

Capital Flows to Developing Countries: the Allocation Puzzle

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Introduction

- This is a very interesting, important paper.
- It convincingly establishes a new puzzle in international macroeconomics – the *allocation puzzle* –, which I expect will generate much research in the future.

Discussion Outline

- I will begin by reviewing some key ingredients of the analysis.
- Next, I will offer comments on a possible direction for future work in this area.

The Allocation Puzzle

- We are all familiar with the Lucas puzzle (1990, *AER*) that capital flows from rich to poor countries are too small relative to differences in marginal returns to capital.
 - This puzzle has generated a large literature – recently, empirical work by Sebnem and coauthors (for instance, Alfaro, Kalemli-Ozcan, and Volosovych, 2005) and theoretical work by Ju and Wei (2006), among others.
- The allocation puzzle is different:
 - It is *not about* the *size* of capital flows from rich to poor countries, *but about* the *allocation* of this capital across developing countries.

The Allocation Puzzle, Continued

- Instead of going to high-productivity countries (like Korea), capital flows disproportionately to low-productivity countries (like Madagascar).
- This is a puzzle for the standard open economy growth model, in which investment and capital flows are both driven by productivity:
 - The model predicts that countries that invest more should receive more capital from abroad.
 - The evidence shows the opposite pattern.

The Model

- The world consists of small, developing economies, and a developed rest of the world (ROW).
- Preferences are identical across all agents in the world.
- The representative agent in each country maximizes $\sum_{s=0}^{\infty} \beta^s N_{t+s} c_{t+s}^{1-\gamma} / (1 - \gamma)$, where N_t is population (growing at country-specific rate n).
- Each developing economy produces according to $Y_t = K_t^\alpha (A_t L_t)^{1-\alpha}$, with $A_t/A_{t-1} = g_t$ and $L_t = N_t$.
- Technology in the ROW constitutes the world productivity frontier: $A_t^*/A_{t-1}^* = g^*$.
- Domestic productivity growth converges to g^* asymptotically: $\lim_{t \rightarrow \infty} g_t = g^*$.

The Model, Continued

- Assume that the ROW is in steady state. $\Rightarrow R^* = g^{*\gamma}/\beta$.
- The domestic, developing economy opens its capital account at time 0.
- \Rightarrow From $t = 0$ on, $(1 - \tau) R_{t+1} = R^*$, where τ is a capital wedge between the social return to capital ($R_{t+1} = \alpha [K_{t+1}/(A_{t+1}N_{t+1})]^{\alpha-1} + 1 - \delta$) and the actual return received by investors.
- \Rightarrow Capital per unit of effective labor (\tilde{k}) is constant from period 1 on:
$$\tilde{k}_{t+1} = \tilde{k}^*, \quad t = 0, 1, 2, \dots, \quad \text{where } \tilde{k}^* \text{ solves } (1 - \tau) R_{t+1} = R^*.$$
- Consumption per capita grows at rate g^* .

Experiment 1

- Suppose $\tilde{k}_0 < \tilde{k}^*$ (initial capital scarcity) and $A_t/A_{t-1} = g^*$.
- \Rightarrow External debt accumulated in period 0 will finance the convergence of capital to \tilde{k}^* entering period 1:

$$\tilde{d}^c = \tilde{k}^* - \tilde{k}_0.$$

Experiment 2

- Suppose $\tilde{k}_0 = \tilde{k}^*$ and $A_t/A_{t-1} = g^*$, but there is a productivity-level catch-up (or a loss of ground) between $t = 0$ and $t = T$:

$$\frac{A_t}{A_t^*} = \frac{A_0}{A_0^*} + x \frac{t}{T} \left(1 - \frac{A_0}{A_0^*} \right) \quad \text{for } t \leq T.$$

- When $x > (<) 0$, domestic productivity grows faster (slower) than ROW productivity between 0 and T , narrowing (widening) the level gap (closing the gap if $x = 1$).
- Define $\pi_t \equiv A_t / (A_0 g^{*t})$, with long-run level $\pi > (<) 1$ for countries that catch up (lose ground).

Experiment 2, Continued

- \Rightarrow The domestic country accumulates foreign debt between 0 and T , with debt stabilizing in period T at:

$$\tilde{d}^p = \frac{\pi - 1}{\pi} \tilde{k}^* + \frac{\chi}{R^*} \sum_{t=0}^T \left(\frac{ng^*}{R^*} \right)^t \frac{\pi - \pi_t}{\pi}, \quad \chi \equiv (1 - \alpha) \tilde{k}^{*\alpha} + \tau \tilde{k}^* R.$$

- Consider the catch-up case:

- $\tilde{d}^i \equiv (\pi - 1) \tilde{k}^* / \pi > 0$ is debt financing the investment required to keep \tilde{k} constant at \tilde{k}^* while productivity is accelerating.
- $\tilde{d}^s \equiv (\chi / R^*) \sum_{t=0}^T (ng^* / R^*)^t (\pi - \pi_t) / \pi > 0$ is debt incurred to smooth consumption in the presence of accelerating productivity.

Model Predictions and the Puzzle

- Experiments 1 and 2 imply that a country that is catching up (either in terms of capital, or in terms of productivity, or both) unambiguously borrows.
- A country that is losing ground (Experiment 2 with $\pi < 1$) is predicted to export capital (lend).
- Pierre-Olivier and Olivier calibrate the model to estimate the predicted capital flows for a large set of developing countries between 1980 and 2000.
 - They consider also the role of collateral constraints or the Solow assumption of a constant saving rate.
- The model reproduces Lucas' evidence of small total capital flows from rich to poor countries – so, there is no Lucas puzzle once differences in productivity and capital wedges are accounted for.
- But the model fails (badly) on the allocation dimension: The predictions above are flatly contradicted by the evidence.

What Next?

- This paper is about establishing the puzzle.
- But once this is done, we like to start thinking about solutions.
- Pierre-Olivier and Olivier briefly discuss three possibilities:
 - The allocation puzzle implies that savings are more correlated with growth than investment.
 - Can we construct models in which productivity acceleration boosts savings more than investment? Habit formation may be a mechanism for this.
 - Trade, industrialization and growth:
 - Developing countries in which a competitive export sector is the engine of growth have larger current account surpluses than less successful counterparts.
 - Domestic financial underdevelopment:
 - Fast-growing, developing countries with underdeveloped financial systems may accumulate foreign assets for insurance purposes and to intermedate their own savings through foreign financial systems.

From Capital Flows to Growth

- The second potential explanation mentioned by Pierre-Olivier and Olivier could be looked at from a reversed perspective: from capital flows to the development of a competitive sector and growth rather than vice versa.
- Consider the literature on the Dutch Disease effects of capital inflows (for instance, Corden and Neary, *EJ*, 1982):
 - In those models, an inflow of foreign capital generally has two effects:
 - A resource reallocation effect – an expansion of the non-traded sector at the expenses of the traded one;
 - And a real exchange rate appreciation effect.
- To the extent that the growth potential of the traded sector is higher (say, because of faster productivity growth), the resource reallocation triggered by the inflow of foreign capital is harmful for growth.
- We may then see an association of large capital inflows with slow growth and, conversely, export-driven growth in countries that avoided such Dutch Disease phenomena resulting in capital outflows.

From Capital Flows to Growth, Continued

- Perhaps incorporating the possibility of the Dutch Disease in a model that allows for differential growth across traded and non-traded sectors could help tackle the allocation puzzle.
- Lartey (2005, Cal State Fullerton) explores the working and consequences of the Dutch Disease.
- In empirical work, he documents evidence that inflows of foreign capital (particularly FDI) result in real exchange rate appreciation for sub-Saharan countries.
- In theoretical work, he develops a small open economy, stochastic growth model in which foreign investment is used as input in production of the domestic investment good, in turn necessary to accumulate capital in the traded sector.
- He shows that the model generates the two features of the Dutch Disease mentioned above following an inflow of foreign capital for plausible parameter values.
 - In further work with a sticky-price version of the model, he explores the question whether monetary policy should counteract Dutch Disease dynamics in order to maximize welfare (the answer is yes).

From Capital Flows to Growth, Continued

- Lartey's focuses on Dutch Disease spells of the length that we would usually associate to business cycles.
- The development of a longer-run, growth counterpart of his model, in which aggregate growth depends on sectoral reallocations triggered by international capital flows may be an interesting direction for future research on the allocation puzzle.

Conclusion

- This is an important paper.
 - It sets the stage for future work on an important portion of international capital flows, with implications for both the understanding of observed patterns and policymaking to promote growth.
- I look forward to seeing the research that will follow Pierre-Olivier and Olivier's work.