Are Capital Inflows Expansionary or Contractionary?

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Are capital inflows expansionary or contractionary? One would think that the question was settled long ago. But, in fact, it is not. Standard models, along Mundell-Fleming or more recent incarnations, predict that, for a given monetary policy interest rate, capital inflows lead to an appreciation of the currency, and thus to a contraction in net exports and in output. Only with a decrease in the policy rate can capital inflows be expansionary. Symmetrically, using such model, Paul Krugman argues in his 2013 Mundell-Fleming lecture (Krugman (2013)) that capital *outflows*, which lead to a depreciation, are expansionary.

Emerging market policy makers, however, have a completely different view. They see capital inflows as leading to credit booms and an increase in output, which can only be offset by an increase in the policy rate. They point to a policy dilemma: while the direct effect of an increase in the policy rate is to limit the increase in output, the indirect effect is to encourage even more capital inflows, potentially dominating the direct effect. Recourse to heterodox instruments, such as capital controls, are invoked to overcome this dilemma—see Ostry et al. (2012a) for evidence on the effectiveness of these measures during the global financial crisis.

The evidence appears to support the beliefs of policy makers: capital inflows appear typically associated with appreciations, credit booms, and output increases, and to be major forces in driving boom-bust cycles (Reinhart and Reinhart (2009)).

How can we reconcile model and reality? The answer we offer in this paper is a simple one. We recognize that capital inflows affect the economy through two channels: currency appreciation as captured in the Mundell-Fleming model, and cheaper financial intermediation, as reflected in the policy makers' views. The first effect is contractionary; the second is expansionary. Which of the two effects dominates depends on the nature of the capital flows.

To formalize and explore this idea, we develop a two-country portfolio model. In addition to money, we assume that there are

two domestic assets which are imperfect substitutes, and which we call "bonds'' and "non-bonds''. We think of "bonds" as those assets whose rate of return is directly controlled by monetary policy, as well as assets that are close substitutes. We assume these assets pay the policy rate. We think of "non-bonds'' as an amalgam of all other financial assets, whose spreads over the policy rate can be significantly affected by capital flows—examples are foreign direct investment, domestic equities, and domestic bank liabilities. We think of the spread as a stand-in for the various ways in which capital flows can decrease the cost of borrowing for a given policy rate, from the financing of new investment through FDI, to a decrease in the equity premium leading to an increase in stock prices, to an increase in credit by domestic banks in response to larger bank inflows.

In addition to domestic assets, we assume that there are foreign bonds, which are imperfect substitutes for the other assets in the model. Foreigners and domestic residents choose between domestic bonds and non-bonds, and foreign bonds. The formal model is articulated in Blanchard et al. (2015), but its implications are explained intuitively below. Which assets—bonds or non-bonds—foreigners want to buy is very much of the essence for what happens to the economy.

I. Bond and non-bond flows

Take an increase in foreigners' demand for domestic bonds. Assume the rate on bonds, which is the policy rate set by the central bank, is fixed. The increased foreign demand for domestic assets leads to an appreciation. The appreciation leads in turn to an expected depreciation, which makes holding domestic non-bonds less attractive to domestics and foreigners. Lower demand for non-bonds leads to an increase in the spread. The outcome is an appreciation and a higher spread, and both are likely to be contractionary. In terms of flows: The larger inflows into domestic bonds are offset by larger outflows into foreign bonds.

Take instead an increase in foreigners' demand for domestic non-bonds. Assume again that the policy rate is fixed. The increased foreign demand for domestic assets leads to an appreciation. But the higher demand for non-bonds leads to a decrease in their spread. Depending on the net effect of the appreciation and the lower spread, non-bond inflows may be contractionary (though less so than bond inflows) or expansionary. In terms of flows: The larger inflows into domestic non-bonds are offset by larger outflows into foreign bonds.

The model therefore offers a tentative reconciliation between the Mundell-Fleming

prediction and policy makers' views. Whether inflows are contractionary or expansionary depends on their nature. Bond flows, at a given policy rate, are contractionary. Non-bond inflows, at a given policy rate, may be expansionary, depending on the strength of their effects on the exchange rate and spread. They are more likely to be expansionary in primitive financial systems where non-bond inflows may have larger effects on the spread—leading to a credit boom and output increase despite the appreciation—than in advanced financial systems.

II. Policies

Before turning to a discussion of "optimal" policy interventions, it is worth going through the simple mechanics of such interventions in the model. Consider first sterilized foreign exchange intervention in which, in response to capital inflows, the central bank purchases foreign bonds and sterilizes the effects of the intervention by selling an equivalent amount of domestic bonds. By doing so, it keeps the money supply, and by implication, the policy rate constant. Such an FX intervention can reduce or even cancel the effects of inflows on the exchange rate. Its effect on the spread depend very much on the nature of inflows.

Take an increase in foreigners' demand for domestic bonds. And assume that FX intervention is aimed at keeping the exchange rate constant. Then, all that happens is a change in the ownership of foreign and domestic bonds (with foreigners holding less of the first and more of the second, and the central bank holding more of the first, and less of the second). The purchases of foreign bonds by the central bank, in an amount equal to the purchases of domestic bonds by foreigners, leave the exchange rate unchanged. And with no change in the exchange rate and no change in the demand for non-bonds, there is also no change in the spread.

Take instead an increase in foreigners' demand for domestic non bonds. Then FX intervention can again, by increasing the domestic demand for foreign bonds (coming from the central bank), offset the increased demand by foreigners for domestic assets, and leave the exchange rate unchanged. This however leads to a larger decrease in the spread. The lack of currency appreciation makes foreign investors more willing to buy domestic non-bonds, leading to a larger decrease in the spread than in the absence of FX intervention.

In short, FX intervention can reduce or eliminate currency appreciation but, by doing so, amplifies the effects of the non-bond flows on the spread.

Turn to capital controls. If across the board (and successful), they can, in contrast to FX intervention, limit the size of the inflows, and thus reduce or even eliminate their effects on the exchange rate and on the spread.

Targeted capital controls have interesting implications. Capital controls on bond inflows, which for example prevent bond inflows altogether, obviously eliminate any effect they would have had on the exchange rate and on the spread. But they lead to a stronger appreciation and a larger decrease in spreads in response to an increase in non-bond inflows. The reason is that they remove one of the offsetting mechanisms present in the absence of controls, namely the decrease in the demand for domestic bonds by foreigners in response to an appreciation: In the presence of controls eliminating bond flows, foreigners do not hold domestic bonds and thus cannot decrease their demand.

Finally, consider a change in the policy rate. A change in the policy rate leads to an equal change in the rate on non-bonds, leaving the spread unaffected. Thus, just as in the Mundell Fleming model, the choice of the policy rate affects the relative movements in the exchange rate and the policy rate.

If the central bank wants to prevent appreciation in response to bond inflows, it must decrease the policy rate, and by implication, decrease the rate on non-bonds. Contrast this with the use of FX intervention, where the central bank can prevent the appreciation without affecting the policy rate or the rate on non-bonds.

If the central bank wants to prevent appreciation in response to non-bond inflows, it must again decrease the policy rate. The rate on non-bonds then declines for two reasons: the decrease in the policy rate and the decline in the spread. The decline in the spread is again larger than under FX intervention.

The bottom line is that each of the tools has a different effect on the exchange rate and on the rates on bonds and non-bonds. For example, if the goal of policy is to prevent appreciation, all three tools can achieve it (leaving aside implementation issues here), but with different effects on the rate of return on non-bonds: Use of the policy rate leads to the largest decrease in the rate of return, followed by FX intervention, followed by capital controls. The fact that they have different effects also implies that the optimal policy will typically involve some combination of the three tools.

Our model however falls far short of what is needed to derive this optimal choice. Whether and how the central bank should use these tools depends on the underlying distortions in the economy. Appreciation implies an

increase in real income, but Dutch disease concerns (Blanchard (2007), Farhi and Werning (2012) and Caballero and Lorenzoni (2014)) may justify preventing excessive appreciations that do lasting damage to the tradables sector. The decrease in the spread in our model may capture financial deepening, and a desirable decrease in the cost of financial intermediation. It may (and indeed often does) instead reflect excessive credit growth, raising the risk of a subsequent financial crisis. Finally, traditional macro distortions such as nominal rigidities may justify the use of different instruments—including the policy rate—to maintain aggregate demand and potential output roughly in balance. For all these reasons, the central bank may care about the degree of appreciation of the currency, the size of the decline in the rate on non-bonds, or both. A central bank which wants for example to limit appreciation, maintain output, and decrease the spread may want to use a combination of changes in the policy rate and FX intervention to achieve its desired outcome.

It may be worth noting how our model and its policy implications relate to Rey's "global financial cycle" proposition. Like her, we capture the notion that capital flows have effects on the financial system beyond the effects through the exchange rate. Thus, countries are likely to be affected by capital inflows, whatever their exchange rate regime. In one dimension however, our conclusions may be more optimistic than hers. At least in theory, countries have a combination of instruments they can use to shape the effects of these capital flows. In particular, with two policy instruments, FX intervention and the policy rate, and two targets, it is theoretically possible to achieve objectives for the exchange rate and the rate of return on non-bonds without resorting to capital controls (see also Ostry et al., 2012b).

III. Some empirical evidence

We have tested our hypothesis that non-bond flows are more likely to be expansionary than bond flows by looking at a sample of 19 emerging market economies since 2000 at a yearly frequency. The sample consists of Brazil, Chile, Colombia, the Czech Republic, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Romania, Russia, Thailand, Turkey and South Africa. For a description of the variables used and details on the estimation, please refer to Blanchard et al. (2015).

Conceptually, our analysis is about variations in flows which are exogenous to the country. Flows are however often triggered by developments in the country itself. To

overcome this identification challenge, we follow Blanchard, Adler and de Carvalho (2015) and use global flows to the other emerging market countries as instruments, on the maintained assumption that these global flows are unlikely to be correlated with country-specific shocks. This provides as many instruments as there are categories of flows, and allows us to estimate the effects of different types of flows on domestic activity and credit. Since flows to different countries can be more or less sensitive to global flows (e.g. some are safer and less dependent on the global flow cycle), we interact the global flow variables with country specific dummies.

Our estimates, based on a regression that also controls for lagged growth, partner country growth and change in terms of trade, indicate that bond flows do not have a significant effect on growth. In contrast, an increase in exogenous non-bond flows of 1 percent of GDP increases GDP growth by 0.31 percentage points. These results support our main theoretical conclusion. When non-bond flows are disaggregated into FDI, portfolio equity and "other flows" (roughly half of which represent changes in domestic bank liabilities), the effect of each of these types remains positive, significant, and roughly of the same magnitude.

These estimates do not control however for the policy response induced by these flows. As we have seen, the policy response can change the resulting effect on output and credit. Thus, we add two policy variables to our regressions, FX intervention and the policy rate. Given the endogeneity of both policy measures, two additional sets of instruments are needed. We use the VIX and the 3-month US T-bill rate, both interacted with country dummies, as additional instruments. The coefficients on bond flows and non-bond flows are roughly similar to those reported above when these two instrumented policy variables are included.

We have also explored the effect of the different flows on the change in private credit normalized by GDP. The effect of bond flows is positive, but insignificant. The effects of non-bond flows vary by type. FDI flows have a large negative and significant effect on credit: a plausible explanation is that some of the intermediation which would have taken place through banks is now replaced by FDI financing. Portfolio equity flows have a large positive, but statistically insignificant, effect on credit. "Other flows" have a positive, large and statistically significant effect on credit. An increase of 1 percent of GDP in "other flows" leads to a 0.6 percentage point increase in credit relative to GDP. Controlling for the

instrumented policy rate and FX intervention does not change the results.

IV. Conclusions

Theory suggests that, for a given policy rate, bond inflows lead to currency appreciation and are contractionary, while non-bond inflows lead to an appreciation but also to a decrease in the cost of borrowing, and thus may be expansionary. The empirical evidence is broadly supportive. Exogenous bond inflows appear to have on average small negative effects on output, while exogenous non-bond inflows appear to have a positive effect. Our analysis has important implications for the use of policy tools to deal with inflows. The tools have to be used in combination. And different combinations of tools must be used depending on the nature of the flows.

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