Managing Capital Inflows: The Role of Controls and Prudential Policies

Jonathan D. Ostry, Atish Rex Ghosh, Marcos Chamon, and Mahvash S. Qureshi[1]

I.   Motivation:

With the global economy beginning to emerge from the financial crisis, capital is flowing back to emerging market economies (EMEs). Many of the flows are perceived to be temporary, reflecting interest rate differentials, which may be at least partially reversed when policy interest rates in advanced economies return to more normal levels. Although capital flows to developing and emerging market countries are generally welcome—providing lower-cost financing and indicating market confidence in the fundamentals of the economy—sudden surges can complicate macroeconomic management and create financial risks. On the macroeconomic front, the concern is that the surge will lead to an appreciation of the exchange rate and undermine competitiveness of the tradable sector—possibly causing lasting damage even when inflows abate or reverse. The main worry from the financial fragility perspective is that large capital inflows may lead to excessive foreign borrowing and foreign currency exposure, possibly fueling domestic credit booms (especially foreign-exchange-denominated lending) and asset bubbles (with significant adverse effects in the case of a sudden reversal). These concerns have been heightened in the aftermath of the global financial crisis. The question is thus how best to handle surges in inflows that may pose both prudential and macroeconomic policy challenges. The menu of policy options includes fiscal policy, monetary policy, exchange rate policy, foreign exchange market intervention, domestic prudential regulation, and capital controls.

Our paper will analyze the alternative policy mixes for Emerging Markets, with a focus on prudential policies and capital controls. Our analysis will build on our recent work on capital controls (Ostry et al 2010, IMF Staff Position Note 10/04), which has received extensive coverage in the press, and has helped shape the IMF's policy stance on this issue. We plan to expand that work, incorporating a series of robustness checks for the results on capital controls, as well as expanding the sample to include previous crisis episodes in EMEs. We will also analyze the design of capital controls, including their scope (e.g. whether certain flows are excluded), the choice of market vs non-market instruments (e.g. taxes or Unremunerated Reserve Requirements vs administrative controls), and their administration. We will also analyze the potential role of prudential policies as substitutes or complements to capital controls.

This outline reports results from our previous work on this topic, discusses directions for future work, as well as some of the preliminary results from these extensions.

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[1] Ostry, Ghosh, Chamon and Qureshi: International Monetary Fund, Research Department

Corresponding author: Marcos Chamon, mchamon@imf.org

II.   Relation to existing Literature

There is an extensive literature on the effectiveness of capital controls. To say that the evidence is mixed is an understatement. Although individual country studies often find little or no impact of capital controls on the aggregate volume of inflows, some cross-country analyses suggest that, at least among countries that faced some surge in inflows, those with controls experienced smaller surges. Obviously, all other things being equal, a country with a closed capital account will experience smaller inflows than a country with a largely open capital account. The effectiveness of controls in regulating inflows thus depends on how extensive they are, whether the country maintains the necessary administrative and institutional infrastructure to enforce the controls, and the incentives investors have to try to circumvent them. Inherent endogeneity problems (e.g. adopting/tightening controls in response to surges in inflows) likely contribute to the mixed evidence found. Since most studies do not find much impact of controls on aggregate volumes of inflows, they usually do not find much effect on exchange rate appreciation either. Empirical studies are typically more successful at finding some impact of capital controls on monetary policy autonomy[2] and on the composition of inflows—particularly, lengthening their maturity.[3]

III.   Initial Results

The recent global financial crisis provides a cleaner setting to assess the effectiveness of capital controls than that used in previous studies. The nature of the shock—originating in the financial sector of advanced economies—can be taken as a source of exogenous variation to capital flows to EMEs (possibly as close as we can get to a "natural experiment" in this literature). We can then measure how the extent of pre-crisis capital controls influenced their resilience to the global downturn. This strategy provides a substantial improvement in terms of identification vis-à-vis the traditional approach of measuring how flows to a country respond to changes in capital control policies (although identification remains a valid concern, and results must still be interpreted with caution).

Empirically, there does appear to be a negative association between capital controls on inflows that were in place prior to the global financial crisis and the output declines suffered during the crisis (Table 1). Although causation is far from established, the empirical evidence suggests that the use of capital controls was associated with avoiding some of the worst growth outcomes associated with financial fragility. Moreover, it is controls on debt inflows that are significantly

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[2] De Gregorio and others (2002) find that capital controls allowed Chile's central bank to target a higher domestic interest rate over a period of 6 to12 months; Ma and McCauley (2008) and Hutchison and others (2009) find that interest differentials are significant and persistent in China and India, which maintain more extensive capital controls. However, Ghosh, Ostry and Tsangarides (2010) find significantly lower monetary autonomy in countries with fixed exchange rates compared with more flexible regimes, even in countries with relatively closed capital accounts.

[3] For example, De Gregorio and others (2000) on Chile, and Cardenas and Barrera (1997) on Colombia.

associated with avoiding crises, consistent with the conventional wisdom that debt flows are riskier than FDI and equity flows. A first look at the foreign liability structure of the EMEs and their resilience in the current crisis confirms the conventional wisdom that debt flows are riskier than FDI and equity flows, but with one qualification: FDI in the financial sector is found to be as risky as debt flows (Figure 1). These results are confirmed in the regressions of Table 2, which includes the different types of flows in a same regression, as well as additional controls.

This finding indicates that some components of financial FDI bring added risks—for example, financial FDI may reflect lending from a parent bank to a branch or local affiliate, which may be more in the nature of debt flows than "greenfield FDI." Turning to the question of what makes financial FDI and debt riskier types of flows, our results show that both are strongly associated with credit booms and foreign-exchange-denominated lending by the domestic banking system, which in turn is associated with greater vulnerability (Table 3). This is likely to be a key channel through which such flows make the country more susceptible to crisis. Interestingly, however, the greater crisis vulnerability associated with debt liabilities holds even controlling for credit booms and foreign-exchange-denominated lending—perhaps because households and firms may borrow directly from abroad (or flows are intermediated through nonbank financial institutions).

IV.   Extensions for future work

Building on our earlier and preliminary work, there are three avenues for further research that we will explore.

A. Role of liability composition and capital controls on previous crises

A natural extension is to check whether the results described above also apply to previous crisis episodes. We estimate a probit model for capital account crises, as a function of the liability structure and other country fundamentals. [4] While identification is not as clean for previous episodes (since in most cases the source of the shock was not exogenous to the country), it is still interesting to compare the results from the recent global financial crisis with those based on a sample of past crises.

Preliminary results confirm the conventional wisdom that debt liabilities increase the likelihood of crises, and that much of the vulnerability is created through the banking system. Both external debt liabilities and financial FDI are associated with credit booms, and with an increase foreign currency lending in the domestic banking sector, which in turn heighten the risk of crises. These results are weaker in a 1995-2007 sample that excludes the recent crises, but become sharp once the most recent episodes are included. This pattern is at least partly driven by the fact that many

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[4] We use the crisis definition from Chamon, Manasse and Prati (2007), which is coded based mainly based on sudden stops in net private capital flows, and is vetted by IMF desk economists. That list has been updated to 2009. It includes 50 crises over the 1994-2009 period (16 of which occurred in 2008-09)

countries with very risky liability structures (e.g., externally financed FX lending booms) did not experience a crisis until 2008. As such, any model estimated using per-2008 data will tend to downplay the risks of such liabilities. More generally, the average difference in indebtedness between countries that experienced crises and those that did not has widened over time, which also helps to sharpen that result (most non-European EMEs actually experienced a decline in their debt liabilities over the 2000s). Finally, to the extent that crises are a confluence of underlying vulnerabilities and an immediate trigger, the benign global environment up to 2008 has also helped disguise these vulnerabilities (unlike the post global crises period, where the trigger event was strong enough that any underlying vulnerability could manifest itself).

Our preliminary results also indicate that controls on inflows do reduce the speed at which external debt liabilities are accumulated, and at which private sector credit (and in particular FX credit) expands. But it is less clear that controls can affect the liability structure in steady-state.

B. Design considerations

Beyond establishing whether capital controls can improve crisis resilience, the key policy question is how to design controls. There is an enormous variety in the way countries actually implement capital controls, but there have not been attempts to systematically analyze why some countries favor a type of intervention over others.

The recent experience suggests countries tend to adopt controls that resemble those that were in place in the past. For example, a country that had URRs at some point would likely reintroduce that type of control rather than design a tax from scratch, and vice-versa. The same applies to their administration.

There have been only a handful of noteworthy experiences with the imposition of taxes on inflows/URRs in this past decade. In the paper we will more formally test to which extent past history of controls explains the design choices made. For example, test whether the level of development of local financial markets helps explain the level of tax (or implied tax by an URR), and the decision to include/exclude some types of flows (e.g. portfolio equity)

While there have been few instances of broad controls on inflows (taxes/URRs), there have been many more episodes of prudential-type controls, such as the macroprudential measures described above. Over time, there has been a trend towards removing controls, particularly administrative ones involving licenses/authorization requirements, and a liberalization of outflows. In general, controls that keep some choice at the margin are preferable to more rigid ones. For example, setting a higher reserve requirement on external borrowing (which forces banks to internalize some of the externalities such activity could cause) seems preferable than a rigid cap. We also plan to more systematically document these trends.

C. Macroprudential policies

Finally, we plan to explore the use of *macroprudential* policies—as a substitute for, or a complement to, the use of capital controls—to enhance crisis resilience.[5] For example, prudential policies that limit/discourage foreign currency borrowing by sectors without a natural hedge can attenuate the risks of externally financed credit booms. The line between macroprudential tools and capital controls can sometimes be blurred, as many prudential restrictions do discriminate between residents and nonresidents (for example, higher marginal reserve requirements on external borrowing).

There are indices that quantify the quality of banking supervision (e.g. Abiad, Detragiache and Tressel (2008) whose index includes independence of supervisors, adoption of Basel capital standards, and framework for banking inspections). But such metrics, and much of the work on prudential policies tends to have a micro-level focus (i.e. the risks to an individual bank, as opposed to the risks to the system as a whole). For example, even if a bank has zero open FX positions, it can still create systemic vulnerabilities if its FX loans are made to sectors without a natural hedge.

The IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) reports prudential measures that involve the regulation of transactions with nonresidents, or that involve foreign exchange. We can rely on those reports to identify a number of macroprudential policies. Indeed, many countries have adopted measures, such as higher reserve requirements on external borrowing, higher reserve requirements on FX liabilities, limits on FX lending to residents, maturity requirements on external borrowing, among others.

The heterogeneity of these macroprudential policies—and differences in the degree to which they were implemented—make cross-country comparisons difficult. While we will attempt to code them into a comparable index, we may ultimately need to rely on a case study approach to assess their effectiveness and limitations. Some of the experience with macroprudential tools suggest that evasion concerns can also be a problem (similarly to capital controls).[6]

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[5] Like capital controls (see Forbes 2007), prudential measures also impose costs on the economy by possibly deterring "good" lending.

[6] For example, Croatia introduced a "speed limit" on bank lending in 2003. Banks responded to that policy by selling part of their loan portfolio to affiliated leasing companies, and selling the credit risk of loans to parent banks abroad (which allowed them to remove those loans from their balance sheet). That speed limit regulation was replaced in July 2004 by a marginal reserve requirement on foreign liabilities. The regulation was continually refined to close loopholes (such as the ones mentioned above), and remained in place until October 2008.

V.   Data sources

The data used in our previous work (Ostry and others 2010) includes the Schindler (2009) index of capital control intensity, the Reindhardt (2009) decomposition of FDI into financial and non-financial flows, the Lane and Milesi-Ferretti (2007) External Wealth of Nations database (updated), and other IMF data (including International Financial Statistics, World Economic Outlook, and International Investment Position databases). For the additional work we will rely mainly on IMF staff reports, Financial Sector Assessment Program (FSAP) reports, and the Annual Report on Exchange Rate Arrangements and Exchange Rate Restrictions to code measures of prudential regulations and design choices regarding capital controls.

VI.   Timetable for the project

In addition to the initial results from our initial policy note, we have started the work on past crises. We have also began assembling the data/documentation on macroprudential policies and capital control design issues. We appreciate any comments/suggestions at this preliminary stage, and plan to have a draft by early 2011.

Table 1. Capital Controls and Growth Crisis 1/

	[1]	[2]	[3]	[4]
Controls on 2/				
Overall Inflows	-2.026*	-2.644**		
	(1.043)	(1.329)		
FDI Inflows			-0.032	1.939
			(1.206)	(1.583)
Equity Inflows			2.057	3.443**
			(1.376)	(1.722)
Bond Inflows			-4.054*	-8.548**
			(2.294)	(3.708)
Growth in trading partners 3/		-0.010		-0.030**
		(0.012)		(0.014)
Change in terms of trade 4/		-0.107**		-0.145*
		(0.054)		(0.085)
Constant	-0.712*	-1.480*	-0.900**	-3.097***
	(0.385)	(0.812)	(0.351)	(0.882)
Observations	37	37	37	37
Pseudo R-squared	0.117	0.240	0.168	0.368

Note: Robust standard errors in parentheses. *,**, and *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

1/ Crisis is coded as equal to one if the decline in the country's real GDP growth (2008-09 relative to 2003-07) is in the lowest 10th percentile of the sample.

2/ Capital controls based on the Schindler (2009) index averaged over 2000-05 (the last year covered in the database is 2005).

3/ Average annual real growth rate in trading partners over 2008-09 weighted by average export to GDP ratio in 2003-07 (in percent).

4/ Average annual percentage change in terms of trade over 2008-09.

Table 2. Composition of Flows and Output Growth Decline, 2008–09 1/

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Foreign Liabilities 2/							
Non-Financial FDI (% of GDP, 2007)	-0.071**	-0.086***			-0.087***	-0.090***	-0.087***
	(0.031)	(0.030)			(0.027)	(0.028)	(0.024)
Financial FDI (% of GDP, 2007)	0.195**	0.134			0.002	0.021	-0.045
	(0.087)	(0.087)			(0.145)	(0.106)	(0.157)
Debt Liabilities (% of GDP, 2007)	0.116***	0.116***			0.102**	0.091***	0.084*
	(0.036)	(0.032)			(0.042)	(0.032)	(0.042)
Equity Liabilities (% of GDP, 2007)	-0.047	-0.039			-0.057	-0.040	-0.061
	(0.064)	(0.051)			(0.065)	(0.041)	(0.053)
Domestic Banking System Credit							
FX Credit (% of GDP, 2007)			0.153***		0.043		0.008
			(0.0534)		(0.069)		(0.057)
Change in Credit/GDP from 2003 to 2007				0.151***		0.101*	0.100
				(0.051)		(0.051)	(0.064)
Other regressors:							
Growth in trading partners 3/		-0.048**	-0.018	-0.038**	-0.054**	-0.047**	-0.053**
		(0.022)	(0.019)	(0.016)	(0.025)	(0.020)	(0.022)
Change in terms of trade 4/		-0.122	-0.017	0.0162	-0.084	-0.068	-0.029
		(0.099)	(0.122)	(0.100)	(0.102)	(0.101)	(0.113)
Constant	3.49	0.873	2.857**	1.814	1.532	1.64	2.253
	(2.19)	(1.545)	(1.269)	(1.138)	(1.785)	(1.495)	(1.504)
Observations	35	34	30	33	30	33	29
R-squared	0.43	0.608	0.411	0.473	0.619	0.717	0.727

Note: Robust standard errors in parentheses.*,**, and *** denote statistical significance at the 1, 5, and 10 percent levels, respectively.

1/ Dependent variable defined as average growth in 2003-07 minus average growth in 2008-09. Positive coefficient indicates that the regressor is associated with a larger decline in the real GDP growth rate.

2/ End-2007 stock (in percent of GDP) based on Lane and Milesi-Ferretti (2007) updated database. Breakdown of FDI into Financial and Non-Financial sectors based on Reinhardt (2009) estimates.

3/ Average annual real growth rate in trading partners over 2008-09 weighted by average export to GDP ratio in 2003-07 (in percent).

4/ Average annual percentage change in terms of trade over 2008-09.

Table 3. Foreign Liabilities and Banking System FX-Credit and Credit Booms 1/

	Dependent variable	
	FX Credit (% of GDP 2007) 1/	Change in Credit/GDP 2/
Financial FDI (% of GDP, 2007)	1.305***	0.914**
	(0.346)	(0.398)
Debt Liabilities (% of GDP, 2007)	0.389***	0.258**
	(0.071)	(0.104)
Constant	-8.044***	-0.031
	(2.838)	(0.045)
Observations	31	34
R-squared	0.75	0.31

Note: Robust standard errors in parentheses. *,**, and *** denote statistical significance at the 1, 5, and 10 percent levels, respectively.

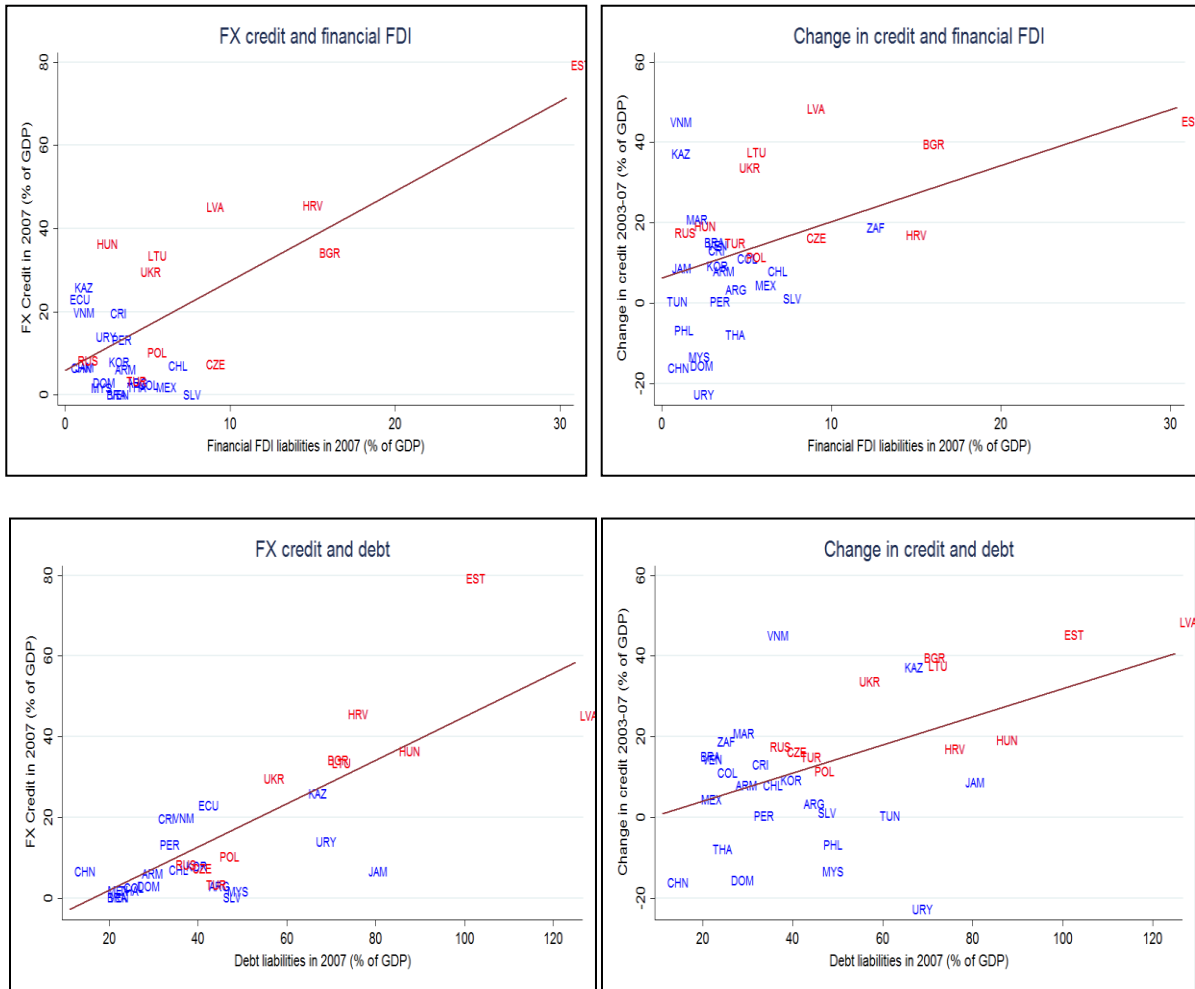1/ FX-denominated banking system credit (in % of GDP).
2/ Change in banking system credit/GDP over 2003-07.

Figure 1. Foreign Liabilities and Growth Decline in 2008-09 relative to 2003-07
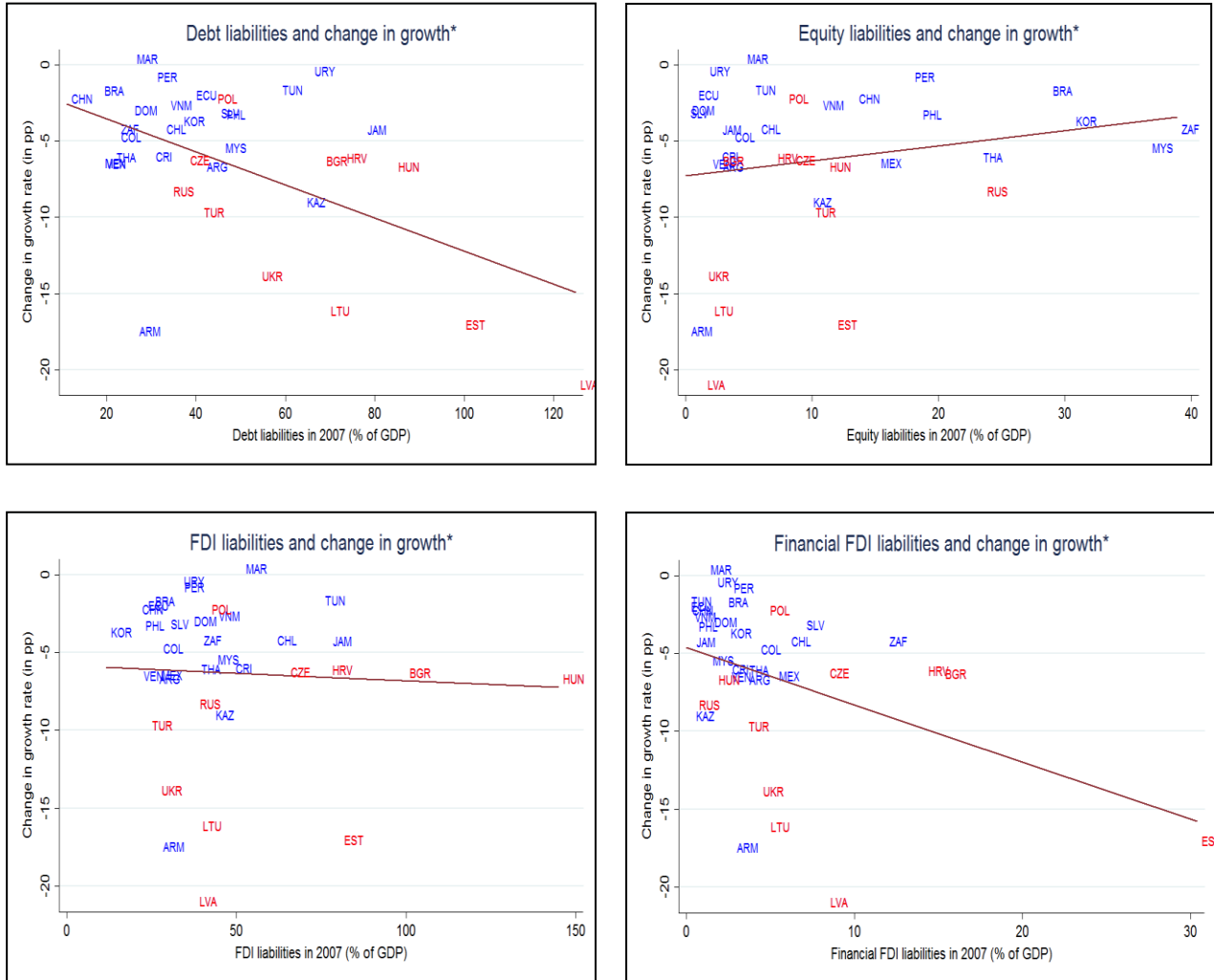
Sources: IMF World Economic Outlook database, Lane and Milesi-Ferretti (2007) updated database, Reinhardt (2009) and staff calculations.

Figure 2. Foreign Liabilities and Banking System

Source: IMF World Economic Outlook database, Lane and Milesi-Ferretti (2007) updated database, Reinhardt (2009), IMF Country Desk data, Reinhardt (2009), and IMF staff calculations.

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