Discussion of Valentina Bruno and Hyun Song Shin, "Capital Flows and the Risk-Taking Channel of Monetary Policy" *

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Valentina Bruno and Hyun Song Shin (2012) have contributed a very interesting and thought-provoking paper to this conference. They set up a model of an advanced economy (AE) where a parent bank lends in dollars to a local branch in an emerging economy (EE). The local branch then lends in dollars to EE borrowers. They show that a lower interest rate in the AE, all else equal, leads to an increased capital flow into the EE. The increased capital inflow in turn leads to an appreciation of the EE's currency, which improves the balance sheets of EE borrowers and leads to an amplified capital inflow. They also provide some empirical analysis with a VAR-model that indicates that a lower federal funds rate stimulates cross-border capital flows.

In my discussion, I first want to make the point that their model only has real interest rates and a real exchange rate. It does not have nominal policy rates that are distinct from the real interest rate and it does not distinguish between nominal and real variables. In particular, it does not contain any nominal frictions that make monetary policy meaningful, and it does not take into account that monetary policy can only temporarily make the actual short real interest rate deviate from the time-varying neutral (or "natural") short real rate, which is determined by other things than monetary policy, for instance, global imbalances, fiscal policy, and shocks to saving and investment. Thus, in spite of its title, their paper is arguably not about monetary policy but about real interest rates and capital flows between the AE and EE.

In my discussion, I will first compare with the standard open-economy macro analysis of cross-country interest-rate differentials, capital flows, and exchange-rate movements. Then I will comment on the EE borrowers' balance sheets, say something about optimal risk-taking and interest-rate differentials, and raise some issues about regulation and macroprudential policy in the model. Finally, I will suggest that the issues discussed in the paper also apply for cross-border capital flows between advanced economies with different interest rates and briefly refer to the situation in Sweden which has higher short interest rates than the euro area and the U.S.

The standard open-economy macro analysis: UIP

Consider the standard open-economy macro analysis of the effects of a fall in the AE currency interest rate for a given EE currency interest rate. A lower AE interest rate then increases the interest-rate differential between the EE and AE and leads to an incipient capital inflow, which under flexible exchange rates in turn leads to an immediate EE currency appreciation and expectations of a future EE currency depreciation. If the appreciation is sufficient to result in an expected future depreciation that balances the increased interest-rate differential, the

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expected rate of return for an AE investor is the same for an investment in AE currency (dollar) and an investment in EE currency. That is, uncovered interest parity (UIP) holds. Then the incipient capital inflow does not materialize into any actual capital inflow, or at least the capital inflow stops after some initial inflows.

What is the appropriate monetary policy response in the EE in this situation? The appreciation dampens export and tradable production and stimulates nontradable production, and it reduces the inflation of imported goods. If policy was appropriate initially and then the negative effect on tradable production and inflation dominates, a lower policy rate that stimulates the EE and somewhat reduces the appreciation is called for.

In practice, it seems that EE monetary authorities in such a situation with lower AE interest rates often do not want to accept the initial appreciation of the currency and instead intervene in the foreign-exchange market or impose some capital controls to resist the appreciation. That is, the monetary authority tries to prevent the equilibrium exchange-rate response that is consistent with UIP. Then AE investors may expect that the central bank will eventually fail to prevent the appreciation, thus making investment in the EE doubly attractive for AE investors. They can profit both from the higher interest-rate differential and from an eventual appreciation. The capital inflow may increase further. Thus, preventing the equilibrium appreciation of the currency may make the capital-flow problem worse.

The balance sheets of EE borrowers

In the Bruno-Shin model, the appreciation of the EE currency is assumed to improve the balance sheets of EE borrowers, since the dollar value of their assets increases relative to the dollar value of their debt. However, if these borrowers are EE exporters, their export and their dollar profits will be hurt by the appreciation, since their dollar costs of production in the EE rise. This effect is missing in the Bruno-Shin model. On the other hand, if the borrowers are producing nontradable goods and services, their production and profits may benefit from the appreciation. This shows that one needs to assess the full general equilibrium effects on the borrowers' balance sheets in order to know whether they on average will improve or deteriorate.

The risk-taking channel and optimal risk-taking

Whether an increased interest-rate differential between the EE and the AE leads to increased risk-taking by the local branch in the EE is not completely obvious. It clearly depends on whether the increased interest-rate differential is moderated by increased expected currency depreciation or not. Under the assumption that the increased interest-rate differential is not fully moderated by the expected depreciation, the increased interest-rate differential means that the expected rate of return from borrowing in the AE currency (dollar) and investing in the EE increases. Whether that leads to more or less risk-taking then depends on the precise form of preferences between the expected rates of return and the risk of the AE bank and the local branch.

Figure 1 shows a stylized example of this, using the standard capital asset-pricing model (CAPM) for the local EE branch of the AE parent bank.[1] The expected dollar rate of return is measured along the vertical axis and the risk, defined as the standard deviation of the dollar rate of return, is measured along the horizontal axis. The concave curve through point B is the efficient frontier of local-branch risky investment opportunities without any dollar borrowing from the AE bank. We can think of these local investment opportunities as the lending of the

[1] See Apel and Claussen (2012) for a discussion of the risk-taking channel with the help of the CAPM.

local branch to local firms, using some capital that the local branch initially has received from the AE bank. If the local branch can borrow from the AE bank at the safe dollar interest rate *f*, corresponding to point A, point B on the efficient frontier shows the expected rate of return and the risk of the optimal combination of local investment projects without any dollar borrowing. The investment-opportunity line for the local branch with dollar borrowing is then the segment of the solid line from point A through B that starts from point B and extends through and beyond point C. By borrowing at the rate *f*, the local branch can increase its leverage and invest in more local projects (in the optimal combination of projects corresponding to point B). In this way the local branch can reach the combinations of expected rate of return and risk on the investment-opportunity line north-east of point B.

The relevant preferences over expected rates of return and risk (the preferences of the shareholders of the AE bank that controls the local branch) are given by the convex indifference curves shown. Higher expected rates of return and less risk are preferred, so indifference curves have a positive slope. The optimal investment/borrowing choice is given by point C, the most preferred point on the investment-opportunity line, which will be a tangency point between the investment-opportunity line and the highest reachable indifference curve. The optimal risk-taking is given by the horizontal coordinate of point C, the horizontal distance between point C and the vertical axis. The leverage of the local branch, that is, its total assets over its capital, is given by the length of the segment AC divided by the length of the segment AB. The price of risk, the marginal increase in the expected rate of return from a marginal increase in the risk, is given by the slope of the investment-opportunity line.

Suppose now that the dollar interest rate falls to *f* ', corresponding to point A' in figure 2. The expected rate of return and risk for the new optimal combination of local investment projects is then given by point B', and the new investment-opportunity line with dollar borrowing is the segment of the line from point A' through B' that starts from point B' and extends through and beyond point C'. The new optimal investment/borrowing choice is given by point C', the new tangency point between the new investment-opportunity line and the new highest reachable indifference curve. Whether the new optimal investment/borrowing choice involves more or less risk-taking than the previous choice depends on whether the point C' is to the right or left of point C. This in turn depends on the precise nature of the preferences between expected rates of return and risk.

Since the new investment-opportunity line is steeper, the price of risk has increased, and a marginal increase in the risk brings a larger increase in the expected rate of return. Therefore, a pure “substitution” effect would tend to increase risk-taking. On the other hand, the new optimal investment/borrowing choice corresponds to a higher indifference curve, resulting in an “income” effect that may increase or decrease risk-taking. For the special case of quadratic preferences, the “expansion curves” representing the income effect are vertical lines, in which case there is no income effect on risk-taking. Then, the substitution effect dominates. But quadratic preferences are a special case. Thus, it is not completely obvious whether a fall in the dollar interest rate always leads to more risk-taking by the local branch.

Furthermore, in figure 2, the risk-taking by the local branch is *privately* optimal, given the AE bank’s shareholders’ preferences over the expected rate of return and the risk. Whether the risk-taking is *socially* optimal or not depends on whether there is some underlying systematic distortion of the local branch’s investment/borrowing choice, causing too much or too little risk-taking relative to what is socially optimal.

The Bruno-Shin paper does not specify what the market failure, externality, or distortion is that may cause actual risk-taking to be too high or too low. There are references to "measured" risk, but there is no discussion of what the "true" risk might be.

Generally, is there too much or too little risk-taking today, after the 2008-2009 financial crisis and during the new euro-area crisis? Whereas there was in many cases obviously too much risk-taking before the 2008-2009 crisis, now there may in many cases be excessive risk aversion and too little risk-taking.

Regulation and macroprudential policy

In the Bruno-Shin model, the local branch's behavior is given by a binding Value-at-Risk restriction. The consequences of regulation and macroprudential policy according to Basel III are not considered. In the model considered, it would be interesting and highly relevant to see what the consequences are of a Basel-III regulation with binding minimum capital requirements, a minimum net stable funding ration (NSFR), and so on. My guess is that the results may be quite different.

Not only emerging economies? What about Sweden?

The analysis in the Bruno-Shin paper is of an EE for which the interest-rate differential to an AE increases when the interest rate in the AE falls. Then capital flows into the EE increase, with possible increased risks to financial stability. However, the analysis also seems to apply to an AE where the interest rate increases relative to the rate in other AEs. Sweden is arguably such a case.

The Swedish policy rate and the overnight rate are high, currently (in July 2012) 1.5 %. This is against the dissent of my colleague on the Riksbank Executive Board Karolina Ekholm and I – both of us would prefer a lower policy rate since current and forecasted inflation is below target and current and forecasted unemployment is above any reasonable estimate of a long-run sustainable unemployment rate (see Svensson (2012) and the attributed minutes from the July 2012 policy meeting, Sveriges Riksbank (2012b)).

In contrast, the Eonia rate in the euro area and the federal funds rate in the U.S. are much lower. The substantial interest-rate differential makes carry trade and capital flows into Sweden – borrowing at euro or dollar short rates and investing at krona short rates – quite attractive. This offers increased opportunities for foreign funding to Swedish banks. However, as is emphasised in the Riksbank's (2012a) *Financial Stability Report*, this entails risks as foreign investors may suddenly stop lending. When the Swedish policy rate is raised in relation to foreign rates it becomes even more attractive for foreign investors to fund Swedish banks and even easier for Swedish banks to increase their foreign funding. This is an example of a situation where raising the policy rate will if anything increase rather than decrease the risks to financial stability.

References

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Figure 1. Expected rate of return, risk, and optimal risk-taking

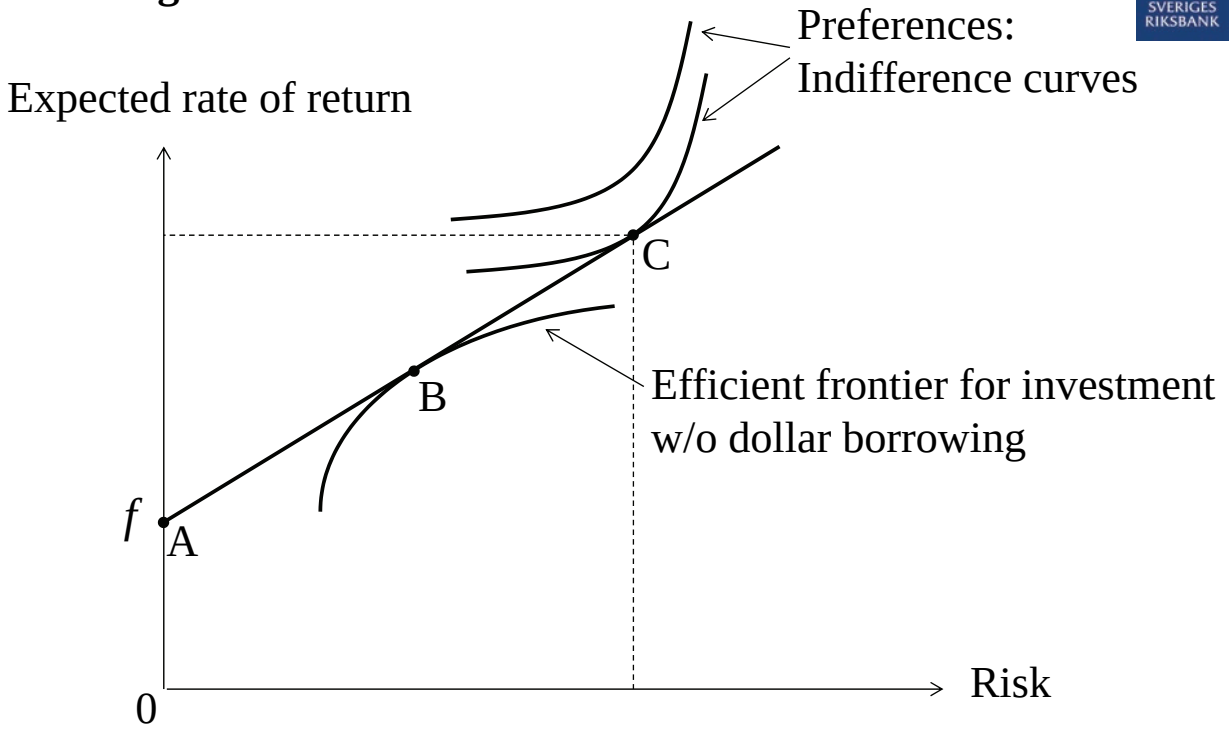

Figure 2. Lower dollar interest rate: More or less risk-taking?