Journal of International Economics 94 (2014) 33–49

Contents lists available at ScienceDirect

Journal of International Economics

journal homepage: www.elsevier.com/locate/jie

Emerging market fluctuations: What makes the difference?

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ARTICLE INFO

Article history:
Received 26 February 2011
Received in revised form 16 May 2014
Accepted 16 May 2014
Available online 24 May 2014

JEL classification:
E32
F41

Keywords:
Business cycles
Small open economy
Country spreads
Financial frictions

ABSTRACT

Aggregate fluctuations in emerging countries are different from those in developed countries. Using data from Mexico and Canada, this paper decomposes these differences in terms of reduced form shocks that affect aggregate efficiency and distort the decisions of households about how much to invest, consume, and work in a standard model of a small open economy. The decomposition exercise suggests that most of these differences are explained by fluctuations in aggregate efficiency, distortions in labor choices over the business cycle, and distortions in intertemporal consumption choices. Successful models for emerging markets fluctuations should include primitive shocks and frictions that generate these features. Models with financial frictions in the form of working capital constraints, possibly augmented with endogenous collateral constraints, are consistent with these findings.

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1. Introduction

Aggregate fluctuations in emerging countries differ from those in developed (small-open) countries. This paper quantifies a set of reduced form shocks, or *wedges*, that account for these differences by extending the ‘Business Cycle Accounting’(BCA) methodology advocated by Chari et al. (2007) (CKM) to an open economy setting. At a conceptual level, shocks and frictions in most structural models drive a wedge between marginal rates of substitution and marginal rates of transformation. Based on this insight, I estimate these wedges using data from Mexico and Canada and the equilibrium decision rules of a frictionless small open economy augmented with five stochastic reduced form shocks (the prototype economy). At face value, these shocks can be interpreted as total factor productivity (the *efficiency wedge*), as labor and investment taxes (the *labor* and *investment wedges*), as fluctuations in real interest rates (the *country spread wedge*), and as government consumption (the *government consumption wedge*). I study the statistical properties of these wedges and their contribution to aggregate fluctuations in Mexico and Canada by feeding them back into the model one at a time or in combination.

The decomposition exercise leads to the following findings. First, aggregate fluctuations in Mexico are mostly driven by the combined contribution of the efficiency, labor, and country spread wedges. On the other hand, the efficiency and labor wedges account for most business cycle fluctuations in Canada, although country spread and investment wedges contribute somewhat to fluctuations in investment, the trade balance, and consumption. Second, fluctuations in the country spread wedge account for the qualitative differences between Mexico and Canada: the excess volatility of consumption over output and the highly countercyclical trade balance in Mexico. Third, the investment wedge plays a minor role in Mexico's business cycles. And fourth, the government consumption wedges play a negligible role in both countries. To check the robustness of the results, I apply the methodology using Korean data and find that, as in Mexico, the combined contribution of efficiency, labor, and country spread wedges accounts for most aggregate fluctuations. Yet, there is a difference in the relative importance of the wedges, with the labor wedge playing a more prominent role in Korea, while the efficiency wedge playing a more prominent role in Mexico.

The decomposition of aggregate fluctuations into reduced form wedges does not identify primitive shocks and frictions. Indeed, different structural models could induce movements in the same wedge or a single structural shock could induce movements in several wedges. Instead, BCA methodology measures the sum of the impact of all structural shocks on each reduced form wedge, and then measures the marginal effect of each wedge on aggregate fluctuations. As noted in CKM, an advantage of this approach is that it does not require making a priori assumptions to identify structural shocks. Yet, the information obtained with BCA is useful for model development: a successful model should induce reduced form wedges similar to those estimated based on the prototype economy, and these wedges should account for fluctuations in the economic aggregates. Therefore, one can interpret the BCA methodology

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http://dx.doi.org/10.1016/j.jinteco.2014.05.002
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as a method to restrict the set of structural models consistent with the data.

One conclusion of this exercise is that Real Business Cycle (RBC) models with just productivity shocks are unable to explain a key business cycle fact in emerging countries. Namely, that shocks that introduce a wedge between the equality of the marginal product of labor with the marginal rate of substitution between consumption and leisure account for a large fraction of fluctuations in Korea and Mexico. RBC models with just productivity shocks do not distort the labor–consumption margin.[1] Second, the observation that investment wedges play a minor role does not mean that financial frictions are irrelevant; it means that financial frictions should manifest themselves primarily as fluctuations in efficiency, labor, or country spread wedges. Mendoza (2010) proposes a model along these lines where a combination of financial frictions in the form of collateralized working capital constraints and capital adjustment costs drive persistent fluctuations in these key wedges. Section 6 illustrates the mapping between Mendoza's model and the prototype open economy. Interestingly, a binding collateral constraint always induces a decline in the government consumption wedge, the opposite of the finding in Chari et al. (2005).

The extension of BCA methodology to a prototype *open* economy allows me to study two intertemporal disturbances that are relevant for small open economies: wedges that affect the intertemporal allocation of foreign debt (through country spread wedges in the Euler equation for bonds), and wedges that affect the intertemporal allocation of capital (through investment wedges in the Euler equation for capital). This modification is important because it is precisely the country spread wedge, not the investment wedge, what drives the excess volatility of consumption over output and the countercyclical trade balance-to-GDP ratio in Mexico. Moreover, this modification also explains why a binding collateral constraint in Mendoza's model induces a negative government consumption wedge in the prototype economy instead of a positive one, as in Chari et al. (2005).

Recent related papers are Kehoe and Ruhl (2009), Garcia-Cicco et al. (2010), Chang and Fernández (2013), and Lama (2011). Kehoe and Ruhl (2009) find that a two sector model with labor reallocation frictions, variable capital utilization, observed interest rate spreads and TFP, and a binding credit limit is able to explain the performance of the Mexican economy during the 1994–1995 crisis. Interestingly, these frictions and shocks induce a set of reduced form wedges that are consistent with the results in this paper. In independent work, Lama (2011) uses a version of BCA to study output drops in six Latin American countries and claims that a shock similar to the country spread wedge plays a negligible role. Section 5.4 discusses why this paper reaches a different conclusion.[2]

The paper is organized as follows. Section 2 discusses the empirical regularities associated with aggregate fluctuations in emerging and developed countries. Sections 3 and 4 describe the prototype small open economy and the BCA methodology used to decompose aggregate fluctuations. Section 5 applies the BCA methodology using data from Mexico, Canada, and Korea. Section 6 describes a structural model with financial frictions that is consistent with the findings and Section 7 concludes. An online Appendix covers additional results and proofs.[3]

2. Empirical regularities

It has been thoroughly documented that business cycles in emerging economies are different from those in developed economies (Neumeyer and Perri, 2005; Aguiar and Gopinath, 2007). Besides being substantially more volatile, aggregate fluctuations in emerging economies seem to be qualitatively different from those in developed countries: consumption is more volatile than output in the former but less volatile in the latter, and the share of the trade balance on output is highly countercyclical in emerging countries but less so in developed countries.

Since the 2000s, however, emerging economies were less prone to suffer the type of crises that they used to suffer in the past. Therefore, one could question whether the documented differences between emerging and developed economies are driven by the inclusion of data from one or two crisis episodes. In this section I revisit these regularities using updated quarterly data and analyze the conjecture that a few crisis episodes could be behind these differences. To have comparable results, I use the sample of emerging and developed economies chosen by Aguiar and Gopinath (2007) with the exception that Chile replaces Ecuador in the sample of emerging economies.[4]

Table 1 displays business cycle statistics for a group of 13 emerging and 13 developed countries. Each series was filtered using the Hodrick–Prescott (HP) filter with a smoothing parameter of 1600 and expressed as percentage deviations from trend, except for the ratio of the trade balance to GDP, which was expressed as simple deviations from trend—using the Band-Pass filter gives similar results (see the online Appendix). These statistics suggest that the empirical regularities documented in the previous literature do not depend on the particular sample period used to compute them. First, GDP and the ratio of the trade balance to GDP are more volatile in emerging than in developed countries (over 70 and 220%, respectively). Second, consumption is, on average, more volatile than output in emerging countries but less volatile in developed countries. And third, there is a large negative correlation between GDP and the ratio of the trade balance to GDP in the group of emerging countries (−0.51) compared to that in the group of advanced countries (−0.14). Furthermore, note that the individual statistics for Mexico and Canada, the prototype emerging and developed countries used in the empirical analysis below, are broadly consistent with the experience of the average emerging and developed country, respectively.

Table 2 reports statistics for the group of emerging countries dividing the sample between crisis and no-crisis periods. Panel A rewrites the averages from Table 1. Panels B and C divide the sample into crisis and no-crisis periods. A crisis is defined as a drop in GDP from peak to trough of at least 9% and the crisis is defined to be over when GDP recovers 50% of its peak-to-trough drop.[5] The two panels differ in the definition of the beginning of the crisis. In panel B, the crisis is defined to begin the quarter after the peak in economic activity. In panel C, the crisis is defined to begin 5 quarters before the peak in economic activity. The latter definition is chosen because it maximizes the difference between the crisis and no-crisis statistics.

Ten emerging market crises are identified by the above criterion: one in Argentina, Korea, Malaysia, Philippines, and Thailand; two in Mexico; and three in Turkey. The statistics in the rows labeled “No crisis,” were computed dropping the HP-filtered data in each individual country corresponding to the crisis window. Next, I computed the corresponding statistics for each country and averaged the result across emerging economies. The statistics displayed in the row “Crisis (pooled)” were computed by pooling the data from the 10 crises episodes. This procedure is valid because HP-filtered data is centered around zero and all the statistics displayed in Table 2 are based on contemporaneous

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[1] Kydland and Zarazaga (2002) argue that a model with just productivity shocks explains successfully the performance of Argentina during the 1980s; Aguiar and Gopinath (2007) argue that a model with permanent productivity shocks explains the statistics in Table 1.

[2] Garcia-Cicco et al. (2010) use long time series data from Argentina and Mexico to estimate a model with temporary and permanent productivity shocks. They find that models with just productivity shock miss the behavior of the trade balance and favor a model with stochastic interest rates and an endogenous country spread that depends on the level of foreign debt. Chang and Fernández (2013) estimate a model with permanent and temporary productivity shocks, interest rate shocks, and working capital constraints. They find that the model with the working capital constraint and interest rates shocks provide a better fit than a model with permanent productivity shocks.

[3] The online Appendix can be found in https://sites.google.com/site/constantinohevia/.

[4] Ecuador revised its National Accounts during the 2000s leading to very different set of stylized facts. See the online Appendix for the construction of the data and the sources.

[5] Results are robust to changing the definition of the crisis (output drops between 7 and 10%) and of the recovery (using 75 and 100% of the initial output drop).

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