Disequilibrium Analysis in Developing Economies
An Overview

No. 206. Gershon Feder, "Adoption of Interrelated Agricultural Innovations: Complementarity and the Impacts of Risk, Scale, and Credit," *American Journal of Agricultural Economics*


No. 208. Michael Cernea, "Indigenous Anthropologists and Development-Oriented Research," *Indigenous Anthropology in Non-Western Countries*


No. 210. George Psacharopoulos, "Returns to Education: An Updated International Comparison," *Comparative Education*

No. 211. Gregory K. Ingram and Alan Carroll, "The Spatial Structure of Latin American Cities," *Journal of Urban Economics*


No. 213. Salah El Serafy, "Absorptive Capacity, the Demand for Revenue, and the Supply of Petroleum," *Journal of Energy and Development*


No. 215. Michael Cernea, "Modernization and Development Potential of Traditional Grass Roots Peasant Organizations," *Directions of Change: Modernization Theory, Research, and Realities*

No. 216. Avishay Braverman and T. N. Srinivasan, "Credit and Sharecropping in Agrarian Societies," *Journal of Development Economics*


Disequilibrium Analysis in Developing Economies: An Overview

BELA BALASSA*
Johns Hopkins University, Baltimore
and The World Bank, Washington, D.C.

Summary. - Disequilibrium is ubiquitous in most developing economies. In product markets, disequilibrium is pervasive in the tradeable goods sector due to foreign trade restrictions. In general, protection discriminates among domestic products, between domestic and foreign goods, and between domestic and foreign sales of any given commodity. Disequilibrium is also common in factor markets. Capital markets are frequently distorted by interest-rate ceilings and credit rationing. Labour markets are subjected to differential income tax rates, minimum wages and social security levies. Here, the techniques developed to analyse product and factor market disequilibrium and the empirical evidence measuring the economic costs of policy-imposed distortions are reviewed.

1. INTRODUCTION

Following contributions by Haberler (1950), Bhagwati and Ramaswami (1963) and Johnson (1965b), Bhagwati (1971) formulated a general theory of distortions in product and in factor markets. Bhagwati distinguished between 'endogenous' and 'policy-imposed' distortions, depending on whether departures from optimal resource allocation result from market imperfections or from policy actions.

While studies of distortions in product markets have continued to focus on policy-imposed distortions, the literature on distortions in factor markets has concentrated on endogenous distortions. Thus, Magee's survey article includes only two policy-imposed distortions in factor markets on a list of 15 (1973, pp. 2-3), and in his subsequent book there are eight literature references to such distortions within a grand total of 244 (1976, pp. 113-30).

This paper will analyse policy-imposed distortions in product and in factor markets of developing economies. Section 2 will describe briefly the principal policy-imposed distortions observed in developing economies, review recent estimates on the extent of discrimination in particular markets, and indicate their possible economic effects. In turn, Section 3 of the paper will report on available estimates of the impact of these distortions on the efficiency of allocating existing resources as well as on savings, investment efficiency, and economic growth.

2. POLICY-IMPOSED DISTORTIONS IN PRODUCT AND IN FACTOR MARKETS

(a) Distortions in product markets

Protection, a ubiquitous phenomenon in developing economies, has received considerable attention in the theoretical literature on international trade. Furthermore, the introduction of the concept of effective protection in the mid-1960s has been followed by a spate of estimates, notwithstanding the conceptual and the measurement problems involved.

Protection introduces three forms of discrimination in the national economy: (a) discrimination among domestic products; (b) discrimination between domestic and foreign products; and (c) discrimination between domestic and foreign sales of a particular product. The first type of discrimination is indicated by relative rates of (gross) effective protection; the second by net effective rates of protection, after adjustment made for the

* The author is indebted to Jaime de Melo, Sweder van Wijnbergen and Larry E. Westphal for helpful comments. The paper expresses the author's views alone and should not be interpreted to reflect those of the World Bank.
effects of protection on the equilibrium exchange rate; and the third by the extent of the bias against exports and in favour of import substitution. The relevant formulas are shown in equations (1)-(3).

(a) Gross effective rate of protection:

\[
\frac{t_i - \sum_j A_{ij} f_j}{1 - \sum_j A_{ij}}.
\]

(b) Net effective rate of protection:

\[
z_i = \frac{r_1}{r_0} (1 + z_i) - 1.
\]

(c) Bias against exports:

\[
x_i = \frac{z_i^m - z_i^x}{z_i^m} - 1
\]

In the equations, \(t\) is the nominal rate of protection, representing the effects of import tariffs (subsidies), or the tariff-equivalent of import restrictions, and export subsidies (taxes) on the price of the product. Subscripts \(i\) and \(j\), respectively, refer to the product and its tradeable inputs; superscripts \(x\) and \(m\) refer to domestic and export sales of a particular product; \(A_{ij}\) denotes input-output coefficients under free trade; and \(r_1\) and \(r_0\) refer to the exchange rate under protection and under free trade, respectively.

Protection-imposed discrimination among domestic products, shown by (gross) effective rates of protection, reflects the existence of price distortions in regard to the product and its inputs. Positive (negative) net effective protection indicates the extent of discrimination between domestic and foreign products, i.e. import protection (subsidization) and export subsidization (taxation). Finally, there is discrimination between domestic and foreign sales of a particular product in the customary case observed in developing economies, when import tariffs (the tariff-equivalent of import restrictions) are not compensated by export subsidies.

The described forms of discrimination are illustrated in Table 1 by estimates for 12 developing economies. The estimates point to the existence of considerable inter-country differences in the extent of discrimination among economic activities, owing to differences in the structure of protection. At the same time, they show that the three forms of discrimination go hand-in-hand.

At one extreme, Argentina, Brazil, Chile, Pakistan and the Philippines exhibit considerable discrimination against primary activities, against manufactured imports, as well as against sales abroad. At the other extreme, primary and manufacturing activities receive similar incentives, there is little discrimination against manufactured imports, and the bias against exports is small in Korea, Malaysia, Singapore and Taiwan. Finally, Mexico, Colombia and Israel occupy a middle position in regard to all three forms of discrimination.

There are also substantial differences in the inter-industry variability of the three forms of discrimination among the 12 developing economies studied. On the whole, the extent of discrimination and its dispersion among industries in the individual economies are positively correlated (Balassa et al., 1971, p. 72, and 1972, Chap. 2).

Protection-imposed discrimination gives rise to inefficiencies in resource allocation that are aggravated due to a bias against exports. This conclusion is strengthened if we consider that tariff protection in developing economies leads to loss of economies of scale and/or a low level of capacity utilization in producing for limited markets and failing to specialize within industries characterized by product differentiation. Also, tariff protection provides little incentive for technical change, in particular in cases when the domestic market can support only one or a few producers, and there is a loss in the form of 'X-inefficiencies', owing to the failure of firms to use least-cost production methods. In turn, exports permit the use of large-scale production methods and need to meet the test of world markets, when the stick and the carrot of competition gives inducement for improvements in production methods (Balassa, 1975).

Apart from protection, distortions in product markets may result from price control and underpricing by public enterprises, in particular, public utilities. Price control may be applied in the production and/or the consumption sphere, requiring increased imports or some form of rationing. The adverse effects of price control on domestic production have been observed, in particular, in Sub-Saharan Africa (World Bank, 1981). In turn, the underpricing of public utilities, widely applied in developing economies, will increase the protection of
Table 1. Effective protection in 12 developing countries

<table>
<thead>
<tr>
<th>Country (Year)</th>
<th>Gross effective protection (zi)</th>
<th>Net effective protection (z̄)</th>
<th>Bias against exports (xi)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primary</td>
<td>Manufacturing</td>
<td>Together</td>
</tr>
<tr>
<td>Brazil (1966)</td>
<td>52</td>
<td>113</td>
<td>83</td>
</tr>
<tr>
<td>Chile (1961)</td>
<td>21</td>
<td>182</td>
<td>84</td>
</tr>
<tr>
<td>Mexico (1960)</td>
<td>1</td>
<td>26</td>
<td>12</td>
</tr>
<tr>
<td>Malaysia (1960)</td>
<td>-6</td>
<td>-6</td>
<td>-6</td>
</tr>
<tr>
<td>Pakistan (1963-1964)</td>
<td>n.a.</td>
<td>271</td>
<td>n.a.</td>
</tr>
<tr>
<td>Philippines (1965)</td>
<td>-1</td>
<td>61</td>
<td>8</td>
</tr>
<tr>
<td>Argentina (1969)</td>
<td>0</td>
<td>112</td>
<td>47</td>
</tr>
<tr>
<td>Colombia (1969)</td>
<td>10</td>
<td>35</td>
<td>-2</td>
</tr>
<tr>
<td>Israel (1968)</td>
<td>48</td>
<td>76</td>
<td>62</td>
</tr>
<tr>
<td>Korea (1968)</td>
<td>9</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>Singapore (1967)</td>
<td>9</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Taiwan (1969)</td>
<td>0</td>
<td>14</td>
<td>5</td>
</tr>
</tbody>
</table>

Sources: Bela Balassa et al., *The Structure of Protection in Developing Countries* (Baltimore, Maryland: Johns Hopkins University Press, 1971), and Bela Balassa et al., *Development Strategies in Semi-Industrial Economies* (Baltimore, Maryland: Johns Hopkins University Press, 1982).
manufacturing industries, such as petrochemicals, chemicals, steel and aluminum, which are large users of these utilities.

Protection also creates distortions in factor markets by affecting the relative prices of labour and capital (the wage-rental ratio). As developing countries generally have a comparative advantage in labour-intensive products, the wage-rental ratio will tend to decline as a result of protection. The distortions are aggravated by the oft-observed tendency in developing economies to discriminate against the domestic production of machinery. Other forms of intervention in product markets, such as the underpricing of capital-intensive public utilities, will introduce further distortions in factor markets.

(b) Policy-imposed distortions in factor markets

Distortions in factor prices, with attendant inefficiencies in resource allocation, further find their origin in policy-interventions in factor markets. The wage-rental ratio may be affected by credit and tax policies that bear on the price of capital, as well as by tax policies, minimum wage legislation, and the social security system that influence the price of labour.

Policy-imposed distortions in factor markets may have a general or a special incidence; in the latter case, their incidence varies among the users of the factors of production. But measures of general incidence, too, will affect the choice of techniques.

(c) Capital markets

Among instruments of credit policy, interest-rate ceilings and preferential credits have been widely used in developing economies. Interest-rate ceilings have been traditionally administered in Latin American countries, keeping real interest rates negative and necessitating the rationing of credit. Latin American, as well as Asian, countries have also provided considerable credit preferences.

The extent of credit preferences has been particularly large in Brazil, where real interest rates to preferred borrowers were in the −30 to −40% range in the late 1970s while non-preferential borrowers paid inflation-indexed rates and savers received negative real interest rates. Credit preferences have been used in part to pursue particular objectives, such as import substitution in intermediate products, and in part to benefit otherwise disadvantaged sectors, such as agriculture (Balassa, 1979). In turn, in developing economies characterized by outward orientation, such as Korea, exports have benefited from preferential credits (Hong, 1981).

Apart from adversely affecting the efficiency of resource allocation, credit preferences have detrimental effects on the development of financial intermediaries. Negative, or below-equilibrium real interest rates, too, hinder the development of financial intermediaries and provide incentives for "self-investment", including inventory building, at rates lower than those obtainable elsewhere in the economy.

More generally, credit rationing under below-equilibrium real interest rates, as well as credit preferences, lower the efficiency of investment, both by discriminating among the users of capital and favouring the application of capital-intensive techniques. Also, below-equilibrium real interest rates tend to discourage domestic savings and encourage the outflow of capital. McKinnon (1973) and Shaw (1973) speak of financial repression that ultimately adversely affects the growth of the economy.

Excessively high real interest rates, resulting from the application of restrictive monetary policies, may also have adverse economic effects, however, by discouraging socially profitable investment and hindering the development of long-term capital markets. Such has been the case in Latin American countries of the Southern Cone, which have attempted to reduce the rate of inflation by not deviating in line with differential rates of price increases at home and abroad.

A shift in interest rate policies has been observed in Turkey where real interest rates on non-preferential loans of one-year maturity were about −80% in early 1980 but became strongly positive following the interest rate reform undertaken in July 1980. At the same time, differences in interest rates among borrowers have persisted. In mid-1981, interest rates on one-year non-preferential loans, including the cost of compensating balances, were about 70% compared to preferential rates of 32% on general investment credits, 24% on export credits, and 10–29% on agricultural credits. In the same period, wholesale prices rose at an annual rate of about 40% (Balassa et al., 1982, Chap. 3).

Tax measures, including the double taxation of corporate income, lack of inflation accounting, accelerated depreciation provisions, and tax holidays, too, affect the price of capital. These measures as well as the taxation of
private savings further bear on the system of financial intermediation, the efficiency of investment, and the volume of domestic savings in developing economies.

In 1981, in Turkey, for example, depreciation was calculated at historical values despite a four-fold rise in prices over the previous six years, thereby taxing 'phantom' profits. Nor were capital gains adjusted for inflation and, in mid-1981, interest rates paid to depositors barely covered the rate of inflation but were nevertheless subject to a tax of 25%. Financial transaction taxes and low interest rates paid on liquidity and reserve deposits further increased the cost of intermediation of the banking system, which totalled 30 percentage points on non-preferential loans financed from one-year time deposits in mid-1981 (ibid.).

In turn, tax benefits to investments in particular sectors are generally linked to the value of investment in developing economies. They thus favour capital-intensive activities just as preferential interest rates do. A case in point is regional policy in Brazil that has provided inducements for capital-intensive investment in the Northeast, a region characterized by excess labour.

The effects of credit and tax measures on the price of capital have been estimated in the case of Pakistan. With tariffs and the overvaluation of the exchange rate bearing on the price of the capital asset; the cost of financing, depreciation provisions, and the corporate tax rate affecting the annual cost of owning capital assets; and tax holidays influencing net returns to capital, the ratio of the market to the equilibrium (shadow) price of capital in Pakistan varied between 0.23 and 0.34 between 1959 and 1960 and 1971 and 1972. The ratio subsequently rose to 0.79 as the overvaluation of the rupee was remedied and the tax holiday scheme was abandoned (Guisinger, 1981, p. 332).

At the same time, these measures were applied selectively and, until 1972, small investors faced capital costs more than twice those of large firms (ibid., p. 333). In turn, in the mid-1970s, the cost of capital to the private sector was about two-and-a-half times that for the public sector in Tunisia (Nabli, 1981, p. 468).

(d) Labour markets

Distortions in the labour markets occur as high marginal income tax rates create incentives to reduce the work effort and to shift from payment in money to payment in kind. For example, in 1980 in Turkey minimum wage-income was subject to a tax of 28%. Under the new schedule introduced on 1 January 1981, the minimum wage is not subject to tax but the marginal tax rate is 40% on incomes immediately above this level (Balassa et al., 1982, Chap. 4).

High marginal tax rates also discourage the movement of labour from lower to higher productivity industries. Labour mobility is further discouraged by redundancy payments that have particular importance in Latin American countries, often amounting to one year's wage. At the same time, high redundancy payments tend to reduce employment by discouraging new hiring. The prohibition to dismiss workers, presently applied in Turkey, will have similar effects.

Minimum wage legislation and social security charges, too, may increase the cost of labour. Such regulations are said to have raised the cost of unskilled labour by 23% in the Ivory Coast (Monson, 1981, p. 273). Furthermore, Guisinger suggests that in Pakistan 'the major part of the increase in wages [that] occurred in the 1970s appears to be due to non-market factors, particularly the wage policies introduced during the period' (1981, p. 325).

Factor-market distortions lowering the cost of capital and raising the cost of labour much exceeded the effects of protection on the wage-rental ratio in Pakistan. According to Guisinger, until the 1972 devaluation, this ratio in market prices was on the average over five times the equilibrium ratio; it was two-and-a-half times greater afterwards (1981, p. 334). Distortions were larger than the average in the large-scale sector that benefited from lower capital charges and was required to pay higher wages (ibid., p. 333). In turn, in the case of Tunisia, distortions in capital and labour markets are said to have resulted in a wage-rental ratio 2.4 times higher in the public sector than in the private sector (Nabli, 1981, p. 468).

3. THE ECONOMIC COSTS OF POLICY-IMPOSED DISTORTIONS

(a) Effects on the efficiency of resource allocation

Harberger was the first to examine possible magnitudes of the (static) cost of production (external distortions, in his terminology) and that of distortions in capital and in labour markets (designated as internal distortions). For the mid-1950s, in Chile, he estimated that
'the welfare costs of external distortions are less than 2% per cent of national income, the welfare costs of internal distortions among sectors less than 10 per cent of the national income, and the welfare costs of within sector distortions less than 3 per cent of the national income' (1959, p. 140). On the assumption that these costs are additive, Harberger reached the conclusion that 'eliminating resource misallocations while maintaining existing production functions might raise the level of national welfare by some 15 per cent, but probably not more' (ibid.).

(b) Product markets

The present author suggested that Harberger had underestimated the cost of protection in Chile by understating the level of tariffs and the share of imports in national income and by excluding the possibility that some inefficient industries may disappear under protection (Balassa, 1966). Subsequently, Bergsman estimated the cost of protection for Brazil by separating industries into two groups, depending on whether they can be expected to disappear or to survive under free trade. The savings in costs in the first group of industries following a move to free trade were considered to represent an improvement in allocative efficiency; in the second group, production costs were assumed to decline to competitive levels under free trade, representing an improvement in X-efficiency (1970, Appendix 4).

Having further calculated the consumption cost of protection, the terms-of-trade loss due to reductions in exports prices, and the cost of increased exports under free trade, the present author estimated the cost of protection, including monopoly profits, for several developing economies with relatively high levels of protection. The results, expressed as a proportion of GNP, were 9.5% in 1966 for Brazil, 6.2% in 1962 for Chile, 6.2% in 1963–1964 for Pakistan, and 3.7% in 1965 for the Philippines. (Balassa et al., 1971, p. 82). In turn, in extrapolating the results obtained for a sample of industries to the entire Turkish manufacturing sector, Krueger (1966) concluded that the reallocation of resources from import-substituting to export industries under free trade would lead to the doubling of the world market value of manufacturing output; with manufacturing industries accounting for one-seventh of GNP, this is equivalent to a cost of protection of 7% of Turkey's GNP.

The results cited so far were obtained in a partial equilibrium framework. Subsequently, de Melo estimated the cost of protection in 1970 for Colombia in a general equilibrium model, incorporating intermediate products, non-traded goods, as well as substitution among products and among factors. Excluding land reallocation within agriculture and postulating an optimal export tax for coffee, the cost of protection was estimated at 11.0% of GNP, assuming labour to be fully employed, and at 15.8% of GNP assuming that additional supplies of labour are available at a constant real wage (1978, p. 217).

The difference between the results indicates the importance of employment effects under surplus labour, which were not considered in earlier estimates of cost of protection. But de Melo's estimates under the full employment assumption are also considerably higher than earlier partial equilibrium results, even though he does not allow for potential gains from X-efficiency and Colombia had a relatively low level of protection. Thus, effective protection rates averaged 29% in the manufacturing sector in Colombia, compared to 113% in Brazil, 182% in Chile, 271% in Pakistan, and 61% in the Philippines (Table 1). In Mexico, which had a similar level of protection, with effective rates averaging 26%, partial equilibrium estimate of the cost of protection was 2.5% of GNP (Balassa et al., 1971, p. 82).

These results point to the underestimation of the cost of protection in a partial equilibrium framework. The use of such a framework does not allow for the fact that the cost of protection rises more than proportionally with the rate of the tariff (Johnson, 1965a) and that this cost increases with the dispersion of tariffs (Johnson, 1966). Furthermore, the use of a general equilibrium framework permits to take account of the interactions among productive activities through factor prices and the allocative cost of distortions in factor prices that result from protection.

(c) Factor markets

As regards the welfare cost of factor market distortions, on the basis of a computer analysis of hypothetical cases Johnson concluded that 'neither their existence nor their elimination is likely to be a strategic determinant of the level of national well-being' (1966, p. 698). Subsequently, estimates derived in a partial equilibrium framework led Dougherty and Selowsky to the conclusion that, following the elimination of wage differences among
five non-agricultural sectors in Colombia, 'output could not rise by more than one or two per cent, a result which leads one to suspect that under any plausible set of assumptions the gain would be insubstantial' (1973, p. 389).

These conclusions were not borne out by de Melo's results for Colombia, obtained in the general equilibrium model referred to earlier, consisting of two agricultural and 13 non-agricultural sectors. Thus, de Melo found that the intersectoral movement of labour in response to the elimination of wage differences among non-agricultural sectors would lead to a 5.7% rise in GNP if capital was immobile and to a 13.3% gain if capital was mobile among sectors (1977, p. 402).

De Melo's use of a general equilibrium framework made it possible to allow for the interactions of product and factor markets through changes in relative prices, as well as for sectoral interdependence, which are absent from the partial equilibrium estimates. But while Dougherty and Selowsky distinguished among seven classes of labour, de Melo separated only skilled and unskilled labour, thereby overstating the welfare cost of factor market distortions associated with intersectoral wage differences.

In the second variant of his estimates, de Melo introduced capital mobility in addition to labour mobility. The welfare effects of the misallocation of both factors were considered by Syrquin in a study of Mexico. Utilizing a 17-sector model and assuming labour and capital to be homogeneous, Syrquin estimated that the misallocation of labour and capital entailed a loss of output of 15.5% in the Mexican manufacturing sector (1973, p. 664).

The authors cited considered the welfare cost of factor market imperfections, reflected in intersectoral differences in factor prices, under the assumption that factor prices equaled marginal productivities in each. Harberger, however, assumed that a substantial part of factor market distortions originated in 'other influences, such as monopoly and taxes, which would cause differences between wages and the value of marginal product, and might make for more variance among sectors in marginal productivity than there is in wages' (1959, p. 138).

As noted earlier, wage differences may also originate in government regulations other than taxes; they may be due, for example, to differences in legal minimum wages among sectors. Furthermore, in investigating wage differentials among Colombian industries, Schultz concluded that 'where economies of scale or market structure inhibited the development of competitive pressures in the protected domestic market, high levels of effective protection appear to have resulted in quasi-rents for factors employed in the more protected sectors' (1979, p. 39).

In turn, following Harberger (1962), estimates have been made of the welfare cost of tax-induced distortions in the intersectoral allocation of capital in the US economy. Using a general equilibrium model and assuming a Cobb-Douglas production function, 'efficiency losses of over 10% of the value of production are reported for tax distortions (on net of tax returns) of 200%' by Whalley (1977, p. 200). The losses are in the 3–5% range if the tax distortion (i.e. the tax on net corporate income) is 100%, corresponding to a 50% tax on gross income that was the case in the United States until recently. Similar estimates for developing countries are not available.

(d) Effects on savings

The estimates reported so far take the amount of productive factors as given; they thus show the (static) cost of distortions in the allocation of existing resources. The assumption of given factor supplies is removed in studies that consider the effects of interest rates on savings. While it had earlier been assumed that savings tend to be insensitive to real interest rates, several recent studies have established the positive interest elasticity of savings.

Brown found a positive correlation between the real interest rate and the ratio of savings to the gross national product in Korea, statistically significant at the 1% level (1973, pp. 195–197). A similar relationship was established for Portugal and for Turkey by Fry (1977, p. 196 and 1979, p. 132). Domestic savings were also shown to be positively related to the real interest rate in 12 Asian developing economies, with the relationship being statistically significant at the 5% level in seven cases (Fry, 1981, Table 9).

The cited studies relate the domestic savings ratio to real interest rates by the use of regression analysis. They may be criticized for the use of a simple adaptive model for estimating expected inflation, and for regarding savings as a flow rather than as an adjustment in a desired stock. Expected inflation rates were utilized by Boskin in the structural estimation of the US aggregate consumption function by the use of instrumental variables
1034 WORLD DEVELOPMENT

(1978). Subsequently, Summers replaced the conventional two-period formulation of the consumption–savings choice by a life-cycle growth model, in which increases in real interest rates lead to higher savings both because the young who save are more affluent and more numerous than the dissavers1 and because the present value of labour income declines as a result (the 'human wealth effect'). For assumed values of the parameters, Summers derived a wealth elasticity of savings of 2.8, thereby raising Boskin's estimate of the interest elasticity of savings from 0.4 to 1.9 (1981, p. 537). In Summers' view this is likely to be an underestimate, given the bequest motive, the importance of which has been demonstrated by Kotlikoff and Summers (1981).

Savings behaviour is modelled by utilizing the notion of the target shock of wealth by Berger, who obtained statistically significant estimates of the interest elasticity of the asset-income ratio at the 5% level for Thailand (1982). It should be added, however, that the estimates pertain to financial savings, excluding unorganized money markets.

(c) Effects on the efficiency of capital

The cited estimates show the direct effects of real interest rates on savings. As noted above, there will also be indirect effects through increases in the efficiency of investment. The direct and the indirect effects of real interest rates on savings were estimated for India and Korea in the framework of a dynamic savings–investment model by Sundararajan and Thakur. The authors found that 'in India, the real interest rate had a significantly positive effect on total savings; while in Korea, the direct effect of the real interest rate, although positive, was not significant' (1980, p. 842). However, in the latter case, there were strong indirect effects. Thus, 'although an increase in the interest rate does not have a significant direct influence on the average propensity to save in Korea, it does have a strong and significantly positive impact multiplier effect. This is so because the higher interest rate serves to raise the efficiency of capital and thereby stimulate economic growth which, in turn, stimulates savings' (ibid.).

Fry also found that improvements in the efficiency of investment are associated with higher real interest rates. Thus, the incremental output–capital ratio was positively correlated with the real rate of interest in all ten Asian developing economies for which calculations have been made, with the regression coefficient being statistically significant at the 5% level in five cases and at the 10% level in three cases (1981, Table 11).

Furthermore, the efficiency of investment is adversely affected by protection-induced discrimination among economic activities that creates a wedge between financial and economic rates of return and limits the use of large-scale production methods as well as the utilization of capacity. This is shown in a study of 11 semi-industrial countries carried out by the present author for the 1960–1973 period. Thus, incremental capital–output ratios were 5.5 in Chile and 5.7 in India—the countries which had the highest protection in the group during the period under consideration. In turn, incremental capital–output ratios were 1.8 in Singapore, 2.1 in Korea and 2.4 in Taiwan—the countries with the lowest levels of protection; and declines in the ratios were experienced in countries such as Brazil (from 3.8 in 1960–1966 to 2.1 in 1966–1973) which reformed the system of protection during the period (Balassa et al. 1982, Chap. 3).

The experience of the 1973–1978 period of external shocks in the form of the quadrupling of oil prices and the world recession confirms these conclusions. Outward-oriented developing economies, characterized by a low degree of discrimination against primary activities, against manufactured imports, and against sales abroad, showed a higher level of investment efficiency measured in terms of incremental capital–output ratios than inward-oriented economies where this ratio increased during the period (Balassa, 1981, Table 7).

(f) Effects on economic growth

Increases in saving ratios and in the efficiency of capital, in turn, contribute to economic growth. Assuming that real interest rates are below their equilibrium level, Fry simulated the effects of increases in interest rates on economic growth by combining estimates of the impact of real interest rates on savings and on the efficiency of investment, represented by incremental capital–output ratios, in 10 Asian developing economies. The results show a median increase of 0.3 percentage points in GNP growth rates for a one percentage point rise in the real rate of interest (1981, Table 16).
While such simulations are open to objections as for several countries they involve combining coefficient values which are not significant statistically, the results have been confirmed in a cross-section investigation of seven Asian developing economies (Fry, 1978, p. 470).

These estimates do not include the effects of increases in real interest rates on capital flows. Yet, there is evidence that real interest rates and changes in net foreign assets are positively correlated. In the case of 12 Asian economies, this relationship was statistically significant at the 5% level in five cases, at the 10% level in two cases, and the regression coefficient was positive but the level of significance was lower in five cases (Fry, 1981, Table 20).

The lowering of protection, too, tends to lead to the acceleration of economic growth. To begin with, Johnson (1967) showed that, in a country that faces given world market prices and protects the capital-intensive sector, increases in the capital stock may lead to a fall in real incomes, measured in world market prices, through the transfer of labour from the labour-intensive to the capital-intensive sector. Subsequently, Martin (1977) demonstrated that such immiserisation through capital accumulation will occur if one plus the rate of protection in the capital-intensive sector exceeds the ratio of labour shares in the labour-intensive sector to that of the capital-intensive sector.

While immiserisation through capital accumulation may represent an extreme case, there is evidence that protection adversely affects the rate of economic growth. Having shown that protection and exports are negatively correlated, the present author found a high positive correlation between exports and economic growth in the study of eleven semi-industrial economies cited above. This relationship was confirmed in a cross-section production-function type relationship, with exports added to the conventional explanatory variables of domestic and foreign capital and labour (Balassa et al., 1982, pp. 52–55). Applying a modified model specification to a sample of 31 semi-industrial countries, Feder found that the use of primary factors in export production, rather than in producing non-export products, accounted for a 1.8 percentage point difference in the rate of economic growth during the 1964–1973 period (1982). The author’s study of the 1973–1978 period, indicating the superior growth performance of outward-oriented over inward-oriented economies, notwithstanding the greater external shocks they suffered, confirms these conclusions (1981, Table 7).

(g) Interactions of savings, investment efficiency, and economic growth

Estimates of the effects of lowering protection on the rate of economic growth do not allow for the impact of higher GNP growth rates on savings. The potential importance of this relationship may be indicated in a hypothetical case, where capital is the only scarce factor of production, the incremental capital–output ratio is 4, the average savings ratio 16%, and the marginal savings ratio 33%. Eliminating protection, assumed to represent a loss of 6% of GNP, would now raise the rate of economic growth from 4.0 to 4.5% by increasing the amount saved. And, if population was growing at an average annual rate of 3%, the rate of growth of per capita incomes would rise from 1.0 to 1.5%. These savings effects, calculated under the assumption of unchanged incremental capital–output ratios, would thus augment the favourable impact of the lowering of protection on economic growth.

At the same time, the described effects will reinforce each other. Thus, increases in the savings ratio will raise the average efficiency of capital as new investments undertaken following the elimination of protection exhibit higher levels of efficiency. Also, as shown in the Sundarajan–Thaker study cited above, the direct effects of higher real interest rates on savings are reinforced by their impact on the efficiency of investment.

Another form of interdependence of the measures taken was observed by de Melo, according to whom removing distortions simultaneously in product and in factor markets would result in a larger increase in GNP than the sum of the effects of removing distortions in the two markets, taken individually (1976, Chap. 8). It has further been shown that the elimination of corporate income taxes would result in a considerable welfare improvement through increases in savings as the (after-tax) real rate of return to capital rises. Boskin estimated the welfare loss associated with the existence of the corporate income tax in the United States at $60 billion a year (1978, p. 519) while Summers’ estimates are $80 and $100 billion, depending on whether the capital gains tax is replaced by a consumption tax or by a wage tax (1980, p. 542). It should be added, however, that these authors do not consider the welfare cost of consumption and wage taxes.
4. CONCLUDING REMARKS

This paper has examined the existence of policy-imposed distortions in product and factor markets of developing economies and indicated their possible economic effects. Estimates have further been provided on the effects of such distortions on the efficiency of allocating existing resources as well as on savings, investment efficiency, and economic growth.

The findings show the importance of policy-imposed distortions in product and in factor markets of developing economies and indicate the cost of these distortions in terms of foregone incomes and economic growth. They thus point to the gains that may be obtained if such distortions are removed or alleviated.

At the same time, removing distortions in product and in factor markets reinforce each other. In particular, the favourable impact of trade liberalization is enhanced if distortions in capital markets are simultaneously removed and vice versa. On the one hand, increases in savings attendant on the rise of real interest rates permit undertaking investments in high-productivity industries as trade is liberalized; on the other, trade liberalization permits the efficient use of savings generated through higher real interest rates.

NOTES

1. The analysis excludes, however, aggregate demand effects by postulating that appropriate macroeconomic policies are applied, utilizing the exchange rate, the government budget, and the supply of money as instruments.

2. This is the case for eight of the 12 developing economies studied (Balassa et al., 1971, 1982).

3. These adverse effects are mitigated if unorganized money markets assume the role of financial intermediation. It has been suggested that, in this event, the results will depend on the extent of substitution between time deposits, on the one hand, and unorganized money markets and 'unproductive' assets, on the other, as well as on bank reserve requirements and limitations imposed on bank lending (Van Wijnbergen, 1982). It should be added, however, that informal credit markets tend to be fragmented; in rural areas, lenders often assume monopolistic positions; and transactions costs are increased by legal limitations on such credit.

4. Moshe Syrquin pointed out to me that Harberger has subsequently reconsidered his estimate removing the assumption that there would be some domestic production of each importable good in the absence of restrictions and assuming more realistic tariffs. With these modifications, he estimated the cost of protection at 10-15% GNP in Chile (1974, p. 107).

5. Bergman's revised estimate - derived by the use of the same methodology - was 7.1% for Brazil in 1967, following reductions in the extent of protection below the 1966 level (1974, p. 421).

6. De Melo's estimate of effective protection rates compares with an estimate of 35% reported in Table 1.

7. Drawing on Johnson's results, Nugent estimated the cost of protection for a hypothetical country that cannot affect world market prices in a three-commodity general equilibrium model. Under the assumptions that the three commodities are consumed in equal quantities under free trade, that the elasticity of substitution in consumption is 1, and that the elasticity of substitution in domestic production is 1.5, he found that the cost of protection would rise from 15.6 to 19.6% of GNP if importables had tariffs of 30 and 70%, rather than a 50% tariff on each. The cost of protection would rise further, to 29.8% of GNP, if the tariffs on the two importables were 0 and 100%, respectively (1974, p. 66).

8. According to a comprehensive review of savings behaviour in developing countries, written a decade ago, 'the explanation of the responsiveness of saving to increases in the real rate of interest may lie in the effects of monetary reform on the level of investment and national income which in turn have a positive effect on saving' (Mikesell and Zinser, 1973, p. 19).

9. The importance of this factor is also shown in the single-equation formulation of the life-cycle savings hypothesis in a cross-section investigation of seven Asian countries by Fry and Mason (1982).

10. According to the authors, 'an increase in interest rates - and hence the rental price of capital - increases the overall efficiency of capital by permitting a shift of resources to more productive sectors and by encouraging more productive use of capital within each sector' (ibid., pp. 837-839).

11. The reader will note that incremental capital-output ratios are affected by changes in the extent of capacity utilization as well as by exogenous factors bearing on the rate of economic growth.

12. This result occurred despite the fact that exogenous influences, in the form of the external shocks they suffered, affected outward-oriented economies to a greater extent than inward-oriented economies.
DISEQUILIBRIUM ANALYSIS IN DEVELOPING ECONOMIES

REFERENCES


Balassa, Bela, 'Incentive policies in Brazil', World Development (December 1979), pp. 1023-1042.


Balassa, Bela et al., The Structure of Protection in Developing Countries (Baltimore, Maryland: Johns Hopkins University Press, 1971).

Balassa, Bela et al., Development Strategies in Semi-Industrial Economies (Baltimore, Maryland: Johns Hopkins University Press, 1982).


Fry, Maxwell J., 'Money and capital or financial deepening in economic development?', Journal of Money, Credit and Banking (November 1978), pp. 464-475.


McKinnon, Ronald I., Money & Capital in Economic...


Monson, Terry, 'Trade strategies and employment in the Ivory Coast', in Anne O. Krueger et al., *Trade and Employment in Developing Countries 1. Individual Studies*, pp. 239–250.

Nabli, Mustapha K., 'Alternative trade policies and employment in Tunisia', in Anne O. Krueger et al., *Trade and Employment in Developing Countries 1. Individual Studies*, pp. 433–496.


Schultz, T. Paul, 'Effective protection and the distribution of personal income by sector in Colombia', Economic Growth Center, Yale University, *Center Discussion Paper No. 316* (July 1979).


van Wijbergen, Sweder, 'Interest rate management in LDCs: theory and some simulation results for South Korea', *Journal of Monetary Economics* (forthcoming 1982).


No. 225. George Psacharopoulos, "The Economics of Higher Education in Developing Countries," *Comparative Education Review*

No. 226. Katrine Anderson Saito and Delano P. Villanueva, "Transaction Costs of Credit to the Small-scale Sector in the Philippines," *Economic Development and Cultural Change*


No. 230. Abdun Noor, "Managing Adult Literacy Training," *Prospects*


No. 233. Keith Bradley and Alan Gelb, "Motivation and Control in the Mondragon Experiment," and "The Replication and Sustainability of the Mondragon Experiment," *British Journal of Industrial Relations*


Issues of the World Bank Reprint Series are available free of charge from the address on the bottom of the back cover.