

Capital Flows and Economywide Modeling

David Roland-Holst[†]

Overview

Financial flows generally, and foreign capital flows in particular, have been one of the more challenging areas for CGE modelers. These flows are important to the underlying economies, particularly developing ones where FDI and other external inflows can exert significant leverage on the growth process and domestic institutions. Despite general agreement about what kind of phenomena deserve primary attention and a wide variety of strategies to capture them, however, modelers have failed to attain consensus about empirically robust specifications. There are substantive reasons for this failure, but perhaps a more modest agenda and greater dialogue can improve this situation.

Why this is difficult:

Like most other components of our models, a structural specification of financial behavior is only as credible as the economic theory it represents. We know money is important in economics, but it has defied conclusive integration into general equilibrium theory. One could quote the Old Masters endlessly on this, beginning with Walras himself, but challenges emerge clearly in today's work [1, 3, 6, 11, 12, 16, 18, and 24].

What we want to explain:

Money and finance at the micro and macro levels encompass a vast range of phenomena and behavior, but for present discussion it makes sense to set priorities. Since the main emphases of the conference are trade and development, I recommend examination of issues in two groups:

High Priority

- Foreign Direct Investment – This really refers to long term real investment, which is important because of its real growth effects and which, being linked to real rates of return, might be more amenable to neoclassical specification.
- Remittances – a very important emergent issue in multilateral capital flows, particularly in the Americas. Also driven by real economic variables, but of a very different kind (see e.g. <http://www.iadb.org/mif/website/static/en/remit.asp>).

Lesser Priority

- Debt and Debt Service – not insignificant, particularly in the sovereign case, but less amenable to market forces and endogeneity.
- Hot Money – probably a waste of time for long term real growth modeling

[†] Handout prepared for the international symposium on “Impacts of Trade Liberalization Agreements on Latin America and the Caribbean,” sponsored by the Inter-American Development Bank and the Centre d’Etudes Prospectives et d’Information Internationales, November 5-6, Inter-American Development Bank, Washington, D.C. David Roland-Holst is the James Irvine Professor of Economics at Mills College, Oakland, CA, 94613. Email: dwrh@mills.edu

- Monetary and financial variables – each interesting in its own right, but unlikely to be endogenized convincingly with our existing repertoire
 - Monetary aggregates
 - Nominal anything, especially the exchange rate
 - Interest rates and other market yields
- Technology transfer/productivity
- Ownership patterns

Alternative Approaches

While every model is different, there is a more limited set of alternatives that have been consistently applied to modeling capital flows. For convenience, I divide them into four generic categories (references in square brackets)

*Ad hoc*¹

Fix something (by far the most common, scores of references)
 Use closure rules that determine capital flows and other financial balances residually (also common) [6, 11]

Static and Sequential Static Multilateral Capital Allocation

Usually the above with capital accumulation [15, 20, 26]
 International real rental rate arbitrage [14]
 Portfolio models with segmented expectations [8, 10, 21, 24, and 27]

Dynamic

Forward-looking sequential [7, 9, 10, 17, and 22]
 Closed-form and Steady-state [25]

Combined micro and macro

GE micro-macro [4, 20]
 Mixed GE and macroeconometric [2]

A Moderate Recommendation

Agree on what we mean by “real” capital flows, attempt to model these, and avoid financial models until neoclassical theory overcomes this conceptual impasse.

¹ In terms of international capital flows, this category includes nearly all one country models.

Selected References

1. Abel, A. B., and Blanchard, O. J (1993) "An Intertemporal Model of Savings and Investment". *Econometrica* 51, 675-692.
2. Azis, I.J. (2001), "Modeling crisis evolution and counterfactual policy simulations: a country case study [Indonesia]," Working Paper 23, ADBI, Tokyo.
3. Baldwin, R., and G.I.P. Ottaviano (1998), "Multiproduct Multinationals and Reciprocal FDI Dumping." Working Paper No. W6483, NBER, March.
4. Bourguignon, F., Branson, W.H. and J. de Melo (1992). "Adjustment and income distribution_ a micromacro model for counterfactual analysis," *Journal of Development Economics* 38: 17-39.
5. Decaluwe, B. and Martens, A. (1988). "CGE modeling and developing economies: a concise empirical survey of 73 applications to 26 countries," *Journal of Policy Modeling* 10: 529-568.
6. Dewatripoint, M. and G. Michel, "On Closure Rules, Homogeneity and Dynamics in Applied General Equilibrium Models," *Journal of Development Economics* 26:65-76, 1987.
7. Diao, X. and A. Somwaru (2000). "An Inquiry on General Equilibrium Effects of MERCOSUR — An Intertemporal World Model," *Journal of Policy Modeling*. 22: 557-558.
8. Easterly, W. (1990). "Portfolio effects in a CGE model: Devaluation in a dollarized economy," in L. Taylor (ed.), *Socially relevant policy analysis: structuralist computable general equilibrium models for the developing world*, MIT press, Cambridge, pp. 269-301.
9. Fargeix, A. and Sadoulet, E. (1994). "A Financial computable general equilibrium model for the analysis of stabilization programs," in J. Mercenier and T. Srinivasan (eds), *Applied general equilibrium and economic development: present achievements and future trends*, Michigan University Press, Michigan, 147-181.
10. Feltenstein, A. and Shah, A. (1995). "General equilibrium effects of investment incentives in Mexico," *Journal of Development Economics* 46: 253-269.
11. Francois, J., Bradley McDonald and Hakan Nordstrom (1997), "Capital Accumulation in Applied Trade Models," in *Applied Methods for Trade Policy Analysis*, Francois and Reinert, eds., Cambridge University Press, Cambridge, 364-382.
12. Goldberg, L.S., and M.W. Klein (2000), "International Trade and Factor Mobility: An Empirical Investigation," *Festschrift in Honor of Robert Mundell*, Calvo, G., R. Dornbusch, and M. Obstfeld, eds., Cambridge: MIT Press, 2000.
13. Hertel, Thomas, Ianchovichina, Elena, and Robert McDougall (1999), "A Disequilibrium Model of International Capital Mobility," GTAP Working Paper 10, Department of Agricultural Economics, Purdue University @(http://ae761-e.agecon.purdue.edu/gtap/resources/res_display.asp?RecordID=399).

14. Lee, H., D. Roland-Holst, and D. van der Mensbrugge (2001). "General Equilibrium Assessments of Trade Liberalization in APEC Countries," in M. Dutta (ed.), *Restructuring of Asian Economies for the New Millennium*, Amsterdam: Elsevier.
15. Lewis, J. (1994). "Macroeconomic stabilization and adjustment policies in a general equilibrium models with financial markets: Turkey," in J. Mercenier and T. Srinivasan (eds), *Applied General Equilibrium and Economic Development_ present achievements and future trends*, The University of Michigan press, Michigan, pp. 101–136.
16. Lipsey, R.E. (2000), "Interpreting Developed Countries' Foreign Direct Investment," Working Paper No. W7810, NBER, July.
17. McKibbin, W.J., and P.J. Wilcoxin (1998), "The Theoretical and Empirical Structure of the G-Cubed Model," *Economic Modelling*, 16:1, 123-148.
18. McMahon, G. (1992). *Financial computable general equilibrium models of developing countries: A critical assessment*, International Development Research Centre, Ottawa, Canada.
19. Rosensweig, J. A. and Taylor, L. (1990). "Devaluation, capital flows and crowding out: A CGE model with portfolio choice for Thailand," in L. Taylor (ed.), *Socially relevant policy analysis: structuralist computable general equilibrium models for the developing world*, MIT press, Cambridge, 302–332.
20. Robinson, S. (1991). "Macroeconomics, Financial Variables and Computable General Equilibrium Models," *World Development*, 19(11):1509-1525.
21. Souissi, M. and Decaluwe, B. (1997). *Financial deregulation in Tunisia: A prospective and retrospective analysis*, Centre de Recherche en Economie et Finance Appliquees CREFA, Universite Laval, Canada.
22. Thissen, M., and R. Lensink (forthcoming). "Macroeconomic Effects of a currency devaluation in Egypt: An analysis with a computable general equilibrium model with financial markets and forward looking expectations." *Journal of Policy Modeling*.
23. Tobin, J. (1971). "A general equilibrium approach to monetary theory," *Essays in Economics*, Markham Publishing Company, Chicago, pp. 323–338.
24. Vos, R. (1998). "Aid flows and "dutch disease" in a general equilibrium framework for Pakistan," *Journal of Policy Modeling* **20**: 77–109.
25. Werin, L. (1990). "An applied general equilibrium model of the asset markets in Sweden," in D. J. Bergman, L. and E. Zalai (eds), *General equilibrium modelling and economic policy Analysis*, Basil Blackwell, Oxford, pp. 149–191.
26. Yeldan, A. (1997). "Financial liberalization and Fiscal repression in turkey: Policy analysis in a CGE model with Financial markets," *Journal of Policy Modeling* **19**: 79–117. 25