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Comment on Lane and Milesi-Ferretti "Long-Term Capital Movements"

Jeffrey Frankel

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In 1985, US statistics showed that the net international investment position turned negative for the first time since World War I. In 1989, the US net international investment position again turned negative for the first time since World War I. How is that possible? In the meantime, a revision had raised the valuation of US assets overseas, by recognizing, for example, increased prices of capital assets acquired in the distant past. This revision was large enough to restore America's net creditor status, though only temporarily.[1] The magnitude of this revision is one indicator of how large the measurement errors in these data are, or at least how bad they have been in the past, which in turn is one reason why they have been so little used. The worldwide discrepancy is another tangible illustration of the problem.

That said, I am persuaded that this line of research by Lane and Milesi-Ferretti is a very useful one. In part this is because of the high marginal product of research in an area where few others have explored. But it is also because the authors have been able to put together data for more countries than were available in the early 1980s. And the variation in the data is sufficiently great that measurement error need not necessarily prevent us from learning anything by examining them.

Overall, the results are much better than I would have predicted. There is little modeling as such. Instead, they offer a variety of theoretical reasons for thinking that income per capita, public debt, and demographics, should each have effects on the net foreign asset position, and these tend to be borne out in the empirical results. In the case of industrialized countries, income per capita has a strong positive effect on the asset position, supporting the idea that countries become creditors as they grow rich. (This certainly fits the experience of the Netherlands and the United Kingdom in their hey-days, the United States until the 1980s, and Japan. The US in recent years is a conspicuous outlier.)

Public debt seems to have a negative effect on the investment position, as hypothesized. This effect is even stronger among developing countries than industrialized countries. The authors explain the discrepancy by the argument that credit

[1] The US data system tends to collect better data on capital flowing in than on capital flowing out. No comprehensive survey of US residents holdings of foreign securities had been conducted since World War II, until one was conducted in 1994. Kester et al (1995). (Measured U.S. net indebtedness is $1.474 trillion as of end-1999, and still climbing rapidly.)

constraints are pervasive in developing countries. But I would have thought that credit constraints for these countries are even worse internationally (capital controls, default risk, recurrent crises, absence of international bankruptcy court) -- that they would find it even harder to finance budget deficits out of foreign borrowing than out of domestic borrowing. I consider this result to be a bit paradoxical, but it is the same paradox found in the Feldstein-Horioka literature: the saving retention coefficient is even higher for industrialized countries than developing countries, which seems inconsistent with the higher capital mobility that we expect for industrialized countries.[2] The big question that this research should try to answer is analogous to the one addressed by the earlier Feldstein-Horioka literature: Are net international investment positions as large as we would expect from neoclassical theory and perfect capital mobility, and if not why not?

The claim is made that economic theory has stronger predictions about the long run relationships among asset stocks than short-run relationships among flows. By way of elaboration, the point is made that theory predicts that the stock of foreign assets should depend negatively on the stock of government debt, but that the relationship between the current account deficit and the budget deficit depends entirely on the origin of the shocks.[3] I think the point is to look at low-frequency relationships, not at long-term capital, whether stock or flow. Perhaps the title of the paper should be long-term movements of capital, rather than long-term capital movements.

The third finding is that demographics matter as well, with the young population reducing the asset position and the peak-earning fifties age cohort adding to it.[4]

Next come estimates with dynamic adjustment. The authors estimate the half-life at five years, and describe this behavior of the investment position as quite persistent. I would have expected slower adjustment, if anything, and am surprised it is not *more* persistent. I suspect that if adjustment were solely by current account surpluses and deficits, the half-life might be longer than five years, and that they are picking variation in exchange rates and asset prices.

In the dynamic estimates, and the panel estimates, the results work less well for the United States, Japan, Germany and United Kingdom. Could this be because these are the countries that borrow primarily in their own currency? A key question is whether we should be thinking of the kind of portfolio balance model where investors are diversifying across currencies of denomination, or the kind where they diversify across

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[2] E.g, Dooley, Frankel, and Mathieson, 1987.

[3] The latter point is certainly true. In the 1980s the US current account grew worse when the budget deficit widened, because the origin was fiscal expansion, whereas in the 1990s the current account grew worse when the budget improved, because both were responding to a "New Economy" investment boom. But is the situation really so different with stocks rather than flows? Mightn't theory predict that the sign of the correlation between the stock of foreign assets and the stock of government debt would reverse, if the driving force were a New Economy boom that raised the return to capital?

[4] The paper mentions that "the over-65 age group exerts a negative effect, consistent with the running down of net foreign assets." In the case of those who have newly retired, I would expect a positive effect on the level of assets. Only for the very old, those who have lived longer than expected, might one look for a negative effect.

countries of issuance. Among other questions that turn on this decision, if it is a matter of currency risk rather than country (default risk), it may be necessary to express foreign holdings relative to total portfolio (wealth) rather than relative to income or exports as the authors do throughout.

I see several remaining puzzles and priorities for future research
(1) The relationship between income and investment position appears to have an inverted-U shape. This follows from the finding that the relationship is positive for one income range and negative for another. If so, the relationship would be analogous to the original Kuznets curve, which said that income inequality gets worse at early stages of industrialization, and then starts to get better when income passes a turning point, and to the so-called environmental Kuznets curve, which says that the same pattern holds for pollution. We observe that high debt brings with it vulnerability to financial crisis. Perhaps all three variables -- inequality, pollution, and debt -- are unpleasant side-effects of growth that people are willing to put up with at early stages when maximizing GDP is the overriding goal, but which they can afford to reduce when the get richer. The authors indeed find some evidence of the U-shaped relationship between income and investment in cross-section data. The puzzle is that they do not find it in time series data.

(2) As the authors say, future research should attempt to distinguish among different components of the net investment position, breaking out FDI, equities and long-term debt from short-term debt -- though it might be necessary at the same time to break out gross assets from gross liabilities. I think we have decided, in the aftermath of the financial crises of the 1990s, that the composition of net capital flows is as important as the total magnitude.

(3) I would suggest trying a more sophisticated approach to measuring the rate of return variable.

A lot can be said on this latter problem.

The authors decompose the expected return differential into two components -- a real interest differential and expected real appreciation.

$$i_{i(t)} - i_{w(t)} - E_t \Delta s_{t+1} =$$
$$(i_{i(t)} - E_t \Delta p_{i(t+1)}) - (i_{w(t)} - E_t \Delta p_{w(t+1)}) - (E_t \Delta s_{t+1} - E_t \Delta p_{i(t+1)} + E_t \Delta p_{w(t+1)})$$

Since the latter term is generally insignificant in their results, they are in effect saying that expected return differentials are determined by differences in real interest rates. I am not sure if this will give the right answer in general. Interest rates in Japan, for example, have been below those in the US for most of the postwar period (real as well as nominal); yet this difference has been approximately offset -- perhaps more than offset, depending on the measure -- by the upward trend in the value of the yen (which in real terms averaged 3 per cent a year). Because yen appreciation was such a strong trend, Japanese bonds paid more than American bonds despite their low interest rate. In other words, real

appreciation of the yen may have been large enough to change the sign of the difference in expected returns.[5]

At the one-year horizon, there is good reason for thinking that speculators expect the real exchange rate to regress gradually toward PPP, at least among the dollar and major European currencies. (Forget the yen.) Actually, there are two reasons for thinking so. First, survey data suggest that expectations of market participants are formed in this way. Second, studies of PPP suggest that the actual real exchange rate process has an autoregressive component, and rational expectations implies that investors' expectations would in turn be formed in this way.

Let me make a pitch for inverting the equation -- running it with rates of return on the left-hand side and asset position on the right. Write the demand for domestic assets as a linear function of the expected return differential:

$$x_{(t)} = \alpha + \beta E_t[r_{i(t+1)} - r_{w(t+1)}]$$

Then invert:

$$r_{i(t+1)} - r_{w(t+1)} = -\beta^{-1}\alpha + \beta^{-1}x_{(t)} + \varepsilon_{t+1}$$

(i) The logic is that measurement errors in the rates of return (ε) are large.

(ii) If the rates of return are measured as ex post returns, then there is a theoretical argument for believing that these large measurement errors -- which are investors' ex post prediction errors -- are uncorrelated with the ex ante asset quantity variable. That theoretical reason is, of course, rational expectations. Let us accept the standard rational expectations methodology for present purposes.

(iii) This specification readily lends itself to intuitive interpretation as the answer to the question: "If I increase my international indebtedness by one percentage point, by how much do I drive up the interest rate I have to pay?"

(iv) If one wants to test the null hypothesis of perfect capital mobility, it is much easier to test $\beta^{-1}=0$ than it is to test $\beta = \infty$.

(v) You can have fun imposing the constraint that β is determined by optimal portfolio diversification, which can give you the constraint that the coefficient matrix is proportional to the variance of the error term ε *in the same equation.* Going to the multi-dimensional case is optional, where β^{-1} is a matrix, proportional to the variance-covariance matrix of ε:

$$\beta^{-1} = \rho E(\varepsilon\varepsilon').$$

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[5] Frankel, 1991, Section 8.2. When Japan removed its capital controls after 1979, the net flow was out rather than in. So perhaps the real interest differentials are giving us the right answer. [This would be easier to understand if we were talking about flows. The low real interest rate in Japan signals an excess of national saving relative to real investment, and the high real interest rate in the US signals the reverse; the discrepancy in each country is the net capital flow.]

Lane and Milesi-Ferretti do invert the equation in part 5, to the extent of putting the ex post real interest differential on the left-hand side. I might understand proceeding in this manner if the logic were that we are talking about assets other than bonds here (e.g., FDI), so that some broad measure of real return to equity is what matters. That gets into the other point about decomposing the aggregate investment position into FDI versus bonds etc. But let us stay with the idea of one aggregate asset. If that one asset were short-term default-free bills, then the only source of uncertainty would be in the exchange rate, for those countries able to borrow in their own currency.

$$r_{i(t+1)} - r_{w(t+1)} \equiv i_{i(t)} - i_{w(t)} - E_t \Delta s_{t+1}$$

This case is particularly simple, and allows one to model and measure the first and second moments with some precision. But it requires also getting data on the stocks of domestic and foreign assets that are outstanding and that thus have to be held by someone, not just net domestic debt to foreigners. Indeed, the net international indebtedness variable, which is the focus of this paper, does not enter into the asset supplies at all. Rather, to get net indebtedness to matter, it comes in as a determinant of demand rather than supply, assuming a home bias in asset demands. Such a home bias is easy to derive from the optimal diversification framework, by the way, because residents of each country consume more of their own goods, and so each view the other's currency as somewhat risky.[6]

I am not recommending that Lane and Milesi-Ferretti go down this route. Their unique contribution is working with the data on the net foreign investment position. Their title and introduction state explicitly that their motivation is to shift the emphasis from short-term flows to long.[7] Long-term loans and bonds, equities and FDI are as important as short-term bonds. As their graphs show, equities and FDI grew rapidly among emerging markets in the 1990s. In these markets, default risk has been as important as exchange risk. So the authors need not focus on short-term interest rates and exchange rates in measuring expected returns. And they need not get sidetracked cumulating government bond supplies in each country.

Even at the stage where the authors continue to aggregate all asset categories together, I would like to propose trying an alternative approach for measuring the aggregate rate of return: the "net investment income" line of the balance of payments, expressed relative to the net international investment position.

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[6] In the framework of mean-variance optimization with nonstochastic goods prices, the home bias in asset preferences is equal to the home bias in consumption preferences, times a term equal to 1 - the inverse of the coefficient of relative risk aversion. (E.g., Frankel, 1994, p.11.)

[7] They describe Feldstein-Horioka as focusing on short-term capital flows. But in fact Feldstein and Horioka gave as motivation for their paper the observation that the existing interest rate parity literature focused on short-term capital mobility and their goal was to address long-term capital mobility. In my view the distinction between short-term and long is misplaced here. Lane and Milesi-Ferretti want to talk about net stocks of assets whereas the earlier literature they have in mind talks about flows. Perhaps a (second) change of title is in order; it should be something like Long-term Patterns in International Investment. And similarly, the contribution of Feldstein-Horioka was not to shift attention from short-term to long, but rather from prices to quantities.

There are certainly problems with this strategy. Even if the data are measured accurately, a serious problem arises if investment income and the investment position the two are of opposite signs, as they were for the United States from 1989 until mid-1998. There is no cure for this problem except to do the disaggregation.) In addition, there are serious errors in the measurement of investment income. They are probably a leading source of both the world current account discrepancy ("horizontal") and the statistical discrepancy in the US balance of payments ("vertical"). Nevertheless, these errors are quite on a par with those in the measurement of the net international investment position itself, and it seems appropriate to study these two important but neglected series together.

The advantage is that you then can avoid deciding what kind of asset you are thinking about, and also can throw the questions of how to measure the real interest rates and expected changes in the real exchange rate out the window and estimate an equation like by (2) above. You can even impose the constraint that b^{-1} is proportionate to the variance of ε.

I look forward to future installments of this work, whether along the lines of my suggestion or not.

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