

Financial openness, exchange rates and macroeconomic volatility

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The last economic crises that have occurred in developing economies have entailed a growing debate upon the role of external finance triggering and exacerbating financial and exchange rate crises. But more radically the view that the drawbacks of financial openness may be larger than its benefits is being more and more considered. It is now widely believed that although policies aiming at developing financial markets are in the long run associated with a higher growth rate, some economies and especially developing ones can at some time of their development path be in situations where economic policies aiming liberalization may be very harmful. Among these policies, financial openness has been a good candidate to blame because of the possibility it has given to firms to contract external debt. This possibility given to firms has been considered as problematic because while traditional theories regard changes in the exchange rate as a mean to restore price competitiveness, introducing external debt in the liabilities of firms changes radically the influence of the exchange rate. A devaluation or depreciation of the local currency may fail to restore price competitiveness as it prompts firms to bankruptcy by increasing the burden of their debt repayments. This is especially true for firms producing non-tradable goods. For these firms, devaluation increases the burden of liabilities without altering the price of goods produced. A slight change in the exchange rate can then generate bankruptcies which may spread then to other sectors. Building on these ideas a number of papers have already tried to exhibit some mechanisms under which financial openness may be harmful. Caballero-Krishnamurty (2000) for instance uses this type of two sectors models to show that external finance is problematic because an economy is then confronted to two types of constraints. In their model, agents have first a limited capacity to borrow from the rest of the world because only assets of firms in the tradable sector, are accepted by foreign lenders. Second, firms in the non-tradable sector, which cannot borrow from international capital markets, have limited capacity to borrow from firms in the tradable sector. The combination of these two constraints then produces an externality that results in an inadequate precaution of firms in the non-tradable sector against adverse shocks, thereby generating excess volatility. Aghion-Bacchetta-Banerjee (2001) also shows that the availability of external debt in a monetary model with rigidity in prices may be at the root of economic

instability. Assuming nominal prices rigidity, a currency depreciation reduces the profits of domestic firms that borrowed in foreign currency. Since lower profits reduce net worth, that may result in a fall in the demand for money, and thus a currency depreciation in that next period and arbitrage in the foreign exchange market will imply a contemporaneous depreciation as well. But then the question that then naturally arises is why firms that know the possible problems posed by external debt still choose to contract it? In other words is it possible to build a positive theory of debt composition? The answers given up to now have been quite restrictive. Caballero-Krishnamurty simply assumes that non-tradable goods producers are excluded from the foreign debt market, this exclusion being a necessary assumption to generate the externality they have. As to Aghion-Bacchetta-Banerjee, due to the well-known effect of limited liability constraints, agents become risk lovers which means that the higher the probability of a devaluation the larger the foreign debt contracted. Moreover in these two models, price stickiness (in the form of short-term rigidity or in the form of non-tradables) is essential to have liabilities increased by an exchange rate depreciation without any change in assets, thereby generating corporate bankruptcies. Here we abstract from all these considerations to concentrate on a single sector economy with a single tradable good without perfect price flexibility. Our core mechanism can be summed up as follows: As noted external finance is problematic since the evolution of the exchange rate drives partly debt burden repayments. But as important as this first remark, the future evolution of the exchange rate determines how collateral is valued by foreign investors *ex ante*. Therefore the exchange rate in a financially opened economy plays at least three roles: First the traditional role which consists in determining the relative price of foreign and local goods. Second the *ex post* role, which determines how heavy debt repayments for firms relying on external debt can be. Third, the *ex ante* role, which determines how large entrepreneurs' foreign debt can be. Then if we take the example of a firm with a CRTS technology which aims at choosing its optimal debt portfolio, a devaluation will reduce profits not only because debt repayments will be higher but also because the capital invested will be lower. Therefore such a firm will have strong incentives to stay away from foreign debt when devaluation is anticipated. On the other hand if an exchange rate appreciation is expected then firms should contract foreign debt. Therefore it looks like we have a mean reverting process where the equilibrium is unique. However it is not the case. Multiple equilibria can arise around the firms indifference point between local and foreign debt. This story goes as follows: If we assume that firms have a better access to local lenders than to international investors, then the amount of debt they can raise from foreign lenders will be lower than what they can get from local capital markets.

Therefore at the indifference point the amount of debt will be higher under local borrowing but the profitability of debt will be higher under foreign borrowing. Now given that the trade balance depends for imports upon the capital stock invested, the trade surplus will be higher under foreign borrowing than under local borrowing because then the capital stock invested is lower. Then under local borrowing we will need a devaluation to balance the trade deficit while under foreign borrowing, if the surplus is enough to finance foreign debt repayments then we will have an appreciation. In these two cases, the exchange rate evolution goes in the direction that justifies financial choices that were made *ex ante*. That's the reason for multiple equilibria. However this mechanism needs a strong assumption to be relevant. It needs the local credit supply be constant and invariant to changes in demand for local credit. If that is not the case, then a mean reverting mechanism would appear. Suppose for instance that firms decide to contract more foreign debt to finance their investments. Then the decrease in the demand for local debt should translate into a decrease in the price of local debt, *i.e.* a decrease in the local interest rate charged by local lenders. This change increases the profitability of local debt and entrepreneur's incentives to contract local debt. This implies that if the exchange rate evolution and the local interest rate are positively correlated then the mechanism described is not relevant. Therefore we need a general equilibrium model where the exchange rate and the local interest rate are endogenously determined, to assess the pertinence of the last mechanism. With this aim in view, let us come back to the first remark upon quantity vs. profitability. We noted that around the indifference point, local debt must be profitable but larger than foreign debt. However if we consider large exchange rate appreciations then foreign debt will be more profitable than local debt and the amount of foreign debt than can be raised will also higher. Therefore in this case we would need a very large decrease in the local interest rate to have firms choose local debt. But if the interest rate decreases to much then agents will be reluctant to lend their capital. Instead they will invest in their own assets whose return will then be higher. In other words the local interest rate will be too high compared to what is needed to have firms be indifferent between local and foreign debt and we will end up with a situation where firms generate external debt and other agents invest in their low productivity assets. The question is now how sustainable this situation can be. In fact it could appear as unsustainable because due to the large amounts of capital borrowed from abroad, imports as well as foreign debt repayments will be large. However, this situation will effectively be sustainable because the growth rate of this economy will also be large (due to the large capital stock invested) and debt capital outflows will be small (due to the large appreciation in the exchange rate which is due to the fall in the local interest rate).

Then if the following generation of firms behaves accordingly, *i.e.* borrows from foreign lenders, then there will be a massive inflow of capital thereby generating a large exchange rate appreciation which justifies to borrow from abroad. On the contrary if agents anticipate a large depreciation then agents will choose internal debt. That may exert a pressure on the supply for local credit and translate into an increase in the local interest rate. However if the exchange rate depreciation is sufficiently large then it will still be optimal to borrow locally. Then assuming that exports are low we will need a large depreciation to balance the trade balance, which will justify firms' expectations. Therefore to sum up, one can say that the availability of external finance naturally produces multiple equilibria situations essentially because the same variable (the exchange rate) plays two different roles (*ex ante* collateral value and *ex post* debt profitability). Moreover if we embed this mechanism in a general equilibrium model then the multiple equilibria situation will still prevail. The pecuniary externality of firms financing decisions on the local interest rate reinforces the multiple equilibria situation. Building on these ideas, the model is able to replicate some stylized facts observed in financially opened economies. First financial openness decreases the costs associated with firms financing. This means that firms have access to a cheaper means of financing which consists in foreign borrowing but it also means that financial openness reduces the local interest rate. Second the exchange rate and the local interest rate, have a positive covariance. This implies that a depreciating exchange rate is always associated with a higher local interest rate. Third, developed economies are mainly locally financed. Fourth openness can generate instability if the local credit market is intermediately developed. This implies that financial openness cannot be at the root of fluctuations in developed economies nor in poor economies. Finally firms profitability is higher under foreign borrowing than under local borrowing. In other words, the higher the quantity of firms contracting locally the lower will be the mean profitability.
