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Protect and survive? Did capital controls help shield emerging markets from the crisis?

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Abstract

Using a new dataset on capital market regulation, we analyze whether capital controls helped protect emerging markets from the real economic consequences of the 2009 financial and economic crisis. The impact of the crisis is measured by the 2009 forecast error of a panel state space model, which analyzes the business cycle dynamics of 63 middle-income countries. We find that neither capital controls in general nor controls that were specifically targeted to derivatives (that played a crucial role during the crisis) helped shield economies. However, banking regulation that limits the exposure of banks to global risks has been highly successful.

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1 Introduction

In the wake of the financial crisis, the international economy has witnessed a renaissance of capital controls. Due to the importance of capital market imperfections in the crisis, this reflex seems understandable. However, the strong belief in capital controls is not rooted in empirical evidence.

In this paper, we test whether capital market restrictions truly helped shield emerging markets from the detrimental consequences of the recent financial crisis.

Besides illuminating the role of capital market restrictions, the present paper offers three contributions:

We propose a panel state space business cycle model that allows for heterogeneity to identify the impact of the crisis in emerging markets. We derive a two-step bootstrap that accounts for cross sectional dependence and allows the use of these results as variable in a regression model. And we introduce a new set of detailed data on capital controls.[1] Our capital control indicators allow to separate controls aiming at derivative trade and banking regulation from general controls on capital flows. Thereby we can account for the nature of recent financial crisis.

The paper adds to a large body of literature that investigates whether capital controls stabilize the economy. Previous evidence on this question is heterogeneous. Ranciere, Tornell & Westermann (2006) find that capital account liberalization increases the probability of financial crisis. Glick & Hutchison (2005) find that capital controls do not limit the risk of speculative attacks or currency crises. Similarly, Kose, Prasad, Rogoff & Wei (2009) report in their literature synthesis that there is no general evidence that capital account liberalization increases the vulnerability to financial crisis. There are several reasons why capital openness might foster stability rather than risk. For example, capital controls prevent consumption smoothing and contribute to corruption, as El-Shagi (2007) and Edwards (1999) demonstrate.

Our study contributes to this literature by treating the recent financial and economic crisis as a natural experiment. The magnitude of the crisis allows us to test the hypothesis that capital controls provide protection from financial turmoil, given equal global conditions.

2 Measuring capital controls

Following El-Shagi (2010)and El-Shagi (forthcoming), we utilize the information given in the text section of the IMF's Annual Reports on Exchange Arrangements and Exchange Restrictions (AREAER).

We propose four capital market restriction indices, covering different segments of the capital market: capital export controls on the derivative market (to account for the potential exposure to the risk of US derivatives), banking regulation (to account for contagion through the banking system), and general capital import and export controls. Each index is given by the share of possible controls (in the respective segment) that are in place in a country.

[1]Data quality has been a major issue in previous econometric analyses of capital controls. Most contributions that have aimed at alleviating the data problem focused on the intensity of regulation (Gwartney & Lawson (2001), Quinn & Toyoda (2008)). We build on work by El-Shagi (2010) who introduce a set of indices that include information on the direction of controls and their intensity.

There are two potential capital exports controls on the derivative market, 11 further capital export restrictions, 13 potential capital import restrictions and 17 restrictions that are considered banking regulation (including reserve requirements for foreign liabilities and limits on open positions in foreign currency). Our import and export indices cover both asset markets and credit markets.

3 Estimation

3.1 Identifying the impact of the crisis

It is insufficient to only examine 2009 growth rates when identifying the impact of the global financial crisis on the real economy in our sample. Given the magnitude of business cycles, we must correct for the expected cyclical movement of GDP. Also, the pace of growth differs strongly among middle-income countries.

To account for this, we perform a state space decomposition of GDP into a trend and a cyclical component. These models include a simple time series model of the underlying economic data that allows forecasting. Thus, we can treat the state space model's 2009 prediction errors as shock to the GDP in 2009.

However, the quarterly data commonly used in business cycle models has only become available for many emerging markets since the mid-1990s. This period is too short to allow the analysis of business cycle dynamics. For many countries, however, annual data is available since 1980. While these data cover a sufficient number of business cycles per country, they leave us with too few observations per country to estimate a state space model.

Therefore, we propose a univariate panel state space model to predict GDP. We allow for heterogeneity in the trend growth rate and the variance of shocks to the business cycle. Thereby, we are able to capture the essential differences in GDP dynamics, while exploiting the cross sectional nature of the data to get more efficient estimates for the autoregressive process of the cycle.

The resulting model is given by the signal equation

$$y_t = y_t^* + \tilde{y}_t \tag{1}$$

and the state equations

$$\begin{aligned} y_{i,t}^* &= y_{i,t-1}^* + \mu_i + u_{i,t} \quad u \sim N(0, \sigma_u) && (2)\\ \tilde{y}_{i,t} &= \phi(L)\tilde{y}_{i,t-1} + v_{i,t} \quad v \sim N(0, \sigma_v, i), && (3) \end{aligned}$$

with the asterisk marking the growth trend component and the tilde denoting the cyclical component.

The log likelihood is maximized with respect to the fit of the model in the pre-crisis era.

3.2 The model

To determine whether capital controls affected the magnitude of the shocks, we propose a straightforward structure given by

$$\eta_{i,2009} = \alpha + \beta c_i + \Gamma X_i, \tag{4}$$

where $eta_{i,2009}$ denotes the crisis impact on country i, c_i, describes the vector of capital market regulation indicators and X is a vector of control variables.

Our set of controls comprises a set of indicators on development and trade, to control for real spillovers.

3.3 Accounting for uncertainty

To enhance the reliability of our results, we consider the uncertainty of shock estimation. Therefore, we propose the two-step bootstrap that allows to consider cross sectional dependence in the business cycle and in innovations to potential output when estimating the confidence bounds.

The model produces two sets of shocks (one from the trend equation and one from the cycle equations). Each country is actually subject to four shocks in each period: a global trend shock, an idiosyncratic trend shock, a global business cycle shock, and an idiosyncratic business cycle shock. To separate the global shock from the panel of shocks, we use a principal components approach to identify a joint factor.

Using these errors, we resample 1000 times, producing new estimates of the parameters of the state space model. These sets of parameters are then used with the original data to produce alternative sets of reactions to the crisis.

The confidence bounds of the final model are bootstrapped in a second step. Each bootstrap iteration is run using a randomly drawn potential crisis effect from the first bootstrap.

4 Data

Our shock identification covers 63 middle-income economies for which the World Bank provides annual GDP data from 1980 to 2009.

To avoid capturing controls that have been implemented as response to the crisis, we rely on the 2007 AREAER to compute the capital controls indicators.

GDP is measured as purchasing power adjusted real GDP per capita in US Dollars. GDP, the data on merchandise exports over GDP, and the share of fuel exports are taken from the World development indicators (2011).

The share of trade with the US and the EU27 is taken from the WTO reports. If neither the US nor the EU27 is among an economy's top-five trading partners, we assume a share of zero for that economy.

5 Results

The results are summarized in Table 1. We run some alternative specifications (R1 to R4) including different subsets of controls. We test derivate controls jointly with and independent from general capital market restrictions to avoid overlooking any impact that might be obscured by multicollinearity. However, there is no evidence that derivative restrictions affected the real consequences of the financial shock in 2009. The same holds for general inflow and outflow controls. Only banking regulation is significantly correlated with the shock during the crisis. A change of one standard deviation in banking regulation explains one to two percentage points of real GDP growth during the crisis.

Table 1: Results

	R1	R2	R3	R4
(1) Const.	0.205 (3.856)	0.196 (3.678)	0.176 (3.135)	0.208 (3.547)
(2) derivative controls	0.000 (0.018)	0.005 (0.404)	-0.008(-0.659)	0.008 (0.569)
(3) banking regulation	- -	- -	0.048 (1.690)	0.052 (2.043)
(4) inflow controls	- -	- -	- -	-0.010(-0.323)
(5) outflow controls	- -	- -	- -	-0.016(-0.679)
(6) ln(GDP)	-0.029(-4.377)	-0.026(-3.901)	-0.027(-4.094)	-0.029(-4.051)
(7) σ_η	0.488 (1.510)	0.467 (1.648)	0.576 (1.792)	0.639 (2.102)
(8) exports/GDP	-0.017(-0.611)	-0.074(-2.074)	-0.027(-1.003)	-0.097(-2.682)
(9) fuel exports/GDP	0.054 (2.925)	0.053 (2.926)	0.055 (2.993)	0.054 (3.250)
(10) EU27 share in exp.	0.014 (0.550)	0.012 (0.502)	0.015 (0.615)	0.014 (0.589)
(11) US share in exp.	-0.049(-1.908)	-0.136(-3.024)	-0.046(-1.884)	-0.138(-3.150)
(12) interaction (8,11)	- -	0.003 (2.310)	- -	0.003 (2.581)
adjusted R^2	0.30	0.35	0.32	0.37

Note: (bootstrapped) t-statistics are given in parenthesis

We find that richer economies suffered more during the crisis, which might reflect the effects of stronger ties to the industrialized economies where the crisis emerged. While we control for trade relations, this does not entirely capture the increasing integration in the world market.

The export to GDP ratio and the share of exports to the US both correlate significantly negative with the crisis. Given the collapse of global trade (the key channel of direct spillovers) and the prominent role of the US at the epicenter of the crisis, this result is unsurprising.

Fuel exporting countries have been less affected by the crisis in 2009. Although the global economic recession occurred in 2009, oil prices stopped crashing by the end of 2008. After a few months of stagnation, oil prices recovered strongly, almost doubling in 2009.

The interaction term between the exports to GDP ratio and the US share of exports is significantly positive. That is, strong dependence on US demand seems to be less important in countries that are very open. This finding suggests that both indicators (the export ratio and the US share in exports) partly act as proxies for real spillover. Because these terms should not be considered twice, their interaction corrects for this "double accounting".

6 Conclusions

We find that capital controls do little to shelter economies from financial turmoil. Our study is unique because it considers controls specifically targeted to the type of asset that played a key role in the propagation of the crisis. Additionally, previous studies have indicated that while controls alleviate risks, in the process, they also create new risks. Our results suggest that controls do not significantly alleviate risk in the first place.

By contrast, banking regulation that limited exposure to foreign risk proved to be highly relevant.

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