issue in Coricelli and Revenga 1992).

A case might also be made for exempting smaller firms from wage controls, on the grounds that controls would place a proportionately greater administrative burden on them and that their wages are more likely to be subject to some degree of market discipline. In most formerly socialist economies, smaller firms are more often privately owned (and vice versa), so in practice an exemption based on number of employees would be roughly equivalent to an exemption of private firms.

Enforcing Controls

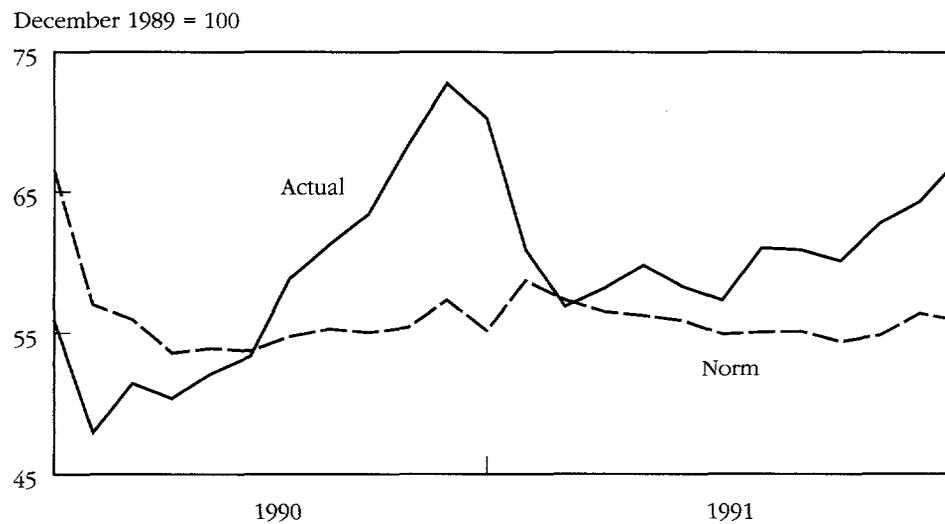
For a wage policy to be effective, it is not enough to specify a norm for the permitted increase in wages. The rule must also be enforced, by providing rewards for compliance, penalties for noncompliance, or both. In Central and Eastern Europe, the main instrument for enforcing wage policy was a tax on excess wages, levied on enterprises that paid wages exceeding the specified

norm. In Bulgaria, Czechoslovakia, and Hungary, the tax penalty was reinforced by a “social pact”—a consensual agreement between the government and workers’ organizations; in Poland, where such a consensus-based approach was not achieved or even sought, workers nonetheless did not disagree—at least at first—with the need for a real wage cut.

The countries of Central and Eastern Europe that launched reform programs in 1990–91 were initially successful in moderating wage increases—achieving, in fact, a sharp initial drop in real wages in all countries except Hungary. In Bulgaria, Czechoslovakia, and Poland, wages were set well below the program ceilings in the first few months following the implementation of the programs. This behavior initially boosted profits and thus swelled government revenues, highly dependent on profit taxes in these economies (Lane 1992). Figure 1 illustrates the behavior of real wages in Poland during 1990 and 1991. Real wages dropped to around half their December 1989 level in the first few months of 1990, as a result of wage controls and other policies.² When this decrease in real wages occurred, average wages were substantially less than their norm, but they exceeded the norm during the second half of 1990 and most of 1991.

After this initial period of moderation, enforcing the wage policy became more difficult, especially in Poland. By the end of 1990, average wages had climbed above the program ceilings. Firms were willing to pay steep tax pen-

Figure 1. *Average Real Wages in Poland, 1990–91*



Note: Average wages charged to costs, deflated by the retail price index.

Source: International Monetary Fund calculations based on data from Central Statistical Office, Poland.

alties in order to award wage increases. During 1991 tax penalties became largely irrelevant as firms fell into arrears for such payments. The financial condition of an enterprise ceased to be an important factor in determining wage increases. Indeed, large tax penalties were incurred by enterprises that were making losses on a before-tax basis. This phenomenon, which implied that firms were being decapitalized, became widespread (see Pinto, in Coricelli and Revenga 1992).

Maintaining wage moderation became difficult for two main reasons. First, the imminent change in the enterprises' ownership associated with privatization provided a strong incentive for incumbent workers and managers to decapitalize their firms, and none at all for workers to restrain their wages, since they would expect any resulting increase in the enterprise's value to accrue to the government or to the future owners, rather than to themselves through premiums paid out of profits. Uncertainty about privatization, or delays in its implementation, would also lead workers to place greater value on the certainty of higher wages now than on the possibility of premiums paid out of profits in the future.

The second problem encountered in the attempt to enforce wage policy was the weak financial discipline characteristic of these economies (Lane and Folkerts-Landau 1992). If enterprises can run tax arrears or can borrow to pay their excess wage tax without regard to their creditworthiness, a tax on excess wages cannot effectively restrain wages. This is particularly true for enterprises that are not viable in the longer term: they can borrow now to pay higher wages and the resulting excess wage tax, knowing that they will never have to pay because they expect eventually to go bankrupt in any event.

The anticipation of ownership changes and the weakness of financial discipline that create a need for incomes policies thus blunt the teeth of those policies at the outset. So, paradoxically, tax-based wage restraints work best when they are not really needed—that is, when they are imposed on firms that care about their profits and therefore have an incentive to keep wage increases down in any case.

The moderation of wage increases observed at the beginning of the stabilization programs in Central and Eastern Europe may therefore have been associated largely with the tightness of macroeconomic policies; the tax penalties associated with wage policy may actually have been of limited relevance, because wage ceilings were not binding. Later, as macroeconomic policies eased up, wage controls were needed to counteract the resulting wage pressures and decapitalization of the firms, but by the same token the tax-based policy became ineffective; this was especially so in Poland.

The success of the enforcement of wage policies differed across countries: Czechoslovakia and Hungary, for instance, did not experience the serious difficulties with enforcement that Poland did in 1991. The comparative success of enforcement in Czechoslovakia and Hungary may have reflected macroeconomic policies that attenuated the pressures for wage increases. In Hungary it

might also be ascribed partly to the decentralized approach to privatization that may have given managers a stronger stake in the long-term performance of the firm. In Czechoslovakia the tighter preexisting state control of the economy may have aided in enforcement. Finally, the consensus-based approach followed in both countries may also have elicited more cooperative behavior from the workers.

For enforcement to be effective and durable, wage policy apparently must contain elements other than tax penalties. Fines and other penalties on non-compliant firms or their managers are the obvious alternative, but, when ownership is uncertain and financial discipline weak, fines run into many of the same problems as taxes. Even if fines were levied on the managers personally, they could be compensated from the firms' finances, and threatening noncompliant managers with jail seems a bit extreme and unlikely to be credible.

The continuing lack of hard budget constraint on state enterprises poses an irreducible barrier to any wage policy that imposes penalties on the enterprises. The shortness and uncertainty of the time horizon resulting from impending privatization is also a fundamental problem. One way to tackle the latter is to change the reward structure by distributing shares to workers to give them a stake in the firms' future profits and to reduce their incentive to decapitalize their firms before privatization occurs. This measure could be strengthened by debarring workers in firms not complying with wage targets from receiving shares. The main limitations of such measures are that they would not completely solve the incentive problem unless the workers are given *all* of the shares in the enterprise—which may not be desirable for other reasons—and that they would be nugatory for unviable enterprises, whose present value is very low or negative and whose shares are therefore nearly worthless.

Another route to effective enforcement, using penalties rather than rewards, involves administrative changes affecting the control of firms. For instance, the state could take full control of enterprises that do not comply with the wage policy, abolishing any legal power of the workers' councils in the management of firms. Placing a substantial number of enterprises under direct state control in this manner, unless soon followed by privatization, would be a backward step, however, and would return a significant part of the economy to another, familiar set of inefficiencies associated with central planning. It is also questionable to what extent abolishing the formal role of the workers' councils would curtail the workers' real bargaining power unless the new managers were given a sufficient interest in the enterprise's profits. To be acceptable in a democratic environment, such measures would also have to be part of a general, consensual agreement between the government and workers' representatives at the national level. Therefore, although a combination of rewards and penalties may make for more effective enforcement of wage policies during the transition, and a consensus-based approach may help to strengthen the legitimacy of wage policies, these are no substitute for measures that deal with the

more fundamental problems of enterprise governance and financial discipline, which would continue to undermine any acceptable method of enforcement.

Conclusion

The need for wage controls in reforming socialist economies springs largely from the fact that the interests of the ultimate owners of the state enterprises are currently not being represented. The uncertain timing of the transformation of ownership compounds the ownership vacuum, while the continuing softness of budget constraints implies that enterprises can accumulate arrears and obtain other financing, enabling them to pay higher wages even if they are insolvent. At the same time, it is precisely these aspects of these economies that make any design of wage controls distortionary and enfeeble enforcement through the tax system. A more sophisticated wage control system is unlikely to alleviate these problems; a simple, transparent policy is most likely to be effective.

More fundamentally, the flaws of wage policy cannot be tackled through wage policy itself; rather, they are inherent in the current economic environment. In this regard, it is essential to resolve uncertainty about the timing of the privatization process and about the workers' stake in the privatized firms, with a view to reducing the incentives for decapitalization. Policy must also establish financial discipline over the enterprises to prevent them from paying excessive wages by borrowing without the means or intention of repaying. Until such reforms—which are themselves exceedingly difficult to accomplish—have progressed, any incomes policy, although necessary, must inevitably be both weak and distortionary.

Notes

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1. Wage controls did not begin with the reform programs of the early 1990s; in Poland and Hungary they were introduced as centralized wage setting ended, in the 1980s and 1970s, respectively.

2. However, this comparison is qualified by the fact that real wages had been unusually high in December 1989 because of seasonal factors such as seasonal bonuses.

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FISCAL DEFICITS AND MACROECONOMIC PERFORMANCE IN DEVELOPING COUNTRIES

William Easterly
Klaus Schmidt-Hebbel

Although fiscal adjustment was urged on developing countries during the 1980s to lead them out of economic malaise, considerable uncertainty remains about the relations between fiscal policy and macroeconomic performance. To illustrate how financial markets, private spending, and the external sector react to fiscal policies, the behavior of holdings of money and public debt, private consumption and investment, the trade balance, and the real exchange rate is modeled for a sample of ten developing countries. The studies find strong evidence that over the medium term, money financing of the deficit leads to higher inflation, while debt financing leads to higher real interest rates or increased repression of financial markets, with the fiscal gains coming at increasingly unfavorable terms. Consumers respond differently to conventional taxes, unconventional taxes (through inflation or interest and credit controls), and debt financing, in ways that make fiscal adjustment the most effective means of increasing national saving. Private investment—but not private consumption—is sensitive to the real interest rate, which rises under domestic borrowing to finance the deficit. Contrary to the popular presumption, in some countries private investment increases when public investment decreases. There is strong evidence that fiscal deficits spill over into external deficits, leading to appreciation of the real exchange rate. Fiscal deficits and growth are self-reinforcing: good fiscal management preserves access to foreign lending and avoids the crowding out of private investment, while growth stabilizes the budget and improves the fiscal position. The virtuous circle of growth and good fiscal management is one of the strongest arguments for a policy of low and stable fiscal deficits.

Fiscal deficits received much of the blame for the assorted economic ills that beset developing countries in the 1980s: overindebtedness and the debt crisis, high inflation, and poor investment performance and growth. Attempts to regain macroeconomic stability through fiscal adjustment achieved

uneven success, raising questions about the macroeconomic consequences of public deficits and fiscal stabilization—or fiscal deterioration.

One recurring question is whether larger public deficits are always associated with higher inflation. Sargent and Wallace's (1985) "monetarist arithmetic" answered this question affirmatively. But the relationship is blurred because governments finance deficits by borrowing as well as by printing money. The relationship is further muddied by other influences such as unstable money demand, inflationary exchange rate depreciations, widespread indexation, and stubborn inflationary expectations (Kiguel and Liviatan 1988; Dornbusch and Fischer 1991). And if larger public deficits are associated with higher inflation, what are the tradeoffs in financing the deficit through money creation?

Interest rates are another ambiguous factor. Do deficits push up domestic real interest rates when governments rely heavily on domestic debt instruments, or is this relationship also blurred by such factors as interest rate or credit allocation controls (Easterly 1989; Giovannini and de Melo 1990) or the high degree of substitutability between public debt instruments and other assets held by the private sector?

Will consumers reduce their spending when taxes are raised and increase it when taxes are lowered? Or will they offset only changes in government consumption—without reacting to changes in government tax or debt financing—as posited by Ricardo and, more recently, by Barro (1974)? Although the issue is still not settled empirically for industrial countries (Hayashi 1985; Bernheim 1987; Leiderman and Blejer 1988), there is growing evidence that refutes Barro's Ricardian equivalence proposition for developing countries (Haque and Montiel 1989; Corbo and Schmidt-Hebbel 1991).

Another unresolved issue concerns the effects of government spending on investment. Does a higher level of public capital spending boost (crowd in) or lower (crowd out) private investment? Theory predicts, and the limited evidence available for developing countries confirms, that the effect depends on whether private and public investment complement or substitute for each other (Blejer and Khan 1984; Khan and Reinhart 1990; Easterly and Schmidt-Hebbel forthcoming).

If real interest rates do rise in response to higher domestic debt financing of deficits, how does that affect private consumption and investment? Although theory argues that the effect is ambiguous—because of potentially offsetting substitution, income, and wealth effects—it predicts unambiguously that private investment will decline with higher interest rates. A growing body of evidence for developing countries supports the notion that private consumption is insensitive to real interest rates (Giovannini 1983, 1985; Schmidt-Hebbel, Webb, and Corsetti 1992). Surprisingly, many studies of developing countries show that private investment also does not respond much to interest rates (Rama 1990; Serven and Solimano 1992).

Finally, how do fiscal deficits feed into external deficits? One expects a strong link between fiscal deficits and current account deficits in financially open econ-

omies when consumers are not Ricardian. The role that fiscal imbalances played in the overborrowing that led to the debt crisis of 1982 is widely recognized (Dornbusch 1985; Sachs 1989). But evidence linking public deficits with external deficits and appreciation of the real exchange rate is still incomplete.

This article examines these issues for a representative sample of ten developing countries. After reviewing alternative measures of the fiscal deficit and the broad outlines of fiscal adjustment in the ten countries, the article focuses on the relation of the domestic financing of deficits to inflation and real interest rates. It looks as well at the direct and indirect effects of public spending, taxation, and deficits on private consumption and investment, at the spillover into external imbalances and the real exchange rate, and finally at some of the policy implications.

Analytical Framework

Governments can finance deficits by printing money (seigniorage), borrowing at home, or borrowing abroad. This public deficit financing identity (written for the broad public sector comprising general government, public enterprises, and the central bank) is a useful starting point for tracing out and quantifying the macroeconomic effects of public deficits:¹

$$(1) \quad \text{Public deficit financing} = \text{Money financing} + \text{Domestic debt financing} + \text{External debt financing.}$$

The consequences of deficits depend on how they are financed. As a first approximation, it can be said that each major type of financing, if used excessively, results in a specific macroeconomic imbalance. Money creation leads to inflation. Domestic borrowing leads to a credit squeeze—through higher interest rates or, when interest rates are fixed, through credit allocation and ever more stringent financial repression—and the crowding out of private investment and consumption. External borrowing leads to a current account deficit and appreciation of the real exchange rate and sometimes to a balance of payments crisis (if foreign reserves are run down) or an external debt crisis (if debt is too high).

To quantify the effects of domestic deficit financing on inflation and real interest rates for the ten sample countries, we applied a portfolio-balance model for the demand for money and public debt instruments, linking it to the public deficit financing identity in equation 1. Econometric estimations of demand for money balances and domestic debt, which reflect substitution between these two assets and a third asset (typically foreign currency or foreign interest-bearing assets) in the portfolios of asset-holders, are the backbone for assessing the effects of domestic financing of the fiscal deficit on monetary and financial markets. Policy simulations are used to estimate the effects of larger deficits, financed through either money creation or the issuance of domestic debt instruments, on inflation and real interest rates.

Public deficits are financed by surpluses from other sectors. So the public deficit can be rewritten in terms of the economy's aggregate resource or saving-investment constraint:

$$(2) \quad \begin{aligned} \text{Public deficit} &= \text{Public investment} - \text{Public saving} \\ &= (\text{Private saving} - \text{Private investment}) + \text{Foreign saving.} \end{aligned}$$

Larger public deficits must lead to some combination of lower private consumption (at a given level of private income), lower private investment, and higher foreign saving. The question is what determines that combination: which of the three components on the right side of equation 2 bears the burden of higher public deficits? The answer depends broadly on five factors that influence the private domestic and foreign response to public deficits: the flexibility and sophistication of domestic financial markets, access to external financing, the source of domestic financing (money or bonds), the forward-looking behavior of consumers and investors, and the composition of the deficit.

The common framework for analyzing the sensitivity of private consumption and investment to fiscal policies is that of consumer and investor behavior constrained by imperfect access to financial markets. The specification of private consumption considers three alternative hypotheses: the Keynesian hypothesis that only current taxation affects consumption; the permanent (long-term) income hypothesis that only permanent taxation matters because consumers spend a proportion of the present value of their expected lifetime income; and the Ricardian hypothesis that only permanent government consumption affects private consumption because any increase or decrease in taxes is offset by an equivalent change in the opposite direction in private saving. The specification of private investment considers the direct and indirect (through higher interest rates) effects of the deficit as well as whether an increase in public investment causes private investment to rise or fall. Econometric estimations can quantify the impact of the deficit (and of the composition of the underlying spending and financing) on private consumption and investment, including the indirect effects through inflation and real interest rates.

Specification of the behavior and sensitivity of the trade deficit and the real exchange rate to public deficits and fiscal policy-related variables follows the framework of Rodríguez (1989). Through a two-step relation linking the deficit and the real exchange rate, the analysis shows how fiscal policies affect private spending and the accumulation of foreign assets. The fiscal deficit (among other determinants of private spending) affects the external deficit, which then determines the real exchange rate that is consistent with the clearing of the market for nontraded goods. Statistical estimation of these relations can quantify the impact of the deficit and its composition (public spending on traded and nontraded goods and services) on the trade balance and the real exchange rate.

Data for the ten sample countries were plugged into this common framework for money and financial markets, private consumption and investment,

and the trade deficit and real exchange rate. Except for some portfolio demand estimations, which were based on quarterly data, most of the estimations were performed using annual data, typically covering the 1960s through the 1980s. The quantitative results of the country analyses, complemented by additional cross-country evidence, are summarized for money and domestic debt financing. Qualitative results are presented for the effects of deficits and fiscal policies on private consumption and investment, the trade balance, and the real exchange rate. (The full set of quantitative estimation results is available in the case studies listed in the reference section.)

Several policy implications are derived from this empirical evidence. Relying on a representative set of case studies rather than on pooled cross-country studies or individual case studies permits more reliable inferences to be drawn about the unsettled issues regarding deficits and their macroeconomic consequences. The countries selected for study—Argentina, Chile, Colombia, Côte d’Ivoire, Ghana, Morocco, Mexico, Pakistan, Thailand, and Zimbabwe—were chosen for the diversity of their fiscal and other macroeconomic policies and experiences and for how well they represent the developing world at large. The sample includes fiscal adjusters and nonadjusters, high- and low-deficit countries, large and small economies, low- and high-inflation cases, and countries with and without well-developed financial markets and with and without access to foreign financing.

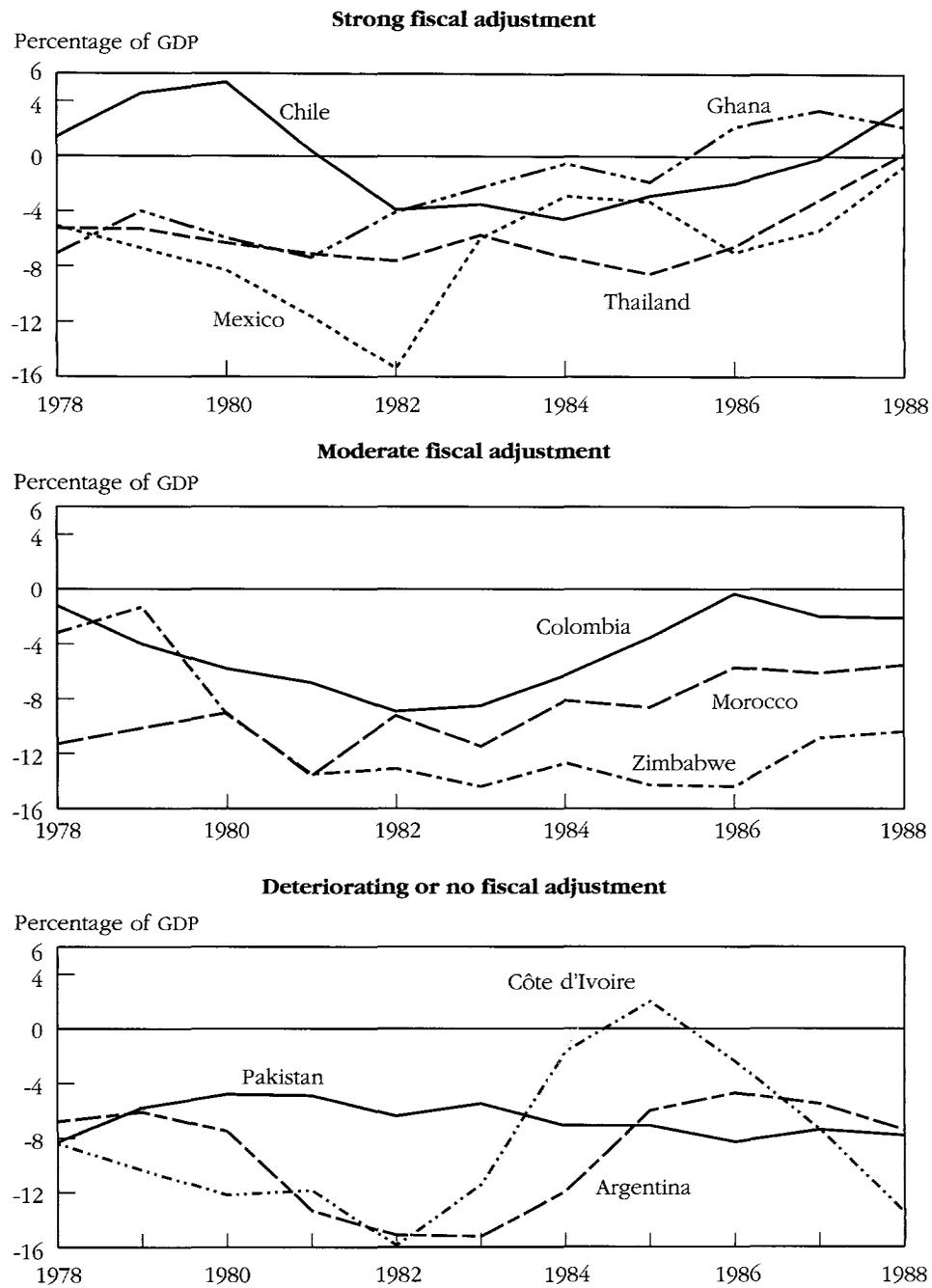
One final point on methodology. This article focuses on how public deficits influence the macroeconomy, but the case studies also examined influences in the other direction. They found that foreign and domestic macroeconomic shocks play only a minor role in cyclical variations or long-run changes in non-financial public sector deficits—fiscal policymakers get both the blame for fiscal crises and the credit for fiscal adjustment (see Easterly and Schmidt-Hebbel forthcoming for a summary). Ignoring the feedback effects thus seems to be a benign simplification.

Deficit Measurement and Fiscal Performance

How the fiscal deficit is measured has an important bearing on an analysis of the macroeconomic implications of deficits.² Two key dimensions are the composition of the public sector and the economic relevance—or quantifiability—of various types of deficit measures.

The composition of the public sector can be defined in three alternative ways: central government only; consolidated nonfinancial public sector, which adds local government, social security, and nonfinancial public enterprises; and consolidated total public sector, which adds the central bank and, sometimes, public commercial banks. Deficit measures based on the most inclusive definition of public sector are the most accurate measures of a country’s fiscal position and public sector resource transfers, but they are not always readily

Figure 1. Patterns of Fiscal Adjustment in Ten Developing Countries, 1978–88



Note: Based on the consolidated nonfinancial public sector balance in each country.
Source: Country case studies listed in the references.

available and are frequently subject to arbitrary accounting conventions that sharply reduce their usefulness.

Nominal consolidated nonfinancial public deficits in the 1980s present one picture for each of the ten sample countries (figure 1). Chile, Ghana, Mexico, and Thailand show strong fiscal adjustment; Colombia and Morocco display more gradual but steady improvement; and Zimbabwe demonstrates partial adjustment in the late 1980s. Argentina, Côte d'Ivoire, and Pakistan show no adjustment or even a deterioration in fiscal accounts.

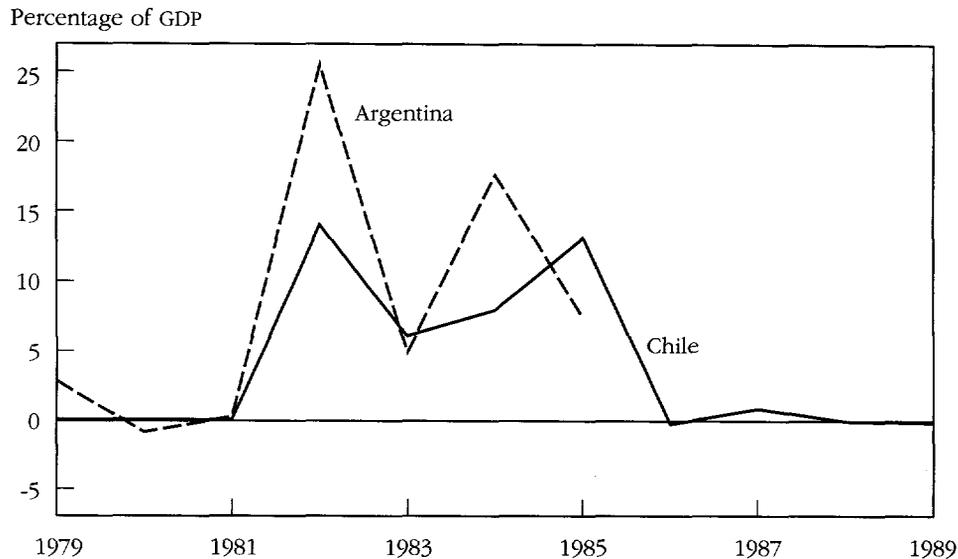
But consolidated nonfinancial public sector deficits do not always show the whole picture. They leave out an important fiscal element, the losses of the central bank or other public financial intermediaries from quasi-fiscal operations that subsidize activities in the private sector. Among the ten countries, deficits in quasi-fiscal operations are exclusively a Latin American phenomenon. The central banks in Argentina and Chile extended emergency loans to financial institutions and suffered losses from exchange rate guarantee programs. A comparison of quasi-fiscal deficits and conventional nonfinancial public sector deficits in the two countries illustrates how misleading nonfinancial public sector deficits are as indicators of overall fiscal policy when quasi-fiscal operations are large (figure 2). In Argentina quasi-fiscal deficits were roughly as large as conventional deficits during 1982–85; together they averaged 25 percent of gross domestic product (GDP) a year. In Chile quasi-fiscal deficits averaged more than 10 percent of GDP a year during the same period, more than double the size of conventionally measured deficits.

There are also several options for measuring the deficit in ways that are more or less economically relevant. The nominal cash approach permits broad comparability of deficits across countries. A variant, the operational deficit, deducts the inflationary component from nominal interest payments on public debt. This deduction, which reflects the compensation of debt holders for erosion of the real value of public debt caused by inflation, is an important correction for high-inflation, high-domestic-debt countries.

An accrual, or payments-order, approach measures income and spending actions when they occur, even if they do not immediately involve cash flows. Deficits measured on an accrual basis would be larger than those measured on a cash basis when arrears have been allowed to accumulate on government payments of interest, wages, or purchases of goods. Accrual-based deficits open the door to a whole set of unconventional measures of the deficit based on considerations of public net worth or intertemporal budget constraints. Such measures would constitute the most meaningful gauge of a government's fiscal position, but they are not observable.

There are other economically meaningful measures. One is the sustainable public deficit of Buiter (1983, 1985, 1990) and van Wijnbergen (1989), a deficit that can be financed without raising debt levels (relative to GDP) under feasible rates of growth, real interest, and inflation. Another is the public sector solvency measure of Hamilton and Flavin (1986), Grilli (1989), Wilcox (1989), and

Figure 2. Consolidated Quasi-fiscal Deficits in Argentina and Chile, 1979–89



Source: Argentina, Rodriguez (1991); Chile, Marshall and Schmidt-Hebbel (1991).

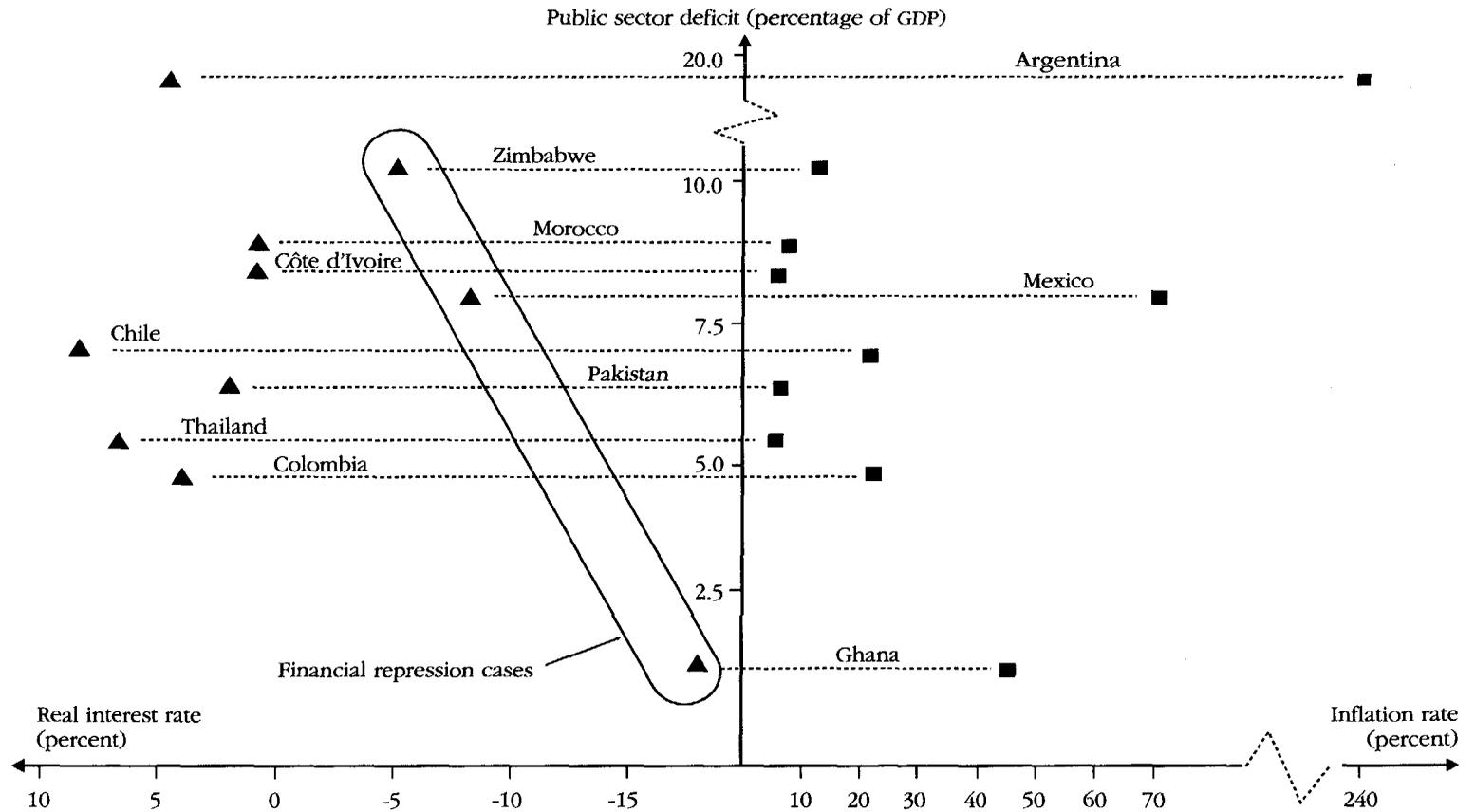
Buiter and Patel (1990), which checks for public sector solvency by comparing the rate of growth of the public debt (relative to GDP) to the real interest rate. If the debt ratio systematically grows faster than the real interest rate, the public sector is considered insolvent.

Despite the usefulness of these measures for assessing overall fiscal stance and issues of sustainability and solvency, the questions addressed in this analysis require the use of cash-based operational (or nominal) deficit measures with the widest available coverage of the public sector. The analysis of deficits, inflation, and interest rates uses consolidated total (nonfinancial plus quasi-fiscal) public sector deficits. The analyses of deficits and private sector response and of deficits and the real exchange rate use operational consolidated non-financial public deficits, because there are no long time-series data for quasi-fiscal deficits.

Inflation, Real Interest Rates, and Financial Repression

The relations between deficits and inflation and between deficits and real interest rates are far from simple (figure 3). With low to medium rates of inflation, there is no relation across countries between long-term inflation (1980–88)

Figure 3. Fiscal Deficits, Real Interest Rates, and Inflation in Ten Developing Countries, 1978–88 Averages



Note: Public sector deficits are for the total consolidated nonfinancial public sector in each of the ten countries, with quasi-fiscal deficits added for Argentina, Chile, and Mexico.

Source: For deficit data, see country case studies listed in the references; for inflation and nominal interest rates, see IMF (annual).

and public deficits. However, countries with the highest rates of inflation—Argentina and Mexico during the 1980s—had significantly higher deficits than countries with lower rates. Similarly, domestic real interest rates show no correlation with public deficits across countries except in the case of high-deficit, high-interest rate Argentina.

The lack of correlation across countries between deficits and inflation and deficits and interest rates is attributable primarily to the different ways that countries finance their public deficits. To account for the effects of these differences, a more detailed understanding is needed of the links between domestic deficit financing and inflation and interest rates.

Fiscal Deficits and Inflation

On average over the long term, developing countries have relied more on money creation (seigniorage) to finance deficits than have industrial countries (table 1). Various factors, including unstable demand for money, exchange rate depreciation, and widespread indexation, blur the relation between money financing and inflation over shorter periods. In the long run, however, an increasingly unfavorable tradeoff between inflation and money creation becomes evident, which explains why money creation is generally used only as a last resort. The last column of table 1 shows the amount of additional inflation required to achieve an additional percentage point in long-run seigniorage revenue relative to GDP, derived from estimates of how much money people are willing to hold at different inflation rates. The tradeoff is still favorable in countries with low inflation (5 percentage points of additional inflation in Thailand), worsens in countries with moderate inflation (15 to 20 percentage points in Colombia and Ghana), and becomes untenable in countries with high inflation (97 percentage points in Argentina), where money holders replace most of their local currency holdings with foreign currency and interest-bearing assets.

Except for Chile, these results are remarkably similar to those derived from more comprehensive models for the long-term effects on price levels of transitory deficits financed by money creation (reported in table 2). These models also consider feedback effects on inflation from asset substitution (and from output, in the cases of Colombia and Pakistan). The four countries with results show that financing a percentage point increase in the deficit (as a share of GDP) through money creation boosts inflation from 10 percent (Zimbabwe) to 18 percent (Pakistan).

Considering the unfavorable tradeoff in most cases and the general aversion to high inflation, it is hard to believe that revenue motivations alone explain chronic high inflation. More likely, the cause is the inability of governments to make credible commitments to fiscal and monetary targets, leading to a loss of confidence and increased substitution away from money (Blejer and Liviatan 1987; Kiguel and Liviatan 1988).

Table 1. Money Creation and the Inflation Tax in Ten Developing Countries, 1965–89

Country	Seigniorage ^a (percentage of GDP)	Inflation ^b (percent)	Percentage increase in inflation to achieve a 1 percentage point increase in seigniorage revenue
<i>Case study countries</i>			
Argentina	4.2	115.3	97
Chile	3.7	56.6	23
Colombia	2.1	17.7	15
Côte d'Ivoire	1.3	7.6	—
Ghana	3.1	31.6	20
Mexico	3.1	28.9	—
Morocco	1.7	6.1	8–26
Pakistan	2.0	8.0	—
Thailand	1.0	5.7	5
Zimbabwe	1.1	7.7	10
Average 10 countries	2.3	28.5	n.a.
<i>Other countries</i>			
Average of 35 developing countries	2.1	—	n.a.
Average of 15 industrial countries	1.0	—	n.a.

— Not available.

n.a. not applicable.

Note: The period covered is generally 1965–89, but coverage varies according to data availability.

a. Defined as the nominal change in the money base each month divided by the consumer price index for that month. The typical method of calculating the ratio of the nominal change in the money base over the entire year to the annual nominal GDP can seriously overstate seigniorage in high-inflation countries.

Although interest paid on reserves should also be subtracted to get a true estimate of seigniorage, the data are generally lacking, and, in any case, few developing countries pay interest on reserves. An important exception is Argentina, where the combination of high inflation and interest paid on reserves makes this adjustment important.

b. Average annual rates of change in the consumer price index between 1964 and 1988.

Source: For Argentina, Colombia, Ghana, and Morocco, country studies listed in the references; for Chile, Thailand, and Zimbabwe, calculated from seigniorage and inflation rates in columns 1 and 2 and long-run money demand inflation semi-elasticities of country studies listed in references; for other countries, Easterly and Schmidt-Hebbel (1991). Inflation data are from IMF (annual).

Fiscal Deficits and Interest Rates or Financial Repression

Real interest rates have risen in many developing countries following financial reform, often becoming positive for the first time in years. Argentina, Chile, Colombia, Morocco, Pakistan, and Thailand introduced financial reforms in the 1970s, and their real interest rates reached positive levels in the 1980s (table 3). Ghana, Mexico, and Zimbabwe maintained interest rate controls during most of the 1980s (Mexico liberalized its rates in 1988) and reaped substantial revenue from this implicit tax on financial assets, particularly during the international credit crunch following the debt crisis of 1982. Average annual revenue for the three countries from financial repression of deposit interest rates during

Table 2. Simulation Results for Long-term Effects of Fiscal Deficits on Inflation and Real Interest Rates
(percent)

Country	Effect of a 1 percentage point increase in the deficit to GDP ratio	
	On the price level with money financing	On the interest rate, with domestic debt financing
Chile	14	0.1
Colombia	14	3.0
Morocco	—	0.2
Pakistan	18	1.1
Zimbabwe	10	2.7

— Not available.

Note: This table presents the long-term effects of a transitory (one year) increase in the public deficit, financed by issuing either domestic noninterest-bearing monetary liabilities or domestic interest-paying debt. The results for Chile and Zimbabwe are based on portfolio models combined with the public sector budget equation, while those for Colombia, Morocco, and Pakistan are based on macroeconomic-portfolio general equilibrium specifications.

Source: Country case studies listed in the references.

Table 3. Evolution of Real Interest Rates following Financial Reform or Repression in the 1980s

Country	Real interest rate on deposits ^a (percent)		Tax revenue on deposits, due to financial repression ^b (percentage of GDP)
	1970–79	1980–88	1980–88
Argentina	-17.2	4.8	n.a.
Chile	-15.9	8.1	n.a.
Colombia	-6.3	0.7	n.a.
Ghana	-18.8	-18.3	0.5
Mexico	-4.6	-8.4	1.6
Morocco	-3.1	1.8	n.a.
Pakistan	-3.4	2.1	n.a.
Thailand	-0.5	6.5	n.a.
Zimbabwe	-3.7	-4.3	0.8

n.a. Not applicable.

a. Average annual real interest rates on time deposits, calculated using the consumer price index.

b. Average annual revenue calculated as the difference between domestic real interest rates and average real interest rate of OECD countries.

Source: Country case studies listed in the references.

1980–88 ranged from 0.5 percent of GDP for Ghana to 1.6 percent for Mexico. Holding down nominal interest rates under high inflation was a quick and easy way to compensate for the loss of external financing after 1982.

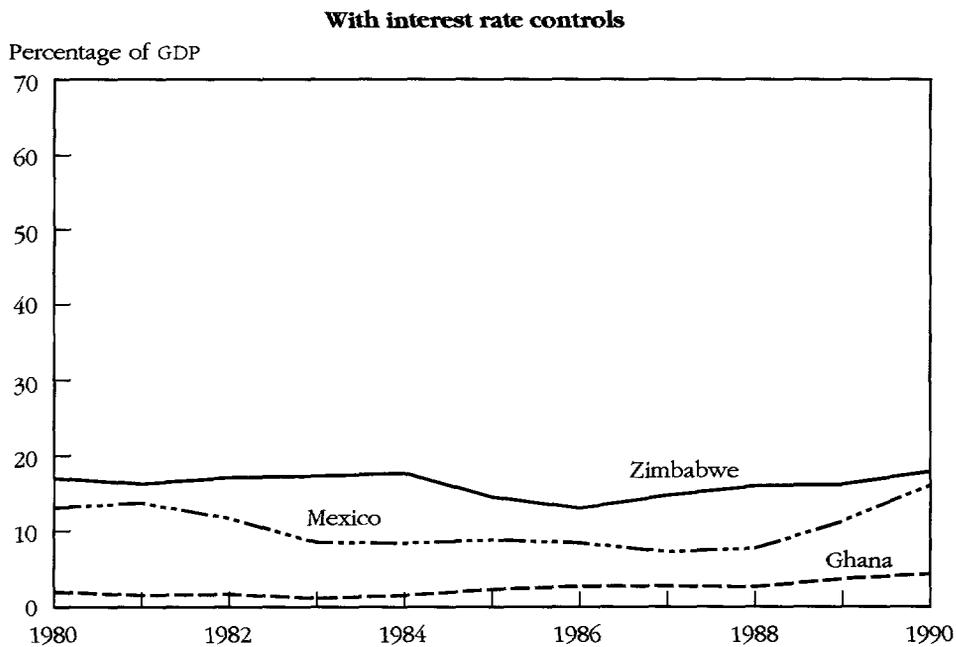
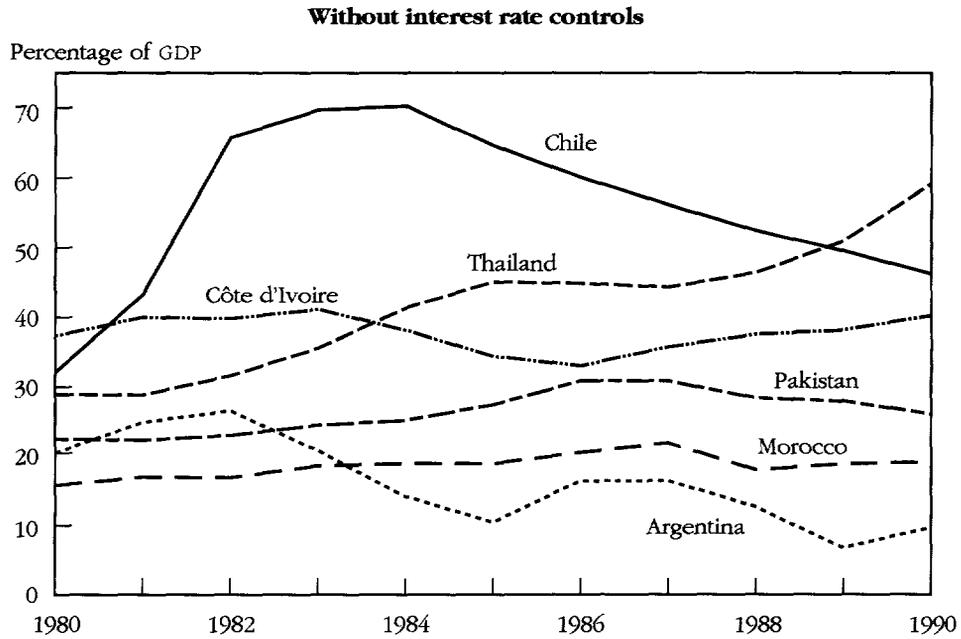
There is a cost, however, in repressed private credit and investment, as other studies have argued (Chamley and Honohan 1990; Easterly 1989; Giovannini and de Melo 1990). There are large differences in domestic private credit between countries with deregulated financial markets and those with stringent financial controls—for the sample countries, an average 30 percent of GDP in the first group compared with 10 percent in the second during 1980–90 (figure 4). Mexico's experience well illustrates the effects of financial repression under rising inflation. Financial controls intensified after 1981 as inflation soared, and the ratio of private credit to GDP dropped below already low levels. Following financial liberalization, the ratio doubled in two years. In Ghana, private credit was at a dismally low level in the late 1980s, reflecting years of financial repression, including two episodes of outright expropriation of financial assets. Countries that abstained from repressive interest rate controls, such as Chile and Thailand, had very high levels of private credit, which may partially explain their superior investment and growth performance in the late 1980s.

The massive decline in private credit in Argentina reflects a more unusual kind of financial behavior. The government oscillated between paying high interest rates and depressing the value of domestic liabilities through surprise devaluations and other undesirable methods, including the forced conversion of time deposits into near-worthless government bonds in 1990. This tactic was necessary because the high interest rates fueled the accumulation of more debt. In a classic example of a debt spiral, the government borrowed more to meet rising interest payments on the debt, which pushed interest rates and borrowing up even higher in the next period, and so on. The following data from Rodríguez (1991) chronicle the inevitable rise in interest rates at the outset of successive economic plans, each of which opened with a devaluation.

<i>Plan</i>	<i>Initial devaluation (percent)</i>	<i>Nominal interest rate (monthly) (percent)</i>
Austral, June 1985	40	7
Primavera, August 1988	24	10
Bunge Born I, July 1989	200	17
Bunge Born II, December 1989	54	60
Erman Plan, January 1990	220	100

Simulation results for the long-term effects on real interest rates of a transitory percentage point increase in the deficit (relative to GDP) financed through domestic borrowing show wide variation, reflecting differences in the willingness of asset holders to shift from alternative forms of savings (table 2). In Chile and Morocco a 1 percentage point increase in the deficit could be absorbed with only a modest 0.1 to 0.2 percentage point increase in real inter-

Figure 4. Private Credit under Financial Liberalization and Repression in Nine Developing Countries, 1980-90



Source: Country case studies listed in the references.

est rates. Larger increases of 1.1 to 2.7 percentage points were required in Colombia, Pakistan, and Zimbabwe (after interest decontrol) to convince markets to absorb the increase in domestic debt. With such a high tradeoff, these countries would have only two choices when domestic borrowing triggers a domestic debt spiral: to clamp down hard on interest rates, as Zimbabwe did up to 1991; or to follow the more desirable course of fiscal adjustment, as Morocco and Colombia did.

These results for domestic debt financing and real interest rates (or financial repression) and those for money financing and inflation indicate strong correlation in both cases in developing countries. Increasingly unfavorable tradeoffs between these financing sources and the rates of return on government liabilities—leading in extreme cases to hyperinflation, debt repudiation, or the virtual disappearance of domestic capital markets—imply that there is no alternative to fiscal adjustment for ensuring monetary and financial stability.

Private Response to Public Deficits

The macroeconomic effects of deficits are determined to a large extent by the direct response of private spending—consumption and investment—to changes in the deficit and its composition. The way governments adjusted their fiscal imbalances during the 1980s—frequently by cutting public investment—was often costly for private investment. In the ten sample countries, private investment declined sharply from an average of 13 percent of GDP in 1981 to 9 percent in 1986. Meanwhile, consumption, both public and private, was relatively insulated. Not even the sharp increases in public consumption of the 1970s—increases that had much to do with the subsequent fiscal crises—were moderated during the adjustments of the 1980s. To provide some insight into how the private sector responds to fiscal policies, we first identify the channels of transmission between fiscal policies and private spending and then assess their empirical relevance.

Private Consumption and Fiscal Policies

Fiscal policies affect private consumption and saving through two major channels: disposable income and rate of return (real interest rate). An increase in the deficit resulting from a cut in current taxes boosts private consumption by increasing *disposable income*, according to the standard Keynesian hypothesis that consumers increase spending when their current income rises. If the tax cut is temporary, the effect will be minimal according to the permanent income hypothesis, which states that only permanent (long-run) tax cuts significantly affect consumer spending.

Both these hypotheses are wrong according to Barro's Ricardian equivalence hypothesis, which claims that consumers react the same whether the govern-

Table 4. *Qualitative Effects of Fiscal Policy-Related Variables on Private Consumption and Investment*

Country	Period	Sensitivity of private consumption to						Real interest rate	Sensitivity of private investment to					Cost of capital	
		Disposable income		Public saving		Public surplus			Public capital		Public deficit	Public consumption	Public revenue	Real user cost	Interest rate
		Current	Permanent	Current	Permanent	Current	Permanent		Stock	Flow					
Argentina	1915-84;1961-84		+	..	..		+	..	0	..	-	+	..	..
Chile	1960-88	+	+	..	0	..	..	0	..	..	..	..	..	..
	1961-88	..	..	..	..	..	..	..	-/0	..	..	..	-/0	..
Colombia	1971-86	+	+	0	..	..	..	+	..	..	..	..	..	..
	1925-88	..	..	..	..	..	..	..	-	..	..	..	0	..
Côte d'Ivoire	1972-87	+	..	..	..	0	..	..	..	..	-	..	..	..
Ghana	1969/70-88	+	+	..	..	0	..	0	..	..	..	..	..	..
	1967-88	..	..	..	..	..	..	..	..	-	..	..	..	0
Mexico	1981.I-1989.IV	+	0	..	0	..	..	-	..	..	..	..	..	..
	1970-89	..	..	..	..	..	..	..	..	-/0	..	..	..	..
Morocco	1972-88	..	+	..	..	..	+	0	..	+	..	..	..	-
Pakistan	1963-87	..	+	..	0	0	..	..	..	..	..	..	..	..
	1972/73-87/88	..	..	..	..	..	..	..	+	..	..	..	..	-
Thailand	1971-87	+	..	..	..	..	..	+	..	+	-	..	..	..
Zimbabwe	1965-88	+	+	..	+	..	..	0	..	+	..	..	..	-

+ and - correspond to statistically significant coefficients; 0 denotes a coefficient not significantly different from zero; .. denotes not available.

Note: Specifications and estimation techniques vary by country. The dependent variable "private consumption" enters in levels for Argentina, Ghana, and Pakistan; log levels for Morocco and Thailand; both levels and log levels for Colombia; ratio to national income for Côte d'Ivoire; and ratio to private disposable income for Chile, Mexico, and Zimbabwe. The dependent variable "private investment" enters in levels for Argentina; log levels for Thailand; ratio to GDP for Chile, Ghana, Mexico, and Zimbabwe; log ratio to GDP for Morocco; and either level, log level, or ratio to GDP for Colombia. For Pakistan, the dependent variable is the private capital stock to GDP ratio. Because of data limitations, the dependent variable is the domestic investment to national income ratio for Côte d'Ivoire.

Source: Country case studies listed in the references.

ment finances its spending through debt or taxes because consumers foresee that a tax cut today, paid for by a deficit and borrowing, will lead to a tax increase in the future. In anticipation of that future tax increase, consumers save rather than spend the income from the tax cut. So a tax cut that simply substitutes debt finance for tax finance of unchanged government spending would leave consumer spending unchanged—and would lower it as a share of now higher disposable income. In short, according to this argument, higher government deficits from tax cuts cause an offsetting increase in private saving. The argument, first skeptically postulated by Ricardo and affirmed in the recent literature by Barro (1974), rests on two main and rather stringent assumptions: that consumers are concerned with their own future welfare and that of their descendants and that consumers can shift consumption over time by borrowing or lending whenever they wish.

There is another reason—unrelated to the Ricardian hypothesis—why a deficit increase resulting from a tax cut could cause private saving to rise. Under conditions of strict credit and interest rate controls, with government having the first claim on credit, an increase in the deficit (a fall in government saving) reduces the credit available to the private sector, forcing consumption to contract and causing saving to rise. This effect, which may be hard to distinguish from the Ricardian hypothesis, may be termed the direct crowding-out hypothesis.

The *real interest rate* determines how consumers schedule their consumption over time, assuming they have access to credit. The effect of the interest rate on today's consumption is ambiguous according to the offsetting substitution, income, and wealth effects. An increase in interest rates causes consumers to substitute consumption tomorrow for consumption today, but it also induces consumers to feel richer and thus to spend more both today and tomorrow—unless this wealth stems significantly from future income streams inflated by the interest rise. Credit controls would block the effect of the real interest rate on consumption.

Econometric estimates for the ten sample countries provide a sense of the qualitative effects of these fiscal policy-related variables on private consumption (table 4). For most of the countries both current (or transitory) and long-run (or permanent) disposable income levels are found to be important determinants of private consumption—and often by magnitudes halfway between those implied by the Keynesian hypothesis and those by the permanent income hypothesis.

Does public saving or the public surplus affect private consumption directly, as implied by the Ricardian and direct crowding-out hypotheses? For most countries it does not: permanent public saving does not significantly offset private consumption in Chile, Mexico, or Pakistan; current public saving or surpluses do not affect consumption in Colombia, Côte d'Ivoire, Ghana, or Pakistan. In three cases, however, changes in public saving (or surplus) cause consumption (or the saving rate) to move in the same direction, which is consistent with both the Ricardian and the direct crowding-out hypotheses. Private

consumption rose with permanent public surpluses in Argentina and Morocco and with permanent public saving in Zimbabwe. Although the coefficients were significant and positive, they were much lower than those for permanent income, implying—contrary to the Ricardian hypothesis—that tax cuts would affect consumption and that public saving would have a positive net effect on total saving.

These three cases could have supported the Ricardian explanation only if these countries had freely operating financial markets, so that consumers could shift their consumption over time in anticipation of future tax increases. In fact, however, Argentina did not liberalize its financial markets until 1977, late in the sample period, while Morocco and Zimbabwe had institutional arrangements giving the public sector preferential access to domestic credit. These facts suggest that direct crowding out of private consumption by public deficits is the more likely explanation for the direct link between public deficits and private consumption in these three countries. Corbo and Schmidt-Hebbel (1991) achieved similar results for a different sample of developing countries.

The ten case studies provide little evidence that real interest rates favorably affect private saving, a result consistent with findings for other developing countries. The real interest rate showed significant effects in three countries. Rising real interest rates depressed private consumption and boosted saving in Mexico (signaling the dominance of the intertemporal substitution effect) but increased consumption and reduced private saving in Colombia and Thailand. The absence of significant results in five other cases suggests either that the substitution, income, and wealth effects cancel each other out or that financial market constraints prevent consumers from responding to interest rate swings by shifting consumption across time. Borrowing constraints are also behind Haque and Montiel's (1989) rejection of Ricardian equivalence for a set of developing countries.

Private Investment and Fiscal Policies

Fiscal policies affect private investment through three major channels: public investment, public deficits, and the user cost of capital. Public capital could be a close substitute for private capital, driving down the rate of return on private investment. Public investment in steel plants is an obvious example. But governments also invest in activities that do not attract private investment, but that raise the return of other private projects, such as infrastructure projects. Thus, the higher the complementarity of public and private capital, the more likely that public investment will have a net positive effect on private investment. If there is domestic financial repression of interest rates and the public sector is given preferential access to domestic credit, the public deficit could crowd out private investment. When interest rates are not regulated, deficit financing through domestic borrowing tends to push up real interest rates, diminishing the profitability of investment by raising the user cost of capital.

(The user cost of capital is determined by the real interest rate, the price of investment goods, and investment incentives.)

Consistent with the theoretical ambiguity of the relation between public capital and private investment, the case studies found sharply different results for the qualitative effects of fiscal policy variables on private investment (see table 4). (For brevity, other investment determinants included in the estimations, such as the marginal product value of capital, foreign saving, firm profits, or banking credit to firms, are not discussed here.) For Pakistan each percentage point increase in the ratio of public capital stock to output results in a 2.1 percentage point increase in the ratio of private capital stock to output. A similar relation is found for Zimbabwe, but the effect is smaller than in Pakistan. By contrast, an increase in public capital stock in Chile and Colombia tends to lower private investment.

Some of the country studies used public investment rather than public capital stock, again finding opposite effects in different countries. For Ghana and Mexico increasing public investment reduces private investment (although the effect was weak for Mexico), while for Thailand private investment rises with public investment. For Argentina no significant relation was found. The Morocco study found that public investment contributes to growth, from which it is plausible to infer that private capital formation rises with public investment because growth boosts private investment.

Thus, only three countries provide direct evidence for the widespread presumption that public sector investment is good for private investment. Aschauer's study (1989) for the United States found that increases in public capital were associated with a large increase in private investment. It seems reasonable to infer, then, that for countries with a negative relation between public and private investment (Chile, Colombia, Ghana, and Mexico) or none at all (Argentina), public investment is concentrated in activities that substitute directly for private investment.

Public deficits have a negative effect on private investment in Côte d'Ivoire, where the effect is weak, and in Thailand, where the effect is strong. For Argentina, the analysis decomposed the deficit into its three major components, finding that public investment does not affect private capital formation, but that public consumption and public revenue do, in directions consistent with the crowding-out hypothesis. The inference, then, is that deficits tend to crowd out private investment through domestic financial markets in Argentina, Côte d'Ivoire, and Thailand.

Although many studies have found that private investment is insensitive to interest rates, the results for the sample countries show a surprisingly strong relation in five of them, with only two—Colombia and Ghana—showing no relation. The effect of interest rates on private investment is strongest in Morocco and Pakistan, moderately strong in Zimbabwe, and weakest in Chile and Mexico.

Table 5. Qualitative Effects of Fiscal Policy Variables on the Trade Surplus and the Real Exchange Rate

Country	Period	Sensitivity of the trade surplus to ^a					Sensitivity of the real exchange rate to ^b		
		Public surplus			Public expenditure		Trade surplus	Public expenditure	Public deficit
		Total	Primary	Operational	Consumption	Investment			
Argentina	1963-88	..	+	..	..	..	..	..
	1964-87	..	..	..	..	-	+	..
Chile	1960-88	..	..	+	..	..	-	..
Colombia	1970-88	..	+	..	..	..	..	..
	1967-87	..	..	..	..	-	-	..
Côte d'Ivoire	1971-81	..	0	..	..	..	..	..
	1979-89	..	+	..	..	..	..	..
	1972-87	..	..	..	..	..	+	..
	1972-89	..	..	..	..	-	0	..
Ghana	1970-88	..	..	..	-^c	..	..	+
Mexico	1970-89	..	..	+	..	..	-	..
Morocco	1974-88	..	..	..	-	..	+	..
Pakistan	1983/84-87/88	..	..	..	..	-	+	..
Thailand	1972-89	+	..	..	..	..	-	..
Zimbabwe	1965-88	..	..	+	..	..	+	..

+ and - correspond to statistically significant coefficients; 0 denotes a coefficient not significantly different from zero; and .. denotes not available.

Note: Specifications and estimation techniques vary by country. The dependent variable "current account or trade balance" enters as a ratio to GDP for Argentina, Chile, Colombia, Côte d'Ivoire, Mexico, and Thailand; in levels for Ghana, Morocco, and Pakistan; and as a log ratio to GDP for Zimbabwe. The dependent variable "real exchange rate" enters as levels for Côte d'Ivoire, Ghana, and Thailand; as levels distinguishing between the relative export price and the relative price for Chile, Mexico, and Zimbabwe; as natural logs of the import price for Argentina; and as natural logs of the real exchange rate for Colombia.

a. The effects for Morocco and Pakistan are not the coefficients for one structural equation but represent the general equilibrium effect of a change in the exogenous variable on the current account surplus (in Morocco) or the trade surplus (in Pakistan). For Morocco, the sign reflects the current account deterioration as a result of a foreign-financed increase in government consumption. For Pakistan, the sign reflects the trade surplus improvement based on the impact of a deficit reduction through lower public investment.

b. The effects for Morocco, Pakistan, and Thailand are not the coefficients for one structural equation but represent the general equilibrium effect of a change in the exogenous variable on the corresponding endogenous variable. For Morocco, the reported effects combine the simulation results of a domestic debt-financed increase in public expenditure and a foreign-financed increase in public expenditure. For Pakistan, the effect of an appreciation of the real exchange rate is brought about by a 10 percent reduction of the public deficit through lower public investment, which causes domestic prices to rise with a fixed nominal exchange rate. For Thailand, the reported effect summarizes the simulation results of domestically financed deficits, which cause a trade deficit and a real exchange rate depreciation.

c. The coefficient for Ghana is for aggregate private expenditure.

Source: Country case studies listed in the references.

Public Deficits, Trade Deficits, and Real Exchange Rates

For the 1980s real exchange rates are closely correlated with the behavior of fiscal deficits in many developing countries, supporting Edwards' finding (1989) that the real effects of nominal devaluations last only if the devaluations are accompanied by fiscal adjustment. To provide more systematic evidence on the links among the fiscal deficit, the trade deficit, and the real exchange rate, behavioral relations for these variables were tested for the sample countries using Rodríguez's model (1989). Econometric estimates were derived for the sensitivity of the trade balance and the real exchange rate to various fiscal variables (table 5).

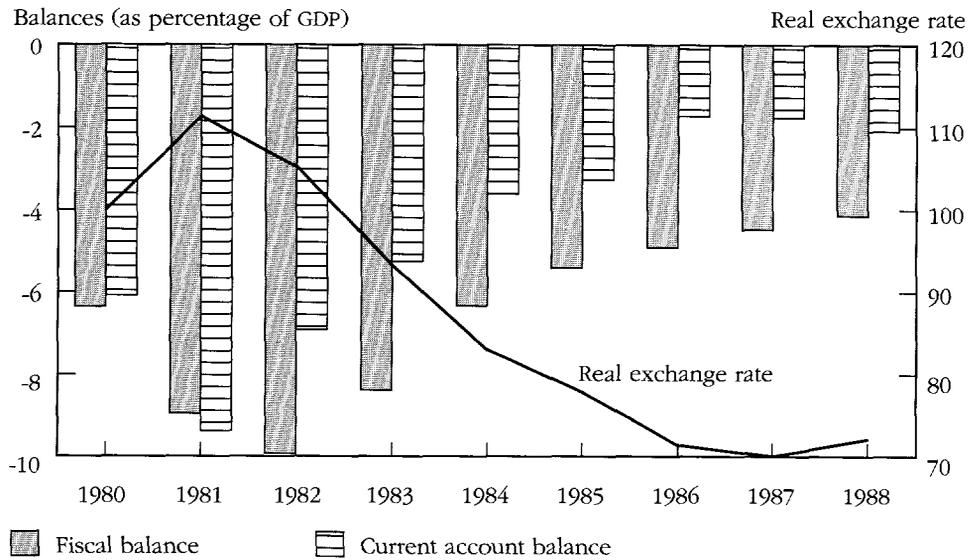
Model estimates for eight countries—Argentina, Chile, Colombia, Côte d'Ivoire, Ghana, Mexico, Thailand, and Zimbabwe—found significant evidence that rising public surpluses are accompanied by rising trade surpluses. A similar relation was found for Pakistan—reducing the fiscal deficit by reducing public investment improves the trade balance—based on a comprehensive macroeconomic model. That fiscal adjustment is a major determinant of external adjustment is also implied by the hypothesis that fiscal policy is an effective instrument for increasing national saving, as the substantial evidence presented in the preceding section shows.

The sample countries overwhelmingly demonstrate the sensitivity of the aggregate real exchange rate to the trade surplus and to fiscal variables (see table 5). For eight countries—Argentina, Chile, Colombia, Côte d'Ivoire, Mexico, Morocco, Thailand, and Zimbabwe—rising trade surpluses lead to depreciation of the real exchange rate. For Ghana a rising public deficit leads directly to appreciation of the real *official* exchange rate. The only contrary result was for Pakistan, where deficit reduction through reduced public investment leads to appreciation of the real exchange rate because of the depressing effect of lower public investment on domestic output. These findings, together with those on the positive relation between trade deficits and fiscal deficits, strongly support the hypothesis that real exchange rates move closely with fiscal deficits.

The studies also examined Rodríguez's hypothesis (1989) that, for a given trade deficit, an increase in public spending affects the real exchange rate because such an increase implies a corresponding decline in private spending. If the public sector has a higher propensity than the private sector to spend on imports rather than domestic goods, a shift to more public and less private spending implies increased demand for imports and a corresponding depreciation of the real exchange rate. Tests of this hypothesis show split results for the sample countries: higher government spending leads to an appreciation of the real exchange rate for Argentina, Côte d'Ivoire, Morocco, and Zimbabwe and to a depreciation for Chile, Colombia, and Mexico.

These empirical results support the notion that the real exchange rate is sensitive to both policy and external variables, with the fiscal deficit prominent among them. The strong contribution of fiscal adjustment to external adjust-

Figure 5. *Fiscal and External Balances and Changes in the Real Exchange Rate, 1980–88 Averages for Ten Developing Countries*



Note: Depreciation of exchange rate is shown as a decrease.
Source: Country case studies listed in references.

ment and, correspondingly, to depreciation of the real exchange rate is shown in figure 5, which presents average values for these three variables in the 1980s for the sample of ten countries. This average trend of steady fiscal improvement from 1982 to 1988 was not confined to the sample countries. Other developing countries showed similar, though less pronounced, deficit reduction, and industrial countries also cut their deficits in half during that period. Accompanying these fiscal adjustments were sharp reductions in current account deficits, supported by massive depreciations of real exchange rates.

Conclusions and Policy Implications

Although correlations across countries between deficits and inflation and deficits and real interest rates were found to be weak at best, the sample countries offer strong evidence that, in the medium term, money financing leads to higher inflation and debt financing to higher real interest rates or increased financial repression. As deficit financing mounts, the terms become increasingly unfavorable to the extraction of these unconventional taxes from the private sector.

The evidence soundly refutes the Barro-Ricardian proposition that consumers react the same to conventional taxes, unconventional taxes (inflation or financial repression), and debt financing. The notion that private saving can be

mobilized through higher real interest rates (resulting from increased debt financing of deficits or from financial liberalization) was also rejected. Both findings are in line with the recent empirical evidence on private saving behavior in developing countries, which was noted in the introduction to this article. Higher interest rates have a negative effect on private investment, however. This finding is consistent with investment theory, but it contradicts some of the empirical evidence showing that investment is insensitive to interest rates in developing countries. Increasing public investment was found to reduce private investment in some countries and to increase it in others. This result confirms previous studies showing that the net effect of public investment on private investment depends on its composition—whether it is a complement to or a substitute for private investment.

Strong evidence was also found in favor of the hypothesis that fiscal deficits spill over into external account deficits, leading, in turn, to depreciation of the real exchange rate.

Several policy implications can be derived from these findings:

- *Fiscal deficits and inflation.* For fiscal deficits financed by money creation, the relation between deficits and inflation is indisputable. Considering the unfavorable tradeoff between additional inflation and revenue, however, a fiscal motivation hardly explains chronic high inflation in countries such as Argentina, where revenue from the inflation tax is slight and comes at the high cost of macroeconomic instability and high variability in relative prices. The inflation tax (or seigniorage) is, at best, only a temporary means of generating revenue. And because the inflation tax is a tax, there is no reason to expect adjustment through inflation to be any less contractionary than conventional fiscal adjustment (see Dornbusch, Sturzenegger, and Wolf 1990 for similar arguments).
- *Fiscal deficits and real interest rates or financial repression.* Financing deficits through domestic borrowing pushes up real interest rates, which can easily start a debt spiral leading to debt repudiation. If domestic interest rates are controlled, however, the result is fiscal crisis: high fiscal deficits are correlated with strongly negative real interest rates, and the loss of access to external borrowing for financing fiscal deficits often leads to high taxes on domestic financial intermediation. But the poor economic performance that follows from strong financial repression, as depressed private credit brings about the collapse of private investment, hardly recommends this solution to fiscal crisis.
- *Budget deficits and private consumption.* The policy implication of rejecting the notion that consumers react the same to taxes or debt financing is that increasing public saving—reducing public deficits—is the most effective contribution fiscal policy can make to increasing national saving. However, increasing real interest rates through domestic debt financing or financial liberalization will not increase private saving.

- *Budget structure, deficits, and private investment.* Real interest rates and private sector credit do significantly affect private investment, so whether there is financial repression or not, increasing public deficits reduces private investment. The composition of public spending matters as well, since increasing public investment depresses private investment in some cases—typically when large public enterprises compete with private firms and have preferential access to domestic financial resources. The policy implication is that the prospects for higher private investment and growth are improved by privatizing or reforming public firms and marketing boards, concentrating public investment on public and social infrastructure, and deregulating domestic financial markets by removing credit ceilings and interest controls, compulsory credit allocation, and preferential access of the government to credit.
- *Fiscal deficits, trade deficits, and real exchange rates.* The evidence of a strong relation between fiscal and external deficits complements the policy implication derived from the finding that private saving does not offset changes in public saving: fiscal adjustment is effective in boosting national saving and, therefore, in increasing the trade surplus as well. Exchange rates are driven by fundamentals and not the other way around, which should serve as a reminder to policymakers that nominal devaluation alone cannot restore macroeconomic balance. As Khan and Lizondo (1987) have hypothesized, real exchange rates are also affected by whether government spends more on tradables than on nontradables. Policymakers should pay attention to the composition of government spending when deciding on an accommodating exchange rate policy.
- *Fiscal deficits and growth.* The conventional notion that public investment is good for private investment and growth received mixed support. Countries that were forced to shift from external to internal financing of deficits—often because of a debt crisis induced by fiscal mismanagement—had particularly poor growth in the 1980s. Growth makes deficits less harmful: countries such as Pakistan and Thailand could sustain larger deficits because of strong growth, while economic collapse exacerbated the macroeconomic effects of deficits in Argentina, Côte d’Ivoire, and Mexico. The virtuous circle between growth and good fiscal management is one of the strongest arguments for a policy of low and stable fiscal deficits.

Notes

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1. The fully specified behavior-based models used in the analysis reported in this article can be found in Easterly, Rodríguez, and Schmidt-Hebbel (1989); Rodríguez (1989); and Fischer and Easterly (1990).

2. The most complete study to date on measurements of the fiscal deficit is Blejer and Cheasty (1991). Alternative measures are discussed in Blejer and Chu (1988), Buiter (1987), Eisner (1986), Fischer and Easterly (1990), Kotlikoff (1988); and Tanzi (1985). IMF (1986) and United Nations (1968) discuss cash and accrual deficits in more detail. Robinson and Stella (1988) and Teijeiro (1989) survey issues concerning quasi-fiscal deficits.

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OBSERVATIONS

*Continuing our occasional series of opinion pieces, briefings,
and articles presenting differing views*

RECENT LESSONS OF DEVELOPMENT

Lawrence H. Summers

Vinod Thomas

Development is the most pressing challenge facing the human race. Despite the enormous opportunities created by the advances in technology, more than 1 billion people, one-fifth of the world's population, live on less than US\$1 a day, a standard of living that the United States and Europe attained two centuries ago.

In the past the development effort may have mattered primarily to the citizens of poor countries. But now demographic, political, and technological trends make development an urgent priority for rich countries as well. Ninety-five percent of the growth in the world's labor force will take place in the developing world over the next quarter of a century. With the end of the cold war, economic and environmental issues will occupy the center of the diplomatic stage, and these issues will increasingly involve developing nations. As improvements in transportation and communication shrink the world, the rich and poor countries will inevitably impinge more and more on each other. International television's impact on the less-advanced nations and the sharp increase in refugee flows worldwide are harbingers of things to come.

A remarkable transformation in prevailing views about how governments can best promote economic development has occurred in recent years. Where it was once thought that government needed to occupy an economy's commanding heights by allocating credit, rationing foreign exchange, ensuring against dependence, and operating key industries, today it is widely accepted that government's responsibility for directing the production and distribution of goods and services should be much reduced and the private sector's role much enhanced. It is in those tasks for which markets prove inadequate or fail altogether—for example, investing in education, health, or physical infrastructure—that government has a central role.

For some time now, the advice of the Bretton Woods institutions (the World Bank and the International Monetary Fund) has reflected the view that eco-

conomic progress is impeded by governments that seek to supplant, rather than support, markets. That view has recently been taken on board by policymakers in many parts of the world. Most publicized has been the collapse of communism in what was once the Soviet bloc. China, where one-fourth of the people in the developing world live, calls itself socialist, but the past decade has witnessed spectacular growth of the nonstate sector and very substantial price liberalization. India, where one-fifth of the population of the developing world lives, is now undertaking a program of structural adjustment and liberalization that is mild by Eastern European standards but would have been unthinkable even two years ago. Chile and Mexico have demonstrated to other Latin American nations the benefits that liberalization can bring. And change is coming, albeit slowly, in Africa, as agricultural marketing boards are dismantled and investment licensing schemes are scaled back.

For fifteen years, the World Bank's *World Development Reports* have been distilling the lessons of the record in various aspects of economic development. In a synthesis of what has been learned to date, the 1991 report (World Bank 1991) described the emerging consensus in favor of what was labeled the "market-friendly" strategy, one in which governments sustain rather than supersede markets. That report coincided with a growing literature on thinking about development (for example, Krugman 1993; Srinivasan 1991; Ranis and Schultz 1988) and on the lessons of growth and development (for example, *Journal of Economic Perspectives* 1990; Barro 1989; Stern 1989; Chenery and Srinivasan 1988; WIDER various years). This article summarizes what we consider to be the main policy conclusions from the development experience of the past thirty years and then considers a number of unresolved issues and challenges for the future.

The Development Record

In thinking about development strategy, it is a mistake to lose sight of the enormous progress that has been made and continues to be made in the developing world. Average incomes in developing countries have doubled over the past three decades—faster, that is, than in the United Kingdom during the Industrial Revolution, in the United States during its spurt to industrial maturity in the nineteenth century, or in Japan during its prewar growth spurt. Economic progress in some developing countries has been dramatic: Turkey doubled its average income in twenty years (1957–77), Brazil in eighteen years (1961–79), the Republic of Korea in eleven years (1966–77), and China in ten years (1977–87).

Tremendous social progress has also been achieved in the developing world. Infant mortality rates have been cut in half, total fertility rates have been lowered by 40 percent, and life expectancy has increased by nearly a decade, equivalent to twice the gain from eliminating both cancer and heart disease in the United States. A child born in Shanghai today has a smaller chance of dying

in the first year of life, a longer life expectancy beyond one year, and a greater chance of learning to read than a child born in New York City. Social advance has been most striking in East Asia. It is estimated that the incidence of absolute poverty (that is, the percentage of the population that subsists below the poverty line) in that region has fallen dramatically in the past three decades, from a third of the population in 1970 to a tenth in 1990 (Johansen 1992).

Many people think of the 1980s as a "lost decade" for development. Indeed the economies of Latin America, the Middle East and North Africa, and Sub-Saharan Africa, where average incomes declined in real terms during the decade, did have a difficult time during the 1980s. But growth of income per capita weighted by population was slightly above the historic average during the decade. In other words, the income of the average person worldwide grew more in the 1980s than in the 1970s. This reflects the acceleration of growth in India and China, where more than 2 billion people live: average incomes in China expanded at roughly 8 percent a year in the 1980s, while those in India increased by more than 3 percent a year.

Of course, this relatively favorable record conceals enormous variations in growth rates and poverty reduction across countries. Per capita incomes in some economies have doubled twice over since 1960 and are well on the way to a third doubling. But thirty-six nations with a combined population of nearly 500 million people have seen low or declining average incomes over the past twenty-five years. Poverty remains a formidable problem, and substantial economic progress has yet to touch millions of people. Before turning to the more detailed implications of this record of divergence for national policy, three broad facts of experience are worth emphasizing.

First, peace is prerequisite to successful development. Most of the economically successful countries have been able to enjoy sociopolitical stability. By contrast, most of the thirty-six countries that have lost ground over the past twenty-five years were involved in a substantial military conflict (Sivard 1989). In Africa, where development performance has been most disappointing, 7 million lives have been lost in wars in the past thirty years.

Second, nations shape their own destinies. Poor domestic policies, more than an unfavorable external environment, are usually to blame for development failures. By any measure more foreign assistance goes to Africa, where performance has been poor, than to parts of Asia, where it has been better. Net capital inflows over the past quarter of a century to the most successful area of the developing world, East Asia, were less than one percent of the region's gross domestic product (GDP). Moreover, East Asia has not had the benefit of natural resources to export. And countries such as the Korea and Indonesia, despite debt burdens similar to those of some of the highly indebted countries, have not experienced debt crises because they used the proceeds of borrowing to make investments yielding high returns. The recognition that countries make their own histories has begun to be reflected in models of economic

growth, which increasingly factor in aspects of a country's policy environment that affect performance (Easterly and others 1991; Romer 1990; Lucas 1988).

Third, the proper blend of state and market in the economy is a decisive factor. A review of the record identifies some important characteristics of successful government intervention. Most of these follow from the general principle of supporting, rather than supplanting, markets and the related idea that, as Keynes (1926) put it, "the important thing for government is not to do the things which individuals are doing already and to do them a little better or a little worse; but to do those things which at present are not done at all".

Market development itself requires government action. The socialist economies in transition, from Eastern Europe to East Asia, are finding out that the establishment of the rules of the game by the government is crucial to the success of market reforms. The need for government action goes further, its rationale resting on various notions of market failure.

Investment in human capital and physical infrastructure by the government are usually justified because of externalities or spillover effects in the consumption or production of both of these categories and the inadequate incentives for markets to take them into account. In the case of primary education, for example, there are consumption related spillovers. The benefits to literacy go well beyond the gains to the individuals becoming literate. In the case of physical infrastructure such as roads, there are production related externalities based on the need to make lumpy investments or to integrate the service in large networks. Negative spillovers, too, justify government intervention: environmental pollution and congestion are inadequately accounted for by the market.

The central issue, then, is one of the state and the market, but it is not a question of intervention versus *laissez faire*—a popular dichotomy but a false one. As discussed below, it is rather a question of the proper division of responsibilities between the two and of efficiency in their respective functions.

Learning from Experience

The relation between government and market can be seen under three broad headings: human and physical infrastructure, competitive climate for enterprise, and macroeconomic management. A fourth area, institutional development, cuts across all three. The areas, of course, are interrelated. A relatively undistorted and competitive domestic economy rewards the buildup of human capital more generously than one that is highly regulated and protected. At the same time, investments in education make the domestic economy more productive by speeding the adoption of new technology. To take another example, a stable macroeconomic framework allows the domestic price system to work effectively because it helps to avoid inflation. But microeconomic efficiency also makes it easier to keep inflation low: with fewer unviable enterprises, there

will be less need for subsidies that swell the public sector deficit. And, reforms in all these areas work better if a country's institutional framework, embracing both market and government institutions, is improved.

Human and Physical Infrastructure

Perhaps the most important investments governments need to make are in people. The economic returns from public and private investments in education and health are often extremely high (Psacharopoulos and Woodhall 1985; Easterlin 1981). Improving peoples' health and education strengthens the demand for smaller families, which, together with better provision of family planning services, helps to tackle the population problem in many parts of the world. Markets in developing countries often cannot be relied upon to provide people—especially the poor—with adequate education (particularly primary education), health care, nutrition, and family planning services. The returns to government development of various forms of physical infrastructure are also usually very high (Jimenez forthcoming). The incentives for the private sector to develop adequate infrastructure, such as rural roads, are often lacking.

A child born in Africa today is more likely to be malnourished than to go to school at all, and is more likely to die before the age of five than to go to secondary school. And yet because basic health care services are labor-intensive, they can be effectively produced in developing countries. By one recent calculation for Pakistan, providing 1,000 girls with one extra year of schooling would raise their market productivity by between 10 and 15 percent and would avert nearly seven hundred births and close to fifty infant deaths. (Summers 1992).

Many governments are investing far too little in human development (World Bank 1991; United Nations Development Programme 1990). In Brazil and Pakistan rapid economic growth alone was insufficient to improve social indicators substantially. In Chile and Jamaica, however, these indicators improved even in periods of slow growth. Among low-income countries, Guinea and Sri Lanka have the same per capita income, but average life expectancy is some two-thirds longer in Sri Lanka. Brazil and Uruguay have similar per capita incomes, but infant mortality is two-thirds lower in Uruguay.

Governments must also make necessary tangible investments in infrastructure. However appropriate the incentive framework, firms cannot function if the water runs brown, and nothing happens when a coin is put in the phone. Too often, as in the case of electricity and water supply, failed government efforts to provide or maintain infrastructure lead to very expensive attempts at private sector substitution. For example, in India power plants operate with a capacity utilization of less than 50 percent, yet firms are forced to install their own generators because the risk of interruptions is so great.

Ensuring that governments make the necessary investments in both tangible and intangible infrastructure is partially a matter of making sure they have

adequate resources. But in addition to increasing the quantity of human investment, governments must improve its quality. Too often, capital investments go forward without adequate provision for the recurrent expenditures they entail, which results in wasteful underutilization. Too often water is provided at little or no cost to industry and then is wasted, while clean water is unavailable where it is desperately needed to improve health. Targeting expenditures appropriately is crucial. Expenditures are frequently poorly targeted and involve a great deal of leakage.

The need to shift priorities in spending is wide-ranging. It will pay to reduce heavy subsidies for higher education and to spend much more on primary education, from which the returns are relatively higher. The case for a similar switch in spending on the margin, from expensive curative health care systems to primary systems, is also strong. In too many developing countries half the national health budget goes to a few hospitals that do open heart surgery in or near the nation's capital, whereas immunizations cannot be afforded in rural areas. The question of priorities goes beyond the area of human resources. In many countries there is scope for substantially reducing spending on the military in favor of increased spending on human and physical infrastructure.

Competitive Climate for Enterprise

Growth led by the private sector needs a permissive, rather than a prohibitive, environment. Almost no one disagrees that communism is the longest route from capitalism to capitalism. For all their faults, competitive markets are the most effective way yet found to get goods and services produced and distributed efficiently. External and domestic competition provides the incentives that unleash entrepreneurship and technological progress (Balassa 1977; Bhagwati 1978; Krueger 1978; Porter 1990).

Openness to trade, investment, and ideas encourages domestic producers to cut costs and improve productivity by introducing new technologies and to develop new and better products (Chenery, Robinson, and Syrquin 1986). A high level of protection for domestic industry, conversely, has held development back by decades in many places. The effect of import protection on firms in Chile and Turkey, for instance, and the effect of greater competition in export markets on firms in Brazil, Japan, and Korea confirm the decisive contribution to efficiency that the external economy can make.

Many developing countries are taking to heart the lessons from worldwide experience in trade liberalization. As a result of the various liberalization episodes of the 1970s and 1980s, the developing world is more open today than at any time in recent history. But the threat of increasing protectionism is ever present, not least from the industrial countries. In fact, as the developing countries liberalized, the industrial countries on average raised trade restric-

tions in the 1980s: development prospects can be substantially improved if all countries roll back trade barriers.

A permissive domestic environment is one where government seeks to reduce, rather than increase, the cost of doing business. That means doing away with licensing requirements for investment, avoiding debilitating restrictions that limit firms' ability to downsize, and reducing tariffs and quotas on capital goods whose cost is found to affect growth performance significantly (De Long and Summers 1992). One study found that the price of traded capital goods was 50 percent higher in Africa than in other parts of the developing world (World Bank 1989). Creating a competitive climate for the private sector also entails avoiding government monopsonies or punitive regulations. The success of the Nigerian government's action in abolishing agricultural marketing boards and moving toward a realistic exchange rate illustrates what deregulation can accomplish. Cocoa output has risen 50 percent since 1986, both rubber and cotton production has more than quadrupled, and soybean production and processing of soybean products have increased even more. A permissive environment is also one where market forces are able to set prices without price controls or large subsidies. The former Soviet Union, where the price of oil at any realistic exchange rate has been less than \$1 a barrel for many years, is an extreme example of distortions caused by subsidies, but large subsidies to energy and energy-using products are ubiquitous in developing countries.

Governments have a history of failure in attempting to manage directly the production of private goods and services. Around the world the record of public enterprise management is one of disaster. It may be true in theory that a properly managed public enterprise can often be as productive and efficient as a private one, but the reality is that politics usually intrudes and efficiency is sacrificed (Nellis 1986; Jones 1982). Public enterprise managers are rarely permitted to shed labor in order to produce at minimum cost. And procurement is often treated as a way of enriching contractor and procurement officers rather than producing efficiently.

Nigeria provides an example of what can go wrong when government tries to operate what should be private industry. Between 1973 and 1990 the Nigerian government invested \$115 billion in its public sector, or about \$1,000 for every citizen. This investment, depending on what exchange rate is used, represented as much as four years' worth of gross national product. Yet there is little growth to show for it. Public sector assets are operating at a capacity utilization rate of less than 40 percent. And a \$3 billion steel complex sits empty, awaiting the \$1 billion of investment necessary to complete it. Mexico, by contrast, provides an example of what privatization can accomplish. Large-scale privatization has attracted substantial foreign investment and has already considerably improved efficiency. Indeed, several countries have found that the expectation that enterprises will be privatized creates an impetus for increased efficiency.

Macroeconomic Management

Sound macroeconomic policies with sustainable fiscal deficits and realistic exchange rates are a prerequisite to progress (Fischer 1986). Large government budget deficits absorb domestic saving and foreign funds that could otherwise be channeled to the private sector. Crowding out productive investments by farmers, entrepreneurs, and large businesses, government deficits place the financial system under great strain. Often they induce rapid inflation, which in turn exacerbates the deficit, creating a vicious cycle. Deficits also lead to overvalued exchange rates, which stifle exports, damage domestic producers, and create pressures for protectionism. Evidence is accumulating from country experience of widespread ill-effects of large fiscal deficits (Corden 1989; World Bank 1988; Tanzi and Blejer 1986, for example).

A distinguishing feature of the East Asian experience is that the public sector exercised discipline in its spending; such discipline is essential to ensure that rents from government interventions are kept to a minimum. Fiscal discipline was practiced in different ways. In Taiwan before 1987, a law limited the value of outstanding government bonds to no more than 40 percent of the central government's annual budget. Thailand limits its budget deficit to 20 percent of expenditures. In Indonesia the openness of the capital account has served as a check on irresponsible fiscal behavior that could precipitate currency speculation and crisis. Malaysia, however, ran a large deficit (a high of 19 percent of GDP in 1982) but cut it sharply (5 percent in 1990) when performance was threatened.

To be sure, fiscal and financial instability have sometimes been partly inflicted on governments by external events—or by internal shocks such as civil wars or natural disasters. But governments can choose how to respond to such pressures. In such countries as Côte d'Ivoire, Kenya, Mexico, and Nigeria, the response to a temporary economic upswing was an unsustainable increase in public spending. Countries such as Botswana, Chile, Colombia, Indonesia, Korea, Malaysia, Mauritius, and Thailand managed to keep their macroeconomic policies on course, and their broader economic performance has benefited accordingly.

If a persistent government budget deficit is the surest route to economic failure, an artificially overvalued exchange rate must be the runner-up. Underlying such overvaluation are expansionary fiscal and monetary policies, excessive borrowing, and inadequate trade and exchange rate policies. Overvaluation leads to the rationing of foreign exchange, which is invariably associated with its discretionary allocation and appropriation by government officials and their friends. Overvaluation also creates pressures for layer after layer of controls on imports, capital flows, and even travel. And it destroys emerging export industries, perhaps the most important foundation for growth that any developing country enjoys. The extent of exchange rate misalignment and its deleterious effects on performance are now well documented (see, for example, Edwards 1989; Williamson 1987).

Institutional Development

The better a country's institutional capabilities are, the more effective such actions will be. Similar policy reforms have produced different results across countries (Thomas and others 1991), and one of the explanations is the variation in the capacity of institutions to implement the reforms. Institutional development refers to market as well as to government institutions.

In many countries market development requires less government intervention. Market institutions are often stifled by a series of harmful interventions. Governments sometimes intervene in the market to address political instability and other political constraints. But, all too often, the resulting combination of pervasive distortions and predatory states leads to development disasters. Reversing this process is a crucial part of institutional development. It requires political will and a political commitment to market reform and market development.

But it is a myth that "government is the problem, not the solution." When governments do the things they should not do, they are stretched too thin to do the things they must do. Governments need to assist in the efficient development of markets. Only governments can provide the institutional framework for exchanges. This means rules governing property rights, and it means enforcement based on preestablished principles of contracts. The establishment of a well-functioning legal system and judiciary and of secure property rights is an essential complement to economic reforms.

Reform of the public sector is a priority in many countries. In addition to market liberalization and privatization, it includes reforming the civil service, rationalizing public expenditures, and reforming some state-owned enterprises. Related economic reforms include better delivery of public goods, supervision of banks, and legislation to encourage financial development. Adopting these reforms will increase the quality of governance and the capacity of the state to implement development policy and enable society to establish checks and balances.

What Are the Uncertainties?

Across a wide spectrum of opinion there is agreement on the basic principles we have just described. Governments have done too much of the things they cannot do well—regulating markets and producing ordinary goods—and too little of the things they must do well—maintaining macroeconomic stability and making necessary public investments. Governments, in ways that will differ from country to country, need to do less of certain things and to do them better. But the agreement on these points leaves a great deal unresolved. There are questions about implementation and concerns about external constraints of various kinds.

First, the East Asian success stories remain open to differing interpretations (Wade 1990; James, Naya, and Meier 1989). Government, at key stages in each of these countries' development, did seek to affect the allocation of resources across sectors through industrial, trade, and credit allocation policies. *World Development Report 1991* noted some key conditions under which East Asian interventions were far more effective than similar actions in other parts of the world. Government interventions were disciplined by international competition. And they were flexible enough to be changed on the basis of the evidence about their effectiveness.

As the success of Japan, Korea, and Taiwan continues, the position taken by some economists that they succeeded despite government efforts at channeling market forces is increasingly implausible. But there is still room for disagreement, and so for research on two questions: how important in explaining East Asian growth is the contribution of sectoral interventions relative to the contribution of overall macroeconomic stability, outward orientation, and investments in capital and people, and what is unique about these countries that enabled interventionist policies to succeed there when they have been so unsuccessful in the rest of the world? Answering the latter question is essential if the East Asian experience is to provide guidance to other countries.

Second, what is the best sequence and pace of reform? If the role of government that we have just described is agreed to be appropriate, there remains the question of how policies should be reformed. On the sequencing question, experience suggests that it is wrong to think of reform as a series of obstacles, each of which must be surmounted. Policy changes typically occur simultaneously or nearly simultaneously on many fronts. But as a general proposition it appears that macroeconomic stabilization is essential to reform and needs to come early, and that it is usually best to delay financial liberalization until macroeconomic stability has been put in place and the viability of enterprises has been restored (Fischer and Gelb 1991). On the question of the pace of reform there is also room for disagreement. Where hyperinflation is rampant or looming, the case for urgent action is clear. But where the threat is not imminent, as in much of Africa, China, or India, the case for "big bang"-style reform is much weaker. Particularly where reform will involve large displacements of workers who will not be quickly reemployed, there are legitimate grounds for favoring gradual transitions. The difficulty, of course, is that gradual transitions are often favored by those whose first choice would be no transition at all.

Third, what is the relationship between political and economic reform? An earlier view that democracy was antithetical to development and that the strong-arm state with a strong leader at the helm was essential has now been discredited. A number of studies, some summarized in World Bank (1991), have found no systematic relationship between liberties and rates of economic growth and evidence of a positive relationship between liberties and social performance. These findings are reassuring to friends of both economic and political freedom, but doubts remain. Most of the major development success

stories—for example, Chile, China, Korea, or Singapore—had governments that were or are authoritarian in many respects. It is possible that democracy can foster growth by making it impossible for hopelessly incompetent and corrupt governments to remain in power, but one also has to wonder whether democracy can be inconsistent with outstanding performance. A related issue involves the sequencing of political and economic reform—the ordering of glasnost and perestroika. It is easier to identify examples of successful economic reform that preceded political reform than that immediately followed it.

Fourth, can adjustment to the “market-friendly” approach work in very low-income countries, especially in Africa? It is hard to answer this question in the absence of a clearly specified alternative strategy. One of the hard lessons of the adjustment efforts of the past decade is that adjustment and reform take time to yield results (World Bank 1989). Government credibility, once lost, is restored only very slowly. And would-be investors, whether foreign or domestic, can always delay investment, waiting to see how things turn out before deciding whether to invest. Most of the success stories—Japan and Germany after World War II and Chile, Korea, and Mexico more recently—took time, and things often got worse before they got better. The process appears even more protracted in very low-income countries. It is no accident that programs put in place with the cooperation of the Bretton Woods institutions involve a higher ratio of adjustment to austerity than would have been the case a few years ago.

Fifth, will the external global economic conditions make export-led growth possible on a large scale over the next twenty-five years? Export-led strategies have not invariably been the most effective. Looking at the record of the period between the two world wars and of the immediate postwar period, it is not difficult to understand the appeal of import substitution notions. Brazil, with relatively closed markets, was about the fastest-growing country in the world from 1965 to 1980. The liberal advice that most developing countries receive must be based on one of two premises. One is that it will be widely ignored, so the adding-up problem—that is, the problem that increased exports from all will deny benefits to individual countries—will not arise, and those few countries that increase their export capacity will benefit. The other is that many countries will be able to increase exports greatly without depressing their terms of trade, either because industrial markets for domestic products will grow without protectionist policies being imposed, or because trade among developing countries will become more important in the future than it has been in the past (World Bank 1992a). These premises are not self-evident as reform sweeps the developing world, industrial country growth slows, and the Uruguay Round flounders. Although it has been true in the past that the external climate has been a less important barrier to development than misguided domestic policies, this may change as domestic policies improve and protectionism in the industrial world mounts.

Sixth, will natural environmental constraints hold back development or force a new paradigm based on notions of sustainability? Environmental concerns are very important and have been too little reflected for too long in policymaking in both developing and industrial countries. To a large extent environmental problems are a consequence of policies that are misguided on narrow economic grounds—subsidies to energy, failure to give farmers title to their land and adequate credit, public ownership of major industries, inefficient charging for water, and so forth. And where they are not, the difficulty is to do the right cost-benefit analysis and implement the most cost-effective policies for sustainable development (World Bank 1992b). Of particular importance are steps to eradicate the severe forms of environmental degradation, such as poor sanitation and water and air pollution, that threaten human lives and well-being. The agenda for environmental reform is a large one. Accepting the challenge to accelerate development in an environmentally responsible manner will involve substantial shifts in policies and priorities and will require substantial investments. Failing to accept it will be far more costly.

Seventh, and finally, there is the ever present danger that some new problem will surface. The only real constant of experience is the unpredictability of the future.

Note

When this article was written, Lawrence H. Summers was the chief economist and vice president of Development Economics at the World Bank; he is now U.S. Treasury Undersecretary for International Affairs; Vinod Thomas is the chief economist in the East Asia and Pacific Region at the World Bank.

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WORLD BANK RESEARCH OBSERVER CUMULATIVE INDEX, 1986–93

Authors

- Ahamed, Liaquat, "Stabilization Policies in Developing Countries," 1 (1, January 1986): 79–110
- Ahmad, Ehtisham, "Social Security and the Poor: Choices for Developing Countries," 6 (1, January 1991): 105–27
- Albrecht, Douglas, and Adrian Ziderman, "Student Loans: An Effective Instrument for Cost Recovery in Higher Education?" 8 (1, January 1993): 71–90
- Ayub, Mahmood A., and Sven O. Hegstad, "Management of Public Industrial Enterprises," 2 (1, January 1987): 79–101
- Bale, Malcolm D. (*See* Ulrich Koester)
- Barnes, Douglas F., Keith Openshaw, Kirk R. Smith, and Robert van der Plas, "The Design and Diffusion of Improved Cooking Stoves," 8 (2, July 1993): 119–41
- Baumol, William J., and Kyu Sik Lee, "Contestable Markets, Trade, and Development," 6 (1, January 1991): 1–17
- Bell, Clive, "Reforming Property Rights in Land and Tenancy," 5 (2, July 1990): 143–66
- Bhagwati, Jagdish N., "Export-Promoting Trade Strategy: Issues and Evidence," 3 (1, January 1988): 27–57
- Binswanger, Hans, "Agricultural Mechanization: A Comparative Historical Perspective," 1 (1, January 1986): 27–56
- Binswanger, Hans, and Prabhu Pingali, "Technological Priorities for Farming in Sub-Saharan Africa," 3 (1, January 1988): 81–98
- Binswanger, Hans P., and Joachim von Braun, "Technological Change and Commercialization in Agriculture: The Effect on the Poor," 6 (1, January 1991): 57–80
- Birdsall, Nancy, "Economic Analyses of Rapid Population Growth," 4 (1, January 1989): 23–50
- Borrell, Brent, and Ronald C. Duncan, "A Survey of the Costs of World Sugar Policies," 7 (2, July 1992): 171–94
- Claessens, Stijn, "Alternative Forms of External Finance: A Survey," 8 (1, January 1993): 91–117
- Carmichael, Jeffrey, "The Debt Crisis: Where Do We Stand after Seven Years?" 4 (2, July 1989): 121–42

- Corbo, Vittorio, and Jaime de Melo, "Lessons from the Southern Cone Policy Reforms," 2 (2, July 1987): 111–42
- Corden, Max, "Macroeconomic Adjustment in Developing Countries," 4 (1, January 1989): 51–64
- , "The Relevance for Developing Countries of Recent Developments in Macroeconomic Theory," 2 (2, July 1987): 171–88
- Coricelli, Fabrizio, and Timothy D. Lane, "Wage Controls during the Transition from Central Planning to a Market Economy," 8 (2, July 1993): 195–210
- Cox, Donald, and Emmanuel Jimenez, "Achieving Social Objectives through Private Transfers: A Review," 5 (2, July 1990): 205–18
- Cuddington, John, "Commodity Export Booms in Developing Countries," 4 (2, July 1989): 143–65
- de Melo, Jaime (*See* Vittorio Corbo; Carl B. Hamilton)
- Duncan, Ronald C. (*See* Brent Borrell; Donald O. Mitchell)
- Easterly, William R., and Klaus Schmidt-Hebbel, "Fiscal Deficits and Macroeconomic Performance in Developing Countries," 8 (2, July 1993): 211–37
- Easterly, William (*See* Stanley Fischer)
- Edwards, Sebastian, "Exchange Rate Misalignment in Developing Countries," 4 (1, January 1989): 3–21
- Eichengreen, Barry, and Richard Portes, "The Interwar Debt Crisis and Its Aftermath," 5 (1, January 1990): 69–94
- Elkan, Walter, "Entrepreneurs and Entrepreneurship in Africa," 3 (2, July 1988): 171–88
- Eskeland, Gunnar S., and Emmanuel Jimenez, "Policy Instruments for Pollution Control in Developing Countries," 7 (2, July 1992): 145–69
- Feder, Gershon, and Raymond Noronha, "Land Rights Systems and Agricultural Development in Sub-Saharan Africa," 2 (2, July 1987): 143–69
- Feder, Gershon, and Roger Slade, "The Impact of Agricultural Extension: The Training and Visit System in India," 1 (2, July 1986): 139–61
- Feder, Gershon (*See* Monika Huppi)
- Fields, Gary S., "Changes in Poverty and Inequality in Developing Countries," 4 (2, July 1989): 167–85
- Findlay, Ronald (*See* Stanislaw Wellisz)
- Finger, J. Michael, "Dumping and Antidumping: The Rhetoric and Reality of Protection in Industrial Countries," 7 (2, July 1992): 121–43
- Fischer, Stanley, "Issues in Medium-Term Macroeconomic Adjustment," 1 (2, July 1986): 163–82

- Fischer, Stanley, and William Easterly, "The Economics of the Government Budget Constraint," 5 (2, July 1990): 127–42
- Fitzgerald, Bruce, and Terry Monson, "Preferential Credit and Insurance as Means to Promote Exports," 4 (1, January 1989): 89–114
- Glaessner, Thomas (*See* J. Luis Guasch)
- Goto, Junichi, "The Multifibre Arrangement and Its Effects on Developing Countries," 4 (2, July 1989): 203–27
- Greenaway, David, and Chris Milner, "South-South Trade: Theory, Evidence, and Policy," 5 (1, January 1990): 47–68
- Gross, David J. (*See* Stephen K. Mayo)
- Guasch, J. Luis, and Thomas Glaessner, "Using Auctions to Allocate and Price Long-Term Credit" 8 (2, July 1993): 169–94
- Haggard, Stephan, and Steven B. Webb, "What Do We Know about the Political Economy of Economic Policy Reform?" 8 (2, July 1993): 143–68
- Hamilton, Carl B., Jaime de Melo, and L. Alan Walters, "Who Wins and Who Loses from Voluntary Export Restraints? The Case of Footwear," 7 (1, January 1992): 17–35
- Hammer, Jeffrey S., "The Economics of Malaria Control," 8 (1, January 1993): 1–22
- Havrylyshyn, Oli, "Trade Policy and Productivity Gains in Developing Countries: A Survey of the Literature," 5 (1, January 1990): 1–24
- Hegstad, Sven O. (*See* Mahmood A. Ayub)
- Huppi, Monika, and Gershon Feder, "The Role of Groups and Credit Cooperatives in Rural Lending," 5 (2, July 1990): 187–204
- Jimenez, Emmanuel, "The Public Subsidization of Education and Health in Developing Countries: A Review of Equity and Efficiency," 1 (1, January 1986): 111–29
- Jimenez, Emmanuel, Marlaine E. Lockheed, and Vicente Paqueo, "The Relative Efficiency of Private and Public Schools in Developing Countries," 6 (2, July 1991): 205–18
- Jimenez, Emmanuel (*See* Donald Cox; Gunnar S. Eskeland)
- Kannappan, Subbiah, "Urban Labor Markets and Development," 3 (2, July 1988): 189–206
- Khan, Mohsin S., "Macroeconomic Adjustment in Developing Countries: A Policy Perspective," 2 (1, January 1987): 23–42
- Kiguel, Miguel A., and Nissan Liviatan, "When Do Heterodox Stabilization Programs Work? Lessons from Experience," 7 (1, January 1992): 35–59
- Koester, Ulrich, and Malcolm D. Bale, "The Common Agricultural Policy: A Review of Its Operation and Effects on Developing Countries," 5 (1, January 1990): 95–121

- Kravis, Irving B. "The Three Faces of the International Comparison Project," 1 (1, January 1986): 3–26
- Krueger, Anne O., "Aid in the Development Process," 1 (1, January 1986): 57–78
- Lal, Deepak, and Sarath Rajapatirana, "Foreign Trade Regimes and Economic Growth in Developing Countries," 2 (2, July 1987): 189–217
- Lane, Timothy D. (*See* Fabrizio Coricelli)
- Lee, Kyu Sik (*See* William J. Baumol)
- Levin, Henry M., "A Benefit-Cost Analysis of Nutritional Programs for Anemia Reduction," 1 (2, July 1986): 219–45
- Lindauer, David L., Oey Astra Meesook, and Parita Suebsaeng, "Government Wage Policy in Africa: Some Findings and Policy Issues," 3 (1, January 1988): 1–25
- Lindauer, David L., and Ann D. Velenchik, "Government Spending in Developing Countries: Trends, Causes, and Consequences," 7 (1, January 1992): 59–79
- Liviatan, Nissan (*See* Miguel A. Kiguel)
- Lockheed, Marlaine E. (*See* Emmanuel Jimenez)
- Malpezzi, Stephen (*See* Stephen K. Mayo)
- Markandya, Anil, and David W. Pearce, "Development, the Environment, and the Social Rate of Discount," 6 (2, July 1991): 137–52
- Mayo, Stephen K., Stephen Malpezzi, and David J. Gross, "Shelter Strategies for the Urban Poor in Developing Countries," 1 (2, July 1986): 183–203
- McCleary, William, "The Earmarking of Government Revenue: A Review of Some World Bank Experience," 6 (1, January 1991): 81–104
- McLure, Charles E., Jr., "A Simpler Consumption-Based Alternative to the Income Tax for Socialist Economies in Transition," 7 (2, July 1992): 221–37
- McNelis, Paul D., "Indexation and Stabilization: Theory and Experience," 3 (2, July 1988): 157–69
- Meesook, Oey Astra (*See* David L. Lindauer)
- Milner, Chris (*See* David Greenaway)
- Mintz, Jack M., and Jesús Seade, "Cash Flow or Income? The Choice of Base for Company Taxation," 6 (2, July 1991): 177–90
- Mitchell, Donald O., and Ronald C. Duncan, "Market Behavior of Grains Exporters," 2 (1, January 1987): 3–21
- Mitra, Pradeep, "The Coordinated Reform of Tariffs and Indirect Taxes," 7 (2, July 1992): 195–218
- Monson, Terry (*See* Bruce Fitzgerald)
- Musgrove, Philip, "Feeding Latin America's Children," 8 (1, January 1993): 23–45

- Mussa, Michael, "Macroeconomic Policy and Trade Liberalization: Some Guidelines," 2 (1, January 1987): 61-77
- Myers, Robert J., "Incomplete Markets and Commodity-Linked Finance in Developing Countries," 7 (1, January 1992): 79-95
- Nash, John (*See* Vinod Thomas)
- Nelson, Joan M., "Organized Labor, Politics, and Labor Market Flexibility in Developing Countries," 6 (1, January 1991): 37-56
- Newbery, David M., "Charging for Roads," 3 (2, July 1988): 119-38
- Noronha, Raymond (*See* Gershon Feder)
- Openshaw, Keith (*See* Douglas F. Barnes)
- Paqueo, Vicente (*See* Emmanuel Jimenez)
- Pearce, David W. (*See* Anil Markandya)
- Pingali, Prabhu (*See* Hans Binswanger)
- Portes, Richard (*See* Barry Eichengreen)
- Psacharopoulos, George, "Education and Development: A Review," 3 (1, January 1988): 99-116
- Psacharopoulos, George, and Zafiris Tzannatos, "Female Labor Force Participation: An International Perspective," 4 (2, July 1989): 187-201
- Rajapatirana, Sarath (*See* Deepak Lal)
- Ravallion, Martin, "On 'Hunger and Public Action': A Review Article on the Book by Jean Drèze and Amartya Sen," 7 (1, January 1992): 1-17
- , "Reaching the Rural Poor through Public Employment: Arguments, Evidence, and Lessons from South Asia," 6 (2, July 1991): 153-75
- Schmidt-Hebbel (*See* William Easterly)
- Seade, Jesús (*See* Jack M. Mintz)
- Serven, Luis, and Andrés Solimano, "Private Investment and Macroeconomic Adjustment: A Survey," 7 (1, January 1992): 95-114
- Shoup, Carl, "The Value Added Tax and Developing Countries," 3 (2, July 1988): 139-56
- Slade, Roger (*See* Gershon Feder)
- Smith, Kirk R. (*See* Douglas F. Barnes)
- Solimano, Andrés, "Inflation and the Costs of Stabilization: Historical and Recent Experiences and Policy Lessons," 5 (2, July 1990): 167-85
- Solimano, Andrés (*See* Luis Serven)
- Srinivasan, T. N., "The Costs and Benefits of Being a Small, Remote, Island, Landlocked, or Ministate Economy," 1 (2, July 1986): 205-18

- Stiglitz, Joseph E., "Some Theoretical Aspects of Agricultural Policies," 2 (1, January 1987): 43–60
- Suebsaeng, Parita (*See* David L. Lindauer)
- Summers, Lawrence H., and Vinod Thomas, "Recent Lessons of Development," 8 (2, July 1993): 241–54
- Tait, Alan A., "A Not-So-Simple Alternative to the Income Tax for Socialist Economies in Transition: A Comment on McLure," 7 (2, July 1992): 239–48
- Takacs, Wendy E., "Options for Dismantling Trade Restrictions in Developing Countries," 5 (1, January 1990): 25–46
- Thomas, Vinod, and John Nash, "Reform of Trade Policy: Recent Evidence from Theory and Practice," 6 (2, July 1991): 219–40
- Thomas, Vinod (*See* Lawrence H. Summers)
- Tzannatos, Zafiris (*See* George Psacharopoulos)
- van der Plas, Robert (*See* Douglas F. Barnes)
- Velenchik, Ann D. (*See* David L. Lindauer)
- von Braun, Joachim (*See* Hans P. Binswanger)
- Wade, Robert, "The Management of Common Property Resources: Finding a Cooperative Solution," 2 (2, July 1987): 219–34
- Wakeman-Linn, John, "The Market for Developing Country Debt: The Nature and Importance of Its Shortcomings," 6 (2, July 1991): 191–203
- Walters, L. Alan (*See* Carl B. Hamilton)
- Warr, Peter G., "Export Processing Zones: The Economics of Enclave Manufacturing," 4 (1, January 1989): 65–88
- Webb, Steven B. (*See* Stephan Haggard)
- Wellisz, Stanislaw, and Ronald Findlay, "The State and the Invisible Hand," 3 (1, January 1988): 59–80
- Winters, L. Alan (*See* Carl B. Hamilton)
- Wood, Adrian, "How Much Does Trade with the South Affect Workers in the North?" 6 (1, January 1991): 19–36
- The World Bank Water Demand Research Team, "The Demand for Water in Rural Areas: Determinants and Policy Implications," 8 (1, January 1993): 47–70
- Ziderman, Adrian (*See* Douglas Albrecht)

Titles

- "Achieving Social Objectives through Private Transfers: A Review," Donald Cox and Emmanuel Jimenez, 5 (2, July 1990): 205–18

- “Agricultural Mechanization: A Comparative Historical Perspective,” Hans Binswanger, 1 (1, January 1986): 27–56
- “Aid in the Development Process,” Anne O. Krueger, 1 (1, January 1986): 57–78
- “Alternative Forms of External Finance: A Survey,” Stijn Claessens, 8 (1, January 1993): 91–117
- “A Benefit-Cost Analysis of Nutritional Programs for Anemia Reduction,” Henry M. Levin, 1 (2, July 1986): 219–45
- “Cash Flow or Income? The Choice of Base for Company Taxation,” Jack M. Mintz and Jésus Seade, 6 (2, July 1991): 177–90
- “Changes in Poverty and Inequality in Developing Countries,” Gary S. Fields, 4 (2, July 1989): 167–85
- “Charging for Roads,” David M. Newbery, 3 (2, July 1988): 119–38
- “Commodity Export Booms in Developing Countries,” John Cuddington, 4 (2, July 1989): 143–65
- “The Common Agricultural Policy: A Review of Its Operation and Effects on Developing Countries,” Ulrich Koester and Malcolm D. Bale, 5 (1, January 1990): 95–121
- “Contestable Markets, Trade, and Development,” William J. Baumol and Kyu Sik Lee, 6 (1, January 1991): 1–17
- “The Coordinated Reform of Tariffs and Indirect Taxes,” Pradeep Mitra, 7 (2, July 1992): 195–218
- “The Costs and Benefits of Being a Small, Remote, Island, Landlocked, or Ministate Economy,” T. N. Srinivasan, 1 (2, July 1986): 205–18
- “The Debt Crisis: Where Do We Stand after Seven Years?” Jeffrey Carmichael, 4 (2, July 1989): 121–42
- “The Demand for Water in Rural Areas: Determinants and Policy Implications,” The World Bank Water Demand Research Team, 8 (1, January 1993): 47–70
- “The Design and Diffusion of Improved Cooking Stoves,” Douglas F. Barnes, Keith Openshaw, Kirk R. Smith, and Robert van der Plas, 8 (2, July 1993): 119–41
- “Development, the Environment, and the Social Rate of Discount,” Anil Markandya and David W. Pearce, 6 (2, July 1991): 137–52
- “Dumping and Antidumping: The Rhetoric and the Reality of Protection in Industrial Countries,” J. Michael Finger, 7 (2, July 1992): 121–43
- “The Earmarking of Government Revenue: A Review of Some World Bank Experience,” William McCleary, 6 (1, January 1991): 81–104
- “Economic Analyses of Rapid Population Growth,” Nancy Birdsall, 4 (1, January 1989): 23–50
- “The Economics of Malaria Control,” Jeffrey S. Hammer, 8 (1, January 1993): 1–22

- “The Economics of the Government Budget Constraint,” Stanley Fischer and William Easterly, 5 (2, July 1990): 127–42
- “Education and Development: A Review,” George Psacharopoulos, 3 (1, January 1988): 99–116
- “Entrepreneurs and Entrepreneurship in Africa,” Walter Elkan, 3 (2, July 1988): 171–88
- “Exchange Rate Misalignment in Developing Countries,” Sebastian Edwards, 4 (1, January 1989): 3–21
- “Export Processing Zones: The Economics of Enclave Manufacturing,” Peter G. Warr, 4 (1, January 1989): 65–88
- “Export-Promoting Trade Strategy: Issues and Evidence,” Jagdish N. Bhagwati, 3 (1, January 1988): 27–57
- “Feeding Latin America’s Children,” Philip Musgrove, 8 (1, January 1993): 23–45
- “Female Labor Force Participation: An International Perspective,” George Psacharopoulos and Zafiris Tzannatos, 4 (2, July 1989): 187–201
- “Fiscal Deficits and Macroeconomic Performance in Developing Countries,” William Easterly and Klaus Schmidt-Hebbel, 8 (2, July 1993): 211–37
- “Foreign Trade Regimes and Economic Growth in Developing Countries,” Deepak Lal and Sarath Rajapatirana, 2 (2, July 1987): 189–217
- “Government Spending in Developing Countries: Trends, Causes, and Consequences,” David L. Lindauer and Ann D. Velenchik, 7 (1, January 1992): 59–79
- “Government Wage Policy in Africa: Some Findings and Policy Issues,” David L. Lindauer, Oey Astra Meesook, and Parita Suebsaeng, 3 (1, January 1988): 1–25
- “How Much Does Trade with the South Affect Workers in the North?” Adrian Wood, 6 (1, January 1991): 19–36
- “The Impact of Agricultural Extension: The Training and Visit System in India,” Gershon Feder and Roger Slade, 1 (2, July 1986): 139–61
- “Incomplete Markets and Commodity-Linked Finance in Developing Countries,” Robert J. Myers, 7 (1, January 1992): 79–95
- “Indexation and Stabilization: Theory and Experience,” Paul D. McNelis, 3 (2, July 1988): 157–69
- “Inflation and the Costs of Stabilization: Historical and Recent Experiences and Policy Lessons,” Andrés Solimano, 5 (2, July 1990): 167–85
- “The Interwar Debt Crisis and Its Aftermath,” Barry Eichengreen and Richard Portes, 5 (1, January 1990): 69–94
- “Issues in Medium-Term Macroeconomic Adjustment,” Stanley Fischer, 1 (2, July 1986): 163–82
- “Land Rights Systems and Agricultural Development in Sub-Saharan Africa,” Gershon Feder and Raymond Noronha, 2 (2, July 1987): 143–69

- “Lessons from the Southern Cone Policy Reforms,” Vittorio Corbo and Jaime de Melo, 2 (2, July 1987): 111–42
- “Macroeconomic Adjustment in Developing Countries,” W. Max Corden, 4 (1, January 1989): 51–64
- “Macroeconomic Adjustment in Developing Countries: A Policy Perspective,” Mohsin S. Khan, 2 (1, January 1987): 23–42
- “Macroeconomic Policy and Trade Liberalization: Some Guidelines,” Michael Mussa, 2 (1, January 1987): 61–77
- “The Management of Common Property Resources: Finding a Cooperative Solution,” Robert Wade, 2 (2, July 1987): 219–34
- “Management of Public Industrial Enterprises,” Mahmood A. Ayub and Sven O. Hegstad, 2 (1, January 1987): 79–101
- “Market Behavior of Grains Exporters,” Donald O. Mitchell and Ronald C. Duncan, 2 (1, January 1987): 3–21
- “The Market for Developing Country Debt: The Nature and Importance of Its Shortcomings,” John Wakeman-Linn, 6 (2, July 1991): 191–203
- “The Multifibre Arrangement and Its Effects on Developing Countries,” Junichi Goto, 4 (2, July 1989): 203–27
- “A Not-So-Simple Alternative to the Income Tax for Socialist Economies in Transition: A Comment on McLure,” Alan A. Tait, 7 (2, July 1992): 239–48
- “On ‘Hunger and Public Action’: A Review Article on the Book by Jean Drèze and Amartya Sen,” Martin Ravallion, 7 (1, January 1992): 1–17
- “Options for Dismantling Trade Restrictions in Developing Countries,” Wendy E. Takacs, 5 (1, January 1990): 25–46
- “Organized Labor, Politics, and Labor Market Flexibility in Developing Countries,” Joan M. Nelson, 6 (1, January 1991): 37–56
- “Policy Instruments for Pollution Control in Developing Countries,” Gunnar S. Eskeland and Emmanuel Jimenez, 7 (2, July 1992): 145–69
- “Preferential Credit and Insurance as Means to Promote Exports,” Bruce Fitzgerald and Terry Monson, 4 (1, January 1989): 89–114
- “Private Investment and Macroeconomic Adjustment: A Survey,” Luis Servén and Andrés Solimano, 7 (1, January 1992): 95–114
- “The Public Subsidization of Education and Health in Developing Countries: A Review of Equity and Efficiency,” Emmanuel Jimenez, 1 (1, January 1986): 111–29
- “Reaching the Rural Poor through Public Employment: Arguments, Evidence, and Lessons from South Asia,” Martin Ravallion, 6 (2, July 1991): 153–75
- “Recent Lessons of Development,” Lawrence H. Summers and Vinod Thomas, 8 (2, July 1993): 241–54

- “Reform of Trade Policy: Recent Evidence from Theory and Practice,” Vinod Thomas and John Nash, 6 (2, July 1991): 219–40
- “Reforming Property Rights in Land and Tenancy,” Clive Bell, 5 (2, July 1990): 143–66
- “The Relative Efficiency of Private and Public Schools in Developing Countries,” Emmanuel Jimenez, Marlaine E. Lockheed, and Vicente Paqueo, 6 (2, July 1991): 205–18
- “The Relevance for Developing Countries of Recent Developments in Macroeconomic Theory,” W. Max Corden, 2 (2, July 1987): 171–88
- “The Role of Groups and Credit Cooperatives in Rural Lending,” Monika Huppi and Gershon Feder, 5 (2, July 1990): 187–204
- “Shelter Strategies for the Urban Poor in Developing Countries,” Stephen K. Mayo, Stephen Malpezzi, and David J. Gross, 1 (2, July 1986): 183–203
- “A Simpler Consumption-Based Alternative to the Income Tax for Socialist Economies in Transition,” Charles E. McLure, Jr., 7 (2, July 1992): 221–37
- “Social Security and the Poor: Choices for Developing Countries,” Ehtisham Ahmad, 6 (1, January 1991): 105–27
- “Some Theoretical Aspects of Agricultural Policies,” Joseph E. Stiglitz, 2 (1, January 1987): 43–60
- “South-South Trade: Theory, Evidence, and Policy,” David Greenaway and Chris Milner, 5 (1, January 1990): 47–68
- “Stabilization Policies in Developing Countries,” Liaquat Ahamed, 1 (1, January 1986): 79–110
- “The State and the Invisible Hand,” Stanislaw Wellisz and Ronald Findlay, 3 (1, January 1988): 59–80
- “Student Loans: An Effective Instrument for Cost Recovery in Higher Education?,” Douglas Albrecht and Adrian Ziderman, 8 (1, January 1993): 71–90
- “A Survey of the Costs of World Sugar Policies,” Brent Borrell and Ronald C. Duncan, 7 (2, July 1992): 171–94
- “Technological Change and Commercialization in Agriculture: The Effect on the Poor,” Hans P. Binswanger and Joachim von Braun, 6 (1, January 1991): 57–80
- “Technological Priorities for Farming in Sub-Saharan Africa,” Hans Binswanger and Prabhu Pingali, 3 (1, January 1988): 81–98
- “The Three Faces of the International Comparison Project,” Irving B. Kravis, 1 (1, January 1986): 3–26
- “Trade Policy and Productivity Gains in Developing Countries: A Survey of the Literature,” Oli Havrylyshyn, 5 (1, January 1990): 1–24
- “Urban Labor Markets and Development,” Subbiah Kannappan, 3 (2, July 1988): 189–206

- “Using Auctions to Allocate and Price Long-Term Credit,” J. Luis Guasch and Thomas Glaessner, 8 (2, July 1993): 169–94
- “The Value Added Tax and Developing Countries,” Carl Shoup, 3 (2, July 1988): 139–56
- “Wage Controls during the Transition from Central Planning to a Market Economy,” Coricelli, Fabrizio, and Timothy D. Lane, 8 (2, July 1993): 195–210
- “What Do We Know about the Political Economy of Economic Policy Reform,” Stephan Haggard and Steven B. Webb, 8 (2, July 1993): 143–68
- “When Do Heterodox Stabilization Programs Work? Lessons from Experience,” Miguel A. Kiguel and Nissan Liviatan, 7 (1, January 1992): 35–59
- “Who Wins and Who Loses from Voluntary Export Restraints? The Case of Footwear,” Carl B. Hamilton, Jaime de Melo, and L. Alan Winters, 7 (1, January 1992): 17–35

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