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Financial market participation and the developing country business cycle ☆

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ABSTRACT

I explore the implications of limited participation in financial markets on a standard small open economy business cycle model. Despite its parsimony, the limited participation model developed in this paper improves over the standard model in terms of explaining two important features of business cycle facts of developing countries: high volatility of consumption, and high negative correlation between the trade balance and output. Limited participation model is then used to inspect the effects of financial development and integration on macroeconomic volatility. Under a standard calibration, limited participation model leads to the conclusion that financial development and integration are associated with higher investment and output volatility. Effect of more participation on consumption volatility is dependent on the specification of the risk premium function.

1. Introduction

A close examination of the existing data on financial markets indicates that participation in financial markets is very limited in developing countries.[1] I incorporate this observation into a standard open economy real business cycle model.[2] I show numerically that the modification of the standard model in this way improves the model's performance in terms of explaining the developing country business cycle. Despite its parsimony, the model developed in this paper performs better than the standard model in terms of explaining the two important features of the business cycle facts of developing countries: first, it generates a higher consumption volatility, and second, a higher negative trade balance–output correlation. Limited participation model is then used to inspect the effects of financial development and integration on macroeconomic volatility. It turns out that, under a standard calibration, limited participation model leads to the conclusion that financial development and integration are associated with higher investment and output volatility. However, the effect of higher participation on consumption volatility depends on the specification of the risk premium function. In these aspects, limited participation model is consistent with some of the recent empirical findings but not with others (see below).

This paper contributes to several strands of literature. First, the model presented in this paper extends the standard small open economy business cycle model constructed by Mendoza (1991) and slight variations of the same which have been widely used in literature.[3] Beginning with Mendoza (1991), researchers have attempted to extend closed economy real business cycle models to the open economy setting. However, with a few exceptions[4], the focus has not been on developing countries. Later in the paper, I show that, when calibrated to an average developing country, the standard model cannot account for highly countercyclical trade balances and highly volatile consumption. This finding leads one to explore modifications that should be made to the standard model. This study allows for limited financial market participation. I discuss later in the paper why this is a meaningful modification by inspecting the financial sector data across countries.

The second contribution of this paper is made to the narrow literature on the linkage between financial development and integration and the volatility in developing economies. Recent empirical studies

☆ An earlier version of this paper was a part of my doctoral thesis at University of California, Santa Barbara.

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[1] In this paper, low and middle income countries are called "developing countries", and high income countries are called "developed countries". World Bank's classification for income groups is used. Under this classification, low income countries are those with a 2004 Gross National Income (GNI) per capita of $825 or less, and middle income countries are those with a 2004 GNI per capita between $825 and $10,605. High income countries are those with a 2004 GNI per capita over $10,605.

[2] See Mendoza (1991) and Schmitt-Grohé and Uribe (2003).

[3] See for example, Correia et al. (1995) and Neumeyer and Perri (2005). See Schmitt-Grohé and Uribe (2003) for an overview.

[4] See for example, Köse (2002) and Senhadji (2003).

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provide mixed evidence on the effects of financial development and integration on macroeconomic volatility. For example, Köse et al. (2003) find that financial integration (up to a threshold) is associated with a higher relative volatility of consumption, which is at odds with the notion that financial integration enhances international risk sharing opportunities. Tiryaki (2003), on the other hand, finds that in the short run, financial development leads to a lower volatility of investment, leaves output volatility unchanged, but leads to a higher volatility of consumption. In a recent study Denizer et al. (2002) find that financial development leads to reductions in investment, consumption and output volatility. Hahn (2003) analyzes the OECD economies and argues that financial development may lead to increased or decreased volatility depending on whether shocks are monetary or real. In this paper I provide a framework to analyze the effects of financial development and integration on macroeconomic volatility from the perspective of a greater participation in financial markets. I find that, when modified to include limited participation in the financial markets, an otherwise standard small open economy model implies that financial development and integration and the ensuing greater financial market participation can be associated with increased output and investment volatility. The impact of more participation on consumption volatility depends on the specification of the risk premium function. If the risk premium is a function of an indicator of solvency, the consumption volatility goes down with more participation, whereas it goes up when the risk premium is specified to be a function of the level of debt as in Schmitt-Grohé and Uribe (2003).

Some of the agents in the limited participation model economy I develop do not have access to financial markets whatsoever, and consume only as much as their labor income allows. These types of consumers have been called "rule-of-thumb consumers" following the work of Campbell and Mankiw (1989). Thus, this study also adds to the growing literature dealing with the impact of the presence of rule-of-thumb consumers on the macroeconomy.[5]

The rest of the paper will be organized as follows: in next section, the business cycle facts for a large number of countries with cross sectional income differences will be briefly discussed. A set of financial development and integration indicators for the same sample of countries will be examined in Section 3. In Section 4, the standard model and the limited participation model will be presented. In Section 5, extensive numerical analyses will be undertaken by calibrating my limited participation model and the standard model to developing country data, comparing the implications of the two. Several experiments with the model of limited participation in the financial markets will be run in order to explore the implications of financial development and integration in Section 6. Section 7 will conclude.

2. Business cycles of developing countries

The expansion of the business cycle research to the areas of macroeconomics of small open economies brought about an interest in the literature to quantify the properties of international business cycles. However, attempts to lay out the business cycle facts of developing countries have been limited. This can partly be linked to the concentration of research on industrialized countries. In addition, it is largely related to the availability and the concern about the quality of the data regarding the developing countries. Also, data in quarterly frequency, which is usually regarded as the business cycle frequency, is only available for a small subsample of developing countries, and for a short period of time. In this paper, the annual data available via World Economic Indicators prepared by the World Bank will be used[6] to calculate the stylized facts of developing countries' business cycles. I use annual data in order to be able to explore the business cycles of a large group of countries, including a group of large low and lower middle income developing countries, which have usually been ignored in previous research. Using annual data for a long sample period may be criticized as there might exist many structural break points, including regime shifts with regard to economic policy, overall political structure of the countries, and changes in the definitions and the quality of the data. However, in plausibly broad terms, the analysis here yields very similar conclusions about the business cycle facts of developing countries when compared to other studies that used quarterly data and included some of the countries in the sample of this paper in their analysis.[7]

Table 1
Business cycle properties according to income groups.

	σ_Y	$\rho_{Y,Y-1}$	$\rho_{C,Y}$	$\rho_{I,Y}$	$\rho_{TB,Y}$	σ_C/σ_Y	σ_I/σ_Y	σ_{TB}/σ_Y
Developing countries								
Mean	4.07	0.49	0.69	0.60	−0.20	1.28	4.18	0.87
Low income								
Mean	4.11	0.43	0.63	0.44	0.01	1.46	4.22	0.91
Min	1.93	0.09	0.15	0.07	−0.39	0.84	1.90	0.31
Max	6.92	0.73	0.94	0.81	0.54	3.06	9.64	2.30
Lower middle income								
Mean	3.90	0.54	0.69	0.67	−0.25	1.01	3.78	0.81
Min	2.16	0.05	0.42	0.36	−0.78	0.64	2.74	0.40
Max	7.52	0.73	0.93	0.93	0.17	1.46	6.37	1.59
Upper middle income								
Mean	4.19	0.56	0.80	0.80	−0.54	1.25	4.54	0.87
Min	1.94	0.36	0.57	0.62	−0.86	1.03	2.89	0.33
Max	5.66	0.69	0.95	0.93	−0.24	1.63	7.05	2.01
Developed countries								
Mean	2.26	0.62	0.77	0.81	−0.36	0.86	3.70	0.68
Min	1.44	0.44	0.53	0.56	−0.69	0.59	2.52	0.30
Max	3.67	0.78	0.92	0.96	−0.08	1.30	5.25	1.94

Source: World Development Indicators Online, World Bank (http://devdata.worldbank.org/dataonline/). Sample period varies by the country, but 1965–2004 for most of the countries included. Shortest sample is for Turkey (1987–2004). Y = GDP, C = total final consumption, I = total capital formation, TB = exports–imports, all series are in local currencies. σ_m denotes the standard deviation of variable m. $\rho_{m,n}$ denotes the correlation between variables m and n. All series but the trade balance are logged, then H–P filtered with smoothing parameter 100. Trade balance is measured as a percentage of GDP.

Summary statistics of the business cycle properties per different income groups are presented in Table 1.[8] The first business cycle phenomenon apparent from Table 1 is that the GDP of developing countries is highly volatile and displays less persistence than that of developed countries on average. This fact is readily observable from the first two columns of the table. Second, consumption in developing countries is more volatile than consumption in developed countries. Also, as emphasized by other studies (e.g., Kydland and Zarazaga, 1997; Aguiar and Gopinath, 2007), consumption is more volatile than income for most of the developing countries. This fact is at odds with the permanent income hypothesis which dictates that consumption should be less volatile than income as a result of consumption smoothing. However, relative volatility of consumption being greater than unity should be regarded with caution. Backus et al. (1995) remark that high consumption volatility might be an outcome of different treatment of durables in the consumption data across countries. Their findings indicate that consumption is more volatile than income even in some of developed countries. However, excluding the consumption durables from data yields significantly lower consumption volatility. Özbilgin (2004) reaches a similar conclusion

[5] Recent examples include Galí et al. (2004) who find that the presence of rule-of-thumb consumers affects the properties of interest rate rules under a dynamic sticky price model framework, and Güvenen (2003) who studies equity premium puzzle in an economy with rule-of-thumb consumers.

[6] See http://devdata.worldbank.org/dataonline.

[7] See Aguiar and Gopinath (2007), Neumeyer and Perri (2005), Kydland and Zarazaga (1997), and Rand and Tarp (2002).

[8] A data appendix containing information on the sample and tables listing the business cycle facts of individual countries included in this study is available from the author upon request.