A Solution to Two Paradoxes of International Capital Flows

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Introduction

- This is a very interesting paper, which truly I enjoyed reading.

- It tackles important issues in a new, extremely promising way.

Discussion Outline

- I will begin by reviewing some key ingredients of the analysis.

- Next, I will offer comments on a direction where I would take this agenda if I were in Jiandong and Shang-Jin's place.

The Paradoxes

1. Lucas (1990, *AER*): Capital flows from rich to poor countries are far too small relative to implied differences in marginal returns to capital in a one-sector model.

2. With free trade in goods, returns to factors are equal across countries even without factor mobility in a neoclassical two-sector, two factor model. Hence, *any* observed capital flow is excessive.

• How do we explain/reconcile 1 and 2?

• It is tricky, because familiar solutions to the Lucas paradox remain subject to factor price equalization (FPE), and proposed reasons for departures from FPE do not resolve the Lucas paradox.

Jiandong and Shang-Jin's Solution

• Combine a traditional Heckscher-Ohlin-Samuelson (HOS) trade model with Holmström and Tirole's (1998, *JPE*) liquidity provision model.

• Jiandong and Shang-Jin develop a two-country version of Holmström and Tirole's (HT) model, extended to incorporate a familiar two-good, two-factor production structure.

• In practice, they turn the HT setup into a model of international capital provision underlying the traditional HOS structure.

• The combination delivers a rich set of results.

• Specifically, it can replicate the constellation of capital flows observed in reality, depending on two key institutional features:

- Financial system development;

- Protection of property rights.

• By doing so, the framework provides a rigorous explanation for empirical results such as those in Alfaro, Kalemli-Ozcan, and Volosovych (2005, NBER WP).

Some Ingredients

• A crucial ingredient for the paper's results is that return to financial investment does not coincide with return to physical investment, owing to the moral hazard problem embedded in the HT model.

• Financial investors obtain only a slice of the return to physical capital, since a portion of the latter must be used to induce entrepreneurs to supply effort.

• The more developed the financial system, the larger the slice that goes to investors.

• Agents' choice over becoming a financial investor or an entrepreneur is endogenous.

• With constant returns to scale at the firm level but heterogeneity in entrepreneurs' ability, sector expansion results in entry of lower-ability entrepreneurs, which lowers the sectoral return to investment.

• Even if free trade equates product prices, factor returns remain different across countries, ensuring departure from FPE.

The Role of Property Rights and Financial Development

• Following HT, the model features a two-period production structure.

• After the initial investment (K_i^1) by the "representative" firm in sector i, an additional, stochastic amount of resources ($\rho_i K_i^1$) is required for the firm to continue operation.

- ρ_i is distributed across sector i firms according to the CDF $F_i(\rho)$, with density $f_i(\rho)$.

• If $\rho_i K_i^1$ is paid, the production project is continued and generates output $y_i = G_i(L_i^1, K_i^1)$

• The first-best continuation decision is such that all firms with $\rho_i \leq \rho_i^1 = \lambda R_i$ continue their projects, where R_i is the total return to one unit of capital ($p_i y_i$ - wL_i^1) and λ is the probability of project success (tied to high entrepreneur effort).

• Jiandong and Shang-Jin identify λ with the extent of property rights protection.

• A capitalist *n* who is considering becoming an entrepreneur is endowed with one unit of capital but must raise additional capital from investors to ensure ability to continue production in the face of further, uncertain capital requirements.

• Investment is subject to a moral hazard problem: A portion ($R_{ni}^{E}(\rho_i)$) of the revenue per unit of investment must be paid to entrepreneurs to induce them to supply effort, so that investors are left with R_i - $R_{ni}^{E}(\rho_i)$.

• The maximum amount that the entrepreneur can promise to repay is $\rho_{ni}^{max} = \lambda(R_i - R_{ni}^{E}(\rho_i))$.

• Incentive compatibility requires $R_{ni}^{E} = c_{ni}/\lambda$, where c_{ni} is the cost of supplying effort.

• The second-best continuation policy is a cutoff rule such that production continues if $\rho_i \leq \rho_i^*$, with $\rho_{ni}^{max} < \rho_i^* < \rho_i^1$.

• Jiandong and Shang-Jin introduce here a parameter θ that indexes the degree of financial development of a country.

• They assume that the country's financial system meets capital requirement shocks up to the threshold $\theta\rho_i^*$.

• The higher θ, the more financially developed the economy, the closer it is to the second-best equilibrium.

• This is where their analysis departs from HT and where I would like to offer comments on a direction that Jiandong and Shang-Jin may consider pursuing in future work.

Intermediaries

• The characterization of financial development by means of the parameter θ is very parsimonious and it allows Jiandong and Shang-Jin to obtain a set of clean, analytical results.

• However, there are deep issues underlying the convenient summary parameter θ.

• Even in the absence of aggregate uncertainty, the economy's stock market will not be able to provide the resources for implementation of the second-best equilibrium.

• The reason is that, *ex post*, investors would not be willing to inject resources in projects whenever $\rho_{ni}^{max} < \rho_i$.

• Therefore, to cover capital requirement shocks up to the cutoff ρ_i^*, one must find a way for investors to commit funds *ex ante*.

• As HT show, this function can be performed by intermediaries that implement the second-best equilibrium by ensuring the optimal distribution of capital across firms.

• In particular, intermediaries perform an optimal insurance role, subsidizing firms with a high capital demand by allowing them to draw on the market value of firms that experience a low capital requirement.

• Given that the stock market will not provide sufficient resources for implementation of the second-best equilibrium, we can think of the parameter θ in Jiandong and Shang-Jin's paper as capturing the extent to which the economy features an appropriate structure of intermediation.

• I see going deeper into the issue of intermediation and the role of banks as a natural extension of this work.

• Why?

• Intermediaries perform a monitoring role that ameliorates moral hazard problems at the firm level.

• On the other hand, monitoring itself may be privately costly, introducing a moral hazard problem at the intermediary level.

• This is explored in Holmström and Tirole (1997, *QJE*).

• HT97 show that moral hazard forces intermediaries to inject some of their own capital into the firms they monitor, making the aggregate amount of intermediary capital one of the constraints on aggregate investment.

• It would be interesting to explore these mechanisms in the international context – and their implications for capital flows.

• The analysis would naturally lead to studying the role of supervision and international institutions (Tirole, 2002, Princeton U Press).

• In addition to the issue of monitoring and related moral hazard, there is another reason for explicit modeling of intermediaries, tied to the possibility of financial market power.

• Remember that there is an endogenous entry decision in productive activity in the model.

• In the general equilibrium of the two-country model, this endogenous entry decision is a crucial determinant of capital flows.

• This feature is shared with Ghironi and Melitz (2005, *QJE*), where international borrowing takes place to finance faster entry in response to deregulation in a model with trade costs and heterogeneous firms.

• Entrants raise finance in the stock market in my work with Marc, whereas they (implicitly) do it via intermediaries in Jiandong and Shang-Jin's paper.

• Bank finance (rather than stock market finance) is empirically more appealing for emerging markets (and even small firms in industrial economies).

• Cetorelli and Strahan (2006, *JF*) document empirical evidence that monopoly power in banking creates a significant barrier to firm entry in the (U.S.) economy.

• Mandelman (2005, Dissertation) and references therein document that monopoly power in banking is especially pervasive in emerging markets.

• He argues that the threat of foreign entry in the domestic banking sector is an important determinant of bank markups in these economies.

• I am aware of closed-economy work that explains the Cetorelli-Strahan evidence (and other features of the U.S. economy).

- For instance, Stebunovs (2006, Dissertation) develops a model with entry subject to sunk costs, in which entry is financed by intermediaries with monopoly power.

- This results in inefficiently low entry and has consequences for the propagation of technology shocks.

• How would Jiandong and Shang-Jin's results be affected if instead of the summary parameter θ, financial intermediation were modeled in a more structural way by having an optimizing banking sector, potentially subject to foreign entry?

• A version of Jiandong and Shang-Jin's model with an explicit treatment of banking – allowing for the possible role of foreign banks in the domestic economy – would be consistent with an agenda that puts institutions at the center of the stage.

• It would give us an even deeper understanding of capital flows.

• It would facilitate quantitative evaluation of other planned future model extensions (risk aversion, dynamics), which I think would be desirable.

- I would find it hard to attach a quantitative meaning to a calibration of θ.

- A structural model of financial intermediation would likely lend itself to more transparent quantitative analysis.

(Of course, this would not address the separate issue of a quantitative meaning for λ.)

• In addition, modeling the behavior of intermediaries would likely provide important policy implications on desirable financial market reform that may be especially relevant for emerging market economies.

Conclusion

• Jiandong and Shang-Jin's solution to two central paradoxes of observed capital flows marries international trade and macroeconomic theory in a novel, extremely interesting way.

• I found it exciting to think where this agenda could go next.

• I very much look forward to reading more of Jiandong and Shang-Jin's work.