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Sebastian Edwards

Economic Analyses of Rapid Population Growth

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| | |
|--|----|
| Exchange Rate Misalignment in Developing Countries <i>Sebastian Edwards</i> | 3 |
| Economic Analyses of Rapid Population Growth <i>Nancy Birdsall</i> | 23 |
| Macroeconomic Adjustment in Developing Countries <i>W. Max Corden</i> | 51 |
| Export Processing Zones: The Economics of Enclave Manufacturing <i>Peter G. Warr</i> | 65 |
| Preferential Credit and Insurance as Means to Promote Exports <i>Bruce Fitzgerald and Terry Monson</i> | 89 |

EXCHANGE RATE MISALIGNMENT IN DEVELOPING COUNTRIES

Sebastian Edwards

In the past few years exchange rates have attained great prominence in economic and policy discussion in developing countries. For example, it has been argued that the inappropriate exchange rate policies pursued by some countries in the late 1970s contributed to the international debt crisis of the early 1980s. According to the World Bank (1984), overvalued exchange rates in many African countries have resulted in a dramatic deterioration in their agriculture and their external accounts. Others have argued that exchange rate policy triggered the disappointing outcome of the Southern Cone (Argentina, Chile, and Uruguay) economic reforms and free-market policies during the late 1970s.

One important exchange rate issue is whether a country's real exchange rate is out of line with respect to its long-run equilibrium level. There is general agreement that maintaining the real exchange rate at the "wrong" level results in significant welfare costs. It generates incorrect signals to economic agents and results in greater economic instability (Willet 1986). If an exchange rate is indeed misaligned, there are alternative ways of correcting it. This raises the issue of effectiveness of *nominal* devaluations to restore equilibrium in the *real* exchange rate.

The distinction between nominal and real exchange rates has become increasingly important. While the nominal exchange rate is a monetary concept that measures the relative price of two moneys, the real exchange rate measures the relative price of two goods. More specifically, the real exchange rate (RER), is defined as the relative price of tradables with respect to nontradables:¹

$$(1) \quad \text{RER} = \frac{\text{Price of tradable goods}}{\text{Price of nontradable goods}}$$

The most important property of the RER is that it is a good proxy of a country's international competitiveness. A decline in the RER, or a *real exchange rate appreciation*, reflects an increase in the domestic cost of producing tradable goods. If there are no changes in relative prices in the rest of the world, this RER decline represents a deterioration of the country's international competitiveness: the country now produces tradable goods in a way that is less efficient than before, relative to the rest of the world. Symmetrically, an increase in the relative price of tradables represents an improvement in international competitiveness.²

Changes in competitiveness are sometimes "justified" by real events in the economy, such as technological progress, movements in external terms of trade, changes in taxation, and so on. These justified changes are an equilibrium phenomenon and do not require policy intervention. In some circumstances, however, there are "unjustified" departures of the actual RER from its equilibrium value: a disequilibrium change, which has come to be known as *RER misalignment*. Distinguishing equilibrium movements from misalignments has become one of the greatest challenges for macroeconomic analysts. The sections that follow analyze in detail different aspects of equilibrium and disequilibrium real exchange rates.

Determinants of the Equilibrium Real Exchange Rate

The equilibrium RER is defined as the relative price of tradables to nontradables that results in the simultaneous attainment of equilibrium in the external sector and in the domestic (that is, nontradables) sector of the economy. This means that when the RER is in equilibrium the economy is accumulating (or running down) assets at the "desired" rate and the demand for domestic goods equates its supply.

Although the definition of RER given in equation 1 is analytically useful, it is difficult to calculate in practice. A more operational definition of the real exchange rate is the following:

$$(2) \quad \text{RER} = \frac{EP_T^*}{P_N}$$

where E is the nominal exchange rate defined as units of domestic currency per unit of foreign currency, P_T^* is the world price of tradables, and P_N is the domestic price of nontradables. In measur-

ing equation 2, economists have to define proxies for P_T^* and P_N . These proxies are usually some foreign price level (wholesale price index, for example), and the domestic CPI. Edwards (1988) discusses measurement problems in detail.

The bare bones of this equation can now be fleshed out. The equilibrium RER is that relative price of tradables to nontradables that, for given (equilibrium or sustainable) values of other relevant variables such as trade taxes, international prices, capital and aid flows, and technology, results in the simultaneous attainment of *internal* and *external* equilibrium. Internal equilibrium means that the nontradable goods market clears in the current period and is expected to be in equilibrium in the future.³ External equilibrium is attained when the sum of the present current account and the expected current account in the future satisfies the intertemporal budget constraint that states that the discounted value of current account balances has to be equal to zero. In other words, external equilibrium means that the current account balances (current and future) are compatible with long-run sustainable capital flows.⁴

Various implications follow from this definition. First, the equilibrium RER is not immutable. When there are changes in any of the other variables that affect the country's internal and external equilibriums, the equilibrium RER will also change. For example, the RER "required" to attain equilibrium will vary according to whether the world price of the country's main export is low or high. It will also be affected by import tariffs, export taxes, real interest rates, capital controls, and so on. These immediate determinants of the equilibrium RER are called *real exchange rate fundamentals*. Second, there is not "one" equilibrium RER, but rather a path of equilibrium RERs through time. Third, the path will be affected not only by the current values of the fundamental determinants, but also by their expected future evolution. If there are possibilities for intertemporal substitution of consumption through foreign borrowing and lending, and in production through investment, expected future events—an expected change in the terms of trade, for example—will affect the current value of the equilibrium RER.

The fundamental determinants of the equilibrium RER are those *real* variables that in addition to the RER, play a large role in determining the country's internal and external equilibrium. The *external RER fundamentals* include: (a) international prices (that is, international terms of trade); (b) international transfers, including foreign aid flows; and (c) world real interest rates. The *domestic RER fundamentals* can be divided into those variables that are policy related and those that are independent of policy decisions. The policy related RER fundamentals include: (a) import tariffs, import quotas, and export taxes; (b) exchange and capital controls; (c) other taxes and subsidies; and (d) the

composition of government expenditure. Among nonpolicy fundamentals, technological progress is the most important.⁵

Changes in taxes or subsidies on trade will have significant effects on the equilibrium RER. For example, a (permanent) import tariff will increase the domestic price of importables, which in turn will reduce demand for importables. The increase in the domestic price of importables will also induce a higher demand for nontradable goods, boosting their prices. Thus, under the most plausible conditions, the import tariff will result in a new equilibrium characterized by a lower price of exportables relative to nontradables and a higher price of importables relative to exportables.⁶

Changes in the international terms of trade will also affect the equilibrium RER. From an analytical perspective a deterioration in the terms of trade and the imposition of a tariff have somewhat similar effects. Both imply a higher domestic price of importables and a lower quantity demanded. However, a worsening in the international terms of trade has a bigger negative income effect than a tariff rise. The empirical evidence suggests that terms of trade deteriorations usually lead to an equilibrium real depreciation (that is, to a higher equilibrium RER; see Edwards, forthcoming).

Capital controls will affect intertemporal consumption and thus the path of equilibrium relative prices and real exchange rates. For example, if they are relaxed to allow an increase in capital inflows and foreign borrowing, the result will be higher current expenditure on all goods, including nontradables. As a result, there will be an increase in the price of nontradables or equilibrium real appreciation.

International transfers are another example of how a fundamental variable affects the equilibrium path of the RER. If a country has to make a transfer to the rest of the world, current and future domestic real income and expenditure will fall, generating a fall in the relative price of nontradables or a real depreciation in the current and future periods. In a way, in order to make a transfer to the rest of the world, the equilibrium RER has to depreciate. This is particularly relevant today: in stark contrast to the 1970s, many developing countries now make significant transfers to the rest of the world.

For those countries receiving foreign aid, the analysis is symmetrical. Aid is a transfer from the rest of the world, and as such it will generate an equilibrium real appreciation. Perhaps paradoxically, it therefore reduces the international competitiveness of the recipient country, making the country's exports less competitive internationally.

The fact that the equilibrium RER moves when its fundamental determinants change has significant consequences for policy. Some policymakers still think that the equilibrium RER is a constant or immutable number. According to this approach, which is derived from the simplest notions of purchasing power parity, any deviation of the

real exchange rate from its value in some past period (usually called “the equilibrium year”) represents a disequilibrium and is cause for concern. On the contrary, actual changes in RERS do not necessarily reflect a disequilibrium. They can reflect changes in equilibrium conditions generated by changes in fundamentals.

Macroeconomic Policy and Misalignment

Although the equilibrium RER is a function of real variables only, the actual real exchange rate responds both to real and monetary variables. The existence of an equilibrium value of the real exchange rate does not mean that the actual real rate has to be *permanently* equal to this equilibrium value. In fact, the actual RER will normally differ from its equilibrium level, at least in the short run. However, other types of deviations can become persistent and can generate large RER *misalignments*.

At any time, the actual RER will depend on the values of the fundamentals (tariffs, international prices, real interest rates, and so on) and also on aggregate macroeconomic pressures, such as excess supply of money and the fiscal deficit. In this analysis, it is useful to distinguish between three different exchange rate regimes: (a) fixed nominal exchange rates (and variants, including managed and crawling rates); (b) floating rates; (c) and nonunified exchange rates, including dual rates and black markets for foreign exchange.

Predetermined Nominal Exchange Rates

A fundamental principle of open economy macroeconomics is that in order to have a sustainable macroeconomic equilibrium it is necessary for monetary and fiscal policies to be *consistent* with the chosen nominal exchange rate regime. This means that the selection of an exchange rate system imposes limitations on macropolicies. If this consistency is violated, severe disequilibrium, usually concentrated on RER misalignment, will follow.

The case of a large fiscal deficit under fixed nominal rates is the clearest example of inconsistencies between macroeconomic and exchange rate policies. In most developing countries fiscal imbalances are partially or wholly financed by money creation. If the required inflation tax is as high as the international rate of inflation, there will generally be an inconsistency between the fiscal deficit and the maintenance of a fixed nominal exchange rate. Since the domestic price of nontradables increases at a rate approximately equal to the rate of inflation, and the domestic price of tradables grows at approximately the rate of world inflation, a real appreciation will take place in every period.⁷

Monetary policy is another potential source of macroeconomic inconsistencies. Under predetermined nominal exchange rates, increases in domestic credit at rates exceeding the demand for domestic money will be translated into an excess demand for tradable goods, nontradable goods, and financial assets.⁸ The excess demand for tradables will be reflected in a large trade deficit (or lower surplus), in a loss of international reserves, and in an increase in (net) foreign borrowing above its long-run sustainable level. The excess demand for nontradables will be translated into higher prices for those goods and consequently into an RER appreciation. If there are no changes in the fundamental real determinants of the equilibrium RER, this real appreciation will be a misalignment.

Consistency between monetary and exchange rate policies is needed not only under fixed rates, but also under systems such as passive crawling pegs. Argentina in the late 1970s exemplifies the problem. Its government used a preannounced rate of devaluation, or *tablita*, as a means to reduce inflation. However, the preannounced rate was clearly inconsistent with the inflation tax required to finance the fiscal deficit (Calvo 1986). This inconsistency generated not only a real appreciation but also substantial speculative bets on when the *tablita* would be abandoned.

Floating Nominal Exchange Rates

Under a floating system the nominal exchange rate fluctuates freely, responding to changes in macroeconomic policies. However, domestic prices and nominal exchange rates adjust to shocks at different speeds. A crucial difference between nominal exchange rates and the prices of goods is that the exchange rate behaves like an asset price; it is extremely sensitive to changes in expectations and to new information. In contrast, goods prices usually react much more slowly to shocks.

The existence of a floating system does not preclude the influence of monetary policies on real exchange rates. Monetary policies, however, do not affect equilibrium real exchange rates. These depend, under any nominal exchange rate regime, on real variables only. The wide swings in real exchange rates in the industrial countries in the past few years have become an important topic of analysis.⁹

The clearer case where monetary policies induce changes of the actual RER has been analyzed by Dornbusch (1976). Assuming that asset (including foreign exchange) markets adjust instantaneously, while nontradable goods markets adjust only slowly, a monetary expansion will result in an immediate jump of the nominal exchange rate that will exceed the long-run equilibrium nominal deprecia-

tion.¹⁰ Prices of nontradables, in contrast, will remain constant in the short run. As time passes, however, domestic prices will rise toward their new equilibrium level compatible with the increased stock of money, and the nominal exchange rate will fall toward its new equilibrium.¹¹

Parallel Nominal Exchange Rates

Multiple exchange rates have traditionally had some appeal for the developing countries and have recently become fairly common. With this system different international transactions are subject to different nominal exchange rates, giving rise to the possibility of having more than one real exchange rate.¹²

With multiple exchange rates, the relation between macroeconomic policies and the rest of the economy will depend on the nature of the system. If, for example, the system consists of two (or more) *predetermined* (that is, fixed) nominal rates, it will work in almost the same way as under a single fixed rate. This is because multiple fixed rates are equivalent to a unified rate with taxes on certain external transactions.¹³ In this case, as with unified predetermined rates, inconsistent macroeconomic policies will reduce international reserves, raise domestic inflation above world inflation, and result in RER overvaluation. Since this combination is unsustainable in the long run, the authorities will have to take corrective action.

A different kind of multiple rate system consists of a fixed official rate for current account transactions and an (official) freely fluctuating rate for capital account transactions. Although this arrangement has been more common in the industrial countries, some developing countries (such as Mexico and Venezuela) have recently experimented with it. The main purpose is to delink the real economy from the effects of supposedly unstable capital movements.¹⁴ Portfolio decisions in this case are strongly influenced by the expected rate of devaluation of the free rate.¹⁵

Under this type of system, even if no current account transactions slip into the free rate, a change in the free nominal rate will influence the RER.¹⁶ Suppose, for example, that domestic credit increases faster than the demand for domestic money, producing excess demand for goods and financial assets. As a result, international reserves will fall, the price of nontradable goods will rise, and the RER will appreciate. In addition, the demand for foreign assets will increase, which will result in a nominal devaluation of the free rate, and in changes in the domestic interest rate.¹⁷ The devaluation of the free rate will have secondary effects on the official *real* exchange rate, through a wealth effect. But the essential point is that inconsistent macropolicies will eventually also be unsustainable, as interna-

tional reserves decline. By isolating the current from the capital account, all the dual rates system can do is delay the eventual crisis.

The analysis is more complex if some current account transactions are subject to the free exchange rate. In such a case, there will then be an additional RER—defined as the price of tradables subject to the free rate relative to nontradables—and changes in macropolicies will affect both real rates.¹⁸ For example, an increase in domestic credit that exceeds growth of domestic money will now result in lower reserves, higher prices of nontradables, a higher “free” market nominal exchange rate, and increased foreign debt. The higher price of nontradables will generate an appreciation of the RER applicable to those goods subject to the official rate. For those goods subject to the free rate, what happens to the RER will depend on whether the nominal exchange rate determined in the free market increases by more or less than the price of nontradable goods. If its behavior is the same as under a freely floating rate, exchange rate overshooting is likely in this market: that is, the free rate will initially rise by more than the price of domestic goods. The RER applicable to this type of good will, at least in the short run, depreciate. Under this dual exchange rate system, it is thus perfectly possible for an expansionary monetary policy to produce a real appreciation for goods subject to the official market and a real depreciation for goods subject to the free market.

Perhaps the most complex type of regime consists of an official pegged (or predetermined) exchange rate plus an illegal black market for foreign exchange. Some kind of black market for foreign exchange exists whenever there are exchange controls; sometimes it becomes very significant, even dominant.¹⁹ Although the results of a fixed official rate coexistent with a black market are similar to those of the dual rates regime discussed above, there are important differences.

- To the extent that the black market is illegal, the expectations and costs of detection affect the premium—the difference between the official and freely determined nominal exchange rates.
- Expectations of political events are crucial, since they reflect possible future changes in exchange controls and other policies.
- Exporters have to decide how much of their foreign exchange earnings to surrender legally and how much to handle through the black market.²⁰ This decision, of course, will partially depend on the size of the premium itself.

With a generalized black market for foreign exchange, the marginal rate for import and import-competing sectors will be the black market rate. As for exports, the marginal rate will depend on the institutional arrangement and on whether exporters “have” to surrender a specified proportion of their export proceeds through the

official market. If so, the marginal rate for exporters is a weighted average of the official and the black market rate. (If exporters have to surrender a given number of dollars, however, the black market rate is the marginal one.)

With a generalized illegal parallel market, an increase in the rate of domestic credit creation will boost domestic prices and the black market premium. Since in this situation it is likely that the central bank has no more international reserves to lose, this expansive monetary policy will push up the official RER, as well as lower the price of exports surrendered through the official market relative to those that use the parallel market.²¹ As a result, a smaller proportion of export proceeds will be surrendered at the official rate, making the crisis even worse. Eventually, the inconsistent macro-policies will become unsustainable, and corrective measures will have to be taken. Then the issue of exchange rate *unification* becomes important, since the authorities will usually try to devalue the official rate, eliminating the multiple rates system.

For policy and analytical purposes it is useful to distinguish between two types of RER misalignment. The first, *macroeconomic-induced misalignment*, occurs when inconsistencies between macroeconomic (and especially monetary) policies and the official exchange rate system cause the actual RER to depart from its equilibrium value.²² As the previous section pointed out, a monetary policy that is so expansive that it is incompatible with maintaining the predetermined nominal exchange rate will result in the price of domestic goods rising faster than world prices. As a result, the real exchange rate (EP_T^*/P_N) will appreciate. Not only will there then be pressures on the price of nontradables; international reserves will also decline, (net) foreign borrowing will rise above its long-run sustainable level, and black markets will grow.²³

The second type, *structural misalignment*, takes place when changes in the real determinants (or fundamentals) of the equilibrium RER are not translated in the short run into actual changes of the RER. One example is a worsening in a country's international terms of trade; the equilibrium RER will change, since now a higher relative price of tradables will be required to maintain equilibrium in the economy.²⁴ If the actual RER does not change in line with the equilibrium RER, misalignment will take place. Temporary changes in fundamental variables can sometimes result in significant divergences between actual and equilibrium RERS (Edwards 1986d). Such disequilibriums can often be handled by, for example, running down (or building up) of international reserves, the use of the compensatory facilities of the

Two Types of Real Exchange Rate Misalignment

International Monetary Fund, and so on. However, it is essential to distinguish between changes that are genuinely temporary and those that are inclined to persist.

Correcting Misalignments

RER misalignments result in severe welfare and efficiency costs, the biggest of which come from the exchange and trade controls that usually accompany overvaluation. Such controls also encourage the creation of strong lobbies which compete for the rents generated by those controls (see Krueger 1974, Edwards 1987). And RER overvaluation greatly hurts exports; maintained for long periods, it can even wipe out the agricultural infrastructure (see World Bank 1984, Pfefferman 1985). RER misalignment also generates massive capital flight, which may be optimal from a purely private perspective, but a substantial cost in terms of social welfare (Cuddington 1986).

How should policymakers deal with RER misalignments? With macroeconomic-induced misalignment, a necessary step is to eliminate the inconsistency between macroeconomic policy and the nominal exchange rate. The authorities could then choose to wait for the economy to adjust on its own, until the actual RER converges with the equilibrium RER. However, this approach has various limitations—which can be particularly severe in the case of predetermined nominal exchange rates.

Once the inconsistent policies generating the macroeconomic-induced misalignment are controlled, the RER will still differ from the equilibrium RER. The question then is, How will the RER return to its equilibrium value? Consider the most common case, where the RER misalignment takes the form of real overvaluation and loss of international competitiveness. If nominal rates are fixed, a rapid return to RER equilibrium will then require a fall in the domestic prices of nontradables.²⁵ This is unlikely to happen quickly, so the RER misalignment will persist for a long period—as will all its related costs.

These costs will be supplemented when (as is usually the case) prices and wages are inflexible, for then unemployment will rise and output will be squeezed. The cut in aggregate expenditure resulting from the macroeconomic correction will generate an excess supply of (or smaller excess demand for) all types of goods and assets. For tradables, this will be reflected in a smaller trade deficit and reduced foreign indebtedness. In the nontradables market, however, the excess supply generated by the disinflation will require a drop in the relative price of nontradables to reestablish equilibrium. If prices are rigid, this realignment will not take place, and unemployment will result.

Devaluation

The restoration of RER equilibrium can be greatly aided by policies that help the domestic price of tradables to adjust. The most common of these policies is a devaluation of the nominal exchange rate.

In principle, the objectives of such devaluations are to improve both the international competitiveness of a country and its external position. Obviously, since $RER = EP_T^*/P_N$, a nominal devaluation that increases E will be effective in moving the RER toward its higher equilibrium value only if P_N does not go up in the same proportion as E .

In theory, and under the most common conditions, nominal devaluations will affect an economy through three main channels.²⁶ First, a devaluation has an *expenditure-reducing* effect. To the extent that domestic prices rise as a result of the devaluation, there will be a negative wealth effect that will reduce the real value of all assets (including domestic money) denominated in domestic currency. (Notice, however, that to the extent that there are assets denominated in foreign currency there may also be a positive wealth effect.) If the negative wealth effect dominates, expenditure on all goods (including tradables) will be reduced, as will be the trade deficit. Second, a nominal devaluation will tend to have an *expenditure-switching* effect.²⁷ To the extent that it succeeds in altering the relative price of tradables to nontradables, expenditure will switch away from tradables, and production toward them. While the expenditure-switching effect boosts demand for nontradables, the expenditure-reducing effect cuts demand for all goods. Depending on which of these effects dominate, the demand for domestic home goods will either rise or fall. Third, a devaluation will boost the domestic currency price of imported intermediate inputs, pushing up the supply schedules for the final goods (including nontradables).²⁸

With unified nominal exchange rates and no quantitative restrictions, a nominal devaluation is not discriminatory: it increases the domestic price of *all* tradable goods, services, and assets. But if there is a parallel (or dual) market and only the official rate is devalued, then only those transactions affected by the official rate will be directly affected by the devaluation. However, transactions in the parallel market will be affected indirectly—though it is not possible to know in advance whether devaluing the official rate will increase or reduce the parallel market premium.²⁹

When there are quantitative restrictions (QRs) on imports, devaluations will also fail to generate a uniform increase in the price of tradables (and other effects are also quite different; see Krueger

1983). The domestic price of importables is endogenous in the sense that it reaches whatever level is required for that market to clear. In this case a nominal devaluation will tend to have no direct (first-round) effect on the domestic price of such importables. However, since the prices of exportables continue to be tied, through the exchange rate, to world prices, the devaluation will increase their price relative to rationed importables. Nonrationed importables will also be affected by the devaluation: their price relative to both rationed importables and nontradables will tend to change.

If a country implements a devaluation at a time when the RER is greatly overvalued, the devaluation will generally help to restore equilibrium. And if devaluation is accompanied by the appropriate macropolicies, it will generally have a medium- to long-run positive effect on the RER. But if the initial condition is one of equilibrium—that is, the actual RER does not diverge from its long-run equilibrium level—a nominal devaluation will have no medium- or long-run effect. The price of nontradables, P_N , will quickly increase, and the RER will not be affected.

Since a nominal devaluation—which increases E in the RER formula ($RER = P^*E/P_N$)—tries to eliminate misalignment by causing a real depreciation, it is imperative that it is not accompanied by an equiproportional increase in P_N . Such an increase could come about in several ways: expansive credit (or monetary) policies, expansive fiscal policies, and wage indexation. But if the nominal devaluation is implemented along with monetary and fiscal restraint and without wage indexation, it is likely to achieve a real devaluation and to help the RER return to equilibrium.

Even if the accompanying macropolicies are restrictive, however, nominal devaluations will never result in *equiproportional* real devaluations in the medium to long run. Several forces will ensure some offsetting increase in the price level P_N . For example, nominal devaluation will boost the prices of imported inputs and consequently the cost of producing domestic goods. Over time, such effects will grow. Thus the nominal devaluation will, on impact, result in a large (and almost equiproportional) increase in the RER. Then, as the prices of imported goods (and in some cases wages) react to the nominal devaluation, the effect on the RER will be *partially* eroded. (See the final section for empirical results regarding the degree of erosion.)

Alternatives to Devaluation

In principle, other policies can have effects similar to those of a devaluation, though it is not easy to replicate all the results of devaluations.

IMPORT TARIFFS AND EXPORT SUBSIDIES. This combination will replicate only some of the effects of a devaluation. Import tariffs will boost the domestic price of importables; export subsidies will likewise boost the domestic price of exportables. As long as both tariffs and subsidies are of the same rate, the relative price between importables and exportables (the tradables) will not be affected, but their relative price with respect to nontradables will increase. This is the same consequence that results from a successful devaluation.

In other respects, however, the two policies differ quite sharply. First, a devaluation affects both visible and invisible trade; the policy of tariffs with subsidies affects only visible trade. Second, a devaluation affects the domestic currency price both of tradable goods and services and of tradable assets; tariffs with subsidies affect only the domestic price of tradable goods and services. Third, a devaluation will affect domestic interest rates if it breeds expectations of further devaluations. In this case, some fraction of the expected devaluation will be passed on to the domestic interest rate, even if the capital account is partially closed. By contrast, the tariffs with subsidies will not have such an effect on interest rates. Fourth, devaluations will generally have no direct effects on the fiscal budget; the tariffs with subsidies will generally result in fiscal imbalances. Fifth, the imposition of tariffs and export subsidies will prompt various interest groups to claim exemption for their particular industry—and history shows that they often succeed. This political reaction is avoided with a devaluation.

MULTIPLE NOMINAL EXCHANGE RATES. The adoption of multiple rates constitutes a semidevaluation, inasmuch as the exchange rate applied to some transactions is altered. Thus multiple rates are essentially discriminatory, whereas one of the most important properties of a devaluation (without rationing) is its neutrality. Furthermore, every variety of multiple rates system begs the important question of how (and at what level) to unify the different rates eventually.

INCOMES POLICIES. This approach will succeed in realigning the real rate only if the price of domestic goods falls relative to that of foreign goods. On this rule, the historical evidence is emphatic: incomes policies that are not supplemented by demand restraint have invariably failed to bring down inflation for more than a short period. Trying to realign the real exchange rate by controlling incomes policies alone is not only an inefficient approach; it is also very risky.

**The
Effectiveness
of Devaluations:
The Evidence**

Empirical evidence strongly suggests that, if accompanied by appropriate macroeconomic policies, nominal devaluations can produce a real depreciation and improve a country's external position. In his classic study, Cooper (1971) analyzed twenty-four episodes and found that most nominal devaluations were indeed associated with real devaluations. He also pointed out that most major discrete devaluations were accompanied by some sort of trade reforms—quantitative restrictions lifted, tariffs lowered. This finding has also been reported by Krueger (1978) and Edwards (forthcoming).

Conolly and Taylor (1976, 1979) found that nominal devaluations were translated into real devaluations in the short to medium run. Their 1979 paper suggests that, on impact, nominal devaluations have

Table 1. Index of Effectiveness of Nominal Devaluation

| Country | Year | Quarter of devaluation | 1 quarter after | 4 quarters after | 8 quarters after | 12 quarters after |
|-------------|------|------------------------|-----------------|------------------|------------------|-------------------|
| Bolivia | 1972 | 0.68 | 0.66 | 0.36 | 0.09 | 0.03 |
| | 1979 | 0.51 | <0 | <0 | <0 | * |
| Colombia | 1962 | 0.94 | 0.48 | <0 | <0 | <0 |
| | 1965 | 1.00 | 0.88 | 0.50 | 0.57* | 0.66* |
| Costa Rica | 1974 | 0.82 | 1.04 | 0.75 | 0.75 | 0.83 |
| Cyprus | 1967 | 1.00 | 0.19 | 0.27 | 0.31 | 0.32 |
| Ecuador | 1961 | 1.05 | 1.06 | 0.93 | 0.51 | 0.03 |
| | 1970 | 0.88 | 0.74 | 0.73 | 0.59 | 0.66 |
| Egypt | 1962 | 1.03 | 1.03 | 0.98 | 0.85 | 0.32 |
| | 1979 | 0.99 | 1.05 | 0.98 | 0.93 | 0.76 |
| Guyana | 1967 | 1.03 | 0.96 | 1.10 | 1.31 | 1.42 |
| India | 1966 | 0.92 | 0.81 | 0.56 | 0.56 | 0.62 |
| Indonesia | 1978 | 1.00 | 0.98 | 0.73 | 0.64 | 0.61 |
| Israel | 1962 | 0.94 | 0.87 | 0.74 | 0.63 | 0.53 |
| | 1967 | 0.95 | 0.93 | 0.99 | 1.05 | 0.57 |
| | 1971 | 0.98 | 0.64 | 0.53 | 0.23 | <0 |
| Jamaica | 1967 | 0.96 | 0.99 | 0.83 | 0.57 | 0.37 |
| | 1978 | 0.46 | 0.43 | 0.31 | 0.26 | 0.20 |
| Malta | 1967 | 0.93 | 0.88 | 0.99 | 1.12 | 0.99 |
| Nicaragua | 1979 | 0.17 | <0 | <0 | <0 | <0 |
| Pakistan | 1972 | 1.00 | 0.99 | 0.78 | 0.61 | 0.45 |
| Peru | 1967 | 0.89 | 0.65 | 0.40 | 0.41 | 0.36 |
| Philippines | 1962 | 0.97 | 0.89 | 0.87 | 0.73 | 0.69 |
| | 1970 | 0.72 | 0.65 | 0.49 | 0.47 | 0.55 |
| Sri Lanka | 1967 | 0.82 | 0.71 | 0.54 | 0.70 | 0.69 |
| Trinidad | 1967 | 0.82 | 0.71 | 0.54 | 0.70 | 0.69 |
| Venezuela | 1964 | 0.98 | 0.95 | 0.96 | 1.00 | 1.02 |
| Yugoslavia | 1965 | 0.67 | 0.46 | 0.42 | 0.29 | 0.26 |

Note: This index is the percentage change in the real exchange rate between one quarter before the devaluation and the quarter given, divided by the percentage change in the nominal exchange rate during the same period. An asterisk indicates that a new devaluation took place.

an important positive effect on relative prices, but this effect erodes slowly—until, nine quarters after the devaluation, the RER is back to the value it had two years before devaluation. Although the details differ, the same point is established in studies by Donovan (1981), Bautista (1981), and Morgan and Davis (1982).

More recently, Edwards (1986b) analyzed twenty-nine devaluations between 1962 and 1979. He found that in some countries nominal devaluation had succeeded in producing a sizable real devaluation. Table 1 shows an index of effectiveness of real devaluations for twenty-eight of these episodes. This index is constructed as the ratio of the percentage change in the RER to the percentage change in the nominal exchange rate. As the table shows, the initial effects of devaluations are large. After twelve quarters, however, much or all of the benefits have been eroded. Indeed the RER became even *more overvalued* in the cases of Bolivia (1979), Cyprus, Egypt (1962), Israel (1971), Jamaica (1967), and Nicaragua (1979). Edwards (1986b) showed that countries that had a large (or complete) erosion of the effect of the nominal devaluation were those that accompanied the exchange rate adjustment with expansive credit policies, large fiscal deficits, or wage indexation. Those countries that experienced only minor erosion usually implemented consistent macroeconomic restraint. Regression results in Edwards (1986b) indicate that, on average and all other things given, a nominal devaluation of 10 percent will result, in the first year, in a real devaluation of approximately 7 percent. However, the real effect of the nominal devaluation erodes (rather slowly) through time. After three years, the average effect on the real exchange rate of a 10 percent nominal devaluation will be only around 5 percent.

The most interesting finding in these regressions concerns the effect of changes in domestic credit creation. The results show that if a devaluation is accompanied by expansive credit policies, its corrective effect on the RER will be greatly diminished. If a nominal devaluation of 10 percent is accompanied by an acceleration of the rate of growth of domestic credit equal to ten percentage points, the resulting depreciation in the RER will be reduced to only 2 percent in that year. After two years, the RER will again have become overvalued.

Exchange rate misalignment has been a serious problem for developing countries in recent years. In looking at these problems the distinction between nominal and real exchange rates is crucial. Misaligned real rates have usually resulted from macroeconomic policies that have not been consistent with the exchange rate system, or from external shocks. These misalignments misrepresented the rela-

*Summary
and
Conclusions*

tive costs of production and consumption of tradable and nontradables. Stability of nominal exchange rates has not always implied stability of real exchange rates, and nominal (and real) exchange rates have not always moved smoothly to new equilibriums after disturbances. Trade barriers and multiple exchange rates, which have often been introduced in response to economic shocks, are not efficient instruments to adjust real exchange rates. Inappropriate monetary policies have often prevented nominal exchange rate adjustments from turning into real exchange rate changes.

Experience suggests, however, that exchange rate misalignment is susceptible to solution. A nominal devaluation undertaken with appropriate fiscal and monetary policies can generate a real depreciation and increase a country's ability to sell those goods in which it is internationally competitive and to attract the investment needed for growth.

Abstract

This article analyzes the theory of equilibrium real exchange rates and defines misalignment as a deviation of the real exchange rate (RER) from its equilibrium level. The role of macroeconomic policies is then analyzed under three alternative nominal exchange rate regimes: predetermined nominal exchange rates, floating nominal rates, and dual or black market nominal exchange rates. This discussion points out how inconsistent macroeconomic policies often lead to real exchange rate misalignment. Corrective measures, including nominal devaluations and several alternative approaches, are then evaluated.

Notes

This article is a considerably shortened and revised version of chapters 1 and 2 of my book, *Exchange Rate Misalignment in Developing Countries*, which was published in November 1988 by Johns Hopkins University Press for the World Bank. Both the article and book originated in a project on exchange rate policy in developing countries undertaken by the Country Policy Department of the World Bank in 1985–86. Armeane Choksi provided strong support for that project. Marcelo Selowsky read every draft of this paper and was relentless with his comments. Comments by Edgardo Barandiaran, Kathy Krumm, Alejandra Cox-Edwards, Farruq Iqbal, Miguel Savastano, Giacomo Luciani, Ruben Lamdany, and Alan Walters are gratefully acknowledged.

1. Although this definition is the most common one, there is still some confusion on what exactly people mean by “the” real exchange rate. See Edwards 1988 and Edwards, forthcoming, on this subject.

2. In theory there are better indexes of a country's international degree of competitiveness, such as unit labor costs. Unfortunately, these indexes are unreliable in the case of the developing countries.

3. Implicit in this definition is the requirement that there are no deviations from the natural rate of unemployment. In fact, internal equilibrium—defined as a nontradables market that clears—can take place at different levels of employment. In our definition of equilibrium RER it is implicit that this equilibrium takes place with no unemployment above its natural level.

4. This intertemporal budget constraint can be written in the following way:

$$\sum_t (1+r)^{-t} C_{t+i} = 0$$

and states that this country cannot be a net lender or net borrower forever. Eventually it has to pay its debts. For a formal and technical discussion on the equilibrium real exchange rate see Edwards 1986d, where an intertemporal general equilibrium model is defined. See also the discussion in Williamson 1983.

5. Naturally not only these variables affect the equilibrium RER, but in many cases the relation will go both ways, with changes in the RER also affecting some of the fundamentals. Perhaps the clearest example of this two-way relation has to do with RER movements and tariffs. It is usually the case that real exchange rate overvaluation is met by an increase in exchange controls and tariffs.

6. These “plausible conditions” are that the substitution effect dominates the income effect, and that all goods are gross substitutes in consumption. See Edwards 1986d. Notice that since a tariff affects the relative price of importables to exportables, it is useful to concentrate on both the relative prices of exportables and importables. Depending on the relative weights of importables and exportables in the price index for tradables, the equilibrium RER will appreciate or depreciate as a consequence of the imposition of an import tariff. What is clear, however, is that the relative price of importables has gone up relative to both nontradables and exportables, while the relative price of exportables will fall relative to the other two goods.

7. The domestic price of tradables is equal to $P_T = EP_T^* \tau$, where P_T^* is the international price of tradables, E is the nominal exchange rate, and τ is one plus the tax on tradables. If the exchange rate is fixed and there are no changes in τ , P_T will increase at approximately the rate of world inflation.

8. Notice that here we are considering monetary policy as different from the fiscal problem discussed above. In reality, however, both of these problems can be considered to be related. This is because in the vast majority of the developing countries government deficits are financed by money creation.

9. See Williamson 1983 for a meticulous analysis of the possibilities of RER misalignment under floating rates.

10. The overshooting in the nominal rate is required in order for interest arbitrage to hold permanently. See Dornbusch 1976.

11. Notice that the direction of the departure of RER from its equilibrium level is the opposite of that under fixed rates.

12. There is a growing theoretical literature on the effects of macroeconomic policies under nonunified nominal rates. See Aizenman 1985 and Dornbusch 1986a and 1986b.

13. See, for example, the discussion in Dornbusch 1986b.

14. In fact, this type of dual rate system is an alternative to foreign exchange controls.

15. The free rate, in turn, will be highly responsive to expectations about future events. This type of regime has been recently discussed by Dornbusch (1986a).

16. Notice that if no current account transactions are subject to the free rate the relevant RER—that is, the appropriate measure of competitiveness—is the fixed rate RER. This is because this is the one at which all goods transactions can take place.

17. In this case, if there are no capital controls and we assume risk neutrality, the following relation will hold between domestic (i) and foreign (i^*) interest rates: $i = (e/f) i^* + (f/f)$ where e is the fixed nominal exchange rate, f is the free rate, and (f/f) is the expected change in f .

18. Dornbusch 1986b analyzes this case in some detail.

19. The extent and importance of the black market is basically determined by whether authorities allow some changes in international reserves. Under complete rationing the authorities have no reserves, and legal export proceeds are the only source of foreign exchange.

20. In a way exporters also face this decision under an official dual system. In that case it will still pay to convert export proceedings at the higher free rate.

21. Depending on expectations the nominal exchange rate determined in the parallel market can increase by more or by less than domestic prices.
22. In a predetermined nominal system this influence of monetary policies is reflected in changes in the price of nontradables; under fluctuating rates it is reflected in changes in both the nominal rate and the price of domestic goods.
23. Naturally, as the gap between the official and parallel market widens, so do the distortions associated with these dual rates.
24. Strictly speaking, as a result of a worsening in the international terms of trade the equilibrium RER could either appreciate or depreciate. As discussed above, under the most plausible circumstances, however, it will depreciate.
25. Since $RER = EP_T^*/P_N$ under fixed E , RER can only jump back to equilibrium if P_N declines.
26. In some cases, however, if there are extensive quantitative import controls and parallel markets some of these effects will be different. See the discussion below.
27. We say it will "tend to have" because this assumes that the nominal devaluation is translated into a real devaluation.
28. The combination of these effects may very well result in a *decline* of aggregate output as a consequence of the devaluation. See Edwards 1986a.
29. Of course, the devaluation itself will affect the parallel rate. Theoretically, an official devaluation can generate either an increase or decline in the black market premium. The empirical evidence indicates that following the nominal devaluation there is usually a drop in the parallel market premium. An important question when there are parallel markets refers to exchange rate unification. Lizondo 1986 has shown that the equilibrium nominal rate can be either above or below the black market rate.

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ECONOMIC ANALYSES OF RAPID POPULATION GROWTH

Nancy Birdsall

The economic growth of Western Europe and North America during the eighteenth and nineteenth centuries was accompanied by the first steady and sustained increase of population the world had ever known. Malthus's gloomy prediction, made in 1801, that population growth would run up against the fixity of the earth's resources and condemn most of humankind to poverty and recurring high death rates, was proved wrong. Indeed, Kuznets (1966) defined modern economic growth in 1966 as a sustained increase in population attained without any lowering of per capita product; he viewed population growth as a positive contributor to economic growth.

But population growth in industrializing Europe was slow, seldom exceeding 1 percent a year, compared with the rapid growth of developing countries in the period after World War II. In the postwar period, as mortality rates declined dramatically in most developing countries and fertility rates remained high or even rose, population growth rose to between 2 and 4 percent a year. Economists began to consider systematically whether and under what circumstances this rapid population growth was contributing to economic growth and development.

This article reviews what is now a rich body of literature by economists on the consequences of rapid population growth for economic development.¹ Discussion of the consequences of rapid population growth is organized according to various views: pessimists, optimists, and what might be called revisionists. More detailed discussions are in a recent review of the economic literature (McNicol 1984) and in two assessments of the consequences of rapid population growth: the World Bank's 1984 report on popula-

tion and development and the National Academy of Science's 1986 report (National Research Council 1986). The implications of that literature for public policies to reduce fertility are then reviewed, using a welfare economics framework.

***The
Consequences
of Rapid
Population
Growth***

There is no consensus on the effects of rapid population growth on economic growth in developing countries. The assumption that rapid population growth was detrimental prevailed in the 1950s and 1960s—when the literature emphasized lack of capital (and savings) coupled with surplus labor in agriculture as the major constraints to economic growth. In the late 1970s, with attention shifting to the efficiency of resource use and the policies to promote it, concern about population abated. Recent analyses have been characterized as “revisionist” Malthusian: population growth is viewed as only one among several factors that slow development, and not as a threat to natural resources.² The debate has become quantitative: are the effects of rapid population growth large or small?

Such a debate is not likely to be resolved easily. The amount of solid empirical work on the subject is limited, especially for developing countries, partly because the subject is not really a tractable one for quantitative analysis. In the real world, population change is not only a cause of economic change, but a consequence as well; it cannot be shifted up or down as an exogenous variable in a simple experiment. The only natural experiment available for analysis is human history; cross-section analyses are a poor substitute. But long time series of demographic and economic data are rare.³ Moreover, because population change is both consequence and cause of economic change, its effects are hard to trace. For example, an increase in fertility that raises population in an agricultural area, and thus lowers potential per capita income in the short run, is likely to lead quickly to emigration, new agricultural techniques, or other adjustments—including a subsequent decline in fertility.⁴ And it is not only families that can adjust their own demographic behavior in response to the economic forces arising from population change. Institutions and policy also play a role, for example, through new investments in the search for new technologies to raise agricultural production.

Much of the work on consequences has been in the form of macroeconomic-demographic models. To be tractable, such models require simplifying assumptions: on the substitutability of labor for capital in production, for example, and the rate and sources of technological change. The assumptions themselves often determine the particular results regarding population effects. Even the few

large and sophisticated macro models that avoid this weakness cannot capture the complexity of the real world and have had little influence on the debate.⁵ Empirical work on the partial effects of rapid population growth—on natural resources, education, and income distribution, for example—has been more illuminating. But by its nature it has been far from definitive on the macroeconomic effects of rapid population growth.

A simple comparison of countries' GNP growth with population growth during the 1970s and 1980s illustrates the problem. There is no clear association between the two rates (table 1). In the 1970s, population growth was high in both the low-income countries and in better-off middle-income countries; in the middle-income countries, GNP growth was much higher. In the industrial countries, both rates were relatively low. Insofar as the two rates are independent

Table 1. Rates of Growth of Population, GNP, and GNP per Capita, Selected Countries, 1973–83

| Country | GNP per capita, 1983 (U.S. dollars) | Population growth rate, 1973–83 (percent) | Real GNP growth rate, 1973–83 (percent) | Real GNP per capita growth rate, 1973–83 (percent) |
|--------------------------------|---|--|--|---|
| <i>Low-income countries</i> | | | | |
| Bangladesh | 130 | 2.4 | 5.5 | 2.9 |
| India | 260 | 2.3 | 4.2 | 1.9 |
| Sri Lanka | 330 | 1.7 | 5.2 | 3.4 |
| Kenya | 340 | 4.0 | 4.7 | 0.6 |
| Pakistan | 390 | 3.0 | 6.2 | 3.1 |
| <i>Middle-income countries</i> | | | | |
| Indonesia | 560 | 2.3 | 6.8 | 4.4 |
| Egypt | 690 | 2.5 | 9.1 | 6.4 |
| Philippines | 750 | 2.7 | 5.3 | 2.5 |
| Nigeria | 770 | 2.7 | 1.5 | -1.1 |
| Thailand | 820 | 2.3 | 6.3 | 4.0 |
| Peru | 1,040 | 2.4 | 1.3 | -1.1 |
| Costa Rica | 1,070 | 2.4 | 2.4 | -0.1 |
| Colombia | 1,410 | 1.9 | 4.1 | 2.1 |
| Brazil | 1,870 | 2.3 | 4.4 | 2.0 |
| Korea, Republic of | 2,010 | 1.6 | 7.0 | 5.4 |
| Mexico | 2,180 | 2.9 | 5.0 | 2.0 |
| Venezuela | 3,830 | 3.5 | 2.4 | -1.1 |
| <i>Industrial countries</i> | | | | |
| United Kingdom | 9,180 | 0.0 | 1.0 | 1.0 |
| Japan | 10,110 | 0.9 | 4.2 | 3.3 |
| France | 10,480 | 0.4 | 2.4 | 2.0 |
| Germany, Fed. Rep. | 11,400 | -0.1 | 2.1 | 2.1 |
| Sweden | 12,440 | 0.2 | 1.0 | 0.8 |
| United States | 14,080 | 1.0 | 2.4 | 1.3 |

Source: World Bank 1986b.

of each other, slower population growth would raise per capita income faster (or prevent its decline). But in at least one sense the two rates are probably not independent; economic growth is likely to contribute to lower death rates and thus faster population growth.

Malthus and Other Pessimists

In his *Essay on Population*, Malthus had a simple model in which aggregate economic and demographic change were tied together by reproductive behavior at the family level. His model incorporated the classical wage theory, that the supply of labor was completely elastic at the subsistence wage level. In good times—when average incomes rose above subsistence level—marriage occurred more often and earlier, and couples had more children. Thus higher income per capita led to an increase in population and in the supply of labor. But population increase eventually brought falling wages and rising food prices as an increasing supply of labor ran up against the fixity of land and, given diminishing returns, labor productivity fell. With falling consumption, marriage and fertility rates fell and mortality rose, completing the cycle. Malthus thought that total economic output could increase, but the standard of living for most families would not permanently rise; the long-run equilibrium standard of living was at the subsistence level.

Malthus assumed that people would not exercise “preventive checks” to reduce births (his axiomatic “fixity of passion”). That, combined with the assumption of diminishing returns in agriculture, made his gloomy prediction a logical necessity.

As a description of trends in the several centuries preceding his 1801 essay, Malthus was largely correct. Data pieced together by demographers and economic historians, on wages, rents, food prices, and fertility and mortality in England from the fourteenth century through the eighteenth century, fit well with parts of the Malthusian model.⁶ In the fourteenth century, the Black Death brought a largely exogenous increase in mortality; as population fell, wages rose. By the mid-sixteenth century mortality was lower and the population was recovering; land rents and the relative price of food were rising, wages were falling. Late in the seventeenth century, population growth slowed again; wages rose and food prices fell.⁷

As a predictor, however, Malthus was wrong,⁸ both about diminishing returns and about human reproductive behavior. Even as he wrote, the Industrial Revolution in England was ushering in a period of sustained improvements in technology, yielding gains in labor productivity that outstripped any effect of diminishing returns and brought increases in per capita income. And by the end of the nineteenth century, couples were consciously controlling fertility

within marriage, which led to smaller family size. By the beginning of the twentieth century, the economic and demographic characteristics of modern industrial economies were set: steady but slow population growth, low fertility, sustained productivity increases, and rising consumption for the majority.

Malthus and the classical economists were writing at a time when in England population growth was accelerating. With the new burst of population growth in developing countries after World War II, economists returned to the Malthusian tradition. Leibenstein (1954) and Nelson (1956) reintroduced population as an endogenous variable influenced by income. In their models, small increases in income for populations at the subsistence level lead to increases in labor supply that swamp small increases in capital or other stimuli to the economy. The result: a low-level equilibrium trap. Only massive capital formation or a major stimulus can ensure that countries avoid the trap.

Early one-sector neoclassical growth models (Solow 1956) were similarly Malthusian. For them, the faster the rate of population growth (and thus of labor supply compared with capital formation), the lower the level of per capita consumption. With constant returns to scale and a constant rate of saving, faster growth of the labor force implies a lower capital-labor ratio and lower productivity of labor. More resources must be used to maintain capital per head, thereby restraining consumption. Thus rapid population growth is harmful even in the absence of diminishing returns. These neoclassical steady-state models treated population growth as exogenous: they did not try to incorporate the determination of population growth through the effects of economic change on mortality, fertility, or marriage rates.

Population growth is also treated as exogenous, and has similar negative effects, in two-sector growth models (Lewis 1954, Ranis and Fei 1964). In them, surplus labor from farming is absorbed into manufacturing only if savings and thus capital grow faster than population, or if technological change in manufacturing offsets the combined effects of diminishing returns in agriculture and of population growth. Other things being equal, the shift of labor into manufacturing occurs more rapidly the slower the growth of population.

These early growth models treated population growth and labor force growth as equivalent and ignored the age structure of a country's population. In his overlapping generations model, Samuelson (1958) introduced a crude approximation of age structure. He posited two age groups, a younger working population and an older retired population. The younger generation transfers consumption "loans" to the older generation, the "loans" to be repaid by the

subsequent generation of younger workers. A sustained increase in population growth raises the proportion of the younger group, and results in higher consumption transfers to the old. If a faster rate of population growth persists, each generation benefits. Thus Samuelson came to the opposite conclusion from that reached in the neoclassical growth models: a sustained higher population growth rate leads to higher lifetime economic welfare.

Samuelson ignored dependent children; in effect he assumed they pose no costs to parents or to the wider economy.⁹ In fact, however, higher population growth that results from higher fertility will increase the proportion of children in a population (and not increase labor supply for about fifteen years). To the extent that children consume more than they produce, their existence must reduce the consumption or the savings of workers and retired people.

In a wholly different tradition, Coale and Hoover (1958) developed a model highlighting the fact that children are costly and that high fertility increases the proportion of children in the population. They maintained that in high-fertility societies, the disproportionate consumption needs of children (including their need for education and health services, which Coale and Hoover in effect treated as consumption rather than investment) will reduce average savings. So they built into their simulation model of India the assumption that savings and investment per capita fall as the proportion of nonworking dependents in the economy rises. They then projected per capita income for India under low, medium, and high (exogenous) fertility assumptions. They concluded that, over a thirty-year period, per capita income could be as much as 40 percent lower with high fertility than with low fertility.

The Coale and Hoover model and the standard neoclassical growth models share one characteristic. As long as there is (a) little room for adjustment in the capital-labor ratio and (b) constant or increasing capital-output ratios, the impact on total income of higher fertility (and, with a fifteen-year lag, of faster labor force growth) is bound to be close to zero. Thus the impact on per capita income is negative, even without taking account of any negative effect of higher fertility on the savings rate and thus on capital formation. The impact is negative even if a production function allowing adjustment in the capital-labor ratio is used, as long as there is a negative effect of population growth on savings and thus insufficient growth of the capital stock. In these models, the only escape is technological progress. If there is sufficient technological progress, and it is responsive to factor scarcities and thus labor-intensive, additional labor can lead to increases in per capita income even without equivalent growth in capital.

The 1958 Coale and Hoover study was followed by others in the

1960s and 1970s. They simulated the effects of alternative future paths of fertility (and thus of changing age structures) on the budgetary costs of education and health services, job opportunities, and so forth in different countries.¹⁰ Generally, as in Coale and Hoover, changes in mortality and fertility were treated as exogenous to the economic system, although they could be affected by family planning policies. Analysts then compared the costs of a family planning program with the projected savings in health, education, or job creation costs associated with lower fertility. In a related study, Enke (1966) made a cost-benefit analysis of family planning. Using estimates of the cost of family planning programs, and his own estimate of the benefit of “averted births,” he concluded that spending on family planning was 100 to 500 times more effective than other forms of development spending.

This conclusion is undoubtedly exaggerated (or public spending on family planning in developing countries would be much greater than it is, even allowing for political and religious barriers). First, the real costs of family planning programs are not easy to estimate (particularly where family planning is part of a health program) and are extremely sensitive to the chosen discount rate.¹¹ Enke probably understated the true costs. Second, estimates of the benefits of an averted birth are sensitive to assumptions about future costs in health, education, and other areas. Third, and most important, estimates of the benefits of an averted birth are conceptually flawed, since most societies value children *per se* in addition to consumption of goods and services.¹²

The models that provided the basis for the pessimists’ views have not been and cannot easily be tested empirically. Moreover, the Coale and Hoover model (and others designed to illustrate the negative consequences of population growth¹³) can be criticized on the grounds that its assumptions—such as the limited substitutability of capital and labor, the negative effect of a high dependency ratio on savings, and the limits of technological change—are incorrect and also on the grounds that fertility is not exogenous.

Despite these problems, however, these models did influence thinking substantially in the 1960s and 1970s. Among those concerned with international development policies, the work reawakened interest in population growth as a potential policy variable; highlighted the importance of growth rates and age structure as well as size of populations, making population an issue for Latin America and Africa as well as the densely populated countries of Asia; and contributed to the view, especially in the rich countries, that rapid population growth was exacerbating development problems in the poor countries (see, for example, National Academy of Sciences 1971).

The Optimists

The pessimists' views have not gone unchallenged. Optimists about the effects of population growth have emphasized as the critical contributors to economic growth such factors as innovation, efficiency in the use of resources, human as opposed to physical capital, and technological change rather than investment per se. Optimists argue that a growing population is a net contributor to economic growth for two principal reasons: (a) a larger population brings economies of scale in production and consumption (note that the neoclassical models are all scale-neutral); (b) population pressure and scale economies are likely to encourage technological innovation and organizational and institutional change, particularly in agriculture. In addition, optimists argue that a growing population can stimulate demand and thus reduce investment risk and that a growing population permits constant improvement of the labor force with better-trained workers.¹⁴

These arguments have echoes from the classical period. Adam Smith invoked scale and resultant induced innovation not only to explain economic growth itself but also as arguments for a positive effect of population growth on economic growth. He noted that a growing population, by widening the market and fostering creativity and innovation, facilitates the division of labor—and thus leads to higher productivity. Later, Marshall also emphasized scale and innovation, noting that “while the part which nature plays in production shows a tendency to diminishing returns, the part which man plays shows a tendency to increasing returns.”¹⁵

Among modern economists, Kuznets (1966), Hirschman (1958), and others (for example, Hansen 1939) have also emphasized the potential contribution of a growing population to scale economies and to innovation. There have been some efforts to test the scale effect empirically. Glover and Simon (1975) report a strongly positive elasticity of road density with respect to population density in a cross-national analysis that controlled for income. Simon (1977), using Denison's data on the sources of postwar economic growth in industrial countries, has also estimated positive, though small, elasticities of economic growth with respect to population size (not population growth).¹⁶ It does seem likely that transport and other infrastructure investments and public services such as health and education have scale economies up to a certain population size—which means that greater population density could improve the potential for economic growth in thinly populated rural areas (for example, in parts of Africa).

The most effective argument that population growth may encourage innovation has been made by Boserup (1965, 1981), for agri-

culture. She suggests that increasing population density induces a shift to more labor-intensive farming systems; the shift from long fallow to more frequent cropping then confronts farmers with new possibilities for innovation. The shift initially requires each worker to work longer hours and results in diminishing returns to labor; therefore, it will not occur unless rising population pressure necessitates it. Once such a shift does occur, however, the use of new tools and techniques (for example, the plow) brings large increases in productivity.¹⁷

Some examples appear to refute the Boserup argument. There are cases—nineteenth-century China, twentieth-century Bangladesh, and parts of Africa in the past few decades—in which population growth has probably contributed to declining returns. For Bangladesh, a country in which there is already high population density in rural areas and labor is already used very intensively, it is difficult to imagine what new technologies or tools could be both more labor-intensive and allow higher labor productivity.¹⁸ Finally, except in the case of agriculture, it is difficult to show that population pressure, rather than other factors, has been the major impetus to innovation.¹⁹

In his influential book, *The Ultimate Resource*, Simon (1981) also ties innovation to population size. He argues that, other things being equal, larger population, and thus more people using their minds, implies greater knowledge. Simon constructs a simulation model in which technological innovation is a function of population size. He finds “moderate” population growth (less than 2 percent a year) to have a positive effect on welfare in the “medium-run,” that is, after a “short-run” period of thirty to eighty years.²⁰ As with the neo-Malthusian simulation models discussed above, however, it is the assumption built into the model which drives the particular result.

In short, the argument of the optimists regarding the advantages of greater population density in rural areas has empirical support. But the other arguments, though of intuitive appeal, are as poorly supported empirically (and as intrinsically difficult to support) as are the arguments of the pessimists. The arguments rest largely on theory. Yet in theory, the things that population growth may encourage—technological innovations and scale economies—can also be encouraged independent of rapid population growth, especially through economic policy.

As with the pessimists in the 1960s and 1970s, the optimists have made their mark on the policy debate. In the 1980s, at least in the United States, optimists’ views have caused considerable questioning of the earlier consensus that rapid population growth slows development.²¹

The Revisionists

The revisionists view population change as the aggregate outcome of many individual decisions at the micro or family level, and thus as one aspect of a larger complex system.²² The micro or family-level decisions are made in response to signals provided by the larger system; under the Smithian logic of an invisible hand, these family decisions should be presumed to maximize not only individual welfare, but also social welfare, unless there are clear market failures. Among revisionists, differences on the negative effects of rapid population growth depend on differences about the pervasiveness and relevance of market failures. The World Bank (1984) and Demeny (1986), for example, emphasize market (and institutional) failures; the National Research Council of the National Academy of Sciences (1986) emphasizes the ability of the market and institutions to adjust.

The revisionist emphasis on micro decisions leads to two related conclusions about the effect of population growth on development. First, rapid population growth is not a primary impediment to economic development—though it can exacerbate the effects of failings in economic and social policy. Second, the negative effects of rapid population growth are likely to be mitigated, especially in the long run, by family and social adjustments.

Revisionists thus resist generalization; the effects of population growth vary by time, place, and circumstance and must be studied empirically. Most empirical work has been done at the sector level, in contrast to the economywide models of the optimists and pessimists. The sector studies tend to show what is wrong with extreme optimism and extreme pessimism.

SAVINGS AND PHYSICAL INVESTMENT. Neoclassical growth theory and intergenerational transfer models point to a negative effect of rapid population growth on aggregate savings and investment. In the case of savings, there is little empirical evidence to support this conclusion. Cross-country studies of the effects of a high dependency burden on aggregate savings have generally found little or no negative effect (except in rich industrial economies, where the high dependency burden is associated with a large proportion of elderly, not with a large youthful population and high fertility).²³ This is not really surprising. For one thing, business savings are not likely to be related systematically to population growth. In addition, government can to some extent change a country's savings rate by fiscal and monetary measures, irrespective of demographic conditions. At the household level, savings in poor countries are probably confined to a small proportion of relatively rich households among whom

fertility is already low. For poorer households, with limited or costly access to banking and credit systems, accumulation of land, tools, or other assets is a more likely form of “savings” than financial savings. For households with little or no savings, children come at the cost of lower per capita consumption rather than lower savings. In less poor households, a child’s anticipated needs (especially schooling) could induce parents to work harder and save more rather than less (Kelley 1980). Indeed, children may themselves provide a relatively safe form of savings (for example, for old age) in places where it is risky or impossible to save for future consumption (Cain 1983). Finally, at the household level, the association between savings and fertility is probably not causal. Rather, both are influenced as development proceeds by improvements in financial markets, more women taking jobs, and so on (Hammer 1986).

As for investment, Coale and Hoover (1958) argued that high fertility would deflect public investment from “productive” purposes to spending on the education and health of the young. But education and health are themselves investments. Indeed, they may well have higher returns than physical investments.²⁴ The argument from neoclassical growth models is that investment per worker will be lower the faster the labor force grows (assuming a savings rate independent of population growth). But the net effect on output depends on the substitutability of labor for capital and on the capital-output ratio; for realistic assumptions about both, the effect has been shown to be small.²⁵ Pessimists argue that developing economies are unlikely to “choose” the labor-intensive technologies that are appropriate for their abundance of labor. The revisionist counterargument is that to the extent that inappropriate choice is due to government subsidies to the urban, capital-intensive sector, the fundamental problem is not rapid population growth but poor economic policies.²⁶ A more straightforward counterargument comes from the simple arithmetic of investment rates in relation to GDP. The different rates of population growth in rich and poor countries have little effect on capital accumulation, compared with the effects of the different initial levels of GDP. In 1980, Kenya, with gross domestic investment equal to 22 percent of GDP, still could have spent only about \$5 per potential new worker (and, even with half as many new workers, could spend just \$10 per worker); whereas the United States, with a lower investment ratio of 18 percent, could spend almost \$200, because of its much higher GDP.

NATURAL RESOURCES AND THE ENVIRONMENT. The revisionist view is straightforward: for nonrenewable resources, such as minerals and oil, over which property rights are generally well established, the market works. The price mechanism ensures that any

change in the scarcity value of such a natural resource will reduce consumption and impel a search for substitutes. Rapid population growth may shorten the period during which people consume a particular commodity, but will not reduce overall welfare since the same number of people benefit from that consumption.²⁷ Indeed, greater use in one period may be economically justified given the needs of a rapidly growing population and the likelihood that a rising price will speed the discovery of substitutes. The only (weak) counterargument is that a longer period might allow more time for serendipitous technological advances; but there is no evidence that such advances come from serendipity rather than the pressures of scarcity.

For renewable resources—land, forests, and fisheries—the problem is more complicated. Greater use of renewable resources in one period need not reduce use in the future—unless use exceeds the rate of regeneration. With a large and rapidly growing population, the risk of excessive use and thus of permanent degradation is high. Though some irreversible overuse may be economically sensible when population growth is rapid, the benefits must be great if they are to justify the loss of the stream of resources that would otherwise be available in perpetuity.

Where property rights are well defined, private landowners or public managers will normally resist degradation of their property in order to protect its long-run value. But if property rights are not well defined and resources are held in common, the risks of degradation are greater. There can occur a “tragedy of the commons” (Hardin 1968); individual users have no incentive to restrict their own use, knowing others will not, and all abuse the commons. This is the classic prisoner’s dilemma.

One such case may be the African Sahel, where the combination of rapid population growth and uncertain property rights is contributing to overgrazing of cattle during drought (and some say to permanent desertification). There, as elsewhere in Africa, low population density has historically mitigated the need to define individual property rights and to create the legal and organizational mechanisms to protect such rights. The revisionist argument would be that the fundamental problem is not rising population but the absence of well-defined property rights. A sophisticated pessimist would reply that, under some not unusual conditions, rapid population growth contributed to permanent degradation faster than the institutional mechanisms could be developed to define rights and control access.²⁸ Either way, population growth is seen as exacerbating a more fundamental problem rooted in market failure. It is hard to measure the relative contribution of population growth to the overall problem.

HEALTH AND EDUCATION. The pessimists' concern—that a high dependency burden will cut public spending on health and education—is only weakly borne out. For education, Schultz (1985) reports that a cross-country regression shows that higher population growth has no effect on enrollment rates though some negative effect on spending per student.²⁹ There is no comparable analysis for health spending; anyway, health spending seems to have little relationship to health conditions, probably because it is often absorbed by urban-based curative services that reach only a small minority. Easily as much an improvement in health conditions would come from reforms in health care delivery as from any increase in health spending per capita that lower population growth might afford.

For health and education, the revisionist emphasis on family-level decisions does lead to concern about the potential drawbacks of high fertility—through its effects on family (not government) budgets. There is substantial evidence that children from large families have lower educational attainment and poorer health, in industrial as well as developing countries.³⁰ Though many studies take inadequate account of parents' income and education, there is some evidence that harm is greater the poorer the family, and particularly applies after four children (Birdsall 1980a and studies cited in Birdsall 1977). Since families in developing countries are on average poorer and larger than those in industrial countries, the negative consequences of large families will have particular weight in the developing world.

Nonetheless, the strong cross-section association should not be interpreted necessarily as a causal one running from family size to health and education. It is possible that parents decide jointly and simultaneously on both the number of children to have and the size of their investment in health and education, in effect trading off between quantity (more children) and quality (more input per child) (see Becker and Lewis 1973). Low income, low returns on education and health spending, and reasonable concern about their own long-term security could lead parents to decide to have many children and to spend little on each child.

So do parents consciously trade off quantity (more children) against quality (higher inputs per child)? The question is an important one for policy. If there is such a tradeoff, the damage that large families can have on children's health and education may signal a market failure that could justify public interventions to protect children, such as mandatory school attendance or quotas on family size.³¹ But if in fact parents are "altruistic"—so that they incorporate their children's utility into their own (Becker 1981)—then efforts to force parents to spend more on child health and education could

simply reduce family welfare.³² From a welfare point of view, it is reasonable to assume (except in the case of “unwanted” children) that parents have another child only when they feel that the benefits to the family as a whole exceed the costs.

Governments have generally taken the view that parents are altruistic—or if they are not, that they still retain total rights over their own reproductive lives. The most widespread form of population policy is public support for voluntary family planning programs. These are justified as a means to assist parents in avoiding unwanted children while also reducing the social costs of extra births. If some children are unwanted, then even altruistic parents must take the number of children as given. They may then be forced into lower investments in child health and education than they would otherwise have made. In a few countries, especially in Asia (where governments view the social costs of high fertility as substantially larger than the private costs), government spending on family planning has another rationale. It provides information and “education” to parents about the likely effects of their own high fertility on the health and education of their own children.

The best evidence that unwanted births do reduce parental investments in children comes from a study on twins in India. Rosenzweig and Wolpin (1980) posit that the birth of twins sometimes constitutes the exogenous imposition of an “unwanted” child. They report that, for families in which the most recent birth was of twins, the children were significantly less likely to be in school. The implication is that the elimination of unwanted births—through, for example, a reduction in the cost of family planning—would raise average education levels among children.

How might the apparent adverse consequences of high fertility for individual families slow a whole country’s development? Kuznets (1966) and others have argued that the effects of the quality of human capital on aggregate economic growth are substantial; the loss of individual potential due to poor health or lack of education can be translated into lower aggregate labor productivity and less potential for entrepreneurial and technological advance.

INCOME DISTRIBUTION. Does high fertility among the poor in all countries, and in poor countries relative to rich, make it harder to reduce income inequality?³³ Most studies that have included population growth in cross-national empirical studies of inequality do report a positive effect, in both single-equation studies (Adelman and Morris 1973) and simultaneous-equation ones (Repetto 1979). One exception was Rodgers (1984). However, the single-equation studies can be faulted for failure to take into account the possible (also positive) effect of an unequal income distribution on fertility;

and the simultaneous-equation studies can be faulted for arbitrary use of identifying restrictions. Moreover, all cross-national studies on this subject are reportedly sensitive to the sample of countries chosen (Lam 1985). Macro-level studies are thus far from definitive; and micro studies cannot address this essentially macro question.

However, the theory linking rapid population growth to greater income inequality is straightforward. In the short run, and other things being equal, increases in the supply of labor relative to capital and land will reduce the return to labor and increase the returns to the other factors. (This is not true when there is perfect substitutability between labor and other factors in production.) This would imply a period of increasing income inequality, since in poor countries a high-income minority generally owns a disproportionate share of capital and land. As discussed earlier, this Malthusian scenario apparently applied in preindustrial Europe; and in modern agriculture, returns to labor may have fallen relative to returns to other factors, at least in densely populated areas of Asia (such as Bangladesh).

A more relevant indicator of inequality may now be changes in the income shares of different types of labor—educated and uneducated, skilled and unskilled—since in today's economies a large share of income accrues to labor. There is some empirical evidence that higher fertility rates reduce the share of less-educated workers, presumably increasing income inequality. Williamson and Lindert (1980) report that, in the United States, increases in the wages of skilled workers relative to the unskilled have been a positive function of the rate of population growth. For Brazil, Behrman and Birdsall (1988) report that wages of uneducated workers are lower if they belong to a large cohort; this is not true of educated workers.

The effects of high fertility on inequality will depend on the distribution of fertility levels and on any fertility change across income classes.³⁴ It is often the case that aggregate high fertility is an average of high fertility among the poor majority and low fertility among the rich minority. The effect of high fertility on inequality is then heightened, since on a per capita basis poor households will have even lower incomes. The opposite will occur if, in the later stages of the fertility transition, fertility declines disproportionately among the poor. If the fertility change is induced by a subsidized family planning service, itself a form of income to households, both these effects will be exaggerated (National Research Council 1986). For example, if the poor are the beneficiaries of such subsidies (the rich obtaining services through private physicians), then family planning subsidies can be said to reduce inequality.

Finally, it is worth noting the long-run effect on income distribution that would result if the adverse effects of high fertility on

children's health and education are greater in poor families, as implied by evidence discussed above. If low parental income and high fertility are combined over a long period, and high fertility is also associated with lower spending on children's human capital, it is possible to imagine an enduring syndrome of poverty and large families. This would produce a permanent underclass which, barring any change, would grow larger and poorer.³⁵ There is, however, no evidence that this has occurred in any society.

***The Welfare
Economics of
Policies to
Reduce Fertility***

In the absence of market failures, family decisions can be presumed to maximize not only individual welfare, but also social welfare—and the macroeconomic consequences of population growth, whether good or bad, would have no implications for optimal public policy. A public policy to influence private fertility behavior is usually justified on grounds of one of two types of market failures: externalities—that the social costs of children may exceed their private costs—and market imperfections in the availability of information about the means of fertility control

Externalities

In principle, a difference between the private and social costs of children could justify public intervention. If parents do not internalize all the costs of children, they are likely to have more children than is socially optimal. The opposite can also apply: if private benefits fall below social benefits (as may be the case in parts of Europe, where fertility is now below replacement), parents will not have enough children from society's point of view.

There are at least three situations where externalities may arise.³⁶

- *The classic "tragedy of the commons."* This applies where a renewable resource is commonly owned and property rights to the resource are not defined (Hardin 1968; and see the discussion above of natural resources and the environment).
- *Congestion of government services such as health and schooling.* This situation is formally identical to the first if government spending on social welfare is viewed as a common resource. For several reasons, governments subsidize such services as education, health, urban transport, and sanitation. In many countries it is reasonable to suppose that the present value of the cost of a lifetime of these services to a newborn citizen will exceed the present value of the citizen's lifetime tax contributions. In that case, government services are subject to congestion, so that, for example, each additional child dilutes the educational services

available to his classmates. In principle, the congestion problem would be eliminated if the subsidy were set at the socially optimal level. But such subsidies are seldom designed to take account of potential congestion; they are more likely to be a response to external benefits and natural monopolies, or to capital market failures. Government efforts to compensate for poor access to capital markets in developing countries may similarly contribute to capital dilution in agriculture and industry (World Bank 1984). Again this problem is not caused by population growth, but probably is exacerbated by it. The argument then is that rapid population growth reduces the amount of physical capital available per worker, as well as the amount of human capital available.

- A “*pecuniary*” externality in the labor market. As population and thus labor supply increase, wages of labor (especially in rural areas) fall and rents rise. Individually, it is rational for landless or land-poor laborers to have many children as a strategy for maximizing the family’s wages as well as their own security in old age. When everybody pursues this strategy, however, wages are depressed: one poor family’s decision to have children imposes costs on others.

Such a decline in returns to labor relative to other factors is classified as a pecuniary externality, rather than a true one, since its consequences are fully reflected in the market. Although wages are depressed by population growth, rents are boosted, so landowners or capitalists gain. Only if one views a reduction in poverty as a public good can the effect of population growth on wages be construed as a true (nonpecuniary) externality. In any case, decreasing the proportion of the population living in poverty by slowing population growth, though low-cost and (perhaps) politically feasible, is a slow-acting alternative to measures such as land reform.

Economists have recently developed new analytic models to examine more closely the social optimality of individual decisions about family size. These models incorporate the overlapping generations framework (Samuelson 1958) and the idea that parents fully incorporate their children’s utility (Becker 1981), and, most important, they take into account the endogenous nature of decisions about family size. Theoretical work suggests that under certain conditions individual decisions will be optimal from a social point of view—that externalities due to diminishing returns to land, for example, are not a problem (Nerlove, Razin, and Sadka 1987). Unfortunately, there has been virtually no empirical work on the magnitude of any possible childbearing externalities—for industrial or developing countries (though see Lee 1988).

Fertility Control and Market Failure

The second rationale for public family planning programs is that contraceptive information is inadequately conveyed, so people have more children than they would want were they better informed.³⁷ There is no opportunity for profit (and thus no private market) from informing people about such means of contraception as rhythm and withdrawal, which involve no sale of a product. Even in industrial countries, information about contraceptives is limited; for example, advertising of contraceptives continues to be frowned upon in the United States, even in the face of the rising social costs of adolescent fertility and of AIDS.

The argument that the market for contraceptive information is flawed, justifying public intervention, is sometimes extended to the notion that the market for certain contraceptive services is flawed (World Bank 1984). Such contraceptive methods as the pill and the intrauterine device (IUD) require medical backup; in effect they are jointly produced along with health care. Where the demand for private health care is limited—as in rural areas of developing countries—the demand for these contraceptives is therefore unlikely to be met in the private sector.³⁸

The result of poor markets for information and services can be “unmet need” for family planning. This concept denotes a specific empirical measure—the number of eligible women (of reproductive age, not pregnant, and so forth) in a sample who say they want no more children or want to delay childbirth, but are not using contraception. Unmet need is not equivalent to the economic concept of unmet demand, as it does not take into account the effect of costs in reducing demand. Unmet need is estimated to be in the range of 10 percent (in Africa) to 30 percent (in such countries as Peru and Bangladesh) of married women age 15 to 49 (World Bank 1984).

Specific Policies

Four types of policies to reduce fertility can be distinguished by their potential effects on social welfare.

FAMILY PLANNING INFORMATION AND SERVICES. Assuming state subsidies are financed appropriately (that is, the tax system is not highly regressive) and programs are voluntary, public involvement in family planning as a means to reduce fertility is likely to improve individual welfare. This principle is generally endorsed in the economics literature, even when the evidence on the size and importance of externalities is disputed (see, for example, Srinivasan 1988). However, Bauer (1985) worries that in many countries of Asia and

Africa, advice, education, and persuasion “in practice shade into coercion.”

ENTITLEMENTS. These are rewards for particular types of behavior. Chomitz and Birdsall (1987) distinguish two types of incentives for individuals: those that reduce barriers to contraceptive use (such as time and travel costs, lack of information, and psychic costs) and those that change the relative costs of children and thus directly reduce the demand for children.

In the first category would be payments to people who attend a session providing information on contraception or compensation for time and travel costs to those who go to a family planning clinic. These “entitlements” are relatively easy to justify, particularly if they are merely for receipt of information. But the most common form of entitlement is designed to compensate for time and travel costs of clients undergoing irreversible sterilization. Such payments are as much as 20 percent of public spending on family planning programs in India and Sri Lanka. Because sterilization is irreversible, they do raise a danger. If the desperately poor have difficulty borrowing, as they often do, such payments may be coercive. They may “entrap” the myopic into forgoing the long-term benefits of additional children for the sake of short-term cash.

In the second category would be payments to individuals (immediate or deferred) for limiting the size of their families. The classic example is the Chinese practice of giving better housing, higher wages, and education privileges to families with only one child. This form of incentive is justified from the standpoint of efficiency only if there are externalities—that is, if there are savings to society when the parents forgo a birth. The optimal incentive payment is the amount at which the gain to society of the last birth averted just offsets the forgone benefits to parents of that birth.

The approach to population policy implicit in this welfare-economic approach is very different from the standard one. Population policies commonly set a target for reducing the birth rate; how the reduction is allocated among families is treated as a secondary consideration. However, the welfare-economic approach is concerned not with the total reduction in births, but with ensuring that the private and social value of each birth is identical.

TAXES AND DISINCENTIVES. A child tax is a disincentive with potential efficiency gains analogous to incentives—but only under perfect market conditions. The same is true of any outright penalty or loss associated with children, such as reduction of maternity benefits. Disincentives have been used in China and Singapore (including restricted educational opportunities for later-born children).

Disincentives in the form of outright penalties pose an obvious distributional problem. Child taxes are likely to affect the poor most severely. Disincentives, such as rising costs of education for each additional child in a family, are likely to penalize the wrong generation: the children whose welfare a population policy is intended to improve.

In addition, unless capital markets are perfect, disincentives can become coercive, with big welfare losses. For the poor much more than the rich, children are a valuable source of old-age income and security. Yet in no society, developed or developing, is it easy to borrow against the future earnings of one's children. Because of this failure of capital markets, a small tax (if nonoptimal from a social point of view) could force a poor couple to forgo the birth of a child whose financial value alone would be greater than the tax.

The potential coercive effect of disincentives contrasts with the overall improvement in welfare that comes from incentives. With laissez-faire choice, a couple can decide whether to have two children at income Y , or three children at income Y . An incentive payment clearly improves the choice: to have two children at income Y plus the payment, or to have three children at income Y . In contrast, a disincentive worsens the choice: to have two children at income Y , or three children at income Y minus the payment. As the disincentive gets larger, the effective area of choice gets smaller; the line between disincentive and coercion is then merely one of degree.

Obviously, the system of financing incentives or disincentives can affect the family's choice and thus modify these simple conclusions.³⁹ If incentives are financed by taxes, or disincentives are distributed as rebates, the overall effects on social welfare are less clear. Finally, at least in principle, if there are large negative externalities associated with childbearing, the immediate impact of a disincentive could be offset by a family's share in the social gains of slower population growth.

QUOTAS. On the face of it, a quota on the number of children any couple can have seems "fairer" than incentives, since rich and poor are equally constrained. In fact, a quota is less fair. In developing countries, it would deprive the poor of the benefits of additional children—and without any compensation; the rich are less reliant on having many children for economic reasons (and have more consumption options as well).

In addition, quotas are far less efficient than incentives. They impose potentially heavy welfare costs on many couples and thus on society as a whole. Quotas, to be efficient, would require that the shadow cost of the quota were identical for all individuals and similarly that the marginal benefits of the additional child or chil-

dren were identical. This is most unlikely to be the case. With a quota, some individuals will be rationed; others might anyway have chosen the number of children permitted, or fewer. In short, quotas eliminate any use of the market, with the typical associated losses in consumer welfare.

Conclusions

The long debate over population growth and development is entering a new phase. The emphasis is now on the interaction of rapid population growth with market failures. Research is concentrating on the quantitative importance of population growth in particular settings and time periods and among particular groups such as the poor, given likely market failures. The issue is whether population growth is so interlinked with other problems—such as poor macroeconomic policies, weak political institutions, or such correctable market failures as poorly defined property rights—as to hardly merit specific attention; or whether the effects of population growth are large enough to justify special policies to reduce fertility.

The issue warrants new empirical research for two types of economies: First are those in which it is likely that the social costs of high fertility exceed the private costs. This might be signaled by social and parental difficulties in educating children (for example, in Bangladesh and in parts of sub-Saharan Africa, where population growth rates remain high and per capita income is low). Second are those economies in which market failures such as lack of property rights or distortions that discourage labor-using technology are likely to heighten any negative effect of rapid population growth.

At least three avenues for new work on the consequences of population growth appear promising. First is analysis of long time-series (covering at least seventy years) of aggregate economic and demographic data, in which exogenous and endogenous components of population change can be distinguished. Such long series should allow a general equilibrium analysis of both indirect and direct effects of population growth. Though simulation models of this type have not been particularly useful or convincing, they have tended to rely on cross-section data and intelligent guesses as a basis for parameter estimates.

Second is analysis of family or household data in which any component of exogenous mortality or fertility can be isolated, and its effects examined. There are very few studies of the long-term consequences for parents and children of large or small family size—in terms of parents' old age security, children's education, and so on.

Third is development of models that link population growth to

changes in social and political institutions and to creation and adaptation of new technology. Such models would do much to enrich the current debate.

The new emphasis on market failure and its interaction with population change has recently inspired concern by economists to consider the optimal public policy regarding fertility. Economic studies of the welfare effects at the individual and family level of public policies that promote family planning or give incentives to alter fertility are still, however, rare.

Abstract

Discussion of the macroeconomic consequences of rapid population growth is organized into three schools: pessimists, optimists, and the recent revisionists. For the revisionists, differing views are presented about the pervasiveness and relevance of market failures, such as the negative externalities of childbearing, and about the ability of families and institutions to adjust rapidly to changes brought on by rapid population growth. A welfare economics approach is used to review the merits of various public policies to reduce fertility, including public financing of family planning services and taxes and incentives associated with childbearing.

Notes

This article is based on "Economic Approaches to Population Growth," a chapter by the author in *Handbook of Development Economics*, edited by H. B. Chenery and T. N. Srinivasan (Amsterdam: North-Holland, 1988).

1. For a summary description of demographic trends in developing countries over the last three decades, see World Bank 1984.

2. See, for example, the report of the National Academy of Sciences (cited as National Research Council 1986) and World Bank 1984, ch. 5. Kelley, in King and Kelley 1985, has characterized both reports as revisionist.

3. See Kelley and Williamson 1974 for one of the few cases of a general equilibrium model of economic and demographic change built and tested using historical series—of industrializing Japan. Of course these difficulties apply to other subjects as well—for example, to studies of the effect of education on development.

4. Indeed, the fundamental behavior is at the "micro" or family level, and many of the difficulties of the "macro" literature arise because the latter is not grounded in any behavioral formulation. An obvious example is a tendency in much of the literature on macroeconomic consequences not to distinguish a population increase due to declining mortality from one due to rising fertility—even though the economic conditions producing and resulting from one have tended to be very different.

5. For useful critical reviews of large interactive economic-demographic models, see Sanderson 1980 and Arthur and McNicoll 1975.

6. The data provide support for the Ricardian idea of diminishing returns to labor embedded in Malthus's model, but do not actually support Malthus's idea that mortality responds to changes in wages. See Lee 1980 for analysis of a time series of real wage and population figures for England.

7. See World Bank 1984, p. 57, box 4.2. The data for that box were assembled by Peter Lindert.

8. Malthus actually revised his views in a subsequent essay. See Birdsall and others 1979 for a discussion and citations to Malthus's subsequent essay.

9. For a steady-state analytic model in which production and consumption are spread more realistically over the life cycle, see Arthur and McNicoll 1978. They find that under typical demographic structures, the net intergenerational transfer effect of higher population growth is likely to be negative.

10. Such studies are cited in Birdsall 1977, itself a review article.

11. Estimates of the cost of averting a birth through provision of family planning services ranged, for example, from \$1 to \$400 in the mid-1970s.

12. Estimates of the benefits of averting a birth ranged from \$100 to \$900 in the mid-1970s.

13. See also *The Limits to Growth* (Meadows and others 1972), an elaborate but essentially mechanical modeling exercise, in which fixed factors of production and fixed absorptive capacity of the environment were assumed.

14. Leibenstein 1967 provides the arithmetic for the latter argument.

15. Smith 1776 and Marshall 1920, cited in United Nations 1973, p. 44.

16. See Simon 1977, p. 69. See also Chenery 1960, who reports a small partial elasticity of manufacturing output with respect to population. McNicoll 1984 discusses some possible disadvantages of demographic scale economies and notes that there are other routes to expansion of market size, including of course, higher per capita income (p. 39).

17. For formal modeling of the Boserup approach, see Robinson and Schutjer, 1984. Note that Robinson and Schutjer, however, fail to distinguish between the shift in farming systems and the introduction of new tools and techniques, lumping both together as “technological change” that shifts the production function outward. For Boserup, only the latter implies the outward shift in production function.

18. Cassen 1978 (pp. 226–27) makes a related point—that rapid population growth leads countries such as India to a quicker shift to capital-intensive production, which is less “appropriate,” given the greater availability of labor compared with capital, but more efficient as measured by total cost. Agriculture in India has become more capital-intensive in order to maintain per capita output, as efficient labor-intensive means have been exhausted.

19. The modern economic theory of induced technological change ties the rate and factor bias of innovation to factor prices and research investments, but research investment strategies are driven not only by factor prices but also by policy views. See Binswanger and Ruttan 1978.

20. See Simon 1977 for a more technical presentation than in the popularized *The Ultimate Resource*. See Sanderson 1980 for a useful critique of Simon’s model and of neo-Malthusian simulation models.

21. For a sense of the debate, see Wattenberg and Zinsmeister 1985 and the reviews of the National Research Council study in *Population and Development Review* (1987). The views of the optimists were embodied in the official position taken by the United States at the international conference on population sponsored by the United Nations in Mexico City in August 1984.

22. For a recent review of the microeconomic literature on the determinants of fertility, see Birdsall 1988.

23. Leff 1969 reports a negative effect of the dependency ratio on savings, but the effect disappears if a few East European countries (with high savings and a low dependency ratio) are excluded from the regression (see Bilsborrow 1973). Mason 1985 finds a negative effect of the old-age dependency burden on savings in industrial countries, but among developing countries, a negative effect only under certain conditions of rapid economic growth.

24. Wheeler 1985 concludes, for example, that a “social investment” package of education and family planning has much higher returns, on the basis of an economic simulation model.

25. See National Research Council 1986, p. 42: “Per capita income in a population growing at 3 percent a year would be only 13 percent lower than in one growing at 1 percent a year.”

26. This counterargument fails to note that low capital-labor ratios using existing technology do not necessarily coincide with (efficient) low capital-output ratios, if only technologies appropriate for industrial economy factor endowments are available. As noted in Sen 1975, p. 47, early vintage labor-intensive methods of presently industrialized countries may be inefficient and noncompetitive in today's international markets.

27. Indeed, application of any positive discount rate would imply more rapid population growth is welfare-enhancing. See National Research Council 1986, pp. 15–16.

28. See World Bank 1986a. The unsophisticated version, at least from an economist's point of view, is the standard argument of ecologists that more people implies more rapid resource depletion.

29. Simon and Pilarski 1979 found a negative effect of higher population growth on secondary enrollment and a positive effect on primary enrollment.

30. Work on the consequences of high fertility for child health and development has been largely the domain of psychologists, public health specialists, and demographers. See Blake 1983 and Maine and McNamara 1985.

31. The market failure would be, for example, a negative intertemporal externality arising because parents do not believe they can capture the returns on investing in their children's health and education.

32. A whole range of pricing policies could affect parental demand for the number and "quality" of children, as shown in Birdsall and Griffin 1988.

33. The effects of population growth on the distribution of income (that is, on income of units relative to each other) must be carefully distinguished from effects on absolute poverty. The latter is closer to effects on "development" broadly defined. For a review of concepts and evidence see Rodgers 1983. For reviews of the relationship between population growth and income distribution, see Rodgers, Boulter 1977, and Lam 1985.

34. See National Research Council 1986, p. 63. Effects are difficult to establish in any case because measures of inequality such as the Gini coefficient are sensitive to the definition of income—whether on a household or per capita basis (Kuznets 1976)—and are often ambiguous, indicating greater inequality in some cases even though the income of the nonrich is increasing. Lam 1985 shows why almost no definitive conclusion can be drawn about the effects of fertility change on income distribution using cross-section and time series data.

35. Assortative mating, in which the sons of rich parents are more likely to marry the daughters of rich parents and also are likely to have fewer children, would further exaggerate this effect. See Meade 1964, pp. 46–48. For an exploration of the effects of the combination of high fertility, low human capital expenditures, and assortative mating on intergenerational mobility using empirically derived estimates, see Birdsall and Meesook 1986.

36. The following discussion relies heavily on Chomitz and Birdsall 1987.

37. Other kinds of information that would reduce fertility may also be unavailable, or available at too high a cost for individuals. Examples are information about declining infant mortality (reducing the need for additional births to ensure a particular number of surviving children) and information about possible negative health effects for the infant of stopping breastfeeding (breastfeeding inhibits conception).

38. It could be argued that jointness arises not in production but in consumption (that is, to be effective the pill and IUD must be used along with medical care), and that therefore demand for the pill and IUD are reduced. In fact, however, in the case of the pill, there is evidence of demand independent of medical backup; for example, more than one-half of all purchases of the pill in Brazil are directly from pharmacists and without prescription. The absence of a comparable private market outside Latin America may be due either to heavier government regulation or, in fact, to insufficient demand.

39. Another argument is that incentive payments in poor societies pose a “tragic choice”—a morally unacceptable choice for example between food for the desperately poor and childbearing. The framing of such choices raises ethical issues beyond the scope of welfare economies.

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MACROECONOMIC ADJUSTMENT IN DEVELOPING COUNTRIES

W. Max Corden

This article surveys the issue of short-run adjustment in developing countries. Such adjustment usually has two parts to it: improving the current account, and reducing inflation. The first task can be analyzed with the help of standard balance of payments theory. This theory uses the concepts of expenditure reduction and expenditure switching, concepts that originated with Meade (1951) and Johnson (1958). They will be used to introduce some simple concepts of adjustment costs with particular emphasis on distributive effects.

But this standard analysis does not allow for inflation. Another body of literature is concerned with inflation, with anti-inflationary policies and with the links between budget deficits and inflation. Since many developing countries, notably in Latin America, often face both a weak current account and rapid inflation, there is a need to show how the two parts of the adjustment problem interact.

Consider a small open economy with a current account deficit that needs to be removed. The less foreign credit that is available, the quicker this has to be done. The standard analysis is that total expenditures—by both government and the private sector, on both consumption and investment—have to fall. This is “expenditure reduction,” which reduces demand for both tradables and nontradables. In addition, there has to be a real devaluation, which shifts both the pattern of domestic demand from tradables toward nontradables and the pattern of output from nontradables towards tradables. This “switches” the pattern of demand and output so as to

*Improving
the Current
Account*

ensure that the decline in the demand for nontradables resulting from the reduction in expenditure does not lead to excess supply of nontradables. In other words, the “switching” policy ensures that the process of attaining “external balance” occurs while “internal balance”—maintaining overall employment—is being maintained.¹

If the exchange rate is used to bring about switching, it is essential that a real devaluation takes place as a result of nominal devaluation. A real devaluation will not be achieved if wages rise in line with import prices and consumer prices or if expenditure has not been reduced by enough to prevent excess demand and then some inflation of nontradable prices. Commonly, a nominal devaluation does initially bring about real devaluation, but its effects are gradually eroded. A great deal hinges on whether monetary policies are accommodating or not, and experiences have varied greatly among developing countries.²

It is possible for a nominal devaluation to bring about some expenditure reduction automatically, chiefly through the reduction in the real value of money balances that a general rise in prices would produce. In addition, a devaluation raises the prices of imported capital goods. If credit in nominal terms to the private sector (and also to the public sector) were kept constant, investment in real terms would decline.

Furthermore, a devaluation boosts the income of exporters—and thus the tax revenues of the government. If the extra revenue is not spent, the fiscal deficit—and hence the current account deficit—will fall. However, devaluation also raises the domestic currency value of the government’s debt service payments abroad, as well as of government imports. This will worsen the fiscal deficit, and hence the current account, unless other items of government expenditures are cut or taxes raised. In general, therefore, a devaluation will not automatically ensure the necessary reduction in real expenditure, though it might do so.³

The need to cut real expenditure imposes an inevitable cost. This *primary adjustment cost* arises even when there is an adequate switching policy or when real factor prices are flexible enough to maintain internal balance. A *secondary adjustment cost* arises when, for example, the switching mechanisms fail or real wages are rigid: this leads to a decline in overall employment or to underutilization of capacity. The primary cost is an unavoidable minimum. The secondary cost reflects inefficiency in adjustment. The aim of adjustment policies should be to make this cost as small as possible.

The Costs of Adjustment

The primary adjustment cost can be divided into a *present cost* and a *future cost*—broadly, the distinction between cutting con-

sumption and cutting gross investment. On this, different policies will have different effects. For example, public sector wages may be cut. The consumption of those employees is then likely to fall, though it may hold up if they save less. The amount by which consumption is reduced will depend on whether or not the employees believe the wage cuts to be temporary; and the external current account will improve by the reduction in the fiscal deficit.

Another policy measure might be to cut subsidies for food or other products, so that their prices would rise. This would also bring a fall in the real income of the private sector, leading to a fall in both consumption and savings. Or, subsidies to government corporations might be cut, compelling the enterprises to raise prices. This would have much the same effect as cutting food subsidies: real incomes of consumers would fall, and they would have to reduce consumption. Finally, government or private investment may be reduced, perhaps by allowing the infrastructure to deteriorate. One would normally expect reduced investment to lead to some future cost. However, some investments—notably big schemes—may have been quite unsound; abandoning them may actually bring future benefits.

Adjustment is likely to be relatively easy if a current account crisis had been caused by an expenditure increase to which people had not yet fully adapted. There may have been a recent and large rise in public investment, perhaps induced by a discovery of natural resources or an improvement in the terms of trade. Or the government may have recently increased subsidies or allowed public corporations to get into large deficit. If all this is fairly new, it may not be too difficult to reverse.

But another possibility is that the crisis was caused by a more fundamental change, such as a serious deterioration in the terms of trade. Spending patterns may already be entrenched, the product of previously favorable terms of trade. Once people believe they have property rights in their high real incomes, cutting expenditures is much more difficult.

When the government has to cut its expenditures, it often has to turn to its real wage bill. It may have to choose between (a) holding back the nominal wages of its employees as prices rise and (b) reducing public employment. If (a) could be done sufficiently, (b) would not be necessary. But if real wages are rigid, unemployment might be inevitable because public employees who lost their jobs may not be able to move readily into other fields. Given time, however, there could be a desirable shift of labor to industries producing tradables.⁴

Another source of secondary adjustment costs is the imposition of import restrictions to “deal with” the current account deficit. This

is, regrettably, all too common and creates a familiar distortion cost which could be avoided by devaluing instead.⁵

Redistributive Effects

The well-known analysis of two instruments (expenditure switching and expenditure changing) and two targets (internal and external balance) provides the basis for the standard adjustment package: a combination of expenditure reduction and nominal devaluation. But, on the assumption that there is a real devaluation, what are the redistributive consequences of this package?

Cutting expenditures will have adverse effects on certain sectors, depending on the nature of the cuts. When investment is cut, the losses will be borne in the future. Real devaluation, in contrast, is a relative price change and will produce both gainers and losers. Exporters will gain. Urban workers, whether private or public employees, are likely to lose, owing to the higher prices of imports. In general, profits of nontradables producers are likely to fall; those of tradables producers to rise.

An analysis that combines both features of the package gives insights into the principal resistances to adjustment. For example, real wages of public employees may fall both because public expenditure has been cut and because their cost of living has risen (through higher prices of imports). They may also be consumers of exportables, the prices of which will also have risen, unless kept down by price controls. For other groups, there may be offsetting effects. Peasants producing export crops may lose through reduced subsidies—say, for fertilizer—or through higher prices for electricity from a public corporation that has had to reduce its losses. The same peasants will gain, however, from higher incomes for their crops, partially offset by higher costs of imported inputs.

Contrary to first expectations, some manufacturing industries that produce potentially tradable products may lose as a result of devaluation. Many developing countries have manufacturing sectors that are protected by import quotas, so the domestic prices of imports would not be raised by devaluation. Instead, importers who hold the scarce import licenses will have their profits squeezed. Although the manufactures are potentially import competing, quotas have actually turned them into nontradables, their prices depending on domestic demand and supply. Demand for these protected products will fall as a result of the general reduction in expenditure. And their costs will increase, both because the costs of imported inputs rise as a direct result of devaluation and because, in due course, the cost of labor may rise as export industries expand.

The crucial point about short-term adjustment is that there are

bound to be losers. This will make it more difficult to implement and may also result in cuts in investment rather than consumption. If a country cannot obtain enough foreign credit, it will have no choice but to cut expenditure, if not to devalue. But the choice of measures will be affected by the varying strength of interest groups. Net investment may even cease, so that the capital stock is run down.⁶

In short, adjustment may be “disorderly.” The loss of efficiency that results from disorderly adjustment could be counted as part of the secondary adjustment cost. But disorderly adjustment is certainly not inevitable, as the experiences of various countries have shown. A description of a successful orthodox adjustment—the case of the Republic of Korea, 1981–84—can be found in Aghevli and Marquez-Ruarte (1985).

Structural Rigidities

In the short run some supply and substitution elasticities are very low, possibly even zero. If so, most of the short-run adjustment will have to take place either at great social cost or in parts of the economy where elasticities are relatively high. An extreme but not unknown condition is what Little (1982) has called “import starvation.” A country has become highly dependent on particular imports for which there are no domestic substitutes, at least in the short run; import restrictions may already have eliminated less essential imports and all those for which local production (though at high cost) is possible. The imports that remain are either essentials—such as medical supplies, petroleum, spare parts for vehicles—or basic components or materials for local manufacturing. Reducing imports further would cause unemployment and output losses in manufacturing. This is an unplanned consequence of a long-term policy of import substitution which has kept exports down to a level where only the most essential imports would be financed. The country needs trade reforms designed to foster exports. If it had done such reforms sooner, the need to reduce essential imports might never have arisen.

Countries with rapid inflation usually also have current account problems. But this association is not inevitable, so this section starts by considering a country with high inflation but no current account difficulties. The government wants to reduce inflation because of the dislocations it causes. The country’s inflation rate is higher than that of its trading partners, so the exchange rate will have to depre-

*Reducing
Inflation*

ciate steadily—possibly with a “trotting peg”—to avoid continuing real appreciation.

It will now be assumed that the current account has to stay in balance or—when there is a given inflow of new foreign finance—that there is a deficit that does not, for the moment, need to be reduced. In such circumstances, adjustment refers to anti-inflationary policy, which will have some costs. In fact, the adjustment raises two quite distinct problems: the “inflation tax replacement” and the “price adjustment.”

The Inflation Tax Replacement

In most developing countries, monetizing the fiscal deficit is normally the essential cause of prolonged inflation. Holders of money balances have to save more to keep their real balances at desired levels. These savings in effect finance all or part of the government’s dissavings. The reduction of real balances owing to inflation is known as the inflation tax.

Of course, other factors may be at work. The demand for real money balances will increase because of real economic growth. It may also increase because the monetized sector is expanding relative to the subsistence (or less monetized) sector. To that extent, a growing supply of money that finances a fiscal deficit need not lead to inflation. Furthermore, monetary growth need not be caused by a fiscal deficit: it can also result from expansion of credit to the private sector. And if inflationary expectations accelerated, the demand for real balances would fall, so that even a given growth in the money supply would lead to faster inflation.

Nevertheless, taking all this into account, it remains true that when inflation is high a principal explanation is usually a monetized budget deficit.⁷ Hence, if inflation is to be reduced, government expenditure has to fall or other sources of taxation have to be found. That is the “inflation tax replacement problem.” Because of the distortions and inefficiencies caused by inflation, the inflation tax is likely to be a very inefficient way of helping to finance public spending. It is thus possible that, for the economy as a whole, there may be a net gain (and hence no inflation adjustment cost at all) when the inflation tax is replaced by a well-constructed set of explicit taxes. This could also be true when public spending is cut, rather than taxes being raised.

The actual fiscal deficit, expressed as a proportion of gross national product, is likely to be much greater than the deficit that has to be eliminated if inflation financing is to end. There are three reasons. First, inflation usually leads to a reduction in tax revenue in real terms, even with given tax rates. This is because nominal tax collections lag behind nominal government expenditure, which fre-

quently adjusts more rapidly to inflation. Cutting the rate of inflation would therefore boost real tax revenues: the “Olivera-Tanzi effect.”⁸ Second, part of the deficit is likely to be bond-financed and so does not need to be reduced or eliminated in order to slow down monetary growth. Third (and discussed below), the deficit will itself decline owing to a reduced interest bill.

A shift from the inflation tax to, say, a value added tax will have important redistributive effects, just as devaluation does. Inflation taxes all money holders, whereas alternative taxes are likely to bear heavily on specific groups, who may therefore resist the new taxes. If taxes cannot be increased, government spending will have to be reduced—leading again to sectoral resistance.

The Price Adjustment

The concern so far has been with the budgetary problem that an anti-inflationary policy presents. The “price adjustment problem” is a quite separate matter. Assuming that the country is in a steady state of inflation, where all prices—notably the nominal interest rate, the nominal exchange rate, and the nominal wage—are fully adjusted to expected inflation, then actual inflation is equal to expected inflation. The real interest rate, the real exchange rate, and the real wage are not raised or reduced just because there is inflation.

The government then introduces an anti-inflationary program, requiring a reduction in the fiscal deficit and leading to a reduction in monetary growth. Product prices may fail to respond in reasonable time; major distortions in relative prices can result; so overall costs and redistributive effects can be imposed. These costs are not inevitable, but a few examples show what might happen.

1. Firms and other price setters are surprised by the anti-inflationary policy, do not expect the program to last, and hence continue to raise prices on the basis of the initially expected inflation. This has been called “inertial inflation”—inflation that does not respond quickly to demand contraction. Given the policy of monetary restraint, the real money supply therefore falls, the real interest rate rises, and the economy contracts. The anti-inflationary policy has a classic deflationary effect.

The implication is that, if this “inertia” is to be overcome, the policy shift must be widely understood and credible. Such conditions are not easy to attain when previous attempts to slow inflation have failed. And the fact that an anti-inflationary policy is likely to involve some painful deflation leads to the view that such a policy would not be sustained for political reasons. This view itself then becomes one cause of the deflation. This does not mean that “inertial deflation” will continue forever, but only that a difficult transi-

tion is possible and that the firmness of the anti-inflationary program must be clearly established.

2. The rate of increase of wages fails to adjust to the slower rate of money growth as rapidly as do product prices, so real wages rise. In industrial countries and in the formal sectors of some developing countries, nominal wages tend to be somewhat inflexible, possibly because of explicit or implicit contracts. By contrast, product prices may be quite flexible. Once again, the policy implication is that the anti-inflationary program must be well understood and believed.

A specific cause of wage inflexibility is indexation. This is usually lagged, so that wages in the current period are adjusted to price changes in a previous period. This means that when price inflation slows, wage inflation slows less rapidly—so real wages rise. This squeezes profits and is likely to increase unemployment. The policy implication is that, if indexation itself cannot be ended, its formula should be adjusted to prevent real wages from rising.

3. Firms may have locked themselves into debts which carry nominal interest rates adjusted to the initially expected rate of inflation. Although the loans may be fairly short term, a sudden decline in the rate of inflation could raise real interest rates substantially, redistributing wealth from debtors to creditors and thus causing bankruptcies. In addition, since high inflation tends to benefit the financial sector, a reduction of inflation can squeeze it tightly.

In considering these costs of reducing inflation, it must be remembered that the starting point is never a well-adjusted, steady-state inflation. With rapid inflation, relative prices are always distorted. Normally there are institutional rigidities and various controls that prevent some prices, but not others, from adjusting to the rate of growth of nominal demand. The motivation for controls is usually a misplaced effort to control inflation—not at the source but by tackling some of its symptoms. Hence some nominal interest rates are controlled, leading to negative real rates; some product prices may be controlled, leading to shortages and distortions in resource allocation; and frequently the exchange rate is not depreciated sufficiently to compensate for the excess of domestic over foreign inflation, leading to a squeeze on the profitability of industries producing tradables and to a current account deficit. All these disadvantages will be diminished as inflation slows.

Exchange Rate and Heterodox Policies

In trying to minimize the part of the inflation adjustment cost that is caused by the price adjustment problem, two approaches have been tried.

One approach has been to fix the nominal exchange rate—or at least to have a preannounced path for it (called *tablita* in Argentina).⁹ The exchange rate is maintained by market intervention and in an indirect way prices of tradable goods will then be somewhat controlled, depending on inflation abroad. When import-competing goods are only imperfect substitutes for imports, the control is inevitably imperfect. The bigger weakness in such an approach is that, if domestic credit continues to expand faster than the exchange rate depreciates, prices of nontradables will rise faster than those of tradables. In short, the real exchange rate will appreciate—with the usual adverse effects on resource allocation. It is therefore crucial that the exchange rate policy be accompanied by orthodox credit restraint.

The alternative is a broader, “heterodox” approach (Dornbusch and Simonsen 1987; Blejer and Liviatan 1987), which really embraces the first as a special case. It was tried in 1985–86 in Israel, Argentina, and Brazil. The approach involves many prices—product prices, wages, the exchange rate, the nominal interest rate—being controlled or at least made subject to predetermined scales. In theory, at least, this does not replace the “orthodox” policy of monetary restraint through reducing the fiscal deficit; it merely supplements it. The idea is that, for a transitional period, controls take the place of market expectations in determining prices and wages.

The central problem is familiar: getting relative prices right. If they were initially in reasonable equilibrium, with no notable shortages or excess demands, and if there were no changes in demand and supply conditions, in the terms of trade, and so on, it would be simplest to freeze all prices and wages. In practice, enforcing a comprehensive freeze is difficult, so some relative prices will change in unplanned directions, and there are usually some underlying shifts in demand and supply that require changes in relative prices. For example, shifting from an inflation tax to explicit taxes or to cuts in public spending is bound to change equilibrium relative prices. Furthermore, one cannot assume that relative prices were initially in “equilibrium.” It may be necessary to make some once-and-for-all price and wage changes before the whole set is frozen, and these preparatory changes are not easy to get through.

In some cases, prices of state enterprises have been frozen or prevented from rising sufficiently while wages have continued to increase. The increased subsidies needed to keep the enterprises afloat have then undermined the policy of monetary restraint which is the key orthodox element of the anti-inflationary program, and without which the heterodox element will achieve very little. Finally, it may be difficult to convince people that prices will not rise

again when controls are removed, since they may attribute the short-term decline in inflation more to the price and wage controls than to the decline in monetary growth.

Two Adjustment Challenges: Current Account and Inflation

A current account deficit is quite likely to be caused by a fiscal deficit (including the deficits of all public agencies).¹⁰ In addition, in most developing countries that have serious and prolonged inflation, the explanation is continued monetary expansion resulting from monetization of a fiscal deficit. Thus a fiscal deficit can cause both a current account and an inflation problem, and there have been plenty of cases where the two have coexisted. It is therefore necessary to combine the analyses of the two adjustment problems.

Financing the Fiscal Deficit

It will now be assumed that the fiscal deficit is financed in two ways: partly by borrowing abroad and partly by the inflation tax. It will therefore be assumed that the government does no domestic borrowing, other than from the central bank; nor has it done any in the past, so it and the central bank combined have no indebtedness in domestic currency. The whole of the public sector's interest bill is on foreign debt. The complication of domestic debt will be introduced later.

The need to reduce a current account deficit means that foreign borrowing has to fall. Unless there is increased inflationary financing, the fiscal deficit must be reduced either by cutting government expenditure or increasing taxes. To avoid unemployment, the reduction in the fiscal deficit has to be associated with real devaluation.

Similarly, a reduction in inflation requires the money-financed fiscal deficit to be cut. Unless there is to be more foreign borrowing (and hence a worse current account), cutting the fiscal deficit also requires cuts in government spending or increases in taxes. Because of the price adjustment problem (which leads to a temporary decline in the real money supply and possibly a temporary rise in real wages), there may also be temporary unemployment. The conclusion is that cutting government spending or raising taxes could both improve the current account and reduce inflation. How much one objective rather than the other is achieved depends on which of the two forms of financing—foreign borrowing and monetization—is reduced more.

The implications for the exchange rate are interesting. The improvement of the current account requires a real devaluation if employment is to be maintained. At the same time the reduction in

inflation requires a reduced rate of nominal depreciation, so as to maintain a given real rate. When a reduction in the deficit is meant to lead to improvements on both fronts, various desirable time paths for the nominal exchange rate can be envisaged. At first, as inflation is reduced, the rate of nominal depreciation might continue as before, until the desired real depreciation is attained; after that, the rate of nominal depreciation would decline in line with the decline in the rate of monetary expansion.

It also follows that either objective—current account improvement or reduced inflation—can be achieved at the expense of the other. Suppose the fiscal deficit is given. A shift from money financing to foreign borrowing will reduce inflation and worsen the current account; whereas a shift from foreign borrowing to money financing will increase inflation but improve the current account. It must be reiterated that in all cases appropriate exchange rate adjustment is assumed. Difficulties often arise because the exchange rate adjustment is not appropriate.

Borrowing Domestically

It is now necessary to introduce government debt held domestically and denominated in domestic currency. One part of government expenditure then consists of interest payments on domestic debt, and the deficit may be financed partly by issuing more domestic debt.

For a given fiscal deficit, the choice is no longer purely between (a) money financing leading to inflation and (b) foreign borrowing leading to a current account deficit. There is also the option of crowding out some domestic investment: the government can borrow more domestically and so divert funds away from private borrowers. Like foreign borrowing and the generation of inflationary expectations, this will create a future cost.

One last complication should be noted: that inflation generates inflationary expectations, which in turn raise the nominal interest rate. The higher the nominal interest rate, the larger the fiscal deficit (with taxes and other government expenditures given). The extent of this effect depends on the length of maturity of government bonds and whether or not they carry floating rates. Anything that reduces inflationary expectations will then reduce the fiscal deficit.¹¹

If there is a shift from foreign borrowing to money financing, it is likely that expectations of inflation would increase—so the government's interest bill and thus the fiscal deficit would also increase. A shift away from money financing would, for the same reason, reduce the fiscal deficit. If the noninterest fiscal deficit (sometimes called the "primary deficit") were reduced by cutting ordinary (non-

interest) expenditures or by raising taxes, and this led to less money financing, the total fiscal deficit would actually fall by more than the decline in the primary deficit. A part of the fiscal deficit is thus endogenous, depending on the manner of financing of the deficit. This part would disappear if inflation were not expected.

Abstract

The short-run adjustment problem in developing countries involves both the improvement of the current account and the reduction of inflation. In both cases, the usual reason for adjustment is shown to be the fiscal deficit. The article distinguishes primary adjustment costs, which are inevitable, from secondary costs, which result, for example, from failure to devalue or from real wage rigidity. The article then analyzes the effects of expenditure reduction and currency devaluation on various sectors of the economy. Reducing inflation involves both an inflation tax replacement and a price adjustment problem, and "heterodox" policies designed to deal with the latter are discussed. If the fiscal deficit cannot be reduced, the article argues, improving the current account may be at the cost of increasing inflation and likewise reducing inflation may be at the cost of worsening the current account.

Notes

An expanded version of this article will appear in *Public Policy and Economic Development: Essays in Honour of Ian Little*, edited by M. Fg. Scott and D. K. Lal (Oxford: Oxford University Press, 1989). I am indebted to valuable comments from Mario Blejer, Guillermo Calvo, Morris Goldstein, Anthony Lanyi, and Sarath Rajapatirana. The paper was written while I was at the International Monetary Fund, but the views expressed do not necessarily represent those of the Fund.

1. There is a diagrammatic exposition of the standard analysis in chapter 1 of Corden 1985, which also contains references to the origins of these ideas. The basic theory originated with Meade 1951, the concept of "switching" with Johnson 1958, and the formal dependent economy model with Salter 1959. The implications of various switching devices, including quantitative restrictions, and their relation to expenditure adjustment are explored geometrically in a short-run model with fixed exports in Corden 1960. The concern in this article with sectoral (distributional) effects of adjustment expands on the discussion in chapter 2 of Corden 1985. A formal framework that focuses on monetary and credit aggregates is in Khan and Knight 1981.

2. Edwards 1987 analyzes eighteen Latin American devaluation episodes and shows in each case what happened to the real exchange rate in the three years after the devaluation. He calculates for each episode an "effectiveness index" and shows that, when there was stepwise devaluation, in most cases the real exchange rate effect was quickly eroded, sometimes completely after three years. When there was a "crawling peg," however, the real exchange rate did stay down, this result being obtained by frequent nominal depreciations. See also Connolly and Taylor 1976 for earlier evidence.

3. It is a well-known proposition that a devaluation may be deflationary for the kinds of reasons discussed here (and others). See Diaz-Alejandro 1965 and Krugman and Taylor 1978. The concern has usually been that it may reduce real expenditures too much, rather than too little. In any case, explicit expenditure policy, whether fiscal or monetary, is always available to supplement or alternatively to compensate for the expenditure-reducing effects of devaluation.

4. Government wage policy in Africa is discussed in Lindauer, Meesook, and Suebsaeng 1988.

5. The choice between import restrictions and devaluation as a switching device when the current account has to be improved is an important issue discussed in detail in Corden 1987.

6. For developing countries with debt service problems and hence serious adjustment needs, there was a big fall in the investment ratio after 1981. For the three years 1979–81, the ratio of gross capital formation to gross domestic product averaged more than 25 percent for them, but for the period 1983–86 it was down to 19 percent. (These figures refer to a large group of countries defined by the International Monetary Fund as “countries with recent debt servicing problems” and are calculated from the *World Economic Outlook*, October 1987.)

7. It is well known from the theory of hyperinflation (Cagan 1956) that if inflationary expectations exceed the actual rate of inflation the latter will accelerate, essentially because the demand for real balances relative to GDP is falling. As the inflation tax *rate* rises, the *base* of the tax actually falls. Hence the revenue from the inflation tax (expressed as a proportion of GDP) would fall if the monetized budget deficit increased beyond a certain point: sufficient private savings to finance the budget deficit at an initial rate of inflation could not be generated, thus leading to a dynamic monetary disequilibrium—that is, hyperinflation.

8. See Olivera 1967 and Tanzi 1977.

9. This was tried in Argentina, Chile, and Uruguay in the 1970s. There is now a large literature analyzing these episodes. For a detailed description of the Chilean episode, see Edwards and Edwards 1987 and for overviews of all three “Southern Cone” experiences, see Corbo and de Melo 1987.

10. This statement is based on casual impression and awareness of particular cases. The empirical issue was analyzed in Kelly 1982. Kelly’s empirical work, based on analysis of programs of the International Monetary Fund between 1970 and 1980, led to the conclusion that “(i) external imbalances in years prior to program years tended to be associated with large fiscal imbalances, and (ii) that reductions and increases (relative to gross national product (GNP)) in the current account/overall balance of payments deficit in the year of Fund programs tended to be associated with reductions and increases (relative to GNP) in the overall government deficit/domestically financed government deficit.” It must also be added that association of fiscal deficits with current account deficits cannot automatically be regarded as indicating causation.

11. Hence the fiscal deficit might be adjusted for inflation to yield the “operational deficit.” On the measurement of fiscal deficits in the presence of inflation, see Tanzi, Blejer, and Teijeiro 1987.

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EXPORT PROCESSING ZONES

The Economics of Enclave Manufacturing

Peter G. Warr

Since the mid 1960s, many developing countries have tried to stimulate exports of nontraditional manufactures. One form this effort has taken is the establishment of export processing zones (EPZs). Many EPZs were set up in the early 1970s; by the early 1980s around thirty-five existed in Asia alone, with an aggregate employment of at least 250,000 (United Nations 1985). Globally, their importance was probably more than twice as great.

EPZs are special enclaves, outside a nation's normal customs barriers. The firms inside them are mostly foreign and enjoy favored treatment with respect to imports of intermediate goods, taxation, and infrastructure. They are also free from industrial regulations applying elsewhere in the country. These privileges are subject to the conditions that almost all of the output is exported and that all imported intermediate goods are used within the zones or else re-exported.

Despite the heavy state investment involved, perusal of government documents on EPZs invariably reveals confusion about the economic and welfare effects of the zones. Similar confusion is also present in the economic literature on EPZs. This article tries to clarify the issues and to draw out the crucial relationship between the benefits and costs of establishing EPZs and the overall trading regime of the host country. The frame of reference is the economic welfare of citizens of the host country. The article starts with a simple theoretical analysis, which is then illustrated by case studies from four East Asian countries.

The most common activities in EPZs have been labor-intensive light manufacturing processes: electronics assembly, garment pro-

duction, assembly of light electrical goods, and so forth. A notable feature of the firms in the zones is their international mobility. Firms leaving an EPZ in one country often migrate to an EPZ in another, in which conditions are more favorable.

The “footloose” character of EPZ firms has been overlooked in most of the small amount of theoretical work that has appeared. This literature has drawn upon the classical Heckscher-Ohlin model of production.¹ Insofar as the model treats capital as being internationally mobile, it fails to capture the international mobility of *capital goods*—which is central to the functioning of EPZs. The main conclusion of most of the literature—that EPZs necessarily reduce the welfare of the host countries—is thus largely irrelevant for EPZs as they actually operate.

Empirical work on EPZs has also tended to overlook the footloose character of EPZ firms. It has therefore had a misplaced preoccupation with the factor intensity of production within the zones. In an otherwise useful descriptive study of EPZs, Spinanger claims that they tend to produce welfare benefits analogous to those resulting from a movement toward free trade, because the elimination of tariffs and other distortions causes factor intensities of production “to correspond more closely with the factor endowment of the host country” (1985, p. 65). This conception of an EPZ rests on the traditional assumption that capital is internationally immobile. It assumes implicitly that the capital used in the EPZ is domestic capital in fixed supply, which has moved there from elsewhere in the host country. Once this assumption is discarded, the factor intensity of production within EPZs is of limited relevance for an assessment of their welfare impact.

Although most of the literature on EPZs has been concerned with their benefits and costs, it has stopped short of formal benefit-cost analysis. The explanation is usually that the data are inadequate. In fact, EPZs are closely monitored by host governments; compared with the data available for other public projects in developing countries, the statistical information on EPZs is unusually complete. It includes detailed time series of exports, imports, employment, use of utilities, infrastructure, and administrative costs. What the empirical studies have lacked has been an analytical framework, so that the benefits and costs of EPZs can be identified conceptually and quantified empirically.

This article describes the footloose character of EPZ firms and the incentives and other facilities in a “typical” EPZ. It then looks at the economic performance of EPZs in four Asian countries: Indonesia, the Republic of Korea, Malaysia, and the Philippines. Using a simple conceptual framework—the “enclave model”—the article analyzes the benefits and costs of the four Asian EPZs. Finally, it discusses the relationship between EPZs and trade policy in general.

In its standard forms, international trade theory treats factors of production—capital, labor, land—as immobile internationally but mobile domestically. In contrast, commodities are considered mobile across, as well as within, international boundaries. EPZs exploit the international mobility of capital goods owned by a “footloose” manufacturing firm, combine them with domestic labor (relatively immobile internationally), and produce traded goods which the firm exports. The firm tries to move its capital equipment to countries in which it can earn the highest rate of return.

This process can be viewed as an indirect form of exporting labor. The foreign firm producing within the EPZ receives the services of domestic labor. In return, the workers receive wages and some training. Not surprisingly, many of the countries establishing EPZs have also engaged in the direct export of temporary labor, to the Middle East and elsewhere.² In the case of EPZs, the capital goods move to where the labor is; with labor export, the movements are reversed.

A simple model to represent the international mobility of capital goods has been developed by Jones (1980) and Caves and Jones (1985). This article uses an amended version of the Caves and Jones model to bring out the essential economic features of EPZs.

The processing activity within the zone produces final traded goods using three kinds of inputs: traded intermediate inputs, capital goods, and labor. The traded intermediate inputs include the electronic components, plastic casings, electrical circuitry, and so forth used in producing electronic goods, and the textiles, buttons, cotton thread, and so forth used in producing garments. The prices of these goods, the wages paid, and the return to the capital goods used are formally related by

$$(1) \quad P_j = \sum_i a_{ij} P_i + a_{Kj} R_j + a_{Lj} w$$

where P_j is the price of the final goods j ; P_i is the price of the intermediate input i ; a_{ij} , a_{Kj} , and a_{Lj} are the amounts of intermediate good i , capital goods, and labor, respectively, required to produce a unit of good j ; and w is the wage rate. These variables determine R_j , the rate of return to capital goods resulting from the production of good j in an EPZ.

It is convenient to define the value added per unit of production of good j , V_j , by

$$(2) \quad V_j = P_j - \sum_i a_{ij} P_i$$

and (1) now becomes

$$(3) \quad V_j = a_{Kj} R_j + a_{Lj} w.$$

Figure 1

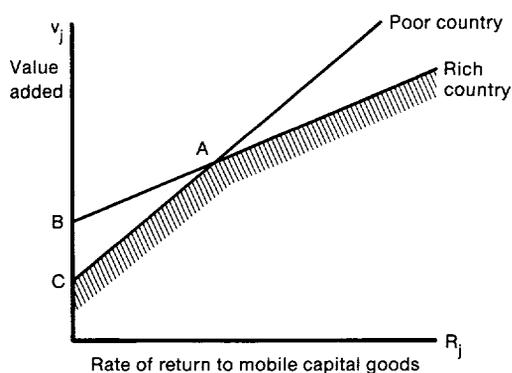


Figure 1 represents equation 3 for two countries, labeled “poor” and “rich.” In the rich country unit labor costs, $a_{Lj}w$, are higher than in the poor country, but unit requirements of capital goods, a_{Kj} , are lower. The rich country’s schedule thus has a higher vertical intercept (unit labor costs)—that is, point B lies above point C—and a lower slope (unit capital good requirement) than the poor country’s.

A footloose manufacturer moves to the country where the highest value of R_j can be realized. This is represented by the shaded surface in the diagram. When unit value added

is high, implying high returns to the capital goods specific to commodity j , the rich country is able to attract the processing activity. The rich country uses the scarce capital goods more efficiently—its unit capital good requirements per unit of output are lower—and in this case unit labor costs are relatively unimportant. But if unit value added falls, implying a squeeze on returns to its capital goods, unit labor costs become relatively more important. Below point A, the process moves to the poor country.

This analysis is consistent with the “product cycle” process identified by Vernon (1966). It suggests a gradual migration of newly developed manufacturing processes from rich countries (where scarce capital goods are used more efficiently) to poor countries (where unit labor costs are lower) as international competition forces down the unit value added generated by these processes.

The Economic Environment of the EPZ

In the early 1970s, after Japan had relaxed restrictions on investment abroad, other Asian countries competed to attract these and similar foreign investments. Light manufacturing, intensive in the use of unskilled or semiskilled labor, was identified as a target: it was well suited to EPZs. The zones appeared to offer the advantages of export promotion without threatening the position of indigenous manufacturers. The “typical” EPZ had four characteristics:

DUTY-FREE IMPORT OF RAW MATERIALS. Raw materials required for the production of exports may be imported duty-free and irrespective of quantitative restrictions in the domestic economy. Products may be exported without payment of export taxes, sales duties, and so forth. Although goods produced in EPZs may not normally

be sold domestically, special permission to do so may be given when consignments are rejected by foreign buyers or fail to meet delivery deadlines. Such sales simply displace imports that would have occurred from other sources and usually attract normal customs duties.

EPZ firms' purchases of raw materials and intermediate goods from domestic suppliers are frequently subsidized, in an attempt to encourage links with the home economy. The subsidies, commonly called "rebates" or "drawbacks," are intended to offset the effects of domestic protection. In the early 1970s it was hoped that links of this kind would generate big benefits to the local economy, both because the social cost of producing these goods was below their market prices and because EPZ firms would transfer technology to domestic suppliers.

TAX HOLIDAYS. Firms in an EPZ are often exempted from normal income tax provisions for three to ten years. The firms often negotiate successfully to extend these tax holidays by threatening to move to another country. Once relocated, the firm's tax-free holiday begins again.

The Philippines offers a generous schedule of deductions instead of tax holidays. Very little tax revenue has been raised from its EPZs, because most firms declare overall trading losses.³ Some firms have declared losses every year for more than a decade, while still producing and even expanding. Vertically integrated firms use transfer pricing to relocate their profits internationally, thereby minimizing their global tax burdens. The Philippines experience suggests that efforts to monitor transfer pricing are ineffective and that tax holidays are less important than they may appear.

STREAMLINED ADMINISTRATION. EPZ firms usually have to conform to simplified administrative requirements, which often deal with a special government agency. They are exempted from many national rules, such as restrictions on foreign ownership of firms (EPZ firms are usually allowed to be fully foreign-owned), restrictions on repatriation of profits, restrictions on the employment of foreign nationals, and requirements for special approval for importing capital equipment. EPZ firms may also obtain a share of the host country's allocation of import quotas—vital for garment producers wishing to export to the European Economic Community.

INFRASTRUCTURE AND UTILITIES. An EPZ consists of a heavily fenced area policed by customs officials to prevent duty-free materials from being smuggled into the domestic economy. Its infrastruc-

ture and telecommunications are normally superior to those in the host economy, but not as good as those in industrial countries.

Utilities are often subsidized. Electricity tariffs are especially important, because light manufacturing firms are heavy users of electrical power. The rates charged in EPZs are frequently below, and never above, industrial rates elsewhere in the host country. The same applies to rental rates. Some firms rent buildings from a government agency; others lease land within the zone and construct their own buildings.

***The Economic
Record in
Four Asian
Countries***

This section summarizes the results of detailed studies of EPZs in four Asian countries:

- Indonesia: The Jakarta Export Processing Zone
- The Republic of Korea: The Masan Free Export Zone
- Malaysia: The Penang Free Trade Zone
- The Philippines: The Bataan Export Processing Zone.

All four began operations in the early 1970s. Each is the largest and oldest EPZ in the country concerned. The Indonesian zone is less typical of EPZs than the other three. It is small and has a number of unusual characteristics but is worthy of examination because it began as an experimental project and, partly on the basis of its performance, the Indonesian government has decided to establish several more EPZs. Detailed case studies of these four zones have been conducted by the present author.⁴ Tables 1 to 4 summarize the economic performance of these four zones through 1982. Altogether, they employed roughly 90,000 people in 1982.

A feature of the zones not revealed by the tables is their industrial composition. Garment production initially dominates, then electronics assembly becomes more important. Indonesia and Malaysia are exceptions to this pattern, in that garments have always been the dominant industry in the former and electronics in the latter. The two industries are quite different. Garment production is generally far more labor-intensive, and its technology has changed little in years.

The data in tables 1 to 4 also fail to reveal the footloose character of EPZ firms. The case of the Philippines' Bataan EPZ provides a good example. In table 4, the number of firms barely changed between 1979 and 1982. But during 1979, four firms entered the zone and four others left. In 1980, five entered and four left; in 1981, three entered and three left; and in 1982, two entered and four left.

Aggregate data on export volumes and employment also disguise annual volatility for individual EPZ firms. Table 4 shows that, between 1981 and 1982, total exports from the Bataan EPZ rose by 19 percent.

Table 1. Indonesia: Aggregate Economic Performance of Jakarta EPZ

| <i>Indicator</i> | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|----------------------------------|------|-------|-------|-------|-------|-------|
| Number of firms | 4 | 7 | 15 | 18 | 18 | 18 |
| Number of persons employed | 773 | 1,653 | 4,317 | 6,374 | 7,520 | 7,742 |
| Value (millions of U.S. dollars) | | | | | | |
| Exports | 0.9 | 12.8 | 5.9 | 18.7 | 28.7 | 37.5 |
| Imports of raw materials | 1.2 | 11.8 | 6.4 | 13.0 | 13.5 | 13.8 |
| Local raw materials | 0 | 0.01 | 0.6 | 1.9 | 5.2 | 9.5 |
| Imports of capital goods | 0.1 | 1.0 | 1.0 | 1.2 | 0.8 | 0.3 |
| Local capital goods | 0 | 0 | 0.03 | 0.01 | 0.03 | 0.01 |
| Total official taxes | 0.01 | 0.15 | 0.33 | 0.40 | 0.56 | 0.56 |
| Estimated unofficial taxes | 0.23 | 3.11 | 1.32 | 2.76 | 3.60 | 3.60 |
| Percentage | | | | | | |
| Local to total raw materials | 0 | 0.80 | 9 | 13 | 28 | 41 |
| Local to total capital goods | 0 | 0 | 2.9 | 0.8 | 4.6 | 3.2 |

Note: All monetary quantities are in current prices.

Source: Bonded Warehouses Indonesia, Jakarta; International Monetary Fund, *International Financial Statistics*, various issues; and Warr 1983.

For individual firms, however, exports rose in only twenty-nine of the fifty-two that were present at the beginning of 1981 and declined in twenty-six (including the three that left the zone during that year). In the first group, the average increase in firm-level exports, weighted by exports in 1981, was 42 percent; in the second group (excluding the three which left the zone) the weighted average decline was 29 percent. These large variations in output partly reflect the adjustments made by the headquarters of the large corporations to which EPZ firms belong, in response to perceived changes in market demand. They also reflect the way that such corporations relocate their activities when the profitability of their firms changes.

Raw Materials and Technology Transfer

Two of the anticipated benefits of EPZs were that firms would buy more local raw materials and that such links transfer technology to domestic firms. In reality, local raw materials make up no more than a third of the total purchases of raw materials. The exception is Indonesia, where local textiles are purchased significantly by the zone's garment producers. In Malaysia, local raw materials constitute only a small percentage of the total. Purchases of raw materials and intermediate goods produced by *other* EPZ firms are more than three times greater. In the Philippines, the share of local raw materials had declined to less than 10 percent by 1982.

Table 2. Korea: Aggregate Economic Performance of Masan EPZ

| <i>Indicator</i> | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|--|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Number of firms | 70 | 115 | 110 | 105 | 99 | 99 | 97 | 94 | 88 | 89 | 83 |
| Number of persons employed | 7,072 | 21,240 | 20,822 | 22,248 | 29,615 | 28,401 | 30,960 | 31,153 | 28,532 | 28,016 | 26,012 |
| Value (millions of U.S. dollars) | | | | | | | | | | | |
| Exports | 23.9 | 145.5 | 298.0 | 257.1 | 441.0 | 496.5 | 579.2 | 621.7 | 577.3 | 664.4 | 601.3 |
| Local sales | 0 | 0 | 6.2 | 7.9 | 25.2 | 28.1 | 81.7 | 90.7 | 82.5 | 99.0 | 92.1 |
| Imports of raw materials | 16.5 | 91.7 | 176.7 | 137.8 | 216.7 | 239.3 | 270.7 | 293.0 | 266.2 | 295.9 | 281.7 |
| Local raw materials | 1.0 | 23.1 | 48.6 | 44.6 | 92.7 | 120.0 | 130.0 | 149.4 | 131.3 | 144.0 | 142.7 |
| Total wages and equipment | 5.9 | 17.9 | 18.9 | 23.2 | 36.2 | 41.4 | 47.5 | 51.5 | 49.4 | 59.0 | 59.6 |
| Total electricity used | 0.2 | 1.3 | 2.3 | 2.0 | 3.4 | 3.8 | 4.5 | 4.8 | 4.5 | 5.1 | 5.3 |
| Total taxes | 0 | 1.44 | 1.79 | 1.55 | 1.71 | 1.50 | 1.85 | 1.78 | 1.74 | 2.31 | 2.17 |
| Percentage of local to total raw materials | 6 | 20 | 22 | 24 | 30 | 33 | 32 | 34 | 33 | 33 | 34 |

Note: All monetary quantities are in current prices.

Source: Administration Office, Masan Free Export Zone, Masan; International Monetary Fund, *International Financial Statistics*, various issues; and Warr 1984.

Table 3. Malaysia: Aggregate Economic Performance of Penang EPZ

| <i>Indicator</i> | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|----------------------------------|------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|
| Number of firms | 10 | 21 | 31 | 32 | 33 | 34 | 35 | 35 | 41 | 49 | 50 |
| Number of persons employed | — | 15,627 | 18,569 | 22,412 | 25,780 | 27,895 | 30,372 | 35,379 | 38,355 | 38,078 | 36,298 |
| Value (millions of U.S. dollars) | | | | | | | | | | | |
| Exports | 2.1 | 53.6 | 94.2 | 192.2 | 274.3 | 226.1 | 591.5 | 1,085.2 | 972.9 | 717.5 | 714.9 |
| Local sales | — | 0.1 | 2.3 | 1.7 | 6.9 | 4.6 | 9.4 | 2.6 | 0.06 | 14.5 | 47.1 |
| Imported raw materials | 1.3 | 55.0 | 127.8 | 185.1 | 237.2 | 193.6 | 425.6 | 492.4 | 707.0 | 523.1 | 520.6 |
| Local raw materials | 0.07 | 0.9 | 2.8 | 7.1 | 6.7 | 10.5 | 13.3 | 14.5 | 14.5 | 16.9 | 22.8 |
| Raw material from EPZs | — | — | — | 5.8 | 12.0 | 13.1 | 40.3 | 64.5 | 76.6 | 48.9 | 82.3 |
| Imported capital goods | 0.4 | 13.4 | 54.7 | 29.7 | 9.5 | 15.2 | 120.0 | 53.9 | 36.6 | 36.7 | 36.6 |
| Local capital goods | 0 | 1.8 | 18.9 | 27.0 | 2.2 | 3.6 | 2.6 | 21.7 | 3.3 | 4.0 | 3.9 |
| Total wages paid | 0.9 | 6.3 | 5.2 | 14.0 | 17.4 | 25.0 | 43.2 | 56.6 | 72.3 | 80.5 | 83.4 |
| Total electricity used | 0.4 | 0.7 | 1.7 | 5.7 | 6.9 | .0 | 8.6 | 12.1 | 17.8 | 23.5 | 23.2 |
| Total taxes paid | 0 | 0 | 0 | 0 | 0 | 0 | 0.14 | 0.15 | 0.09 | 0.74 | 1.29 |
| Percentage | | | | | | | | | | | |
| Local to total raw materials | 5 | 2 | 2 | 4 | 3 | 5 | 3 | 3 | 2 | 3 | 4 |
| Local to total capital equipment | 0 | 12 | 26 | 48 | 19 | 19 | 18 | 29 | 8 | 10 | 10 |

— Not available.

Note: All monetary quantities are in current prices.

Source: Panang Development Corporation, Penang; International Monetary Fund, *International Financial Statistics*, various issues; and Warr 1987b.

Table 4. *The Philippines: Aggregate Economic Performance of Bataan EPZ*

| <i>Indicator</i> | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|--|------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| Number of firms | 1 | 5 | 14 | 16 | 39 | 38 | 47 | 51 | 51 | 52 | 52 |
| Number of persons employed | — | 1,298 | 3,321 | 5,502 | 8,962 | 12,821 | 17,495 | 18,877 | 19,204 | 19,858 | 19,410 |
| Value (millions of U.S. dollars) | | | | | | | | | | | |
| Exports | 0.4 | 0.9 | 2.1 | 7.3 | 22.4 | 39.7 | 73.1 | 98.2 | 122.7 | 134.0 | 159.6 |
| Local sales | — | 3.9 | 6.8 | 4.3 | 11.7 | 13.6 | 14.8 | 16.5 | 13.3 | 8.2 | 5.0 |
| Imports of raw materials | 0.2 | 0.5 | 2.9 | 7.8 | 15.8 | 38.5 | 47.3 | 66.4 | 77.3 | 81.2 | 122.3 |
| Local raw materials | 0.07 | 0.2 | 0.3 | 0.8 | 4.2 | 9.9 | 3.8 | 7.9 | 9.5 | 7.4 | 8.5 |
| Total wages paid | — | 0.6 | 1.5 | 2.5 | 4.3 | 6.6 | 9.3 | 14.4 | 20.4 | 22.4 | 21.8 |
| Total electricity used | — | 0.1 | 0.3 | 0.5 | 0.7 | 0.9 | 1.2 | 1.6 | 1.5 | 1.7 | 1.6 |
| Total taxes paid | — | — | 0.07 | 0. | 0.4 | 0.6 | 1.5 | 2.2 | 1.9 | 1.7 | 1.4 |
| Total domestic borrowings | 1.8 | 22.8 | 61.4 | 117.8 | 85.9 | 89.4 | 3.3 | 2.8 | 2.3 | 1.9 | 1.5 |
| Percentage of local to total raw materials | 30 | 30 | 8 | 10 | 21 | 20 | 7 | 11 | 14 | 9 | 6 |

— Not available.

Note: All monetary quantities are in current prices.

Source: Export Processing Zone Authority, Manila; International Monetary Fund, *International Financial Statistics* various issues; and Warr 1985.

Managers of EPZ firms report that the main obstacle to buying local raw materials is their low and unreliable quality. Entire shipments of finished goods may be rejected if the raw materials or intermediate goods used were inferior. The changing industrial composition of the EPZs is also a factor: garment and footwear manufacture uses a much higher proportion of local raw materials than electronics assembly. And a third factor is the global strategies of the corporations involved. Parent firms wish to preserve the international mobility of their processing operations; developing long-term relations with local suppliers does not serve this goal. If the corporation wishes to retain the capacity to relocate its activities at short notice, it is better to buy these inputs from the cheapest reliable international source.

As for the transfer of technology, the initial hopes have not been fulfilled. Many EPZ industries use technology that is universally available: labor-intensive garment production is a good example. Those that do have special information—electronics firms are the best example—guard it carefully, even from their own workers. To hand technical know-how to the locals is thought to be equivalent to handing it to one's competitors. It is hardly surprising that know-how is not readily given away; it has to be purchased.

Working Conditions and Wages

Working conditions in EPZs have been widely criticized by writers from industrial countries. This perspective is often combined with the claim that EPZ firms "exploit" their workers and enjoy big profits, at the expense of jobs back home in the industrial countries. Such arguments have usually reflected a lack of familiarity with the conditions and wages in developing countries; unless workers were better off being "exploited" in an EPZ, EPZ firms would find it impossible to hire.

Useful information on the Philippines was provided by Castro (1982). In the Bataan EPZ, 74 percent of workers were female; two-thirds were with no previous factory experience; and most were between the ages of seventeen and twenty-four. Turnover rates were high; the average duration of zone employment was around three years. Most of the workers in Castro's sample were members of larger households (the average size was six members); incomes represented roughly half the combined cash incomes of these households. Almost half of all zone workers worked overtime. The average working week was fifty-four hours. Of those who had previously had paid employment, their average earnings in the EPZ were 35 percent higher than these previous earnings. Castro concludes that there was a clear income gain from moving to the EPZ.

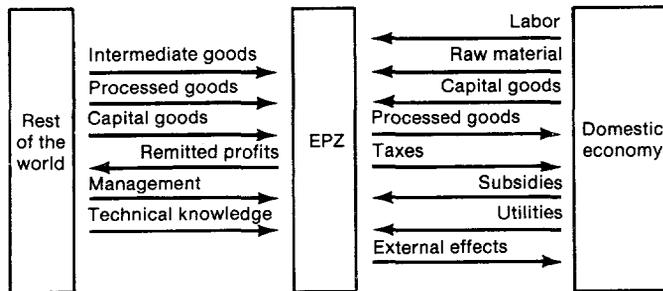
Data provided in a survey conducted by the Philippines' Ministry of Trade and Industry suggest that—allowing for differences in living costs—real wages of unskilled workers were roughly the same in the EPZ as in similar employment in the capital city (Warr 1985). Real wages for skilled workers were somewhat higher in the EPZ. Whereas unskilled workers may be drawn from any part of the country, including rural areas, skilled workers must be recruited from the capital city, requiring a premium to attract them.

EPZ firms appear generally to adhere to minimum wage laws, where these exist. Firms operating within the domestic manufacturing sector may often avoid these regulations, but the greater visibility of EPZs and their politically sensitive position make violations of minimum wage restrictions more difficult.

The Welfare Economics of EPZs

This section considers the benefits and costs of an EPZ, as experienced by citizens of the host country by comparing the observed situation with the hypothetical results of not having a zone.⁵ The foreign ownership of firms and the “offshore” nature of the zones themselves suggest a simple framework for analyzing their impact on the domestic economy. This framework can be termed the “enclave approach,” following Corden (1974 and 1985). It is shown in figure 2.

Figure 2



Consider (a) the flows of goods and services and the financial flows between the EPZ and the rest of the world and (b) the flows between the EPZ and the host country. The essence of the enclave approach is that the flows in (b) are relevant for evaluating the welfare impact of the zone, but that the flows in (a) are not.

EPZ firms purchase intermediate and capital goods from abroad, which results in outflows of foreign currency.⁶ In vertically integrated firms these transactions occur within the firm, giving rise to questions of transfer pricing. The firm may also repatriate profits to its parent abroad. These transactions are irrelevant for an evaluation of the welfare effects of the zone, except insofar as they affect the domestic economy.

The issue of transfer pricing provides a good illustration. Suppose that (as is often the case) there is no profits tax on EPZ firms. Transfer

pricing influences whether a firm's profits will be recorded in the host country or elsewhere. But, so long as these profits are earned by the EPZ firm, whether they are realized in the host country or abroad and whether they are repatriated or retained by the EPZ firm are irrelevant for economic welfare in the host country. But if profits are taxed within the host country, transfer pricing affects the size of these taxes and becomes highly relevant.

Economic conditions in an EPZ are generally less distorted than those elsewhere in the domestic economy. Nevertheless, this does not imply that the net outcome of the real and financial flows in figure 2 necessarily raises welfare in the host country. Only a detailed examination of the benefits and costs can resolve this question. The next section looks at each of the main links between EPZ firms and the domestic economy and its welfare significance.

Components of a Benefit-Cost Analysis of EPZs

PROFITS AND LOSSES. Most EPZ firms are foreign-owned. Their profits or losses, to the extent that they are retained or incurred by the firms themselves, do not enter our calculations directly. The *domestically* owned profits and losses (if any) properly belong in an evaluation of the zone, but they can seldom be estimated satisfactorily from the available data. To the extent that such data are collected, they are unreliable, but they do suggest that the profits of domestic firms are only a minuscule proportion of the overall benefits from EPZs. So, for the purposes of this study, the profits of domestically owned firms will be omitted.

FOREIGN EXCHANGE EARNINGS. Public discussion of EPZs places considerable stress on the foreign exchange earnings derived from the zones, reflecting the presumption that these earnings have direct welfare relevance for the host country. In fact, however, the foreign exchange earnings of foreign-owned EPZ firms merely constitute transactions between these firms and firms abroad. They have no direct effects on the economic welfare of domestic nationals. Regardless of the difference between a firm's officially declared exports and imports, the corresponding amount of foreign exchange remains the property of the firm itself (leaving aside possible taxation for the moment). The money may be:

- a. held in liquid form in foreign exchange accounts, whether inside or outside the host country
- b. used to buy imported capital equipment
- c. converted into the domestic currency to be spent on wages and purchases from the local economy.

Item (a) is of little welfare importance and reduces to a decision as to where the firm chooses to do its banking. Item (b) can also be disregarded if the imported capital equipment is ultimately disposed of abroad or scrapped. Only item (c) has welfare importance, because there may be a net benefit to the host country from these purchases.

To purchase raw materials and services from the domestic economy and to hire local workers, EPZ firms must convert their foreign exchange into domestic currency. This is done through the central bank at the official exchange rate. The question is therefore whether the social value of the foreign exchange received by the host country's central bank exceeds the value of the domestic currency the firms obtain in return. The value of the foreign exchange means the domestic value of the extra traded goods and services the host country may absorb as a result of its extra foreign exchange holdings. The value of the domestic currency given to EPZ firms means the domestic value (opportunity cost) of the domestic factors of production and intermediate goods and services purchased by EPZ firms with the money. When exchange controls and domestic protection imply that the social value of foreign exchange in terms of the domestic currency exceeds the official exchange rate, the requirement that these conversions must be made through the central bank at the official exchange rate constitutes, in effect, a form of taxation.

The firm's true foreign exchange earnings will presumably differ from their conversion of foreign exchange into domestic currency. Transfer pricing may be one mechanism by which this profit is realized, but to measure the host country's actual gains, the firm's actual foreign exchange conversion is the relevant statistic.

EMPLOYMENT. The concern that host country governments have for the jobs created by an EPZ presumably reflects their view that the social benefits derived from generating an additional job outweigh the costs. In other words, the wage received by a worker is considered to exceed the social opportunity cost of employment in the zone. However, it is difficult to measure the relevant opportunity cost. Wages in the zones are normally equal to, or slightly above, wages in comparable employment outside the EPZ. Nevertheless, estimates of the social opportunity cost (the shadow price) of unskilled and semiskilled labor commonly suggest that it is less than wages paid in manufacturing.

A difficulty in applying these estimates arises in relation to the transfer of skills to EPZ employees. The estimated value of such skills could in principle be incorporated either by reducing the parameter of the estimated opportunity costs of labor or by increasing

appropriately the parameter of the wage received. But, lacking detailed estimates of the value of these transfers, there is no solid basis for making such an adjustment. Consequently, some arbitrariness cannot be avoided.

TECHNOLOGY TRANSFER. Administrators of EPZs agree that there have been few significant transfers of technology and skills from EPZ firms to the domestic economy. Those firms with the technical knowledge from which local firms could benefit (most notably electronics and electrical companies) have been isolated from the domestic economy. Little of their raw materials and capital equipment has come from local suppliers. In retrospect, the early expectations that much technology would be transferred were naive. To the extent that intermediate products are internationally traded, EPZ firms will buy from the cheapest reliable source.

Managerial practices and notions of quality control are inevitably transferred to the local middle managers whom EPZ firms employ. These managers can eventually obtain significantly higher salaries in domestic industry than they could after a similar period of employment elsewhere. This suggests that the training they receive confers a benefit to the domestic economy, which may not be fully captured in the wages they receive in the EPZs. One way of treating this issue is to say that the social opportunity cost of the employment of these workers in the EPZ is lowered by such training. These externality effects can be incorporated in principle by lowering the parameter of the opportunity cost of labor.

DOMESTIC SALES. Almost all of the output of EPZs must be sold abroad, but domestic sales are permitted when, for example, finished consumer goods are rejected by foreign buyers. Such sales are typically treated as imports, and duty must be paid at the normal rate. The net value to the host country of the goods consumed is the value at c.i.f. prices of the imports which would otherwise have occurred, which is also the net price actually paid to the EPZ firm. Thus, as these sales have no net welfare effects, they can be ignored in the benefit-cost analysis.

PURCHASE OF DOMESTIC RAW MATERIALS AND CAPITAL GOODS. Governments typically encourage EPZ firms to use domestic raw materials, intermediate inputs, and capital goods. This can be interpreted to mean that governments believe that the prices paid by firms for these materials exceed the marginal social costs of supplying them. Local raw materials and capital goods generally compete with imported substitutes, and the duty applied to these imports provides the basis for estimating the difference between the social

opportunity cost of providing these imports (their border c.i.f. prices) and the prices paid (tariff inclusive). When EPZ firms receive a rebate from the host government equivalent to the duty that would have been paid on these imported inputs, there is no net welfare effect from their purchase by EPZ firms.

USE OF ELECTRICITY. EPZ firms, especially garment and textile producers, are big users of electricity. The benefit-cost analysis must compare the tariff rates paid with estimates of the long-run marginal cost (LRMC) of supplying extra power. If the average tariff exceeded the LRMC, the electricity used by EPZ firms would entail a net tax—or, in the reverse case, a net subsidy.

DOMESTIC BORROWING. Foreign investors are sometimes allowed to borrow on local capital market, perhaps with a government guarantee. This arrangement would be unimportant if the local capital markets was open to international capital flows: borrowing by EPZ firms would then simply induce inflows of private capital from abroad and would not displace local investment. However, when local capital markets are closed and interest rates suppressed—a combination present in Latin America (Diaz-Alejandro 1970) and the Philippines—the analysis is different. The implication is that the domestic output forgone as a result of additional borrowings by (foreign) EPZ firms exceeds the compensation received from them in interest and principal repayments. To put it another way, the shadow price of capital exceeds its market price.

TAXES. Although taxes raised from EPZ firms are generally small, they are a clear benefit for the domestic economy: without the zone, there would be no taxes. Firms that move to a zone from elsewhere in the host country or foreign firms that would have entered even without a zone are exceptions, but unimportant ones. Most firms are foreign and, according to managers, few would have invested in the host countries without the EPZ incentives. Taxes are therefore counted as a net benefit to the host country.

The low rates of company income tax offered by host country governments to attract foreign firms into the EPZs sometimes achieve this goal. Some foreign investors legally reside in countries that allow their firms to credit taxes paid abroad against taxes due at home. The United States is such a home country. In these cases, a tax holiday for firms investing in the EPZ may merely transfer revenue from the treasury of the EPZ country to that of the investor's home country.

DEVELOPMENT AND RECURRENT COSTS. The establishment of the zone site, its maintenance, and administration all represent economic costs—and in principle should be evaluated at shadow prices. In the absence of disaggregated data, however, it is necessary to rely on financial costs. Against these costs are the rents and other charges received from EPZ firms, not counted elsewhere in the analysis.

*Evidence from
Four Asian
Countries*

Estimates of the shadow prices of labor, foreign exchange, capital, and so forth are available for most developing countries. Their quality varies widely, but the best estimates for each country were:

- Indonesia: Hughes (1983), Pitt (1981), and Munasinghe (1980)
- The Republic of Korea: Koo (1981) and Nam (1981a and 1981b)
- Malaysia: Veitch (1977, 1979, and 1984)
- The Philippines: Medalla and Power (1984) and Manalaysay (1979).

These studies provided the basis for the shadow prices, but they were sometimes updated, corrected, or amended to a form more suitable for evaluating EPZs. Table 5 summarizes the information as ratios of the estimated shadow prices to market prices.

Table 6 shows the contributions of each of the major benefit cost categories to the aggregate net present value (NPV) of the EPZs. Costs appear as negative items. For consistency, the calculations assume a real discount rate of 7.5 percent and a life for the EPZ of twenty-five

Table 5. Estimated Ratios of Shadow Prices to Market Prices

| Category | Indonesia | Korea | Malaysia | Philippines |
|----------------------------|-------------------|-------|----------|-------------|
| Labor | 0.75 | 0.91 | 0.83 | 0.64 |
| Foreign exchange | 1.00 ^a | 1.08 | 1.11 | 1.25 |
| Domestic raw material | 0.85 | 0.92 | 0.90 | 0.96 |
| Domestic capital equipment | 0.85 | 0.98 | 0.91 | 0.96 |
| Electricity | 1.05 | 1.33 | 0.93 | 1.30 |
| Domestic financial capital | n.a. | n.a. | n.a. | 1.58 |

n.a. Not applicable.

a. Hughes 1983 concluded that the effects of Indonesia's import barriers (tariffs and quotas), which raise domestic prices above border prices, and subsidies on the consumption of traded goods (such as rice and petroleum products) roughly canceled, implying that the shadow price of foreign exchange was approximately equal to the official rate.

Source: Indonesia: Hughes 1983, Pitt 1981 and Munasinghe 1980. Korea: Koo 1981 and Nam 1981a and 1981b. Malaysia: Veitch 1977, 1979, and 1984. Philippines: Medalla and Power 1984 and Manalaysay 1979.

Table 6. Welfare Impact of EPZs: Net Present Value
(millions of 1982 U.S. dollars)

| Category | Indonesia | Korea | Malaysia | Philippines |
|------------------------------------|-----------|-------|----------|-------------|
| Employment | 4 | 39 | 111 | 59 |
| Foreign exchange earnings | 0 | 65 | 94 | 72 |
| Local raw materials | 5 | 16 | 18 | 3 |
| Local capital equipment | 0 | 0 | 10 | 0 |
| Taxes and other revenue | 23 | 18 | 10 | 11 |
| Electricity use | -1 | -13 | -53 | -4 |
| Administrative costs | -13 | -17 | -4 | -23 |
| Infrastructure costs and subsidies | -3 | -68 | -43 | -196 |
| Domestic borrowing | 0 | 0 | 0 | -147 |
| Total net present value | 15 | 40 | 143 | -225 |
| Internal rate of return (percent) | 26 | 15 | 28 | -3 |

years. The final row of table 6 displays the calculated internal rate of return for each of the EPZs. Table 7 presents the NPV computations in more convenient form, by expressing the various components as a percentage of the *gross* benefits of the EPZ (the sum of all positive NPV items appearing in table 6).

Before discussing the results in detail, it is necessary to focus on a methodological point: the distinction between the benefits from “foreign exchange earnings” and those from other sources. As explained earlier, the benefits attributed to foreign exchange earnings arise because EPZ firms must convert foreign exchange into domestic currency

Table 7. Composition of Net Present Value
(percent of gross benefits)

| Category | Indonesia | Korea | Malaysia | Philippines |
|------------------------------------|-----------|-------|----------|-------------|
| Employment | 13 | 28 | 46 | 41 |
| Foreign exchange earnings | 0 | 47 | 39 | 50 |
| Local raw materials | 16 | 12 | 7 | 2 |
| Local capital equipment | 0 | 0 | 4 | 0 |
| Taxes and other revenue | 72 | 13 | 4 | 8 |
| Electricity use | -3 | -9 | -22 | -3 |
| Administrative costs | -41 | -12 | -2 | -16 |
| Infrastructure costs and subsidies | -9 | -49 | -18 | -135 |
| Domestic borrowing | 0 | 0 | 0 | -101 |
| Total | 47 | 29 | 59 | -155 |

to meet their domestic costs. It is analytically possible to separate the net gains from the currency conversion from those arising from the subsequent domestic payments, as reflected in tables 6 and 7. Alternatively, the two can be combined—and it makes economic sense to do so. Indirectly, foreign exchange is being paid to local workers, suppliers, and so forth.

Consider a hypothetical example: the conversion of \$1,000 into Philippine pesos at the official 1982 exchange rate of P9.17 = US\$1 for the payment of local wages. When the \$1,000 is converted into pesos, there is a net gain to the Philippines arising from the difference between the official exchange rate and the shadow price of foreign exchange. Since the ratio of the shadow price to the official rate was an estimated 1.25, this implies a net gain of P2,290. When the P9,170 is paid to Philippine workers, there is a second net gain—from the difference between the social opportunity cost of labor and the market wage. The estimated value of 0.64 for the ratio of these two sources of gain arises from the way our shadow prices have been defined. But the two are aspects of the same phenomenon: the (indirect) payment of \$1,000 to hire domestic workers. Philippine workers are indirectly earning for the Philippines \$1,000 in foreign exchange, generating a net gain to the Philippines of P4,590.⁷

Table 8 incorporates this analysis and shows the re-estimated distribution of net benefits, substituting for the first five rows of table 7. The gains from “foreign exchange earnings” have been redistributed among the other benefit-cost categories. The results for Indonesia are unchanged from table 7, because the estimated net gains from foreign exchange earnings were zero (see note a to table 5). The percentage totals do not add to 100 because only part of the firms’ foreign exchange conversions can be attributed to the four categories in the table.

Benefits

Table 7 shows that the big gains in Korea, Malaysia, and the Philippines come from employment and foreign exchange earnings.

Table 8. *Composition of Net Present Value with Foreign Exchange Earnings Distributed*

(percent of gross benefits)

| <i>Category</i> | <i>Indonesia</i> | <i>Korea</i> | <i>Malaysia</i> | <i>Philippines</i> |
|-------------------------|------------------|--------------|-----------------|--------------------|
| Employment | 13 | 55 | 68 | 69 |
| Local raw materials | 16 | 14 | 15 | 3 |
| Local capital equipment | 0 | 0 | 8 | 0 |
| Taxes and other revenue | 72 | 14 | 5 | 9 |

With the gain from foreign exchange earnings distributed as in table 8, employment accounts for more than half the gross benefits. Local suppliers and tax revenue are much less important. For these three countries, the EPZs are in effect a form of indirect labor export.

For Indonesia, two unusual features must be stressed. First, an unusually high proportion of raw materials is obtained within Indonesia: primarily textiles used in garments. By 1982 more than 40 percent of all raw materials used were bought in Indonesia. The estimated net gains from this source outweigh the estimated net gains from job creation. The second unusual feature is the importance of the "taxes and other revenue" category. Of the \$22.6 million shown in table 6, property tax accounted for \$2.9 million; other official taxes \$0.9 million; "unofficial" taxes \$25.9 million; and expenditure on the drawback scheme -\$7,100.⁸

The "unofficial" tax item, discussed in detail in Warr (1983) and Gray (1979), represents the outcome of rent-seeking behavior by government officials. This reveals much about the way the net benefits from the zone are distributed among individuals and also shows that these are collected at considerable social cost. If these revenues are excluded from the benefit-cost analysis, the NPV of \$15,000 shown in table 6 becomes -\$11,000, and the internal rate of return also turns negative (Warr 1983).

The \$7,100 spent on the drawback scheme is a subsidy to the use of domestic raw materials. It is intended to counteract the effects of protection on the costs of the imports used in producing these raw materials. Since the estimated net gain from the use of these raw materials is only \$4,900, the drawback provisions are costing Indonesia more than they are worth.

Costs

The costs of achieving the benefits are summarized by the negative items in tables 6 and 7. In table 7 they are expressed as a percentage of the sum of all net benefits. The striking features of this table both involve the Philippines: (a) the enormous infrastructure cost of the Bataan EPZ, and (b) the heavy cost of giving EPZ firms (subsidized) access to the local capital market. Each of these items is itself large enough to outweigh the sum of all benefits derived by the Philippines from its EPZ.

Another feature is the low administrative and infrastructure cost of Malaysia's Penang Free Trade Zone. However, the cost of Malaysia's subsidization of electricity outweighs the combined benefits from the use of local raw materials and local capital equipment and all tax revenues raised from EPZ firms.

Any cost-benefit analysis of EPZs is bound to ignore a deeper question: would it be possible to achieve the benefits available from EPZs in another, more cost-effective way? For governments considering the merits of EPZs, this fundamental issue needs to be addressed directly.

In recent years, several of the countries that established EPZs in the 1970s have extended the right to import free of duty to firms producing for export but located outside EPZs. The duty-free raw materials are held in bond on the factory site until required for production. This change of policy—in the Philippines, Malaysia, and Korea—undermined the advantages of EPZs and showed that expensive special zones were not really necessary.

The same applies to other attractions of EPZs: the simplification of customs procedures, the clarification or elimination of regulations, and the upgrading of industrial infrastructure—each could be achieved for the whole economy. And, as foreign firms frequently attest, countries need stable and clear policies to attract foreign investment. This obviously applies as much outside the EPZs as within. Most of the features that have enabled EPZs to attract foreign investment could be applied outside the zones, with similar effectiveness, and without establishing special enclaves.

The features of the domestic economy that impede foreign investment and that EPZs are intended partly to counteract also impede the development of efficient domestic industries. If a liberalized environment within the EPZs deflects attention from these matters, the net outcome could be worse than what would have occurred in the absence of the zones.

The benefits from EPZs are limited. They are definitely not “engines of development.” For countries in the early stages of development, zones can be an efficient and productive means of absorbing surplus labor. Even then, they will never be more than a modest part of the solution to the vast employment problems of these countries. EPZs also expose domestic businesses to examples of internationally competitive enterprises; this demonstration effect is undoubtedly valuable, especially in the early stages of industrialization, as is the on-the-job training of local managers. Even so, such benefits should not be exaggerated.

As industrial development proceeds, interest in EPZs tends to wane. Taiwan and Korea, having been pioneers in the establishment of EPZs in the late 1960s and early 1970s, are now much less interested in this type of enclave development. In the next couple of decades a similar change of attitude may occur in many of the countries now actively promoting EPZs.

Abstract

Export processing zones (EPZs) are economic enclaves within which manufacturing for export occurs under virtual free trade conditions. Many developing countries have established EPZs in hopes of reaping economic gains through employment, foreign exchange earnings, and technology transfer. This article studies the benefits and costs of EPZs in Indonesia, the Republic of Korea, Malaysia, and the Philippines and reviews the relationship between the welfare effects of EPZs and the host country's economic policies. When the domestic economy is distorted, the EPZ confers limited welfare gains. Nevertheless, EPZs are far from the "engines of development" that some countries had initially hoped they would become.

Notes

This paper has benefited from the comments of W.M. Corden, Demetrios Pappaogiou, and Marcelo Selowsky. The author is responsible for the views presented and any errors.

1. See Hamada 1974, Rodriguez 1976, and Hamilton and Svensson 1982. Hamilton and Svensson 1983 is a partial exception to this description. See also Balasubramanyam 1988 for a useful discussion of this literature.

2. Examples in East and Southeast Asia include the Republic of Korea, the Philippines, Thailand, and Indonesia.

3. For example, the proportions of firms in the Philippines' Bataan EPZ (discussed later) that declared overall trading losses in their annual financial statements were: 1980, 58 percent; 1981, 81 percent; 1982, 75 percent; and 1983, 64 percent (Warr 1985, p. 12).

4. These case studies are: Indonesia, Warr 1983; Korea, Warr 1984; Malaysia, Warr 1987b; and the Philippines, Warr 1985 and 1987a.

5. Our discussion will disregard income distribution within the host country.

6. To keep figure 2 simple these financial flows are not indicated in the diagram. Most of the flows shown in the diagram are accompanied by financial flows in the opposite direction, but exceptions are taxes and subsidies and external effects such as transfers of managerial and technical knowledge.

7. The aggregate welfare outcome for the Philippines would have been essentially no different if the \$1,000 had been paid directly to Philippine workers who then converted it into the domestic currency through the central bank.

8. The negative sign draws attention to the fact that this item is a revenue outlay—a subsidy—rather than a tax receipt.

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PREFERENTIAL CREDIT AND INSURANCE AS MEANS TO PROMOTE EXPORTS

Bruce Fitzgerald and Terry Monson

In recent years, many countries have sought to expand their exports. Many governments have tried to reduce biases against exports and to neutralize incentives between export and import-competing activities.¹ Their policies have sometimes included “active” instruments of export promotion, such as export credit and export insurance programs. Export credit programs provide credit for export activities before or after shipment; export credit insurance programs insure export credit against commercial or political risks.²

This article examines from an overall economic perspective reasons for these programs and briefly reviews their use in three industrial and seven developing countries. It focuses on the subsidy elements of the programs and their effects on exports and resource allocation.

Domestic Distortions

The theory of domestic distortions provides much of the rationale for export promotion in general, and particularly for export credit programs (Bhagwati and Ramaswami 1963; Bhagwati 1971; Johnson 1966, 1971). It demonstrates that where protection creates a bias against exports and where policymakers are unwilling to eliminate the bias, an equivalent subsidy to export activities can restore neutrality, encourage trade along lines of comparative advantage, and improve economic welfare. These antiexport biases arise when

Rationales for Export Credit

prices in a country's domestic market diverge from world prices and cause high-cost domestic production to be subsidized while internationally competitive export activities are taxed.

Export credit programs are intended to offset such biases against exports. Preshipment credit lowers the price of capital by offering working capital to exporters at rates less than or equal to those available to domestically oriented activities. Postshipment credit lowers the prices of export goods (particularly capital goods) by providing credit on more favorable terms than are otherwise available. These programs generally contain implicit subsidies, and if they did not, they would be incapable of offsetting the antiexport bias.

A distinction is needed between policies that *offset* and those that *remove* biases. In theory, interventions that remove or offset biases could be structured to be equivalent. In practice, however, other considerations argue in favor of removing the cause of the bias:

- The goal of export subsidies is a "neutral" system in which a producer receives the same price for selling in the international and the domestic market. Attaining this would require a complicated system of differential subsidies, keyed to the levels of protection.
- Export subsidies increase biases against nontraded goods and may create new unintended distortions (for example, postshipment credit favors capital goods over consumer goods).
- It is difficult to know how much to compensate exporters and how frequently to change the rates.
- The introduction of new distortions does not counter the political and economic pressures that caused the original problem. Indeed, it may increase the pressure (Cuthbertson 1983, p. 37).
- An "active" export promotion program must be financed through increased taxes or government control of economic activity.³ In developing countries, taxes on international trade generate about a third of government revenue, so the taxes would increase incentives to import-competing activities, raise the costs of exports, and undermine the effectiveness of the program.
- Trade can be financed within the exporting or importing country, depending on prevailing interest rates. A subsidy within the exporting country will distort the financing decision, causing too much of the trade to be financed in the importing country and drawing credit from other high-priority uses.

To avoid new distortions, the intervention must occur in the market where the distortion is found. For example, credit policies ought to be directed toward credit market distortions. Preshipment credit illustrates this point. It changes the price of capital and rewards producers for using more of it. The approach could conceivably be accurate enough to offset other distortions; more probably, it will simply be

intended to compensate for a general antiexport bias (caused by protection, for example), in which case a new distortion will result.

When the capital market is distorted, an economy produces inefficiently the wrong combination of goods and services. Eliminating the distortion would create incentives to increase the output of all goods and to shift the mix between traded and nontraded goods. In this case, a carefully chosen intervention in the capital market could alter relative factor prices, increase production, and allow the economy to reach the right output.

In contrast, a product market intervention leaves factor prices distorted; it moves the economy toward the right product mix, but does not simultaneously increase output. Similarly, a factor market intervention is not the right way to correct a product market distortion: for example, it is inefficient to subsidize capital for exporters for the purpose of neutralizing tariffs protecting import-competing production.

A related suggestion is to use taxes or subsidies in factor markets to compensate exporters for any cost advantages that their international competitors may enjoy. But such measures could undermine the principle of comparative advantage, the foundation of international trade. They cause factor prices to differ between exportables and other activities while keeping factor prices in exportables equivalent to those in other countries' exportable activities; again, this causes the economy to underproduce an incorrect combination of goods and services.

Capital Market Failures

Government provision of export credit is sometimes offered on the grounds that capital market failures may prevent exporters from obtaining short-term preshipment credit at rates comparable to those for other activities. Causes of difficulties may include (1) costs associated with risk and information, (2) fragmented or poorly developed capital markets,⁴ or (3) government policies that direct credit to domestic activities, such as housing or agriculture.

- *Incomplete information* on export risk can cause lenders to charge higher rates or to demand more collateral. However, these terms are not capital market distortions if they are commensurate with the risks. Unpaid exports are a drain of a country's assets and should be discouraged. If the perceptions of exporters, insurers, or financiers are wrong, the right response is to provide correct information (Virmani, p. 31). Even here, since information is costly, intervention is not justified on theory alone; it must be guided by a suitable evaluation of costs and benefits.
- *Access to credit* is sometimes cited as the biggest problem facing exporters. Lenders distinguish among activities on the basis of

risks, and in an efficient market, lower-risk activities will obtain more or cheaper credit than higher-risk activities. If financial institutions are required to offer credit on equal terms to activities with different risks, they will prefer lower-risk activities—thereby giving the appearance of a “shortage” of export credit. If lenders are freed from this restriction, some potential borrowers will choose not to obtain credit at the higher rates. But this is not sufficient reason to conclude the market is misallocating credit or that intervention would improve it.

- *Segmented markets* may cause some exporters (especially larger firms) to receive preferential credit while others receive none. Such segmentation is evidence of a market failure only if the exporter receiving the favorable terms is actually the higher risk. Guaranteeing access to credit at uniform terms will cause less risky export activities to subsidize riskier activities, or other activities to subsidize exports, or the exporting country to subsidize importing countries (to the extent that importers capture the benefits of export subsidies). Under these circumstances, a market failure would exist if exporters with different risks received the same credit terms.
- *Weak financial structures* may fail to allocate credit according to the criterion of its highest value. Directed credit policies create rents; they allocate credit to activities beyond their level of comparative advantage; and they further segment, rather than strengthen, weak financial structures. There is no a priori reason why exporters are more efficient users of credit than others; preferential credit is unlikely to improve capital market efficiency and is likely to be inferior to general deregulation of financial markets.
- *Government policy failures* often produce the situations that are asserted to be capital market failures. Government policy may direct credit toward nonexport activities, such as housing, agriculture, or the fiscal deficit. In such cases, all credit users, including exporters, lose at the expense of those favored activities. Although such favoritism may suboptimally allocate credit, there is no a priori reason why export credit subsidies are preferable to eliminating the biases of the original credit policy. Ultimately, empirical evidence is required on the nature and the extent of the policy failure and on the additional costs and benefits of further government intervention.

Rationales for government provision of export insurance are related to market failures and the difficulties of finding insurance with “reasonable” premiums to cover export risks. The lack of insurance or (where it is available commercially) the “high” premiums are sometimes attributed to market failures.

The uncertainties inherent in international trade drive a wedge between the world price and the exporter’s certainty price which discounts for this risk (see De Gregorio 1987 and Fitzgerald and Monson 1988 for details). This wedge is not a distortion. It represents the difference between what the buyer expects to receive—allowing for a finite probability of nonpayment—and the price the buyer expects to pay. It is an irreducible element of risk, outside the control of the exporter or its government, present in all commercial transactions. Private markets provide alternative instruments to redistribute this risk optimally (for example, prepayment, letters of credit, private insurance, and self-insurance). Government intervention alters the choice among them. However, the existence of the risk does not, in itself, justify governments’ providing assistance.

All such assistance institutionalizes, transfers, and perhaps (through risk-pooling) reduces this wedge and its associated costs to the exporting country. But it cannot eliminate them. Export insurance reduces the costs if premiums are less than exporters’ perceived losses from self-insurance;⁵ or if insurers have better perceptions of risk than exporters; or if insurance is subsidized. In the first two cases, the private market could profitably offer insurance without subsidy provided the administrative costs could also be covered. When insurance is subsidized, the government absorbs part or all of the costs of reducing export risk. These costs, including the scheme’s administration, might be significant; they might even exceed the benefits of risk reduction.

Other distinctive features of risk may be the reason why export insurance is not available to all exporters. Incomplete markets are not necessarily market failures, nor do they justify intervention (see Schlesinger and Doherty 1985). Causes of incomplete markets include moral hazard, adverse selection, the risk-seeking and risk-avoiding behavior of exporters, and the “loading” of premium rates to exceed expected losses.

Moral Hazard

Moral hazard exists if the insured exporter has an incentive to change its behavior once it obtains insurance. Suppose insurers make insurance available at premiums based upon exporters’ expected

losses. The availability of insurance allows exporters to change their behavior, sell to riskier customers and transfer greater risk than they would bear if they could not get insurance. Over time, unless insurers can accurately predict this behavior and set premiums accordingly, they will suffer larger-than-anticipated losses; premiums will rise; and some insurers and exporters may withdraw from the market (see Kunreuther and Kleindorfer 1983).

Pauly demonstrated that moral hazard may cause incomplete insurance markets, since "some events may be 'uninsurable' for some persons and not for others" and "some events, though uncertain, may not be insurable for anyone" (1968, p. 534). In a recent paper, Arnott and Stiglitz (1986) reiterate this conclusion. They point out that "there is no *a priori* presumption that . . . non-market institutions [such as governments] deal more adequately with the problems arising from moral hazard than those relying on market-oriented institutions" (p. 5). Empirical estimation is necessary to demonstrate that government intervention would encourage a more efficient allocation of resources.

Adverse Selection

The risks of various international transactions will differ, and an exporter can generally distinguish riskier transactions (for example, first-time shipments) from less risky ones (for example, shipments to long-standing customers). If insurers cannot distinguish risks as finely as their clients, they must base premiums on broad averages of claims, rather than charging differentially according to risk. Exporters then have an incentive to insure high-risk sales (since the premium is less than their expected losses from these sales), whereas they would lose by insuring low-risk sales. Over time, insurers would have to raise premiums as they revised their estimates of risk to recapture earlier losses or to prevent future losses. Rising premiums increase the threshold of risk at which exporters buy insurance. In time, only a few, high-risk exports would be insured. Note that adverse selection does not affect exporters' behavior in the way that moral hazard does. With moral hazard, insured exporters sell to riskier customers. With adverse selection, exporters sell to the same customers, but assume more of the risk as premiums rise over time.

Adverse selection and moral hazard are not market failures. They are inherent features of risk and asymmetry of information and they occur whether insurance is provided by private insurers or by the state. The cost of subsidized export credit insurance will rise if the problems of moral hazard and adverse selection increase. To the extent that state action could ameliorate these problems, it may be better to provide exporters with more information on risks than to

offer them insurance; even then, however, the information can be compiled and disseminated privately.

Other Reasons for Incomplete Markets

Export insurance markets may also be incomplete because exporters are inclined to take risks; because to differing degrees they are averse to risks; or because insurers “load” premium rates above losses expected under self-insurance. The first reason is unlikely, but if it were to hold, government action to reduce risk would be self-defeating. The second is plausible and indicates the market, though incomplete, functions well and is not a failure. The third reason is possible if imperfect insurance markets permit premium loading with insurance premiums which exceed exporters’ risk premiums. Even if evidence of imperfect competition were available, government regulation of the terms of service—which is common in most insurance markets—would be preferable to direct state provision of insurance.

Industrial Policies

In recent years, “strategic trade” rationales based, for example, on economies of scale (Helpman and Krugman 1985, Krugman 1966) or rents in imperfectly competitive international markets (Brander and Spencer 1983, Brander 1986) have been put forward to justify export promotion. Even in the limited cases where these rationales would hold, they would require much larger export incentives than those usually offered under export credit and insurance programs. Furthermore, Grossman (1986) questions whether policymakers have enough information to implement strategic trade policies and adjust them to changing market conditions. He points out that poorly implemented policies could be worse than none at all.

Export Externalities

Some analysts think that “externalities” associated with production for the export market (for example, from training, competing with stronger firms, introducing new technology, and so forth) cause divergences between private and social costs and benefits. For example, “innovating” exporters are thought to create externalities. By establishing market share in a market previously closed to suppliers from a given country, innovating or “first time” exporters lead

Other Rationales for Export Credit and Insurance

the way for others. Breaking into a market can have large effects. The first Japanese exporter of transistor radios may have led the way for an entire electronics industry.

At other times, people have argued there are externalities from import substitution or "self-sufficiency." The benefits of exporting or import substitution are usually cited qualitatively, so it is impossible to measure them against the costs of resource misallocation or to know whether overall the externalities create biases for or against exports. Even if a proexport bias is warranted, the externalities are attributable to the act of exporting, not to the provision of credit or insurance. It suggests that the right policy would be to eliminate the antiexport bias directly or to intervene in the market where the externality arises.

Employment and the Balance of Payments

Unemployment and trade deficits have also been cited as justifications for export credit and insurance programs (see Baron 1983 and Fleisig and Hill 1984). Export credit and insurance are unlikely to have much impact on such problems, which may require a broader macroeconomic response. Both programs are unlikely to have appreciable long-run benefits unless they eliminate distortions (Fleisig and Hill, pp. 18–20); if they introduce distortions, they move the economy away from an efficient allocation of resources. Even if export credit and insurance were temporarily to increase exports and employment, the exchange rate would appreciate, imports would increase and employment in import-competing activities would fall to offset the temporary improvements. In evaluating the French experience when export credit subsidies reached 0.5 percent of GNP, Melitz and Messerlin (1987) concluded that they "are likely to be distortionary in ways which more than offset any macroeconomic advantage which they allow. The case for such subsidies is not persuasive" (p. 167).

Matching Other Countries' Programs

Proponents of subsidizing export credit and insurance programs sometimes argue that a country should match the terms offered by others. This matching is claimed to provide fair treatment for exporters, to avoid dislocations of industry, or to be necessary to convince other nations to reduce their subsidies (Baron, p. 82).

PROVIDING FAIR TREATMENT. The costs of all inputs, including credit, vary internationally, and a nation's comparative advantage in international trade is determined by the costs of all factors. "Fair"

is a value-laden term. A notion of fairness which prescribes that a nation match for its own exporters any advantages enjoyed by others undermines the principle of comparative advantage and thus leads to an inefficient allocation of resources, domestically and internationally. It is the same as saying that governments should subsidize natural resources when they are costly in order to compete against nations in which they are cheap, or that governments should subsidize costly labor.

AVOIDING INDUSTRIAL DISLOCATION. Industries can be kept in business if their government subsidizes them enough in international markets, but this policy often costs the economy more than the wages of the jobs retained.⁶ In the absence of distortions, much of the benefit of postshipment credit accrues to the importing country, while the exporting country bears its costs. Unless distortions are being offset, the exporting country never gains; at best, it breaks even (see below). If country A makes an export sale only because its government matches other nations' credit and insurance terms, then it bestows a gift upon the importer while imposing allocative and administrative costs upon itself. In short, it taxes its own citizens and subsidizes foreigners. There is no a priori reason to assume that exporting provides other benefits that offset this cost. If competitors' concessionary postshipment financing is thought to be permanent, country A would be better off reallocating resources to other activities than forever incurring the costs of competitive intervention.

CONVINCING OTHERS TO REDUCE SUBSIDIES. Only a few developing countries—Brazil, the Republic of Korea—may be powerful enough to threaten other countries with subsidies in export credit programs. Even so, it is costly for industrial countries to try to compete in a subsidy race. The race amounts to a “prisoner’s dilemma,” in which the seemingly rational action of each participant leads to the worst outcome for all of them. The GATT Subsidies Code (see below) was adopted to prevent this. Even if rich countries’ governments tax their citizens for this purpose, it does not follow that developing countries can gain by doing so.

Development Aid

It is sometimes argued that industrial countries can use their own export credit and insurance programs as vehicles for development aid. Though designed primarily to facilitate exports and to benefit the exporting country, such programs give some benefit to the importing country to the extent that exporters reduce prices. However, their commercial nature makes them questionable vehicles for trans-

mitting development aid;⁷ and the rationale of transferring wealth is an argument against developing countries adopting these programs.

Status under GATT

Because industrial countries have used export credit and credit insurance for many years, developing nations may think that these programs are acceptable under GATT, that GATT is irrelevant to the subject. However, Paragraphs j and k of the Illustrative List of Export Subsidies of the Subsidies Code prohibit export credit and credit insurance offered at rates below financing costs or market rates (Hufbauer and Erb 1984, Snape 1984, Nam 1986).

Nonetheless, the GATT Subsidies Code has serious weaknesses. Paragraph j permits subsidized export credit insurance as long as premiums are not “manifestly inadequate” to cover operating costs and underwriting losses. This vague terminology permits the continuance of loss-making programs of export insurance.⁸ In Paragraph k, GATT effectively hands over to the OECD the task of regulating industrial countries’ export credit subsidies,⁹ and the proscriptions of the Subsidies Code are very weak with respect to developing countries. In practice, industrial countries use their own legislation to impose countervailing duties on developing countries that subsidize export credit.¹⁰

Institution Building

Some hold that institutions in developing countries are weak: one of the benefits of credit and insurance schemes, then, is to strengthen financial institutions and to train personnel. However, even if one subscribes to this view, then there are further questions. First, since the same argument would apply to *any* government program or institution, are these the best *government* institutions to be building and the best skills to be teaching? Second, are institutions strengthened in a cost-effective manner? Finally, does the institution building yield social benefits greater than those which would flow from alternative uses of the resources?

How Effective Are Export Credit and Insurance?

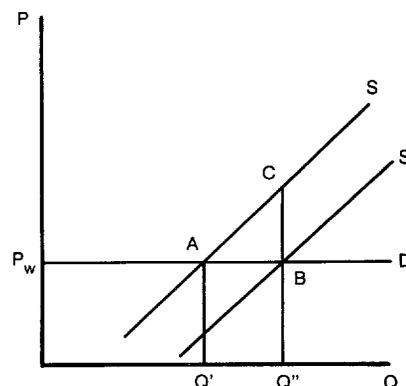
Do export credit and export credit insurance significantly increase export incentives, and does the exporting country capture a sufficient portion of their benefits? This section shows that in the absence of distortions which they are offsetting, the exporting country cannot gain from subsidized postshipment credit; that the importing

country cannot lose; and that the incentive effects of subsidized preshipment credit are likely to be relatively small.

Postshipment Credit

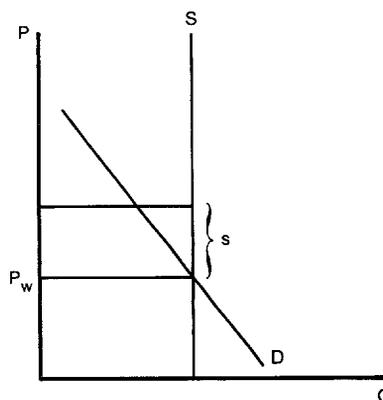
The price responsiveness of exports determines the way that the benefits of postshipment credit are divided between the exporting and the importing countries.¹¹ Suppose an exporting country introduces a postshipment credit subsidy when it cannot influence export prices. As figure 1 shows, the subsidy shifts the exporting country's supply curve from S to S' (the vertical distance BC represents the unit subsidy) and the exporting country retains the full subsidy. Its sales at the world price increase from Q' to Q'' and its exporters receive the subsidy for each unit exported—a windfall on the original exports, plus a small gain on the marginal units. Although the exporting country retains the full subsidy, it still suffers a resource misallocation loss equal to the area ABC , which measures the extent to which the cost of producing $Q'Q''$ exceeds the revenue. The importing country's welfare is unchanged, since it pays the same price regardless of the subsidy.

Figure 1



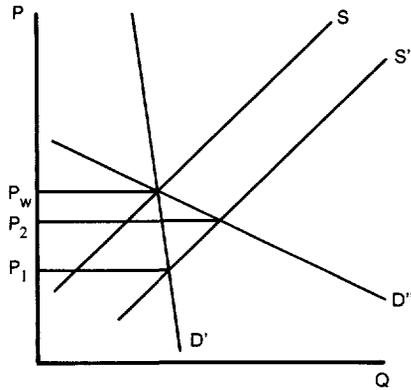
Now suppose that the exporting country is unable to increase its exports (perhaps because they are subject to a quota under an international marketing arrangement). Its supply curve is vertical (figure 2). The subsidy transfers income to exporters within the exporting country, does nothing to increase exports, and does not change the exporting country's economic well-being. Exporters receive the unsubsidized world price (P_w) plus the subsidy (s) from their government; the exporting country retains the subsidy (since output is unaffected); so the subsidy represents an income transfer from its taxpayers to exporters. The importing country has no welfare gain since the price and quantity of imports are unchanged.¹²

Figure 2



Now take the case in which the exporting country can influence world prices (that is, supply and demand curves have some price elasticity). The expression $S = E_s / (E_s - E_d)$, with a positive elasticity of supply (E_s) and a negative demand elasticity (E_d), gives the share of the subsidy received by the importing country, and $1 - S$ gives the share retained by the exporting country (see

Figure 3



Fleisig and Hill, pp. 42–43). Other things being equal, the share retained by the exporter increases as demand is more price elastic and as supply is less price elastic. The importing country gains through a lower price. This gain increases as demand becomes more inelastic. Figure 3 illustrates this conclusion: as supply shifts rightward, the price decline (and hence the importer's gain) is larger for the more price inelastic demand curve (D'). Using Stern, Francis, and Schumacher's (1976) estimates of supply and demand elasticities in international trade, Fleisig and Hill concluded that the importing countries received between 50 percent and 100 percent of the subsidy in OECD export credit programs.

This analysis leads to the conclusion that the exporting country is likely to lose less of its subsidy if it concentrates on subsidizing those products that are in competitive world markets, because export subsidies will then transfer rents to inframarginal exports if the country already exports the product. It is therefore important to determine the degree to which the subsidy provides rents to existing exports.¹³

Preshipment Credit

Credit subsidies can do little to offset antiexport bias. Consider a case in which the world price of a potential export is \$100; the world value of material inputs per unit of output is \$50; inputs are subject to no protection; labor costs per unit of output are \$30; and nominal protection on sales in the home market is 20 percent. Effective protection on export sales is zero, whereas effective protection on domestic sales is 40 percent.

Now assume the government subsidizes preshipment working capital to offset the home market (antiexport) bias. With a market interest rate of 20 percent and a subsidized rate of 10 percent, the subsidy provides an export incentive between 2.5 percent and 10 percent if the exporter finances its material inputs (\$50) for three months to one year; it ranges between 4 percent and 16 percent if the exporter finances its material and labor inputs (\$80) for three months to one year. In contrast, effective protection on domestic sales remains at 40 percent, so a further subsidy of 24 – 37.5 percent is required to offset the bias. And if the exporter borrows 100 percent of the world value of output (\$100) for six months, the antiexport bias will be eliminated only if interest rates are forty percentage points below the market rate (for example, 10 versus 50 percent).

Industrial countries' export credit and insurance programs have been expensive, difficult to control, and subject to political and economic pressures that have tended to subvert their objectives.¹⁴

THE UNITED STATES. The U.S. Export-Import Bank finances 5–10 percent of all U.S. exports and 25–35 percent of exports of capital goods. In 1982 it was estimated that 95 percent of its financing went to three sectors—nonelectrical machinery, electrical equipment, and transportation equipment (Feinburg 1982, p. 34). Estimates of its annual credit subsidies in the late 1970s and early 1980s range from \$500 million to \$1 billion (Fleisig and Hill 1984, Baron 1983, Boyd 1982).¹⁵ Its operating losses from 1982 to 1985 are estimated at \$1.25 billion (U.S. Senate 1985; U.S. Export-Import Bank 1984, 1985). But this figure understates its true losses, since the Export-Import Bank's accounting practices do not adequately treat problem loans: in 1985, the Comptroller General indicated that one-third (\$44.9 billion) of its loans were probably uncollectable (U.S. Export-Import Bank 1985, p. 39). The Foreign Credit Insurance Association (FCIA) brokers commercial and political risk insurance for the Export-Import Bank; it insured an average of 5 percent of U.S. exports during 1971–82, and Huszagh and Greene conclude that “export credit insurance has never really become a significant facilitating factor in U.S. sales abroad, in spite of the fact that it has been available for twenty years” (1982, p. 258–59). It provided a modest subsidy of at least one-half of 1 percent of the value of insured exports (U.S. Export-Import Bank 1984, 1985).¹⁶

THE UNITED KINGDOM. The Export Credits Guarantee Department (ECGD) has a long history of subsidizing exports. Byatt (1984, table A) reported that its credit subsidies ranged between 300 million and 500 million pounds sterling a year in the early 1980s; Fleisig and Hill (1984, tables 1, 2) estimated these subsidies to be about \$500 million annually between 1978 and 1980, some 11 percent of the exports it financed. The ECGD also subsidizes commercial and political risk insurance. Its premium income covered operating costs plus net claims (claims paid less recoveries) in only one year between 1973 and 1982; its losses in 1982 and 1983 were about \$500 million (Byatt 1984, Shapiro 1983).

FRANCE. The Compagnie Française d'Assurance pour le Commerce Extérieur (COFACE), the semipublic Banque Française du Commerce Extérieur, and the Banque de France offer a range of

export credit and insurance programs. Duff (1981, p. 931) called the French system "the most costly in the world." His estimated 1980 subsidy (\$2.0 billion to \$2.5 billion) approximates Melitz and Messerlin's estimates of \$1.5 billion to \$2.7 billion annually during 1981–84 (1987, tables 1 and 3); it is higher than Bobe's range of 2.4 to 4.4 billion francs annually (\$0.5 billion to \$0.9 billion) between 1974 and 1978, exclusive of central bank preferential discounting (1983, table 14); and Fleisig and Hill's total of \$1.2 billion to \$1.4 billion dollars for 1978–80, again exclusive of rediscounting (1984, tables 1, 2). Whatever the exact figure, the French system clearly involved substantial costs during the 1970s and early 1980s.

Developing Countries

The programs of the seven developing countries examined here all emphasize short-term preshipment credit; Korea and India have postshipment credit programs as well; and insurance is available in some, but not all, of them. In most countries, these programs are administered by export promotion agencies that provide other services to exporters. We have not evaluated the economics underlying the other functions they perform.

COLOMBIA. A public body (PROEXPO) rediscounts subsidized export credit. Until recently, 80–85 percent of this credit was for preshipment purposes. The differential between export credit and other interest rates varies, but has averaged 20 percent in recent years. The effective subsidy given by 1986 PROEXPO credit averaged 5.7 percent of value added in 1986. PROEXPO has favored export activities that use relatively more credit. Its subsidies have been nonuniform, ranging from 0.5 percent for beverages to 18.0 percent for oil refining (Schenone 1986). PROEXPO has recently reduced its subsidy for working capital in order to increase subsidies for long-term fixed investment in export activities.

PROEXPO is financed from interest earnings on its lending and a duty surcharge on all imports. In 1987, this surcharge was raised from 5 percent to 6 percent, and PROEXPO used part of the surcharge to subsidize nontraditional exports. The surcharge is a direct drain on the government's tax receipts, and a large one. It cost nearly 70 billion pesos (about \$750 million) between 1980 and the first half of 1986 (Schenone, table 7). In the first quarter of 1987, it represented about 4 percent of total government revenue.

Despite PROEXPO credit and other export promotion measures, Colombia's minor exports declined by 34 percent between 1980 and 1984—the years when the subsidy reached its maximum. Export subsidies were too weak to offset the increasing inward orientation

of the economy. In the same period, exports of all developing countries in the Western hemisphere increased by 8 percent and exports of Asian developing countries increased by 21 percent (International Monetary Fund 1986).

HONG KONG. Although Hong Kong has no officially sponsored export credit program, the Hong Kong Export Credit Insurance Corporation (HKECIC) offers export credit insurance. The government established HKECIC in 1966, provided its paid-up capital, and guarantees its insurance and guarantee liabilities (Rhee 1985, p. 121). HKECIC's insurance activities provide a small export subsidy and in themselves do not add significantly to export growth. On the strong assumption that insured exports would not have occurred without insurance, HKECIC's activities accounted for only 4 percent of all exports between 1980 and 1985.

In evaluating government-sponsored programs, one must distinguish between economic and accounting profits. Some programs have received their capital from the government, the capital being invested in government bonds or notes. These investments generate a steady stream of receipts comparable to annual budgetary appropriations. As long as the annual operating losses are less than these receipts, the agency shows an accounting "profit" even though it is inherently uneconomic and commercially unviable. Thus it is important to determine whether the "profit" is from operating revenues or other sources. Over the period 1975 to 1985, HKECIC suffered cumulative underwriting losses. But investment income on its initial capital plus undistributed surpluses allowed it to show an accounting profit that averaged 5.8 percent of its assets (HKECIC, various years). These underwriting losses plus forgone income on accumulated losses represented a subsidy of 0.13 percent of the value of insured exports.

INDIA. A range of export credit and export credit insurance is available in India. The Export Credit Guarantee Corporation of India (ECGCI) has offered export credit insurance and export credit guarantees since 1957; the central bank rediscounts export credit at concessional rates; the Ministry of Commerce provides a small interest subsidy on banks' export credit; and the Export-Import Bank of India finances longer-term credit.

The export credit guarantees of ECGCI represent 75–80 percent of ECGCI's insured and guaranteed values; insurance accounts for the rest and covers 10–20 percent of Indian exports (ECGCI 1984, and Reserve Bank of India, various years). ECGCI has always made accounting profits, but it has suffered some underwriting losses. For example, in 1983–84 the sum of net claims, employee remunera-

tion, other expenses, and depreciation was 17 percent greater than premium income (ECGCI 1984, Income and Expenditure Account, p. 33). ECGCI also has a history of rejecting and delaying claims. Three years or more are not uncommon, and many negotiations take longer. These delays reduce the attractions of rates that are among the lowest in the world.

The central bank rediscounts export credit above a minimum threshold, based on a bank's previous lending. Preferential rates for exports have been 5–9 percent below other short term rates. In addition, the Ministry of Commerce uses general revenues to fund an interest subsidy of at least 1.5 percentage points to export credits. This is intended to compensate for indirect taxes not covered by duty drawbacks—that is, a factor market subsidy is used to offset biases against exports originating in product markets. This program appears to function poorly, probably because India's conservative and highly regulated banking industry considers export credit to be risky. In the long run, deregulation of the banking system and liberalization of the trade regime may supply credit to exporters better than subsidizing short-term interest rates.

The Export-Import Bank of India, established in 1982, provides long-term export credit and, to a limited degree, shorter-term pre-shipment credit to activities eligible for its longer-term loans. It competes with industrial countries' programs, and its efficiency and effectiveness are subject to the same reservations. A rough calculation under alternative sets of assumptions suggests that assistance of somewhere between 104 million and 456 million rupees (\$9 million–\$40 million) in 1984, and between 138 million and 610 million rupees (\$11 million–\$49 million) in 1985 could have been given.¹⁷

KOREA. From the mid-1960s to 1982, Korea offered several credit incentives for exporters; concessional rediscounting of pre-shipment credit was the most important. The Korean Export-Import Bank was established in 1976 to provide longer term postshipment credit. In 1977, it assumed administration of the Korea Reinsurance Corporation's export insurance program (Cizauskas 1979b).¹⁸

Until 1982, Korea's financial sector was heavily oriented toward exporting. In the 1970s, preferential rediscounting, which gave banks a spread of 2.5 to 5.0 percent between lending and borrowing rates (Rhee 1985, table 19), accounted for 40 percent of the loans and discounts of the central bank (Bank of Korea 1986, p. 24). The differential between the pre-shipment export credit rate and the general bank loan rate ranged between 2.5 and 18.0 percent in the 1970s; it narrowed in 1980–81 and was eliminated in 1982's financial liberalization. Its subsidy was 1–2 percent of the f.o.b. value of

manufactured exports and 5–10 percent of the domestic value added in manufacturing exports.¹⁹ Access to bank loans for preshipment credit was important only to the degree that it reduced exporters' reliance on the informal money market, where interest rates were 15–20 percent above commercial bank rates. If exporters had paid these higher rates rather than the subsidized rates, their costs would have increased by between 3.5 percent and 6.7 percent of the f.o.b. price.

Export credit insurance does not appear to have done much to boost Korean exports. Commercial and political risk insurance covered less than 1 percent of Korean exports in 1979–80 (Rhee 1985, annex table 18). Extensive use of letters of credit (L/Cs) was the main reason the demand for export credit insurance was so small. During 1968–80, L/Cs were used for 84–96 percent of Korea's exports (Rhee 1985, annex table 5); since then, their share has fallen to 80 percent (Bank of Korea 1985, p. 90). Preshipment credit guarantees issued by Korean insuring agencies have also been relatively unimportant, since commercial banks and borrowers assumed risks and extended preshipment credit on the basis of L/C financing without other collateral. As the banking system was publicly owned until 1982, banks' preshipment credit represented an implicit assumption of private risk. Nonperforming export loans were 3 percent of total export loans at the end of 1978 (Rhee 1985, p. 101, footnote 30).

The Korean Export-Import Bank provides longer-term finance to Korean exports of capital goods. Its credit has been evenly divided between exports to industrial and to those developing countries, and its outstanding loans showed a tenfold real increase between 1978 and 1985 (Bank of Korea 1986). It finances 2–3 percent of total Korean exports and 15–20 percent of capital goods exports. In the late 1970s it provided a subsidy ranging from 15 to 25 percent of its loans' face values; its rates were 9–10 percent while the London interbank offered rate (LIBOR) was about 15 percent (Cizauskas 1979a).²⁰ Since then its subsidy has fallen, because it denominates its loans in foreign exchange and charges world market rates plus a margin.²¹ It is nonetheless reasonable to suspect that foreign buyers who use its credit may be subsidized.

It remains controversial whether Korea's selective credit policies have contributed to Korea's export growth. Some claim that without favored access to long- and short-term capital, exports probably would have been smaller, since other distortions penalized exporters. Others argue that the huge increase in Korean exports was due to policies other than selective credit—import liberalization and depreciation of the won—and that the insignificant preshipment credit subsidy was a transfer with little effect, provided at fairly high cost.

SRI LANKA. The Sri Lanka Export Credit Insurance Corporation (SLECIC) issues guarantees and offers commercial and political insurance. In 1979–85, guarantees and insurance covered 5 percent of total exports and 13 percent of industrial exports; insurance against commercial and political risks covered 3 percent of industrial exports (Central Bank of Ceylon, 1983, 1985). The central bank also has rediscount arrangements for short-term credit (before and after shipment) on nontraditional exports. Recently, 50–55 percent of central bank rediscounting has been for concessionary export credit; of this, three-fourths was preshipment credit (Lindgren and others 1986a, appendix table 29). The refinancing rate has ranged from 10 percent to 13 percent; the maximum commercial banks could charge was 13–16 percent; and the commercial bank rate on short-term credit for other purposes was around 20 percent. Assuming that the credit program reduced exporters' borrowing costs by five percentage points (from 20 to 15 percent), the credit subsidy totaled about 200 million rupees from 1983 to 1985. This subsidy was small (0.55 percent of the value of industrial exports over the period), but its cost to the central bank was significant. It caused the central bank to lose 160 million rupees in forgone interest earnings (assuming that the export credit rediscount rate was four percentage points below alternative rediscount rates): this equalled 2 percent of the central bank's total net assets at the end of 1985.

Sri Lanka's concessional export credit raises three problems. First, exporters can obtain the credit they need at market rates from the banks; central bank refinancing provided only one-fourth of the increase in commercial bank short-term loans and advances to exporters between 1980 and 1985 (Central Bank of Ceylon 1985; Lindgren and others 1986a, appendix table 29). Second, the concessional credit discriminates against newly established banks, since it allocates credit among commercial banks on the basis of each one's percentage share of outstanding export credit. Third, banks tend to lend to established customers (Cuthbertson 1983, p. 44). These factors cast doubt on how far concessional credit can stimulate extra Sri Lankan exports.

TURKEY. Subsidized export credit, indirect tax rebates, and duty-free imported inputs were elements in the export promotion program that Turkey began in 1980 (see Milanovic 1986). Export insurance was not offered. Export credit received a direct subsidy financed by a 7.5 to 15 percent tax on other credit; it was subject to a lower discount rate, and it was exempt from a 3–15 percent credit transactions tax. The export credit subsidy fell from about three-fourths of export subsidies in 1980 to 7 percent in 1984; it was phased out in January 1985 and reintroduced in November 1986.

The export credit program provided large subsidies, introduced new distortions and involved large costs for the Turkish government. Its subsidies ranged from 16 percent of the f.o.b. value of manufactured exports in 1980 to 1 percent in 1984 (Milanovic 1986, table IV.4). During this period, the differential between export and general credit ranged between 17 and 30 percent; adjusted for inflation, the effective real interest on export credit ranged from -45 percent to 1 percent. The program favored capital goods over consumer and intermediate goods; in 1980, for example, export credit subsidies as a percentage of export value were zero for paper products but as high as 70 percent for electrical machinery. During 1980-82, the credit subsidy represented 10 percent of the value of Turkish exports (Milanovic 1986, table IV). However, Milanovic, in a survey of five firms, concluded that export credit subsidies were the least important of the export promotion instruments implemented between 1980 and 1985.

VENEZUELA. Venezuela offers extensive financing for exports through the Export Financing Fund (FINEXPO) of the central bank. About three-fourths of this financing, available at preferential rates of 5-9 percent, is postshipment and the rest is preshipment credit. FINEXPO provides about one-third of the total directly, and two-thirds indirectly through foreign or national banks. For domestic indirect financing, originating commercial banks have matched FINEXPO's financing equally (FINEXPO 1986) so the interest rate to the exporter is a blend of the subsidized and the market rates. FINEXPO also offers export insurance jointly with a private provider; it covers political risks, the latter covers commercial risks. The insurance is generally not comparable to that offered in most industrial countries and some developing countries, where a government agency assumes direct responsibility. Between 1979 and 1985, insurance was used for about 6 percent of nontraditional exports.

Since 1976, FINEXPO financing has covered 6 percent of nontraditional exports (0.3 percent of total exports), and the FINEXPO/Commercial Bank program has averaged another 5 percent. The rates of subsidy vary among the programs. In the largest program, the indirect financing of the credit line between FINEXPO and national banks, FINEXPO provides half the financing at 5 percent, and the participating bank provides the other half at the market rate. With the market rate at 14 percent, credit would therefore be available at 9.5 percent—a cost reduction of about one-third. Assuming that credit lasts, on average, for six to nine months, the subsidy would average 2-3 percent of the f.o.b. price of an export.²² For exporters, the benefit will be greater for goods with low value added than for those with high value-added. With an average value added

for Venezuelan exports of 68 percent, the subsidy provides a 3–5 percent incentive as a percentage of world value added (see Fitzgerald 1987 for details).

FINEXPO's credit lines with foreign banks total \$100 million, with rates ranging from 6 to 8 percent on terms from one to three years. Direct postshipment financing offers loans for as much as six years for capital goods and twelve years for projects, with minimum rates of 7.5 percent plus a handling fee of up to 0.5 percent. These rates are lower than those at which Venezuela borrows in international capital markets—so the government has been borrowing abroad in order to lend abroad at lower rates.

Conclusions

Many of the economic rationales for subsidizing export credit and export credit insurance do not stand up to close inspection. The best arguments are based on domestic distortions that cause divergences between private and social costs and benefits. However, even these arguments have not been well articulated, nor have they been strongly supported with empirical evidence of their significance.

The experiences of industrial and developing countries do not provide a clear basis for recommending subsidies for export credit and insurance. OECD credit programs have a history of subsidy, and after twenty years of negotiations, major exporting nations' credits are still not at market levels. Lenders still differentiate according to the level of development of the foreign buyer and, in some countries, there is preferential access to credit at noncommercial rates. The preferential credit and insurance schemes in most of the seven developing countries studied here also provide little clear support for their introduction elsewhere. Most emphasized preshipment credit (although some, such as those in Korea and India, provide longer-term postshipment credit on terms similar to those in OECD countries). Their export credit insurance programs differed markedly: some insure against commercial and political risks; others emphasize guarantees on preshipment credit; others have credit but not insurance programs. The degree of subsidy in export credit programs varies among countries and over time. Some countries' insurance programs have shown accounting profits; however, more than half the Berne Union members are still cumulatively unprofitable. A general impression is that, instead of responding to capital market failures, preferential export credit is used as a rather weak means to offset biases against exporting found elsewhere in the economy. Finally, export credit insurance has not been shown to stimulate exports to any great extent; in every country except India insured exports accounted for less than 10 percent of total exports.

Rationales for preferential export credit and export credit insurance are reviewed and several countries' programs are examined to determine if these preferential programs are appropriate export promotion instruments for developing countries. Market failure is the most compelling rationale for their introduction but these arguments have not been well articulated and there is no systematic analysis of the costs of alternative government responses. Industrial countries' programs have histories of subsidy while developing countries' preferential programs have not been significant factors in stimulating exports.

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1. Balassa 1971, 1978; Bhagwati 1978 and 1988; Krueger 1978; and Little, Scitovsky, and Scott 1970 provide evidence that countries adopting export-oriented policies have enjoyed higher employment and economic growth rates than those pursuing import substitution policies.

2. Commercial risk is "the risk that the foreign private buyer will not effect timely deposit of local currency with instructions to its bank to make payment in foreign currency." Political risk arises from "actions or non-actions of foreign governments, including the failure or inability to effect payment in foreign currency after deposit by a private buyer of local currency with instructions to transfer" (Moore 1984, p. 140).

3. See Anand and Joshi 1979, Corden 1974, and Krueger 1984. Four conditions must be met for subsidies to be the best instruments: (a) nondistorting taxes must finance the subsidies, (b) taxation must involve no collection costs, (c) the subsidies must have no disbursement costs, and (d) income distribution effects of the policies can be neglected (Corden, ch. 3).

4. Baron 1983 provides more detail on issues related to capital market distortions.

5. Portfolio theory indicates that the risk of a large portfolio of risky assets is less than the risks associated with each individual asset. Hence, risk pooling could reduce risk perceived by any one exporter in international transactions and raise its "certainty" price. Similarly, insurers may have different information on international risks than exporters. If this is the case, the insurance premium (representing the insurer's risk perception) may be less than the difference between the expected world price and the exporter's certainty price. Exporters will always insure sales to reduce risk. In either of these cases, if the insurance premium is actuarially neutral, insurance will reduce the differential between the foreign and domestic marginal rates of transformation and bring the economy closer to the riskless optimum.

6. OECD export credit subsidies were over \$1 billion annually in the early 1980s, and more than twenty years of negotiations were needed to bring OECD export terms close to market rates (see Fitzgerald and Monson 1988 and the discussion below for details).

7. Four percent of U.S. Export-Import Bank loans and guarantees in 1984-85 were made to low-income economies; 50 percent were made to lower-middle-income countries and 46 percent were made to upper-middle-income and industrial economies (World Bank 1986a income classifications applied to data in U.S. Export-Import Bank 1984, 1985). Feinburg (p. 79) also notes that the U.S. Export-Import Bank does not consider projects' broader effects upon development and may finance projects that exacerbate biases in countries' economic policies (for example, import-substitution projects in countries with this predilection will appear

more attractive than export activities). In 1984–85, 97 percent of U.S. Export-Import Bank loans and guarantees to low-income countries were used to finance the acquisition of aircraft. One half of its 1984–85 loans and guarantees to lower-middle-income economies were for mining, oilfield, and construction equipment; 19 percent financed aircraft; 21 percent financed industrial equipment; and only 10 percent could be considered to be infrastructure loans.

8. For example, in only one year between 1973 and 1982 did the British official insurance agency have premium income in excess of operating costs and net claims; from 1979 to 1982, its net cash flow averaged a negative 50 million pounds; in 1982–83, it had a deficit of 280 million pounds (Byatt 1984, p. 166). It would seem that this loss record would qualify the premiums as “manifestly inadequate.” Yet, as far as we know, there have been no complaints brought against it under GATT provisions.

9. Cheney 1985, Duff 1981, Hufbauer and Erb 1984, and Moore 1984 review the history and institutions of the OECD programs.

10. Countervailing actions of the United States, the European Communities, Australia, Canada, and Japan rose from a total of 10 in the period July 1980–June 1981 to 67 in the period July 1984–June 1985; of the 232 total countervailing actions between July 1980 and June 1985, 122 (53 percent) were brought against developing countries; nearly every case of subsidization of exports from Brazil, Korea, Mexico, and South Africa against which the United States imposed countervailing duties between 1980 and 1985 involved short- or long-term preferential credit or credit guarantees (Nam 1986, tables 1, 2, 6).

11. This analysis is based on Fleisig and Hill 1984, appendix B.

12. In the case of perfectly elastic export supply, the importing country gains the entire subsidy as it purchases its imports at the world price minus the subsidy.

13. Itoh and Kiyono (1987) similarly conclude that export subsidies on nonmarginal goods (goods and quantities that the country would export without the subsidies) worsen the exporting country’s welfare and that, under certain conditions, export subsidies on marginal goods (goods not exported or exported in small amounts under free trade) may improve welfare in the exporting country.

14. See Brau and Puckahatikom 1985, Cheney 1985, Duff 1981, Fitzgerald and Monson 1988, Hufbauer and Erb 1984, and Moore 1984 for greater detail.

15. The export credit subsidy is the interest rate differential between the subsidized terms and those the borrower would have otherwise paid in capital markets. For postshipment credit, the subsidy is given as the present value of the interest rate differential over the life of the loan; it can be thought of as the difference between the face value of the loan and the present value of the stream of principal and interest payments computed at the market interest rate. The choice of interest rate to compare the subsidized rate is important. For preshipment and shorter-term postshipment credit, an approximation is the short-term rate which existed on export working capital loans before subsidization. An even higher rate (the curb rate) may be the appropriate comparison when it is felt that exporters did not use commercial bank preshipment working capital before subsidization or when export credit is offered at rates comparable to those on other activities.

Insurance subsidies are the excess of loss claims plus operating expenses over the insuring agency’s premium income adjusted for investment income from the agency’s initial capital and any operating surpluses. A simpler measure is the accumulated difference between premium income and costs plus losses. Both measures are roughly equal when the agency’s surpluses some years offset other years’ losses.

16. FCIA’s operating costs could not be separated from other Export-Import Bank costs. If these costs were added, the subsidy would be even larger.

17. These estimates were derived by applying the difference between the prime rates of Indian long-term lending institutions and the Export-Import Bank’s lending rates to its loans, advances, and discounts. In 1984 and 1985, its lending rates were 8 percent when lending directly to a commercial bank and 9 percent when

lending directly to the exporter, while prime rates of Indian long-term lending institutions ranged from 11.5 to 20.0 percent (Reserve Bank of India 1984/85, p. 71). Its loans, advances, and discounts were 4.15 billion rupees in 1984 and 5.54 billion rupees in 1985.

18. The Korean Credit Guarantee Fund also provides preshipment guarantees (Rhee, p. 101).

19. Output value is converted to value added assuming the low 0.20 ratio of value added to sales found in Bank of Korea 1984, p. 80.

20. Assuming that it borrowed at LIBOR plus 1 percent (that is, 16 percent) for seven years and made loans of seven-year maturities with 10 percent interest rates, the discounted present value of the subsidy over the seven years is 17 percent of the loan's face value. If the loan were over ten years, the subsidy would be 21 percent.

21. Information provided in correspondence from Yung Rhee.

22. That is, $0.5 \times (14\% - 9.5\%)$ to $0.75 \times (14\% - 9.5\%)$.

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