
International Capital Mobility

What Do Saving-Investment Correlations Tell Us?

MICHAEL DOOLEY, JEFFREY FRANKEL,
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What Do Saving-Investment Correlations Tell Us?

MICHAEL DOOLEY, JEFFREY FRANKEL,
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The finding that countries' investment rates are highly correlated with their national saving rates has been confirmed by many studies. Our interpretation of the saving-investment evidence is that the hypothesis of a high degree of substitutability for claims on physical capital located in different countries is not supported by the data. High international substitutability for bonds would imply the same for physical capital if capital were perfectly substitutable for bonds within each country, but there is no more reason for this assumption to hold than for the assumption that all goods are perfect substitutes.

THE FINDING OF Feldstein and Horioka (1980) that countries' investment rates are highly correlated with their national saving rates has now been confirmed by many subsequent studies. With few exceptions, industrial and developing countries with relatively high levels of or changes in average saving ratios over the past 25 years have also had relatively high levels or changes in investment ratios. There remains little

* Mr. Dooley, Chief of the External Adjustment Division in the Research Department of the Fund, is a graduate of Duquesne University, the University of Delaware, and the Pennsylvania State University.

Mr. Frankel is Professor of Economics at the University of California, Berkeley, and is a graduate of Swarthmore College and the Massachusetts Institute of Technology. This paper was written while he was a consultant in the Research Department.

Mr. Mathieson is Chief of the Financial Studies Division in the Research Department. Educated at the University of Illinois and Stanford University, he was on the staff of Columbia University before coming to the Fund.

agreement, however, on the lessons that can be drawn from this empirical regularity. This paper focuses on the inferences that can be drawn from data for 64 industrial and developing countries over the 1960-84 period. In Section I of the paper, international capital mobility is defined as the condition under which expected differential yields on physical capital in different countries are eliminated by net saving flows, as conventionally measured by current account imbalances.

If capital were mobile in this sense, there would be no reason to predict that countries with relatively high saving ratios over a given period would also have relatively high investment ratios, since savings would be redistributed to countries that offered relatively high rates of return on physical capital. The finding that saving and investment ratios are highly correlated, however, is also consistent with several plausible alternatives to the view that capital is immobile. To organize systematic review of these alternatives, a very general framework is proposed in Section I that allows the statistical covariance of saving ratios and investment ratios to be decomposed into economically meaningful components. In general, the alternative hypotheses do not provide an adequate explanation of the high saving-investment correlations.

This leaves outstanding the apparent contradiction between the saving-investment correlations and the widely discussed integration of international financial capital. To evaluate this problem, an analytical framework is developed in Section II that shows that the failure of net saving flows to equalize international rates of return on physical capital is possible even with highly developed financial markets. It is widely accepted that integration of international goods markets cannot be evaluated by noting that the common currency prices of a subset of goods are equalized. Although there are many "traded" goods for which the "law of one price" holds strictly, the more interesting measure of goods-market integration—purchasing power parity among broad price indices—has in general failed to hold in recent years. This failure, of course, reflects substantial changes in the relative prices of traded and nontraded goods. In contrast, the evidence that expected yields are equalized for a subset of financial assets is widely interpreted as supporting the view that "capital" markets are highly integrated. The implicit assumption is that the observed yields for a subset of "traded" securities are fixed relative to the unobserved yields for claims on physical capital. Because there is little evidence that such an assumption is warranted, the role of current account imbalances in equalizing international rates of return on physical capital remains an interesting empirical issue, and directions for further research are suggested in Section III.

I. Endogeneity and the Interpretation of Saving-Investment Correlations

Many of the difficulties in interpreting saving-investment correlations arise because national saving and investment ratios are endogenous variables. Thus, the finding in cross-section studies that relatively high saving ratios are associated with relatively high investment ratios may not mean that residents accept lower yields on domestic investments, but that factors that generate relatively high saving ratios in a given country also generate relatively high investment ratios. The capital mobility issue can be conceptually disentangled from such problems by considering three conditions that must hold in a very simple framework before no correlation between saving and investment would be expected.

CONDITION 1. *A country's investment rate must depend on a "representative" national real rate of return r but not on other variables that are correlated with domestic saving.*

Thus, while investment is endogenous it depends only on r , a variable that because of capital mobility is determined entirely outside the country in question. For convenience, we assume the relation to be linear:

$$I/Y = a - hr + \epsilon, \quad (1)$$

where I is domestic fixed investment, Y is gross national or domestic product (GNP or GDP), h denotes a linear coefficient, and ϵ is an error term. The statistical support for the relationship between investment and the real interest rate has in fact always been weak. We know that, at a minimum, the error term ϵ must be large. But if investment is to be uncorrelated with saving, it is crucial that this error term be purely random—that it be uncorrelated not only with the national rate of return, but also with national saving. The first subsection below explores this aspect of the endogeneity of saving and investment in some detail and concludes that this problem is so serious that little confidence can be placed in estimates that do not attempt to control for common determinants of national saving and investment.¹

¹ A similar problem arises if measurement errors for investment are incorporated in measures of national saving. In that case the covariance of ϵ and national saving would clearly not be zero. The instrumental variables approach is used in Section II to minimize these difficulties.

CONDITION 2. *The foreign expected rate of return relevant for saving and investment, r^* , must be determined exogenously.*

In other words, the country in question must not be large enough in world financial markets to affect the world interest rate. This problem is also taken up in the following subsections, where it is argued that a more careful evaluation of existing empirical evidence suggests that exogenous determination of r^* is not an important obstacle in interpreting the correlations.

CONDITION 3. *The domestic expected real rate of return relevant for real investment and saving decisions must equal the foreign expected rate of return: $r = r^*$.*

If we think of the capital account balance, KA , as a function of the differential in returns,

$$KA = k(r - r^*), \quad (2)$$

then the hypothesis is that the coefficient k is infinite. Of the three conditions, only this one can properly be associated with the phrase "international capital mobility" as traditionally understood. But, as we argue in Section II, *financial* capital mobility by itself is not sufficient to ensure that even this condition holds.

By using this framework, the covariance between investment and national saving can be decomposed into three parts:

$$\text{cov}(I/Y, NS/Y) = \text{cov}(\epsilon, NS/Y) - h \text{cov}(r - r^*, NS/Y). \quad (3)$$

The assumption that investment depends only on domestic interest rates would suggest that the first term on the right-hand side of equation (3) is zero. The exogeneity of the world interest rates would suggest that the second covariance is also zero. Finally, the assumption of perfect capital mobility would suggest that the third covariance is zero. If one of the three covariances fails to hold—if any one of the links is broken—then there is no reason to expect the investment rate to be uncorrelated with the saving rate.

Each of the three conditions in fact often fails to hold, and so we would not expect the covariance of national saving and investment to be zero, no matter what the degree of international capital mobility. To gauge the empirical importance of these failures, the paper examines the statistical relationship between national saving and investment in a sample that

includes not only 14 industrial countries, but also 50 developing countries.²

Endogeneity of National Saving and Investment

One obvious version of the endogeneity problem that arises in time-series studies is the strongly procyclical nature of both saving and investment, even when expressed as shares of GNP. If an exogenous boom causes both to rise, we do not want to attribute the correlation to low capital mobility. For this reason, Feldstein and Horioka (1980) restricted their analysis to cross-section data, as did most who followed in their footsteps.³ But even in time-series studies, one can cyclically adjust the saving and investment data.⁴

An alternative version of the problem that is relevant even for cross-section studies is that the saving and investment rates both depend on the *rate of growth* of national income—as determined, for example, by population growth or productivity growth. This problem is particularly relevant if the sample includes both industrial countries and developing countries. One solution that has been applied is to add the rate of growth as a second explanatory variable. But the finding has been that holding the growth rate constant, like holding the business cycle constant, does not reduce the coefficient in the saving-investment regressions.⁵

The most popular version of the endogeneity critique is that governments react systematically to current account imbalances so as to offset these imbalances. For example, if the government reacts to a trade deficit induced by an increase in investment by cutting government expenditure or raising taxes, then national saving and investment will be correlated for reasons having nothing to do with capital mobility.⁶

² Summers (1985) and Fieleke (1982) also include developing countries in their samples.

³ Other cross-section studies include Fieleke (1982), Feldstein (1983), Penati and Dooley (1984), Murphy (1984), Caprio and Howard (1984), and Summers (1985).

⁴ Sachs (1981) included a GNP gap variable in his regressions. Frankel (1985) tried two approaches: decade averages on a ten-year time sample of U.S. data, and cyclically adjusted annual saving and investment rates on shorter postwar time samples. A third time-series study is Obstfeld (1986).

⁵ Summers (1985) argued, for developing countries in particular, that the influence of the growth rate on the other two variables explains the saving-investment correlation. Obstfeld (1986) makes the argument carefully, in the context of OECD countries. But Summers (1985, p. 22) added the rates of population growth and GNP growth to his regressions and found no effect on the saving coefficient.

⁶ The "policy-reaction" argument has been made by Fieleke (1982), Tobin (1983), Westphal (1983), Caprio and Howard (1984), and Summers (1985). Summers called it the "maintained external balance" hypothesis.

