Why don’t we observe improvements in consumption smoothing as countries get more financially integrated: Bridging theory and empirics

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Abstract

This study provides suggestive theoretical and empirical evidence that the productivity shock correlation between a country and the rest of the world may help explain why we do not observe more consumption smoothing as countries have become more financially liberalized.

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1. Introduction

Over the past two decades, official restrictions on cross-border capital flows have decreased while actual capital inflows and outflows among countries have increased substantially. Very influential theoretical studies predict that as countries become more financially liberalized they should be better able to offload some of their income risk onto world markets, smoothing consumption. A number of recent papers have empirically examined the relationship between financial liberalization and consumption smoothing, but have not been able to establish causality between the two.

However, there are two problems with the existent work in this literature. First, most studies are ad-hoc. Second, measuring the actual degree of financial openness is a challenging enterprise (Kose et al., 2006). This study develops and applies a framework for studying the effects of financial liberalization on consumption smoothing, and uses multiple available indicators of financial openness to capture the degree of financial liberalization in different countries.

The main findings are that the effects of financial liberalization on consumption smoothing depend on both the initial extent of financial integration, and on the correlation between the productivity processes of a country and the rest of the world. Failure to account for these factors in past empirical analysis can help explain why we do not observe improvement in consumption smoothing as countries get more financially liberalized. The paper concludes by documenting suggestive evidence that supports the predictions of this theory.

2. Theoretical framework

Consider a two-country exchange economy, as in Heathcote and Perri (2004). A tree in each country produces some non-storable fruit. Endowment in each country depends on the realization of the state of nature s. Prior to any trade, the representative domestic agent owns the entire domestic tree, X(s), while the foreign agent owns the foreign one, Y(s). At the start of the period, the domestic household buys claims to a fraction θf of the foreign tree (the analysis for the foreign household is analogous), given the budget constraint:

\[ \theta P + \theta^f P^* = P \]

where, P and P* are the prices of domestic and foreign trees, respectively, and \( (1 - \theta) \) is the fraction of domestic tree sold.
Then, the state of nature is revealed, contracts are honored, and agents consume any fruit to which they have claims. A tax $\tau$ on repatriated earnings represents market restrictions. Thus, given a choice for $\theta$, consumption in state $s$ is given by:

\[
c(s) = \theta X(s) + \theta^f (1 - \tau) Y(s) = \theta X(s) + P(1 - \theta)/P^s(1 - \tau) Y(s) \quad (*).
\]

For high values of $\tau$, autarky prevails, while values of $\tau$ close to zero imply no impediments to cross-border capital movements and a country that is financially open. The domestic household solves:

\[
\max_{\theta} \{E[\mu(c(s))]\} \text{s.t. } (*) \text{ and } 0 \leq \theta \leq 1.
\]

I follow Lewis (1996), who argues that as countries get more financially integrated, consumption should vary with the common component of international income growth and should be less dependent on country-specific disturbances, and define the correlation between domestic consumption and domestic output as a measure of consumption smoothing. As countries integrate with the global economy, increasing their ability to smooth consumption, the correlation between domestic consumption and domestic output should decline. The following equation can be derived for a perfectly symmetric joint distribution between domestic and foreign productivities and an exponential utility function:

\[
\text{Corr}(c,X) = \left(1 - \mu/A\sigma \right) + \left(2\mu/A\sigma - 1 \right) \left(2 - \tau \right) + \rho - \rho/(2 - \tau)\right)s/\sigma_c
\]

where, $\mu$ denotes the mean of output, $E(X)$ and $E(Y)$, at home and abroad, $\sigma$ is the standard deviation of output (in this analysis it will be the same for both countries), $\sigma_c$ is the standard deviation of consumption at home, $\rho$ is the correlation of productivity shocks between home and foreign countries, and $\tau$ denotes the impediments to trade in foreign capital. Eq. (1) shows that the correlation between domestic consumption and domestic output depends on the extent of market restrictions, $\tau$, as well as on the correlation of productivity shocks between the two countries, $\rho$.

In contrast to early studies in this area, this framework suggests that the degree of consumption smoothing depends not only on the degree of openness, but also on the nature of underlying shocks. Fig. 1 shows the relation between impediments to trade in capital, $\tau$, and consumption smoothing, as described by Eq. (1). For a given $\rho$, as the country becomes more liberalized the correlation between consumption and output in the domestic country decreases, albeit in a nonlinear fashion (note that for values of $\tau$ close to one there is little or no change in consumption smoothing when $\tau$ decreases).

Fig. 1 also highlights that for fixed values of $\tau$, as $\rho$ increases (this is shown by an upward shift in the curve in the figure) consumption smoothing deteriorates. The intuition would be that as $\rho$ increases, productivity processes between the domestic country and the rest of the world become more similar, making the gains from diversifying consumption risk smaller. As the country liberalizes while $\rho$ has increased, the net result may be deterioration in consumption smoothing. In the next section, I show evidence suggesting that $\rho$ may indeed be an important determinant in explaining the patterns of consumption smoothing.

### 3. Empirical analysis

As mentioned above, financial liberalization is difficult to measure. To address this concern, three different indicators of

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3. Other measures of consumption smoothing used in the literature are $\text{corr}(c,X)$ and $s_c$. This study does not regard any one measure as superior.

4. Allowing for different country sizes (different means) does not change the analysis.

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5. In this simple framework, because $c(s) = \theta X(s) + (1 - \theta) Y(s)$, $\text{corr}(c,X)$ will be high, even for full integration. For example, for $\tau = 0$ and $\rho = 0$, i.e. full integration and i.i.d. productivities, $\text{corr}(c,X) \approx 0.7$. 

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financial openness are used for the subsequent analysis. First, each indicator is standardized on a scale from 2 to 1, with 2 being the most restrictive (high \(\tau\)) and 1 being the most liberalized (low \(\tau\)). Then, an index is constructed for each country as the average of all three indicators, for the years and countries available. Next, for each country, I check whether the constructed index suggests periods during which the markets were relatively open. I identify a relatively open period such that it is at least 6 years long and, the value of the constructed index for each year is at least 15% lower than in any other year. Then I calculate consumption smoothing in the identified relatively open periods, if any, and compare it with consumption smoothing in the remaining period, provided that it is at least 6 years long.

Out of 22 countries for which all three indicators were available, I was able to define 8 developing and 10 developed countries that have experienced a relatively open (and a relatively closed) period as defined above. In general, developed countries are more open than the developing ones. For example, for Denmark the openness indicator was 1.53 (2 being the most closed, 1 the most open) during the relatively closed period, and 1.05 during the relatively open period. In contrast, in Brazil the indicator was 1.94 during the closed period and 1.58 during the relatively open period. Thus, according to the model, Brazil would be mapped on the right side of Denmark in Fig. 1, and consumption smoothing in Brazil and Denmark will respond differently to financial liberalization, provided that \(\rho\) has not changed much in these two countries. This can explain why studies like Kose et al. (2003) did not find evidence of consumption smoothing for developing countries.


7 Canada, Germany, Hong Kong, US and the countries listed in Table 1a–b.
To measure consumption smoothing, I follow Lewis (1996), and calculate the correlation between annual growth of real domestic output per capita demeaned by the aggregate of world output in each period and annual growth of consumption per capita. According to standard theories, one would expect corr(c,X) to be lower for relatively open periods and higher for relatively closed ones.

Next, I investigate whether the theoretical framework explained in Section 2 can help explain these puzzling findings. I construct ρ using annual TFP data from Bosworth and Collins (2003), where TFP is constructed as a residual from growth accounts equations. I first calculate bilateral correlations of TFP growth between all countries for each of the identified periods. Then, for each country I calculate a weighted coefficient of the productivity shock correlation with the rest of the World, where the weights are the average import shares from each country over the period 1980–2004, as shown in the Direction of Trade Statistics Yearbook.

Results are shown in Table 1a–b. Brazil, Chile, Philippines (developing), Denmark, Italy and Norway (developed) follow predictions of standard theories. The change in consumption smoothing for the countries in bold in Table 1a–b (Korea, Mexico, Finland, Spain and Sweden) can be explained by the increase in the productivity shock correlation with the rest of the world (last two columns). For example, in Sweden, during the relatively closed period (73–83) ρ was 0.21, financial openness was around 1.50, and consumption smoothing (corr(c,X)) was 0.23. During the open period (93–04) consumption smoothing deteriorated (corr(c,X)=0.41) at the same time that productivity correlation with rest of the world increased (ρ=0.66). This would correspond to a move from point A to point B in Fig. 1 and explains why consumption smoothing did not improve in Sweden. Neither the standard theories, nor this model can explain what happened to consumption smoothing in Argentina, Colombia, Malaysia and France, Japan, Portugal, UK.

Whereas standard theories were able to explain only 3 out of 10 developed and only 3 out of 8 developing country experiences, accounting for cross-country productivity correlations helps explain what happened to consumption smoothing in 6 out of 10 developed countries and in 5 out of 8 developing ones.

The constructed correlation of productivity shocks between a country and the rest of the world, ρ, is robust to the choice of the number of years in a period. At the same time, it has been varying a lot between periods (for example for Mexico more than doubled going from 0.17 to 0.36), suggesting that this correlation is empirically relevant. This evidence shows that the actual degree of financial openness and the correlation of productivity shocks with the rest of the world are important factors in explaining the apparent lack of risk sharing as countries get more financially integrated, and calls for more empirical investigation of these facts following the framework derived in Section 2 of this paper.

4. Conclusions

This study highlights a direct link between theory and empirics, which the author feels is absent in the existent empirical studies in this area. Using a very simple model, the author constructs a framework that relates financial liberalization, correlation of productivity processes between two countries and consumption smoothing. Then, using an array of existing indicators, the study identifies countries that have had periods of relative high and relatively low financial openness, and presents empirical evidence that supports the theoretical prediction that correlation between the productivity processes of a country and the rest of the world can explain why we fail to see improvements in consumption smoothing in some of these countries.

References


Lewis, 1996. What can explain the apparent lack of international consumption risk sharing. JPE 104 (2), 267–297.

8 Evolution of r is similar for 7, 8, 9 and 10-year periods.

9 This calls for cautious interpretation as TFP derived from growth accounts measures a combination of changes in efficiency in the use of capital and labor inputs, as well as changes in technology.