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# 10 Tax Policy and International Competitiveness

Lawrence H. Summers

International considerations are coming to play an increasingly important role in U.S. tax policy debates. Policy discussions of tax provisions bearing on foreign investment in the United States and American investment abroad has long focused on the competitiveness question. Recently, reductions in taxes on business investments have been advocated on the grounds that they will increase American competitiveness. Excessive tax burdens are frequently blamed for the poor international performance of some American industries. Indeed, the President's Commission on International Competitiveness recently urged business tax relief as a major element in a strategy directed at improving the trade position of the United States. Tax increases to reduce looming budget deficits are often defended on the grounds that they will reduce trade deficits.

While economists have long recognized that increased international competitiveness is not necessarily a good thing, because it is the mirror image of a decline in a nation's terms of trade, it is nonetheless an important policy goal. An analysis of the interrelationships between tax policy and competitiveness therefore seems worthwhile. This paper provides such an analysis, stressing the crucial role of capital mobility in determining the impact of tax reforms on an economy's traded-goods sector. I begin by examining theoretically the relationship between tax changes and competitiveness under various assumptions about international capital mobility. Finding the conclusions sensitive to assump-

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tions about capital mobility, I go on to consider empirically the extent of international capital mobility. Drawing on both the theoretical and empirical analysis, I attempt to assess the likely impact of alternative tax reforms on international competitiveness.

The common assumption that capital flows freely internationally leads to striking conclusions regarding the effects of tax policies. Tax measures which stimulate investment but do not affect savings will inevitably lead to declines in international competitiveness as long as capital is freely mobile internationally. The economic mechanism is simple. Measures which promote investment attract funds from abroad leading to an appreciation in the real exchange rate and a reduction in the competitiveness of domestic industry. The accounting identity holding that the current account equals the difference between national savings and national investment, insures that increases in investment *ceteris paribus* will be associated with decreases in the trade balance. Conversely, tax policies which promote savings but do not have a direct impact on investment will improve trade performance.

These results challenge the commonly expressed view that reductions in tax burdens on business will improve competitiveness by enabling them to undertake more productivity-enhancing investment. They also raise an interesting question in political economy. Why do firms in the traded-goods sector, whose competitiveness will be hurt by the capital inflows associated with investment incentives, lobby in favor of them? Consideration of this question leads naturally to an examination of the premise of free international capital mobility that underlies the arguments in the previous paragraph. If capital is not internationally mobile, stimulus to investment will not lead to capital inflows and therefore will not be associated with trade-balance deterioration.

While there certainly is a large pool of internationally mobile capital, Feldstein and Horioka (1980) and Feldstein (1983) have pointed out an important puzzle raised by the hypothesis of perfect international capital mobility. This hypothesis would predict that there should be no systematic relationship between domestic saving and investment rates, since capital can flow freely. Yet across the Organization for Economic Cooperation and Development (OECD) nations there is a very strong positive correlation between savings and investment rates. Over long periods of time, cumulative current-account deficits or surpluses are quite small despite large variations in domestic savings rates. On a very consistent basis, high-savings countries are also high-investment countries, while low-savings countries, like the United States, have relatively low rates of investment.

The observation that domestic savings and investment rates are strongly associated can be interpreted as suggesting that tax policies which raise savings are likely to increase domestic investment signif-

icantly. Similarly, policies directed at investment are unlikely to lead to permanent increases in investment unless domestic savings are increased as well. Alternatively, as many international economists argue, the cross-sectional correlation between national savings and investment rates may be a statistical artifact that does not call into question the international mobility of capital. Resolving the issue requires that some interpretation of the close cross-sectional linkages between national savings and investment be provided.

I consider three alternative hypotheses regarding the apparent international immobility of capital. The first is the hypothesis advanced by Feldstein and Horioka that institutional and legal restrictions of a variety of types preclude substantial international capital flows. The second is a possibility advanced by Obstfeld (1985), among others, that the high correlation between domestic savings and investment rates is an artifact of common factors, such as high population growth, that affect both savings and investment. The third hypothesis is that capital is mobile internationally, but that countries systematically utilize economic policy tools in an effort to achieve approximate current-account balance, so that large, sustained capital flows are not observed. My conclusion is that the third hypothesis provides the most satisfactory available explanation for the observed correlations between domestic savings and investment rates. I suggest several reasons why countries might find it desirable to maintain external balance.

This conclusion raises an important question. Given that policies to limit net capital mobility are frequently pursued, how should the effects of tax policy reforms which affect savings or investment be evaluated? If no other policy measures are undertaken, their effects should be analyzed under the assumption that capital is perfectly mobile. But the historical record suggests that current-account imbalances are likely to be offset by other policy actions. Both these issues have obvious relevance to the current American situation, where business tax reductions appear to have stimulated a significant amount of capital formation, and to have drawn capital in from abroad in large quantity, but where the trade deficit is seen as a major problem.

The paper is organized as follows. The first section examines theoretically the effects of alternative tax policies on competitiveness under different assumptions about international capital mobility. It suggests some possible explanations for the paradox that firms in traded-goods industries frequently support tax policies that seem likely to reduce competitiveness. The second section takes up the question of the extent of international capital mobility and documents the very high correlation between domestic savings and investment rates across the OECD nations. The third section considers alternative hypotheses regarding this phenomenon and concludes that it is most likely the result of

national economic policies directed at maintaining external balance. Possible reasons why nations might pursue such policies are considered. The fourth and final section considers the implications of the results for tax policy in general and the current American situation in particular.

## 10.1 Tax Policy in an Open Economy

This section examines theoretically the effects of various tax policies in an open economy where capital is mobile. In considering taxation in an open economy it is crucial to distinguish between taxes on savings and those on investment. As I use the terms here, taxes on savings refer to taxes on capital income received by home-country residents regardless of where the capital is located. The U.S. interest-income tax is an example of such a tax. Conversely, taxes on investment refer to taxes levied on capital within the home country, regardless of its ownership. The tax on corporate income is an example of an investment tax. In closed economies, it is clear that there is no important difference between savings and investment taxes. But in open economies, where capital flows are possible, they will have quite different effects. The model presented below makes it possible to analyze the short- and long-run effects of both pure savings and investment taxes. There are a variety of complexities involved in mapping real-world tax structures with their complex foreign tax credit and deferral provisions into the pure savings and investment taxes treated here. I bypass these problems.

The main conclusions of the formal analysis presented below may be motivated by considering the national income accounting identity $S\text{-}I = X\text{-}M$. This identity holds that the trade balance ($X\text{-}M$) must equal the excess of domestic savings over investment. Equivalently, as the balance of payments must balance, the current account ($X\text{-}M$) must be just offset by the capital account ($S\text{-}I$). It is apparent from this identity that policies which increase national investment without increasing national savings must necessarily lead to increases in imports or decreases in exports. In either event, the traded-goods sector of the economy will contract. Conversely, policies which increase national savings without affecting national investment will improve the current account and, in a fully employed economy, lead the traded-goods sector to expand.

These results apply in the short and intermediate run. Ultimately, they will be reversed. Consider again the case where investment is increased with no change in savings. Foreigners who finance the excess of investment over savings will accumulate claims on the domestic economy. Ultimately these claims must be paid back, and this will require that the home country run a trade surplus, exporting more than

it imports. Similarly, increases in domestic savings without changes in investment will lead ultimately to trade deficits as domestic residents liquidate their claims on foreign economies.

### 10.1.1 Modelling the Linkages between Tax Policy and Competitiveness

While a number of studies, notably Feldstein and Hartman (1980) and Hartman (1983), have examined the effects of tax policy on capital intensity, they have assumed that there is only one internationally produced good making it impossible to study issues relating to competitiveness. Goulder, Shoven, and Whalley (1983) examine the implications of international capital mobility within the context of a computable general equilibrium model and show that international considerations can have important implications for tax policy. Because the model they consider is not grounded in intertemporal optimization, it is not possible to distinguish the short- and long-run effects of tax policies. Lipton and Sachs (1983) examine a two-country growth model with two sectors producing traded and nontraded goods, and with investment function–based adjustment costs. Their model is sufficiently complex that it must be solved by numerical simulation.

Here I follow very closely Bruno (1982) and less closely Sachs (1981, 1982) in considering a two-period model in which the first period corresponds to the short run and the second period corresponds to the long run. Consideration of a more realistic infinite horizon model would be analytically intractable. I treat the case of a small, open economy that takes both the price of the traded good and the interest rate as given. The analysis could be modified to treat the case of an economy large enough to affect world markets.

Consider a two-commodity, two-period framework. Tradeables $Q_f$ are produced in each period according to the production function $Q_f^t = Q_f(L_f^t, K_f^t)$, which is assumed to have constant returns to scale. The nontradeable domestic good $Q_d$ is produced with the constant returns-to-scale production function $Q_d^t = Q_d(L_d^t, K_d^t)$. The price of tradeables is taken as the numeraire and price of the domestic good is denoted $\pi$. Increases in $\pi$ correspond to real appreciations of the local currency. Production of tradeable goods is allocated between consumption $C_f$, investment $I$, and net exports $X$ which may be negative. Production of nontradeable goods is divided between private consumption $C_d$ and public consumption $G$. It is examined further below. The assumed sectoral specialization of investment and government spending simplifies the analysis and does not alter the basic conclusions.

Total labor supply in each period is fixed at $\bar{L}^t$, ($\bar{L}^t = L_d^t + L_f^t$). Total capital is fixed in the first period and cannot be reallocated between sectors. First-period investment or disinvestment augments the second-

period capital stock. ($K_d^2 - \bar{K}_d + K_f^2 - \bar{K}_f = I$). Since for simplicity it is assumed that capital does not depreciate, it is reasonable to allow $I$ to be negative. No new capital goods are produced in the second period, since it represents posterity.

Firms maximize the present value of after-corporate-tax profits:

$$PV = (1 - \tau)[Q_f^1 + \pi^1 Q_d^1 - w^1 L^1 + R^{-1}(Q_f^2 + \pi^2 Q_d^2 - w^2 L^2)] - I^1$$

where $R = (1 + r)$. Note that since capital does not depreciate, the firm is allowed no tax depreciation allowances. Maximization subject to the production functions and factor accumulation constraints yields standard first-order conditions:

$$(1) \qquad \pi^t \partial Q_d^t / \partial L_d^t = \partial Q_f^t / \partial L_f^t = w^t \qquad t = 1,2$$

$$(2) \qquad R = (1 - \tau)\pi^2 \partial Q^2 / \partial K_d^2 = (1 - \tau)\partial Q_f^2 / K_f^2$$

where equality of first-period marginal products at the point $K_d$, $K_f$ has been assumed.[1]

At this point, we are ready to examine the implications of a corporate tax change for factor and product prices in the long run. Figure 10.1 depicts the factor-price frontiers in the two sectors under the assumption that the traded-goods sector is more capital intensive. Production occurs at the intersection of the two frontiers. The relative price of the

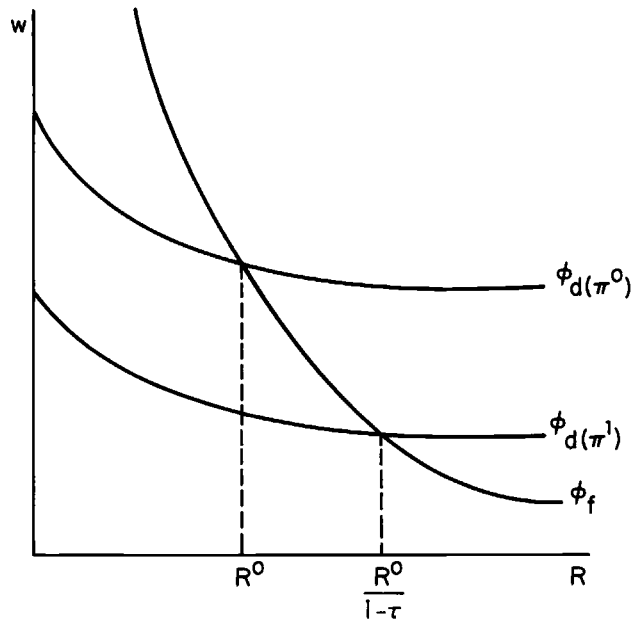


**Fig. 10.1** The long-run effects of corporate tax increase

nontraded good, $\pi$, shifts until the factor-price frontiers intersect at the world interest rate. Now consider a corporate tax increase. The factor-price frontier for the tradeable good does not shift, but the required pre-tax return on capital is increased from $R^0$ to $R^0/1 - \tau$. This necessitates a change in $\pi$ to shift the domestic-goods factor price frontier. It is clear from figure 10.1 that under our assumption that the traded-good sector is more capital intensive than the nontraded-goods sector, a corporate tax will lower capital intensity in both sectors and reduce the relative price of domestic goods, thereby causing the traded-goods sector to contract. The last result would be reversed if the opposite factor intensity assumption was maintained.

Leamer (1980) presents some rather dated evidence on the relative capital intensities of U.S. traded and nontraded goods in the context of a study of the Leontief paradox. His data, drawn from Leontief's original work, indicate that the traded-goods sector is much more capital intensive than the nontraded-goods sector. However, he notes that the more recent data provided in Baldwin (1971) suggests the opposite conclusion. At present, I am unaware of more satisfactory evidence on this question for the United States. It seems appropriate to be agnostic in the relative capital intensity question and to conclude that capital intensity effects will not lead to large effects of tax policies on the long-run composition of national output.

As just demonstrated, it is possible to examine the impact of a corporate tax change on factor and product prices in the long run without specifying anything about product demands. In order to address the sectoral composition of output and employment and to consider short-run issues, it is necessary to specify how demand is determined. For simplicity, I assume that consumers maximize a Cobb-Douglas utility function:

$$(3) \quad U = \alpha \ln C_f^1 + (1 - \alpha)\ln C_d^1 + D[\alpha \ln C_f^2 + (1 - \alpha)\ln C_d^2]$$

where $D$ is a discount factor, and $\alpha$ is the share of consumption-expenditure devoted to the foreign good.

Households maximize utility subject to their budget constraint which holds that:

$$(4) \quad C_f^1 + \pi^1 C_d^1 + [(1 - \theta)R]^{-1}(C_f^2 + \pi^2 C_d^2) = \Omega$$

where $\Omega$ represents the present value of their endowment in terms of the foreign good, and $\theta$ is the tax rate levied on savings. Net household wealth $\Omega$ is given by:

$$(5) \quad \Omega = (Q_f^1 + \pi^1 Q_d^1) + [(1 - \theta)R]^{-1}(Q_f^2 + \pi^2 Q_d^2) - T - I$$

where $T = T^1 + R^{-1}T^2 = \pi^1 G^1 + R^{-1}\pi^2 G^2$ is the total cumulative revenue of the government. Since $C_d^t + G^t = Q_d^t$, it follows that:

$$(6)\quad \Omega = Q_f^1(\pi^1) + \pi^1 C_d^1 + \{[(1-\theta)R]^{-1} w^2 L^2 - [(1-\theta)R]^{-1}\pi^2 G^2 + \bar{K}_d + \bar{K}_f\}$$

where it can be assumed that $Q_f$ is a negative function of $\pi^1$.

At this point we are ready to solve the model using the very ingenious graphical technique developed in Bruno (1982). Equation (6) and the assumption of Cobb-Douglas utility imply that:

$$(7)\quad \pi^1 C_d^1 = b\Omega[\pi^1, R(1-\theta)\, G^2]$$

The $b\Omega$ function is negatively related to all three of its arguments. It is plotted as the line marked $b\Omega$ in figure 10.2. In order to characterize first-period equilibrium we add a supply function for the total value of $C_d$:

$$(8)\quad \pi^1 C_d^1 = \pi^1 Q_d^1(\pi^1) - \pi^1 G^1.$$

This curve is also depicted in quadrant 1 of figure 10.2.

Together these two schedules already permit us to characterize the determination of first-period equilibrium. Note that any policy which reduces first-period consumption, such as a reduction in the individual tax rate $\theta$, will lead to a reduction in $\pi^1$ and an increase in the size of

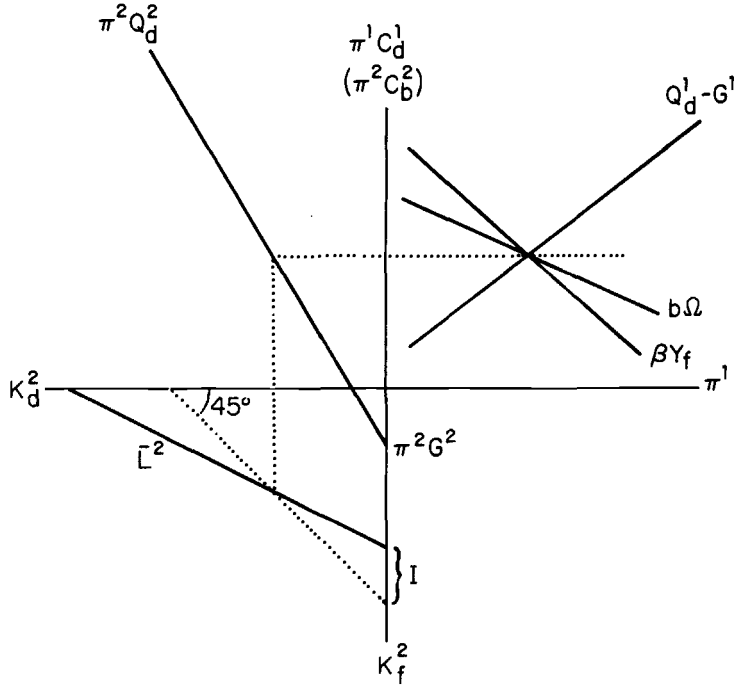


**Fig. 10.2** The determination of long-run equilibrium

the tradeable-goods sector. Likewise a decrease in public consumption will lead to a reduction in $\pi$, and an increase in competitiveness.

In what follows it will be useful to examine the behavior of domestic savings $S$. Note that $S_1 = Y_f - C_f^1$. Given our assumption of Cobb-Douglas utility, $C_f^1$ is proportional to $\pi C_d^1$. Drawing in the schedule $\beta Y_f(\pi_1)$ where $\beta = (1 - \alpha)/(\alpha)$, we can see that savings is proportional to the vertical distance between this schedule and the $b\Omega$ schedule. Note that the $\beta Y^f$ schedule is steeper than the $b\Omega$ schedule because $b < \beta$.

We are now ready to consider second-period equilibrium and the determination of investment. The determination of second-period factor and product prices has already been discussed. These serve to uniquely determine capital-labor and capital-output ratios in both sectors. In quadrant 2 of figure 10.2, the relationship between $\pi^2 C^2 d$ and $K^2$ is depicted. The slope of this schedule increases with the period-2 capital output ratio and the intercept is $\pi^2 G^2$. It is possible to put $\pi^1 C_d^1$ and $\pi^2 C_d^2$ on the same axis because they are proportional by the Cobb-Douglas assumption.

The requirement of full employment in period 2 is expressed as the $\bar{L}^2$ schedule in quadrant 3. It will be less (more) steep than the 45° line as the nontraded-goods sector is more (less) capital intensive than the traded-goods sector. The equation of this schedule is $\gamma_d^2 K_d^2 + \gamma_f^2 K_f^2 = \bar{L}^2$, where $\gamma_i$ represents the labor-capital ratio in sector $i$, which is determined by factor prices. The level of investment can be read as the vertical distance between the $\bar{L}^2$ schedules and the 45° line's $K_f^2$ intercept.

The schedules in figure 10.2, along with the factor-price frontiers in figure 10.1, serve to fully characterize equilibrium. Notice, finally, that the current account, $CA$, is given by $S - I$, which can be read from figure 10.2.

### 10.1.2 Savings Incentives

At this point, we are ready to consider the effects of policy changes. The effect of a decrease in period-1 public consumption is depicted in figure 10.3. As already noted, the relative price of nontradeables, $\pi$, declines. Employment in the traded-goods sector increases, while decreasing in the nontraded sector. National savings increases. None of the schedules in the other quadrants shifts. It is apparent that in the long run $K_d^2$ increases and $K_f^2$ decreases. Since capital-labor ratios are unchanged, it follows that employment in the traded-goods sector will decline in the long run after its initial increase. Investment will increase (decrease) as the traded-goods sector is less (more) capital intensive than the nontraded goods sector. As long as the nontraded-goods sector is not "far" more capital intensive than the traded-goods sector, savings

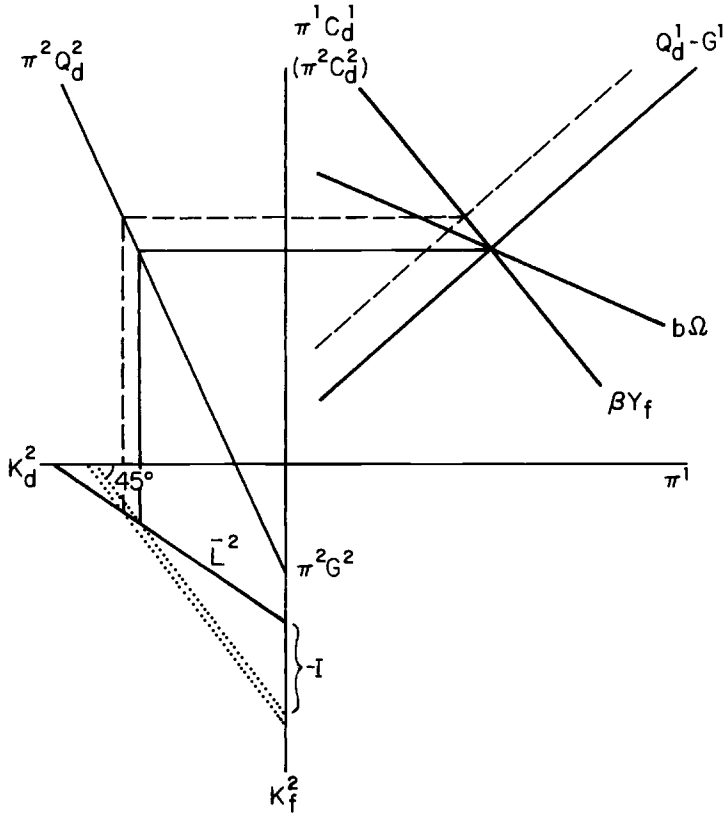


**Fig. 10.3** The effect of a saving incentive

will increase more than investment, and a current-account surplus will result.

The effects of a decrease in $\theta$, which reduces private consumption, parallel those of a reduction in public consumption. They cannot be neatly analyzed diagrammatically because a change in $\theta$ breaks the proportionality between $\pi^1 C_d^1$ and $\pi^2 C_d^2$. Note however that the effect of a savings incentive will be to raise $\pi^2 C_d^2$, and give rise to second-period effects very similar to those of a change in government spending. The traded-goods sector will expand in the short run and contract in the long run. Investment may rise or fall but it is unlikely to change a great deal.

### 10.1.3 Investment Incentives

The effects of an investment incentive, treated here as a decline in $\tau$, are depicted in figure 10.4. The solution is most easily achieved working backwards. It is clear that, with capital mobile, the long-run

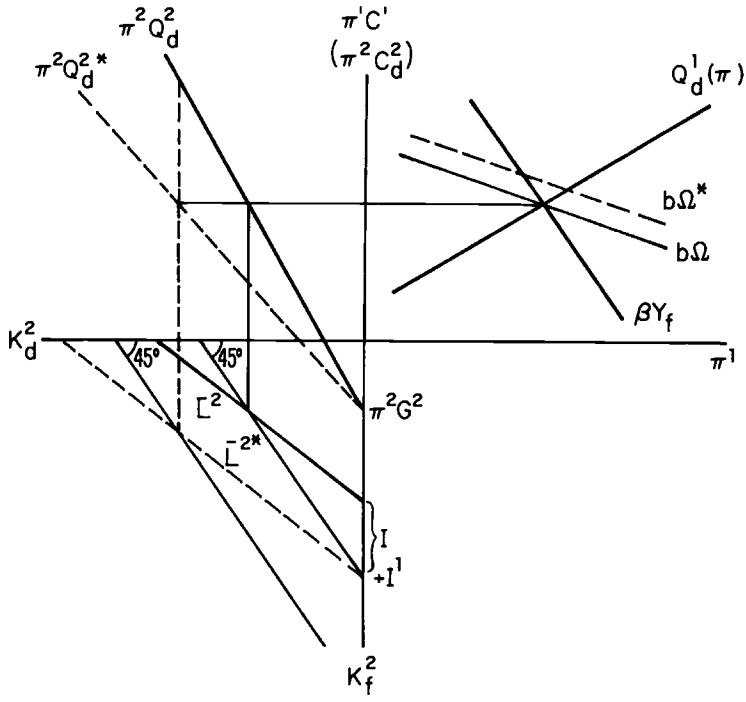


**Fig. 10.4** The effect of an investment incentive

effect of an investment incentive will be to raise capital intensity in both production sectors and to raise real wages. Thus the $\bar{L}^2$ schedule in the third quadrant shifts downwards. The shift will be parallel in the special case depicted here where the elasticities of substitution in the two sectors are equal. The capital output ratio in the domestic goods sector must increase, shifting the $\pi^2 C_d^2$ schedule down and to the left. Finally, the increase in second-period real wages increases human wealth and shifts the $b\Omega$ schedule in the first quadrant upwards.

The effect of an investment incentive is to reduce short-run competitiveness and to reduce domestic savings. Long-run capital intensity is increased, so the current account declines unambiguously. An investment incentive has an ambiguous effect on $\pi^2$, the relative price of nontradeables, depending on the relative capital intensities of the two sectors. In the special case of the two sectors with equal capital intensity, an investment subsidy will increase long-run employment in the traded-goods sector. More generally, however, the result is ambiguous.

In assessing the implications of this theoretical analysis, a crucial question arises. How much real time corresponds to the short and long run in the stylized two-period model considered here? The issue is

difficult to judge, but it seems likely that the model's short-run predictions are applicable over fairly long horizons. Policies directed at increasing the domestic capital stock are likely to lead to increased net investment for many years as new capital is accumulated. The available evidence, while weak, suggests that capital adjusts relatively slowly to its desired level. Likewise simulations of the type presented by Summers (1979) and Chamley (1981) suggest that households will take periods of up to a decade to fully adjust their wealth holding following a change in the available rate of return. These considerations suggest that, with a horizon of a decade or less, it is probably appropriate to use the short-run predictions of the economy to tax reforms. The simulation results of Lipton and Sachs (1983) are consistent with this suggestion.

### 10.1.4 The Political Economy of International Competitiveness

The arguments in this section raise an obvious question. Why is business-tax relief so frequently advocated as a vehicle for increasing international competitiveness? The analysis here suggests that tax reduction measures, which encourage investment, inevitably reduce competitiveness and hurt firms in the traded-goods sector as long as capital is mobile internationally. In part, advocacy of tax relief must result from a failure to consider its general equilibrium ramifications. With fixed real exchange rates, tax relief does help the traded-goods sector. Its advocates may fail to take account of the increase in real exchange rates that necessarily accompanies capital inflows. But economists should be reluctant to assume that self-interested parties are advocating positions contrary to their interests. It is therefore worthwhile to consider other reasons why those in the traded-goods sector might advocate tax relief.

A first possibility is that they are motivated by long-run considerations. Accumulating debt to foreigners will eventually require that we run a trade surplus. But it seems unlikely that such a long-run consideration plays an important role in current policy debates. A second explanation starts with the recognition that the traded-goods sector is not monolithic. Tax reforms which benefit firms in some, but not all, of the traded-goods sector may cause their competitiveness to increase even as the total traded-goods sector is shrinking. It might, for example, be argued that incentives to invest in plant and equipment benefit American manufacturers at the expense of farmers. The corporate sector is so large a fraction of the traded-goods sector that it seems unlikely that this is the whole story.

A third explanation for the advocacy of investment incentives to increase competitiveness is that advocates suspect that investment incentives will not, in fact, lead to prolonged capital inflows. This may

be because capital mobility is limited, and so investment incentives will lead to only small capital inflows. Alternatively, it may be because governments are perceived as unlikely to permit large trade deficits to continue for long periods of time. In either of these cases, tax incentives will raise the after-tax profits of firms in the traded-goods sector and will not lead to significant declines in competitiveness. I explore the question of the extent of international capital mobility in the remainder of the paper.

## 10.2 National Savings and National Investment

The preceding section demonstrated that the assumption of perfect international capital mobility has important implications for the analysis of competitiveness. It also is important for other fiscal questions. With internationally mobile capital, taxes on investment will all be borne by labor. Government budget deficits will not affect national levels of investment, but will instead reduce investment around the world. More generally, policies which increase national savings will have no effect on national investment.

In provocative recent papers, Feldstein and Horioka (1980) and Feldstein (1983) point out that if national savings do not affect national investment as the capital mobility hypothesis implies, one would not expect to see any strong relationship between national savings and investment rates. Yet, as table 10.1 demonstrates, there is a very close association between levels of national savings and national investment. While the long-run average net savings rate varied across countries between 6.5 and 19.6%, the largest average current account deficit was 8.3%, and the largest surplus was only 2.3%. The correlation between domestic savings and investment rates was .92.

Table 10.2 presents regressions of the national investment rates on national savings rates for a number of different intervals. Using both net and gross measures, the data suggest a strong relationship between investment and savings.[2] In all cases, the savings variable is highly significant. It is noteworthy that there is no evidence that the impact of national savings on national investment has declined through time, even though institutional barriers to international capital mobility have been broken down over the past 25 years. There is some evidence, however, that the correlation between savings and investment rates has declined through time.

Comparisons of the size of actual capital flows with those that might be expected highlight the apparent immobility of capital. Consider a policy which raises the return on domestic investment by 20%. This is about the right order of magnitude for the 1981 and 1982 U.S. tax reforms. Assuming a Cobb-Douglas production function with a capital

**Table 10.1** Net Savings and Investment, 1960–1983

| Country | Net Savings GDP | Net Investment GDP | I-S GDP |
|---|---|---|---|
| U.S.A. | .065 | .066 | .001 |
| Iceland | .071 | .113 | .042 |
| U.K. | .074 | .070 | −.004 |
| Sweden | .008 | .102 | .013 |
| Ireland | .091 | .174 | .083 |
| Canada | .098 | .110 | .012 |
| Denmark | .098 | .128 | .030 |
| Belgium | .105 | .115 | .010 |
| Spain | .108 | .122 | .014 |
| Finland | .110 | .124 | .014 |
| Italy | .112 | .115 | .003 |
| France | .112 | .121 | .009 |
| Turkey | .118 | .153 | .035 |
| Norway | .126 | .144 | .018 |
| Germany | .129 | .124 | −.005 |
| Netherlands | .142 | .129 | −.013 |
| Austria | .145 | .152 | .007 |
| Australia | .146 | .165 | .019 |
| New Zealand | .150 | .188 | .038 |
| Greece | .155 | .179 | .024 |
| Switzerland | .182 | .159 | −.023 |
| Portugal | .191 | .265 | −.074 |
| Japan | .196 | .191 | −.003 |

*Source:* OECD.

share of .25, an increase of about 20% in the capital stock would be required to equalize the return on domestic and international investment. With a capital output ratio of 1.5, this would mean a capital inflow of close to 30% of GNP. Only one OECD nation, Portugal, experienced a capital inflow of this magnitude over the 1975–81 period. Stating the point differently—the capital flows that are observed do not seem to be large enough to have very large effects on rates of return.

A number of papers including Sachs (1981, 1982), Feldstein (1983), and Caprio and Howard (1984) have examined the relationships between changes in domestic savings and investment rates. While the approaches taken in these papers differ somewhat, several conclusions emerge. There is a positive relationship between changes in domestic savings and changes in domestic investment that is weaker than the relationship between savings and investment levels. Also, it appears that shocks both to domestic savings and to domestic investment have significant effects on the current account, although their relative importance is a subject of debate. Finally, there is very weak evidence that the degree of international capital mobility has increased somewhat

**Table 10.2** **The Correlation Between National Investment and National Savings**

| Period | Intercept | $S_i$ | $R^2$ |
|---|---|---|---|
| | Net | | |
| 1960–1964 | .015 | .962 | .821 |
| | (.013) | (.095) | |
| 1965–1969 | .043 | .750 | .687 |
| | (.016) | (.106) | |
| 1970–1974 | .042 | .777 | .733 |
| | (.017) | (.099) | |
| 1975–1979 | .025 | .941 | .528 |
| | (.024) | (.185) | |
| 1980–1983 | .024 | .960 | .586 |
| | (.018) | (.164) | |
| | Gross | | |
| 1960–1964 | .029 | .920 | .879 |
| | (.017) | (.073) | |
| 1965–1969 | .047 | .834 | .783 |
| | (.023) | (.093) | |
| 1970–1974 | .049 | .835 | .755 |
| | (.026) | (.106) | |
| 1975–1979 | .065 | .789 | .439 |
| | (.042) | (.185) | |
| 1980–1983 | .086 | .679 | .464 |
| | (.032) | (.152) | |

in recent years. But, none of the time-series analysis calls into question the proposition that domestic savings and investment rates are closely linked.

One consideration that could account for some degree of association between domestic savings and investment rates is the fact that countries are not perfectly "small" on the world capital market. A share of each country's savings would be invested in it, even if capital were perfectly mobile. It seems unlikely that this can account for a large part of the correlation between savings and investment rates. Even for the United States, a dollar of savings would be expected to produce only about 25 or 30 cents of domestic investment, if capital were really perfectly mobile. Moreover, this point has no force in considering the cross-sectional association between domestic savings and investment rates.

Another possible source of association between domestic savings and investment is Keynesian effects. Increases in investment which raise domestic income temporarily would be expected to increase domestic savings as well. The fact that savings and investment rates are

about equally highly correlated over short and long periods of time suggests that this is not likely to be too important a factor.

It is not clear how to interpret the observation that savings and investment rates are highly correlated across countries. The questions of policy interest concern the allocation of the marginal dollar of domestic savings, or the financing of a marginal dollar of domestic investment. It is conceivable that incremental savings are invested in a very different way than the average dollar of savings. The fact that the linkages between changes in savings and changes in investment are weaker than those between levels suggests this view. An argument of this kind must explain, however, why ongoing capital flows are not observed between countries with stable high and low savings rates. In the next section we consider alternative explanations for the close association between savings and investment rates across nations. These explanations have differing implications for the hypothesis of marginal capital mobility and for the effects of fiscal policies.

## 10.3 Explaining Apparent Capital Mobility

The previous section documented the very high correlation between national savings and investment rates. This section considers three possible explanations for this phenomenon. These explanations assume in turn that capital mobility is greatly limited by institutional factors, that the correlation between national savings and investment rates is a spurious reflection of third factors, and that apparent capital immobility reflects the endogenous adjustment of savings and investment rates. While there is some element of truth in each of these explanations, we are led to accept the third one as the primary reason for the close association of domestic savings and investment rates.

### 10.3.1 Capital Immobility

A first natural explanation for the observed savings and investment patterns is that most capital is immobile. While some capital can flow freely, restrictions in financial institutions, capital controls, and the perceived risks of foreign investment greatly reduce the flow of capital. As Feldstein and Horioka (1980) suggest, "official restrictions impede the export of capital. Moreover the fear of future capital export controls by potential host countries . . . deters investors. . . . Important institutional rigidities also tend to keep a large segment of domestic savings at home. The most obvious of these in the United States is the savings institutions that are required by law to be invested in mortgages on local real estate."

There is, of course, a large pool of very liquid international capital. The argument, however, is that only this money is freely mobile with

other savings being immobile. This raises an immediate problem. If only a small pool of "hot money" were available to arbitrage large international return differentials, one would expect that it would all end up in one place. As long as some mobile funds are located almost everywhere there is a presumption that rates of return must be equalized.

The related argument of Feldstein and Horioka, that returns on short-term financial assets are arbitraged while returns on longer-term investments are not equalized, is also difficult to accept. Arbitrage, like equality, is transitive. As long as there are institutions in each country (e.g., Citibank) which hold different types of domestic assets, and also hold some foreign asset, we can be sure that the returns on domestic and foreign assets are arbitraged. Equalization of returns does not require that there be any agent who makes long-term investments both at home and abroad. As long as the standard assumption of marginal domestic capital mobility is maintained, the existence of investors at interior solutions holding any domestic and any foreign assets is sufficient to insure marginal capital mobility on an international basis.[3]

A clear piece of evidence suggesting the mobility of capital internationally is the fact that the relatively small net flows of capital that are observed reflect large offsetting gross flows. If capital were immobile, one would expect to see small gross as well as net flows. Unfortunately data on foreign investment by domestic firms and domestic investment by foreign firms are not available on a consistent international basis. Therefore, table 10.3 presents some information on gross and net flows of investment for the United States. In 1982, both capital inflows and outflows for the U.S. were more than ten times the

**Table 10.3** **Net and Gross Flows in the U.S.**

| | 1981 | 1982 |
|---|---|---|
| | (Billions of $) | |
| Current-account balance[a] | 4.5 | −8.1 |
| Net foreign investment | 4.1 | −4.6 |
| Increase in U.S. assets abroad[b] (capital outflows) | 109.3 | 118.3 |
| Increase in foreign assets in the U.S.[b] (capital inflows) | 77.9 | 84.5 |

*Source: Survey of Current Business*, March 1983, pp. 13 and 51.

*Note:* The reason that the difference of the gross flows is not equal to the reported net flows is a sizable statistical discrepancy.

[a]The current-account balance and net foreign investment are conceptually the same, differing only by the allocations of SDRs ("capital grants" in the NIPA) and some small definitional differences.

[b]The net increase over the year; that is, conceptually, the difference between the value of assets at the end of the year and the value at the year's beginning.

net flow of capital. Even these figures underestimate the true flows, because they fail to take account of replacement investment by Americans abroad and foreigners here.

Large reciprocal gross investment flows also call into question Feldstein's (1983) argument that subjective uncertainties inhibit capital flows. Feldstein and Horioka argue that foreign investment is typically directed at exploiting specialized opportunities rather than the general pursuit of higher returns. This claim is difficult to reconcile with the large volume of portfolio investment and with Hartman's (1983) demonstration that foreign direct investment is very sensitive to tax considerations. Recall that no foreign direct investment is necessary for international arbitrage to equalize returns. Even granting that direct foreign investments represent special situations, it is still reasonable to expect that increased domestic savings that reduce domestic rates of return would lead to more specialized foreign investments.

This discussion suggests that there exist capital flows which seem to have the potential to equalize rates of return around the world. A more subtle explanation for capital immobility, which accommodates this observation, might suggest that *total* net capital mobility is limited by fears of expropriation. This is the essential idea lying behind the burgeoning literature on international debt. It was first treated formally by Eaton and Gersovitz (1981). While capital can be freely moved, investors are aware that, if a country has imported too much capital, the gains from expropriating it will exceed the costs that can be imposed. In this case, marginal investors will not invest abroad even if foreign assets are yielding higher returns. At the margin, capital will be immobile. Changes in domestic saving will affect international capital flows only insofar as they affect countries' debt capacity by affecting the size of the "punishment" that can be inflicted on them for defaulting.

It would seem likely that arguments of this type would be more applicable to less-developed countries (LDCs) than to the OECD nations where expropriations seem implausible. One way of testing this explanation for apparent capital immobility is to examine the association between savings and investment across a broad range of countries. If expropriation fears were a major cause of capital immobility, one would expect to see savings and investment rates even more closely associated among LDCs than among the OECD nations. This hypothesis was tested by examining data on national savings and investment rates for 115 countries using data provided by the World Bank.

A regression of investment rates on savings rates using data arranged over the 1973–80 period yields:

$$I/Y = \underset{(1.1)}{18} + \underset{(.051)}{.311}(S/Y) \qquad R^2 = .24$$

These results were almost unchanged when the OECD countries were excluded from the sample. As a further check, the equation was reestimated dropping observations with large residuals from the sample. Observations with residuals with absolute value greater than two and three times the standard error of the regression were omitted. This did not have a significant impact on the results. One possible explanation for the low correlation between savings and investment is that aid flows drive a wedge between investment and savings even though capital is immobile. However, subtracting aid flows from investment had little impact on the results. It might be argued that the low correlation between domestic savings and investment is the result of measurement error. This seems unlikely. In most cases, domestic savings is estimated as a residual. When this method is used, measurement error may result in a spurious positive correlation between measured savings and investment.

The results suggest a much greater degree of apparent capital mobility when a large sample of countries is considered. Similar results are reported by Fieleke (1982) and Frankel (1985). This provides evidence against the hypothesis of capital immobility, which offers exactly the wrong predictions—that capital should be most mobile against politically allied developed countries with well-functioning capital markets.

It does not seem reasonable to conclude that capital immobility is the right way to explain the close association between national savings and investment rates. I therefore turn to other explanations.

### 10.3.2 Common Factor Explanations

Another possible explanation for the close association between national savings and investment rates is the fallacy of the common cause. Perhaps there is some third factor which determines both savings and investment, leading them to be highly correlated, even though exogenous changes in savings would have only very small effects on investment. Two such factors suggest themselves. Countries with high rates of population- or productivity-growth would be expected to have high investment rates because of the opportunities created by a rapidly growing labor pool. Lifecycle savings considerations suggest that such countries should also have high savings rates, as young savers are more numerous and have more lifetime income than older dissavers. Thus, growth could be a common factor accounting for associations between savings and investment. Obstfeld (1985) provides a rather elaborate example illustrating this point.

A second factor that could lead to a positive association of savings and investment is initial wealth. A clear example is provided by a nation ravaged by war. Such a country would be expected to have a high investment rate because of the destruction of its capital stock, and a

high savings rate because of households' desire to rebuild their wealth holdings. Any source of initial differences in national wealth income ratios would tend to work the same way.

The growth explanation for the strong association between savings and investment rates is easily tested. It is only necessary to add measures of the rate of growth to a regression of the investment rate on the savings rate.

A regression of the net investment rate on the net savings rate and the rates of population growth and productivity growth using the data in table 10.1 yields:

$$\underset{}{I/Y} = \underset{(.023)}{-.015} + \underset{(1.39)}{1.02\ S/Y} - \underset{(.01)}{.002n} + \underset{(.001)}{.0026g} \qquad R^2 = .703$$

Similar results are obtained reversing the equation, using gross rather than net concepts and varying the sample period. Adding growth variables actually increases the coefficient on $S/Y$. This implies that variations in savings that are uncorrelated with variations in growth actually have more relation to investment than variations explained by the growth variables. Growth is not the spurious factor accounting for the strong correlations between national savings and investment rates.

There is no single variable which can capture the possible effects of initial conditions on both savings and investment. Therefore it is necessary to take a more indirect approach. Estimating the basic investment-savings relationship with instrumental variables, using as instruments any variable expected to affect savings but not investment, will yield a consistent estimate of the "pure" correlation between savings and investment. Feldstein and Horioka report a number of estimates of this type using social security variables as instruments. They find that this has little effect on the estimated savings coefficient. Indeed, in several cases it actually increases. Frankel (1985) presents some corroborating evidence.

In order to further examine this issue, the basic savings investment relationship was reestimated using the government budget deficit as an instrument. Because of data limitations, a smaller sample (14 countries) and a shorter time period (1973–80) were used in the estimation. For this sample the net result of an *OLS* regression was:

$$\underset{}{I/Y} = \underset{(.03)}{.02} + \underset{(.13)}{.97\ (S/Y)}$$

Using the government deficit as a share of GDP as an instrument, the result was:

$$\underset{}{I/Y} = \underset{}{-.10} + \underset{(1.10)}{1.45\ (S/Y)}$$

This result is surprising. The coefficient on the savings variable rises substantially rather than declining. It attains an implausible value exceeding one. On the "spurious factor" explanation, one would have expected the savings coefficient to decline.

There is no evidence here to support the "spurious factor" explanation for the close association of national savings and investment rates. But the last equation does raise a puzzle. Why should purging the savings and investment variables of the effects of their common causes cause their estimated association to increase? Clearly the answer must have something to do with the properties of the deficit variable. This issue is explored in the next subsection.

### 10.3.3 The Maintained External Balance Hypothesis

The assumption has been made so far that national savings and investment rates are exogenously determined. Feldstein and Horioka treat differences in national savings rates as a consequence of "basic structural differences among countries." In their formal model (1980, p. 324), the level of public savings is an exogenous variable affecting the national savings rate.

An alternative view is that countries consistently manipulate the levels of economic policy with a view to maintaining external balance. Such an argument has been made by Fieleke (1982) and Tobin (1983) among others. In this case, capital appears immobile only because countries pursue policies that bring savings and investment into balance. Possible rationales for this behavior are discussed below.

The endogeneity of budget policy can easily explain the empirical results in the preceding section. Consider the special case where capital is completely mobile on world markets, and countries set budget deficits according to:

$$D_i = \alpha(PS_i - I_i) + u_i, \quad \text{with } 0 \leq \alpha \leq 1 \tag{9}$$

where $D_i$ is the deficit, $PS_i$ is private saving, and $u_i$ represents the effect of other factors on the deficit of country $i$. The assumption that deficits are exogenous corresponds to $\alpha = 0$ in this formulation. Standard calculations suggest that the coefficient on saving in our basic equation will equal:

$$\hat{\delta}_{OLS} = \frac{(1 - \alpha)\sigma_{PS,I} + \alpha\sigma_I^2}{(1 - \alpha)^2\sigma_{PS}^2 + \alpha^2\sigma_I^2 + 2\alpha(1 - \alpha)\sigma_{PS,I} + \sigma_u^2} \tag{10}$$

Notice that in the special case where $\alpha = 1$ and $\sigma_u^2 = 0$, $\hat{\delta} = 1$, and that with Feldstein and Horioka's implicit assumptions that $\alpha = 0$ and $\sigma_{PS,I} = 0$ in a perfect capital market, $\hat{\delta} = 0$. As these polar cases suggest, increases in $\alpha$ and reductions in $\sigma_u^2$ will tend to raise the value of $\hat{\delta}$. Direct estimation of (9) yields:

$$(11) \qquad D_i = -.01 + .715\,(PS_i - I_i) \qquad R_2^2 = .77$$
$$(.004)\ \ (.107) \qquad \sigma_u^2 = .00024$$

Using this estimated value of $\alpha$ and the observed sample moments tautologically yields the *OLS* estimate for $\delta$. If we reevaluate (10) assuming that $\alpha = 0$ and that $\sigma_u^2 = \sigma_d^2$, the implied value of $\delta$ is .597. This confirms that some of the strength of the Feldstein and Horioka results arises from deficit policy actions directed at maintaining external balance. Note that Feldstein (1983) admits that some positive association between $PS_i$ and $I_i$ is to be expected, arising from factors such as growth rates that simultaneously affect both $PS_i$ and $I_i$. And other policy levers besides deficits may be used to bring savings and investment into balance. Hence, the remaining correlation of .6 should not be treated as evidence of the immobility of capital.

The maintained external balance hypothesis also explains the paradoxical results obtained when $D_i$ is used as an instrument. In this case, the probability limit of the coefficient of interest is given by:

$$\hat{\delta}_{IV} = \frac{\sigma_{D.I}}{\sigma_{D.S}} = \frac{\alpha\sigma_I^2 - \alpha\sigma_{PS.I}}{\alpha^2\sigma_I^2 - \alpha(1-\alpha)\sigma_{PS}^2 + \alpha(1-2\alpha)\sigma_{PS.I} + \sigma_u^2}$$

which will be greater than unity as long as:

$$\alpha(1-\alpha)\ \text{var}\ (I\text{-}PS), > \sigma_u^2$$

The estimates of $\delta_{IV}$ and $\sigma_u^2$ reported above imply that this condition is satisfied in practice.

This section has shown that the maintained external balance hypothesis can explain how the observed high correlation of national savings and investment rates could occur in a world with perfect capital mobility. It also explains an additional finding (the high degree of capital mobility among less-developed countries) that is anomalous given the view that capital is internationally immobile. In these nations, the pressure to maintain external balance is much weaker, and so fiscal policy actions are not taken to prevent capital flows. As a consequence, greater current-account imbalances and capital mobility are observed.

The maintained external balance hypothesis seems on the basis of the evidence considered here to be the most plausible explanation for the high cross-sectional correlation between domestic savings and investment rates. By its nature it is difficult to test, since levels of national savings and investment are affected by a wide variety of policy levers, and so the stance of policy towards saving and investment in any given country is difficult to evaluate. Below, I discuss a number of plausible reasons why nations might seek to maintain external balance. The fact that countries so frequently resort to capital controls that force savings

and investment into balance makes it very plausible that they also use other policy levers to achieve the same purpose.

Capital will be effectively immobile internationally if nations act so as to avoid either capital outflows or capital inflows. Either would be sufficient to preclude capital flows. Consider first the incentives nations might have to avoid capital outflows. The fundamental reason why nations might prefer to do this is that the social return to domestic investment exceeds that of foreign investment, even when their private returns are equated. Most obviously, this will be the case where there are taxes on domestic investment. More subtly and more importantly, there is the risk associated with capital expropriation by government action or by labor.[4] Keynes (1924) puts the argument well: "Consider two investments, the one at home and the other abroad, with equal risks of repudiation or confiscation or legislation restricting profit. It is a matter of indifference to the individual investor which he selects. But the nation as a whole retains in the one case the object of the investment and fruits of it; whilst in the other case both are lost. If a loan to improve South American capital is repudiated we have nothing. If a Poplar housing loan is repudiated, we as a nation still have the houses."

Note that the phrase "legislation restricting profit" covers a host of possibilities far short of outright nationalization. There is also the possibility that capital expropriation will take the form of actions by workers to raise wages and capture the rents that can be earned from irreversible capital investments. Together these possibilities seem likely to be of substantial importance. They provide a motivation for countries which find themselves exporting capital on a substantial scale to pursue measures directed at spurring domestic investment. Insofar as they suggest that the social return to foreign investment may be rather low, they also suggest the possible desirability of reducing savings when they are primarily flowing abroad. Certainly this was Keynes's view regarding the huge British capital outflows in the early part of this century.

It is noteworthy in this regard that capital-exporting nations tend to be large countries with substantial international power. The British in the Victorian era and the United States during the post–World War II period are obvious examples. The current Japanese situation is less clear. Where capital outflows are made by dominant international powers they may confer external benefits which raise their social return by increasing international influence. Large countries may also regard themselves as relatively immune from expropriation risks. The striking feature of table 10.2 is that almost all of the small countries are capital importers. With large countries unwilling to export capital in large

quantities, however, the scope for international capital mobility is relatively limited.

Keynes went on to provide an additional reason why a nation might want to limit its capital exports.[5] He wrote that "Foreign investment does not automatically expand our exports by a corresponding amount. It so affects the foreign exchanges that we are compelled to export more in order to maintain our solvency. It may be the case—I fancy that it now is the case—that we can only do this by lowering the price of our products in terms of the products of other nations, that is by allowing the ratio of real interchange to move to our disadvantage."

This consideration, which is important only for countries with some market power, may also help to explain why large capital outflows are so rare. A possible example is provided by the efforts of the United States to limit capital outflows in the early 1960s in an effort to maintain the value of the dollar. Whether the motivation for maintaining the value of the dollar was enjoying favorable terms of trade is not clear.

There are also reasons why countries would be reluctant to accept large capital inflows. Where these are associated with large movements in real exchange rates, they are likely to damage severely an economy's traded-goods sector. This may generate political pressures to increase domestic savings or to reduce the rate of investment. These pressures are likely to be particularly serious in situations where the real exchange rate changes quickly or where the traded-goods sector is not benefiting from the capital inflows. It should not be surprising that capital inflows into Canada to finance development of its natural resources have proved more politically acceptable than recent inflows into the United States to finance budget deficits.

These arguments are suggestive as to why we see such a small volume of net international capital mobility. Evaluating their relative importance is left for future research. In the next section, we tentatively accept their validity and explore their implications for economic policy.

## 10.4 Conclusions

Our analysis of the historical experience of the last twenty years suggests that capital was internationally mobile but that governments acted so as to permit only relatively small capital flows. This makes it difficult to analyze the effects of tax policy changes. Such changes, if not accommodated by other policies, would lead to significant capital flows with associated implications for competitiveness. But the historic record suggests that policy changes are adopted to maintain external balance. If such changes are always adopted, capital is effectively immobile. National investment cannot be increased without increasing

national savings. The effect of any policy depends on the policies it engenders. Consider, for example, an investment tax credit. The resulting capital inflow would lead to a trade deficit. If this created pressures leading to an increase in public savings, the ultimate result would be more domestic investment, with only a small effect on the traded-goods sector. If, on the other hand, other countries responded to their capital outflows by strengthening capital controls, the result would be increased domestic interest rates and only relatively small investment increases. In this case short-run competitiveness might actually be improved by investment tax incentives.

Clearly there are no general principles which can be used to assess the effects of different policies in all situations. Neither the analytic benchmark of perfect capital mobility nor the polar opposite assumption that capital is immobile seems appropriate in assessing the effects of tax reforms.

These points are well illustrated by considering the current American situation. The dollar is extremely strong, having risen by about 60% in the last four years. This has led to the large trade and current-account deficits, which are regarded by many observers as a cause for grave concern. Beyond the direct effects on industries producing traded goods, concerns are expressed about the United States becoming a debtor nation, and about a weakening in our national commitment to free trade. Following the Reagan tax incentives, an increase of close to 25% in the capital stock would be necessary to bring the after-tax return to capital back to its former level. Since the United States is not a small country on the world capital market, not all of these funds would come from abroad even if capital were perfectly mobile. But with mobile capital, one would have to predict a cumulative current-account deficit in excess of 15% of GNP in response to the 1981 tax cuts. This is on top of any current-account deficit attributable to federal budget deficits. It seems unlikely that such large, sustained capital inflows will be allowed to materialize. Some combination of increased savings through reduced budget deficits and expansionary monetary policy is likely to be used to restore external balance. Thus, the recent U.S. experience is in a sense the exception that proves the validity of the maintained external balance hypothesis.

Note, finally, that the maintained external balance hypothesis resolves the riddle of why firms producing traded goods favor investment incentives. If they expect these incentives to be coupled with other policies directed at stabilizing the current account, they are rational in advocating investment incentives. This is true if investment incentives are accommodated by increased public savings, expansionary monetary policies, or even protectionist policies. This point may well be illustrated by the evolution of the U.S. economy over the next few years.

# Notes

1. Note that the formulation here requires that capital invested in either sector earn the world rate of return $R$ in period 2. As Frankel (1985) has stressed, there is no reason to expect that real interest rates measured relative to a domestic price index that includes both tradeable and nontradeable goods will be equalized across countries. Indeed, as long as purchasing power parity fails as a description of exchange rate behavior, real interest rates cannot be equalized, measured both relative to price changes in tradeable goods and the domestic consumption basket. In the model considered here, despite capital mobility, there is no real interest rate equalization measured in the standard way using general domestic price indices.

2. There is no obvious reason for regressing investment on savings rather than running the reverse regression. The interested reader can compute the coefficient that would be obtained from the reverse regression by dividing the reported coefficient into the regression's $R^2$. The reverse regression coefficients tend to be a little smaller than the reported coefficients.

3. Zeira (1986), in a very perceptive analysis, notes that this conclusion is only correct if assets are perfect substitutes in individual portfolios. The empirical importance of this qualification is, however, open to question, given the findings of Frankel (1985) that the standard CAPM along with reasonable assumptions regarding risk aversion implies that assets are in fact very close substitutes.

4. I am indebted to Jeff Sachs for bringing Keynes's discussion of this issue to my attention.

5. This argument in many ways parallels the one developed by Roger Gordon in his discussion of this paper.

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## Comment Jeffrey A. Frankel

This paper is a much-needed attempt to interpret the businessman's view that taxation which raises the cost of capital is "bad for international competitiveness," and specifically that cutting corporate income taxes would help the national trade balance. This view needs interpreting, because we would expect, from the identity that the current-account balance is equal to national savings minus investment, that any incentives that succeed in stimulating investment would in general *worsen* the trade balance. At least we would expect this in the short run. In the longer run, intertemporal considerations suggest that the current-account balance will be zero. Summers proposes the size of the tradable-goods sector as the definition of "competitiveness," in place of the size of the trade balance, thus leaving the question open.

The paper is divided into two, very different, parts. The first part is theoretical. Its conclusion is that, if tradable goods are capital intensive, then subsidies to investment will increase the size of the tradable sector,

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under the condition of imperfect international capital mobility. The latter qualifying condition is a controversial one. The second half of the paper attempts to measure the degree of capital mobility, along the lines of the Feldstein-Horioka tests of saving-investment correlation. Presumably the aim is to see whether investment incentives do increase the size of the tradable-goods sector; but the capital mobility testing is an entirely self-contained discussion. I will allocate most of my comments to that part of the paper.

There have been many econometric critiques of the Feldstein-Horioka literature, and Summers mentions most of them. The critiques are correct on the econometrics (though Feldstein and Horioka themselves made a better attempt to address problems of econometric endogeneity, through the use of instrumental variables, than many of the critics who followed in their footsteps). But in my view the critiques are beside the point, if the point is to estimate the degree of capital mobility in the sense of the degree of international integration of financial markets. Let us begin by reviewing the statistical facts. They have been found puzzling to many who interpret them in terms of the degree of capital mobility, and in any case are considered striking by all parties.

First, the correlation of national investment with national saving (defined as private savings minus the government budget deficit) is greater than zero, and in fact is relatively close to unity. If one accepts a causal interpretation, the finding says that changes in national saving are offset by net capital inflows only to a relatively minor degree, and are reflected primarily as changes in national investment; fiscal crowding out of investment, for example, does take place. This was the original result of Feldstein and Horioka, interpreted by them as evidencing a low degree of international capital mobility.

Summers adds a second statistical fact by including less-developed countries (LDCs) in the sample: the saving-investment correlation is no lower for industrial countries than for LDCs. This finding, noted earlier by Fieleke (1982, pp. 154–55), seems puzzling. In light of the default risk, the greater government use of capital controls, and the less advanced state of financial markets in LDCs, one would expect to find lower capital mobility for this group.

A third statistical fact is analogous to the preceding one, but in the time dimension rather than the cross-section dimension: the saving-investment correlation is no lower after 1974 than it was before 1974. Again, in light of the greater use of capital controls and the less advanced state of financial markets before 1974 than after, one would expect a higher degree of capital mobility in the later period. The Summers paper—both the results reported in table 10.2 and the discussion of them—is ambiguous on the question of how the saving-

investment correlation has changed over time. But Feldstein (1983) and Penati and Dooley (1984) found no sign of a decline in the correlation.[1]

Most economists seem inclined to conclude from the statistical finding that the saving-investment correlation is stubbornly high, that there must be something wrong methodologically with this way of estimating the degree of capital mobility. Hence the many econometric critiques. Most can be subsumed in the general complaint that the righthand-side variable is correlated with the error term, that is, that national saving is endogenous. Though this econometric problem is an ever-present danger in macroeconomics, it is particularly likely to arise when the lefthand-side and righthand-side variables are linked by an identity (via the current account, in this case). There are four common varieties of the critique: the procyclicality of both saving and investment rates, the large-country problem, the government policy reaction problem (which Summers calls the "maintained external balance hypothesis"), and the influence of population growth, or other third factors, on both saving and investment rates. All are potentially serious problems, but in my view all can be handled with some degree of success. A cross-section study largely avoids the procyclicality and large-country problems from the beginning.[2] To deal with the possible endogeneity with respect to the growth rate, Summers adds it as a separate variable, and finds no effect. As a cure for the endogeneity of national saving, he also tries instrumental variables. But his choice of instrumental variable, the government deficit, guarantees a bad outcome because it is also endogenous. This Summers himself concludes, precisely on the grounds of the maintained external balance hypothesis: governments tend to react to current-account imbalances by varying fiscal (among other) policies so as to minimize such imbalances. Feldstein and Horioka used instrumental variables that can more plausibly be argued to be exogenous, such as the ratio of the retirement-age population to the working-age population. But it turns out that such regressions do little or nothing to reduce the coefficient on national savings.[3]

1. I also have found coefficients that are, if anything, higher later in the twentieth century than earlier (Frankel 1986), and, if anything, higher for industrial countries than for LDCs (Dooley, Frankel, and Mathieson 1986).

2. The latter is the problem in a time series study that when a country that is large in world financial markets experiences a fall in savings, there may be an increase in the rate of return to capital and a consequent fall in domestic investment, not because of imperfect capital mobility but because there are (equal) effects on the rate of return and investment everywhere in the world. Obstfeld (1986), for example, attributes the finding of a high saving-investment correlation for the United States to the large-country effect.

3. I consider the level of military expenditure, an important determinant of government expenditure that is driven primarily by political events, to be another good instrumental variable. But using military expenditure and the retirement ratio as instrumental variables does little to reduce the saving coefficient (Frankel 1986).

After the best possible fix-ups are applied, econometric problems undoubtedly still remain. But it seems likely that even genuinely exogenous shifts in national savings do not in fact provoke a sufficiently large capital inflow to keep the domestic rate of return and investment from changing. It is in this sense that the econometric critiques are beside the point.

The condition that we are really interested in testing is that capital is sufficiently mobile to equalize expected real rates of return internationally. After all, the only reason one might have for thinking that national investment rates would be insulated from domestic disturbances would be that investment depends on a rate of return that is in turn tied to an exogenous world rate of return. Subject only to the quality of the data on expected rates of return, equalization of the returns is a condition that can better be tested directly. Tests of real interest rate parity abound; Mishkin (1984) is one example. They all tend to find large and sustained deviations. The observed failure of capital movements to equalize rates of return is itself sufficient to negate the hypothesis that savings should have no effect on investment, econometric problems aside.

Why are real rates of return not equalized? Imperfect integration of financial markets, attributable in the case of LDCs to political risk in particular, is certainly one explanation. But even if political risk and exchange risk were unimportant enough that uncovered interest parity were to hold well, i.e., even if financial markets were perfectly integrated internationally, there would be no reason to expect real interest parity to hold. Let us label the domestic real interest rate $r = i - \pi$, and the foreign real interest rate $r^* = i^* - \pi^*$, where $i$ and $i^*$ are the domestic and foreign nominal interest rates, respectively, and $\pi$ and $\pi^*$ are the domestic and foreign expected inflation rates, respectively. Then the real interest differential can be broken into two components:

$$r - r^* = (i - i^* - \Delta s^e) + (\Delta s^e - \pi + \pi^*),$$

where $\Delta s^e$, is the expected rate of change of the spot exchange rate. It is clear that even if arbitrage in financial markets were to eliminate the first term, i.e., even if uncovered, or "open," interest parity were to hold, real interest parity would not hold unless the second term, representing expected real depreciation of the currency, were also to equal zero. Expected real depreciation is zero if purchasing power parity holds, but it is well known by now that purchasing power parity empirically does not hold, even approximately and even in the relatively long run. Thus there is good reason to expect real interest parity to fail, and there is in turn no reason to expect savings and investment rates to be uncorrelated, problems of econometric endogeneity aside. International portfolio investors may have reason to arbitrage away gaps in countries' nominal rates of return when expressed in a common

numeraire; but they have no reason to arbitrage away a gap between the domestic rate of return expressed in terms of domestic goods and the foreign rate of return expressed in terms of foreign goods. Put differently, crowding out of investment occurs, but the failure of international capital mobility to prevent it may have more to do with the imperfect integration of goods markets than with the imperfect integration of financial markets.

Two qualifications to the purchasing power parity argument can be made. First, statements about tax policy such as Summers has in mind are often made in a context of comparative-statics public finance. In such a context, very long-run measures of expected rates of return, which might show purchasing power parity holding, are relevant. But if this is the argument, then a decade, which is the approximate span of time over which the cross-section studies typically average the savings and investment rates, may not be a long enough run. Expected real depreciation of the U.S. dollar has by a variety of measures been positive throughout the 1980s. (Furthermore, American businessmen's concerns with competitiveness and the trade balance are not primarily concerned with the longer run.)

Second, it should be noted that proponents of the saving-investment approach to measuring capital mobility over the rate of return approach often argue that what matters is the less measurable return on real capital, not the more measurable real return on bonds, and that the two are not necessarily equal even within a country. But foreign investors who purchase equities or undertake direct investment are no more likely to evaluate returns in terms of local purchasing power than are investors who purchase bonds. On the other hand, it is true that political risk, especially in LDCs, has usually been considered a more serious barrier to the equalization of returns on direct investment than on bonds, with the implication that the imperfect integration of financial markets becomes relatively more important for LDCs. In short, all three factors—expected real depreciation, political risk, and exchange risk—can be relevant in explaining international differences in real rates of return.

The position of the Summers paper is that barriers to international capital mobility, such as the three obstacles to real interest rate equalization just named, are not particularly important. The high observed effects of national saving on investment are instead attributed to government behavior under the maintained external balance hypothesis. He ties this conclusion back to the original question of why businessmen claim that they need tax advantages in order to compete internationally. The concluding paragraph offers the novel argument that businessmen expect enhanced investment incentives to lead to a worsening of the current account, which in turn will prompt the government to adopt other measures to move the current account back toward

balance (not, presumably, including a rollback of the investment incentives!), and that the businessmen who are in tradable-goods industries will benefit from these other measures. It seems to me that a much less convoluted way of getting the same result is that a reduction in corporate taxes is directly in the interest of corporations, and that they find it useful to cite international competition as their justification. It may be rational for businessmen to try to argue to the public that investment incentives improve the trade balance, just as it is our role as economists to point out that investment incentives, whatever their other advantages, in fact have no such effect.

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# Comment Roger H. Gordon

The declining international competitiveness of the United States has been of much concern to policy makers. Summers, by analyzing the

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short- and long-run effects of various policies on international competitiveness, provides an important public service by making this policy debate more informed.[1]

The key question in his analysis is the degree to which the U.S. economy approximates a small, open economy, where there is no direct link between domestic savings and investment. Summers reexamines the evidence presented originally by Feldstein and Horioka (1980) that domestic savings and investment rates are closely linked statistically, and argues that this close link is the result of policy decisions to keep them closely linked.

This argument seems quite plausible. Concern with the current account deficit or surplus certainly affects policy decisions both here and abroad. The recent pressure in the United States to cut the deficit in order to alleviate this trade deficit is only a recent example. How much importance to assign to this factor is a more difficult question, however. Summers's statistical evidence must be interpreted with some care given the large differences between the deficit as actually measured and the size of public savings as it ought to be measured.[2] There is no reason to expect that the measurement errors will be uncorrelated with savings or investment rates.

Several questions remain, however, even if we accept Summers's argument. First, why have governments chosen so consistently to restrict any current account deficit or surplus? Since, given the normal vagaries of policy-making, it seems difficult to attribute the close association between savings and investment across many countries and over an extended period of time entirely to the use of policy, what else may be going on?

The model that Summers develops in the first part of the paper does not really help in answering these questions. As Summers argues, if saving increases in a country, "investment may rise or fall but it is unlikely to change a great deal." In the next section, he argues that if investment increases, then domestic savings should fall.[3] This model therefore cannot help in explaining the close association between saving and investment. In addition, within the model, since the country is a price taker in the international markets, it is easily shown that the government cannot improve welfare by distorting decisions made by

1. However, why policy should be concerned with the size of the traded-goods sector of the economy per se on efficiency or welfare grounds is not clear.

2. Probably the two largest problems in the measure of the deficit are first the omission of the change in the implicit debt of the Social Security and other transfer programs, and second the lack of correction for the effects of inflation on the real value of outstanding debt. See Kotlikoff (1984) for further discussion.

3. This argument ignores any tax increase necessary to finance the investment incentives. It is not clear what happens to savings due to this tax change if a balanced budget is required.

the private market, so would have no clear reason to seek to restrict current account deficits and surpluses—private decisions are Pareto optimal, given internationally set prices.

However, a simple alternative to this model, which I would like to present next, can imply not only a close association between savings and investment if there is no government intervention, even though goods flow freely across borders, but also the desirability on welfare grounds of government intervention to further restrict the current account deficit or surplus.

To keep the story simple, let there be two countries each of which produces a single commodity. The two commodities are not perfect substitutes, and consumers in each country consume both commodities. Each consumer has a relative preference for the locally produced good.

In order to explore savings and investment decisions in the home country, assume that the world lasts for two periods. Output in the foreign country in period $i$ is assumed to be exogenous and to be denoted by $Y_i$. Domestic output in the first period is also assumed to be exogenous and denoted by $X_1$. This output can be consumed at home, consumed abroad, or invested at home. Only the locally produced good is suitable for investment. If $S$ denotes first-period investment in the home country, then second-period resources are assumed to equal $S + f(S)$, where $f'(.) > 0$ and $f''(.) < 0$.

Let $H_{ij}$ ($F_{ij}$) represent the amount of the domestic (foreign) good produced in period $i$ which is consumed that period in country $j$. The government is assumed not to use any resources, so that the first-period resource constraint implies that $S = H - H_{11} - H_{12}$.

Let $U(H_{11}, F_{11}, H_{21}, F_{21})$ represent the utility of the representative domestic consumer, where $U(.)$ satisfies the normal properties of a utility function. Let the market prices for these four goods be denoted by $(1 + d)$, $P_1(1 + d)$, 1, and $P_2$ respectively. If this individual maximizes utility subject to the given market prices for the four goods, then among other conditions it must be the case that:

$$U_1/U_3 = 1 + d, \text{ and} \tag{1a}$$

$$f' = d. \tag{1b}$$

Therefore, investment occurs until the marginal product of capital equals the market determined interest factor $d$, and the marginal time preference rate with respect to the domestic good must also reflect this interest factor.

Similarly, let $V^1(H_{12},F_{12}) + \beta V^2(H_{22},F_{22})$ represent the utility of the foreign consumer, where $V^i(.)$ also satisfies normal properties of a utility

function.[4] This consumer is subject to the trade balance constraint, which requires that

$$(2) \qquad (1 + d)H_{12} + H_{22} = P_1(1 + d)F_{11} + P_2 F_{21}.$$

Given that $F_{12} = Y_1 - F_{11}$ and $F_{22} = Y_2 - F_{21}$, we can solve for utility maximizing behavior of the foreign consumer subject to the above budget constraint, and find for example that

$$(3a) \qquad V_2^1/V_1^1 = P_1,$$

$$(3b) \qquad V_2^2/V_1^2 = P_2, \text{ and}$$

$$(3c) \qquad V_2^1/V_2^2 = (1 + d)\, P_1/P_2.$$

It follows from equation (3a) that $P_1 = p^1(H_{12},F_{11})$, and from (3b) that $P_2 = p^2(H_{22}, F_{21})$ for some functions $p^1(.)$ and $p^2(.)$. Given standard assumptions about the utility function, all the first derivatives of these functions $p^i$ will be positive.

One interesting case to explore is when the home country is sufficiently small relative to the foreign country that the foreign interest rate can be taken to be exogenous. Denote this rate by $r$. It then follows from equation (3c) that $(1 + d)P_1/P_2 = 1 + r$, implying that $1 + d = P_2(1 + r)/P_1$. Since $d$ represents the home interest rate, this result tells us how the amounts traded affect the home interest rate.

For example, in the context of Summers's argument, given currently high U.S. deficits, current demand for U.S. goods should be relatively high and the model, for plausible parameter values, would imply a low value of $P_1$.[5] Conversely, in the second period, when the U.S. debt is repaid, demand for U.S. goods is low and so $P_2$ should be high. Together these imply that the U.S. interest rate will exceed the foreign interest rate $r$. Since investors will invest in any project at home earning at least the domestic interest rate, we find that the deficit should cause a drop in domestic investment, and also, given equation (1$a$), an increased incentive to save. Therefore, this model describes how market forces can push domestic savings and domestic investment together.

Assume now that through its tax policy the government can determine the consumer's consumption bundle. What government policy will maximize the consumer's utility, taking account of the effect of the policy on market prices?

The objective of the government is to maximize $U(H_{11},F_{11}, H_{21},F_{21})$ subject to the domestic resource and the trade balance constraints:

4. The superscripts are used primarily to make clear what the arguments of $V$ are in any given context and not necessarily to describe differences in tastes between the periods.

5. Examples certainly exist, however, with the opposite implication, e.g., when the deficit results primarily from an increased demand for the foreign good.

(4a) $H_{22} + H_{21} = f(X - H_{11} - H_{12}) + X - H_{11} - H_{12}$, and

(4b) $P_2(1 + r)H_{12}/P_1 + H_{22} = P_2[(1 + r)F_{11} + F_{21}]$.

The first-order conditions with respect to $H_{12}$ and $H_{22}$ together imply that

$$(5) \qquad 1 + f' = (1 + d)\left[\frac{1 - (H_{12}/P_1)(\partial P_1/\partial H_{12})}{1 - (H_{22}/P_2)(\partial P_2/\partial H_{22})}\right], \text{ and}$$

$$(6) \qquad U_1/U_3 = 1 + f'.$$

Recall that without government intervention, $f' = d$. The extra expression in equation (5), to the extent it differs from one, represents the desired intervention by the government. The numerator and denominator each take the form of $(1 - 1/\epsilon)$, where $\epsilon$ is a price elasticity of demand abroad for the domestic output. But this is just the standard form for the ratio of the marginal revenue to the price when a monopolist sells in a given market. To the extent that the price elasticities differ in the two periods, the government should push sales towards that period where the price elasticity is greater.[6]

To explore the implications of equation (5) let us examine two examples. Consider first the situation where the foreign consumer's utility function can be expressed as

$$(7) \qquad V(H_{i2}, F_{i2}) = (H_{i2} + A)^{\alpha}F_{i2}^{(1-\alpha)}.$$

One way to rationalize the extra term $A$ is to argue that there are really fewer goods than countries, so that the home country is not the only supplier of its particular output. The home country takes as given the supply of its good produced elsewhere, denoted by $A$, when making its own decisions.[7] The smaller the home country's share of the market for its output, the larger is $A$ relative to $H_{i2}$.

Given this utility function, equation (5) can be reexpressed as

$$(5a) \qquad 1 + f' = (1 + d)\frac{1 - H_{12}/(H_{12} + A)}{1 - H_{22}/(H_{22} + A)}.$$

If current deficits cause current exports of the domestic good to be a relatively small share of the foreign supply of this good, then equation (5*a*) indicates that the marginal product of capital should be raised above what would occur without intervention. In other words, given the low current rate of savings, there is an incentive for the government to raise the domestic interest rate so as to restrict investment and

6. For a related argument on the use of government policy to exploit monopoly power in the international securities market, see Gordon and Varian (1986).

7. It would be interesting but more complicated to explore more sophisticated interactions of the policies in different countries.

encourage savings, pushing the savings and investment rates together.[8] This is just the type of government behavior that Summers argues does occur.

Note in equation (5*a*) that if $A$ equals zero, so that the foreign utility function is Cobb-Douglas, the equation breaks down. In this case, the optimal policy is to sell virtually nothing abroad in each period—given the Cobb-Douglas specification, foreigners will spend a fixed fraction of their income buying the domestic good, regardless of the available supply, so that the optimal supply from the home country's viewpoint is zero. Assuming the foreign consumer's utility function to be Cobb-Douglas is *not* an innocuous assumption.

Equation (5*a*) also implies that when $A$ is larger, perhaps due to the home country being smaller, there is less incentive for government intervention. This is consistent with the evidence in Summers which shows that savings and investment are less closely related in a sample of smaller countries than they are in the OECD countries.[9] Even if there were no important government intervention, if $A$ is larger then the behavior of the home country should have less effect on the size of $P_1$ relative to $P_2$ given this utility function, implying that the home country's domestic interest rate would be less affected by the time pattern of its trade balance. This further helps explain the above evidence.

As a second example, assume that the empirical evidence indicates that $\ln H_{i2} = aP_i + Z\beta$ for some set of coefficients $a$ and $\beta$, and for some set of other explanatory variables $Z$. Given this empirical evidence, equation (5) can be reexpressed as

$$1 + f' = (1 + d)\frac{(1 - 1/aP_1)}{(1 - 1/aP_2)}. \tag{5c}$$

In this example, a current deficit should lead to a strong dollar, so a relatively small value of $P_1$. Therefore, equation (5*c*) implies that the government should lower the domestic interest rate, stimulating investment and discouraging savings. This specification implies government behavior contrary to Summers's argument.

At least with the first example, this model helps explain why governments may in fact have acted so as to restrict the trade deficit or surplus. Given the large budget and trade deficit currently in the United States, the model can be used to argue for increased savings incentives and perhaps for a cut in the budget deficit. These policies, by raising the price of goods produced abroad, would improve the competitive

8. Given equation (6) however, we see that there is no incentive to cause the value of the marginal product of capital to differ from the marginal time preference rate.

9. Similar evidence on a weaker association between savings and investment in smaller countries is found in Obstfeld (1985).

position of domestic firms. However, the model would argue against enacting investment incentives, given the budget deficit, and in fact would support raising the required rate of return on domestic investment in line with the increase in the return to savings, contrary to what is advocated by those concerned with international competitiveness. The motivation behind these policies in the model is to prevent the price of U.S.–produced goods from being driven down too far when the debt is eventually repaid and the market is flooded with U.S. goods. Policies which reduce the build-up in the debt, by increasing savings and reducing investment, look attractive within the model.

This model therefore seems to provide a framework that can rationalize not only the evidence in Feldstein and Horioka (1980) that current account deficits and surpluses never become very large but also the argument by Summers that governments seem to set policy to further restrict these deficits and surpluses. How important government policy is relative to market forces in pushing savings and investment rates in a country together remains an open question, however.

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