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December 19, 1988

To: Members of the Executive Board

From: The Acting Secretary

Subject: Structural Reform and Macroeconomic Adjustment in Industrial Countries

The attached paper on structural reform and macroeconomic adjustment in industrial countries provides background material to the discussion scheduled for Friday, January 13, 1989 of the paper on the role of structural policies in industrial countries (SM/88/271, 12/16/88).

Mr. Wattleworth (ext. 8765) or Mr. Robert Alan Feldman (ext. 8869) is available to answer technical or factual questions relating to this paper prior to the Board discussion.

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Structural Reform and Macroeconomic Adjustment in Industrial Countries

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(In consultation with other departments)

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Structural Reform and Macroeconomic Adjustment in Industrial Countries

I. Introduction

The record of economic performance in many industrial countries during the 1970s and early 1980s did not measure up to expectations. Part of the performance shortfall can, with hindsight, be attributed to deep-seated and irreversible factors which made it unlikely that growth rates in many countries could return to the levels of the 1950s and 1960s; part of the shortfall can also be attributed to inappropriate demand management policies. But some of the difficulties in adjusting to the global oil shocks clearly emanated from dysfunction on the supply side of economies, the operation of which was not well understood. To improve its understanding of supply side factors, the Research Department has carried out a number of studies as background analysis for the World Economic Outlook. This paper, which is the fourth in the series, seeks to extend earlier staff work on structural issues by analyzing structural reform in a macroeconomic framework (Chapter II). 1/ It also reviews structural reforms in key areas (Chapter III), and evaluates the evidence on the quantitative impact of structural measures (Chapter IV). An annex presents the microeconomic foundations of structural reform.

II. Structural Reform and Macroeconomic Theory

1. Definition of structural reform

The beginning of the 1980s marked a major turning point in the thinking of economic policy makers in the industrial countries. There was widespread disappointment with the ability of fiscal, monetary, and incomes policies to foster noninflationary growth with full employment during the previous decade. Indeed, since the early 1970s, many countries had been experiencing low growth, high and rising unemployment, accelerating inflation, and large budget deficits. The challenge facing policy makers in the early 1980s was therefore to restore, through a sustained commitment to fiscal and monetary restraint, an environment conducive to stronger economic performance over the medium term. This medium-term orientation of demand management policies implied that attempts to moderate short-run cycles in economic activity had to be resisted, even at the cost of some temporary loss in output and employment. At the same time, there was widespread recognition that

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1/ Earlier WEO Staff Studies in the structural area dealt with differences in employment behavior among industrial countries, with analysis and projections of potential output in the major countries, and with indicators of structural policies and performance. See Adams, Fenton, and Larsen (1986) and (1987); and, SM/88/181 (The World Economic Outlook), Annex III.

improvements were needed in the way the industrial economies functioned--primarily through the adoption of "structural policies" to promote flexibility in factor and goods markets and more efficient economic adjustment.

The medium term strategy recognized that many of the structural rigidities that were thought to impede growth were associated with the effects of earlier policy actions. Some of these actions sought to redistribute income with little attention to efficiency and budgetary implications. Others sought to reduce or delay the costs of adjustment for specific industries, regions, or labor groups in the face of successive external shocks throughout the 1970s. There also was a growing perception that the costs of these earlier actions were much greater than earlier recognized. In part this was because some of the external shocks turned out to be of a lasting nature, thus requiring adjustment rather than financing. Policy makers gradually realized that the adjustment process would require modifications in economic structure which would allow changes in market forces to be better understood by economic agents. The strong interest in structural reform therefore reflected, to a considerable extent, an erosion of confidence in the efficacy of government intervention. Instead, reliance on market forces was seen as the central principle in the economic organization of the industrial countries.

The new medium-term orientation of policies has highlighted the fact that, beyond the short run, economic performance depends primarily on the economy's productive capacity. The emphasis has therefore been placed on the introduction of measures that increase the "flexibility" of the economy or raise its potential output. 1/ Such measures are called "structural" (or sometimes, "supply side") measures, and they include many traditional fiscal policy changes. Conceptually, structural measures can be classified into two broad categories: those that eliminate existing inefficiencies of resource use (so that output can be maximized, given existing resources) and facilitate more rapid adjustment to shocks; and those that raise potential output, either by adding to existing productive resources--capital and labor--of the economy or by raising total factor productivity (TFP). 2/ (Hernández-Catá, 1988.) In practice, of course, most structural measures are likely to involve effects of both types.

1/ The precise analytical and empirical links between structural reform measures and the rise in potential output are often unclear. This issue is discussed fully in another background paper (SM/88/181--Annex III) which describes the difficulty of defining appropriate indicators of structural policies and performance.

2/ In terms of the microeconomics of the Annex, the first type of structural change moves the economy from some interior point to the production possibilities frontier (PPF) surface or along the surface to the optimal output mix. The second type of structural change shifts out the entire PPF surface.

Structural measures of the first type include removal of rigidities that hinder the mobility of resources--such as institutional or regulatory barriers to the intersectoral (or international) mobility of labor--as well as elimination of price distortions, such as those created by tax wedges in various markets, including those that affect financial markets. Such measures may improve resource allocation and thereby raise potential output directly (while altering its sectoral composition), but they also facilitate adjustment following exogenous disturbances (e.g., technological innovations, changes in relative prices, or trade liberalization) by lowering transitional costs in terms of unemployed resources.

Structural measures of the second type include those that raise the level (or rate of growth) of potential output by increasing TFP or by raising savings and capital formation. Examples of such measures include efforts to promote research and development activity or to apply existing technical knowledge more effectively in production processes, and the elimination of tax measures that distort private saving and investment decisions.

Because structural measures often change the way individual markets work, they frequently are called "microeconomic" policies. 1/ It is important to remember, however, that they relate to fundamental macroeconomic concerns about the growth of potential output and the speed with which the economy weathers external shocks.

An important characteristic of "structural reform" is that it emphasizes the removal of market rigidities and distortions. This is in stark contrast to earlier usage of the term which was synonymous with "industrial" or "regional" policies. Such policies usually involved efforts to introduce incentives (i.e., "strategic" market distortions), in order to channel resources into specific sectors or regions with a view to correcting some perceived market failure. In contrast, the new view on structural reform implies a reduced role for government in the economy and an unfettering of private markets.

2. Domestic and international macroeconomic effects of structural reform

a. Effects of an increase in potential output

This section focuses on the domestic and international macroeconomic effects of an increase in potential output resulting from a structural measure. 2/ The approach adopted here is based on the widely used two-

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1/ Calling structural measures "microeconomic" measures is well-grounded in economic theory, as is shown in the Annex.

2/ By making markets more competitive, structural policies increase economic efficiency and in general raise potential output. It is possible, however, to imagine structural policies that reduce potential output while

country version of the Mundell-Fleming model. This framework is an analytically convenient vehicle for studying the international spillover effects of structural policies, and it also forms the theoretical basis for the Fund's MULTIMOD model, which will allow the theoretical results to be illustrated with model simulations.

The analysis will proceed from a simple version of the Mundell-Fleming model, to more complicated versions. 1/ It is initially assumed that each of the two countries specializes in the production of one good and trades for the foreign good. The price level in each country is sticky, so that changes in aggregate demand lead to changes in both the level of output and the price level. Capital mobility is assumed to be perfect, implying that the expected nominal rates of return on all assets are equal. The price deflator for real money balances and real wages is taken to be the deflator for domestic output (or GDP deflator). Finally, expectations are assumed to be backward looking or adaptive. The issue to be examined is how an increase in potential output in one country (say the "home" country) affects the levels of output and prices and the external balances of both countries in the short and the long runs. 2/

In studying this problem it is natural to compare the effects of an increase in potential output in the home country, with those of more traditional demand policies. Those effects are clearly not identical although there are some important similarities. In the former case the productive capacity of the economy has increased: in the latter case it has not. This difference has very important microeconomic implications (and benefits) for the home country. From the perspective of the foreign country, however, disturbances in the home country are transmitted via changes in trade volumes, interest rates and the real exchange rate, i.e., the same variables that transmit the effects of changes in demand management policies. Given any pattern of these variables facing the foreign country, that country will be indifferent in the short run to whether this pattern resulted from structural reforms that raised potential output or from altered demand policies. In the long run,

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increasing social welfare. For example, the relaxation of laws regulating the workweek can lead to more efficient labor/leisure choices. Yet, it is possible that the employees might decide to opt for more leisure and less work, thereby lowering potential output. Such examples of a reduction in potential output coupled with a rise in welfare are clearly the exception rather than the rule.

1/ The properties of the Mundell-Fleming model and its many extensions are described in Boughton, Haas and Masson (1986) and Frenkel and Razin (1987).

2/ The analysis abstracts from dynamic adjustment (e.g., "J" curve effects are ignored). Comparing the MULTIMOD simulation results to the qualitative properties of the theoretical equilibrium analysis will help to illustrate the importance of dynamics relative to the simple analysis presented here.

however, there would generally be a preference for the potential output channel since foreign potential output would also rise. 1/

(1) Demand-side effects of an increase in potential output

The effects of changes in potential output can be described in terms of the IS-LM and aggregate supply/demand framework, illustrated in Figure 1. This figure shows for a closed economy the short- and long-run effects of an increase in potential output with a given stance of demand policies. The initial equilibrium in Figure 1 occurs at point A where the aggregate supply curve in the top panel intersects the aggregate demand curve at potential output. The initial price level (P_0) thus corresponds to a long-run, full-employment equilibrium where all nominal contracts have adjusted to the correct expectation of the price level. The increase in potential output resulting from a structural measure is shown by the shift from Y^P to $Y^{P'}$. If the price level stayed at P_0, the long-run, full employment equilibrium could be maintained. This fact is depicted in the figure by the new short-run aggregate supply curve Y_1^S intersecting the new level of potential output, $Y^{P'}$ at the initial price level, P_0. At that price level, however, there is insufficient aggregate demand, so that the new short-run equilibrium (point B) occurs at a lower price level, P_1, and at a level of output Y_1 which is higher than the original level, but lower than the new level of potential output.

The increase in aggregate demand results from the drop in the price level from P_0 to P_1, as shown in the bottom panel. The decline in the price level with no change in the nominal money supply increases the real money supply. The excess supply of money in turn causes the interest rate to fall. The interest-sensitive components of spending rise and a new demand-side equilibrium (point B) is achieved at a lower real interest rate and higher level of output. The new short-run, IS-LM equilibrium in Figure 1 is similar to the equilibrium that would result from an increase in the nominal money supply, even though the shifts in the aggregate supply and demand curves and the change in the price level would be quite different. 2/

1/ The positive transmission of potential output is explained later in the text. Also if technology has changed and technology is mobile, the potential output channel would be preferred.

2/ A monetary expansion would shift the aggregate demand curve to the right and not affect the aggregate supply curve. As a result the aggregate price level would increase. There is one other possible difference between the demand-side effects of the two types of policies. An open market operation does not give rise directly to any wealth effects (if Ricardian equivalence does not hold), because the central bank exchanges reserves for an equal value of government bonds. In the case of a fall in the price level, the real value of outside money and the interest bearing debt both rise. Thus it is possible that the decline in the price level raises private sector wealth in a way that the monetary expansion does not. The significance of this possible wealth effect could

In the long run, expectations of the price level and nominal contracts must adjust until a new full-employment equilibrium (point C) is restored at P_Z and Y_Z (see note to Figure 1). 1/ The increase in output eventually will be reflected in the expectations of a rise in permanent output. As a result, demand is likely to rise more in the long run than in the short run. In order to determine how much long-term demand will rise, it is necessary to introduce additional assumptions about the determinants of spending in the long run. In the current context it is reasonable to assume that the long-run changes in demand will be proportional to the increase in potential output and permanent income. To locate the IS curve in the long run, it is necessary to specify the determinants of all components of spending, including government spending. The IS_Z curve in Figure 1 is drawn on the assumption that government spending in the long run is proportional to permanent income. 2/ Under these assumptions, the demand-side effects of the increase in potential output in the long run are basically similar to the short-run effects of a simultaneous monetary and fiscal expansion. (In both cases the IS and LM curves have shifted to the right; the effects on economic capacity differ, however.)

The spillover effects from the home country will affect the foreign country through trade volumes, the interest rate and the real exchange rate. The impact on trade volumes is determined by real aggregate demand in the two countries and by the real exchange rate. From the foreign country's perspective it is therefore the real exchange rate, the interest rate and real demand in the home country that matter. These last two variables are determined by the intersection of the IS and LM curves in the home country. The final determinant of the spillover effects, the real exchange rate, must be analyzed in an explicit open economy context.

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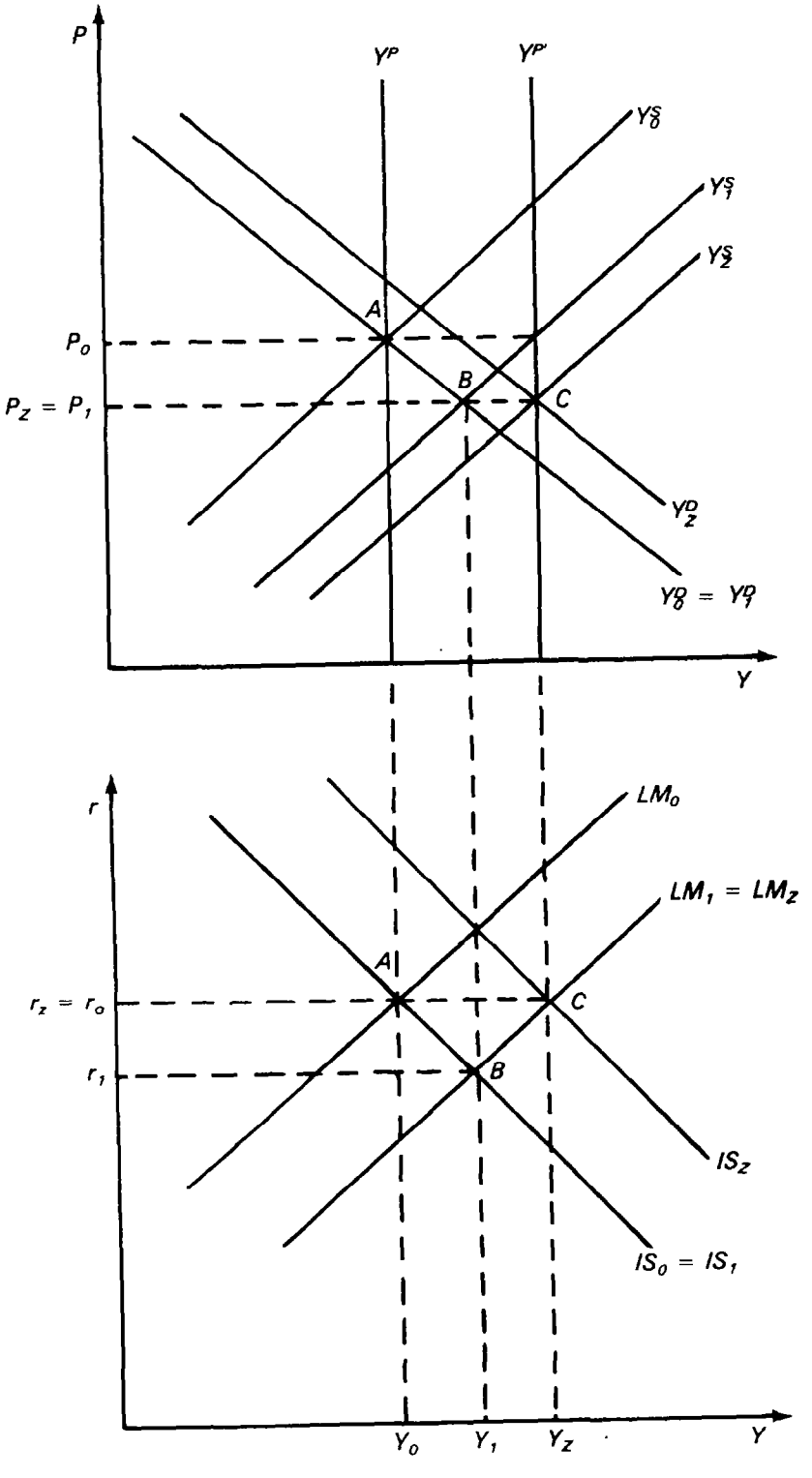
be mitigated by Ricardian equivalence, which argues that private sector wealth is determined more by anticipated future taxes than by the current stock of government liabilities. In any event, the present analysis abstracts from wealth effects.

1/ The long-run equilibrium price level must be below P_0, but need not equal P_1. The value of P_Z will depend on the slopes of the IS and LM curves. Figure 1 was drawn assuming $P_Z = P_1$ to simplify the presentation.

2/ Neoclassical economic theory does not address the determinants of government spending, but the assumption of proportionality to permanent output does not appear unreasonable, and it keeps the analysis simple, by restoring the real interest rate to r_0 in the long run. The assumption that government spending is proportional to permanent income implies that the income elasticities of public and private consumption are both one. Notice that the increase in government spending does not change the deficit, because with constant tax rates, tax revenues rise in proportion with the increase in output. Alternatively, if one assumed that government spending did <u>not</u> rise in proportion to the increase in permanent income, then the IS curve would not shift all the way to IS_Z and the real interest rate in the long run would be lower than r_0.

FIGURE 1. Demand-Side Effects of an Increase in Potential Output



Note to Figure 1

Notation and assumptions

Subscripts denote time periods; 0 denotes original equilibrium (point A); 1 denotes short-run equilibrium (point B); z denotes the long-run equilibrium (point C). Y^S and Y^D are aggregate supply and demand curves. Y^P and $Y^{P'}$ are the original and new levels of potential output. P is the aggregate price level, Y is real output, and r is the interest rate (changes in which measure changes in both the nominal and the real interest rate since expectations of inflation are backward looking). IS is the locus of goods market equilibria; and LM, money market equilibria.

It is assumed that money growth and potential output growth are zero, that there is no foreign sector and are no wealth effects, and that expectations are formed adaptively.

Explanation

The diagram illustrates that the demand-side effects of an increase in potential output are equivalent to a monetary expansion in the short run (viz., LM_1 is to the right of LM_0 and $IS_1 = IS_0$), and equivalent to a balanced monetary and fiscal expansion in the long run (viz., Both IS_z and LM_z are to the right of IS_0 and LM_0, respectively.

In period 1 (i.e., the new short-run equilibrium) the level of potential output increases to $Y^{P'}$, which shifts the aggregate supply curve to Y^S_1. The new equilibrium occurs at a higher level of output and a lower aggregate price level. The IS-LM panel shows the effects of the lower price level on the demand side of the economy. With constant nominal money balances, the lower price level implies higher real money balances, which explains the shift in the LM curve to LM_1. In the first period the IS curve doesn't shift, so that the interest rate falls to r_1. The increase in aggregate demand is explained by the fall in the real interest rate, which increases interest-sensitive spending which then has feedback effects on total spending.

In the long run, the aggregate demand curve must intersect the aggregate supply curve at potential output (i.e., at $Y^{P'}$). Thus, the IS-LM must also intersect at $Y^{P'}$. The IS curve, however, will shift from its original position. Because of the permanent increase in real output, consumption will respond more in the long run than it does in the short run. In addition, the increase in output also increases the productivity of capital, and thereby increases the optimal capital stock and investment. Finally, one might also expect that the permanent increase in output would lead to an increase in public consumption (i.e., government spending) as well as private consumption. All of these factors would lead the IS curve to be further to the right in the long run. The diagram is drawn in the special case where the ratios of C/Y, I/Y, and G/Y are constant in the long run. In this case the aggregate demand expands to the new higher level of output at a constant interest rate in the long run. More generally, the IS curve shifts to the right and the interest rate rises above r_1 in the long run.

(2) Short-run international effects: adaptive expectations

So far the analysis has shown that the demand-side spillover effects to the foreign country of an increase in potential output are similar in nature to the effects of a monetary expansion in the short run and of a balanced monetary-fiscal expansion in the long run. Now the analysis must be extended to include the determinants of the real exchange rate. As mentioned above, the simple version of the Mundell-Fleming model assumes perfect capital mobility, which implies (because of arbitrage), that the expected nominal rates of return on financial assets in the two countries must be equal. The real exchange rate must adjust to maintain macroeconomic equilibrium in both countries, while fulfilling the arbitrage condition.

To analyze the impact of structural measures on the real exchange rate, it is convenient to focus on how the initial effects of the increase in potential output in the home country affect the foreign country. Given perfect capital mobility and adaptive expectations, the fall in the home country's interest rate leads to a fall in the foreign country's interest rate. In addition, the rise in output in the home country will increase net exports in the foreign country. Both effects tend to raise aggregate demand and output in the foreign country.

The simple case of "negative transmission" The impact on the exchange rate can now be inferred from the two initial effects on the foreign country's money market. The fall in the interest rate and the initial rise in output tend to increase the real demand for money. In turn, excess demand for money in the foreign country puts upward pressure on the foreign interest rate. However, the foreign interest rate must satisfy the arbitrage condition, and therefore it cannot adjust to eliminate the excess demand arising solely in the foreign country's money market. Thus, the upward pressure on the foreign interest rate leads to a capital inflow and a real appreciation of the foreign currency.

The effects of the real appreciation on the money market of the foreign country depend upon the particular analytical model used. In the original Mundell-Fleming model, it is assumed that the exchange rate has no direct effect on the aggregate price level. 1/ This assumption implies that the price level used to deflate nominal money balances is the

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1/ By affecting aggregate demand, the exchange rate can indirectly affect the domestic (GDP) price deflator. The domestic deflator, however, will only fall if foreign output falls. The exchange rate may still influence consumer prices (more generally, an expenditure or absorption deflator) by altering the price of the import component of the index. However, a complete account of all the effects on the foreign country price level does not change the qualitative analysis of the text, which is summarized in Table 1.

domestic output (GDP) deflator, which does not depend directly on the exchange rate. Therefore, changes in the exchange rate will only influence the money market through changes in net exports which in turn reflect changes in aggregate demand and output in the foreign country. However, with the interest rate below its original equilibrium level, the excess demand for money can only be eliminated if foreign output falls below its original equilibrium level. The real exchange rate must adjust to lower foreign output and restore money market equilibrium in the foreign country. Specifically, the foreign currency must appreciate by enough to more than offset the initial rise in foreign country exports. The foreign currency appreciates until the fall in its net exports is larger than the rise in interest-sensitive spending, so that equilibrium in the money market is restored at a lower interest rate and a lower level of output. These effects are summarized in Table 1. The nominal depreciation of the home country's currency follows from the necessity of a real depreciation in the home country and the falling price level (associated with the expansion of potential output).

Table 1. Impact Effects of an Increase in Home Country Potential Output: The Simple Mundell-Fleming Model

	Home Country	Foreign Country
Actual Output 1/	+	–
Interest Rate	–	–
Exchange Rate:		
Real	depreciation	appreciation
Nominal	depreciation	appreciation
Net Exports	+	–
GDP deflator	–	–

1/ The effect on potential output in the foreign country is discussed in the subsection below dealing with the transmission of supply effects.

As noted at the outset, in many respects the short-run spillover effects of an increase in potential output are similar to those of an expansionary monetary policy. 1/ There is, however, one notable

1/ Of course, in the long run an increase in potential output raises supply capacity, while an expansionary monetary policy does not. Long-run effects are discussed in section (3) below.

difference. A monetary expansion by the home country leads to an increase in that country's price level, whereas an increase in potential output leads to a decrease. This difference has no effect on the international transmission of the effects of the two policies: residents of the foreign country are not concerned with the home country prices of home country goods, but rather with the foreign country prices of home country goods. In other words, it is the real exchange rate that is important. Trade volumes and real output, however, depend on real magnitudes. As a result, the difference in the behavior of the nominal exchange rate and the home country's price level under the two types of policies does not lead to any differences in real effects. 1/

"Positive transmission" The similarities of the results of structural measures in Table 1 to the results of a monetary expansion include one of the key results of the simple Mundell-Fleming model, i.e., that a monetary expansion in the home country may lead to a fall in output abroad ("negative transmission"). This strong and somewhat counter-intuitive result has attracted a great deal of attention and analysis as many economists have suspected that this was a reflection of the particular assumptions of the simple Mundell-Fleming model, a suspicion that was confirmed by Argy and Salop (1979).

In Argy and Salop's analysis, households are concerned about the consumption value--as opposed to domestic output value--of their money balances. With this assumption, the correct deflator for money balances is the consumption deflator as opposed to the GDP deflator. As a result, changes in the exchange rate can directly affect the foreign country deflator for money balances.

Real appreciation of the foreign exchange rate has two effects on the excess demand for money in Argy and Salop's analysis. As in the simple Mundell-Fleming case, the real appreciation lowers net exports and

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1/ To make the argument more concrete, let Japan be the home country and the Federal Republic of Germany be the foreign country. In the two country example where all goods are traded, the DM price of German goods relative to the DM price of Japanese goods represents the real exchange rate. Thus the fact that the foreign country's currency has undergone a real appreciation implies that the DM price of Japanese goods has risen relative to the DM price of German goods, even though the yen price of Japanese goods has fallen. Put another way, the rise in the DM per yen exchange rate (i.e., the nominal exchange rate) must more than offset any fall in the Japanese price level. In the case of a monetary expansion in the home country (i.e., Japan), the real appreciation in the foreign currency (i.e., the DM) would be similar but the nominal appreciation would have to be greater. In the case of a monetary expansion, the nominal exchange rate would have to adjust to more than offset the rise in the home country's price level.

therefore aggregate demand and output in the foreign country. However, the real appreciation also lowers the consumption deflator, thereby increasing real money balances. The net effect on output in the foreign country becomes ambiguous. If the effect of the real appreciation on real money balances in the foreign country is relatively small, the new equilibrium will involve lower output in the foreign country as shown in Table 1. If the impact of the real appreciation on real money balances is large enough, however, money market equilibrium in the foreign country will involve a higher level of output (hence, a "positive transmission" effect). The result of positive transmission of the potential output increase in the home country to foreign output is more likely to occur the greater the degree of openness of the foreign economy. The qualitative results for the modified Mundell-Fleming model are summarized in Table 2.

Table 2. Impact Effects of an Increase in Home Country Potential Output: The Extended Mundell-Fleming Model 1/

	Home Country	Foreign Country
Actual Output	+	+
Interest Rate	−	−
Exchange Rate:		
Real	depreciation	appreciation
Nominal	depreciation	appreciation
Net Exports	+ or −	− or +
GDP deflator	−	+

1/ The extended Mundell-Fleming model assumes that exchange rate changes have a large effect on the consumption deflator, which is used as the deflator for money balances.

The sign of the change in net exports in Table 2 is ambiguous. In the extended model, there are two offsetting effects working on net exports. The expansion of demand in the home country will increase net exports in the foreign country, whereas the real appreciation of the foreign exchange rate will tend to lower net exports. In addition, interest sensitive spending generally tends to increase in the foreign country. Thus, when foreign output falls (as in Table 1), the fall in foreign net exports more than offsets the rise in interest-sensitive spending. When foreign output rises, however, the change in the sum of

interest-sensitive spending and net exports rises (Table 2). Foreign output could rise because both interest-sensitive spending and net exports are rising, or because interest-sensitive spending is rising by more than the decline in net exports in the foreign country.

The ambiguity of the change in net exports has important implications for external and internal balance. A similar ambiguity occurs with expansionary monetary policy that is positively transmitted. Boughton (1988) and Genberg and Swoboda (1987) have argued that because fiscal policy has a more predictable and significant effect on the current account, fiscal policy should be aimed at achieving external balance while monetary policy should be aimed at internal balance. These same arguments would imply that policies designed to stimulate potential output should be more concerned with internal than with external issues.

The Transmission of Supply Effects. The previous section examined several aggregate demand channels through which changes in potential output are transmitted internationally. This section examines transmission effects through the supply side--i.e., how an increase in potential output in the home country may lead to an increase in potential output in the foreign country. 1/

International transmission effects of an increase in potential output may also arise because of the effect of exchange rates on labor supply decisions. Wage earners care about the value of their nominal wages in terms of the goods they buy, which include imports; they therefore deflate nominal wages by the consumption deflator. Firms, however, care about the real product wage, which is the nominal wage deflated by the price of output or GDP deflator.

In this situation an appreciation of the foreign country's exchange rate causes a decrease in consumer prices, which under conditions of real wage flexibility would lead to lower nominal wages. From the firms' perspective, a real appreciation will thus increase the supply of labor. As a result, the real product wage at full employment falls and foreign potential output rises. This result, which does not affect the qualitative results in Table 2, implies that some of the benefits to the

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1/ The transmission channels described in this subsection are independent of those described in the previous subsection. The demand-side effects described there require only that the deflator for money demand depend upon the consumption deflator, rather than the domestic deflator; the supply side was not discussed explicitly. In contrast, the effects described in this subsection could be thought of as centering on the supply side, with aggregate demand assuming a passive role--à la Say's Law ("Supply creates its own demand"). Here the deflator used for money balances is irrelevant. Instead, the focus is on the increase in labor supply that results from terms-of-trade changes. When the effects of the last subsection and this subsection both work, they reinforce one another.

home country stemming from the increase in its productive capacity eventually are shared by the foreign country.

The increase in potential output in the foreign country was caused by the real appreciation of its currency, the counterpart of which is a real depreciation in the home country. But as the home country wage earners face higher import prices, they will demand higher wages and reduce their labor supply. This channel of international transmission therefore implies that part of the initial increase in potential output in the home country is lost to the foreign country. Of course, if the degree of real wage flexibility differs across countries, the ultimate impact on world potential output may be either greater or smaller than the initial expansion of capacity in the home country.

An additional channel through which supply effects could be transmitted abroad is directly through transfers of technology. For example, technical progress that raises total factor productivity and potential output in the home country could be embodied in capital goods (e.g., computers) that are exported, thus raising productivity and potential output in the foreign country.

(3) Long-run effects 1/

The similarity between the effects of an increase in potential output and of a monetary expansion breaks down in the long run. In virtually all macroeconomic models, a one-time change in the money supply is neutral (i.e., has no effect on any real variable) in the long run. Thus, an increase in the nominal money supply in the home country will ultimately lead to an equal percentage increase in the home country's GDP deflator and no change in its real exchange rate or any other real variable. In contrast, a one-time increase in potential output in the home country will have real effects as actual output converges toward potential output in the long run.

The more interesting long-run results of an increase in potential output on the demand-side concern the impact on the real exchange rate and the trade balance. In order to determine these long-run results, the determinants of spending in the long run must be specified. As noted previously, the simplest specification is to assume that the ratio of any component of spending to real output is constant in the long run. This specification of long-run demand implies that absorption and import demand in each country would be a constant fraction of output if the interest rate and real exchange rate are unchanged.

Such a scenario, however, cannot describe the new long-run equilibrium following an increase in potential output, because output and

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1/ In the long run, both adaptive and rational expectations are accurate, so that there is no difference between long-run equilibrium results in the two models.

demand have risen in the home country, and therefore imports have also risen. This would imply an excess demand for goods in the foreign country (with a corresponding excess supply in the home country), which would cause the exchange rate (and perhaps the interest rate) to change. To eliminate the home country's excess supply of goods its currency would have to depreciate. In the long run, an increase in home country potential output is therefore likely to result in a real depreciation of its currency. In contrast, with an expansionary monetary policy there are no real exchange rate effects in the long run.

(4) Rational expectations

The similarity between the demand-side effects of a monetary expansion and an increase in potential output breaks down even in the short run when forward-looking, rational expectations are introduced. Both developments increase demand in the short run by raising real money balances. In the rational expectations case, however, market participants anticipate that a long-run real depreciation of the home country's currency will result from an increase in potential output, while in the case of a monetary expansion the real exchange rate will return to its original value. Under rational expectations, this difference in long run impact shows up immediately.

A rise in potential output and a monetary expansion also have different long-run effects on permanent income, the optimal capital stock, and the debt-GNP ratio among other variables. Under rational expectations these differences in long-run effects also have immediate and significant effects. These effects can be illustrated on the basis of simulations derived from an empirical rational expectations model, such as MULTIMOD. 1/

(5) Simulation results

The major findings of the two simulations that are reviewed here can be summarized as follows: i) The MULTIMOD simulations are qualitatively consistent with the simple theoretical analysis of sections (2) (Table 1) and (3); ii) The quantitative impact on current accounts of structural policy measures that raise potential output is small; iii) the simulations confirm the similarity between the short- and medium-run international transmission of the effects of an increase in potential output and the transmission of the effects of more traditional demand policies. As discussed earlier, however, the difficulty of linking (both analytically and empirically) specific structural reform measures to the subsequent rise in aggregate potential output underlines the stylized nature of the simulation exercise and suggests caution in using the results.

1/ MULTIMOD is a global multi-region econometric model used by the Fund's Research Department for policy simulations. Its structure and use is fully described in Masson et al. (1988).

Table 3 (at the end of this section) lists the simulation results for an increase in potential output of 1.5 percent in all industrialized countries other than the United States. Thus in terms of the theoretical discussion, the United States is the foreign country and the rest of the industrial world is the home country. 1/ The results are given in terms of the change in the value of each variable relative to the baseline levels. For the current account, the effect of the increase in potential output on the aggregate of the rest of the world can be inferred by changing the sign of the change for the United States. The effects on the home country price level, real output and interest rate, can be inferred from any of the countries that comprise the home economy. (The behavior of these variables is not completely uniform among the home countries, which indicates there are significant distributional effects working among the countries experiencing the increase in potential output.) Finally, the results for the first 4 years will be taken as conforming roughly to the "short run" of the theoretical discussion, and the later years indicate the adjustment toward the long run.

The short-run simulation results for the United States in Table 3 are qualitatively similar to the theoretical predictions for the foreign country in Table 1. In the short run there is negative transmission of the increase in potential output in the home country. Interest rates fall in the United States, but the effect of this fall on spending is more than offset by the real appreciation of the dollar. 2/ The short run effects on current accounts are small in relation to the effects on output. Over the medium and longer term, the qualitative results gradually change as demand in the U.S. increases and eventually reflect positive transmission and an improvement in the U.S. current account. These longer term results are due to the outward shifting of the home countries' IS curve as expectations of permanent income in the home countries increase. Indeed, by the mid 1990's the fall in prices and interest rates in the home country diminishes and eventually reverses itself. For example, in Germany during the first 4 years of the simulation, the GNP deflator falls by over 3.5 percentage points and the long-term interest rate by almost 70 basis points. In the 4 year period from 1993 to 1996, the GDP deflator falls by only 1 percentage point and the long-term interest rate rises. This suggests that some of the increase in demand is coming from IS shifts as opposed to the initial LM shifts. Although MULTIMOD has a relatively complicated economic structure, the simulation results of Table 3 are

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1/ There is not exactly a "two-country" world in this simulation because the developing countries' level of potential output could not be changed.

2/ The behavior of the Japanese yen is an anomaly that is due to distributional effects among the "home" countries. Table 1 predicts that the country experiencing the increase in potential output must suffer a real depreciation. The fact that the U.S. dollar is appreciating in real terms, however, implies that the aggregate of the home countries' currencies are depreciating in real terms.

broadly consistent with the simple theoretical results of Table 1 in the short run and with those of section (3) in the long-run.

Table 4 (at the end of this section) provides simulation results of a monetary expansion. 1/ On the basis of the impact on real GNP in the United States, the immediate impression is that the effects of a monetary expansion are transmitted much more quickly than a rise in potential output. By 1990 and 1991, however, the magnitudes of the effects are about the same. The major difference in the two sets of simulations is in terms of the impact on nominal exchange rates. In the monetary expansion the U.S. currency appreciates by over 5 percent, whereas in the case of the increase in potential output the nominal exchange rate appreciates by less than one-half of a percent. This difference, however, solely reflects the fact that in the monetary expansion the home countries' price levels are rising, whereas in the case of the increase of potential output the home countries' price levels are falling. As noted in the previous section, this difference between the effects on the home countries' price level is irrelevant for international effects. Instead, what matters is the real effective exchange rate. By 1990-91 the change in the real effective exchange rate of the U.S. dollar is in the 1-2 percent range for both simulations.

Some of the difference in the timing of the effects of the two policy changes is due in part to overshooting. For the monetary expansion the nominal and real appreciations are largest in the first year, whereas in the case of the increase in potential output the change in the real exchange rate is modest in the first year and slowly increases in the short run. The greater overshooting in the case of the monetary expansion therefore explains in part the more immediate transmission to foreign output and the current account.

b. Structural policies and macroeconomic flexibility

In addition to affecting the level of potential output, structural policies can affect the way an economy reacts to shocks by increasing "flexibility". Structural policies that increase flexibility include efforts to reduce wage rigidities or increase openness. 2/ Not all types

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1/ In the simulation underlying Table 4, money supply is gradually increased to exceed the baseline level by 5 percentage points, and this change is maintained throughout the simulation period. All countries experience the increase in the money supply with the exception of the United States and the developing countries. The size of the monetary shock was selected so that it would lead to roughly the same change in foreign country (i.e., U.S.) real GNP in the short run as had the potential output shock.

2/ A third possibility for increasing flexibility could result from structural reform of financial markets. As financial markets become more competitive, one would expect the degree of international capital mobility to increase. In the industrial countries, however, most financial markets are already very competitive, so that the assumption of perfect capital

of flexibility are desirable from a macroeconomic perspective, however. For example, while improvements in real wage flexibility are always desirable, it is possible for nominal wage flexibility to be too high in the short run.

(1) Short-run flexibility and macroeconomic adjustment

Short-run nominal and real wage flexibility are measures of the responsiveness of wages to short-run disturbances. 1/ Short-run real wage flexibility is measured by the responsiveness of the real wage to unemployment. 2/ Perfect real wage flexibility would correspond to the case where wages adjust to their "warranted" level, where the unemployment rate is kept at its long-run equilibrium rate. Nominal wage flexibility is measured by the elasticity of the nominal wage with respect to the aggregate price level. Perfect, short-run nominal flexibility would correspond to an elasticity of one, so that any increase in the price level would give rise to an equiproportionate increase in the wage rate, with no change in the real wage.

Many analysts associate short-run rigidity of wages with the periodic nature of wage bargaining. With contracts of a fixed duration, contracts that are currently scheduled for renegotiation can be adjusted in response to current economic disturbances. Contracts are negotiated with fixed durations because of bargaining costs. One way of minimizing bargaining costs while still increasing wage flexibility is the use of contingent wage contracts. In contingent contracts, the formula for determining the wage is negotiated, rather than the level of the wage. A well known example of a contingent wage contract is the union wage contract that includes a cost-of-living (or, COLA) clause. In such a contract, the actual level of the wage depends on the level of consumer prices during the life of the contract. COLA clauses increase nominal flexibility, at the expense of lower real wage flexibility in the short run. 3/

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mobility is fairly accurate already. It should also be emphasized that the analysis in this section is concerned with the macroeconomic or "business cycle" effects of flexibility. Flexibility also has important microeconomic or real effects. For example, an increase in flexibility that causes resources to move more quickly in response to changing comparative advantage has important microeconomic advantages, which are not directly addressed in this section.

1/ See Adams, Fenton and Larsen (1986) for a discussion of these concepts and for a review of the empirical evidence.

2/ Because real flexibility is measured by the coefficient on the unemployment term in a Phillips curve relationship, the statement in the text also is true for nominal wages. Since prices are implicitly held constant in such a relationship, real wages move in the same direction as nominal wages.

3/ Profit sharing plans are contingent wage contracts that would increase real wage flexibility. A decrease in economic activity that increases unemployment would lower profit and thereby lower the profit

An economy with perfect short-run nominal wage flexibility is protected from the effects of demand shocks on unemployment, but not from the effects of supply shocks. Perfect short-run nominal flexibility makes the aggregate supply curve vertical, but not necessarily at potential output. For example, consider an economy with perfect, short-run nominal flexibility, which is subject to an adverse supply shock that lowers the warranted real wage. In order to preserve full employment, the actual real wage must fall. Perfect nominal flexibility, however, makes the real wage constant for any price level. As a result, the aggregate supply curve is vertical at a level of output below potential, 1/ and unemployment increases until nominal wages are renegotiated to reduce the real wage.

In contrast, perfect nominal flexibility will tend to protect an economy from the real effects of a demand shock on unemployment. In addition to purely cyclical influences on the demand for labor, demand shocks may increase unemployment by changing the price level, thereby bringing the real wage out of line with the warranted real wage. With perfect short-run nominal flexibility, however, changes in the price level no longer affect the real wage. Put another way, in the absence of a supply shock, perfect, short-run nominal flexibility makes the aggregate supply curve vertical at potential output.

With perfect, short-run real wage flexibility, the degree of nominal flexibility is irrelevant. With less than perfect real wage flexibility, the desirable degree of short-run nominal flexibility depends on the relative importance of demand and supply shocks. Gray (1976) has shown in the context of a closed economy that the optimal degree of nominal wage flexibility leads to a positive wage elasticity which is closer to unity the more prevalent are demand shocks relative to supply shocks. Aizenman and Frenkel (1985) have extended Gray's analysis to a model of a single open economy and analyzed how the optimal degree of nominal wage flexibility depends on the demand policies being pursued.

(2) Medium-run flexibility and macroeconomic adjustment

So far the discussion of flexibility has been concerned with the short-run response of the economy to shocks. In the absence of perfect short-run real wage flexibility, however, the initial response will not preclude adverse effects on unemployment. It is also important, therefore, to analyze how an economy adjusts to eliminate unemployment that results from past shocks. It is convenient to call this latter type of flexibility

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share component of wages.

1/ In general, an adverse supply shock shifts the aggregate supply curve to the left and lowers potential output. With fixed wage contracts, the aggregate supply curve is shifted by more than the reduction in potential output.

medium-run, real wage flexibility. The higher the degree of medium-run, real wage flexibility, the more quickly will unemployment be eliminated. 1/

The causes of medium-run real wage rigidities are not well known, but in light of recent persistence of European unemployment, a number of theories have been proposed. Taylor (1980) argues that medium-run rigidities may result from the wage bargainers' concern with relative as well as real wages. In an economy with high unemployment and staggered wage negotiations, bargainers who focus on relative wages will not negotiate their real wage to the warranted real wage because such a negotiation would lower the relative wage. Thus, high unemployment may persist even after all contracts have been renegotiated.

Another set of theories relies on the relative power of "insiders" vs. "outsiders" (Blanchard and Summers (1986) and Lindbeck and Snower (1988)). 2/ These types of theories explain the persistence of deviations of the real wage from the warranted real wage, for example on the basis of senior union members pushing for wage increases even though this would lead to unemployment among junior members. A related argument based on empirical analysis (Bruno and Sachs, 1985) argues that unions often fail to lower their real wage goals after a decrease in trend productivity growth. Finally, Bean and Layard (1988) argue that the real wage may be sticky because of "outsider ineffectiveness." In their view, the long-term unemployed, perhaps through the loss of job skills and motivation, fail to exert any pressure to lower wages and restore high employment.

Regardless of which of these theories proves to be correct, the international consequences of differences in medium-run, real wage flexibility are important. Consider a shock that causes an equal rise in unemployment in all countries. Further assume that the real wage temporarily has risen over the warranted real wage in all countries (so that there is a rise in structural unemployment) and that one group of countries has a high degree of medium-run, real wage flexibility and another group has very low real wage flexibility. In the former group of countries, real wages will fall rapidly in response to the rise in unemployment, and these countries will return to high employment and high levels of demand quickly. In the low flexibility countries, a return

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1/ There is no meaningful concept of medium-run, nominal wage flexibility. The medium run corresponds to a period long enough for contracts to be renegotiated in light of past economic disturbances. Rational wage bargainers will bargain over real values, not nominal values. In the short run, however, the wage can respond only via contingent contracts, which may be either explicit or implicit and which are typically indexed contracts. Because the short run is too short for a renegotiation, the wage earners are concerned about the effects of indexation on real wages, hence the concern with nominal flexibility.

2/ The hypothesis underlying these theories is often referred to as "hysterisis", since they argue that the natural unemployment rate tends to follow actual unemployment. See also the discussions in Chapter IV and in SM/88/181, Annex III.

to full employment with price stability requires a reduction in real wages, which takes time. Thus, differences in medium-run flexibility are likely to lead to quite different cyclical patterns of adjustment.

The delay in the fall of real wages puts the obvious costs stemming from global disturbances on the low flexibility countries. However, it may also place an external adjustment burden on both groups of countries. If the shock takes the form of an increase in demand in the high flexibility countries, caused by a fiscal expansion, then these countries may experience an appreciation of the exchange rate and a widening trade deficit. Alternatively, if the increase in demand is brought about by an increase in the real money supply, then the impact on the trade balance is likely to be small. In the latter case the demand effects on the trade balance are offset by a real depreciation of the currency. However, there may still be external costs in this situation to the extent that individual countries may be affected by the changing patterns of demand and relative prices. In either case, the difference in the degree of wage flexibility adds an external adjustment burden to the internal adjustment costs caused by differences in the stance of demand policies.

c. Flexibility and macroeconomic adjustment: simulation results

The theoretical discussion has drawn a distinction between the short-run effects of increased flexibility and the longer-term effects as contracts are renegotiated. Because MULTIMOD is a model of annual observations, and some contracts will be renegotiated during the year in which a shock occurs, the results of the simulations cannot be broken down into these two categories very easily. Even the shortest possible simulation period will thus contain some of the effects of what was described as "medium-term" flexibility in the theoretical discussion. However, the longer the period of the simulation, the more the results correspond to the effects of medium-term flexibility. To illustrate the effects on international macroeconomic adjustment, two MULTIMOD simulations of a change in the degree of real flexibility were implemented (Table 5, at the end of this section). In both cases, the macroeconomic disturbance is a reduction in government spending in all industrial countries. 1/ The two simulations show the response of the world economy in the cases of high and low real flexibility. 2/

One result in Table 5 is particularly surprising: the change in output is smaller in the United States in the less flexible case over both time periods, and the same relationship holds true in Germany over the shorter time period. In terms of changes in real output, greater

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1/ In each of the industrial countries, government expenditure is reduced by 1 percent of baseline GNP, for the years 1988 to 1996. After 1996 the reduction in government spending relative to the baseline is gradually eliminated. As before, no policy changes are assumed in developing countries.

2/ The change in flexibility is introduced as a change in the coefficient on capacity utilization in the aggregate price equation.

flexibility does not appear to be stabilizing. Notice, however, that none of the differences in the cumulative changes in output between the high and low flexibility cases is ever very large. The surprising result of output stability is apparently due to the forward looking expectations in the MULTIMOD model. With forward looking expectations, the greater price flexibility that results from increased real wage flexibility exacerbates disturbances in aggregate demand. Greater real flexibility is always stabilizing in terms of aggregate supply. Table 5 suggests that the effects of price flexibility on aggregate supply and demand in the MULTIMOD model are roughly offsetting in the short run.

In the simulations reported in Table 5, the aggregate demand effect works through forward looking expectations of inflation. Because the price level falls by more in the high flexibility case, forward looking expectations of inflation decline more in the short run. As a result, real interest rates rise by more, and thus the "crowding in" effect following the fiscal contraction is attenuated. The possibility that increased price flexibility could destabilize aggregate demand has been long recognized in the theoretical macroeconomic literature (although not in the literature on the optimal degree of wage flexibility, such as Gray (1976)). Recently it has been argued that this theoretical possibility has empirical relevance for the U.S. economy. 1/ While MULTIMOD seems to be supporting this last contention, it should be noted that the destabilizing effect is confined to the short run, and that the net change in real output over any time span is small.

While the gains from increased real flexibility in terms of real output stability seem to be small, there are significant gains in terms of inflation control. By comparing the output and inflation effects, it is possible to infer the output costs that may be associated with policies of demand restraint aimed at lowering inflation. By comparing the high flexibility to the low flexibility columns in Table 5, there is clearly evidence that increased flexibility can substantially lower the "sacrifice ratio." In other words, the simulations show that for about the same cumulative reduction in output, the price level would fall by much more in the case of high real flexibility. The results in Table 5 also have important implications for the external costs of adjusting to a common macroeconomic shock. These external costs result from differences in the degree of flexibility among countries that leads to different cyclical responses to a common shock.

After 4 years all three countries have experienced a real appreciation of their currencies (the currencies of the other industrial countries have depreciated, which is not shown in Table 5) with the real appreciation in Japan and the U.S. the largest. This result holds true

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1/ DeLong and Summers (1986) argue that price flexibility is destabilizing for the U.S. economy. They also cite a theoretical literature going back to the 1920s, with Irving Fisher as a proponent of the view that price flexibility can be destabilizing.

for both the low flexibility and the high flexibility column. In addition to the quantitative differences, there are qualitatively different changes in current account positions. The U.S. experiences a reduction in its current account deficit, while Germany's surplus falls; there is very little change in the Japanese current account. At least part of the differences in the behavior of the current accounts reflect different speeds of adjustment to the demand shock among countries.

In the longer run (after 8 years) the change in real GNP is at or near its peak in all three countries, but the value at this peak is much different. In particular, Germany and Japan experience much more of a change in the price level than in real output. In the case of Japan, the real appreciation broadly offsets the effects of the decline in output and demand on the current account. In the U.S., however, where output and demand are declining the most, there is a substantial improvement in the current account. In Germany, the real appreciation is more than enough to offset the demand effects, so that there is a marked decline in the current account surplus. Overall, these simulations confirm the theoretical result that differences in medium-term flexibility can add significant external costs to the internal costs of adjusting to common macroeconomic shocks.

III. Structural Reform in Practice

1. Introduction

This chapter builds on the theoretical framework for analysis of structural policies developed in Chapter II and examines how structural reforms might affect macroeconomic performance and international adjustment in practice. The chapter reviews examples of some of the important initiatives taken over the last several years in the area of structural reform, with the emphasis on the types of reforms common to most industrial countries. Specific measures in industrial countries are mentioned as examples within each category; however, these examples do not aim at providing an exhaustive inventory of structural measures taken so far. 1/ The presentation will distinguish between aggregate demand effects and aggregate supply effects. Table 6 presents an overview of the analysis.

2. Reforms in financial markets

The effects of recent financial market reforms are illustrated with three examples. The first two examine the effects of possible structural shifts in money demand and supply relations; the third discusses the effects of changes in capital controls.

1/ For such inventories, see OECD (1987), OECD (September 1988), and IMF (August 14, 1988).

Table 3. Simulated Effects of an Increase in Potential Output in All Industrial Countries Except the United States, 1988-99

(Percentage deviation from baseline unless otherwise noted)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Major industrial countries												
United States												
Real GNP	-0.1	-0.2	-0.3	-0.3	-0.3	-0.2	-0.1	-0.0	0.1	0.2	0.3	0.5
Real domestic demand	0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.0	0.0	0.1	0.1	0.2	0.2
GNP deflator	-0.1	-0.3	-0.6	-1.0	-1.5	-2.0	-2.5	-3.0	-3.4	-3.7	-3.9	-3.9
Inflation rate (%)	-0.1	-0.2	-0.3	-0.4	-0.5	-0.5	-0.5	-0.5	-0.4	-0.3	-0.2	-0.0
Short-term interest rate (%)	-0.0	-0.1	-0.1	-0.2	-0.3	-0.3	-0.4	-0.4	-0.4	-0.5	-0.5	-0.4
Long-term interest rate (%)	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
Nominal effective exchange rate 1/	0.5	0.5	0.4	0.3	0.2	0.0	-0.1	-0.3	-0.4	-0.6	-0.7	-0.8
Real effective exchange rate	0.7	1.2	1.7	2.1	2.2	2.2	2.1	1.9	1.7	1.4	1.2	0.9
(As a percent of baseline GNP)												
Current account balance	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2
Gen. gov. financial balance	-0.0	-0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Private saving	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.0	0.1	0.1	0.2	0.3
Gross private investment	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.0	0.0	0.0	0.1	0.1	0.2
Japan												
Real GNP	0.1	0.5	0.9	1.3	1.7	1.9	2.1	2.1	2.1	2.2	2.2	2.3
Real domestic demand	0.0	0.3	0.7	1.0	1.3	1.6	1.7	1.8	1.8	1.9	2.0	2.0
GNP deflator	-0.6	-1.6	-2.7	-3.7	-4.4	-4.9	-5.2	-5.4	-5.5	-5.4	-5.3	-5.0
Inflation rate (%)	-0.6	-1.1	-1.1	-1.0	-0.8	-0.5	-0.3	-0.2	-0.1	0.0	0.2	0.3
Short-term interest rate (%)	-0.1	-0.1	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
Long-term interest rate (%)	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Nominal effective exchange rate 1/	0.2	0.2	0.4	0.5	0.6	0.8	0.9	1.0	1.0	1.0	1.0	1.0
Real effective exchange rate	0.1	0.1	0.0	-0.0	-0.0	0.0	0.1	0.3	0.4	0.5	0.5	0.6
Exchange rate ($/Yen)	-0.1	-0.1	0.1	0.2	0.4	0.6	0.8	1.0	1.1	1.2	1.3	1.3
(As a percent of baseline GNP)												
Current account balance	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
Gen. gov. financial balance	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Private saving	0.1	0.2	0.4	0.6	0.8	0.9	0.9	0.8	0.8	0.8	0.8	0.8
Gross private investment	0.0	0.1	0.3	0.5	0.7	0.8	0.8	0.9	0.9	0.9	0.9	0.9
Germany												
Real GNP	0.3	0.6	0.9	1.3	1.6	1.8	1.8	1.8	1.9	1.9	1.9	2.0
Real domestic demand	0.1	0.4	0.6	0.9	1.1	1.2	1.3	1.3	1.3	1.3	1.3	1.4
GNP deflator	-0.5	-1.5	-2.6	-3.5	-4.4	-5.0	-5.4	-5.7	-5.9	-6.0	-5.9	-5.7
Inflation rate (%)	-0.6	-1.0	-1.1	-1.0	-0.9	-0.7	-0.5	-0.3	-0.2	-0.1	0.1	0.2
Short-term interest rate (%)	-0.0	-0.1	-0.2	-0.3	-0.3	-0.4	-0.4	-0.5	-0.5	-0.5	-0.5	-0.5
Long-term interest rate (%)	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	-0.1
Nominal effective exchange rate 1/	-0.5	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.6	-0.6	-0.5
Real effective exchange rate	-0.4	-0.6	-0.8	-1.0	-1.2	-1.3	-1.4	-1.4	-1.4	-1.3	-1.3	-1.2
Exchange rate ($/DM)	-0.8	-0.9	-0.9	-0.9	-0.8	-0.7	-0.6	-0.4	-0.3	-0.1	0.1	0.2

1/ A positive value indicates an appreciation.

(cont'd) Table 3. Simulated Effects of an Increase in Potential Output in All Industrial Countries Except the United States, 1988-99

(Percentage deviation from baseline unless otherwise noted)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Major industrial countries												
Germany (continued)												
(As a percent of baseline GNP)												
Current account balance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Gen. gov. financial balance	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
Private saving	0.1	0.2	0.4	0.5	0.7	0.7	0.6	0.6	0.6	0.5	0.6	0.6
Gross private investment	0.1	0.2	0.4	0.5	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7
Other major industrial countries (Canada, France, Italy and the United Kingdom)												
Real GNP	0.2	0.7	1.2	1.6	1.8	1.9	1.8	1.8	1.8	2.0	2.1	2.1
Real domestic demand	0.1	0.5	0.9	1.3	1.5	1.5	1.5	1.4	1.5	1.6	1.7	1.8
GNP deflator	-0.7	-1.7	-2.7	-3.5	-4.1	-4.6	-4.9	-5.2	-5.4	-5.5	-5.4	-5.1
Inflation rate (%)	-0.7	-1.1	-1.1	-0.8	-0.6	-0.5	-0.4	-0.3	-0.2	-0.1	0.1	0.3
Short-term interest rate (%)	-0.1	-0.1	-0.2	-0.3	-0.3	-0.4	-0.4	-0.5	-0.5	-0.5	-0.5	-0.4
Long-term interest rate (%)	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1
Nominal effective exchange rate 1/	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.0	-0.0	0.0	0.1	0.1	0.2
Real effective exchange rate	-0.1	-0.3	-0.4	-0.4	-0.3	-0.3	-0.3	-0.2	-0.2	-0.2	-0.1	-0.1
(As a percent of baseline GNP)												
Current account balance	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Gen. gov. financial balance	-0.0	0.0	0.1	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.2
Private saving	0.1	0.2	0.4	0.5	0.6	0.6	0.5	0.4	0.4	0.4	0.5	0.6
Gross private investment	0.1	0.2	0.4	0.6	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
Other industrial countries												
Real GNP	0.1	0.5	1.0	1.3	1.6	1.6	1.7	1.6	1.7	1.8	1.8	1.9
Real domestic demand	0.1	0.4	0.8	1.1	1.4	1.4	1.4	1.3	1.3	1.4	1.5	1.6
GNP deflator	-0.7	-1.7	-2.8	-3.7	-4.3	-4.8	-5.1	-5.3	-5.5	-5.6	-5.5	-5.3
Inflation rate (%)	-0.7	-1.1	-1.1	-0.9	-0.7	-0.5	-0.4	-0.3	-0.2	-0.1	0.1	0.2
Short-term interest rate (%)	-0.1	-0.1	-0.2	-0.3	-0.3	-0.4	-0.4	-0.5	-0.5	-0.5	-0.5	-0.4
Long-term interest rate (%)	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1
Nominal effective exchange rate 1/	-0.2	-0.1	-0.1	-0.1	-0.0	0.0	0.1	0.2	0.2	0.3	0.3	0.4
Real effective exchange rate	-0.1	-0.3	-0.4	-0.4	-0.3	-0.3	-0.3	-0.2	-0.2	-0.2	-0.1	-0.1
(As a percent of baseline GNP)												
Current account balance	-0.0	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1
Gen. gov. financial balance	-0.0	0.1	0.1	0.2	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.2
Private saving	0.0	0.1	0.1	0.2	0.3	0.2	0.2	0.1	0.1	0.2	0.3	0.4
Gross private investment	0.1	0.2	0.4	0.6	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7

1/ A positive value indicates an appreciation.

(cont'd) Table 3. Simulated Effects of an Increase in Potential Output in All Industrial Countries Except the United States, 1988-99

(Percentage deviation from baseline unless otherwise noted)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total industrials												
Real GNP	0.1	0.3	0.6	0.8	1.0	1.2	1.2	1.3	1.3	1.4	1.5	1.6
Current account balance, as a percent of baseline GNP	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Developing countries												
Developing countries,exclusive of high income oil exporters												
Real GDP	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
Real domestic demand	0.1	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6
GNP deflator	-0.9	-1.7	-2.4	-3.1	-3.6	-4.0	-4.2	-4.4	-4.5	-4.4	-4.3	-4.0
Inflation rate (%)	-0.9	-0.8	-0.8	-0.7	-0.5	-0.4	-0.3	-0.2	-0.1	0.0	0.2	0.3
Price index of exports (in $)	-0.9	-1.6	-2.4	-3.1	-3.7	-4.2	-4.5	-4.7	-4.8	-4.8	-4.6	-4.4
Real exports	0.1	0.3	0.5	0.6	0.7	0.7	0.7	0.6	0.6	0.6	0.7	0.7
Real imports	0.3	0.8	1.3	1.7	1.9	2.0	2.0	1.9	2.0	2.1	2.2	2.2
Interest payments as a percentage of export values	0.1	0.1	0.1	0.1	0.1	0.0	0.0	-0.0	-0.1	-0.1	-0.2	-0.2
(As a percent of baseline GDP)												
Current account		0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0
Total savings		0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Gross private investment	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
High income oil exporting Developing countries												
Real GDP	0.1	0.4	0.8	1.2	1.5	1.8	2.0	2.1	2.3	2.5	2.6	2.7
Real domestic demand	0.2	0.7	1.4	2.2	3.1	3.9	4.7	5.4	6.0	6.4	6.8	6.9
World prices (in dollars)												
Price of oil	-0.8	-1.5	-2.2	-2.9	-3.4	-3.8	-4.1	-4.4	-4.5	-4.6	-4.5	-4.3
Price index of commodities	-0.5	-0.7	-1.1	-1.7	-2.4	-3.0	-3.5	-3.8	-3.8	-3.6	-3.3	-3.0

Table 4. Simulated Effects of an Increase in Money Supplies of All Industrial Countries Except the United States, 1988-99

(Percentage deviation from baseline unless otherwise noted)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Major industrial countries												
United States												
Real GNP	-0.7	-0.7	-0.5	-0.3	-0.1	0.0	0.1	0.2	0.2	0.3	0.3	0.3
Real domestic demand	-0.2	-0.3	-0.2	-0.1	-0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2
GNP deflator	-0.2	-0.4	-0.8	-1.3	-1.7	-2.1	-2.4	-2.6	-2.8	-2.8	-2.7	-2.6
Inflation rate (%)	-0.2	-0.3	-0.4	-0.5	-0.5	-0.4	-0.3	-0.2	-0.1	-0.0	0.1	0.2
Short-term interest rate (%)	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Long-term interest rate (%)	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Nominal effective exchange rate 1/	5.9	5.6	5.4	5.3	5.1	5.0	4.9	4.9	4.8	4.8	4.8	4.8
Real effective exchange rate	3.3	2.7	2.0	1.3	0.8	0.4	0.1	-0.1	-0.2	-0.3	-0.3	-0.3
(As a percent of baseline GNP)												
Current account balance	-0.1	-0.1	-0.1	-0.1	-0.0	-0.0	-0.0	0.0	0.0	0.1	0.1	0.1
Gen. gov. financial balance	-0.0	-0.0	-0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0
Private saving	-0.2	-0.3	-0.2	-0.2	-0.1	-0.0	0.0	0.0	0.1	0.1	0.2	0.2
Gross private investment	-0.2	-0.2	-0.2	-0.1	-0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Japan												
Real GNP	1.0	1.0	0.8	0.4	0.1	-0.2	-0.3	-0.2	-0.1	-0.0	0.1	0.2
Real domestic demand	0.5	0.6	0.5	0.2	0.0	-0.2	-0.2	-0.2	-0.1	-0.0	0.1	0.1
GNP deflator	0.4	1.0	1.8	2.4	2.8	2.9	2.9	2.8	2.6	2.5	2.4	2.5
Inflation rate (%)	0.4	0.7	0.7	0.6	0.4	0.2	-0.0	-0.1	-0.2	-0.1	-0.0	0.1
Short-term interest rate (%)	-0.4	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Long-term interest rate (%)	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Nominal effective exchange rate 1/	-2.8	-2.6	-2.5	-2.5	-2.4	-2.4	-2.4	-2.5	-2.5	-2.5	-2.6	-2.6
Real effective exchange rate	-0.6	-0.4	-0.3	-0.1	-0.0	0.1	0.1	0.0	-0.1	-0.2	-0.2	-0.3
Exchange rate ($/Yen)	-5.6	-5.3	-5.1	-5.0	-4.9	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8
(As a percent of baseline GNP)												
Current account balance	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gen. gov. financial balance	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1
Private saving	0.4	0.3	0.2	0.0	-0.1	-0.2	-0.3	-0.2	-0.2	-0.1	-0.0	0.1
Gross private investment	0.3	0.4	0.4	0.2	0.1	-0.0	-0.1	-0.1	-0.1	-0.0	0.0	0.1
Germany												
Real GNP	1.1	0.9	0.5	0.2	-0.1	-0.3	-0.3	-0.3	-0.2	-0.2	-0.1	-0.0
Real domestic demand	0.6	0.6	0.3	0.0	-0.2	-0.3	-0.3	-0.3	-0.2	-0.1	-0.0	0.0
GNP deflator	0.3	0.9	1.6	2.1	2.5	2.7	2.8	2.7	2.7	2.7	2.8	3.0
Inflation rate (%)	0.4	0.6	0.7	0.5	0.4	0.2	0.1	-0.0	-0.0	0.0	0.1	0.1
Short-term interest rate (%)	-0.4	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Long-term interest rate (%)	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Nominal effective exchange rate 1/	-1.5	-1.5	-1.4	-1.3	-1.3	-1.2	-1.2	-1.1	-1.1	-1.1	-1.1	-1.0
Real effective exchange rate	-1.2	-1.0	-0.9	-0.7	-0.4	-0.3	-0.1	0.0	0.1	0.1	0.1	0.1
Exchange rate ($/DM)	-5.8	-5.6	-5.4	-5.2	-5.1	-4.9	-4.8	-4.7	-4.7	-4.6	-4.6	-4.6

1/ A positive value indicates an appreciation.

(cont'd) Table 4. Simulated Effects of an Increase in Money Supplies of All Industrial Countries Except the United States, 1988-99

(Percentage deviation from baseline unless otherwise noted)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Major industrial countries												
Germany (continued)												
(As a percent of baseline GNP)												
Current account balance	0.2	-0.0	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Gen. gov. financial balance	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Private saving	0.3	0.2	0.1	-0.1	-0.2	-0.3	-0.3	-0.3	-0.2	-0.2	-0.1	-0.0
Gross private investment	0.4	0.5	0.3	0.1	-0.0	-0.1	-0.1	-0.1	-0.1	-0.0	0.0	0.1
Other major industrial countries (Canada, France, Italy and the United Kingdom)												
Real GNP	1.0	1.0	0.7	0.4	0.1	-0.1	-0.1	-0.0	0.1	0.2	0.3	0.3
Real domestic demand	0.5	0.7	0.4	0.1	-0.1	-0.2	-0.2	-0.2	-0.0	0.1	0.2	0.2
GNP deflator	0.5	1.2	1.9	2.5	2.8	2.8	2.8	2.7	2.6	2.7	2.8	3.0
Inflation rate (%)	0.5	0.7	0.7	0.6	0.3	0.1	-0.1	-0.1	-0.0	0.0	0.1	0.2
Short-term interest rate (%)	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.2	-0.2
Long-term interest rate (%)	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Nominal effective exchange rate 1/	-1.6	-1.5	-1.4	-1.4	-1.4	-1.4	-1.4	-1.3	-1.3	-1.3	-1.3	-1.3
Real effective exchange rate	-0.5	-0.3	-0.1	0.0	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
(As a percent of baseline GNP)												
Current account balance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Gen. gov. financial balance	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1
Private saving	0.3	0.3	0.2	0.0	-0.1	-0.2	-0.2	-0.2	-0.1	-0.0	0.1	0.1
Gross private investment	0.3	0.5	0.4	0.2	0.0	-0.1	-0.1	-0.1	-0.0	0.0	0.1	0.1
Other industrial countries												
Real GNP	0.8	1.0	0.7	0.3	0.1	-0.1	-0.1	-0.0	0.1	0.2	0.3	0.3
Real domestic demand	0.4	0.7	0.5	0.1	-0.1	-0.2	-0.2	-0.2	-0.1	0.1	0.2	0.2
GNP deflator	0.3	0.9	1.6	2.1	2.4	2.5	2.5	2.5	2.5	2.5	2.6	2.8
Inflation rate (%)	0.3	0.6	0.7	0.5	0.3	0.1	0.0	-0.0	-0.0	0.0	0.1	0.2
Short-term interest rate (%)	-0.5	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Long-term interest rate (%)	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Nominal effective exchange rate 1/	-1.8	-1.7	-1.6	-1.5	-1.5	-1.4	-1.4	-1.3	-1.3	-1.3	-1.3	-1.3
Real effective exchange rate	-0.5	-0.3	-0.1	0.0	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
(As a percent of baseline GNP)												
Current account balance	-0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Gen. gov. financial balance	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Private saving	0.2	0.3	0.2	0.1	-0.0	-0.1	-0.1	-0.1	-0.1	-0.0	0.0	0.1
Gross private investment	0.3	0.5	0.4	0.2	0.1	-0.1	-0.1	-0.1	-0.0	0.0	0.0	0.1

1/ A positive value indicates an appreciation.

(Cont'd) Table 4. Simulated Effects of an Increase in Money Supplies of All Industrial Countries Except the United States, 1988-99

(Percentage deviation from baseline unless otherwise noted)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total industrials												
Real GNP	0.4	0.4	0.3	0.1	-0.0	-0.1	-0.1	-0.1	0.0	0.1	0.2	0.2
Current account balance, as a percent of baseline GNP	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Developing countries												
Developing countries,exclusive of high income oil exporters												
Real GDP	0.2	0.1	0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.0	-0.0
Real domestic demand	0.5	0.2	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.0	0.0	0.1	0.1
GNP deflator	-4.0	-3.4	-2.9	-2.5	-2.2	-2.1	-2.1	-2.1	-2.1	-2.1	-2.0	-1.8
Inflation rate (%)	-4.1	0.6	0.6	0.4	0.3	0.1	0.0	-0.0	-0.0	0.0	0.1	0.2
Price index of exports (in $)	-4.0	-3.5	-3.1	-2.8	-2.5	-2.4	-2.3	-2.3	-2.3	-2.3	-2.2	-2.0
Real exports	0.7	0.4	0.1	-0.1	-0.2	-0.3	-0.3	-0.2	-0.2	-0.1	-0.1	-0.0
Real imports	2.4	1.1	0.3	-0.2	-0.4	-0.4	-0.3	-0.1	0.1	0.2	0.3	0.4
Interest payments as a percentage of export values	0.5	0.3	0.2	0.1	0.1	-0.0	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2
(As a percent of baseline GDP)												
Current account		0.1	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
Total savings		0.2	0.0	-0.0	-0.1	-0.1	-0.1	-0.0	-0.0	0.0	0.0	0.0
Gross private investment	0.3	0.1	-0.0	-0.1	-0.1	-0.1	-0.0	-0.0	0.0	0.0	0.0	0.0
High income oil exporting Developing countries												
Real GDP	0.7	0.8	0.7	0.5	0.4	0.3	0.3	0.4	0.5	0.6	0.6	0.6
Real domestic demand	1.0	1.6	1.9	1.9	1.9	1.8	1.8	1.8	1.9	2.0	2.0	2.0
World prices (in dollars)												
Price of oil	-3.5	-3.0	-2.6	-2.3	-2.2	-2.1	-2.2	-2.3	-2.3	-2.3	-2.3	-2.1
Price index of commodities	-2.5	-3.0	-3.3	-3.4	-3.2	-2.9	-2.5	-2.3	-2.1	-1.9	-1.9	-1.8

Table 5. Macroeconomic Adjustment and Real Flexibility

(Percentage Deviations from baseline levels)

	High Flexibility		Low Flexibility	
	After 4 years	After 8 years	After 4 years	After 8 years
U.S.:				
Real GNP	-2.2	-0.8	-2.0	-1.2
Cumulative change	-7.2	-13.5	-6.7	-13.4
GNP deflator	-6.3	-23.1	-4.3	-15.5
Real exchange rate	2.7	-0.6	2.1	0.4
Current account 1/	0.1	0.5	0.1	0.4
Japan:				
Real GNP	-1.3	-0.2	-1.5	-0.3
Cumulative change	-6.1	-7.9	-6.4	-8.8
GNP deflator	-11.3	-23.4	-8.6	-18.1
Real exchange rate	1.4	2.8	1.5	2.8
Current account 1/	0.0	0.0	0.0	0.0
Germany:				
Real GNP	-1.6	-0.3	-1.7	-0.5
Cumulative change	-5.9	-8.5	-5.8	-9.3
GNP deflator	-11.1	-25.6	-8.2	-19.4
Real exchange rate	0.5	2.1	0.5	2.0
Current account 1/	-0.1	-0.6	-0.1	-0.5

1/ Changes in percent of baseline GNP.

Table 6. Structural Policies and Macrooeconomic Relationships

	Aggregate Demand Effects		Aggregate Supply Effects	
	Real effects	Financial effects	Short-run effects	Long-run effects
Financial market reforms				
(e.g., deposit rate deregulation, growth of money markets, removal of capital controls)	Improved smoothing of consumption through time. Possible fall in the cost of capital would raise investment.	Money demand parameters change. Money multiplier changes. Interest parity relation changes. Altered risk/return opportunities cause widespread reallocation of portfolios.	Lower financial costs may shift supply curve outward.	Portfolio reallocation may lead to lower capital costs or more efficient use of the capital stock, and thus to higher productivity, a higher capital/output ratio, and higher long run output.
Goods and services market reforms				
(e.g., increased competition, removal of regulations, reduction of trade barriers)	Investment response to new business opportunities; differential effects across industries. Trade elasticities may change. Consumption rises due to rise in real income after redistribution effects.	Accommodation of the higher capital stock in portfolios may shift demand for financial assets, e.g., to recoup overall liquidity.	Lower input costs shift the supply curve outward. Resource reallocation may cause changes in output.	Resource reallocation may increase effective supply of capital or labor, due to higher productivity. Higher equilibrium capital stock is likely with improved business opportunities and lower costs; thus, higher long term output is likely.
Labor market reforms				
(e.g., simplification of work rules, reduction of regulations, reform of wage bargaining.)	Investment rises because (1) the marginal product of labor rises under more flexible arrangements; and (2) business risk is lower if more flexible real wages stabilize output; lower risk may bring higher investment.	Accommodation of the higher capital stock in portfolios may shift demand for financial assets, e.g., to recoup overall liquidity.	Lower wage costs shift the supply curve outward. If the real wage becomes more flexible, the short run supply curve steepens, stabilizing output in the face of shocks. Resource reallocation may cause changes in output.	Productivity increase is equivalent to a rise in the effective labor force; long run output rises. A higher capital/output ratio might result from more stable short run demand, thus raising long run output.
Tax reform				
Income tax rate cut (with base broadening)	Income multiplier rises. If cost of capital falls, investment rises.	Portfolio preferences might change with higher disposable incomes, with possible change of the cost of capital.	Higher after-tax wages may shift the supply curve outward, unless more leisure is preferred to more work at margin.	Effective labor supply may rise, resulting in higher long run output.
Corporate tax rate cut (with base broadening)	Income multiplier and investment demand rise.	Accommodation of the higher capital stock in portfolios may shift demand for financial assets, e.g., to recoup overall liquidity.	Lower tax costs may shift the supply curve outward.	Higher capital/output ratio might result from higher return on capital. Long term capital stock might rise.
Indirect tax rate cut (with base broadening)	Income multiplier rises. If cost of capital falls, investment rises.	Portfolio preferences might change with higher real incomes, resulting in a possible change of the cost of capital.	Higher real wages may shift the supply curve outward, unless more leisure is preferred to more work at margin.	Effective labor supply may rise, resulting in higher long run output.
Harmonization of indirect tax rates	Demand and supply elasticities may change, as might preferences on time path of consumption (i.e. savings rates).	Reduced distortions may alter portfolio preferences and risk/return opportunities. Changed savings rates would alter funds available for investment.	Simplified tax system would lower burden on business, and thus shift the supply curve outward.	Resource reallocation would raise effective supply of labor and/or capital.

Decontrol of banks' deposit rates. The decontrol of banks' deposit rates was generally motivated by the undesirable impact of interest rate ceilings on credit markets: in times of high interest rates, the supply of bank credit actually contracted, because asset holders tended to reallocate their portfolios, shifting demand deposits into higher-yielding non-bank instruments ("disintermediation").

In the United States deposit rate controls began to break down in the 1960s. Money center banks circumvented regulated deposit rates for large-denomination deposits with the introduction of negotiable certificates of deposit (CDs) in the 1960s. Certain states permitted individual NOW (negotiable order of withdrawal) accounts in the early 1970s, which were essentially interest bearing checking accounts that had been prohibited under earlier regulations. After many intermediate stages, the process was completed with the Monetary Institutions Deregulation and Decontrol Act of 1980, which specified a timetable for further deregulation. NOW accounts were permitted nationwide in January 1981, and other innovations followed, including money market mutual funds 1/ and money market deposit accounts. 2/ In Japan, free-rate repurchase transactions emerged in the tight money periods of the 1960s and became important after the credit crunch which followed the first oil crisis. Similar instruments, such as CDs, emerged over the late 1970s and early 1980s. In both countries, the linkage among financial markets was crucial: distortions in the market for credit led to reform in the market for deposits.

These developments, which may be interpreted as the introduction of new assets into the balance sheets of economic agents, may result in a decline in the interest sensitivity of demand for narrow money (since interest rates on some of the assets included in M1 are now free to adjust), and in changes in underlying ratios of deposits to other assets. The demand for broad money would rise because asset holders would shift into the attractive new types of deposits. The money supply might also change because the changes in deposit/cash ratios would cause banks to lend more of fund inflows (assuming that the central bank would not act to offset the rise in money supply). In the end, aggregate demand could either rise or fall in the short run. In the longer run, it is likely that the price level would change, but output may not change because the resources available to the economy-- labor and capital--have not changed. However, it is possible that total factor productivity could rise as a consequence of financial sector reform, thus leading to some rise in

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1/ Money market mutual funds, which are typically issued by non-banks, bear high interest rates and are checkable (usually above a certain minimum check size), but do not guarantee the value of principal and are not insurable by the Federal Deposit Insurance Corporation (FDIC).

2/ Money market deposit accounts, which are typically issued by banks, bear high interest rates, guarantee the value of principle, and are insurable by the FDIC, but face restrictions on the number of transactions authorized per month.

potential output. However, empirical evidence for the latter effect is rather weak (see Section IV). 1/

Expansion of money markets. As deposit rates were decontrolled, investors sought new financial instruments. A consequence of the subsequent response of intermediaries was the need to deepen financial markets in order to provide institutions the liquidity necessary to accommodate the new instruments on their balance sheets. The effects of financial deepening on the macroeconomy may be illustrated by examining potential changes in the parameters of the LM curve.

Deeper markets lower the cost of liquidating assets, 2/ and therefore may be expected to lead to economization of reserves and an increase in the money multiplier. This increase in the multiplier would, unless offset by a reduction in base money, lead to an expansion of the money supply. In the short run, therefore, aggregate demand would increase. If nominal wages are less than perfectly flexible, the real cost of labor would fall, and both output and prices would rise while unemployment falls. After this initial period, however, wages would rise in response both to higher prices and to the decline in unemployment; thus, the decline in the real cost of labor would be reversed. As labor costs rise, output would fall. In the long run, there would be no change in total output for the same reason cited above--i.e., that there has been no long-run increase in capital or labor supply and no change in the rate of technological progress. 3/ The price level, however, will be higher. With respect to the external impact, the trade balance would tend to deteriorate initially but would be unlikely to be significantly affected in the longer run.

Capital controls. Another important structural reform of the financial sector in many industrial countries has been the removal of capital controls. Such controls were widely used until recently in an effort to influence capital flows, exchange rates and the use of specific currencies as international reserves. In countries with strong balance of payments positions, such as Japan, Switzerland, and the Federal Republic of Germany, capital controls were altered periodically during the 1970s to limit capital inflows and their effects on domestic liquidity. 4/ These

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1/ There is little empirical evidence that the availability of new assets affects the overall savings rate, although asset substitution occurs.

2/ This statement is true under normal market conditions, but may not be so in crises, due to a moral hazard problem. In a crisis a deep market may be more one-sided than a shallower one, or at least be more difficult to control. In crises, therefore, deep markets may raise liquidation costs.

3/ This long-run result would be altered if better financial efficiency improved R & D efforts, and resulted in better technology.

4/ Common measures included 100 percent reserve requirements on increases in deposits of nonresidents, prohibition of interest payments on such increases, authorization requirements for purchase of domestic

measures were difficult to enforce, as they did not address the underlying reasons for capital inflows. In the end, they generally failed to have the desired effects. Financial centers with strong controls also lost market shares, both because demand for financial services fell due to investors' concerns about future policy changes and because supply fell due to the costs implied by the regulations. By the late 1970s most countries viewed capital controls as ineffective and potentially harmful. Switzerland and the United Kingdom abolished capital controls in 1979; Japan overhauled its foreign exchange law in 1980; and Germany eliminated the last of its administrative measures in 1981.

For some countries with a tendency to weak balance of payments positions, controls on capital outflows continued to be expanded into the 1980s, but distortions built up as well. In France, the deterioration of the balance of payments in the early 1980s led to a requirement that residents wishing to invest abroad obtain the exchange for such transactions from other residents willing to sell such exchange, and a special exchange rate, the devise titre emerged. In Italy, a cash deposit requirement in a non-interest bearing account at the central bank was imposed on certain types of capital outflows. In both of these cases, the controls came to be viewed as encouraging speculation and misallocation of resources through false price signals. Both countries have subsequently dismantled most of the controls, and strongly support the policy of complete liberalization of capital movements within the EC, expected to become effective during the period 1990 to 1992.

Some of the macroeconomic effects of removing capital controls may be analyzed in the context of interest parity relationships. 1/ Capital controls introduce a wedge between the domestic and foreign interest rates that differs from the expected change in the exchange rate between the two countries. The main conclusion from the interest parity literature is that such controls make international capital transactions more costly; the stricter the enforcement, the higher the costs.

Consider a country that is "small" relative to the rest of the world with respect to interest rate determination. If such a country imposes controls on capital outflows, then the cost of international investment will rise, domestic investors will keep more assets at home, and domestic interest rates will fall. As interest rates fall, the interest-sensitive components of aggregate demand rise; with less than perfectly flexible nominal wages, real wage costs fall as prices rise, and output rises as well. Once nominal wages respond to the higher prices, wage costs reverse their fall and output drops back to the long-run equilibrium. This long

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securities, and sometimes negative interest rates via taxes.

1/ Capital controls may also affect the allocation of saving among countries and hamper growth in countries with high productivity growth. Conversely, removing capital controls would work toward equalizing costs of capital across countries and thus toward more efficient allocation of savings.

run equilibrium will be affected, however, to the extent that the distortion of capital flows alters the level of saving, capital accumulation, and work effort.

The evolution of the trade balance is uncertain. The rise in demand would tend to cause a deterioration of the trade balance, but the course of the real exchange rate depends on the relative strength of the demand increase and the output increase. If the latter is very large, then some of the excess supply might be absorbed in net exports by a real depreciation, and even bring about a trade surplus in the end. The presumption, however, is that the income effect will dominate, and that the trade balance will deteriorate.

Summary. There are important similarities in these three cases of how structural changes in financial markets affect macro performance. First, there are short-run effects; in general, deregulation will tend to *increase output if the effect of raising the money multiplier outweighs* that of raising money demand. And to the extent that output rises in the short run, prices will also rise. Second, many of the initial effects are reversed in the long run. In simple models, no real variables change in the long run; the long-run capital-labor ratio does not change; and temporary changes in interest rates have no effect on the steady state capital stock. If efficiency gains are realized as a result of financial sector reform, however, real output could rise in the long run. Third, analysis of how a structural change affects financial relationships is far from straightforward. Both the money demand relation and the money multiplier are usually affected by such changes, so that the balance of forces in the financial markets is difficult to predict. Fourth, the course of the trade balance is also difficult to predict; there is a presumption that income effects will dominate, at least in the short run, but the length of time of this dominance is not clear. Moreover, with exchange rate overshooting, the price effect might dominate the income effect, even in the short run.

3. Reforms in goods and services markets

Markets for goods and services in industrial countries have been affected extensively by industrial policies. 1/ The objectives of these policies have in general been (1) to shape the industrial structures of economies for reasons of social policy or defense, and (2) to ease the burden of adjustment of industries to changed economic conditions. These objectives have been pursued with both domestic measures such as subsidies, procurement policies, indirect taxes, and product standards and also trade measures such as tariffs, quotas, voluntary export restraints, legal structures that can be misused to harass competitors, health

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1/ A review of industrial policies of industrial countries may be found in IMF, SM/88/167. Details of sectoral interventions (e.g., in agriculture and industry) and an analysis of their effects can be found in Kelly et al., (1988).

standards, and export subsidies. Typically, such policies have not prevented substantial declines in the industries in question. Moreover, the cost to the economy per job saved has often been several times average earnings, and these costs often occur as transfers to foreign suppliers in the form of quota-rents (see Section IV).

Reforms in markets for goods and services generally affect the relative prices among various types of goods and services; macro models, even of the open-economy variety, are generally not well suited to analyze such problems because they tend to assume the existence of only one or, at most, two goods (tradables and nontradables). Still, it is useful to explore the implications for the aggregate price level, effective resource supply, trade, and economic efficiency which may result from removal of distortions in these markets.

In the area of telecommunications, the economies of scale inherent in old technologies, which had been the justification of earlier regulations, lost much of their importance with the advent of new technologies in the 1970s and 1980s. The obvious possibilities for cost saving spurred deregulation, although implementation was at times delayed by vested interests.

In the United States, deregulation began when the monopoly of equipment supply became more difficult to enforce, and was altered by a court ruling that found the monopoly on long distance services contrary to anti-trust laws. In the United Kingdom, British Telecom was privatized as part of the policy of reducing the size of the public sector. In Japan, after the domestic telephone monopoly was privatized in 1985, further steps to deregulate telecommunications included a reduction in the number of regulations, revision of testing and approval procedures for equipment, and elimination of some subsidies. As a result, several new companies have entered the market for long distance services, and more than 500 new firms have been formed to supply ancillary services. France acted by adjusting telecommunications rates to better reflect the true costs of services. The position of the telephone monopoly in France will also be reviewed in light of plans for the integrated European market in 1992, which will introduce foreign competition in equipment and service supply. The Federal Republic of Germany will end the state monopoly on equipment supply within the telecommunications network in 1990.

In the steel sector, industrial policies up to the mid-1980s were influenced primarily by changed conditions in both input and output markets. In the input markets, both energy and labor costs rose after the oil crises, making large parts of capacity obsolete. In the output markets, the emergence of new steel producers in developing countries and competing materials in plastics and other industries put downward pressure on prices. Most countries responded at first with a combination of subsidies, marketing restrictions or quotas, and trade controls.

The United States imposed a trigger price mechanism in the late 1970s, which attempted to gauge whether producers in other countries were

selling below production cost and imposed restrictions in certain cases. Since that time, a series of trade controls focusing on voluntary export restraint agreements with a number of foreign producers (in both industrial and developing countries) have been signed. 1/ In the European Community (EC), import controls were combined with heavy state subsidies and cartel arrangements to keep mills in operation in the 1970s, but the high budgetary and welfare costs of this approach led to a capacity reduction plan that was implemented, with substantial success, in the 1980s. In light of these adjustments, the EC reduced production quotas in 1986 and abolished them in 1988, although bilateral voluntary export restraint agreements were retained in some cases; heavy subsidies remain, however, in some EC countries, as does a minimum import price system for countries not covered by bilateral agreements.

Government intervention in the transportation sector often took the form of price cartels and volume controls, which led in turn to wasted capacity and excessive costs. 2/ International transportation agreements in particular have involved complicated and sub-optimal provisions. Reform of transportation regulations began in the 1970s, and has continued in the 1980s.

As regards airline deregulation, the United States began with administrative approval of stand-by discount fares in the early 1970s, and deregulation became established in law in the late 1970s. In Europe and Japan, more modest moves toward airline deregulation were taken in the mid-1980s, particularly concerning international travel. In trucking, the United States undertook a major deregulation in the late 1970s, in an effort to reduce cartelization and lower freight costs. In Europe, however, most countries maintain heavy regulation through domestic cartel agreements and an international quota system despite recent moves to loosen quotas. The plan for a unified market for 1992 in the EC includes consideration of reforms of international standards of inspection, safety, competition, etc.; progress so far has been limited, however.

Privatization programs, such as undertaken in the United Kingdom, France, Japan, Canada, and many other countries have been an important component of structural reform in goods and service markets. In most cases, these programs were motivated by the view that changes in ownership would promote efficiency and that increased competition would raise the importance of market signals in management decisions, improve service, and lower costs. In the United Kingdom, 12 firms accounting for 400,000 jobs were privatized between 1979 and 1985; in France, 11 firms had been sold by mid-1987, with a large part of the shares going to small investors; in Japan, the domestic telephone monopoly and the tobacco monopoly were

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1/ For details of the evolution of trade policy in steel in the United States, see Kenward (1987) and SM/88/166, Supplement 2, Annex III.

2/ Examples of wasted capacity include low ratios of passengers to seats that prevailed on airlines in the 1960s and 1970s and trucks that traveled empty due to freight cartel agreements.

privatized in 1985, and the national airline and national railroad in 1987; in Canada, seven Crown corporations, including two large producers of aircraft, were sold in 1984-86. The Federal Republic of Germany has also sold the government shares of certain corporations, though on a smaller scale. These reforms are widely believed to have achieved their aims. Improvements in efficiency have also been achieved even without outright privatization. In New Zealand, for example, the philosophy of public enterprise management was shifted to emphasize efficiency, and pricing policies shifted from cross-subsidization toward full cost recovery.

In the service sector, a major example of reform concerns housing. Because of the political importance of housing, government intervention in the housing market has been common in many countries; rent control and tenant rights procedures often came to distort not only housing investment but also business location and labor mobility. In the United Kingdom, a major reform initiative was taken with the Housing Act of 1980, which allowed public housing tenants to purchase their units; this measure was aimed at increasing the mobility of labor by allowing accrued wealth (in the form of tenancy rights) to become mobile. Decontrol of rents on newly-built units was enacted in 1987. France went one step further by decontrolling rents on all vacant units in 1987, and will eliminate controls on other units gradually over the next eight years. In Japan, extensive tenant rights, land-use regulations, and rent controls have reduced the incentives for the construction of rental property for many years; measures to ease rent controls were taken in 1985.

In all of the major industrial countries, government intervention in agriculture has led to major distortions, such as over-production, huge inventories, and sub-optimal trade patterns. The latter in particular have distorted incentives to produce in developing countries and in industrial countries with comparative advantage in agriculture (e.g., Australia and New Zealand), have caused misallocation or underutilization of resources, and thus have contributed to worldwide problems such as the debt crisis. 1/ Ironically, there is little evidence that a major goal of agricultural policies, income support for poor farmers, has been achieved.

The distortions resulting from government intervention in agricultural markets have given rise to pressures for reform. In the United States, the Food Security Act of 1985 froze target (i.e., support) prices for a period and reduced them by 10 percent over the life of the Act, and tied floor prices (the so-called "loan rate") loosely to market

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1/ See Schmitz (1985). It has been estimated, for example, that the reduction in sugar import quotas by the United States in 1984 reduced earnings of Caribbean Basin countries by more than $1 billion in subsequent years. See IMF, SM/88/166, Supplement 2, p.63.

prices. 1/ In the EC, price supports were cut for milk, cereals, and meat in 1984; production restrictions were tightened in 1986 and 1987 for beef, milk, and other surplus products; and "guarantee thresholds" 2/ were tightened and land set-aside programs introduced in 1988. In Japan, reform measures have been taken on several occasions since 1979, freezing or cutting the support prices for rice. 3/

The international nature of the agricultural crisis has led to some global policy proposals. In the context of the Uruguay Round, the United States has proposed a major initiative to eliminate trade-affecting measures over a ten-year period, to delink income support measures from the type or amount of commodities produced, and to harmonize health and safety regulations. The EC has proposed, for the short term, a system of production controls, minimum export prices, and committments to freeze support levels, and, for the long term, negotiations on reducing protection and support levels. The Cairns group 4/ has proposed a medium term (ten-year) phase down of government support for agriculture (which would emphasize elimination of export subsidies and lower tariff and non-tariff barriers), after which there would be full application of a long term framework that would remove all agricultural trade restrictions and subsidies and would integrate agricultural trade into GATT's surveillance and dispute settlement mechanism. At the mid-term review of the Uruguay Round held in December 1988, however, no agreement on agriculture was reached, and completion of the review was postponed until April 1989.

Measures to reduce non-tariff barriers, such as the harmonization of standards for product safety and testing, have been adopted in a number of countries. For example, an important component of the negotiations leading to the common internal market for the EC concerns harmonization of regulatory practices in a host of industries, including trucking, insurance, and telecommunications. Japan has introduced several major packages of trade liberalization measures that have worked to improve efficiency and openness of domestic markets, e.g., liberalization of leather and leather goods imports, and changing product testing procedures to allow submission of foreign test data. In many other areas, however, a disturbing trend toward proliferation of non-tariff barriers has occurred,

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1/ See Evans (1988). As pointed out by Evans, these reforms did not, however, reduce fiscal expenditure on farm support, because world prices fell faster than foreseen by the Act.

2/ Guarantee thresholds are limits on production which, if exceeded, result in a reduction of support prices in a subsequent year.

3/ However, the nominal protection coefficient--the ratio of the domestic price to the border price--has risen significantly for rice in Japan, because of the double effect of lower world prices for rice in dollars and the appreciation of the yen.

4/ The Cairns group comprises Argentina, Australia, Brazil, Canada, Chile, Colombia, Fiji, Hungary, Indonesia, Malaysia, New Zealand, the Philippines, Thailand, and Uruguay.

the majority of which are aimed at protecting the EC or United States markets. 1/

A comprehensive approach to trade liberalization has been adopted within the framework of the Uruguay Round. 2/ This round has attempted to extend the scope of multilateral free trade agreements by including negotiations on new or hitherto neglected sectors, in particular agriculture, services, and intellectual property. Progress, however, has so far been limited by disagreements concerning not only most of the new or hitherto neglected areas but also strengthening of safeguard clauses and special treatment of developing countries. In addition, in many cases the standstill and rollback commitments 3/ adopted at Punta del Este remained to be implemented.

The macroeconomic effects of structural reforms that affect markets for goods and services can be analyzed under two headings. First, in some cases they can alter the effective supply of labor (and hence of potential output) by encouraging reallocation of resources toward more productive uses. Second, they generally affect parameters in trade relationships, since opportunities for trade are changed.

An increase in the effective labor supply may come about because of the deregulation of certain goods and services markets, such as the housing market. (The analysis is similar for the deregulation of labor markets examined in Section 4 below.) This change is qualitatively different from earlier cases discussed in this chapter because there is an effective augmentation of resources available to the economy in the form of a higher supply by labor. In the short run, therefore, there is downward pressure on nominal wages, which leads over time to absorption of the newly available workers and to a rise in actual and potential output.

On the demand side, investment will increase in order to provide new workers with new equipment. Hence the increase in aggregate supply will be accompanied by an increase in aggregate demand; the net effect on prices and the trade balance depends on the size of the relevant elasticities. So long as the increase in investment demand is not extremely large, the price level will fall in the short run. The trade balance tends to deteriorate due to the rise of aggregate demand, unless the labor market is flexible enough to absorb the new workers and raise supply quickly. Over the long run, the added investment demand subsides, but the level of output is higher. (The short and long run effects described in the previous two paragraphs were illustrated by the empirical

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1/ For an overview of developments in non-tariff barriers, see Kelly et al., (1988).

2/ See IMF, SM/88/166, especially Supplement 2, Annex I, pp. 1-6.

3/ These commitments require countries to refrain from trade restrictions and distortions that are inconsistent with GATT rules during the negotiations for the round, and to roll back measures that are inconsistent with the GATT.

simulations reported in Section II (Table 3), which are partly driven by an accelerator mechanism in the investment demand equation.)

A structural change that affects parameters in trade relationships may be analyzed in terms of movements in aggregate demand and supply schedules. For example, import liberalization would raise the propensity to import, implying a deterioration of the trade balance and a reduction in domestic output and demand. In the long run, demand must readjust to the original level of output because the supply of resources and productivity are unchanged; with output fixed in the long run, the real exchange rate must depreciate to lower imports, raise exports, and bring demand back to equilibrium. 1/ Eventually equilibrium is re-established at the long-run output level with a lower price level.

4. Reforms in labor markets

Structural reforms in labor markets have attracted considerable attention in recent years. In the 1970s, the rise of unemployment, and the emergence and persistence of high levels of youth and long-term unemployment have motivated interest in labor market reform.

Wage setting and indexation. Distortions that result in downward rigidities of real wages and compression of wage differentials have led to widespread reform of regulations and procedures concerning wage setting. Italy, for example, was seriously affected by the gap between domestic inflation and that of major trading partners; consequently, major changes in the scala mobile indexation system were introduced first in 1984 and again in 1986. These changes reduced the frequency of wage adjustments and made them more forward-looking, linking them to officially projected changes in the consumer price index. The general reform of the scala mobile in 1986 increased wage differentiation and reduced the frequency of adjustments, but it maintained the backward-looking character and the linkage to the conventional indicator ("indice sindacale") of the old system. As a result, the degree of indexation declined from 76 percent in 1981-1983 to 61 percent in 1986-87. In France, a desire to break a wage-price spiral caused the indexation system for public worker wage contracts, which traditionally have been pace-setting, to be linked to the official forecast of inflation, eliminating backward-looking cost-of-living increases.

The United States has allowed the nominal minimum wage to remain constant since 1981 (though there have recently been pressures from many quarters to raise it). The United Kingdom abolished the minimum wage for workers under 20 years of age in 1986; the Netherlands lowered the general minimum wage in 1984, after having lowered the youth minimum wage twice previously. Practices regarding extension of wages, i.e., application of wage rates in certain firms of an industry or region to all

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1/ This excludes the (unlikely) case in which the country may borrow forever to finance a trade deficit.

firms in the industry or region, have also been re-examined. In the United Kingdom, provisions allowing such extension have been rescinded.

Labor contract law. Legal and regulatory constraints on labor contracts have often been adopted as protective devices, e.g., child labor laws or layoff procedures. With changes in market conditions, demography, and work preferences, however, some of these regulations began to restrict the supply of labor or to prevent available workers from finding jobs. Accordingly, several countries have relaxed such laws and regulations. Italy liberalized laws on part-time work in 1984, and the Federal Republic of Germany did so in 1985. France liberalized provisions for fixed-term employment in 1983 and abolished them in 1987; the Federal Republic of Germany liberalized such provisions in 1985. On the length of the work week, France allowed more flexible "borrowing" of hours among weeks within the framework of a reduced average work week in 1986, in order to allow firms to meet seasonal or unexpected demand at lower costs; similar provisions were included in the German wage agreements of 1987. Japan, which has one of the longer average work weeks among the industrial countries, has moved to shorten work hours, a policy aimed at increasing consumption.

Some direct government interventions have also been removed. In France, for example, the requirement of government approval for layoffs of more than a certain number of workers was abolished in 1987. In New Zealand, the right of appeal to arbitration was extended to corporations, in support of a more meaningful negotiation process.

Wage bargaining and the role of unions. Wage bargaining institutions and the role of unions differ substantially across countries, reflecting differences in history and social choices. In some countries, bargaining and unions are decentralized or firm-based, with local conditions the dominant factor in setting wages and working conditions and with little role of government (United States, Japan, Switzerland). In other countries, bilateral oligopolies exist; negotiations are more centralized, with nationwide industrial unions and corresponding employers' associations determining wages and working conditions for a large number of firms, with a minimum of differentiation (Federal Republic of Germany). In some countries, the government itself plays a central role as arbitrator, and has a strong influence on the overall level of wage increases (Austria, Sweden; until recently New Zealand).

The relative merits of these different types of bargaining systems have been debated extensively. 1/ Recent empirical work suggests that (i) in terms of macroeconomic performance, countries with either highly centralized or decentralized systems have done better than countries with mixed systems, and (ii) there has been a worldwide trend toward decentralization of negotiations. 2/ This trend has been supported by

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1/ See OECD, Structural Adjustment and Economic Performance (Paris, 1987), Chapter 3.

2/ See Calmfors and Driffil (1988).

policy actions. In the United Kingdom, laws introduced in 1982 and 1984 made strike activity more difficult to organize and mandated secret ballots in union elections; in 1987, closed shop laws were relaxed. In France, promotion of localized contract negotiations raised substantially the proportion of operating sites with their own contracts between 1983 and 1987; in addition, the profitability of an enterprise was legally permitted as a factor to consider in wage negotiations. In the Federal Republic of Germany, legal changes in 1986 forbade the payment of unemployment benefits to workers who were laid off because of strike action by other members of their own union in supplier industries. In New Zealand, where negotiations were traditionally highly concentrated, the government has withdrawn from the wage negotiation process, in large part because of the difficulty of avoiding the validation of higher, government-mandated wage settlements through expansionary monetary policy.

Workplace organization. Another important aspect of labor market operations is the set of work rules and decision-making procedures at the firm and the plant level, which affect productivity and the gains from cooperation between labor and capital. In some countries, work rules specify in great detail which classes of workers may do which types of jobs, while practices in other countries are more flexible. For example, worker representation on deliberative bodies is mandated in some countries, but voluntary in others. The coverage of such laws also differs by size of firm and type of decision being made, as do the election procedures for worker representatives.

In some cases, work rules and worker participation requirements have increased the gains from specialization or improved information (e.g., on staffing, scheduling, or hiring), but in many cases they have raised costs (e.g., by requiring the hiring of new workers for certain jobs even though already-hired workers might be available). In response to such problems, the United Kingdom has restricted the jurisdiction of Wage Councils, the decision-making bodies which bring labor and management together, to decisions on setting minimum hourly rates and single overtime rates. In the Federal Republic of Germany, proposals have been made to improve election procedures for similar bodies known as Works Councils.

Mismatch and training. A conventional indicator of labor market distortion is the Beveridge curve, which indicates the mismatch between jobs and workers by depicting the inverse correlation between vacancy rates and unemployment rates. In many countries, the Beveridge curve has shifted adversely since the early 1970s, probably a reflection of inadequate training of younger workers, insufficient retraining of older displaced workers, and (at least in North America), a rising proportion of young and female workers in the labor force. In response, many governments have reformed vocational training programs. In France, for example, an expansion in youth training programs was introduced in 1982, and extended to 21-25-year-olds in 1986; a program for the long-term unemployed was also introduced in 1986, and supported by an easing of social security contributions. The United Kingdom has also implemented major programs for school-leavers and the long-term unemployed, as has the

Federal Republic of Germany, which enrolled more than 1/2 million each in the 1986 and 1987 "qualification offensives."

Unemployment insurance and social security. Unemployment and social security systems play an important role in the labor markets of all industrial countries, by extending the gains from risk sharing to labor markets. However, these systems also affect search activity and skill acquisition incentives, and therefore labor supply. In addition, work incentives and labor demand may be adversely affected by the wage taxes that finance these systems.

Many countries found that supply incentives and the financial health of unemployment insurance systems had deteriorated in the 1980s, and changed both unemployment insurance schemes and social security procedures accordingly. The United Kingdom, France, and Germany all lowered unemployment benefit levels during these years, in the belief that high replacement ratios were slowing the process of labor search by the unemployed; a reform of the Wage Supplementation Fund in Italy is also planned. In order to improve search activity further, the United Kingdom has instituted an interview program for every person on the unemployment registers, with the intention of excluding those who fail to participate. Within social security systems, early retirement schemes have also been introduced in both France and Germany, in order to make plant closing and other adjustments easier. The functioning of labor exchanges has also been improved in some cases, e.g., an Italian change that allowed employers to choose among applicants sent by labor exchanges rather than obliging acceptance of the single candidate sent by the exchange and chosen in order of registration.

As with other structural measures, labor market reforms can change the magnitude of parameters underlying behavioral relationships; sometimes they can also fundamentally alter the framework in which such relationships operate. For example, work-rule or contract law changes allow more efficient use of a given amount of labor, thus improving labor productivity. The same change, however, may result in a decrease in the demand for workers, since each worker may be used more intensively. Changes in wage bargaining procedures make the real wage more sensitive to excess unemployment. Changes in indexing methods will alter the responsiveness of labor markets, and thus of the overall economy, to nominal shocks. Changes in unemployment insurance can increase the effective supply of labor by encouraging search activity.

First, consider such reforms as work-rule changes that result in higher productivity and potential output, i.e., that shift the supply curve outward. In the short run, output will tend to increase but labor demand may fall, as fewer workers are needed to produce a given level of output. Over time, however, nominal wage demands will moderate, allowing labor to be reabsorbed. In the long run, output is higher and the price

level is lower, but unemployment is unchanged. 1/ The trade balance will improve because of the implied real depreciation in the long run, which can be deduced by examining the IS curve (see Chapter II): long-run output is supply-determined; the real interest rate is unchanged; the only variable in the IS relationship that has changed is the real exchange rate, which depreciates so that the foreign country absorbs some of the higher domestic output.

Changes in the wage bargaining process are most likely to be reflected in the natural rate of unemployment (or the NAIRU) and the responsiveness of the real wage to excess unemployment. A change in the NAIRU may result from changes in bargaining procedures that alter the constituency on whose behalf the bargaining takes place. If, for example, bargaining considers benefits only for union members or the employed to the exclusion of others, this would be likely to raise the natural unemployment rate. Analytically, changing such changes in wage bargaining procedures could be interpreted as a change in the effective labor force, a case which was analyzed above. With respect to changing real wage flexibility, the economy's ability to withstand shocks is affected, as was discussed in Section II.

Wage indexation may affect macroeconomic performance in two ways: by changing the effective supply of labor, and by changing the reference period for wage adjustments. The effective supply of labor may be affected by indexation procedures that affect various groups of workers differently, e.g., procedures that lead to compression of wage differentials. The analysis of the macroeconomic effects of changing such procedures is identical to those of other changes in effective labor supply.

Changes in the reference period for wage adjustments, which have occurred in some countries, require a different type of analysis. The most common form of change in reference periods has been the change from backward-looking to forward-looking regimes. As in the case of a change in wage responsiveness, a change in reference period will have no effect for an economy that is in long-run equilibrium. Rather, the change in the reference period will affect the path of the economy back to equilibrium after a shock. If wage adjustments are backward-looking, then nominal wages will be stickier than otherwise. A positive shock to aggregate demand, for example, will then lead to more real expansion and less inflation in the short run. In the long run, the total change in the price level will be the same, because the final equilibrium is determined by the intersection of the new aggregate demand curve and the original long-run supply curve; the short-run supply curve moves to this equilibrium. The long-run level of output will be the same, again because real resources have not changed.

1/ Unemployment remains at the original level because neither the labor force nor the effective supply of labor is changed by the change of productivity.

5. Tax reform

Proposals to reform tax systems have been the focus of considerable debate in many industrial countries. These debates have resulted in major reforms, which are described briefly below. The far-reaching effects of many of these tax reforms imply that their macroeconomic impact is particularly important and not yet fully visible. 1/

Personal income tax systems were increasingly criticized in the 1970s for being unfair (the "equity" problem) and for discouraging work effort (the "incentive" problem). Horizontal equity was affected because identical amounts of income came to be taxed at very different rates; this anomaly reflected the proliferation of special tax preferences and the difficulty of defining precisely both labor and capital income. 2/ Vertical equity was distorted because the progressivity of rate structures encouraged evasion and discouraged labor force participation.

Flattening of tax rate schedules thus has been a major objective of tax reform in many countries: For example, the United Kingdom lowered the maximum tax rate on personal income from 83 percent to 60 percent in 1979 and further to 40 percent in the 1988/89 budget; the United States from 70 percent to 50 percent in 1981, and then to 33 percent in 1988. In the Federal Republic of Germany, the highest rate is to be lowered from 56 to 53 percent in the reform proposed for 1990, and the steepness of the progression up to the highest rate has been reduced. In Japan, the proposed tax reform would lower the top rate (central and local combined) from 88 percent to 65 percent.

The quid pro quo for these rate reductions was the elimination of many tax preferences; moreover, any remaining preferences generally have become less distortionary because of reduced tax rates. In the United States, for example, the Tax Reform Act of 1986 phased out the deduction of interest on consumer loans (albeit not on home-equity loans) and reduced the deduction of local sales taxes. In Japan, the system of tax exemption on interest income has been reformed significantly, in part to combat widespread evasion. In the Federal Republic of Germany, the withholding of taxes on interest income has been proposed.

Corporate income tax systems also began to be viewed as potentially distortionary through the 1970s and early 1980s, due to the growing role of corporate taxes as tools not only for raising revenue but also for

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1/ A recent appraisal of tax reform in industrial countries is contained in Pechman (1988). An assessment of the value added tax (VAT) and reforms involving the VAT can be found in Tait (1988).

2/ An example of such definitional problems concerns distributed corporate profits. When such distributions are considered income to the recipient, as in the United States, there is de facto double taxation of capital income.

achieving microeconomic, regional, distributional, and macroeconomic objectives. Many distortions emerged because the income from capital invested in different undertakings were taxed at different rates.

Corporate income tax reform has pursued the same strategy used for personal income tax reforms, i.e., lower statutory tax rates coupled with broader tax bases. Many countries have already acted to lower statutory corporate tax rates: the United States from 46 percent to 34 percent (1986), the United Kingdom from 52 to 35 percent (1984), the Federal Republic of Germany from 56 to 50 percent (proposed for 1990). In Japan, it is proposed to reduce the corporate rate from 43.5 percent to 37.6 percent. Once again, the quid pro quo for these tax cuts has been the reduction of preferences through the elimination of investment tax credits (United States and Canada), the elimination of accelerated depreciation allowances (United Kingdom), and modifications of the lives of depreciable assets (proposed for Japan).

As with direct taxes, distortions introduced through indirect tax systems have tended to grow through the 1970s and 1980s. High overall rates, e.g., value-added tax (VAT) rates in excess of 10 percent in many countries, have been one factor in encouraging evasion and erosion of the tax base, not only for indirect taxes but also for direct taxes through the expansion of the underground economy. 1/ Energy taxes tied to world trade prices have at times caused large fluctuations in budget revenue due to fluctuations in both oil prices and exchange rates; different tax rates for different products have skewed consumption patterns; and the degree of "hiddenness" of these taxes has affected perceptions of the distortions they can cause. Reforms have been difficult in most cases, although a number of countries have simplified systems.

Some countries have also tried to reduce distortions by increasing overall reliance on low rated, broad based consumption taxes, on the grounds that this would raise efficiency by reducing high and progressive direct tax burdens, which generate evasion, erode the tax base and may discriminate against saving. Such considerations have been part of the thinking involved in the shifts enacted in the United Kingdom, New Zealand, and Japan, and as well as that now proposed for Canada. International harmonization of tax systems is also an important factor in altering indirect tax systems; this is particularly important in the EC, where border trade to evade consumption taxes has become highly organized. The difficulties in pursuing further rationalization of indirect taxes seem to be due primarily to perceptions of fairness concerning differential taxation of products and to asymmetries in the distribution of political influence of losers and gainers from such reforms.

1/ It is worth noting, however, that VAT-based indirect tax systems tend to be less distortionary than single point indirect tax systems, because the incentive to evade is spread over many agents. A draw-back of VAT systems is that administrative costs for the business sector tend to be higher than in other systems.

In order to analyze the effects of tax reform in a macroeconomic model, the influence of tax parameters on both demand and supply must be considered. A cut in individual income taxes has three major effects: first, it raises disposable income and thereby consumption and aggregate demand; second, it increases the expenditure multiplier (which implies a further increase in aggregate demand); and third, it increases work effort and labor supply. Thus, both the demand and the supply side effects of these tax cuts are expansionary. If the demand effects predominate, the rise in the price level will be relatively high, the output rise relatively low, and the trade balance will tend to deteriorate. If the supply-side effects are stronger, the trade balance may improve or deteriorate, depending on elasticities. In the long run, only the supply effects will remain, leading to higher output, but an uncertain change in the trade balance. The demand effects are ultimately offset by price increases.

A corporate tax cut would also affect both aggregate supply and demand. On the supply side, lower (effective) rates would increase the return to capital, and thus strengthen incentives for capital deepening. The new capital will enter production and raise long-term output, even at the original level of labor supply. On the demand side, investment will rise as the economy adjusts to the higher capital stock, thus raising aggregate demand. Reasonable estimates of parameters suggest that the demand effects will be stronger in the short run, leading to some inflation and trade balance deterioration; over time, the supply increases will come through, possibly reversing the changes in price level and the trade balance.

Analysis of indirect tax system reforms requires a distinction between changes in the overall tax rate and changes in the rate structure among products. A cut in the overall consumption tax rate will have some effects similar to a cut in personal income tax rates, (e.g., changing the income multiplier and labor supply), as was discussed above. Offsetting the positive supply-side effects of augmented labor supplies, however, may be a reduced incentive to save, which in the long run would reduce capital accumulation and potential output from what they otherwise would have been. Thus, there is less likelihood that supply side effects would outweigh demand side effects. 1/ A price-level-neutral harmonization of

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1/ There is some disagreement in the literature about whether this saving effect would carry over equally to national savings. An important class of intertemporal models has the property that overall saving in the economy is not affected by the choice between direct taxation and indirect taxation. For example, in a two-period model with no discounting of future consumption and a direct tax in the first period (when production occurs), consumption in each period equals one half of total income net of taxes. (When the future is discounted, consumption in the first period will be slightly higher.) In the same model, a consumption tax that raises the same amount of revenue over the two periods will result in

indirect tax rates 1/ will have effects similar to removal of a goods market distortion. Consumption patterns will change, and lead to a reallocation of labor and capital that may increase the effective resources available to the economy.

IV. Empirical Estimates of the Impact of Structural Policy Measures

This chapter summarizes the empirical literature on the effects of structural policies. Section 1 discusses conceptual issues to do with how such effects are calculated. Section 2 summarizes the evidence of the effects of four types of policies on the economy: tariff and tax reform; deregulation and privatization of goods markets; deregulation of financial markets; and, labor market reforms. Finally, Section 3 looks at recent estimates of the expected gains from three types of comprehensive reforms: the removal of internal barriers in the European Community by 1992, Japanese structural reforms (Mayekawa Report recommendations), and recent Fund staff work assessing the impact of structural reforms in the Federal Republic of Germany.

1. Conceptual issues

a. Partial Equilibrium Static Gains

This section discusses the estimation of the static gains from structural policies. Static gains are gains to welfare or output that occur when structural policies are adopted given full employment of the available resources. A later section will discuss the dynamic effects of adjusting to the new static equilibrium--e.g., whether the long-run rate of growth of the economy is affected.

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consumption being exactly the same. Thus, the path of consumption is not affected by the tax regime. Moreover, national saving will be identical in the two cases so long as government spending is smooth over the two periods. The difference between the cases comes in the distribution of saving between private and public sectors. In the direct tax case, both public and private sectors save in the first period and use these savings in the second period. In the consumption tax case, only the private sector saves in the first period, while the government pays for its activities from current revenues in both periods. These results do not hold when government spending is lumpy or when the private and public sectors have different discount rates. See OECD (1987).

1/ A price-level neutral change of indirect tax rates is one that, given demand and supply elasticities, will not change the overall price level at the original level of real income after behavior adjustments are completed.

Much of the discussion presented here will focus on the estimation of the welfare gains or losses, rather than the gains to output (such as GNP). 1/ This focus is a result of two considerations; first, the theory of the estimation of welfare gains is well defined and understood, and second, most of the studies that will be discussed in the section on empirical results focus on estimating the welfare gains; indeed many of them do not even contain estimated output changes. In this situation it is clearly important to understand what exactly is being measured, and how it relates to the level of output.

As discussed in Chapter II, the gains to welfare and output from structural policies come through two main channels: efficiency gains from the reallocation of existing resources through changes in relative prices, and what might be termed direct (or dynamic) productivity gains, associated with better management and economies of scale.

Relative Prices. Consider the market for a single good, as illustrated in Figure 2. As discussed in the Annex, welfare gains are measured using the concepts of consumer and producer surplus. Consumer surplus is the area under the demand curve down to the price line, and it measures the amount extra that consumers would be prepared to pay for the quantity purchased. In terms of Figure 2, given supply and demand curves S' and D (and hence price p_0), total consumer surplus is measured as area A. Similarly the producer surplus is made up of the area above the supply curve up to the price line, which is the area B+E+H in Figure 2.

Two caveats to this analysis should be noted. The first concerns the demand curve which is used to calculate consumer surplus. The usual Marshallian demand curve estimates the demand for a good, holding money income constant; hence, different points on the curve imply different levels of utility for the consumer. Ideally a demand curve should be used which holds utility constant by varying income. (Such demand curves are usually called Hicksian or compensated demand curves). The use of such demand curves leads to two calculations of consumer surplus, the equivalent variation, which is defined as the amount of extra income at old prices that would enable the consumer to reach the new utility level, and the compensating variation which is the amount of income at the new prices needed to reach the new utility level. The second caveat concerns the concept of producer surplus. The supply curve for an industry may be upward sloping in the short run but the long run supply curve will be much flatter. Hence producer surplus only matters under imperfect competition.

Given these caveats, the effect of the removal of a distortionary tax (t) on the market in Figure 2 can be analyzed as follows. The underlying supply curve for the industry is S, however the effect of the government levying tax t per unit is to raise the supply curve from S to S',

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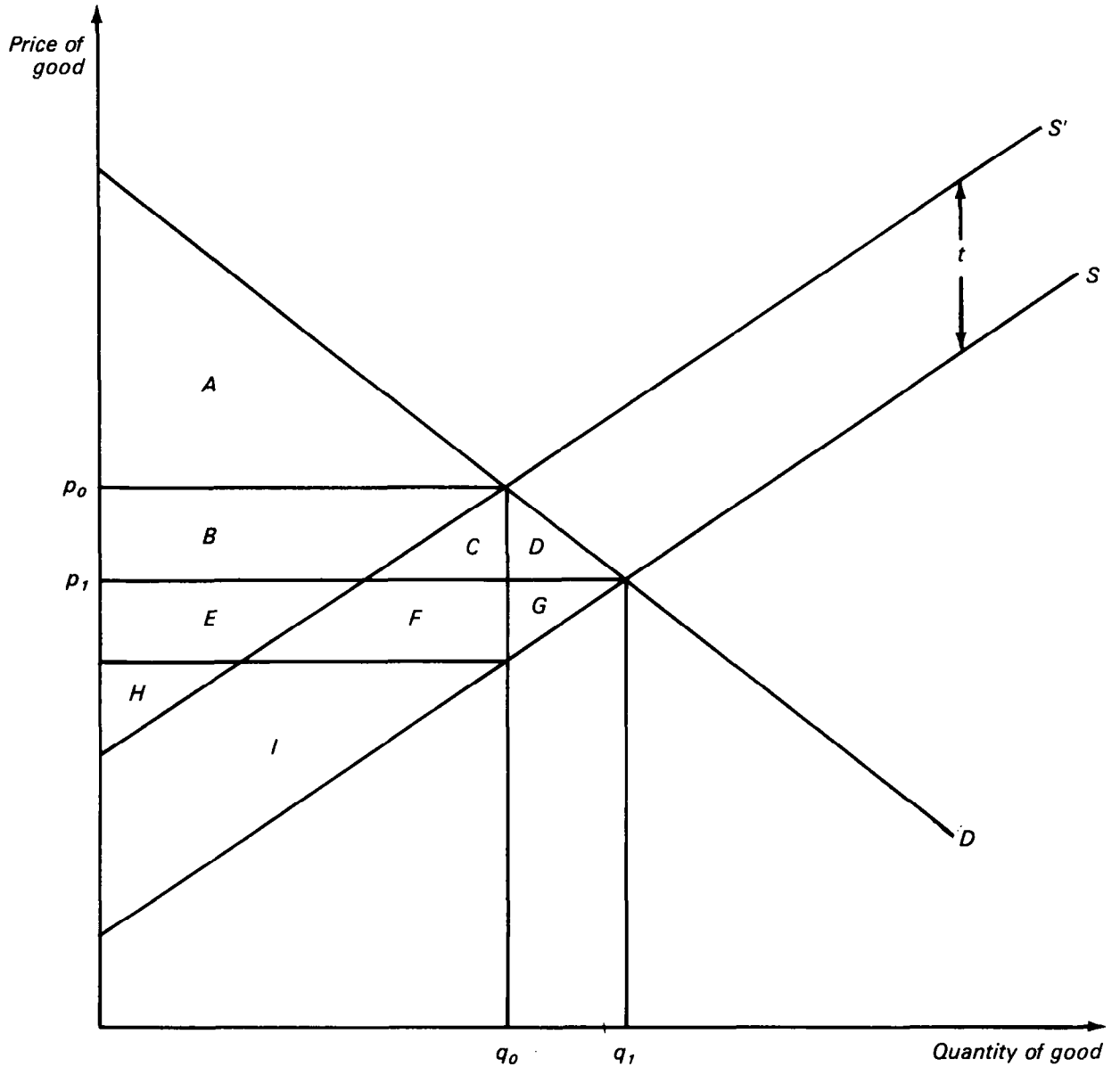
1/ Subsection c below discusses the relationship between welfare and output measures.

FIGURE 2. Measurement of Alternative Market Distortions



Note to Figure 2

Notation

S and D represent the underlying supply and demand curves for the industry when there are no distortions. S' represents the supply curve when the industry faces a distortion (such as a tax) equal to t per unit of output. P_0 and q_0 are the price and quantity when the distortion is present, while p_1 and q_1 are the price and quantity after the removal of the distortion. Capital letters A-I represent areas on the graph.

Explanation

The diagram shows a market facing a distortion (such as a tax) equal to t per unit supplied. This distortion causes the supply curve of the industry to shift upwards from its underlying value of S to S'; this results in price p_0 and quantity q_1.

This diagram is used to illustrate the welfare effects of several policy changes. The simplest is when there is a tax of t per unit of production. In this case the removal of the tax causes consumer surplus to rise from area A to areas A+B+C+D, a net increase equal to area B+C+D. Producer surplus changes from area B+E+H to area E+F+G+H+I, a net increase equal to area E+F+G. On the debit side, the government loses the revenue from the tax, equal to area B+C+E+F. The net gain to welfare is the sum of producer and consumer surplus minus the loss to government revenue, which nets out as area D+G.

resulting in an equilibrium with price p_0 and quantity q_0. The removal of the tax lowers the supply curve from S' to S, the amount of the tax. As a result the equilibrium price moves from p_0 to p_1. In the new equilibrium consumer surplus rises to area A+B+C+D, an increase equal to B+C+D; producer surplus becomes area E+F+G+H+I, a net gain equal to area E+F+G; and the government loses the tax revenue, B+C+E+F. The net gain to welfare is the area D+G, which represents the change in consumer and producer surplus associated with the increase in production from q_0 to q_1. These welfare triangles form the basis of the increase in welfare from changing relative prices. 1/

This type of analysis can be used for virtually any change in relative prices. This can be illustrated using two more examples, first the effect of a quota on an imported good, and second a labor market distortion caused by restrictive union practices. For the case of a quota assume that Figure 2 represents the market for an imported good, and that the quota is initially set at q_0. Assume now that the quota is lifted, so imports increase to q_1 and prices fall from p_0 to p_1. The gain in consumer surplus is represented by area B+C+D; the importers lose profits B+C on imports up to q_0, but gain the surplus represented by area G, due to the increase in imports to q_1. The net gain to world welfare is D+G, with the home country gaining consumer surplus B+C+D while the importers lose surplus represented by area B+C and gain area G.

In the case of a labor market distortion, let Figure 2 represent a labor market where initially a union has managed to raise the supply curve of labor from S to S'. Assume the union loses its market power and hence the supply curve reverts to S and the wage falls from p_0 to p_1. In the new equilibrium the firm gains the amount B+C+D from the reduction in the wage; initially employed workers lose B+C due to the reduction in their pay, while the newly employed workers gain the amount G. Again, the overall rise in welfare is area D+G.

In addition to showing that the overall gain in welfare due to changes in relative prices can be represented by the sum of consumer and producer surpluses, these examples illustrate that the gainers and losers from such policies can be quite disparate. In the case of a distorting tax the major gainers are consumers and producers, with the government as the loser. In the case of a quota reduction the gainers are domestic consumers and the losers are importing firms, while in the case of a removal of a labor market distortion the beneficiaries are the firm and the new workers, while the losers are the initial employees. Often, in

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1/ These triangles are frequently called "Harberger triangles," after the first researcher who attempted to measure them empirically (see Annex). It should be noted that the gain to society from removing a distortion could exceed the area of the triangles if real resources that had been devoted to maintaining the distortion (e.g., through paid lobbyists) flowed back into productive uses after the removal of the distortion.

practice, the losers tend to be a small and relatively well defined group, whereas the gainers are more dispersed.

Direct Productivity Gains. In addition to the gains from changing relative prices, some structural policies have a direct (or, dynamic) effect on productivity. Examples of the effects of such policies include improved efficiency of management caused by increased competition in an industry, the exploitation of economies of scale caused by a widening of the market and lowering bureaucratic costs such as customs inspections. The impact of these policies, which affect productivity, can also be analyzed using Figure 2. Assume that S' and S represent the supply curve of the industry before and after the increase in direct productivity, respectively. Again, the consumer gains the area B+C+D, and the firm gains the area E+F+G; but in this case there is no corresponding loss to the government as there was in the case of a distorting tax. Hence in this case the total gain in welfare is the full area B+C+D+E+F+G, 1/ which can be conceptually divided into the gain from direct productivity effects (B+C+E+F) and the gain from changed relative prices (D+G). As can be seen from Figure 2, the welfare effects derived from direct productivity gains are potentially very large compared to the gains from changes in relative prices, because they operate on the whole of the output of the industry, while the gains from changes in relative prices only pertain to the increase in output generated by the policy.

b. Computational general equilibrium models

Partial equilibrium analysis is useful, but it cannot take into account the spillover effects of a change in policy on other markets. While this is not a particularly important problem for the analysis of certain types of structural policy, such as deregulation or privatization of an industry, it can be a serious problem for more general policies such as tax reform or a general reduction in tariffs (see Chapter III). For these policy changes the interaction between various markets may be important for the overall assessment of the policy change, and hence the analysis has generally been done using computational general equilibrium (CGE) models. CGE models are particularly useful for studying the effects of general price distortions and have been primarily used for the analysis of tax reform, tariff reform and internal subsidies.

As their name suggests, these models aim to compute the general equilibrium of an economy. Originally their structure mirrored the standard competitive general equilibrium. For each market, demand and supply functions are defined as a function of relative prices. The models generally assume competitive markets, constant returns to scale and full employment of a fixed level of resources. Taxes, tariffs, quotas and other distortions are introduced as wedges to the price system (generally as ad valorem taxes). The models can then be solved for the set of prices which set demand equal to supply in all markets. By calculating the

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1/ By construction this area is equivalent to area C+D+F+G+I.

equilibrium under different sets of policies, represented by different price wedges, it is possible to compare the effects of alternative policies.

Recently there have been various additions to the structure of these models. The most important from the point of view of this paper is the inclusion of dynamic savings/investment and labor/leisure decisions. The result is not simply an estimate of the effect of a policy in terms of reallocating the existing amount of labor and capital, but also a calculation of how the policy may change the supply of labor and capital in the economy. As far as the level of potential output is concerned, any effects on the aggregate level of resources devoted to output can be crucial to the analysis. For example, some analyses directly estimate the gains expected from removal of a sectoral distortion (say, agricultural subsidies), but their results also incorporate indirectly (via an assumption that existing unemployment will be eliminated) the output effects of a reduction in the economy's NAIRU. Another enhancement has been the addition of the assumption of increasing returns to scale and collusive pricing in certain industries. Finally, these models have been used to attempt to analyze high unemployment in certain countries by assuming that the real wage is fixed above the market clearing level, thereby creating unemployment.

Although CGE models are useful for policy analysis, they are not free from problems. In particular, as with the partial equilibrium approach, they depend on the realism of the functional form and elasticities they assume. Unfortunately the empirical evidence on many elasticities is not strong, which often forces model builders to impose uncertain values and simple functional forms. This problem is exacerbated by the fact that the results from these models are difficult to allocate to particular assumptions. Unlike the partial equilibrium analysis, where the effects of different assumptions are fairly easy to calculate, general equilibrium models involve complex interactions among large numbers of equations. Even when sensitivity tests are reported it is often difficult to analyze which characteristics of the model are dominating the results.

The results of CGE models can also be quite sensitive to "closure" assumptions. Often the model is closed by keeping fiscal stance and the current account unchanged, the former by adjusting taxes and the latter by the terms of trade. The logic behind fixing the government deficit and the current account is that it leaves net lending of the private sector to the government and the rest of the world unchanged. This may be reasonable when considering the movement from one long run equilibrium to another, but it does mean that these models have little to say about the short run effects of structural policies on government finances or the current account. Alternative closure assumptions can also be used; for example, for trade some rule fixing relative prices can be imposed (such as price taking behavior), allowing the trade balance to be determined endogenously.

c. The relationship between welfare measures and GNP

The above discussion has focused on the estimation of the gains to welfare. In practice, policy decisions are based on other variables such as the level of actual or potential output and consumption. The relationship between the estimation of welfare, and of output and consumption gains, depends on the relative weight of each of the elements discussed above: the gains from changing relative prices within the given resource allocation, the changes in aggregate resource allocation, and the direct productivity gains.

Changing relative prices within a given set of fully employed resources causes the output of some industries to rise while others fall. There is no hard and fast rule between the valuation of the welfare implications in output terms, which will reflect the elasticities in the particular market, and the valuation of these outputs in terms of real GNP, which is based on the original prices of some base year. However, empirically it appears that not only is the sign usually the same, but the magnitudes are similar. Another example is when direct productivity gains free resources from a sector. These excess resources can then be used to increase output either in that particular industry or in the economy as a whole. As with changes in relative prices the gains to GNP will be similar, although not identical, to the welfare gains.

In contrast, when changes in aggregate resource supply are considered, there are potentially large differences between the measurement of GNP and of welfare. The principal reason for such differences is that when labor is substituted for leisure, calculated GNP takes no account of the reduction in consumers' utility caused by the loss of leisure time, while welfare measures do. In addition, when capital accumulation is taken into consideration, welfare gains are calculated using a present value calculation. For macroeconomic policy makers the path of potential output over time is clearly relevant. Another area where there may be differences between GNP and welfare are terms-of-trade changes. A favorable movement in the terms of trade allows a country to consume more, hence raising welfare, while leaving output the same.

To summarize, in many cases GNP and welfare calculations can be expected to give similar results. However, when work/leisure decisions are modeled endogenously or when terms of trade effects are important, these measures can diverge considerably.

d. Direct estimation of potential output

Both the partial and general equilibrium approach generally assume that the economy fully utilizes resources. A different approach to the estimation of the gains or losses from structural policies is to assume that the economy is operating in short run disequilibrium. Time series data are then used to attempt to estimate the potential level of output, and how it is affected by various rigidities in the economy. In practice this literature has focused almost exclusively on the labor market,

involving estimation of the NAIRU (non-accelerating inflation rate of unemployment). 1/

The approach is based on the expectations-augmented Phillips curve, which states that the economy is in macroeconomic equilibrium at the NAIRU. When the economy is operating below the NAIRU, the inflation rate rises; when it operates above the NAIRU inflation falls. The value of unemployment associated with stable inflation can therefore be estimated using time series data on actual unemployment and inflation. The relevance of these estimations for structural reform is that, in principle, changes in the NAIRU over time (and the determinants of these movements) can be identified. The approach is crucially dependent on the assumptions of the model, in particular that there is a stable relationship between the NAIRU, which is often identified with the natural rate of unemployment, and the level of inflation. This is an assumption that has been questioned, in particular by the proponents of the hysteresis theory of unemployment, who argue that the relationship between unemployment and inflation depends upon past values of unemployment.

While being less solidly grounded in micro-economic theory, the Phillips curve approach does have certain advantages. It is a rather more direct method of estimating potential output than the partial equilibrium or CGE approaches, and unlike these approaches it does not assume that the economy is in long-run equilibrium. In addition, the estimation of the NAIRU using time series methods gives direct evidence on the adjustment process from one equilibrium to another.

e. Dynamic effects: costs of adjustment and growth.

Unlike macroeconomic policies, structural reform measures are geared to changing the underlying microeconomic equilibrium of the economy. As such they require the reallocation of resources among sectors. This process may not be smooth, however, and will usually involve adjustment costs for both labor and capital. On the positive side, structural policies may produce dynamic gains to the economy. For example, increased competition in an industry could raise the long-run rate of technological change, thereby inducing a higher rate of productivity growth over the long run. Similarly, on the economy-wide level, the recent literature on endogenous growth implies that static gains could translate into higher overall growth rates due to external economies of scale. 2/ Unfortunately, theory has little to say about the size of these dynamic gains or losses; hence, further discussion on this topic will be left to the empirical section.

1/ Staff estimates of potential output consistent with this approach are contained in Adams, Fenton and Larsen (1987), updated in the World Economic Outlook, October 1988 (SM/88/167).

2/ See Romer (1987) and Lucas (1985).

2. Empirical evidence

Any attempt to survey the literature on the empirical effects of various structural policies confronts two problems. The first concerns the scope of possible structural reforms; a broad interpretation would encompass virtually every government policy. Such a task is beyond the scope of this chapter, which will be limited to four areas where recent interest in structural reforms has been demonstrated: tariffs and tax reform; deregulation and privatization of goods markets; financial market deregulation and labor market reforms. The second complication is that the literature on structural problems is both very large and rather limited, depending on the area of focus. There is a vast literature that attempts to quantify the cost of the present structure of the economy against some ideal structure. But there are relatively few studies which quantify the effects of actual structural reforms. The aim here is to summarize the former literature, while reviewing the latter.

a. Tariffs and tax reform

These two broad topics will be analyzed in the same section since they each can be represented by well-defined price wedges which affect a range of industrial sectors, with important spillover effects into other markets. As such the obvious method of analysis is to use computational general equilibrium models to evaluate policy effects.

The effects of protectionism. In order to estimate the effects of tariff reform, effective tariff rates can be calculated for different sectors of the economy. These calculations transform nominal tariff rates, taking into account interactions in the economy such as the tariffs on intermediate goods, in order to come up with a number that more accurately reflects the protection being given to any particular sector or activity in the economy. In addition, non-tariff barriers such as quotas and voluntary export restraints are represented, often by notional tariff rates.

Table 7 gives a summary of the results of several CGE model simulations which are representative of the much larger literature. The results can be broadly divided into those from traditional models, which assume perfect competition, and those based on the new trade theories, which emphasize imperfect competition.

The results from Whalley (1982 and 1986a) and Deardorff and Stern (1986) are representative of the effects of general cuts in tariffs in traditional models. These assume perfect competition and a technology that exhibits constant returns to scale; hence all gains to world welfare come through changes in the level of specialization caused by relative price movements, with no scope for direct productivity gains. The welfare gains to tariff reform are calculated to be generally small; the effect of various tariff reforms on world welfare is 0-0.8 percent of world GNP, the latter being for the elimination of all tariff and non-tariff barriers.

Table 7. Estimated Effects of Tariff Reforms on Welfare

Researcher	Policy	Region	Effect on Welfare	Effect on GNP
Perfect Competition and Constant Returns to Scale Models			(In Percent of GNP)	
Miller and Spencer (1977)	Removal of U.K.-EEC tariffs and U.K. Commonwealth preferences	U.K.	-1.8	+0.2
Whalley (1982)	Tokyo Round cuts	World	0.0-0.1	n.a.
	All tariffs abolished	World	0.1	n.a.
	All tariffs and NTBs abolished	World	0.8	n.a.
	All factor taxes/subsidies abolished	World	0.3	n.a.
Deardorff and Stern (1986)	50 percent multilateral cut in pre-Tokyo round tariffs	World	0.0	0.2 (employment)
Whalley (1986) 1/	50 percent multilateral cut in tariffs	World	0.1	n.a.
	50 percent multilateral cut in tariffs and NTB's of developed world	World	0.3	n.a. (employment)
	50 percent unilateral cut in U.S. tariffs	U.S.	-0.2	n.a.
Brown and Stern (1987)	Canada-U.S. Free Trade Agreement	Canada U.S.	-0.35 +0.06	n.a. n.a.
Imperfect Competition and Increasing Returns to Scale Models				
Harris (1983)	Unilateral reduction of Canadian tariffs	Canada	4.1	3.5
	Multilateral reduction of tariffs	Canada	8.6	7.0
Canada (1988)	Canada-US Free Trade Agreement	Canada	2.5	n.a.
Brown and Stern (1988)	Canada-US Free Trade Agreement	Canada U.S.	1.1 0.1	n.a. n.a.
Nguyen and Wigle (1988)	Elimination of tariffs and selected NTBs all regions	Large DC's Small DC's Others	1.5 0.7 -0.0	n.a. n.a. n.a.

Source: OECD (1988), Shoven and Whalley (1984), and individual studies.

1/ Data set refers to 1977, when tariff levels were higher than they are now.

The differences between the estimated welfare gains of abolishing tariffs and abolishing all tariffs and NTB's 1/ (Whalley (1982) and (1986)) do illustrate an important point. Industrial country tariffs are now quite low, the main form of protection being non-tariff barriers. Estimated welfare gains from cuts in tariff levels, without changes in NTB's, will tend to underestimate the potential gains from trade policy reform. 2/ The study by Whalley (1986) illustrates another feature of most traditional models, namely, that nondiscriminatory reductions in tariffs can actually lower welfare for some countries due to terms-of-trade effects. However, in some cases, such as when a country implements a discriminatory reduction in tariffs--e.g., upon entering a free trade area (as in the cases of the United Kingdom and Canada reported in the upper panel of Table 3), there can be a trade diversion effect that contributes to the net welfare loss. This latter effect is different from a nondiscriminatory tariff reduction. It is possible in these circumstances that the increase in import prices resulting from liberalization in such cases would reflect trade diversion and not the impact of additional demand pushing up world prices. In the case of the United Kingdom, the welfare loss would come from the participation in the CAP. This factor has nothing to do with the traditional terms of trade effect. 3/

Larger gains from the removal of trade barriers are obtained by models that assume the existence of imperfect competition and increasing returns to scale. 4/ Two recent studies with CGE models with these features estimate that a Canada-U.S. trade agreement would increase Canadian welfare by 1.1 to 2.5 percent of GDP. These gains come about because the expanded market allows firms to exploit economies of scale, resulting in a direct productivity gain. Using a similar type of model Nguyen and Wigle (1988) estimate that the elimination of tariffs and selected NTBs produce welfare gains of up to 1.7 percent of GNP, depending on the world region. Partial equilibrium models which assume increasing returns to scale also produce large gains; such "new trade theories" obtain gains that can be two to three times the size of those estimated under traditional assumptions.

A useful framework for thinking about these results is contained in a comment on the Brown and Stern (1987) paper by Petri (1987), who uses back-of-the-envelope calculations to assess the relative importance of

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1/ The effects of NTB's are difficult to calculate. Whalley (1986b) uses the estimates of Yeats (1979).

2/ For an extensive discussion of recent trade policies see IMF "Trade Policy Issues and Developments", SM/88/166. On the wider issue of general industrial policies see IMF "The Industrial Policies of Industrial Countries," SM/88/167.

3/ Also work undertaken on agriculture and reported in the recent trade paper (SM/88/166) concluded that unilateral liberalization benefits countries which provide higher effective protection to this sector although the benefits would be higher under multilateral liberalization.

4/ This section relies heavily on OECD (1988).

specialization effects, terms of trade effects, and productivity effects on the change in welfare of Canada when moving into a free trade arrangement with the United States. He concludes that the specialization effects are dominated by (potential) terms of trade effects, which in turn are dominated by (potential) productivity effects. The size of the potential productivity gains explains the increases in welfare estimated by models which assume increasing returns to scale. Clearly, the gains from increasing returns to scale depend upon the size of the expanded market; hence the large estimated increases in Canadian welfare compared to U.S. welfare from a joint free trade area.

The importance of terms-of-trade effects on welfare vis-à-vis specialization effects explains why many traditional models show that unilateral reductions in tariffs can have negative welfare effects on the country that reduces tariffs, even though world welfare increases. This point comes out most clearly if estimated trade elasticities are used to calculate optimal tariff levels for countries, where optimal tariffs are defined as those tariffs which maximize the welfare of the individual country. Generally, for major industrial countries, the optimal tariff level tends to exceed the actual tariff level, implying that unilateral tariff reductions may be welfare reducing.

Turning to the reallocation costs of moving from one equilibrium to another, Whalley (1982), in common with the earlier literature, concludes that if the economy functions smoothly these costs are relatively small, even in comparison to the annual welfare gain of the policy. However, if there are real wage rigidities or factor specificity then the costs can be considerably higher. Indeed, in one case the assumption of real wage rigidity was enough to turn a welfare gain into a welfare loss. This example illustrates the importance that non-equilibrium assumptions can have on the results of CGE models. For the new trade models, adjustment costs are also likely to be high since much of the welfare gain come from shutting down small inefficient firms and replacing them with larger, more competitive ones. These changes in industrial organization could produce significant short-run adjustment costs.

The results in Table 7 indicate that the welfare gains from tariff reform depend on the modeling assumptions made. For traditional models the welfare gains from reducing all tariff and non-tariff barriers are estimated at less than one percent of world GNP. When the results from an actual policy change (the GATT Tokyo round cuts) are estimated, the results are negligible. 1/ On the other hand, estimates based on the new trade models, which assume imperfect competition and increasing returns to scale (which may be more accurate in many circumstances), indicate that the gains from trade liberalization could be significantly larger. These

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1/ This is not to say that these increases in world welfare are unimportant. It must be remembered that these gains are permanent; a permanent gain of 0.1 percent of GNP discounted at 5 percent per annum has a present value of 2 percent of GNP.

gains depend upon the successful exploitation of economies of scale by firms in the affected countries; hence the gains will be largest when the expansion of the market is large, as is the case for Canadian firms in a U.S. free-trade agreement, and as is the case for the lifting of internal barriers in the European Community in 1992. In addition, the adjustment costs associated with such welfare could be significant, so that short-run net welfare gains may be moderated.

Tax Reform. The estimation of the effects of tax reform using CGE models is very similar to the estimation of tariff reforms. Taxes are represented using an effective ad valorem rate, and the models are solved using different tax packages. Table 8 represents some of the estimates of the welfare and GNP effects of tax reforms.

The most important conclusion from Table 8 is that the gains from reforming the tax system could be large, though there is much uncertainty attaching to the estimates. Estimated welfare losses associated with the tax system have generally risen over time, apparently due to higher estimates of certain key elasticities and increasing disaggregation of the models. While estimated welfare losses are potentially large, the estimates of the welfare gains accruing to actual reforms are rather smaller. 1/

Fullerton and Mackie (1988) estimate the welfare gains of three U.S. tax reforms of the 1980s (the major 1981 reform, the cumulative changes introduced during 1982-85, and the major 1986 reform) against the 1980 tax system. The estimated welfare gains of three tax reforms against the 1980 baseline vary from -0.3 percent to 0.8 percent of adjusted GNP. The gain to actual GNP from one of the three measures, the 1986 Tax Reform Act (TRA) was estimated at 1.3 percent by the Economic Report of the President and at 0.5 percent by Evans and Kenward (1988). The somewhat higher numbers for the actual GNP gain from the 1986 TRA compared to welfare measures occur because of the estimated substitution of labor for leisure. In actual GNP the lost leisure has no value, while in the welfare calculations the cost of this loss of leisure is taken into account.

The Ballard et al. (1985) study illustrates the sensitivity of CGE model results to closure assumptions. Under the standard assumptions of the model, the move to a system based on a consumption tax raises welfare by approximately 1 percent of GNP. On the other hand, when capital flows are included in the model the same policy experiment reduces welfare by 0.5-1 percent of GNP. The reason for this is that there is a large capital outflow, which represents a loss of the gross rate of return on the capital, while the interest actually received by the economy is the net rate of return. As a result, the capital outflow causes a welfare

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1/ Again it should be emphasized that these gains are permanent. Also although the welfare effects of a particular tax may be small in terms of GNP, they are often large in comparison to the revenue raised.

Table 8. Estimated Effects of Tax Reform on Welfare

Researcher	Country	Type of Policy	Welfare Gains	GNP Gains
			(In percent of GNP)	
Harberger (1966)	U.S.	Lump-sum tax	0.3-0.6	n.a.
Slemrod (1983)	U.S.	Indexation	0.48	n.a.
Ballard et al. (1985)	U.S.	Full integration	0.6-1.2	n.a.
		Progressive consumption tax	1.6-1.8	n.a.
		Consumption taxes: standard assessment	1.1	n.a.
		Consumption taxes: capital service flow	-0.6 - -1.0	n.a.
Piggott and Whalley (1985)	U.K.	Various plans	6.0-9.0	3.7 NNP (point est.)
		1973 U.K. tax reform	-0.1	n.a.
Daly et al. (1985)	Canada	Elimination of dispersion of capital tax rates	2.0	n.a.
Fullerton and Henderson (1986)	U.S.	1984 Treasury proposal	-0.1-1.2	
		President's proposal	0.2-1.2	n.a.
Economic Report of the President (1987)	U.S.	Tax Reform Act (1986)	n.a.	1.3
Evans and Kenward (1988)	U.S.	Tax Reform Act (1986)	n.a.	0.5
Fullerton and Mackie 1/ (1988)	U.S.	Economic Recovery Act (1981)	-0.3 - +0.5	n.a.
		Changes 1981-1985	+0.2 - +0.6	n.a.
		Tax Reform Act (1986) (All against 1980 tax system)	+0.2 - +0.8	n.a.

Source: Shoven and Whalley (1984), and individual studies.

1/ Several estimates are presented in Fullerton and Mackie; those reported here are a subset of the results.

transfer from the U.S. to the rest of the world due to the transfer of the tax benefits from capital investment to foreign governments.

To summarize, the static effects of tax reform on the economy are potentially large, although quite uncertain. Estimates of actual tax reforms yield rather smaller numbers. As regards the dynamic elements, most recent models endogenize the work/leisure and investment decision; hence the results take into account changes in inputs. Little work has been done on the costs of adjustment to a new equilibrium; however, the results from the trade literature can probably be assumed to hold for these policies too. 1/

b. The effects of deregulation of goods markets and of privatization

Deregulation and privatization are aimed at improving the performance of a sector of the economy by reducing the role of government intervention. While such policies are likely to improve welfare by changing relative prices (thereby improving the allocation of resources), their main effects on both welfare and GNP come through direct productivity gains as a result of increased competition. Tables 9-11 contain representative results from this literature. Table 9 summarizes the literature on the effects of regulation on the efficiency of various industries, while in Tables 10 and 11 the comparison is between private and public ownership. The evidence includes both cross-sectional evidence (comparing similar industries at the same moment in time) and time series studies (comparing performance before and after a policy change). Both tables focus on the effect of regulation and public ownership on prices and productivity.

In Table 9 the main focus is on the industries which have actually experienced deregulation in the 1980s, namely airlines, railroads, trucking and telecommunications. The evidence from all of these industries indicates that there were substantial benefits from deregulation. For example it appears that labor productivity rose by 20 percent in the airline industry 2/ and over 50 percent in railroads; in trucking deregulation is estimated to have reduced rates by 14 percent, however, part of the reduction was due to wage reductions rather than increased productivity.

Deregulation has not been without its problems, including considerable turmoil in the industrial organization of the sectors

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1/ A recent summary and appraisal of tax reform in industrial countries is contained in Pechman (1988). An assessment of the value added tax (VAT) and reforms involving the VAT can be found in Tait (1988).

2/ One important factor has been the adoption of hub and spoke techniques, which allow higher utilization rates and the use of larger, more efficient aircraft. Bailey (1986) notes that a B-737 is three times as efficient as a 30 passenger commuter jet.

Table 9. Estimated Effects of (De)regulation on Firm Performance

Researcher	Industry	Results
Brayer and MacEvoy (1974)	Natural gas	No difference between monopoly and regulated prices.
Smiley and Greene (1983) Greene and Smiley (1984)	Electricity generation	Regulated prices 20-50 percent lower than monopoly prices.
Kaplan (1985)	Airlines	Labor productivity rose 20 percent, mid-1979 to mid-1984.
Barrett (1985)	Airlines	Prices and operating costs in Europe almost double U.S. levels.
Morison and Winston (1986)	Airlines	Fares--fallen 40 percent for long distance, high-density markets. --risen 15 percent for short distance low-density markets.
Bailey (1986)	Airlines	Consumer gain: $5.7 billion 1977 dollars (35 percent revenues). Producer gain: $1.6 billion 1977 dollars (10 percent revenues). No significant losses.
Sloss (1970)	Railroads	Average revenues 7 percent lower in nonregulated provinces.
Keeler (1983)	Railroads	Costs: Excess route mileage $0.9-$1.8 billion, 1986 dollars. Underutilization of freight cars: $2.7-$3.1 billion, 1986 dollars.
Braentigan and Noll (1984)	Railroads	Welfare cost versus first best $0.9-$1.8 billion, 1984 dollars.
Barenkov (1987)	Railroads	1980-85 workforce fell 40 percent, volume constant.
Blaire et al. (1986)	Trucking	Deregulation reduced rates by circa 14 percent.
Bailey (1986)	Telecommunications	1982-86 AT&T shed 6 percent of workforce.
Shepard (1978)	Dentistry	Lack of reciprocal licensing raised rates by 12-15 percent.
Harrington (1984)	Insurance	Survey of literature found no overall pattern.

Sources: Joskow and Rose (1987), Bailey (1986), and individual studies.

Table 10. Results of Actual Privatizations

Type of Firm	No. of Firms	Mean Profit Margin 1981	1984	Change
Firms privatized in competitive markets 1/	6	2.3	10.6	+8.3
Public firms operating in competitive markets 2/	5	-4.4	1.7	+6.1
All commercial and industrial companies	All	7.4	10.4	+3.0

1/ Amersham, Associated British Ports, Cable and Wireless, Jaguar, National Freight and British Aerospace.
2/ BL, British Steel, British Airways, Rolls-Royce and National Bus Company.

Table 11. Comparison of Public and Private Ownership

Author	Industry	Conclusion on Public Ownership	Means of Comparison, Public and Private
De Alessi (1977)	Electric utilities	Anti	Pricing policy.
Meyer (1975)	" "	Pro	Costs and prices.
Neuberg (1977)	" "	Neutral	Cost-efficiency.
Pelzman (1971)	" "	Anti	Pricing policy.
Spann (1974)	" "	Neutral	Operating costs, investment costs.
Yunker (1975)	" "	Pro/neutral	Unit costs, customer costs.
Pescatrice et al. (1980)	" "	Pro	Costs.
Mann et al. (1976)	Water	Pro	Costs.
Crain et al. (1978)	"	Anti	Costs.
Bruggink (1982)	"	Pro	Costs.
Feigenbaum et al. (1983)	"	Neutral	Costs.
Davies (1971)	Airlines	Anti	Passengers, revenue, freight per employee.
Pryke (1982)	"	Anti	Daily flying hours, capacity, tonne km., profitability.
Pryke (1982)	Appliance showrooms	Anti	Expenditures/staff, mark-up, market share, profitability.
Pryke (1982)	Ferries	Anti	Turnover per emloyee, profitability, growth in traffic.
Caves et al. (1980)	Railways	Neutral	Total factory productivity.
Hirsch (1965)	Refuse	Anti	Costs.
Kitchen (1976)	"	Anti	Costs.
Pier et al. (1974)	"	Pro	Costs.
Pommerehne (1977)	"	Anti	Costs.
Savas (1974)	"	Anti	Truck utilization.
Savas (1977)	"	Anti	Overall costs.
Rowley et al. (1981)	Steel	Anti	Total factor productivity, technological diffusion.

Source: Yarrow (1986).

affected, but the overall assessment is that deregulation raised productivity in these industries by noticeable amounts. The gainers in this process have been the general consumers, while the major losers have been incumbent firms and organized labor, who previously were able to capture some of the economic rents implied by regulation. Table 9 also contains information on other regulated industries. Here the conclusions are mixed. Regulation helped to lower prices in electricity generation; it had no systematic effect on natural gas or insurance prices; and, it raised prices in dentistry. This evidence suggests that large gains from deregulation may be limited to specific industries where regulation stifled competition, 1/ rather than a general policy to improve industrial performance across the board.

Tables 10 and 11 summarize the literature on the efficiency of public versus private ownership. 2/ The first looks at the effect of the U.K. privatization program on firms facing private sector competition within the industry. Since these firms face competition, financial performance indicators are a meaningful guide to efficiency. Average profit margins in 1981 and 1984 are given for six firms which have been privatized, five that have remained in the public sector and all industrial and commercial companies. The evidence indicates that the general performance of public sector enterprises has improved, with the privatized firms doing better than those still in public ownership. In these competitive sectors it appears that privatization and the threat of privatization have lead to improved performance. Table 11 summarizes the available cross-sectional evidence on the effect of public ownership on efficiency. The results can be divided into those relating to natural monopolies (electric utilities and water), where the evidence appears mixed, and competitive industries (airlines, appliance showrooms, refuse, steel, etc.) where the consensus is that public enterprises tend to be relatively inefficient.

The conclusions from the two tables are surprisingly similar. Deregulation and privatization have yielded important benefits when the industry is competitive. On the other hand, when the industry has a natural monopoly, some kind of limitation on private enterprise could be appropriate. There is no consensus on the effect of the form (regulated private enterprise versus public ownership) or the severity of such limitations on the performance of industry. Certainly the empirical evidence does not point to substantive productivity gains from changing the status of these industries. 3/ Hence the important issue for policy makers is which industries are genuine natural monopolies and which are not. In this context the deregulation of long distance telephone services in the U.S. has shown that competition can be introduced in some parts of

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1/ The study by Barrett (1985) indicates that this may be the case for the European airline industry.

2/ The discussion of privatization is based on Yarrow (1986).

3/ Evidence from British Telecom, which was privatized with relatively lax regulatory control, may help to clarify these issues.

an industry even if other parts (local telephone services) are a genuine natural monopoly.

Dynamic costs and gains from privatization and deregulation are potentially important but difficult to quantify. Deregulation in the U.S. caused considerable turmoil within the industries, introducing new entrants and leading to some spectacular failures. However, the overall costs of adjustment do not appear to have been very large. Turning to dynamic benefits, Caves and Christensen (1980) find that over the 1963-74 period productivity growth in the unregulated Canadian railroads was 4.0 percent while in the regulated U.S. railroads it was 0.1 percent. They attribute the difference to the regulatory environment. By contrast Nelson and Wohar (1983) find that regulation of electricity generation had both positive and negative effects on productivity growth, depending on the time period examined. These results are insufficient to permit any overall assessment on the wider dynamic effects of deregulation.

c. Financial market deregulation

Although a large amount has been written about financial market deregulation, there are few empirical estimates of the effects on welfare. The main reason for this is that the gains from an improvement in financial intermediation are complex and difficult to estimate, the effects coming largely through the more efficient allocation of capital. However some evidence on the industries themselves does exist. Bailey (1986) concludes that deregulation of stockbroking reduced cross-subsidization of small transactions by large ones. The commission on large transactions fell by 40 percent, while those on small transactions rose; this resulted in substantially higher turnover in the industry. For commercial banks, an annex in the papers on the most recent Fund consultation with the United States 1/ estimates that the cumulative effect of the structural changes in the economy since the mid-1970s on commercial banks' profitability is a decline of about 4 percentage points. While this indicates that regulation provided the commercial banks with substantial economic rents, there is little evidence that the industry experienced large productivity gains as a result of deregulation. The recent paper on structural indicators (SM/88/181, Annex III) reproduces evidence that regulations on international capital flows affect the differential between domestic and Euromarket interest rates. However, a recent theoretical paper by Cole and Obsfeld (1988) argues that the welfare gains associated with increased international capital mobility are small. Finally it should be noted that, to the extent that the current problems being experienced by the savings and loan industry in the United States can be ascribed to deregulation, adjustment costs in this industry may be substantial.

1/ International Monetary Fund, SM/88/162, Supplement 2, Annex 15, August 4, 1988.

d. Labor Market Reforms

In principle, labor market distortions could be analyzed in a similar manner to the other markets that have been examined. Distortions could be measured, put into a computational equilibrium model and the effects of the distortion measured. This approach is rarely used, partly due to the nature of labor market distortions and partly due to problems of interpretation. Many of the distortions alluded to in discussions about labor markets are difficult to quantify. Factors such as the degree of unionization, high minimum wages and the nature of collective agreements do not lend themselves to quantification in the same way as a tariff or a tax. In addition, utilization rates in labor markets are highly correlated with short-term changes in aggregate demand, and there is a widespread belief that, at least in recessions, a portion of observed unemployment is involuntary. This makes it difficult to use computational equilibrium models which generally assume the economy is in long-term equilibrium.

The approach usually adopted to answer these questions uses an expectations-augmented Phillips curve to help determine the deviation of the actual rate of unemployment from the natural or non-accelerating inflation rate of unemployment (the NAIRU). If the economy is operating below the NAIRU then inflation will tend to rise due to capacity constraints in the economy; conversely, if unemployment is above the NAIRU then inflation will tend to fall. Given some stable relationship between the deviations of unemployment from the NAIRU and the change in inflation, the NAIRU can be estimated using time series data on actual unemployment and inflation. On this approach, changes in the NAIRU are interpreted to represent changes in the structural characteristics of the labor market. These changes can then be attributed to different structural problems.

Table 12 presents OECD standardized unemployment levels for the seven major industrial economies for 1967-74 and 1987. The two most striking features of the table are the steady rise in unemployment rates over the last twenty years and the disproportionate increase in unemployment in the major European countries and Canada relative to the United States and Japan. Explanations of these trends, in particular the differential performance among Europe, North America, and Japan, form the bulk of the literature on labor market structural rigidities. 1/

Many researchers believe that these trends in the data largely reflect changes in the level of the NAIRU. Indeed, given the high levels of unemployment (particularly in Europe) and the relatively modest deflationary pressures of the 1980s, it is difficult to see how any other conclusion could be reached, given the expectation-augmented Phillips curve approach. Some examples of estimated NAIRU's are given in Table 13. Particularly striking are the large rises in estimated NAIRUs in the European Community.

1/ See Adams, Fenton and Larsen (1986) for a review of this literature.

Table 12. Major Industrial Countries: Standardized Unemployment Rates, 1967-87

	1967-74	1987	Change
Canada	5.2	8.8	3.6
United States	4.6	6.1	1.5
Japan	1.3	2.8	1.5
France	2.5	10.8	8.3
Germany, Fed. Rep. of	1.1	6.5	5.4
Italy	5.6	10.5 1/	4.9
United Kingdom	3.4	10.3	6.9

Source: Bean et al. (1986) and OECD (1988)

1/ 1985 data.

Table 13. Estimated NAIRUs: Selected Countries

Researcher	Country	NAIRU 1967-69	NAIRU 1981-83	Change
Coe and Gagliardi (1985)	United States 1/	4.1	4.2	+0.1
	Japan	1.2	2.3	+1.1
	France 2/	4.6	9.0	+4.4
	Germany, Fed.Rep. of	0.9	8.0	+7.1
	United Kingdom	2.6	5.9	+3.3
		1965-69	1985	Change
Burda and Sachs (1987)				
Method 1	United States	4.5	5.7	+1.2
	Germany, Fed.Rep. of	0.8	8.6	+7.8
Method 2	United States	4.5	6.6	+2.1
	Germany, Fed.Rep. of	1.3	5.7	+4.4

Notes: Coe and Gagliardi report two sets of estimates. The table reports their estimates using the actual rate of growth of import prices. Burda and Sachs estimate NAIRUs in two ways; Method 1 represents a traditional expectation-augmented Phillips curve approach, while Method 2 represents a frequency domain estimation.

1/ Second time period is 1982-83.
2/ First time period is 1971-75.

Disagreements between researchers come in the interpretation of the reason for the rise in the NAIRUs, and in particular the increase in European NAIRUs compared to the United States and Japan. Two broad schools of thought exist, those that believe that these changes are primarily the result of structural inefficiencies in labor markets and those who believe that European labor markets exhibit hysteresis, i.e., that the NAIRU today depends on the actual level of unemployment, rather than being an independent structural parameter. According to this line of thought the rise in European NAIRUs has been primarily caused by the (cyclical) rise in the actual rate of unemployment in Europe over the last decade.

Proponents of the structural view point to a series of structural factors that have made labor markets less efficient; increasing employee protection, higher non-wage labor costs, more generous unemployment contributions, higher unionization and increased minimum wages. A summary of this evidence is presented in "Indicators of Structural Policies and Performance" (SM/88/181, Annex III), and will not be repeated here. An attempt to quantify these effects for most OECD countries was made by Bean et al. (1986). Their division of the rise in NAIRUs from 1956-66 to 1980-83 between the effect of taxes on employers, the terms of trade and factors affecting search intensity (such as unemployment benefits) are reported in Table 14. The results indicate that much of the rise in European NAIRUs comes from reduced search intensity rather than from higher non-wage labor costs, whereas for the rest of the world the roles are reversed.

Another wide ranging empirical study, Chan-Lee et al. (1987), looks at changes in structural policies in OECD economies in the 1980s. They argue that since 1980 government policies affecting the labor market have generally changed in a direction which would reduce rigidities and distortions and hence reduce the NAIRU. Based on estimated expectation-augmented Phillips curves for 13 economies, they investigate the possibility that NAIRUs have changed and that real wages have become more responsive to economic conditions from either mid-1979 or the end of 1982. They find no statistically significant structural breaks in the equations, although the equations do slightly overpredict inflation in the 1980s. They conclude there is no firm statistical evidence that structural policies have affected wage behavior in the 1980s, although there may have been a small effect.

An interesting variant of the structural approach is presented in Burda and Sachs (1987), who argue that the crucial difference between the U.S. and West Germany is that, while both economies have uncompetitive labor markets and rigid real wages in manufacturing, the U.S. has a competitive service sector and more regional mobility which have absorbed changes in the labor force. By contrast the West German services sector is heavily unionized and appear to be unresponsive to changes in labor supply. According to this interpretation, the crucial area for labor market reform is in the services sector, rather than the economy as a whole.

Table 14. Estimated Effects of Structural Policies on the NAIRU of the Major Industrial Countries

(Assessment : 1956-66 to 1980-83)

	Taxes	Import Prices	Search	Total
Canada	1.34	0.02	--	1.36
United States	1.30	0.19	--	1.49
Japan	--	--	0.59	0.59
France	0.46	-0.04	3.27	3.69
Germany, Fed. Rep. of	--	--	3.68	3.68
Italy	1.12	-0.02	--	1.10
United Kingdom	2.06	-0.05	2.25	4.46

Source: Bean et al. (1986).

While structural factors may account for increases in European NAIRU's in the period up to the late 1970s, it is difficult for them to account for the increase in NAIRUs in the 1980s because most of the structural determinants have moved in a direction which would tend to reduce the natural rate. As a result alternative explanations have received increasing attention. The hysteresis theory of European unemployment was advocated by Blanchard and Summers (1986). Their model distinguishes insiders and outsiders. Insiders are people who have secure jobs, who are not threatened by unemployment, and who set wages. Outsiders are workers who have to accept the given wages, under threat of unemployment. Under this view a series of adverse shocks to the European economies in the 1970s and 1980s lowered the real wage that is consistent with full employment. The insiders did not allow changed real wages, and the result was high unemployment. They test the theory by estimating expectations augmented-Phillips curves using the change unemployment rather than its level, and they argue that the evidence supports this interpretation. It is not clear, however, that this implies that structural policies are ineffective. The main question about this approach is how the insiders are able to insulate themselves from competition, and in particular why this behavior occurs in Europe and not in the U.S. or Japan. Soltwedel (1988) looks at the West German labor market and argues that a significant factor stopping outsiders from taking high wage jobs from insiders is government intervention.

Insider/outsider theories are not the only explanation of hysteresis, many other proponents of the theory argue that the European economy is in a low employment equilibrium and needs a demand stimulus in order to recover. One example of this approach is Gordon (1988) who compares present European unemployment to U.S. unemployment in 1939. Arguing against the importance of structural rigidities in the present case he points out that there were many perceived rigidities in 1939 too, but the unemployment problem was solved by a stimulus to aggregate demand.

A separate part of the literature looks at the responsiveness of wages to changes in economic conditions. The aim of this approach is to gauge the flexibility of labor markets in the face of economic shocks. The results from this literature indicate that European labor markets exhibit real wage rigidity, U.S. labor markets exhibit nominal wage rigidity, while Japanese labor markets are the most flexible, possibly due to the widespread use of bonus payments. Chan-Lee et al. (1987) investigate whether structural policies had affected the speed at which real wages responded to price changes over the 1980s, and found no evidence that they had (see above). Finally, a number of authors have attempted to relate labor market performance to the structure of bargaining in the economy, e.g., Freeman (1988). He concluded that countries with either relatively centralized wage setting or decentralized wage setting had better performances than those with intermediate types of labor market structures and institutions. However, the variance of performance within these categories is large, making it unclear that the gains from such a change would be sizeable.

3. Prospective Gains: A Review of Three Papers on Structural Reforms

This section contains a brief review of three papers which attempt to quantify the effects of comprehensive structural reforms: the estimates by the Commission of the European Communities (1988) of the effects of the reduction in internal barriers proposed by 1992, the effects of Japanese structural policies as estimated by Takenaka and Ishii (1987), and recent work by the Fund on the effects of structural reform in West Germany (Mayer (1988) and Rosenblatt et al., (1988)).

The European Commission estimated the gains to be achieved by 1992 from the reduction in internal barriers in the European Community at ECU 125 to 190 billion (4.5-6.5 percent of GDP). Rough orders of magnitude of individual gains are ECU 10 billion from reduced frontier formalities, ECU 30 billion from other identifiable internal barriers, ECU 20 billion from increased competition in public procurement, ECU 60 billion from economies of scale, and ECU 45 billion from reductions in management inefficiencies due to greater competition.

Two points are worth making about these estimates. First, the estimates are crucially dependent on the effects of the 1992 reforms on competition. Only around one quarter of the estimated gains to welfare are a direct result of reducing internal barriers; economies of scale and reductions in inefficiencies in management due to greater competition each account for half of the remainder. Second, to the extent that the gains come through changes in industrial structure, adjustment costs may be significant. Third, the estimates reflect the maximum gains possible. The Commission has estimated the gains of moving to a completely free and competitive internal market. While this is the objective for 1992, it may not be achieved by then.

The effects of some of the proposals for structural reform contained in the Mayekawa Report have been analyzed by Takenaka and Ishii (1987). 1/ Their paper looks at the effect of two proposed structural reforms; the first is a program of deregulation (minkatsu), 2/ and the second involves changing the exchange rate and income elasticities in a standard macroeconomic model. 3/ These proposals will be discussed in turn.

To analyze minkatsu, the authors rely on their own earlier estimates of the effect of this plan on investment, and simulate the overall effect

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1/ All of the proposals are contained in two separate reports, see Mayekawa (1986) and the (Japanese) Economic Council (1987).

2/ The term is an acronym for "private sector vitality program". The program incorporates the relaxation of a wide variety of government regulations as well as substantial privatization.

3/ The second exercise could be related to structural reform of the economy, but exactly what reforms is not made clear in the paper. This issue is discussed later.

on the Japanese economy by using a macroeconomic model. Minkatsu is estimated to raise investment demand in the affected sectors by ¥4.7 trillion. After substitution effects are taken into account the net effect on investment is estimated as ¥3.2 trillion (about 1 percent of GNP). Using the latter figure, the consequences of the rise in investment on GNP and the trade account are simulated using a macroeconomic model. The policy is estimated to raise Japan's GNP by 0.5 percent, to reduce the Japanese current account surplus by $5 billion, and to improve the U.S. current account by $1.3 billion. These estimates are dominated by the effects of a simulated change in the taxation of agricultural land in municipal areas from agricultural to residential tax rates. This accounts for almost ¥2 trillion or over 60 percent of the rise in net investment. The authors note that due to various political factors this measure is unlikely to be adopted in the near future. Without this measure, the direct stimulation to domestic demand falls to under four tenths of a percentage point of GNP. 1/

The second simulation reported by Takenaka and Ishii (1987) involves a shift in the income elasticities of the bilateral import equations between Japan and the United States. The expenditure elasticity of U.S. demand for Japanese goods is assumed to fall from 3.33 to 1.5 while the elasticity of Japanese demand for U.S. goods rises from 1.0 to 1.5. Over the period 1986-90 such a change increases both Japanese and U.S. GNP by 0.2 percent, improves the U.S. current account deficit by $25.3 billion while reducing Japan's surplus by $7.4 billion. This simulation illustrates that one of the key problems in reducing current account imbalances is the relatively high income elasticity of the U.S. for Japanese goods and the relatively low income elasticity of Japan for U.S. goods. However, it is not entirely clear how the assumed changes in structural parameters relate to structural policies, and this makes it difficult to interpret their empirical results. The rise in the Japanese income elasticity could result from reducing regulations on imported goods. It is less clear what set of structural policies would lead to a fall in the income elasticity of U.S. consumers.

The Fund's Central European Division has developed a computational general equilibrium model of the West German economy, which has been used to estimate the effects of structural policies and rigidities on the German economy. 2/ Two sets of estimates will be dealt with here, a study of the costs of the CAP on the German economy and a comparison of the effects of a ten percent appreciation of the mark with and without structural rigidities.

1/ Inefficient land use policies in Japan are generally acknowledged to be the source of considerable distortions in the Japanese economy. Recent discussions on this point include Balassa and Noland (1988) and Sachs and Boone (1988).

2/ Rosenblatt et al. (1988).

The cost of the CAP is estimated by comparing the initial equilibrium with one in which the rate of subsidization/import protection on agriculture is reduced by 26 percent and the world price for agricultural products relative to manufactures is increased by 8 percent, (translating into a 20 percent reduction in the subsidy/duty ratio for agricultural products). 1/ The closure assumptions in the model are that all markets except the labor market clear; the labor market is characterized by fixed real wages in consumption terms, government expenditures are a fixed proportion of absorption, and the current account is balanced by varying absorption.

The result of this simulation is to increase domestic output by 3.6 percent and to raise employment by 5.5 percent. While it is always difficult to assign results from CGE models, it is clear in this case that a very large part of the gain to output comes from the rise in employment. This in turn is crucially dependent on the assumption of fixed real wages. Employment rises because agricultural prices fall, lowering the rates of increase of consumer prices and nominal wages, and hence lowering real product wages faced by other sectors of the economy. Thus while employment falls by 11.6 percent in the agricultural sector, it rises by between 4.4 percent and 7.8 percent in the other three sectors. Alternative labor market assumptions, such as fixed nominal wage rates or fixed employment levels would reduce the estimated gains drastically. This is an illustration of the sensitivity of CGE models closure assumptions; 2/ in this case it is the labor market which is being closed by a non-market clearing assumption, which is consistent with the view that the present high levels of European unemployment largely reflect labor market rigidities. 3/

The Fund's model has also been used to compare the effect of a 10 percent appreciation of nominal value of the deutsche mark, both with and without, structural rigidities in the economy (Mayer (1988)). The model assumes that real wages are fixed and above the market clearing level. In the base case simulation the appreciation of the exchange rate raises output by 1.8 percent, presumably because the fall in consumer prices caused by declining import prices is reflected in a drop in real product

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1/ Ibid. The paper also contains a review of earlier empirical estimates of the cost of the CAP.

2/ Another illustration of the sensitivity of CGE results to labor market assumptions, Kirkpatrick (1988), using a different CGE model of the West German economy, finds that when after tax real wages are fixed for all employees, trade and industrial subsidies liberalization raises real GDP by 6.3 percent, whereas when before tax real wages are fixed for unskilled workers and after tax real wages for skilled workers, real GDP expands by 19.7 percent.

3/ Using a different CGE model in which employment levels are assumed to be fixed, a group of researchers at the OECD (Burniaux et al. (1988)) has recently estimated the welfare gain from abolishing all agricultural support in the European Community at 0.1 percent of disposable incomes.

wages. Three sets of structural rigidities are then added to the model; agriculture and mining are isolated from foreign competition using import levies and export subsidies; iron, steel, clothing and shipbuilding are insulated from the effects of the appreciation by various non-tariff barriers; output and employment in the non-traded goods sector is assumed not to rise due to government regulations and labor market rigidities. These rigidities reduce output by 1 percent, 0.2 percent and 4.3 percent respectively, indicating that the combination of fixed real wages and structural problems can have large output effects. As with the earlier simulations, the results are heavily influenced by labor market assumptions.

Microeconomic foundations of structural reform

1. The market mechanism under perfect competition

There are three fundamental economic problems that must be resolved in every society. First, which goods and services (and how much of each) will be produced? Second, how shall the goods and services be produced--by what techniques, using which resources? Third, for whom shall the goods and services be produced--i.e., how is the national product to be divided among society's members? One system, and administratively the simplest, that solves these problems in an efficient way is based on the free market mechanism. 1/ This section briefly reviews how the competitive system works. 2/ The next section considers several types of market failure, where one or more of these conditions is not met or where other distortions may impede the functioning of an economy.

Consider an economy that can produce only two goods, X and Y, as depicted in Figure 3. The production possibilities frontier (ppf) of the economy shows the maximum physical output combinations of X and Y that can be produced, given the economy's productive resources and the state of technology. 3/ But exactly which output mix should be selected from the infinite number of possibilities along the ppf? The answer depends on what X and Y are "worth", i.e., what their relative price is. This price will be determined simultaneously in individual markets for X and Y (to be shown below), and can be assumed to be given by the slope of the line CD in Figure 3. The curves that are convex to the origin are social

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1/ Centrally planned economies can in principle achieve the same efficient solution as the free market system, although the difficulties involved in determining the appropriate price structure makes it unlikely that such a solution can be achieved in practice. If income distribution and tastes were the same in both systems, the efficient solution would be essentially the same--i.e., the implicit scarcity prices of all factors of production and outputs would be the same, and the basic role of such "prices" would be functionally similar although determined differently. This identical outcome results because there is only one way to maximize output, given resources and the state of technology. For more information, see Lange and Taylor (1938).

2/ A perfectly competitive market exists when no buyer or seller can influence the price, and where output is homogeneous, resources are mobile, and knowledge is perfect.

3/ In macroeconomic terms, the ppf corresponds loosely to the concept of potential output, although the latter usually constrains unemployment to equal the "natural rate" such that aggregate inflation does not accelerate. It can be shown that the ppf itself constitutes the locus of equilibrium points (the contract curve) in the factor markets for capital and labor (as represented in an Edgeworth box diagram).

indifference curves which show the various combinations of X and Y between which society is indifferent in choosing.

At point B, the marginal rate of transformation (MRT) in production is equal to the marginal rate of substitution (MRS) in consumption, and both are equal to the ratio of their market prices. This equilibrium occurs because forces associated with the desire to maximize profits are set in motion to shift production and consumption in order to meet this condition. For example, if the MRS is equivalent to the price ratio, but the MRT is not, as is indicated by production point C in Figure 4, then a reallocation of resources can raise social welfare by providing the products in a different ratio (Point B).

This type of analysis can also be used to illustrate how social welfare may be raised, even without a change in the structure of output (Figure 5). If international prices differ from domestic prices, social welfare can be increased by consuming goods in different relative quantities than they are produced domestically. Some structural measures, e.g., in the area of trade liberalization, may therefore increase social welfare for a given level of domestic output. If all distortions are eliminated between the domestic price structure and that prevailing in world markets, both output and social welfare may increase through the reallocation of resources in accordance with a country's comparative advantage. 1/

As mentioned earlier, relative output prices are determined in individual markets. Corresponding to Figure 3, therefore, are two individual markets, where the one for good X is illustrated in Figure 6. The supply (SS) and demand (DD) schedules can be derived from Figure 3. The supply schedule shows what the economy has to give up in terms of Y production forgone in order to obtain an additional unit of X. The demand schedule (DD) shows what individuals are prepared to give up in terms of consumption of Y in order to obtain an additional unit of X. The intersection of the two schedules gives the market clearing price and quantity. At other points forces are set in motion that move the market toward this equilibrium solution (as explained in the note to Figure 6). The market adjustment mechanism, where prices adjust to clear the market of quantities, reveals the powerful role of the price system as a signaling device.

2. Static market failures

When prices lose their signaling and allocative content, markets are said to fail. Market failures occur for a variety of reasons, many of which are related to intervention by public and private agents. Other

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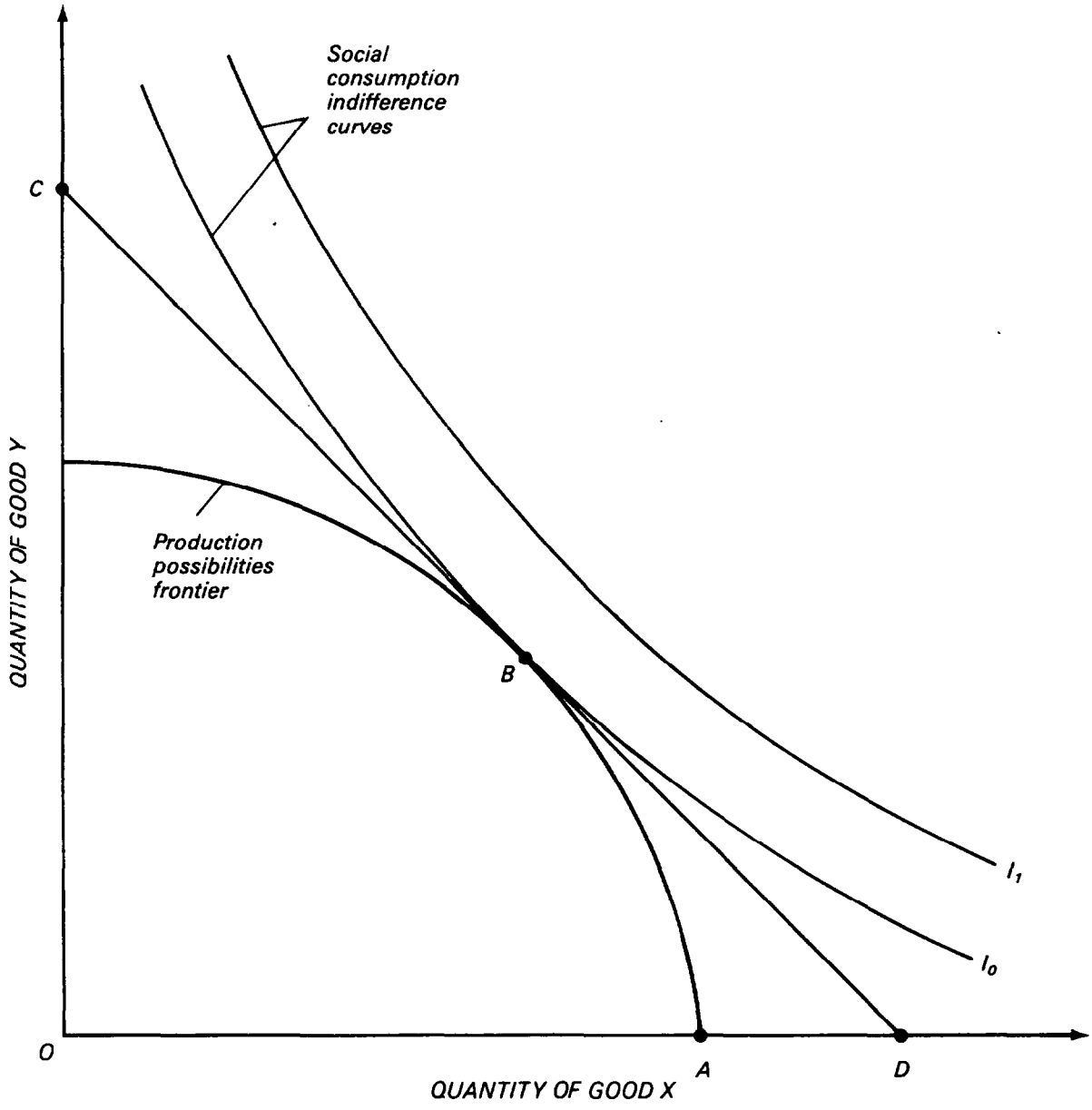
1/ If domestic prices change to reflect international prices, then the measured value of output (i.e., using the new price index) will rise with the change in the composition of output, even if the production possibilities frontier does not shift out.

FIGURE 3. Production, Consumption, and Relative Prices in a Closed Economy in Equilibrium



ANNEX

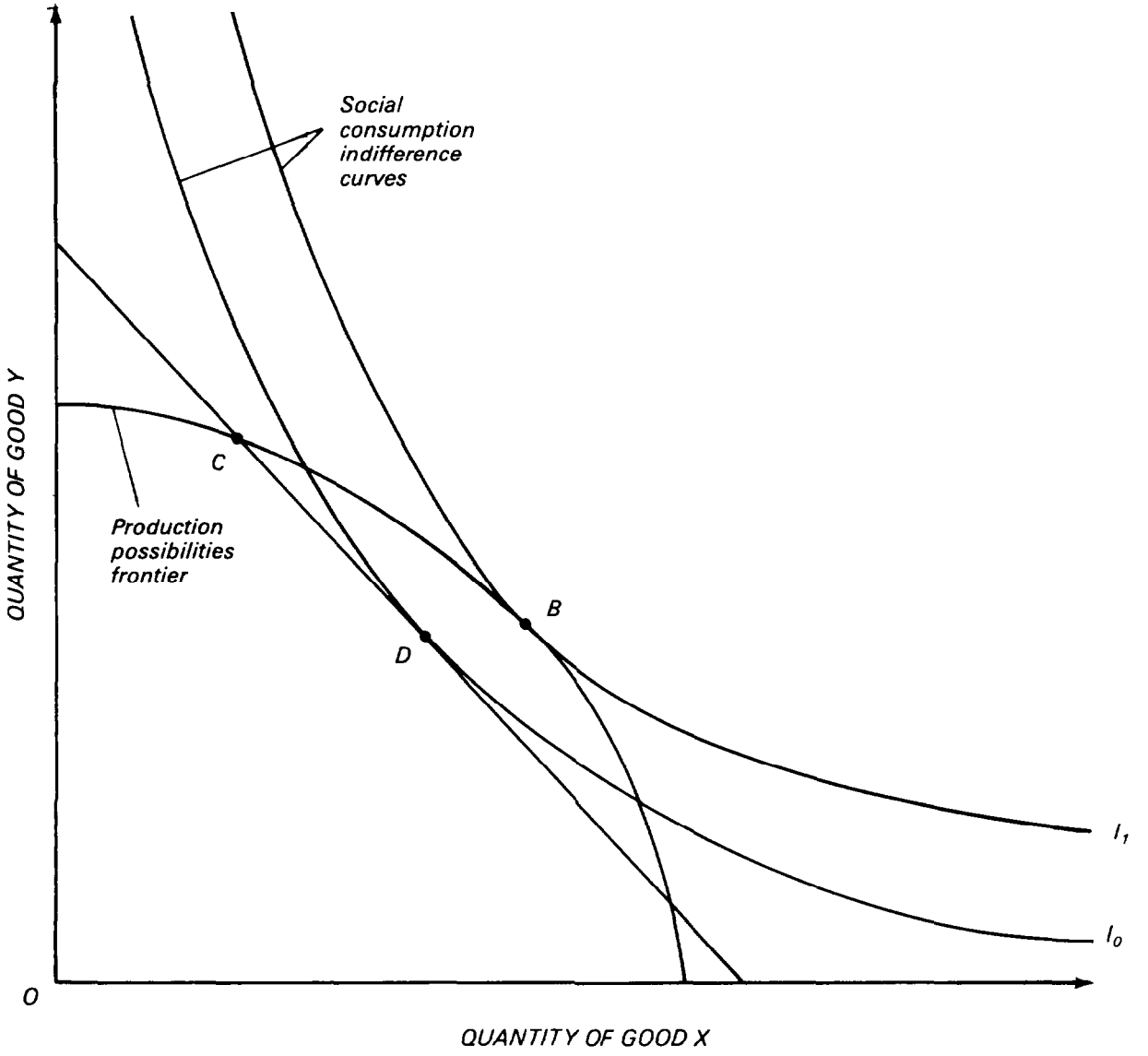
Note to Figure 3

The slope of the production possibilities frontier (ppf), which is concave to the origin, reflects the assumption of diminishing marginal productivity of factors of production. If the economy initially produced only output X (point A), then as resources are shifted out of production of X and into Y, the shape of the curve implies that the economy gets proportionately more of Y than it had been getting of X. This trade-off continuously worsens until the opposite is true when the economy approaches the position of producing only Y. This shape therefore reflects the idea that some resources have a comparative advantage in production of X rather than Y; thus, the most productive resources for a given output level will be allocated to its production first, the least productive last. When those least productive resources are reallocated from the production of X to the production of Y, the economy gets a lot of Y because these resources are relatively more productive in the output of Y than of X. The slope of the ppf is called the marginal rate of transformation (MRT) of X into Y, and it is continuously changing to reflect the shifting trade-off just described. The particular output combination that will be produced is determined by what X and Y are worth--i.e., their relative price. This relative price ($-P_X/P_y$) is given by the slope of line CD, whose equation is: $Z = P_X \cdot X + P_y \cdot Y$ where z represents the value of total output.

The curves in Figure 3 that are convex to the origin are social indifference curves. The one further from the origin represents higher welfare or "utility" (just as contour lines on a map indicate eleva-tion). An indifference curve shows the various combinations of X and Y which give equal satisfaction, or equivalently, the various combinations of consumption bundles between which society is indifferent. Through reasoning analogous to that on the production side the shape is convex. The slope of the schedule is defined as the marginal rate of substitution (MRS) of X for Y.

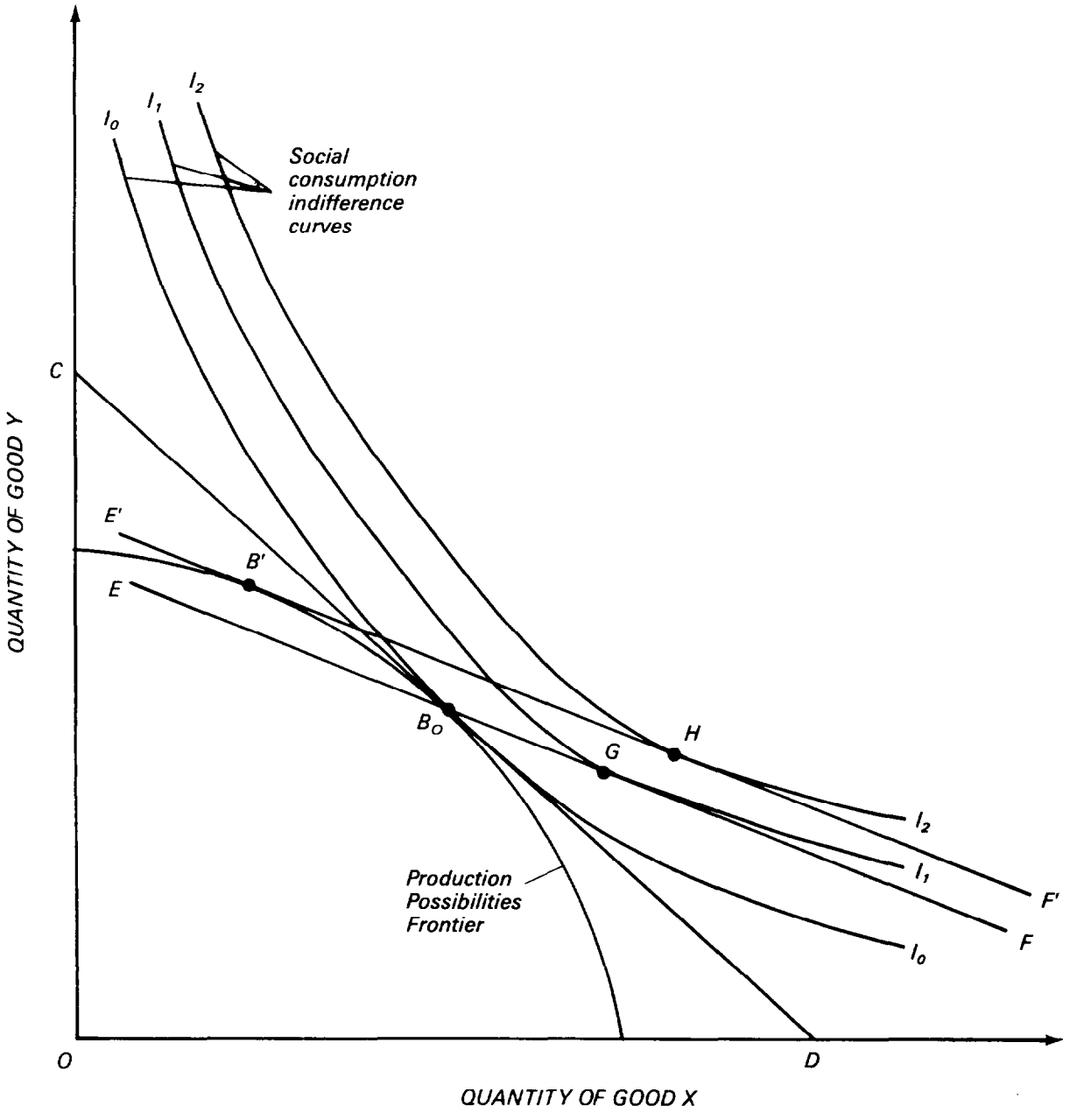
The market mechanism ensures that equilibrium in the economy occurs at point B, where the MRT in production is equal to the MRS in consumption, and where both are equal to the ratio of their market prices. This equilibrium occurs because forces will be set in motion to shift production and consumption bundles in order to meet this condition if it does not hold.

FIGURE 4. Market Price Signals and
Production Decisions in a Closed Economy



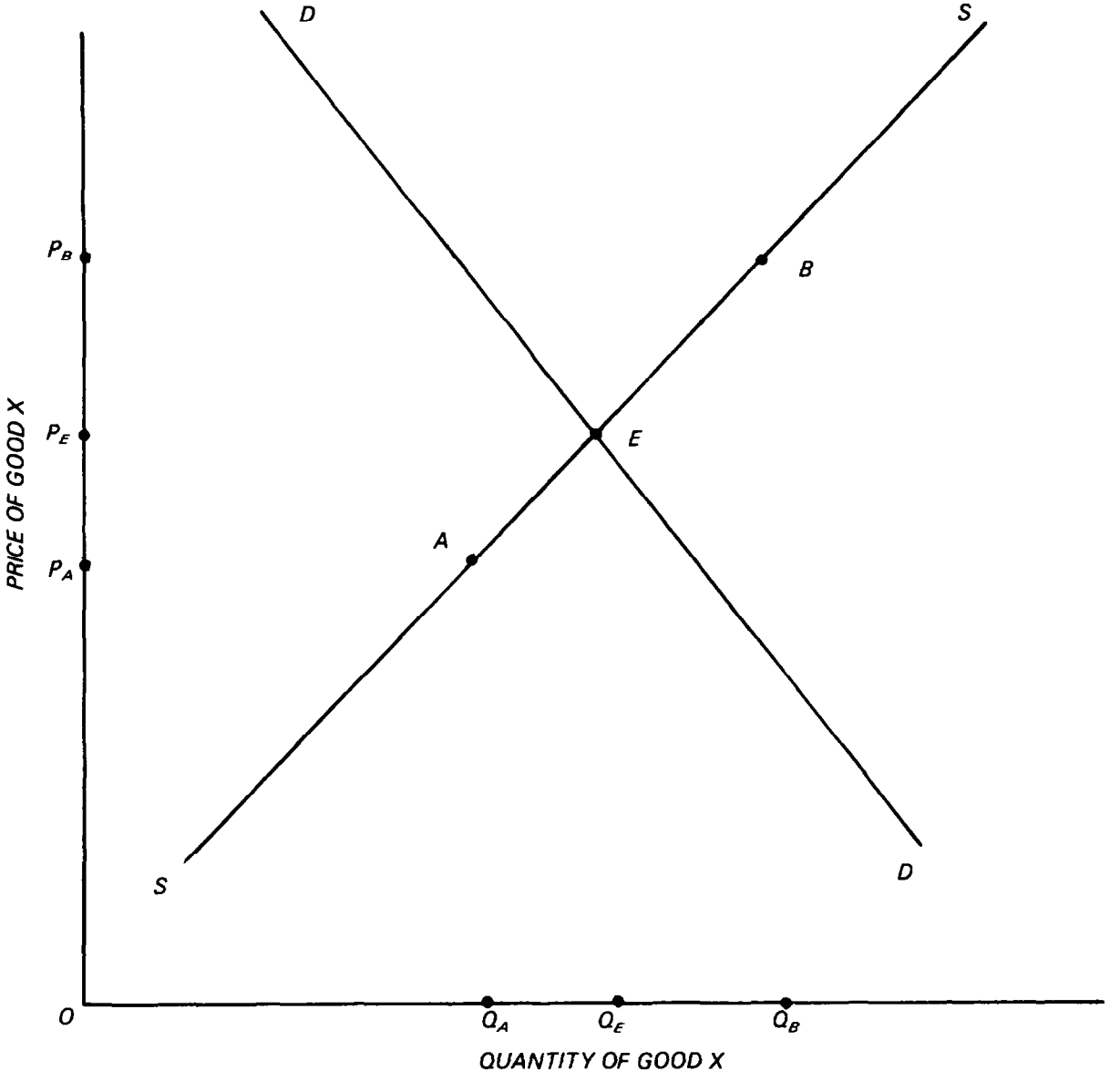
Note: If the MRS is equivalent to the price ratio, but the MRT is not, as is indicated by production point C in Figure 4, then a reallocation of resources in order to produce less Y and more X will raise social welfare by providing the products in the ratio in which they are preferred (Point B). This ratio puts a higher value on X than producers are currently receiving in terms of what they give up in Y to produce an additional unit of X. In other words, consumers are willing to pay more for an additional unit of X (marginal revenue to the producers) than producers have to give up (marginal cost to the producers). Thus, it pays the producers to reallocate production from Y into X. This same outcome will result from every decision taken at the margin until producers provide X and Y in the desired ratio. This will occur only at point B in the diagram.

FIGURE 5. Production, Consumption, and World Relative Prices in an Open Economy



Note: If the economy were opened to international trade, it is likely that social welfare could be raised, even without a change in the structure of output. This possibility is shown in Figure 5, where YB_o is equivalent to position B in Figure 4. If international prices (represented by EF) differ from domestic prices (represented by CD), then social welfare could be increased (from level I_o at B_o to level I, at G) simply by taking advantage of the opportunity to transform domestic output at different rates than are available domestically. One implication of this example is that some structural measures, e.g., in the area of trade liberalization, might increase social welfare, even without affecting domestic output and its growth rate. But if all distortions were eliminated between the domestic price structure and that prevailing in world markets, social welfare could increase even further (to level I_2 at consumption mix H) by the society's reallocating resources to produce relatively more of the output in which its economy has a comparative advantage (production mix B'). In the process such structural measures would affect the short-run rate of growth of output.

FIGURE 6. Equilibrium in the Market for an Individual Commodity



Note to Figure 6

The vertical axis of Figure 6 shows the relative price of X (i.e., in terms of the amount of Y foregone), the horizontal axis units of X. The supply (SS) and demand (DD) schedules can be derived from Figure 1. The supply schedule shows what the economy has to give up in terms of Y production forgone in order to obtain an additional unit of X, while the demand schedule shows what individuals are prepared to give up in terms of consumption of Y in order to obtain an additional unit of X. The intersection of the two schedules (point E) gives the market clearing price (P_E) and quantitiy (Q_E). At other points forces are set in motion that move the market toward this equilibrium solution. For example, a situation of excess demand (as at point A) would indicate that consumers place a higher value on additional units of X than currently prevails, consequently the price would be bid up, and resources would be reallocated from production of Y into production of X, and the supply of X would rise. Assume that this process continued until output had reached a level (Q_B) corresponding to point B, as position of excess supply. The demand schedule indicates that if consumers had to give up this much Y (i.e., P_B), then they would only take Q_A units of X. However, at this price (P_B), producers are supplying Q_B units. Therefore, inventories of X rise, and the price of X falls. As the price falls, producers cut production. This iterative process continues until the system arrives at point E. Only at the output and price levels corresponding to this point does the market clear so that no forces are set in motion to push producers and consumers out of equilibrium.

failures occur because of breakdowns in the underlying conditions which are necessary for the smooth functioning of markets. A couple of examples of each type should suffice to show how these failures may result in inefficient solutions to the three fundamental economic problems laid out at the beginning of the previous section. In each case the economy would end up at a point inside its production possibilities frontier, and thus with actual output below potential. The economy may also remain at potential, but in a situation in which a reallocation of resources would raise welfare. The simple diagrams to be introduced in this section also lay the theoretical framework for attempts to measure the costs of market distortions.

(a) Government intervention

Agricultural producer subsidies are commonplace and quantitatively important in most industrial countries. A frequent method used to achieve such income transfers is simply to restrict production, say through a ceiling on the amount of land that can be planted. This has the effect of shifting the supply schedule to the left, while the resulting excess demand is eliminated by a rise in the market clearing price (Figure 7). Because the demand for most foods is inelastic, acreage restrictions raise the income of farmers even though farm output is lowered. Such schemes are implicitly financed by consumers paying a higher price for food than they would without acreage restrictions. Another form of producer subsidy (not illustrated) is when the government supports farm output prices. This approach frequently leads to overproduction, to depressed world prices for commodities, and to additional storage and disposal costs for the government.

(b) Monopoly power

A similar outcome can occur without government intervention if, for example, some group of producers is able to exercise monopoly power in the marketplace. A classic example is the restricted supply of medical doctors that may result from the certification of medical schools by a country's national association of doctors. (A monopoly position could result for a variety of reasons, however, e.g., through protection provided by a tariff, regulations, or an exclusive patent.) Because the demand for medical services is inelastic, the restricted supply raises both the price of medical care and the income of doctors. This case is illustrated in Figure 8, which has been constructed on the assumption that all other industries and factor markets are competitive, and all consumers have similar income levels and tastes. 1/ The marginal cost (MC) schedule

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1/ These are very strict conditions. If consumers are not identical, it is important to take into account who is consuming and who receives the monopoly income. Many monopolies also arise because of declining costs, (such that the minimum efficient plant scale is a large portion of industry output), as is often the case in electricity generation. In such cases competition would not be viable, so the comparison should be with

shows the social cost (i.e., output foregone in other industries) at each level of output. The hypothetical competitive market solution would be at output level Q_C. A monopolist, in seeking to maximize his own profit, would set his marginal revenue equal to his marginal cost, resulting in a constriction of output to Q_M, which is sold at the higher price P_M. The deadweight economic loss that is associated with the monopolist's restriction of output is the cross-thatched area, which represents the sum of the differences between the marginal social utility and marginal social cost of each unit of output between Q_M and Q_C; alternatively, it is the cumulative loss in "consumer surplus" (upper triangle) and "producer surplus" (lower triangle). 1/

(c) Externalities

If prices are to be effective signalling devices they must carry the correct information to producers and consumers about economic costs and benefits. In cases where there is a divergence between private costs, as reflected in the price facing private agents, and social costs, as reflected in the true economic costs (sometimes referred to as "shadow prices"), the outcome of market decisions will be economically inefficient, and there may be a case for government intervention. The most extreme market failure of this type is the case of a so-called "public good." Such a good is characterized by indivisibility (or, non-excludability) of consumption, such that a private producer cannot prevent "free riders" from consuming the good without paying for it. Common examples are national defense and flood control, which are provided by governments as collective goods and financed from general tax receipts.

An alternative type of spillover effect, or externality, occurs whenever firms impose costs (or benefits) on others without paying (or receiving) the full price. A frequent example is a plant that emits significant amounts of pollution that impose costs on the rest of society, e.g., through additional water purification costs, increased medical expenses, etc. In this case too there may be a need for government to intervene in the market system to raise the polluter's costs (for example, through a tax on his output, sometimes called the "Pigouvian tax solution") until these reflect the total social costs incurred. (Such

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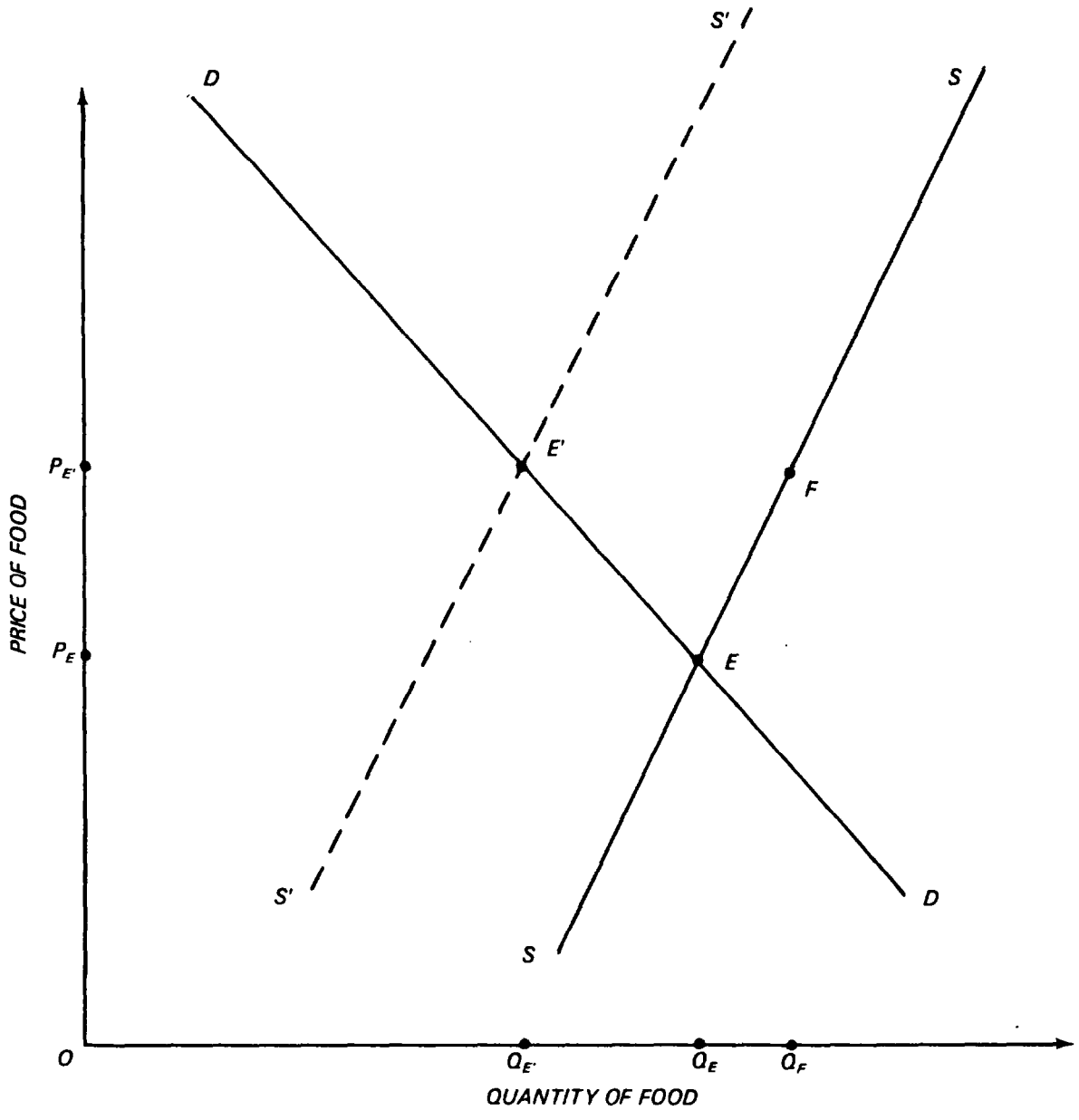
that of a regulated monopoly. The spirit of the comparison, however, would still hold.

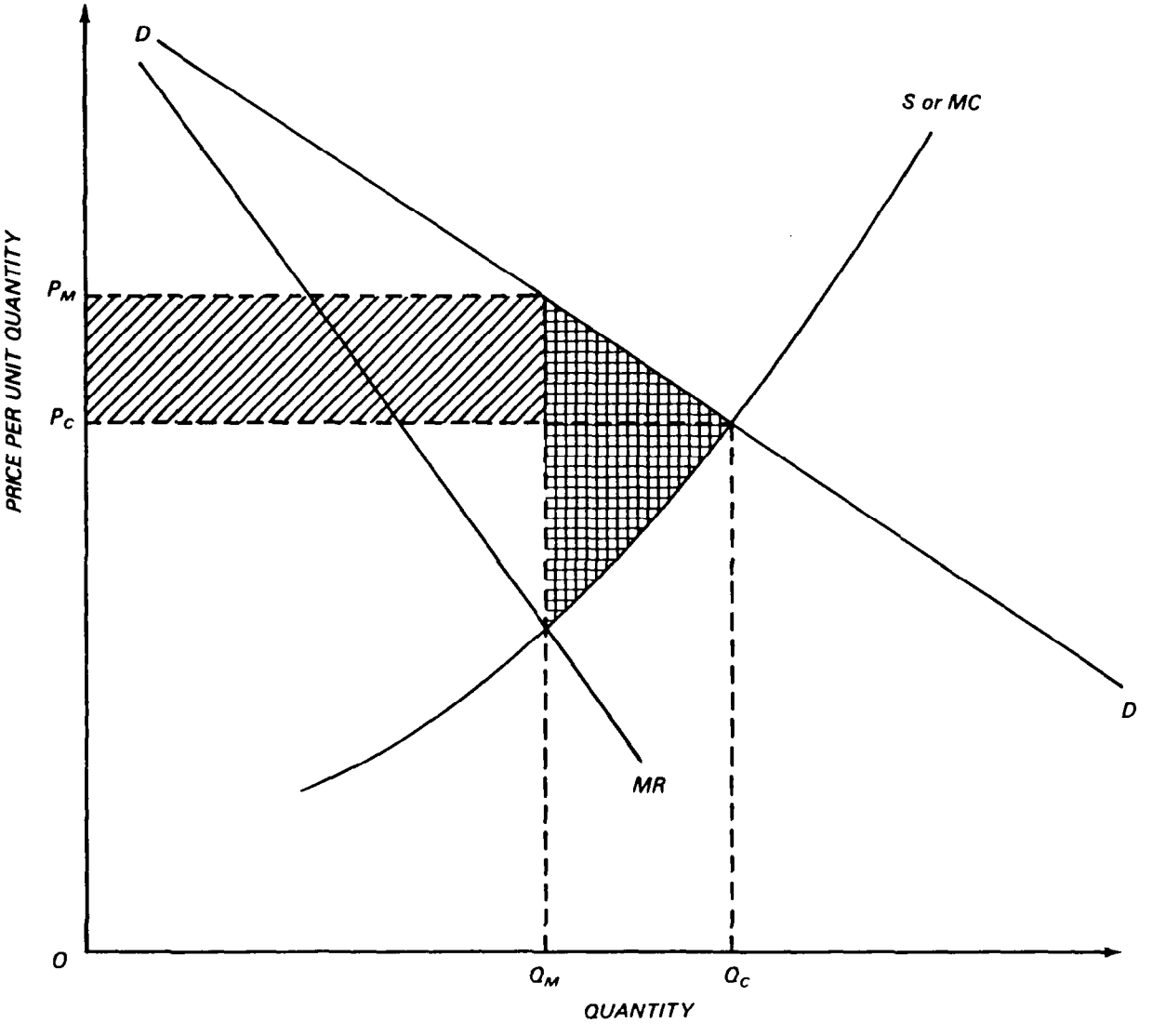
1/ Attempts to measure the empirical magnitude of such losses began with the pioneering work of A.C. Harberger (1954); consequently, these areas have sometimes been called "Harberger triangles." This diagram represents the theoretical basis for some of the empirical literature reviewed below (Section IV.) which attempts to measure within a partial equilibrium framework, the economic cost of structural distortions, and hence the potential benefit from their removal. In Harberger's initial work an estimate was made only of the upper triangle, i.e., the loss in consumer surplus, as he assumed a horizontal supply schedule.

FIGURE 7. An Individual Market Distortion



Note: Acreage restrictions have the effect of shifting the supply schedule (SS) to the left (S'S'), while the resulting excess demand is eliminated by a rise in the market clearing price from P_E to $P_{E'}$. At the same time the equilibrium output level declines from Q_E to $Q_{E'}$. If a government scheme simply raises the price to P_E by setting its own floor price in the market, without implementing acreage restrictions, then the government itself would have to purchase a large portion of total output ($Q_F - Q_{E'}$) and would have an additional expensive storage and disposal problem.

FIGURE 8. Monopoly Power and Harberger Triangles



Source: J. Hirshleifer (1976)

Note: Figure 8 shows how the competitive market solution is altered by the existence of monopoly power. *If there are no economies or diseconomies of scale, the marginal cost (MC) curve, or supply schedule (S), of the monopolist is essentially equivalent to a* competitive supply schedule (the cumulation of individual firms' MC schedules). The monopolist would set output at the level where marginal cost equals marginal revenue (Q_m), as his profit is maximized at this level, and this output would be sold at P_m, the price that clears the market of this level of output via the demand schedule (DD). The hypothetical competitive equilibrium would have been at an output level of Q_c, which would have been sold at price P_c. Thus, the monopolist both constricts output and raises the price. The shaded *area* $(P_m - P_c)Q_m$ *is the consumers' loss of consumer surplus on the output of* Q_m *due to the higher price paid on each unit. This loss is* not a deadweight loss to the economy, however, as it is received by the monopolist. Thus, it is a transfer payment from consumer to the monopolist. The deadweight loss to the economy consists of two parts, both of which derive from the output that has been lost—i.e., output that would have been produced and bought under competitive conditions: (a) the loss in consumer surplus (upper cross-thatched triangle), and (b) the loss in producer surplus (lower cross-thatched triangle).

a method is frequently called "internalizing the externality", i.e., bringing it into the market system.) The consequent rise in the marginal cost curve will induce the polluter to reduce the level of production or lower the amount of pollution though changes in production technology.

Another way in which the externality might be internalized in cases like this, without resorting to government intervention, has been developed by R. H. Coase (1960). He observed that the fundamental source of the externality phenomenon is an inappropriate assignment of property rights. A downstream user should ideally be assigned a property right to receive water of some specific quality. Upstream producers would then be liable for the damages suffered by downstream users. Such a clear assignment of property rights in water quality need not freeze the pattern of uses in accordance with the legally defined rights, so long as property rights are exchangeable. For example, if the downstream users were entitled to absolutely pure water, the upstream producer could nevertheless buy from him the right to pollute the river to some specified degree, in a private market of property rights. Therefore, so long as the legal rights were well-defined and marketable, the market system would tend to lead the parties to an efficient outcome. The reason this kind of theoretical solution is so rarely seen in practice is because the kind of negotiations required are often impractical. 1/

(d) Income distribution

A rationale that is often used to justify government intervention is a wish to modify the distribution of income that would result from unfettered functioning of markets. Such proposals usually confuse equity with efficiency issues, however. Distributional questions can be addressed indirectly through the fiscal system with taxes and transfers that do not interfere with the efficiency of resource allocation and production. When equity issues are addressed directly through market intervention, an inefficient solution usually results, as was shown in the above example of government intervention to raise farmers' incomes by imposing acreage restrictions.

In addition, policies that seek to raise the income of particular groups through market intervention often fail to do so for substantial numbers of the target groups. A good example of this problem is the introduction of a minimum wage, which is analyzed in Figure 9. 2/ As the explanatory note indicates, when a minimum wage is introduced that is higher than the unregulated competitive equilibrium wage, two results occur unambiguously: first, previously employed workers are thrown out of work, and second, unemployment increases because there are more people willing to work at the higher wage than there are jobs offered at that

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1/ Hirshleifer (1976).

2/ Another common example is represented by the farm subsidy programs in many industrial countries that disproportionately raise the incomes of relatively rich farmers, while leaving the rural poor relatively unaffected.

wage. Although governments can force private employers to pay a higher wage to those working, they cannot force employers to hire the same number of workers as before. Only those fortunate enough to get the (fewer) higher paying jobs will benefit from a higher minimum wage.

Other departures from the strict assumptions underlying perfect competition--including deficiencies or asymmetries of information on the part of market participants or immobility of resources--will also tend to cause a breakdown in the market system and lead to inefficient solutions. In such cases there may be a legitimate case for government intervention to remedy market deficiencies. Such a policy may involve a direct intervention in the market (e.g., providing subsidies to migrating workers) or an indirect intervention (e.g., providing an information service free to everyone).

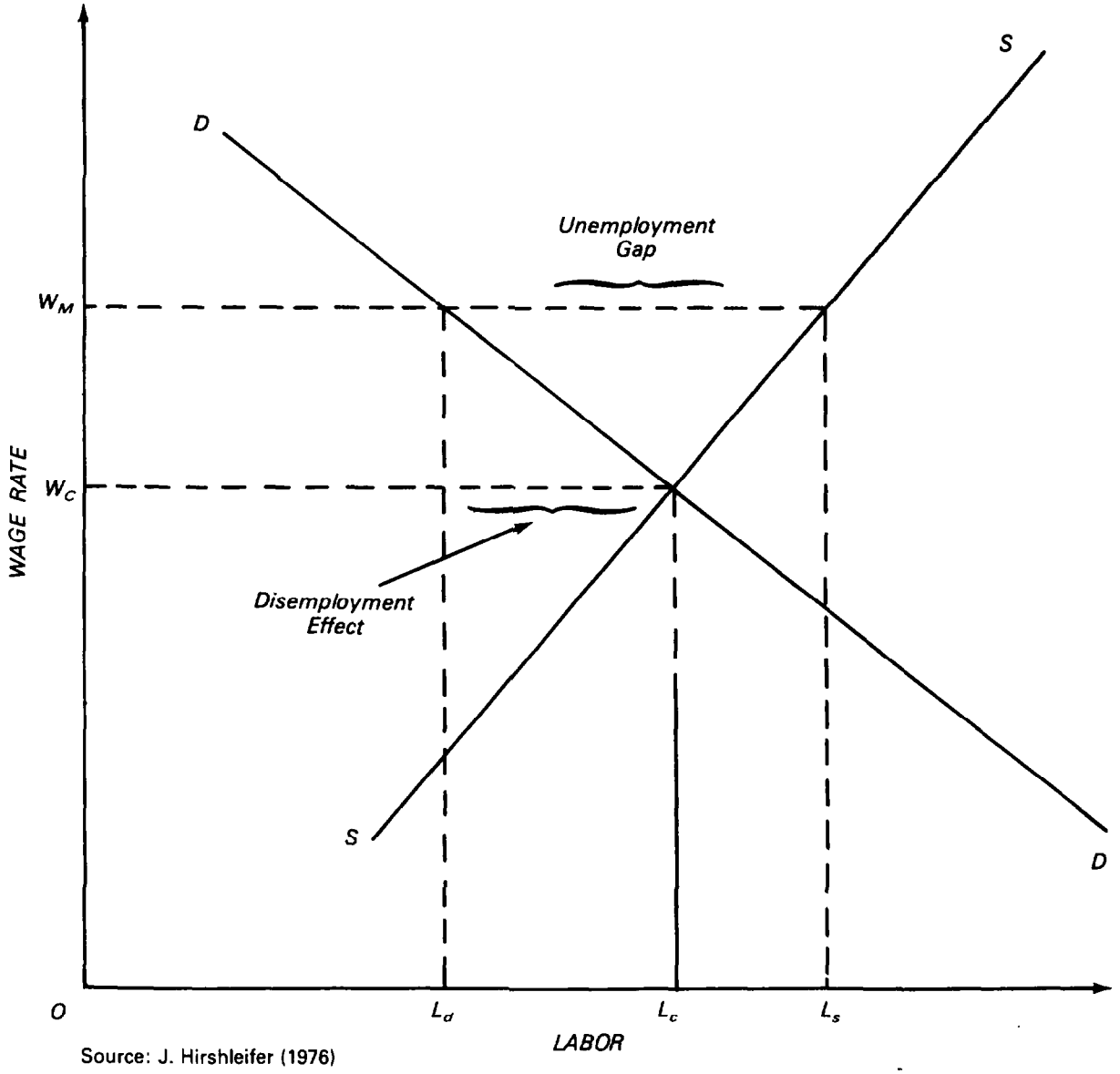
3. Intertemporal market distortions

Introducing time is a natural extension of the foregoing analysis. In Figure 10 the slope of the production possibility frontier shows the changing rate at which consumption in the current year can be transformed into consumption next year. If society is initially at point C, social welfare can be increased by saving some of this year's consumption, investing it, and consuming both it and the proceeds of its investment next year. Introduction of a capital market external to this economy would offer it another way to transform consumption between periods through the opportunity to borrow or lend, and this might well induce a shift in the intertemporal pattern of consumption. A capital market may be illustrated by a straight line whose slope represents the relative price of consumption now compared with next year--i.e., the interest rate (or social rate of discount) (Figure 11).

A capital market distortion (such as interest rate controls) is illustrated in Figure 12. The competitive equilibrium is depicted by capital market line 1, where capital market line 2 shows the new "equilibrium" position, after the introduction of interest rate ceilings on savings deposits. The effect of reducing interest rates tends to lower social welfare and saving, while investment financed by borrowing (the current account deficit) increases markedly. If this were a sectoral program, (such as tax deductibility of mortgage interest when other interest costs are not deductible), excess investment would occur in this sector (housing). Although aggregate investment might increase, the marginal productivity of capital would be depressed below its optimal level, and aggregate economic growth, as reflected in the level of potential output, would suffer.

An implication of the foregoing discussion is that structural policies that remove implicit capital subsidies could increase financial savings and the marginal efficiency of capital, while reducing borrowing. Another implication is that other types of structural policies, depending on their particular microeconomic character, might well leave the trade-off between current and future consumption essentially unchanged, with the

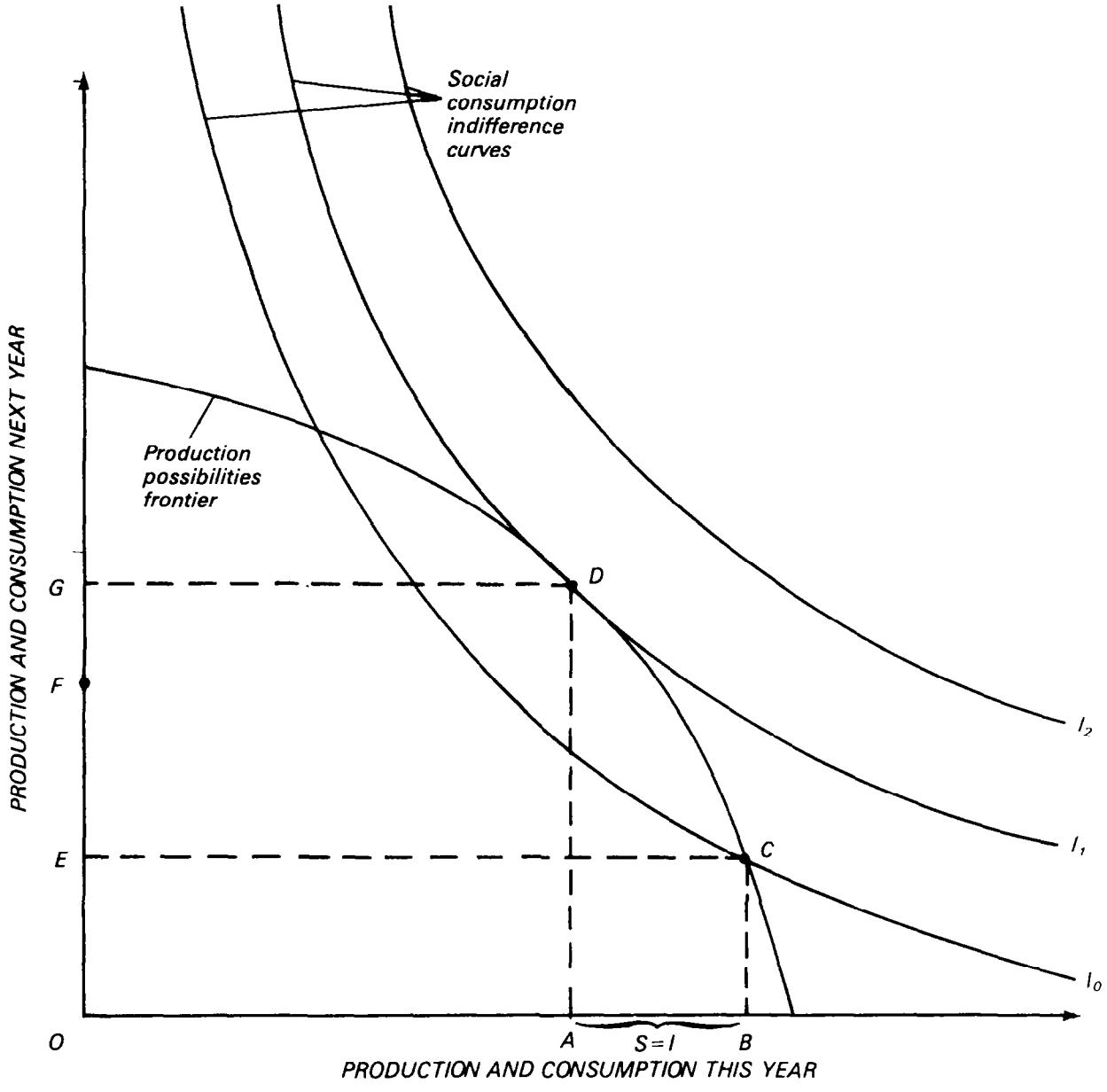
FIGURE 9. Effects of Introducing a Minimum Wage



Source: J. Hirshleifer (1976)

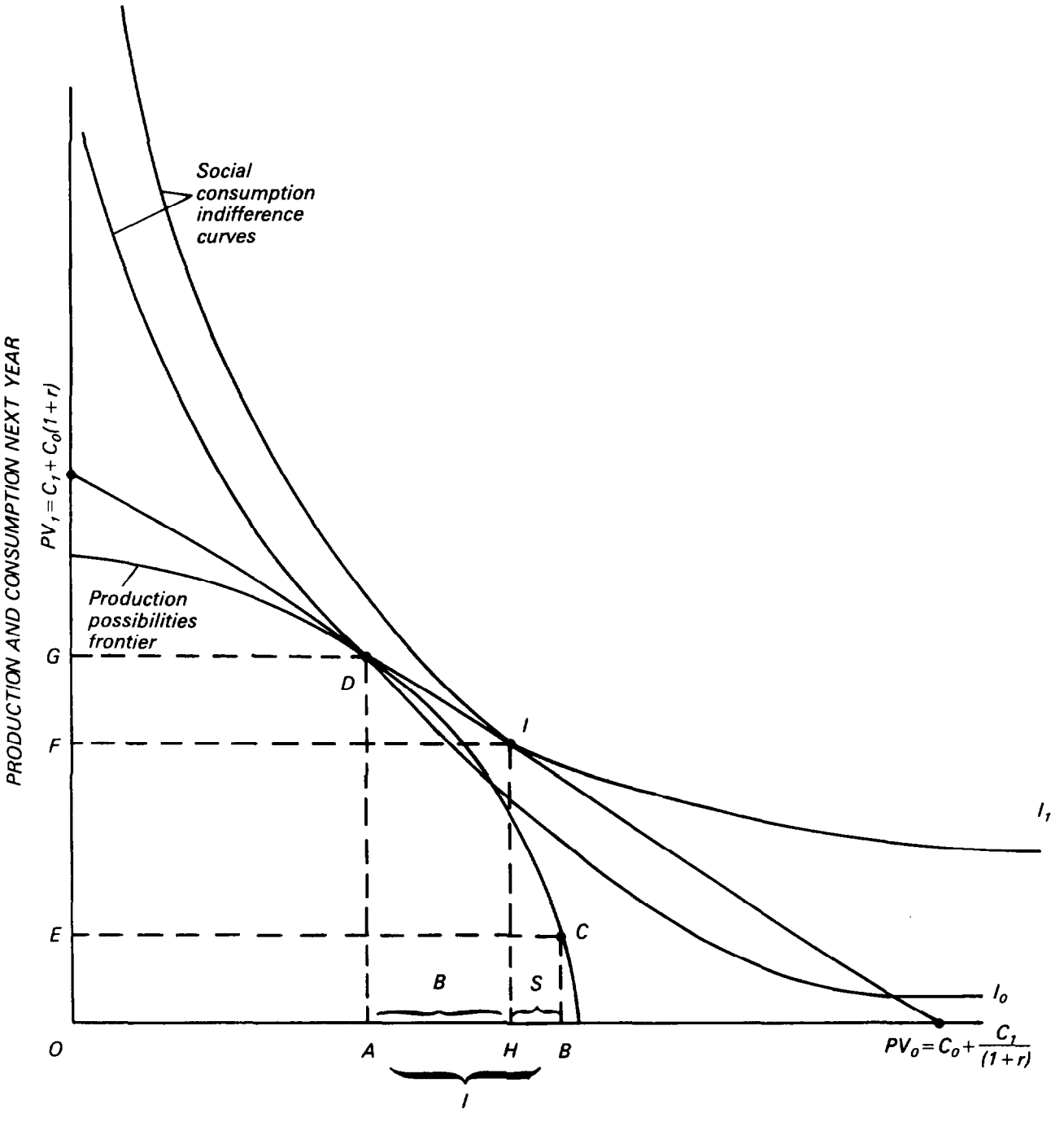
Note: The competitive in the labor market is characterized by employment of L_c of labor, working for a wage rate of w_c. When a minimum wage of w_m (higher than the pre-existing wage) is imposed, demand for labor is reduced to L_d, while the supply of labor increases to L_s. Thus, an unemployment gap of L_s–L_d opens up. One portion of the unemployed (i.e., the "disemployed") consists of those who previously had been working, but who are not offered jobs at the (higher) minimum wage rate (L_c–L_d), and another portion consists of those who are willing to work at the new wage, but who are also not offered jobs.

FIGURE 10. Savings and Investment
in a Closed Economy



Note: Figure 10 shows a dynamic version of Figure 3, with production and consumption this year on the horizontal axis and next year on the vertical axis. The slope of the ppf shows the changing rate at which consumption in the first year can be transformed into consumption next year. Assume that society is initially at point C, with OB of production and consumption this year and OE of production and consumption next year. Social welfare (utility) can be increased by saving some of this year's consumption, investing it, and consuming both it and the proceeds of its investment next year. Thus, saving means simply refraining from consumption, while investing means the formation of new capital assets. More specifically, if consumption in the first year is reduced from OB to OA, then consumption next year can be increased from OE to OG, of which OE is equivalent to next year's production (as originally planned), EF is equivalent to the amount saved (i.e., EF = AB) and FG is equivalent to the return on the investment.

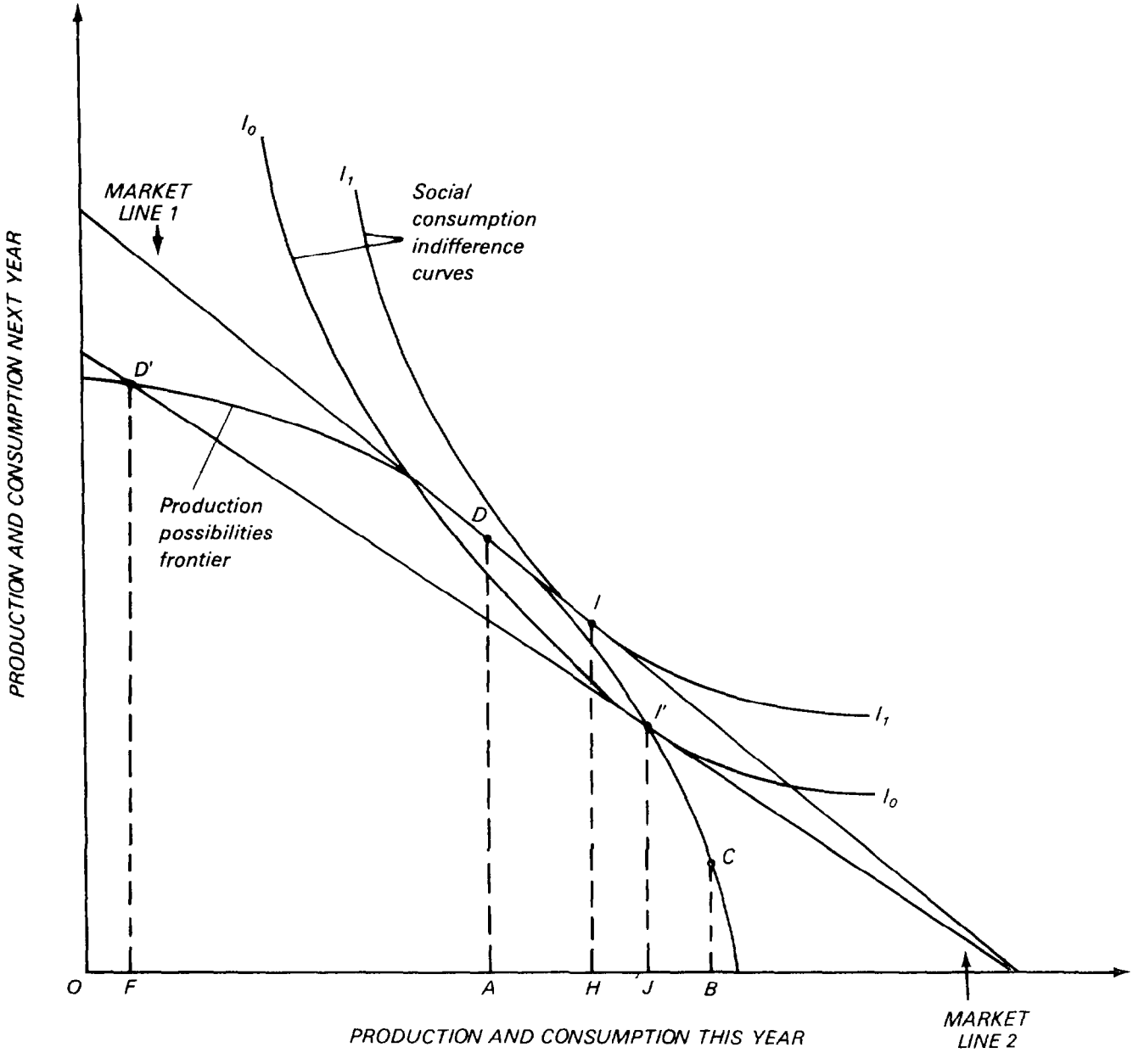
FIGURE 11. Savings, Investment and
the Market Rate of Interest in a Closed Economy



Note to Figure 11

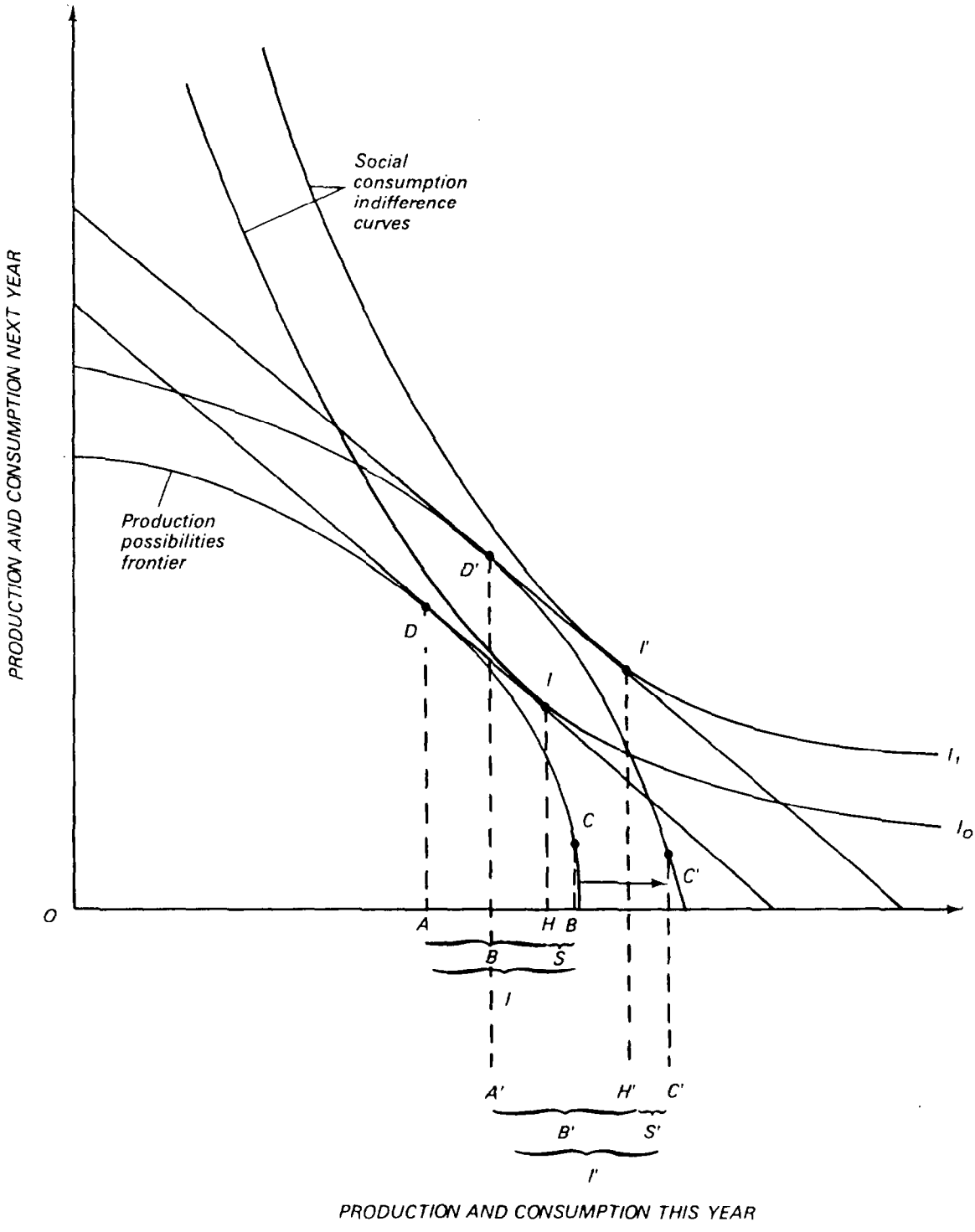
In Figure 11 the capital market is represented by a straight line whose slope represents the relative price of consumption now compared with next year--i.e., the interest rate (or social rate of discount). The intersection of the market line with the horizontal axis is defined as the present discounted value of the consumption stream, expressed in units of consumption now; or, $PV_0 = C_0 + C_1/(1+r)$, where r is the rate of interest. Alternatively, the intersection on the vertical axis is: $PV_1 = C_1 + C_0(1+r)$. Consequently, the slope of the market line is $-(1+r)$. Social welfare is maximized (and market equilibrium is achieved) in this context in two steps. First, the society maximizes the present discounted value of its consumption stream; this is done by shifting the production/consumption pattern to the point at which the market line is tangent to the ppf. Second, market participants can then borrow or lend at the market rate of interest in order to achieve the highest indifference curve. In Figure 11, therefore, social welfare is maximized by initially reducing consumption this year by OB less OA and adding this amount to the capital stock. However, all of this is not saved, as OH less OA is borrowed in the capital market in order to reach the highest social indifference curve at I. When the ppf diagram represents an entire economy, this market borrowing (OH-OA) can be thought of as the external current account deficit.

FIGURE 12. Effects of a Capital Market Distortion



Note: As in Figure 11, the competitive equilibrium in Figure 12 is depicted by capital market line 1, with position D indicating the production mix and position I the consumption mix; the segment AB represents investment, which is financed by HB of saving and AH of investment. Market line 2 shows the new "equilibrium" position after a government program to subsidize interest rates is introduced. (A reduction in the interest rate is shown graphically as a rotation of the capital market line downwards, pivoting around the horizontal intercept, which holds the present wealth position constant.) The program could be based, for example, on interest rate ceilings on savings deposits. This "captive" source of savings then becomes available for borrowing at similarly reduced rates. Compared with the free market solution, the effect of reducing interest rates lowers social welfare (from indifference curve I to I') and saving (from OB–OH to OB–OJ), while investment financed by borrowing, which is now subsidized, increases markedly (from OH–OA to OJ–OF).

FIGURE 13. Effects of Structural Reform on
Savings, Investment and the Current Account Balance



Note: This figure depicts the possible minimal effects on savings, investment, and the current account that some structural reforms might have. Such reforms could include removal of distortions in factor or goods markets or of some hindrances to technological chanes (e.g., absence of patent or other intellectual property rights legislation). Such reforms could involve a symmetrical shift outward in the ppf, such that saving (S and S'), investment (I and I'), and borrowing (B and B'), are relatively unchanged before and after the structural reform.

result that the optimal pattern of borrowing would be unaffected. This means that a great many structural policies that expand potential output may leave the external current account largely unaffected. Examples of such policies could include removal of distortions in factor or goods markets or promotion of technological change. Figure 13 depicts the effects of such policies as a symmetric outward shift in the ppf, which leaves savings, investment, and foreign borrowing about the same as before. Of course, to the extent that such structural policies would be accompanied by changes in fiscal or monetary policies, or would result in changes in the real exchange rate, a country's savings-investment balance, or current account, might be affected.

References

Adams, Charles, Paul Fenton and Flemming Larsen, "Differences in Employment Behavior among Industrial Countries" in Staff Studies for the World Economic Outlook, World Economic and Financial Surveys (Washington: International Monetary Fund, 1986).

_____, "Potential Output in Major Industrial Countries" in Staff Studies for the World Economic Outlook, World Economic and Financial Surveys (Washington: International Monetary Fund, 1987).

Aizenman, Joshua, and Jacob Frenkel, "Optimal Wage Indexation, Foreign Exchange Intervention, and Monetary Policy" in American Economic Review, Vol. 75, June 1985.

Argy, Victor, and Joanne Salop, "Price and Output Effects of Monetary and Fiscal Policy Under Flexible Exchange Rates," in Staff Papers, International Monetary Fund (Washington), Vol. 26 (June 1979).

Bailey, Elizabeth E., "Price and Productivity Change Following Deregulation: The U.S. Experience," Economic Journal (March 1986), pp. 1-17.

Balassa, Bela, and Marcus Noland, Japan in the World Economy (Washington: Institute for International Economics, 1988).

Ballard, C.L., Dan Fullerton, John B. Shoven and John Whalley, A General Equilibrium Model for Tax Policy Evaluation (Chicago: Chicago University Press, 1985).

Barrett, S.D., Sky High: Airline Prices and European Deregulation (Washington, D.C.: Adam Smith Institute, 1985).

Bean, Charles, and Richard Layard, Why Does Unemployment Persist? (Oxford: Centre for Labour Economics, June 1988).

Bean, C.R., P.R.G. Layard, and S.J. Nickell, "The Rise in Unemployment: A Multi-Country Study," Economica Supplement (1986), pp. S1-S22.

Blanchard, Olivier, and Lawrence Summers, "Hysteresis and the European Unemployment Problem" in NBER Macroeconomics Annual 1986 (Cambridge: MIT Press, 1986).

Boughton, James, "Policy Assignment Strategies With Somewhat Flexible Exchange Rates" in Exchange Rate Regimes and Macroeconomic Policy, ed. by B. Eichengreen, M. Miller, and Richard Portes (1988).

_____, R. Haas and P. Masson, "The Role of Exchange Rate Movements in Transmitting International Disturbances" in Hodgman D. and G. Wood, eds., Macroeconomic Policy and Economic Interdependence (London: Macmillan, 1989).

Brown, Drusilla K., and Robert M. Stern, "A Modeling Perspective," in Perspectives on a U.S.-Canada Free Trade Agreement (1987), ed. by Robert M. Stern, Phillip H. Trezise, and John Whalley, The Brookings Institution (Washington).

Bruno, Michael, and Jeffrey Sachs, The Economics of Worldwide Stagflation (Oxford: Basil Blackwell, 1985).

Burda, Michael C., and Jeffrey D. Sachs, "Institutional Aspects of High Unemployment in the Federal Republic of Germany," NBER Working Paper 2241 (Cambridge, Massachusetts: National Bureau of Economic Research, May 1987).

Burniaux, J., F. Delome, I. Lienert, J.P. Martin and P. Hoeller, "Quantifying the Economy-Wide Effects of Agricultural Policies: A General Equilibrium Approach," (Paris: Organization for Economic Cooperation and Development, Department of Economics and Statistics Working Paper No. 55, July 1988).

Calmfors, L., and J. Driffil, "Bargaining Structure, Corporatism, and Macroeconomic Performance," in Economic Policy, No. 6, April 1988.

Caves, D.W., and L.R. Christensen, "The Relative Efficiency of Public and Private Firms in a Competitive Environment: the Case of Canadian Railroads," Journal of Political Economy (1980).

Chan-Lee, James H., David T. Coe and Menahem Prywes, "Micro-Economic Changes and Macro-Economic Wage Disinflation in the 1980s," Organization for Economic Cooperation and Development, Economic Studies (Spring 1987).

Coase, R. H., "The Problem of Social Cost," Journal of Law and Economics, October 1960.

Coe, D., and F. Gagliardi, "Nominal Wage Determination in Ten OECD Economies," OECD, Economics and Statistics Department, Working Paper No. 19, (Paris: Organization for Economic Cooperation and Development, March 1985).

Cole, M., and M. Obsfeld, "Commodity Trade and International Risk Sharing: How Much Do Financial Markets Matter?", (Philadelphia: University of Pennsylvania mimeo, July 1988).

Commission of the European Communities, "The Economics of 1992," European Economy (March 1988), 35.

Deardorff, Alan V., and Robert M. Stern, "The Structure and Sample Results of the Michigan Computational Model of World Production and Trade," in General Equilibrium Trade Policy Modeling, ed. by T.N. Srinivansan and John Whalley (Cambridge, Massachusetts: M.I.T. Press, 1986).

Delong, J.B., and Lawrence Summers, "Is Increased Price Flexibility Stabilizing?" in American Economic Review, Vol. 76, December 1986.

Economic Council, (Japan), Policy Recommendations of the Economic Council--Action for Restructuring (Tokyo: The Economic Council, May 14, 1987).

Evans, Owen, "The Impact of Agricultural Support Policies in the United States and Other Major Countries: A Survey," (Washington: International Monetary Fund Working Paper, WP/88/1, January 1988).

_____, and Lloyd Kenward, "Macroeconomic Effects of Tax Reform in the United States," Staff Papers, International Monetary Fund (Washington), Vol. 35 (March 1988), pp. 141-65.

Freeman, Richard B., "Labor Markets, Institutions, Constraints, and Performance," NBER Working Paper 2560 (Cambridge, Massachusetts: National Bureau of Economic Research, April 1988).

Frenkel, Jacob A., and Assaf Razin, "The Mundell-Fleming Model A Quarter Century Later: A Unified Exposition," in IMF Staff Papers, Vol. 34, No. 4, December 1987.

Fullerton, Don, and James B. Mackie, "Economic Efficiency in Recent Tax Reform History: Policy Reversals or Consistent Improvements?" (Cambridge, MA: National Bureau of Economic Research Working Paper No. 2593, May 1988).

Genberg, Hans, and Alexander Swoboda, "The Current Account and the Policy Mix Under Flexible Exchange Rates," (Washington: International Monetary Fund Working Paper, WP/87/70, October 15, 1987).

Gordon, Robert J., "Back to the Future: European Unemployment Today Viewed from America in 1939," revised version of paper presented at Brookings Panel on Economic Activity, (Washington: unpublished mimeo, April 1988).

Gray, Jo Anna, "Wage Indexation: A Macroeconomic Approach" in Journal of Monetary Economics, April 1976.

Harberger, Arnold C. "Monopoly and Resource Allocation," American Economic Review, May 1954.

Hernández-Catá, E. "Issues in the Design of Growth Exercises," (Washington: IMF Working Paper No. 88-65, July 20, 1988).

Hirshleiffer, Jack, Price Theory and Applications, (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1976).

International Monetary Fund, "World Economic Outlook--Prospects and Policy Issues," (Washington: SM/88/167, August 1988).

_____, "Indicators of Structural Policies and Performance," (Washington: World Economic Outlook, Annex III, SM/88/181, August 14, 1988).

_____, "The Industrial Policies of Industrial Countries," (Washington: Internal mimeo, SM/88/167, August, 1988).

_____, "Trade Policy Issues and Developments," (Washington: Internal Mimeo, SM/88/166, with Supplements 1, 2, and 3; August 1988).

_____, "Financial Product Deregulation: Effects of Reforming the Glass-Steagall Act" (Washington: Internal mimeo, SM/88/162, Supplement 2, Annex 15, August 4, 1988).

Joskow, Paul L., and Nancy L. Rose, "The Effects of Economic Deregulation," M.I.T. Department of Economics Working Paper No. 447 (April 1987).

Kelly, Margaret, Naheed Kirmani, Miranda Xafa, Clemens Boonekamp, and Peter Winglee, Issues and Developments in International Trade Policy (Washington: IMF Occasional Paper No. 63, December 1988).

Kenward, Lloyd, "Perspectives on the International Competitive Position of the U.S. Steel Industry," (Washington: International Monetary Fund Working Paper No. 87/8, 1987).

Kirkpatrick, G., "Liberalizing the Trade Regime in Germany--An Applied General Equilibrium Analysis," in Trade and Industrial Policy in West Germany, ed. by F.D. Weiss, et al., (1988).

Lange, Oskar, and Fred M. Taylor, On the Economic Theory of Socialism, (New York: McGraw-Hill & the University of Minnesota, 1938. McGraw-Hill edition edited by Benjamin E. Lippincott).

Lindbeck, Assar, and D. Snower, "Cooperation, Harassment, and Involuntary Unemployment: An Insider-Outsider Hypothesis" in American Economic Review, Vol. 78, March 1988.

Lucas, R. E., Jr., "On the Mechanics of Economic Development," (unpublished paper prepared for the Marshall lecture, May, 1985).

Masson, Paul, Steven Symansky, Richard Haas, and Michael Dooley, "MULTIMOD: A Multi-Region Econometric Model," in Staff Studies for the World Economic Outlook, World Economic and Financial Surveys, (Washington: International Monetary Fund, 1988).

Mayekawa, H., et al., The Report of the Advisory Group on Economic Structural Adjustment for International Harmony, (Tokyo: report submitted to the Prime Minister, April 7, 1986).

Mayer, Thomas, "Economic Structure, the Exchange Rate and Adjustment in the Federal Republic of Germany: A General Equilibrium Approach" (Washington: IMF Working Paper No. 88/79, September 1, 1988).

Miller, Marcus H., and John E. Spencer, "The Static Economic Effects of the U.K. Joining the EEC: A General Equilibrium Approach," Review of Economic Studies (February 1977), 44, pp. 71-93.

Nelson, R.A., and M.E. Wohar, "Regulation, Scale Economies, and Productivity in Steam-Electric Generation," International Economic Review (1983), 24, pp.57-78.

Nguyen, Trien, and Randall M. Wigle, "Trade Liberalization with Imperfect Competition: The Large and the Small of It" (unpublished mimeo, March 1988).

Organization for Economic Cooperation and Development, Structural Adjustment and Economic Performance (Paris: OECD, 1987), Chapter 3.

_____, "Empirical Research on Trade Liberalization with Imperfect Competition: A Survey," (Paris: OECD Secretariat CPE/WP1 (88) 7, Annex 1, September 1988.

Pechman, Joseph, World Tax Reform: A Progress Report (Washington: The Brookings Institution, 1988).

Petri, Peter A., "Comments," Perspectives on a U.S.-Canadian Free Trade Agreement (1987) ed. by Stern, Trezise, and Whalley, The Brookings Institution (Washington), pp. 187-90.

Romer, P.M., "Growth Based on Increasing Returns Due to Specialization," in American Economic Review, May 1987.

Rosenblatt, J., Thomas Mayer, Kasper Bartholdy, Dimitrios Demekas, Sanjiv Gupta, and Leslie Lipschitz, The Common Agricultural Policy of the European Community: Principles and Consequences, Occasional Paper No. 62 (Washington: International Monetary Fund, November 1988).

Sachs, J., and P. Boone, "Japanese Structural Adjustment and the Balance of Payments" (Cambridge: NBER Working Paper No. 2614, June 1988).

Schmitz, Lelde, "The Sugar Policies of the European Comminity and the United States and Their Impact on the World Sugar Market," (Washington: International Monetary Fund, DM/85/26, April, 1985).

Shoven, J.B., and J. Whalley, "Applied General Equilibrium Models," Journal of Economic Literature (September 1984).

Soltwedel, R., "Employment Problems in West Germany--The Role of Institutions, Labor Law and Government Intervention," in Stabilization Policies and Labor Markets, Carnegie-Rochester Conference Series on Public Policy 28, ed. by Karl Brunner and Alan H. Metzler (Amsterdam: North Holland, 1988), pp. 153-220.

Tait, Alan A., Value-Added Tax: International Practice and Problems (Washington: International Monetary Fund, 1988).

Takenaka, Heizo, and Naoko Ishii, "Simulation of Policy Coordination Under Structural Adjustment: An Estimate of the Economic Impact of the Mayekawa Report," (Tokyo unpublished mimeo, 1987).

Taylor, John, "Aggregate Dynamics and Staggered Contracts" in Journal of Political Economy, Vol. 88, February 1980.

Whalley, John., "An Evaluation of the Recent Tokyo Round Trade Agreement Using General Equilibrium Computational Methods," Journal of Policy Modeling (November 1982), 4, pp. 341-61.

_____, "Impacts of a 50 Percent Tariff Reduction in an Eight-Region Global Trade Model," in General Equilibrium Trade Policy Modeling, ed. by T.N. Srinivansan and John Whalley (Cambridge, Massachusetts: M.I.T. Press, 1986).

_____, "What Have we Learned from General Equilibrium Tax Policy Models?" Department of Economics, University of Ontario Working Paper No. 8625C (September 1986).

Yarrow, George, "Privatization in Theory and Practice," Economic Policy (April 1986), pp. 323-78.

Yeats, A.J., Trade Barriers Facing Developing Countries: Commerial Policy Measures and Shipping (London: MacMillan, 1979).