Trade Shocks
Consequences and Policy Responses in Developing Countries

Paul Collier and Jan Willem Gunning

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PREFACE

We are pleased to publish *Trade Shocks: Consequences and Policy Responses in Developing Countries,* by Paul Collier and Jan Willem Gunning, as the fifty-first in our series of Occasional Papers, which present perspectives on development issues by noted scholars and policy makers.

In this study Professors Collier and Gunning examine a question of great importance for countries whose resources are disproportionately concentrated in single commodities, such as coffee or oil, and which are therefore vulnerable to trade shocks. This paper explores how mistaken policy responses to such shocks have had destructive consequences for many developing economies. They summarize two works, still in progress, that examine for policy lessons both theoretical issues and empirical evidence from a large number of countries on three continents.

The authors explore five key issues: whether volatile prices carry beneficial or harmful implications for expected national income, the extent to which smoothing of shocks over time will improve economic performance, Dutch disease (favorable external shocks causing shifts of resources away from other [nonboom] tradable sectors), the theory of construction booms (positive shock causing disproportionate increase in demand for assets vis-à-vis consumption), and the fix-price macroeconomic response (effects of price rigidities in the labor market).

The authors discuss the relationship of trade and monetary policies, emphasizing exchange rate policies and how they react to shocks. They observe that when policy does not respond efficiently to shocks, the result can be intense price and income volatility. They suggest, however, that price volatility should not be viewed as universally harmful. In the

wake of preventative shock, volatility may be seen as a force for long-term growth, provided the private sector—which is best able to adapt to short-term fluctuations—is not unduly restrained by government control of income windfalls.

Professor Collier is coauthor along with Professor Jan Willem Gunning of the major multi-country study still in progress, "Trade and Development: Protection, Shocks, and Liberalization," summarized in this paper. Funded by the Agency for International Development, the World Bank, and British Petroleum, this study advances twenty-five case-studies of episodes of external shocks in Africa, Latin America, and Asia, providing evidence of patterns in policy response.

We hope this paper will be valuable for policy makers and scholars who are trying to reform the policy responses of developing countries that experience major trade shocks.

Nicolás Ardito-Barletta
General Director
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Panama City, Panama
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Both Professor Gunning and Professor Collier are Professeurs Associetés at CERDI, Université d'Auvergne. They have written, with David Bevan, *Peasants and Governments: An Economic Analysis and Controlled Open Economies: A Neoclassical Approach to Structuralism.*

Paul Collier and Jan Willem Gunning

Trade Shocks: Consequences and Policy Responses in Developing Countries

The history of external shocks, followed by errors in policy response, is a very long one. A famous example occurred in the 1860s, during the American Civil War. The interruption to American cotton exports caused a corresponding cotton boom that enormously increased public revenue in Egypt. With a lag, public expenditure increased but could not be scaled back when the boom was over. The resulting bankruptcy handed the Suez Canal to Anglo-French ownership. To take a current example, a reasonable case can be made that the present fiscal crisis in Nigeria can be traced to the 1991 oil boom that resulted from the invasion of Kuwait. In this paper we first briefly review the main analytic building blocks that are useful in thinking about external shocks. Although Dutch disease is one of them, we think it has received disproportionate attention. In "Shocks, Assets, and Output" we address asset behavior, which we regard as the central issue in dealing with shocks. We draw on two blocks of evidence, a twenty-five-country study of which we are the coordinators, and a thirty-five-country econometric time series study by Deaton. Both are work in progress. In "Consequences of the Control Regime" we turn to the appropriate control regime, focusing on trade and monetary policies. The final section provides a conclusion on policy lessons.

Five Analytic Building Blocks

Five analytic building blocks are useful in thinking about external shocks. They are, first, the theory of whether volatile prices are good or bad in the restricted sense of what they imply for expected income. Second is the extent to which intertemporal smoothing of shocks is appropriate. Third, and most familiarly, is the Dutch disease approach. Fourth is the intersection of the second and third approaches—the theory of construction booms. Finally, there is the fix-price macroeconomic approach.

Instinctively, one imagines that price volatility must be disadvantageous compared with some "equivalent" constant terms of trade. Although this instinct may well turn out to be right, there is one interesting sense in which it is absolutely untrue: a volatile terms of trade should result in a higher income terms of trade than if the terms of trade were constant around either its arithmetic or its geometric means. The reason is that if there is any intratemporal substitution in either production or consumption, then the economy will to some extent be able to take advantage of fluctuations in relative prices, exporting disproportionately more of its export good when its price is high, and concentrating on import substitution when its price is low. Price volatility is thus an opportunity to make a killing, which is missing when the terms of trade are constant. This simple insight has two powerful corollaries. First, it suggests that an appropriate strategy for an economy that is subject to a lot of price volatility is to have as much resource mobility as possible. Concerning the less mobile factor, capital, the economy would invest in general rather than sector-specific skills and physical capital, short-lasting rather than long-lasting sector-specific capital (vehicles rather than buildings), and have a large "moving sector" (following Mussa's term). Concerning the intrinsically more mobile factor, labor, policies that tended to convert labor from a variable to a fixed factor by restricting layoffs would be costlier in such an economy than in others, because labor mobility is likely to be the primary means of achieving short-term shifts in output. Second, it suggests that either domestic or world price stabilization would reduce real income. Domestic price stabilization removes the incentive for domestic agents to shift resources or consumption. World price stabilization removes the

opportunity for the economy to cash in on high prices. We do not wish to overstate this position. On balance, we believe that price volatility is damaging. However, it does suggest an alternative focus for public policy.

While the first building block has assumed price volatility and deduced that a high degree of intratemporal substitution in production and consumption is the appropriate response, the second poses the question of whether a price shock should be treated as having intertemporal implications. Some price shocks are pretty obviously temporary, such as the coffee booms induced by Brazilian frosts. However, most price shocks, even if temporary with the benefit of hindsight, do not occur in a context in which the duration of the shock is readily discerned. Indeed, most econometric studies of commodity prices are not able to reject the hypothesis that they are random walks, implying that price changes should be regarded as permanently altering the expected future price by the same amount. This should not be taken too seriously. First, the forecasting record of commodity prices using econometric methods, notably by the World Bank, is very poor. Second, recent improvements in econometric specification are starting to find some reversionary component to prices, while simulation models yield occasional peaks (during stockouts) followed by long, shallow troughs. The present state of knowledge about commodity prices justifies neither the assumption that shocks are entirely temporary (though they may be), nor that they are permanent (though they may be). Given the high degree of uncertainty about the persistence of a price shock, the response then depends in part on whether there are asymmetries between the consequences of errors of optimism and pessimism. For instance, if the costs of erroneous optimism exceed those of pessimism, then caution would be appropriate. There are, therefore, two rather different justifications for high savings rates in response to positive external shocks: that based on a belief that the shock is temporary, and that based on uncertainty coupled with asymmetric costs of errors. Neither of these propositions is currently well established.

The third building block, Dutch disease, is familiar: favorable external shocks shift resources out of the nonboom tradable sector. This is only a "disease" if particular assumptions are added to the standard analysis; for example, if the shock turns out to be temporary but this is

not realized at the time, then those resource shifts that are costly to reverse will be excessive. It is hardly surprising, though, that an economy would do better if there were perfect knowledge of the future, and there is no reason to believe that resource allocation errors would be any greater in response to external shocks than to any other innovation. Arguments based on learning by doing in the nonboom tradable sector, or any other externalities generated in the sector, are not really shock-specific: they constitute a case for favoring the sector in all circumstances rather than for shielding it from Dutch disease effects.

The fourth building block, construction booms, combines the Dutch disease disaggregation into tradables and nontradables with the intertemporal analysis that disaggregates into consumer goods and assets. A positive external shock induces a disproportionate increase in the demand for assets relative to consumption. Some of these assets are nontradables, such as buildings and infrastructure. Hence, the rise in demand for consumer nontradables is weaker than that predicted within the framework of Dutch disease theory (with a boom fully treated as temporary it might be close to zero), whereas the rise in demand for nontradable capital goods may be very substantial. The sector that produces these goods, namely the construction sector, is therefore a major beneficiary of external shocks. Indeed, the construction boom could be much more pronounced than the primary export boom that induces it. But, if the price of construction services is driven up substantially, then smart agents will temporarily acquire foreign assets that they will repatriate once the price of construction is lower. This role of foreign assets as a means of stretching the investment boom over a longer period than the savings boom, thereby raising the efficiency of domestic investment, is one of the central propositions of the theory.

The final building block is to introduce some nominal or real price rigidities, for example, in the labor market or a part of it. Shocks may have temporary effects because they catch agents by surprise. The most obvious examples concern temporary increases in employment. This could be brought about because the shock might raise the price level, lowering real wages until agents recontract, or the shock could raise the equilibrium real wage while leaving the actual real wage temporarily fixed by contracts. Aside from these necessarily temporary effects based on surprise, shocks could have permanent effects if there

is a formal/informal labor market dichotomy. The real wage in the formal sector might be above the equilibrium wage but not functionally related to it. Thus, a favorable shock that raised the equilibrium real wage need not induce recontracting in the formal sector, but could lead to the enlargement of that sector (and the contraction of the informal sector) for the duration of the favorable shock (rather than for the duration of surprise). There is scope for asymmetries in response. One such assumption, sometimes made, is that real or nominal wages are flexible upward in response to positive shocks, but rigid downward in response to negative shocks. In the African labor markets with which we are familiar this would probably be the reverse of the truth. By the time of the favorable shocks of the mid-1970s African formal sector wages were high as an inheritance from the political economy of independence. Wage earners on the whole did not succeed in raising real wages during the booms. By contrast, during the negative shocks of the 1980s, real wages fell with remarkable flexibility. As we will see, the quest for plausible accounts of asymmetries turns out to be important.

Shocks, Assets, and Output: Some Evidence and Its Implications

The government must have some policy toward shocks because, like other agents, it gets revenue and makes expenditures. Revenue will change as a result of the shock even if there is no direct taxation of the windfall. For instance, during the coffee boom of 1976–1979, the Kenyan government ended up with about half of the windfall even though it had virtually no tax on coffee itself, because it derived much of its revenue from import taxes and imports increased substantially. The returns to public expenditures are also likely to change, though not in a straightforward manner (Bevan et al. [1989]). For instance, if public investment in infrastructure is complementary to private investment then there is a case for increasing it during the boom, whereas offsetting this, such expenditures will amplify the construction boom. In this section we investigate public and private expenditure responses to external shocks. We turn to the other aspect of government policy, the control regime, in "Consequences of the Control Regime." Still, it is convenient to bring one control into the picture at an early stage because

it directly concerns the asset policies that are the main focus of this section, namely exchange controls that prevent private agents from legally acquiring assets abroad. This control was common to most though by no means all of the countries to be discussed.

We now turn to the evidence to see whether there was a pattern to policy responses. We draw mainly on two sources. The first is a set of twenty-five case studies of episodes of external shocks in Africa, Latin America, and Asia (although most of the Asian studies are as yet incomplete).[1] The second is a study by Deaton (1992) on thirty-five African countries over the period 1968–1985, in which time series on export prices of commodities are related to GDP and the components of national expenditure.

We begin with the identification of the shocks: In what sense were there ex post episodes and were these identifiable ex ante? Generally, the greatest difficulties were with the oil economies. Clearly, there were very large price shocks that ex post proved temporary. There was some basis for regarding them at the time as temporary because the history of cartels suggests that they rarely persist; however, there was no way of knowing how temporary this might be and in the late 1970s and early 1980s the central forecasts of the oil price had it continuing to rise in real terms. Most oil producers also had large quantity shocks. These ranged from the discovery of, in practical terms, limitless supplies (Venezuela) to supplies that were expected to be exhausted over ten to fifteen years (Cameroon). This seems to have been fairly typical of mineral extraction: price shocks that were very hard to interpret (another example would be Zambia and the copper price and a series of highly inaccurate World Bank forecasts), but quantity shocks that were much easier to read. In between were quantity shocks induced by pricing policy. As an example, in 1980 the de Beers diamond cartel suspended purchases so as to defend the price and this caused a temporary but

1. The case studies have been done to a common design. The study is funded by the Research Department of the World Bank, the International Center for Economic Growth, the Oxford Institute for Energy Studies, and the Dutch government. The countries included are Kenya, Egypt, Niger, Senegal, Cameroon, Cote d'Ivoire, Zambia, Botswana, Malawi, Ghana, Nigeria, Mauritius, Colombia, Mexico, Costa Rica, Venezuela, Bolivia, Indonesia, Pakistan, Bangladesh, Papua New Guinea, Malaysia, Thailand, Sri Lanka, and Philippines. Preliminary results are published in Bevan et al. (1993, 1993a).

substantial negative shock in Botswana. In 1981 Nigeria drastically reduced oil exports in an attempt to defend the premium price of its oil over North Sea crude. In both these cases, even though the quantity change could reasonably be seen as temporary, there was uncertainty over whether the strategy would succeed in its objective: in Botswana it did and in Nigeria it didn't. The broad picture on mineral shocks is that the price shocks are often long-lasting and hard to read; the quantity shocks related to discoveries are long-lasting, whereas the quantity shocks related to cartel behavior are periods of high uncertainty. By contrast, agricultural shocks seem rather easier to read. Price shocks such as the beverage booms of the late 1970s are evidently temporary because supply either recovers (where the source of the shock is a fall in supply) or can be expanded almost without limit in the medium term. Quantity shocks are usually climatic and again therefore quickly reversed.

The two reasons for having a high savings rate from windfalls, either because they are seen to be temporary or because they are regarded as highly uncertain, thus apply very differently to the various types of shock. The peculiarity is that this seems to make little difference to savings behavior.

Are Windfalls Saved and Who Saves Them? First, it must be admitted that it is not a straightforward matter to calculate windfall savings rates because it is necessary to specify counterfactual income. Even ex post, this is fairly arbitrary, and we have no way of knowing how agents viewed their likely incomes ex ante. The twenty-five case studies did, however, use a reasonably common approach and so have some internal consistency. Where windfall savings rates are found to be in the range of 60 to 90 percent whereas normal savings rates are below 20 percent, the conclusion that windfall savings are high is unlikely to be an artefact, although the actual rates cannot be regarded as robust.

With the above caveat, most countries experiencing windfalls have had high savings rates out of them even when the shocks appeared likely to be long-lasting. Examples are the Nigerian oil boom of the 1970s, most other oil booms, and the Botswana diamonds boom. Booms that looked likely to be short-lived also usually generated high savings rates: Kenya, Colombia, Niger, Cote d'Ivoire, Malawi, Senegal, and Mauri-

tius. Complete failures to save windfalls were fairly rare. In Ghana there was no savings from the cocoa boom (although it was fairly obviously temporary) and in Nigeria during the second oil boom of 1979–1981 the rate of windfall savings was probably slightly negative due to heavy borrowing.

We now turn to a disaggregation of behavior between the public and private sectors. It is not entirely straightforward to identify whether shocks were public or private. The initial configuration of taxes or ownership rights gives a clear categorization, but endogenous changes in tax effort or government transfers complicate the picture. In Côte d'Ivoire and Senegal, tax collection efforts slackened during the period of the windfall so that part of it was transferred in a highly indirect form to the private sector. In Kenya and Malawi precisely the opposite happened: tax effort was increased during the boom. Purchasing power could also be transferred from the government to private agents. In Ghana, due to high export taxes, the government initially received the entire windfall on cocoa but then transferred about three quarters of it to public sector employees. In Indonesia there was some transfer of the oil windfall to farmers, for example, through fertilizer subsidies. Of course, in some sense almost all public uses of windfalls benefit private agents (military hardware is probably the most pertinent exception), but there is a difference between transfers of purchasing power such as is achieved by raising public sector wages, and the provision of illiquid assets such as an expansion of public primary education or roads. We can therefore distinguish between the savings rates out of windfalls that were received by and stayed with the private sector, windfalls that were received by and stayed with the public sector, windfalls that were indirectly transferred from private to public agents, and windfalls that were indirectly transferred from public to private agents.

We have at present seven cases of private agents directly receiving at least part of the windfall. In four of these the recipients were farmers: coffee farmers in Kenya, Colombia, and Costa Rica, and groundnut farmers in Senegal. The remittance booms in Egypt and Pakistan accrued directly to households. Finally, in a more marginal case, a substantial part of the Zambian copper boom of the early 1970s accrued to the Zambian copper company ZCCM, which was majority publicly owned but behaved to some extent independently of the government. In

each of these cases the private agents had high savings rates out of the windfall. The highest, that of Kenyan coffee farmers, was about 70 percent. The Kenyan government made special efforts through the coffee marketing cooperatives to explain to farmers that the price increase was caused by a frost in Brazil and was therefore unlikely to persist. Considerably the lowest rate, 33 percent, is that of Colombia. The first conclusion from this is that, as far as the evidence permits, it suggests that private agents respond in a cautious and farsighted way to positive shocks. This cuts away the main rationale for domestic stabilizing taxation policies. The government does not need to play a custodial role because private agents, sharing the same information as the government, make sensible savings decisions. The second conclusion is that the Colombian case is out of line, and so it is of obvious interest to inquire why. One possibility is that private agents took into account the savings behavior of the government, which had a particularly high and institutionalized savings rate from its component of the windfall. A second is that coffee farmers became confused as to the nature of the price increase. During 1977 not only was the world coffee price high, but within Colombia the price to farmers probably rose disproportionately because the former government marketing monopoly was liberalized, allowing private coffee marketing firms to buy at close to world prices. Bates argues that this was a response to the fact that the 1978 elections were to be the first genuinely contested elections in many years, so that rural votes now mattered.[2] It is thus possible that coffee farmers attributed much of the price increase to a change in market structure driven by the switch to contested elections. In this case they would have interpreted much of the increase in income as permanent rather than transient and therefore rationally have chosen a lower savings rate. There are other possible explanations and the issue is evidently important for whether the Colombian government can afford to trust its farmers to make savings decisions.

There are many more cases in which the government directly received and kept all or part of the windfall. In some ways the most

2. We are indebted to discussion with Robert Bates (Department of Government, Harvard) for this point. His work on the Colombian coffee boom is in progress.

remarkable case is Colombia. The initial reaction of the government to the coffee boom windfall, which it shared with private agents, was to reduce its own expenditure in order to dampen what it expected would be the inflationary pressure of increased private expenditure. Although this was the only example of an initial public savings rate in excess of 100 percent, quite commonly public savings rates were high and occasionally maintained at high levels for long periods (for example, Botswana and Cameroon). There were also, however, cases in which the public savings rate was zero (Ghana, Costa Rica, Mexico) and often a pattern in which there was a loss of control of public expenditure with a consequent decline from high savings to dissavings (Nigeria). On the whole it is quite surprising that even in countries where the government was notorious for inefficiency and extravagance (like Nigeria and Zambia in the 1970s) the savings rate from public windfalls was fairly high.

There are only two cases in which the windfall accrued directly to the private sector but was, to a substantial extent, transferred indirectly to the public sector through increases in other taxes, these being Kenya and Malawi. In the Kenyan case the public sector managed to capture about half of the windfall. Despite policy statements that the resources were to be used for capital expenditure, in the outturn the public savings rate was low. Quite how low depends on how much of the postboom experience is attributed to the consequences of the boom. During the boom itself the government had a windfall savings rate of 20 percent. But, this masks an initially high rate that decreased as recurrent expenditure ballooned. By the end of the boom, recurrent expenditure was high and persisted, while capital expenditure was reduced to pay for it. If allowance is made for this during the three postboom years before the budget was restored to its preboom configuration, then the overall public windfall savings rate is slightly negative: the boom rephased public investment but did not increase it overall. This pattern was not repeated in Malawi, where the government achieved a respectable savings rate out of its share of the windfall.

There are two further cases in which the boom was received by the government but indirectly transferred in part to the private sector, these being Ghana and Cameroon. In each of these cases private savings out of the windfall were low: 15 percent in Cameroon and zero in Ghana.

One interpretation of these results is that indirect transfers between

agents, whether public to private or private to public, tend to destroy the essential information about the true nature and source of the income windfall. To take an extreme example, the Ghanaian civil servants who received part of the cocoa boom in the form of higher salaries would have needed much greater foresight to realize that these wage increases would not be sustained once the cocoa price fell than the foresight needed by Kenyan coffee farmers to realize that their high coffee incomes would not persist. But, because there are few cases, they might all be explicable ad hoc. For instance, in Ghana during the late 1970s the environment for private asset accumulation was unattractive, so savings might have taken the form of illegal acquisition of foreign exchange, which would obviously not be recorded in the data. With this caveat, our tentative conclusion is that high savings rates are normal in response to external windfalls unless the transfer mechanism succeeds in divorcing the recipient from the information about the true source of the windfall. The high savings rates seem to apply even where, on the basis of price forecasts made at the time, or the reserves of newly discovered minerals, it would be quite reasonable to expect the income stream to persist for many years. In any event, this behavior has ex post turned out to be shrewd in that seldom have income sources persisted. Even in the case of the most sustained windfall, Botswanan diamonds, the true source is not so much the reserves of diamonds in the ground as the preservation of the cartel that keeps the price at perhaps ten times its marginal cost. As events in Russia and Angola have demonstrated in the past year, even this cartel, much of which is the most successful in world history, is far from secure, and so a high savings rate is much the most prudent course.

Finally, there should be some qualification to the high rate of public savings out of windfalls. We have seen that in the case of Kenya the rate of public savings out of its windfall is very sensitive to the time period over which the shock is defined. Although initially the government saved part of the windfall, it also increased recurrent expenditure and was unable to reduce it once the windfall ended, forcing it to dissave. This pattern was found in several of the other studies. It is also consistent with results by Deaton (1992), for thirty-five African countries during 1968–1985. He finds that government expenditure has a much higher degree of persistence than the other components of expenditure. This

would imply that even if governments have a high rate of savings during income windfalls, they are likely to dissave in the aftermath. Deaton finds that three years after a single year rise in export prices, government expenditure is the only component of expenditure that is still higher.

Dissaving during Negative Shocks Full-blown crashes in commodity prices are less common than booms (peaks are more common than troughs) and this was reflected in our sample with only six episodes of negative shocks. All six governments attempted to defer and smooth the negative shocks, a propensity for intervention rather higher than that with respect to positive shocks. There is a good case for government smoothing of negative shocks, where it is feasible, as private agents are less able to smooth negative shocks than positive shocks because they will encounter credit constraints. Nevertheless, a policy of government dissaving can only succeed if it is credible. If private agents see it as a loss of control they will speculate against it in anticipation that the crisis will eventually be resolved through devaluation or trade restrictions. Indeed, with two exceptions, government dissaving provoked speculation and crisis. In Costa Rica the government had previously successfully smoothed negative shocks by borrowing, but by the early 1980s this was no longer credible: during the coffee boom, revenue earmarking and legal spending requirements had made fiscal retrenchment exceedingly difficult. In the first of the Venezuelan negative shocks, in 1982, private agents reacted to the government's failure to adjust through capital flight (switching US$6.5 billion of financial assets into foreign currency) and by stockpiling imports. During the second negative Venezuelan shock, 1986, a new multiple exchange rate regime curtailed capital flight. Instead, there was hoarding of domestic production and a move into nontraded capital goods. In Chile the target of speculative incredibility became the government's guarantee of bank deposits. In Cote d'Ivoire, as the government accumulated foreign debt, the private sector switched to foreign assets.

There were, however, two successful cases of government dissaving during negative shocks: Botswana (1981) and Bolivia (1986). In each case public dissaving was quite substantial (Botswana had a dissaving rate of 75 percent) yet it did not produce speculation of policy reversal. Why were these stabilizations credible? First, both governments cut

public expenditure substantially and swiftly, making it less likely that the dissavings policy could be construed as a loss of control over public spending, or simply as policy inertia. Second, dissaving was clearly sustainable for a long time: Botswana had enormous reserves while Bolivia had access to external capital through having just agreed to sweeping policy reforms with donors.

What Assets Are Acquired? If windfalls are largely saved, then the next question concerns the composition of the assets that are acquired. The acquisition of foreign financial assets enables the domestic investment boom to be stretched if they are subsequently repatriated. The acquisition of nontradable capital goods such as buildings will cause a construction boom, pushing up unit costs. The acquisition of imported capital equipment will avoid the problem of pushing up unit costs, but as the investment program becomes more congested, the returns might fall due to poor design and implementation.

Consider, first, the acquisition of foreign assets. In most of the countries in our sample, private agents were unable to do this legally. The conjunction of a windfall directly received by the private sector and a legal framework in which it was possible to retain it in foreign assets was found only in the remittance booms (Pakistan and Egypt). Here, because the incomes were being generated outside the country, the government had no means of preventing savings being held in the form of foreign assets. Indeed, because this was so apparent, and the sums involved were so large, both governments modified their control regimes in response. In Pakistan there was a move to convertibility, while in Egypt foreign-currency-denominated assets were introduced that could be purchased with remitted money. In both cases there was a high rate of acquisition of foreign financial assets on the part of remitting households. But, the case of remittance booms is rather different from that of other booms. In particular, because migration is usually seen as temporary, the income windfall is manifestly temporary for the household, whereas for the economy as a whole it may not be. In retrospect, even in aggregate, these two remittance booms had a substantial temporary element because of the collapse of Middle East oil receipts from the mid-1980s. Hence, even at the aggregate level, there was some reason for high savings. Yet, the case at the aggregate level was much

less strong than that at the level of the individual households involved. Correspondingly, the case for stretching the investment windfall by means of the temporary acquisition of foreign assets was far weaker at the aggregate level than at the level of the individual households. The latter clearly wished to delay investment, not because of temporary macroeconomic circumstances, but because it was sensible to delay until migration was completed, enabling an investment in housing or business that could be used by the agent. Hence, in these peculiar circumstances the role of foreign financial assets is somewhat perverse. Whereas, when the shock is temporary at the aggregate level there is a good case for deferring some investment by means of such assets, when the shock is temporary only at the level of each currently-migrant household, the ideal would be for the resulting savings to be invested within the economy immediately. To the extent that this is not done, it may reflect the lack of confidence in, or absence of, domestic financial markets that could intermediate these private savings. If the government is sufficiently credible it is therefore indeed sensible for it to sell foreign currency liabilities to migrants as in the Egyptian case: public action is needed both to bring forward what would otherwise be an unwarranted deferral of windfall investment, and even to transform some of these (private) savings into (public) consumption. In effect, the government, by borrowing the remittances, is able to consume on behalf of those households that have higher permanent incomes than current incomes because they will at some future date send a migrant to the Middle East, but are unable to dissave because the prospect is not creditworthy at the household level. If the remittance boom were secure, then public action to switch the income from savings to consumption would be appropriate for the entire amount. Yet, the two remittance booms in our sample were essentially indirect oil booms and so somewhat similar savings behavior was appropriate to that in the direct oil booms.

Other than these special cases of the remittance booms, the extent to which foreign assets were acquired as part of an investment-stretching strategy depended on the government because either it was the only recipient of the windfall or it was the only agent allowed to hold foreign assets. There seems to have been considerable variation in the extent to which this was done. Public windfalls were temporarily parked abroad by the governments of Indonesia, Botswana, Colombia, and Cameroon.

In two of these, Indonesia and Cameroon, the operation was made politically feasible by being shrouded in obscurity. In neither country were the foreign assets reported in published figures, and in Cameroon even the Ministry of Finance was not informed, the process being in the hands only of the Presidency. In Botswana the policy was at first also highly obscure. A vast amount of government revenue appeared in the budget only as a single line item, euphemistically entitled. But, thereafter the Botswanan government became more open about its policy and conducted a campaign of education and persuasion. The dismal and salutory example of the misuse of a temporary windfall in neighboring Zambia was put to good use. It may also have helped that, because the population are historically pastoralists in near-desert conditions, they are well-used to the notion that the accumulation of assets during favorable conditions is appropriate. Over several years the Botswanan government was able to accumulate one of the highest ratios of reserves to GDP in the world. The Colombian case was the most formalized through the coffee fund, which had a long history of complex procedures for dealing with windfalls (because, unlike most of the other coffee growing countries in our sample, Colombia was not a new entrant). There are two disappointing features of Colombian windfall management during this period. First, although the coffee fund chose to accumulate assets, a major asset that it chose to acquire was coffee. By holding on to coffee stocks well beyond the price peak, the policy dissipated rather than deferred the boom. Second, after the 1978 election, the new president, an enthusiastic spender, was able to spend the accumulated savings on public consumption. That is, the institutionalized savings rules proved impotent against a determined president.

Four governments, those of Niger, Zambia, Kenya, and Costa Rica, failed to stretch the investment boom, either by not accumulating foreign assets at all or by repatriating them while the boom was still in progress. In Kenya the private sector initially acquired claims against the government that, because they yielded heavily negative returns, were rapidly cashed in for investment. Hence, the private sector only shifted its investment relative to its savings by one or two years. The government made much the same decisions with respect to its own assets, even though, unlike the private sector, it had access to foreign financial assets with better yields. Further, as noted above, public investment was

rephased from the postboom period (when it was slashed as the easiest part of public expenditure to trim) into the late stages of the income boom. Hence, government policy had the effect of shifting both the private and the public investment booms into the same brief time period.

Four governments, those of Nigeria, Cote d'Ivoire, Malawi, and Mexico, far from accumulating foreign assets, used the opportunity of improved creditworthiness to increase borrowing from abroad, thereby accentuating the investment boom rather than stretching it. Of course, this was not necessarily inappropriate, but it did depend on the rate of return on investment not being substantially depressed either by a construction boom or by congestion, a matter to which we return.

Finally, the government of Senegal implemented a policy that in effect constituted a permanent, irreversible acquisition of foreign assets. The government used its windfall to nationalize foreign-owned firms with compensation. In addition to its direct effects, this policy presumably also discouraged new foreign investment. The policy thus not only precluded the stretching of investment beyond the income boom, but actually reduced it postboom.

Overall, windfalls usually gave rise to investment booms. This finding is consistent with Deaton's study of the consequences of shocks in thirty-five African export price series. He finds that much of the most powerful impact of an export price shock is on investment. He also finds that nearly all of this effect is exhausted in the year following the shock. This is consistent with the finding that not many of the countries in our sample managed to stretch investment over a significantly longer period than the income boom. There were a few cases in which windfalls did not lead to investment. In Ghana there was, in any case, no savings out of the windfall. In Colombia and Niger, as discussed in "Consequences of the Control Regime," there was a tightening of monetary policy so that private investment actually fell.

Dutch Disease and Construction Booms The high propensity to save out of windfalls had a consequential dampening of the increase in consumption. As a result we would not expect to find strong Dutch disease effects (an increase in the price of nontradable consumer goods and services relative to importables). Conversely, the high propensity to invest makes it likely that there would be a substantial increase in the

demand for nontradable capital goods, giving rise to a construction boom and a rise in the relative price of construction services. The conjunction of weak Dutch disease and strong construction boom was found in several of the case studies, for example, Kenya and Zambia. Recall that the rise in the costs of construction is one of the mechanisms by which the compression of investment into a brief period might lower returns, the other being that the design and implementation of projects might deteriorate. We now consider whether these effects were powerful.

Consequences for Output The consequences for output work partly through the rate of return on investment and partly through direct effects. We consider them in turn.

It is very difficult to get good data on the return to incremental investment. The most spectacular example of high investment during a commodity boom failing to achieve a return is Nigeria. Here the sheer scale of both the income boom and the investment boom leave it beyond reasonable doubt that the returns on investment collapsed. During the period 1953–1973 the economy seems to have achieved reasonable returns on investment, as measured by the ICOR, and it did so again from about 1984 onward. During the decade of the oil boom the ICOR was, however, very high. The explanation for this has less to do with high unit costs of construction, although they certainly rose, and more to do with a widespread deterioration in implementation. A second dramatic example is Zambia, where much copper boom investment was directed into parastatal import substituting industrialization with low value-added at world prices. A third example is Tanzania during the coffee boom when the "basic industries strategy" was implemented as a direct policy response to the boom (it had previously been abandoned), yielding a zero or negative return. Analogous to the reintroduction of the basic industries strategy, in Mexico and Malawi public investment projects that had previously been rejected as uneconomical were implemented. Poor returns on boom investment were also found by the country authors in Costa Rica, Niger, Kenya, and Cote d'Ivoire. Conversely, in two of the cases in which investment was stretched, Colombia and Botswana, there is evidence that rates of return held up. An audit of public investment projects in Colombia found that rates of

return remained satisfactory. In Botswana almost all public projects were subjected to cost-benefit analyses and there was a rule that if there were insufficient projects to meet these tests, surplus money would not be spent. The sustained high growth rate of the Botswanan economy over many years suggests that this rule was largely followed.

The above evidence is, however, only indicative. Deaton, while admitting that his results "tell us very little about the quality of investment," finds "no evidence of the eventual declines in output that might happen if low- or negative-return state projects crowded out high-return private ones." There may, indeed, be offsetting advantages from the synchronizing of investment decisions. Firms (or farm households) that would otherwise not invest may be induced to do so through copying the many that do (see Burger et al. [1993]). The increase in income that results from synchronized investment might, through increasing demand, make an atypically large proportion of projects viable ex post (Scott [1989]).

We now turn to effects on output that do not work through investment. Deaton's most remarkable result concerns the short-term response of GDP to price shocks, controlling for any effects by way of investment. He finds that in the year after a doubling of export prices (worth, on average, 15 percent of GDP), GDP is 9 percent higher. There are various ways in which this might come about. Higher returns to labor and capital both in the export sector and the nontradable sector (as a result of Dutch disease effects), perceived as temporary, might induce an increase in factor supply much larger than that which would be sustained over a longer period (analogous to the surprise supply function). Higher demand in a fix-wage formal sector may permit employment increases in the sector that have only a low opportunity cost in terms of informal sector output. Part of the economy may be foreign-exchange-constrained and expand output as the supply of imported inputs is increased. An analogous relaxation of a constraint, discussed in "Consequences of the Control Regime," is that of working capital. Finally, the effect may be spurious, with the boom expanding the recorded part of the economy at the expense of the unrecorded part. All of these mechanisms would be symmetrical as between booms and slumps and therefore simply make life in shock-prone economies more of a roller coaster. Yet, Deaton finds that, whereas agricultural (but not

mineral) booms raise GDP, slumps do not reduce it (other than by way of investment effects). If this is not spurious, it implies that volatility raises expected income (though not its growth rate, because the output gain does not persist). Given his data set (1968–1985), Deaton is in effect saying that the booms of the late 1970s were strongly expansionary whereas the slumps of the early 1980s were not contractionary. Those who view African economies as flex-price will find the first proposition surprising, while those who view them as fix-price will be surprised by the second. If the result is genuine, then either the economies have asymmetric rigidities (such as real wages being flexible downward but not upward) or asymmetric factor supply response (such as price increases being seen as temporary and inducing a large response, price decreases being seen as long-lasting and inducing little response). Alternatively, the apparent asymmetry could be spurious, for example if economies have evolved from fix-price to flex-price over the period (the thesis of Collier and Lal [1986] that the labor market was gradually eroding wage differentials created during the process of independence). More simply, recall that governments appear to be more inclined to attempt to cushion negative shocks than to stabilize during positive shocks. Hence, any negative output consequences of slumps in commodity prices may be deferred beyond the first year and therefore do not appear to generate a fall in output.

Is Volatility Good or Bad? To summarize so far, economies may differ in two respects, each of which may make a major difference as to whether price volatility is harmful or beneficial. An economy with a high degree of resource mobility can benefit through temporarily shifting resources into the export sector when prices are high. Characteristics conducive to this are whether there is initially a lot of informal employment and whether the export sector can utilize unskilled, casual labor. An economy with a high absorptive capacity for investment may benefit from synchronization of investment through demand and informational externalities. Characteristics conducive to this are an initially high rate of investment (so that boom-induced investment is not proportionately such an acute increase) and either a large construction sector or a high proportion of tradable capital. An economy with these characteristics would not need either price stabilization or investment

stretching. In economies with opposite characteristics, if there is an open capital account and private agents receive the windfall, then they will themselves stretch the investment boom, so there does not appear to be a strong case for public action. Only in economies that combine unsuitable characteristics with a closed capital account (and good reasons, such as political instability, for not opening it) is there a case for public action. Even here, this action need not be taxation to stabilize the price, but rather the provision of domestic currency assets that are backed by foreign currency accumulation.

Who Should Stabilize Whom and How? The public sector participated in all the windfalls in our sample, either as a direct or an indirect recipient. The private sector, by contrast, participated only in a minority of them, partly because there was sometimes complete stabilization of windfalls that would otherwise have accrued to private agents, and partly because many windfalls accrued directly to the government. This is again consistent with Deaton's finding that the elasticity of public recurrent expenditure[3] with respect to an export price increase was more than double that of private consumption. In principle, either public or private agents could be more adept at handling windfalls. The public sector has the advantage of not being constrained by its own rules. In particular, in economies with exchange controls, it is the only agent legally able to acquire foreign assets and repatriate them. Against this, the public sector has less-flexible expenditures than private agents: once its expenditures have risen, they are inclined to persist. It is therefore, at least in principle, an open question whether, if an automatic transfer mechanism is needed for windfalls, it should be designed to convert private windfalls into public, as is the intention of stabilizing taxation, or to convert public windfalls into private. While the former has been the subject of much analysis, the latter has not received attention.

There are various mechanisms by which public windfalls can be converted into private ones. We have seen that in Ghana and Cameroon the transfer was by way of rents to those on the public payroll. Where

3. As Deaton notes, the treatment of government expenditure in national accounts is not consistent across countries, so that government expenditure may include some investment.

public resources are very large and long-lasting (Kuwait, Alaska), explicit transfer payments are made; however, this is not really generalizable. Most developing-country governments either do not make transfer payments or target them on the poor. It would be an odd policy if such payments were treated as the transmission mechanism of external shocks onto the private sector, because these agents are the least well able to withstand income fluctuations. A third mechanism is that of a floating exchange rate combined with a government policy of not attempting to build up reserves. By selling all the windfall foreign exchange (which we will refer to as a "sell-as-you-go" policy), the government achieves maximum appreciation of the exchange rate. This dampens the increase in domestic currency revenue, which is how most of public expenditure is denominated. By making foreign exchange temporarily cheap, the government transmits the windfall to all net consumers of importables, while of course penalizing the nonboom-tradables-producing sector. Depending on the elasticity of demand for imports, such a policy might substantially stabilize government revenue, shifting the volatility to the private sector. But, in the process, the overall extent of volatility is increased because net producers of nonboom tradables suffer counter-cyclical volatility, which in turn amplifies the procyclical volatility of net consumers. A priori this may be a price worth paying. The gain from the policy as compared to direct government stabilization through accumulation of reserves is that a part of the windfall is transferred to the private sector, which might make more effective use of it (higher return investment or less subsequent disruption of budgets). The loss is that the transfer within the private sector increases the overall volatility in the economy. The larger the nonboom tradable sector, the greater the cost. The wider the efficiency gap between the public and private sectors in using windfalls and the closer the elasticity of demand for imports to unity, the larger the gain. The elasticity should, however, be unusually high during the windfall because private agents should want to hold some of their income windfall in the form of foreign exchange. Note that a general problem with all plans to shift the windfall between agents is that information as to the true source of the windfall might get lost, reducing the propensity to save. But, this is possibly less true of a transmission mechanism through the exchange rate than one through either public expenditure or trade policy.

Consequences of the Control Regime

So far we have focused on policies toward assets and expenditure. We now turn to trade and monetary policies.

Trade Controls and Exchange Rate Protection We begin with trade and exchange rate policy. As with all aspects of the control regime, there are two aspects of trade policy under shocks: the consequences of the initial policy configuration and the appropriateness of endogenous policy responses to the shock. A common, though not universal, response was for governments to liberalize trade policy during a windfall. This happened in Colombia, Malawi, Kenya, Nigeria, Costa Rica, Tanzania, and Egypt. In several other countries tariff rates were held constant and quantitative restrictions did not apply (for example, Botswana). Finally, an endogenous trade policy of reverse sign was followed in Senegal, where the government actually tightened trade restrictions in a deliberate attempt to offset Dutch disease.

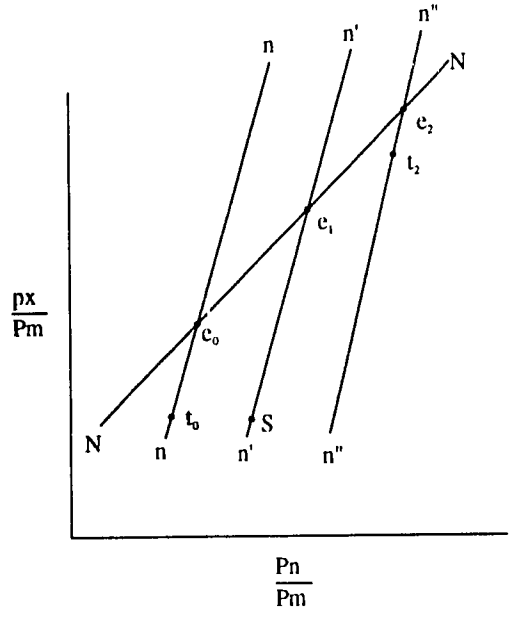
We will define as a pure endogenous trade policy the case in which the government sells all the foreign exchange that it receives while holding the exchange rate constant, allowing quantitative restrictions, and hence the implicit tariff, to vary. We will start by reconsidering the transfer of a windfall that initially accrues to the public sector. Superficially, an endogenous trade policy seems very much like a sell-as-you-go policy with a floating exchange rate, because in both cases the government sells all its foreign exchange to the private sector as it receives it. But, the consequences turn out to be quite different. We have seen that a policy of selling foreign exchange as it comes in can have some advantages in terms of stabilizing public revenue under a floating exchange rate. By contrast, it has no advantages in the context of a fixed exchange rate with an endogenous trade policy. If the government sells more foreign exchange, the implicit tariff rate will fall. The volatility of government revenue in domestic currency is therefore not reduced at all, private rents in the trade sector will either be stabilized as compared with government revenue or even be countercyclical, whereas other private agents will suffer just as much volatility as under floating. Hence, the costs of instability generated by intraprivate transfers are incurred as with floating without any offsetting benefits. This suggests

that if a government starts with this policy configuration (fixed exchange rate and rationing of imports) and itself owns the boom sector, then either it should alter the control regime or attempt to stabilize by means of accumulating foreign exchange. For reasons that take us beyond the scope of this paper, attempting permanently to liberalize a control regime during a boom may not be good timing because it is likely to be seen as a response to the boom and therefore temporary. Hence, governments caught with a windfall and a control regime may be best advised to try to save the windfall rather than transfer it.

Now consider the effect of an endogenous trade policy when the windfall accrues to the private sector. Under this policy, the government always spends the foreign exchange, rationing excess demand by trade restrictions. Such policies are generally combined with exchange controls. Hence, even if the private recipients of the windfall choose to save it, they must cash in their foreign exchange for a claim on the government. The government now sells the foreign exchange to other private agents who are initially rationed, driving down the implicit tariff rate. The structure of claims is thus that the windfall recipients have a claim on the government and the government has a reduced liability to other private agents. Although the private agents who purchase the foreign exchange might use it for investment, so that the savings rate of the economy need not be reduced, there is evidently no foreign asset accumulation.

Figure 1 compares the effect of an endogenous trade policy as opposed to a floating exchange rate with a windfall that is, in one case, entirely spent and in the other case, largely saved. The figure utilizes the double relative price space developed in Bevan et al. (1990). The N–N locus shows equilibrium in the nontradables market for free trade and different terms of trade. The n–n locus shows equilibrium in the same market for a given terms of trade but varying degrees of trade restrictions. Under free trade (or constant tariff rates) combined with a floating exchange rate, a windfall that is spent shifts the economy from an initial equilibrium at e_0 to a new equilibrium at e_2 (on the n″–n″ locus). With a windfall that is largely saved, part of the savings are in the form of foreign assets so that the impact on relative prices is less pronounced, shifting the economy only to e_1 (on the n′–n′ locus). This was, for example, the policy of the Botswanan government. Under an

FIGURE 1. The Relative Price Changes Caused by an External Shock: Floating as Opposed to Endogenous Trade Policy



endogenous trade policy, the economy is initially subject to trade restrictions at t_0. Now, regardless of savings behavior, because all the windfall foreign exchange is spent, the economy shifts to the n″–n″ locus. The trade liberalization reduces the implicit tariff rate, taking the economy to t_2. This was the policy of the Ghanaian government, and to an extent also the Costa Rican and Kenyan. Finally, the Senegalese policy of combining foreign asset acquisition (though recall that these were not very appropriate assets) with an increase in trade restrictions, is illustrated by the move from t_0 to S.

Looking at how relative prices change in the various cases, there is a clear ranking. The least disturbance to relative prices is achieved by the Senegalese policy. The next least disturbing is the floating exchange rate combined with windfall savings (Botswana and Indonesia). Much more disruption occurs if floating is combined with zero windfall savings (the classic Dutch disease story). Finally, the endogenous trade policy generates the most disruption, whether the windfall is saved or

spent being immaterial. Thus, for a given windfall, an endogenous trade liberalization causes more income changes at a disaggregated level. This is because the boom sector gets a second windfall due to trade liberalization at the expense of the import-competing sector and because all the windfall must be spent. Further, the difference is larger, the greater the proportion of the windfall that is saved. First, the demand shock diminishes as savings increase under floating but not under an endogenous trade policy. Second, the construction boom effect is also weaker under floating. The construction boom effect (not shown in Figure 1) increases the greater the proportion of the boom that is invested. Even with an open capital account there is likely to be some increase in investment during a windfall, and so the diminution in Dutch disease is partly offset by a rise in the price of nontradable capital goods. Still, for a given savings behavior, the investment boom is more pronounced under an endogenous trade policy (because no foreign assets are acquired) and therefore the construction boom effect is also larger than under floating. Hence, if private agents receive a windfall and save it, but the government operates an endogenous trade policy, there will be much more income volatility than under a floating rate. Under such circumstances the government might easily conclude that it was necessary to have stabilizing taxation to prevent social disruption. This would be a chronic misreading of the problem that is caused by the government's excessive liberalization of imports.

The greater fall in the relative price of importables under an endogenous trade policy than under floating has a further consequence. As Calvo (1987) has shown, if agents anticipate a reversal of trade liberalization, they have an incentive to hoard imports. If, therefore, the private sector judges that a windfall is temporary (and their savings behavior suggests that they usually do) and if they know the policy rule, the private sector can therefore be expected to hoard imports. An endogenous trade policy rule is usually so transparent that the agents who regularly import are bound to recognize it. In a country like Tanzania, where for many years the reserves covered less than a week's supply of imports while the exchange rate was fixed, it was evident that the central bank simply sold such foreign exchange as came in. In both Tanzania and Kenya there is evidence that during the coffee boom there was substantial hoarding of durable imports.

To summarize, an endogenous trade policy gives rise to two problems: first, excessive changes in relative prices, and consequently excessive income volatility due to transfers that compound the initial windfall and an inability to acquire foreign financial assets, and second, the speculative accumulation of imports. These problems would be avoided were the government to maintain implicit tariff rates constant, accumulating foreign exchange as backing for the extra claims on it. However, this is not such an easy objective in a quantity-rationed import system because implicit tariff rates are immmensely difficult to observe.

The Senegalese strategy of *raising* implicit tariff rates in the face of a windfall is successful with respect to both of these problems. First, it reduces the change in relative prices for a given savings behavior as shown in Figure 1. Second, if seen as temporary, it will induce a temporary increase in savings as private agents anticipate subsequently cheaper imports (the Edwards and van Weinbergen argument for preannouncement of liberalization). Yet, the Senegalese policy has its costs and dangers. These can be seen most clearly in the extreme case in which the policy is to keep the total volume of imports constant, whereas private agents foresee no future relaxation in the policy. The only way in which the private sector can then benefit from the windfall is by shifting resources out of the export sector in order to expand production of import substitutes. The implicit tariff rate rises accordingly. This is obviously a highly inefficient way of benefiting from an external windfall because the resource shifts are the opposite of what would be needed to take advantage of it.

The motive for the Senegalese policy, the prevention of the temporary contraction of the import-substitute sector, is an objective shared by governments that did not use trade policy. In Indonesia and Botswana the policy of giving temporary protection to the nonboom tradable sector was achieved by undervaluing the exchange rate. This has the advantage over trade restrictions in that it extends the temporary protection to nonboom exportables as well as import-substitutes. But, the objective of temporary protection of the sector is not necessarily sound. First, it is efficient for there to be a temporary contraction of the sector if thereby it releases resources for the boom export and construction sectors, activities that need to increase for an economy to make the best use of a temporary windfall. Second, undervaluation (as indicated by the

accumulation of foreign assets) is probably better seen as being justified by the increased efficiency resulting from a stretching of the investment boom. That is, it is the capacity of the economy to absorb investment rather than the need to prevent temporary contractions of some sectors that should determine the foreign asset and hence the exchange rate path of the economy. To justify exchange rate protection even if there were no difficulty in absorbing investment, there would need to be substantial external costs to reversed contractions in the nonboom tradable sector.

To summarize, an endogenous trade liberalization policy, as adopted by many of the countries in our sample, is an inefficient response to an external shock. The converse, an endogenous increase in trade restrictions, as followed by Senegal, if not done à l'outrance has some advantages. But, it is dominated by the policy of exchange rate protection because this protects nonboom exportables as well as importables. In turn, the policy of exchange rate protection is likely to be better based by focusing on asset absorption than on the need to protect particular sectors. The likely outcome of an asset-focused policy is, as discussed already, one in which foreign assets are temporarily accumulated so that the exchange rate is indeed undervalued.

Given the difficulty of monitoring implicit tariffs, a government that uses a lot of quantitative restrictions on trade cannot even be sure whether it is liberalizing or tightening trade policy (as defined by implicit tariff rates) in response to a shock. If it "does nothing" in the sense of keeping the controls constant, it will have an increase in implicit tariffs à l'outrance, which we have seen might be highly inefficient. If it "does nothing" in the sense of passively selling whatever foreign exchange is available, it will have an endogenous trade liberalization. It therefore has to be very active and skillful in order to "do nothing" in the sense of keeping implicit tariffs constant. Given the lack of information and skill, it is therefore highly likely that if the government starts with quantitative restrictions on trade, it will inadvertently either endogenously liberalize or endogenously tighten. Of the two, the latter is less bad: it causes less disruption to relative prices and it implies a high rate of foreign asset acquisition unless the private sector shifts resources out of the export sector. Still, any active trade policy is strictly dominated by a floating exchange rate policy. Hence, the conclusion is, first, that countries prone to external shocks should not have quantitative

restrictions on trade. Second, if a country with quantitative restrictions faces a windfall, it should focus on the question of appropriate foreign asset acquisition, deriving its trade policy from that. It is not a good time to undertake a trade liberalization. Even the more modest step of converting quotas to equivalent tariffs will produce a transfer to the government (in the form of tariff revenue) at just the time when it is likely to be least able to use it productively.

Financial Controls and Monetary Policy Governments in the sample commonly set maximum interest rates and minimum liquidity ratios. The impact of an external shock on the financial sector will, in the first instance, depend on whether it accrues to the public or private sectors. Since M0 is a claim by the private sector on the public sector, a public windfall reduces the money supply because the government sells at least part of the foreign exchange to the private sector, thereby reducing its net liability. When the windfall accrues to the private sector, the initial effect depends on whether the government is operating a floating or a fixed exchange rate. If the rate is floating, then the supply of domestic currency is unaffected. If it is fixed, then the supply of currency is increased as exporters convert foreign exchange into domestic currency at the central bank. In both the first and last cases the impact effects tend to be offset in the second round: In the first case the government spends the domestic currency that it has purchased from private agents, while in the last, other private agents repurchase some of the foreign exchange that the government has bought. But, given lags, the former gives rise to a tendency to reduce the money supply (while at the same time increasing real income and thereby unambiguously tightening monetary policy) whereas the latter tends to expand M0 relative to real income.

Now, remaining with the last case (a private windfall with a fixed exchange rate), consider the implications for credit. Suppose that the primary recipients of the windfall, exporters, wish to save it because they see it as temporary. If they are subject to exchange controls, they convert their export income into domestic currency and deposit it with the banking system. If the latter has been constrained in its lending by its liquidity ratio, it will now increase lending. Other private agents who had wished to consume or invest but had been constrained from doing so by credit rationing will now borrow. The economy thus experiences

a temporary financial quasi-liberalization. That is to say, because bank liquidity rises, the market-clearing interest rate falls and may fall below the official maximum so that both the liquidity ratio and the interest rate controls become slack. For likely initial ratios of M0:M3 and M0:GDP, the supply of credit will increase relative to real income. There is thus a case either for sterilizing a part of the foreign exchange inflow through sales of government debt, or for temporarily raising the minimum liquidity ratio of the banking system, each mechanism having the objective of preventing the boom-induced expansion in credit proportionately exceeding the boom-induced increase in real income. Just the same, it should be stressed that, given exchange controls, the only way in which the private sector can stretch a windfall is by increasing its claims on the public sector, which in many economies can only be done through increasing M0, because there is no significant market in public debt. This increase in M0 is not itself inflationary because the private sector wishes to hold it as an asset. What can be inflationary is the expansion in credit that it permits.

In most of the cases of private windfalls under fixed exchange rates there was indeed an explosion in credit, a notable example being Kenya. But, in two cases, Colombia and Niger, the government more than offset the tendency to liberalization so that liquidity became more restricted. Interestingly, in each case this was sufficient to produce an overall reduction in private investment despite the windfall, probably a sign that the policy was carried too far.

The investment response may be quite sensitive to the monetary response because much of the initial savings of the primary recipients may be financial. For instance, in Kenya, in the first two years of the coffee boom, about half of the windfall received by farmers was saved as bank deposits, which were gradually depleted over the next few years and converted into fixed investment. Much of the initial investment boom thus depended on financial intermediation. We do not know whether the increased investment by agents other than coffee farmers was induced by the increase in real incomes and then financed by the banking system because funds happened to be available, or whether it was directly induced by the extra finance in the sense that projects that firms would have wished to undertake anyway now became financeable. The experience of Colombia and Niger suggests that financial liberal-

ization is at least the handmaiden of an investment boom. Of course, if most of these investment booms were excessive, being better stretched over a longer period, then even if financial liberalization is a sine qua non of an investment boom, it would typically itself be excessive.

Nevertheless, it would be possible to take a more positive view of financial liberalization. If firms are constrained by a shortage of finance not just in investment but also through shortage of working capital, in output, then a temporary liberalization might boost output directly. Following this line of argument, there might indeed be an asymmetry between a positive and a negative shock as found by Deaton. If farmers do not normally hold significant amounts in banks, when hit by a negative shock they will not be able to withdraw currency from the banks (but rather have to cut consumption) so that a negative shock will not induce a liquidity squeeze in the same way that a positive shock causes a liquidity increase for the banking system. If liquidity directly affects output (through working capital), then agricultural price booms would raise output while agricultural price slumps would not reduce it, as Deaton found. Further, recall that Deaton found no output effect in the case of mineral booms (which very largely accrue to the public sector). This is consistent with a liquidity-constrained-output story because, as discussed above, shocks that accrue to the public sector have contrary implications for the money supply. This would imply that public sector windfalls should be transferred to the private sector not as income windfalls but by way of the banking system: the government would lend to the banks, which in turn would lend to the private sector. On the whole, we do not find such a central role for financial liberalization very plausible because we doubt the existence of a large supply of identifiably creditworthy lending opportunities. But, it may be that the move from extreme financial repression is significantly beneficial, and it does provide a possible explanation for the otherwise puzzling conjuction of asymmetries (positive/negative; agricultural/mineral) found by Deaton.

Conclusion

Idées reçues have been common in the subject of external shocks but none of them seems to withstand scrutiny. The conventional wisdom

of twenty years ago was that peasant farmers could not be trusted to use a windfall wisely. This was the dominant rationale (although there are others) for stabilizing taxation. As a generalization of private responses to shocks, this seems far from accurate. The convention of a decade ago was that public windfalls were a bane because they were handled so badly. This also seems indefensible as a generalization. Deaton is now challenging the current conventional wisdom that volatility is undesirable with the result that it actually raises the average level of output. Where does this leave the policy maker?

First, if a windfall would naturally accrue in the private sector, there seems quite a good case for leaving it there. On the whole, private savings rates seem to be high in these circumstances, and if Deaton is correct that there is a direct stimulus to output, it is confined to cases in which the windfall accrues to agriculture. This is indeed closely related to the argument for agricultural-led stimuli advocated by Mellor (see, for example, Mellor [1994]). If the private sector receives the windfall, then the control regime becomes important. An endogenous trade policy appears to be a serious mistake. If possible, the government should remove quantitative controls on imports well before a windfall and during a windfall not use trade policy actively. If there are good reasons for maintaining exchange controls, then the government must permit either currency or other government liabilities to expand to permit private savings to rise in aggregate, holding increased foreign exchange reserves as a counterpart to this temporary increase in liabilities. In this case there will be a large financial liberalization unless the government raises the minimum liquidity ratio of the banking system or is able to sell debt. Although some such policy is probably advisable, it should not be done to the point at which what would otherwise be a private investment boom is completely suppressed.

Second, if the windfall would naturally accrue to the public sector, there is a case for transferring part of it to the private sector with a floating exchange rate combined with a sell-as-you-go policy, and possibly, through the banking system.

Third, there is a reasonable, though not overwhelming, case for stretching the investment boom over a longer period than the income windfall. In the absence of exchange controls this will to an extent happen automatically if the windfall accrues to the private sector or

is transferred to it. If the windfall is kept by the public sector, then this must be an explicit focus of policy. The result, though equivalent to exchange rate protection, is differently, and we would suggest, better motivated.

Finally, price volatility need not be the curse that policy makers think it is. Rather than export diversification being central, the key concepts might be enhanced resource mobility, enabling advantage to be taken of price windfalls by shifting resources into the boom sectors, and enhanced capacity to absorb investment booms productively.

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