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External balance sheets as countercyclical crisis buffers

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Abstract The external balance sheets of many emerging market countries are distinguished by their holdings of assets primarily in the form of foreign debt and foreign exchange reserves, while their liabilities are predominantly equity, either foreign direct investment or portfolio equity. We investigate the claim that this composition served as a buffer for the emerging markets during the global financial crisis of 2008–09. We use data from a sample of 67 emerging market and advanced economies, and several indicators of the crisis are utilized: GDP growth rates in 2008–09, the occurrence of bank crises and the use of IMF credit. Our results show that those countries that issued FDI liabilities had higher growth rates, fewer bank crises and were less likely to borrow from the IMF. Countries with debt liabilities, on the other hand, had more bank crises and were more likely to use IMF credit. We conclude that the "long debt, short equity" (hold debt assets, issue equity liabilities) strategy of emerging markets did mitigate the effects of the global financial crisis.

1 Introduction

While the global financial crisis (GFC) of 2007–09 was truly an international phenomenon, some countries were more severely affected than others. The decline was steepest

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in the high-income countries, where GDP contracted in 2009 by 3.5%. The emerging market and developing economies also recorded declines in growth rates, but the differences between their rates and those of the advanced economies rose during the crisis (see Fig. 1). The relatively stronger performance of the emerging markets and developing economies has been attributed to several factors, including improved macroeconomic policies, stronger external positions before the crisis, more regulated financial sectors and a rapid response by the IMF.[1] In this paper we investigate whether the composition of the external balance sheets of emerging market nations also mitigated the effects of the global downturn on their economies.

After the financial crises that occurred in emerging markets during the late 1990s and early 2000s, many of these nations altered the configurations of their external balance sheets. Countries that once had obtained external funds primarily through debt in the form of bonds or bank loans turned to equity, either foreign direct investment (FDI) or portfolio equity, for sources of finance. As a result, their equity liabilities grew steadily, both in terms of magnitude and relative to their debt liabilities. Their assets, on the other hand, largely consisted of the foreign exchange reserves of their central banks, held in the form of U.S. Treasury bonds, and other debt holdings. This profile is known as "long debt, short equity," and differs from the "long equity, short debt" composition of most advanced economies that hold equity and issue debt.

Lane (2013) has claimed that the structure of the emerging markets' external balance sheets served as a buffer against the GFC, while the contrasting profile of many advanced economies' assets and liabilities heightened their vulnerability. Similarly, Gourinchas et al. (2010) have maintained that the U.S. provided "insurance" to other countries against the effect of the crisis through its holdings of their equities. The fall in equity valuations combined with depreciations against the dollar lowered the value of the liabilities of the emerging market nations while the value of their foreign-currency denominated assets increased, thus raising their net international investment positions (NIIP). The advanced economies that were net holders of equity, on the other hand, suffered deteriorations in their external positions. They were also subject to financial volatility, which was much less of a threat for the emerging markets that had issued FDI.

This paper tests whether the composition of external assets and liabilities affected the impact of the GFC on emerging markets and advanced economies. We specifically look at the net holdings and gross stocks of equity and debt assets and liabilities. We investigate their effect on GDP growth rates during the crisis, the incidence of bank crises and participation in IMF programs. While other papers have explored the causes and extent of the GFC (see literature review below), ours concentrates on how the holdings and issuance of equity and debt affected the response of countries to the GFC.

To preview our results, we find that countries with FDI liabilities recorded smaller declines in GDP growth, experienced fewer bank crises and were less likely to enter IMF programs. Holdings of FDI assets were associated with lower growth rates. Portfolio assets and liabilities had similar impacts but their coefficients are less

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[1] Didier et al. (2012) offer an analysis of the economic performance of emerging market countries during the crisis. Ceballos et al. (2013) examine the policies that contributed to this record.
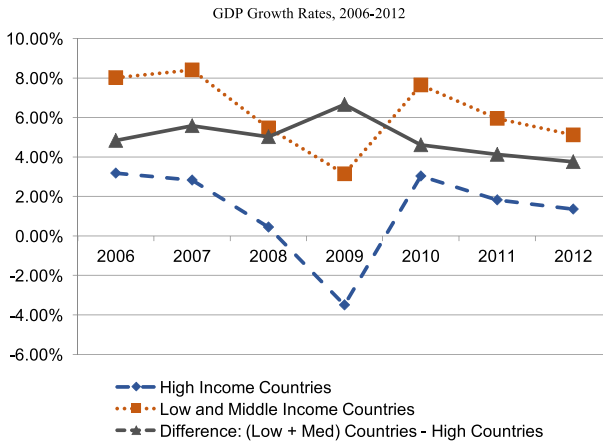
Fig. 1 GDP Growth Rates, 2006–2012

significant. External debt liabilities, on the other hand, were associated with a greater incidence of bank crises and more use of IMF credit. Our results, therefore, demonstrate that the "long debt, short equity" strategy of many emerging markets did act as a countercyclical stabilizer to mitigate the effects of the global financial crisis. FDI liabilities in particular served as a risk-sharing mechanism.

The next section examines the impact of balance sheet positions on the transmission of external shocks. The following section presents a selective review of the relevant literature. Section 4 describes the empirical model and data. Section 5 contains our main results for the investigation of a linkage between the severity of the crisis and the composition of the external balance sheet. In section 6 we examine the robustness of our results. The last section offers our conclusions and proposes extensions of the research.

2 Balance sheets and the transmission of external shocks

Figure 2 provides a stylized version of a country's external balance sheet, which records the foreign assets owned by domestic residents and the domestic liabilities held by foreigners. The foreign assets are denominated in the foreign currencies, while domestic equity is denominated in the domestic currency. Domestic debt held outside a country may be denominated in the domestic or a foreign currency. The net position determines a country's net international investment position (NIIP) as a creditor or debtor.

Lane and Milesi-Ferretti (2001, 2007) in a series of seminal papers provided data and analysis on the external assets and liabilities of a wide range of countries. They pointed out that international financial integration had advanced much further in the advanced economies than in the emerging markets. Lane and Milesi-Ferretti (2007) and Kose and Prasad (2010) also noted the increase over time by emerging market countries in the issuance of equity liabilities. The advanced economies that hold these liabilities issued debt liabilities, which in turn are held by the emerging markets. In the empirical literature, Faria et al. (2007), Faria and Mauro (2009) and Vermeulen and de Haan (2014) attributed

External Balance Sheet

Assets	*Liabilities*
Equity (FDI, Portfolio)[F]	Equity (FDI, Portfolio)[D]
+ Debt (Bonds, Bank Loans)[F]	+ Debt (Bonds, Bank Loans)[F/D]
+ Foreign Exchange Reserves [F]	

Foreign Assets of Domestic Residents - Domestic Liabilities of Foreign Residents =

Net International Investment Position (+ creditor, - debtor)

Note: F identifies assets and liabilities denominated in foreign currency, D denominated in domestic currency, F/D denominated in foreign or domestic currency.

Fig. 2 External Balance Sheet. Note: F identifies assets and liabilities denominated in foreign currency, D denominated in domestic currency, F/D denominated in foreign or domestic currency

the rise in the issuance of equity liabilities by emerging markets to improvements in institutional quality and/or financial development in these countries.[2]

The external balance sheet can affect a country's performance during a crisis through several transmission mechanisms. The first is a wealth effect exerted through a country's NIIP. Gourinchas and Rey (2007a, 2007b, 2014), who examined the role of external balance sheets in preserving the intertemporal budget constraint, focused on the role of valuation changes, which are driven by fluctuations in the market values of assets and liabilities as well as exchange rate movements. A decline in the value of equity, for example, will lower the NIIP of those nations that are "long" equity, while raising it for those that are "short" equity. A depreciation of the exchange rate has mixed effects: on the one hand, it increases the value of a country's foreign assets while lowering the value of liabilities denominated in the domestic currency. But it also raises the value of any foreign-held debt that is denominated in a foreign currency.

These changes in the NIIPs can exert wealth effects on expenditures. Kubelec et al. (2007) analyzed the external balance sheets of the United Kingdom, the U.S. and Canada, and described how changes in these would impact economic activity within the countries. Cavallo et al. (2005), using data from 24 crises in the 1990s, reported that balance sheet effects due to exchange rate overshooting led to large contractions in output.

The second channel of transmission between the composition of the balance sheet and economic performance takes place through the flow of net investment income. Dividend payments on equity investment are state-contingent, while debt payments are contractual in nature. Consequently, in normal times equity payments incorporate an equity "premium," and equity payments exceed those on debt. But during a crisis, the equity payments are cut as profits fall, while debt payments continue, except in the extreme case of a default. Net income payments for China, for example, are usually negative despite the country's NIIP status as a creditor because the payments made on foreign-held FDI exceeds the interest received on U.S. Treasury and other securities. Ma and McCauley (2014) pointed out, however, that in 2008 China's net income payments turned positive due to the reduction in income outflows while the country

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[2] Devereux and Sutherland (2009), Mendoza et al. (2009) and Mendoza and Smith (2014) develop theoretical models to explain the reasons for the differences in the composition of external assets and liabilities of the advanced and emerging economies.

continued to receive a return, albeit a small one, on its holdings of U.S. Treasury debt. Lane (2001) and Balli et al. (2011) have examined whether investment income flows and capital gains can smooth income.

Third, the structure of the external balance sheet influences the degree of volatility in financial flows before and during crises. Changes in the stocks of assets and liabilities initiated by foreign and/or domestic investors can overwhelm financial markets and institutions, and exacerbate a crisis. In the case of a "sudden stop," there is a severe drop in capital inflows and the reversal of a current account deficit, which is often accompanied by a recession.

The degree of instability manifested by financial assets and liabilities depends in part on their composition. Several studies have compared the relative stability of equity and debt flows during crises. Levchenko and Mauro (2007), for example, found that FDI flows were stable during periods of sudden stops, while portfolio equity played a limited role in the proliferation of these crises. Portfolio debt, on the other hand, and bank flows were more likely to be reversed. Similarly, Sula and Willett (2009) investigated the behavior of capital flows during currency crises, and reported that FDI flows were the most stable, while portfolio flows and private loans in particular were more reversible.

The transmission of external shocks to an economy will be intermediated through a country's external balance sheet. Whether or not the shock is amplified or attenuated depends on both the size and configuration of the components of the balance sheet. The difference in the compositions of assets and liabilities between emerging market and advanced economies makes these countries a suitable focus to study these effects during the GFC.

3 Literature review

The role of the different types of external assets and liabilities in propagating financial crises has been extensively studied.[3] The debt crisis of the 1980s, for example, was due in part to the bank debt that developing economies had accumulated in the previous decade. Rodrik and Velasco (2000) showed that this short-term debt contributed to the occurrence of capital flow crises during the period of 1988–98.

Pistelli et al. (2008) investigated how the composition of external assets and liabilities affected the occurrence of current account reversals, sudden stops and currency crises. Portfolio equity liabilities were associated with a higher occurrence of current account reversals, while FDI liabilities had the opposite effect. They also found that FDI assets made sudden stops more likely, but portfolio equity assets and FDI liabilities lowered the probability of their occurrence. Catão and Milesi-Ferretti (2014) noted that an increase in net foreign assets lowered the probability of the occurrence of external crises. They reported that debt liabilities were a significant determinant of these crises, while FDI had the opposite effect, i.e., an increase in FDI liabilities lowered the risk of a crisis. Similarly, Frankel and Wei (2005) observed that the share of FDI and portfolio equity in external liabilities decreased the chance of a currency crisis.

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[3] Levy Yeyati and Zúñiga (2015) provide a thorough review and evaluation of this literature.

Joyce (2011) and Boukef Jlassi et al. (2018) examined systemic bank crises in a sample of emerging markets, and found that foreign debt liabilities contributed to an increase in the incidence of bank crises, while FDI and portfolio equity liabilities had the opposite effect. Ahrend and Goujard (2014) confirmed that debt liabilities increase the occurrence of systemic banking crises.

There are also studies that compare the effect of equity and debt *flows*. Furceri et al. (2012) reported that large capital inflows driven by debt increase the probability of banking, currency and balance-of-payment crises, while inflows that are driven by FDI or portfolio equity have a negligible effect. Forbes and Warnock (2014) found that episodes of extreme capital movements are associated with debt flows, whereas equity flows are not.

Calderón and Kubota (2012) examined gross capital inflows during periods of credit surges, or "booms," including those that lead to banking crises. They distinguished among FDI, foreign portfolio investment and "other investment inflows," which included loans. They report that credit booms that lead to banking crises are driven by other investment flows. FDI-driven surges in some cases actually mitigated the incidence of crises. Lane and McQuade (2014) looked at domestic credit growth and capital flows in Europe during the period of 1993–2008. They found that debt flows contributed to domestic credit growth but equity flows did not. Similarly, Caballero (2016) reports that debt inflows contributed to the incidence of bank crises through their correlation with lending booms.

Several recent papers have dealt with the impact of external assets and liabilities in the GFC.[4] As stated above, Lane (2013) suggested that the "long debt, short equity" external profile of the emerging markets "…provided valuable insulation against the crisis. In contrast, the "long equity, short debt" profile of many advanced economies was a risky profile in the face of declining equity markets and disruption in credit markets." Gourinchas et al. (2012) examined the wealth transfers that took place via changes in external positions during the crisis to determine which countries benefitted and which lost.

Al-Saffar et al. (2013) also looked at external balance sheets during the GFC, and found that external debt liabilities contributed to the deviation of GDP in 2009 from its 1997–2007 trend. They did not find evidence of a linkage from equity positions to the slowdown in growth, but did not decompose equity into its FDI and portfolio components. Balli et al. (2013) investigated income factor flows in advanced economies during the crisis, and reported that debt provided better risk sharing than equity.

Our research, therefore, draws from several strands of the literature, including analyses of external capital structures, external adjustment, and the record of the GFC. Previous analyses indicate that the various forms of foreign capital can have very different impacts on an economy. We build upon this work to examine whether the composition of external balance sheets affected economic performance during the GFC.

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[4] Several studies have investigated the impact of international reserves on performance during the crisis. See Aizenman and Sun (2012), Dominguez et al. (2012), and Bussiére et al. (2015).

4 Data

We obtained data for 67 countries, which include 44 emerging market economies and 23 advanced economies.[5] We did not include small financial centers with oversized financial holdings (Hong Kong, Iceland, Ireland, Luxembourg, Singapore), countries where oil exports were the dominant source of economic activity or those with populations below one million. The countries included in the sample are listed in the Appendix Tables 8 and 9.

The data on external assets and liabilities were taken from the the "External Wealth of Nations" dataset, which was constructed by Lane and Milesi-Ferretti (2007). We use the NIIP scaled by GDP (NIIP/Y), as well as the sum of external assets and liabilities scaled by GDP as a measure of de facto financial openness (Fin Opn). We also use a country's net equity position scaled by GDP (Net Eq/Y) and its components, the net FDI balance (Net FDI/Y) and the net position in portfolio equity (Net Prt/Y), as well as net debt (Net Dbt/Y), and the central bank's foreign exchange assets scaled by GDP (For Res/Y). In addition we use measures of the gross stocks of assets and liabilities, all scaled by GDP: FDI assets (FDI Ast/Y) and liabilities (FDI Lbt/Y), portfolio assets (Prt Ast/Y) and liabilities (Prt Lbt/Y), and debt assets (Dbt Asset/Y) and liabilities (Dbt Lbt/Y).

Our crisis indicators include GDP growth rates, banking crises and participation in IMF programs.[6] We provide more detail for each crisis variable as well as the control variables used in the empirical analyses in the following sections of results. A list of all the variables and their data sources appears in the Appendix Tables 8 and 9.

5 Results

5.1 Growth

The decline in economic activity during 2008 and 2009 was used by Lane and Milesi-Ferretti (2011) in their analysis of the cross-country severity of the crisis, and in several subsequent similar studies. We follow them in our specification of the dependent variable, the average real growth rate of GDP over the two years, and the choice of control variables.

The control variables for the growth regressions include the current account as a percentage of GDP (Cur Act/Y); the change in domestic credit during the period of 2004–2007 as a percentage of GDP (ΔDm Cr/Y); the logarithm of GDP per capita in 2011 international dollars (Y/Pop); and trade openness as measured by exports and imports as a percentage of GDP (Trad Opn). The current account data were obtained from the "External Wealth of Nations," while the data for the other control variables were taken from *World Development Indicators*. We added the external balance sheet

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[5] We relied on the October 2007 edition of the IMF's *World Economic Outlook* for the classification of the economies.
[6] Frankel and Saravelos (2012) used six indicators of crisis incidence in their study of the 2008–09 crisis, including the change in GDP and the use of IMF credit.

variables listed above. We used the 2007 values of all these variables to avoid simultaneity.[7]

Our results are reported in Table 1. The results for the control variables are quite similar to those of Lane and Milesi-Ferretti (2011). The countries with better growth records during the crisis were those with higher current account balances, smaller growth in domestic credit in the period leading up to the crisis and lower GDP per capita. Trade openness and financial openness were not significant, with the possible exception of the results in one of the subsequent equations where their coefficients are negative and positive, respectively. The adjusted R^2s range from 0.38–0.46, and these are also similar to those reported by Lane and Milesi-Ferretti (2011).

Turning to the external balance sheet variables, a country's net international investment position scaled by GDP appears in the first equation with a negative coefficient that is significant at the 5% level. A higher net position in the period before the crisis was linked to lower growth during the crisis. In order to ascertain which assets and liabilities drive this result, in eq. 1.2 we replace the NIIP with its components: net equity/GDP, net debt/GDP and foreign exchange reserves also scaled by GDP. Net equity appears with a highly significant negative coefficient, while net debt and foreign reserves are not significant.[8] In eq. 1.3, we replace net equity with its components, net FDI and net portfolio equity, and drop the other two variables from the previous estimation. The coefficient of the net FDI variable is negative and significant at the 1% level, whereas the coefficient of the net portfolio variable is negative but not significant.

We then replace the net equity and net debt positions with their components: FDI assets and liabilities in eq. 1.4, portfolio equity assets and liabilities in eq. 1.5, and debt assets and liabilities in eq. 1.6. Only the FDI variables appear to be significant: FDI assets with a negative coefficient and FDI liabilities with a positive coefficient, both significant at the 5% level. The two findings suggest that the countries that hosted foreign partners did better during the crisis than did their partners' home countries. The portfolio equity variables have the same signs as the FDI variables but are not significant.

Figure 3 plots the countries' Net FDI positions in 2007 against their average growth in 2008–09. The advanced economies with red diamonds are concentrated in the right-hand and lower area and the emerging markets with blue circles appear mainly in the left-hand and upper area. Given their positions, it might be argued that the net FDI variable is a proxy for something else that distinguishes emerging market countries from advanced nations. Our inclusion of GDP per capita in the estimations should control for that, but we also estimated the equations using only data from the emerging market countries, and Table 2 reports those results.

The results are consistent with those of the previous table, and the adjusted R^2s are higher. The current account is not always significant in these regressions, but the negative impacts of domestic credit and income per capita are. The net equity and net FDI variables appear with negative coefficients that are significant at the 5% level.

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[7] However, use of the 2007 values of the right-hand variables does not ensure their exogeneity, as foreign investors may have allocated more equity investment to those countries with strong growth prospects.
[8] The studies cited in note #6 and others report different findings regarding the significance of foreign reserves during the GFC. The specifications of the variable and the estimating equation affect the results.

Table 1 Average GDP growth (2008–09) and external assets and liabilities: full sample

	(1.1)	(1.2)	(1.3)	(1.4)	(1.5)	(1.6)
Cur Act/Y	0.20***	0.22***	0.20***	0.20***	0.11**	0.12**
	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.06)
ΔDm Cr/Y	−0.05*	−0.04*	−0.03	−0.03	−0.05*	−0.04*
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Y/Pop	−3.44***	−2.77***	−2.66***	−2.94***	−3.20***	−3.64***
	(0.70)	(0.76)	(0.75)	(0.73)	(0.82)	(0.74)
Trad Opn	−0.01	−0.02	−0.02*	−0.02	−0.00	−0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Fin Opn	0.00	0.00	0.00*	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
NIIP/Y	−0.03**					
	(0.01)					
Net Eq/Y		−0.06***				
		(0.02)				
Net Dbt/Y		−0.01				
		(0.01)				
For Res/Y		−0.03				
		(0.03)				
Net FDI/Y			−0.07***			
			(0.02)			
Net Prt/Y			−0.04			
			(0.02)			
FDI Ast/Y				−0.07**		
				(0.03)		
FDI Lbt/Y				0.05**		
				(0.02)		
Prt Ast/Y					−0.04	
					(0.04)	
Prt Lbt/Y					0.01	
					(0.03)	
Dbt Ast/Y						−0.02
						(0.02)
Dbt Lbt/Y						0.01
						(0.02)
Constant	34.23***	27.93***	26.92***	29.75***	32.47***	36.32***
	(6.63)	(7.23)	(7.15)	(7.00)	(7.71)	(6.92)
Adjusted R^2	0.43	0.46	0.46	0.44	0.38	0.38
N	67	67	67	67	67	67

The dependent variable is the average GDP growth rate during 2008–09. The lagged independent variables include the current account/GDP, the change in domestic credit over 2004–2007/GDP, the logarithm of income per capita, trade openness, financial openness, the NIIP/GDP, net equity/GDP, net debt/GDP, foreign reserves/GDP, net FDI/GDP, net portfolio equity/GDP, FDI assets/GDP, FDI liabilities/GDP, portfolio equity assets/GDP, portfolio equity liabilities/GDP, debt assets/GDP and debt liabilities/GDP. The symbols *, **,*** denote statistical significance of 10%, 5% and 1%

Fig. 3 GDP Growth (2008–09) vs. Net Equity (2007)

The FDI assets coefficient has a negative coefficient that is significant at the 5% level, while the positive impact of FDI liabilities is significant at the 10% level. The results indicate that within this group of emerging market countries, there was a range of external balance sheet positions and responses to the crisis that are consistent with the hypothesis that countries with a "short equity" position did better than those that were not.

As a further test of robustness, we respecified our dependent variable to be the difference between average growth in 2008–09 and the growth rate projected by the IMF in its publication, *World Economic Outlook*, in the October issue of the previous year.[9] Those results appear in Table 3, and are generally consistent with those of the previous two tables, although the adjusted R^2s are lower. The negative sign of the change in domestic credit is strongly significant, as is the negative sign of trade openness, but the coefficient of the current account is not. Financial openness has a positive coefficient that is significant in several cases. Increases in net equities and net FDI are associated with slower actual growth in 2008–09 at the 5% level of significance. The positive coefficient of FDI liabilities, which is significant at the 10% level, demonstrates that these liabilities provided a buffer against the worst effects of the shock.

We also tested the effects of the balance sheet variables on the GDP growth rates averaged over the four years of 2008–2011, which also encompass the recovery from the global crisis.[10] The current account balance continues to have a positive coefficient

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[9] The *World Economic Outlook* is published twice a year, in April and October. Berkmen et al. (2012) used a similar specification.

[10] The results are available from the author. Additional tests of robustness are reported in Section 6.

Table 2 Average GDP growth (2008–09) and external assets and liabilities: emerging markets

	(2.1)	(2.2)	(2.3)	(2.4)	(2.5)	(2.6)
Cur Act/Y	0.15*	0.15*	0.18**	0.19**	0.08	0.06
	(0.09)	(0.08)	(0.07)	(0.07)	(0.07)	(0.08)
ΔDm Cr/Y	−0.15**	−0.14**	−0.14**	−0.13**	−0.17***	−0.17***
	(0.06)	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)
Y/Pop	−2.97**	−2.58*	−2.71**	−3.01**	−2.86*	−3.22**
	(1.34)	(1.30)	(1.31)	(1.27)	(1.44)	(1.35)
Trad Opn	−0.01	−0.01	−0.02	−0.02	−0.01	−0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Fin	0.01	0.00	−0.00	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
NIIP/Y	−0.02					
	(0.02)					
Net Eq/Y		−0.07**				
		(0.03)				
Net Dbt/Y		0.02				
		(0.03)				
For Res/Y		−0.03				
		(0.04)				
Net FDI/Y			−0.09**			
			(0.03)			
Net Prt/Y			−0.04			
			(0.04)			
FDI Ast/Y				−0.10**		
				(0.04)		
FDI Lbt/Y				0.07*		
				(0.04)		
Prt Ast/Y					−0.01	
					(0.08)	
Prt Lbt/Y					0.03	
					(0.05)	
Dbt Ast/Y						0.04
						(0.04)
DbtLbt/Y						−0.03
						(0.04)
Constant	30.34**	26.69**	27.56**	30.17**	29.40**	32.75***
	(11.77)	(11.50)	(11.54)	(11.13)	(12.63)	(11.81)
Adjusted R^2	0.47	0.53	0.54	0.53	0.45	0.46
N	44	44	44	44	44	44

The dependent variable is the average GDP growth rate during 2008–09. The lagged independent variables include the current account/GDP, the change in domestic credit over 2004–2007/GDP, the logarithm of income per capita, trade openness, financial openness, the NIIP/GDP, net equity/GDP, net debt/GDP, foreign reserves/GDP, net FDI/GDP, net portfolio equity/GDP, FDI assets/GDP, FDI liabilities/GDP, portfolio equity assets/GDP, portfolio equity liabilities/GDP, debt assets/GDP and debt liabilities/GDP. The symbols *, **,*** denote statistical significance of 10%, 5% and 1%

Table 3 Difference in average and projected GDP Growth (2008–09) and external assets and liabilities: Full sample

	(3.1)	(3.2)	(3.3)	(3.4)	(3.5)	(3.6)
Cur Act/Y	0.07	0.09	0.08	0.07	0.01	0.02
	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)
ΔDm Cr/Y	−0.05**	−0.05**	−0.04**	−0.04*	−0.05**	−0.05**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Y/Pop	−1.60**	−1.09	−1.08	−1.34*	−1.60**	−1.77***
	(0.63)	(0.70)	(0.69)	(0.67)	(0.73)	(0.66)
Trad Opn	−0.02**	−0.03***	−0.04***	−0.03***	−0.02*	−0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Fin	0.01***	0.01***	0.01***	0.01*	0.00	0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
NIIP/Y	−0.02*					
	(0.01)					
Net Eq/Y		−0.04**				
		(0.02)				
Net Dbt/Y		−0.01				
		(0.01)				
For Res/Y		−0.02				
		(0.03)				
Net FDI/Y			−0.04**			
			(0.02)			
Net Prt/Y			−0.02			
			(0.02)			
FDI Ast/Y				−0.03		
				(0.03)		
FDI Lbt/Y				0.04*		
				(0.02)		
Prt Ast/Y					−0.01	
					(0.04)	
Prt Lbt/Y					0.01	
					(0.02)	
Dbt Ast/Y						−0.02
						(0.02)
Dbt Lbt/Y						0.00
						(0.02)
Constant	12.71**	7.87	7.88	10.61	13.03*	14.39**
	(6.02)	(6.64)	(6.60)	(6.41)	(6.93)	(6.16)
Adjusted R^2	0.22	0.24	0.23	0.22	0.17	0.19
N	67	67	67	67	67	67

The dependent variable is the difference in GDP growth rate during 2008–09 and its projected values. The lagged independent variables include the current account/GDP, the change in domestic credit over 2004–2007/GDP, the logarithm of income per capita, trade openness, financial openness, the NIIP/GDP, net equity/GDP, net debt/GDP, foreign reserves/GDP, net FDI/GDP, net portfolio equity/GDP, FDI assets/GDP, FDI liabilities/GDP, portfolio equity assets/GDP, portfolio equity liabilities/GDP, debt assets/GDP and debt liabilities/GDP. The symbols *, **,*** denote statistical significance of 10%, 5% and 1%

while income per capita again has a negative and significant impact on growth, consistent with the slow recovery in many advanced economies. The significance of the equity variables falls: net FDI has a negative coefficient that is significant at the 10% level, while the negative and positive coefficients on FDI assets and liabilities respectively are no longer statistically significant. These results are consistent with the change in the impact of the external assets and liabilities during a recovery. During periods of growth, countries that hold foreign equity benefit from their rise in value and the increase in investment income, while the countries that issued them have a decline in their NIIP and pay out a higher rate of return than they receive on their debt holdings.

Our results confirm that the composition of external assets and liabilities affected the response of countries to the GFC. FDI liabilities appear to have been particularly important in buffering nations from declines in growth due to foreign shocks, while FDI assets had the opposite effect. The results are consistent with other analyses of the linkages among nations during the GFC.

First, changes in the values of investments that had been financed by foreign funds contributed to the transfer of wealth documented by Gourinchas et al. (2012). They reported that "…most countries long equity or direct investment faced losses on their net positions, as risky assets took some of the sharpest valuation falls in the crisis." The counterparts to these losses were the gains in the NIIPs of those countries that had issued FDI liabilities. Lane (2013) pointed out these improvements were a "stabilizing force," which differed from the usual pattern observed in emerging market crises in the past when debt liabilities denominated in a foreign currency were more common on the balance sheets of those countries.

Similarly, Ceballos et al. (2013) pointed out that the emerging markets were willing to allow their currencies to depreciate during the GFC since the decline in currency values contributed to the fall in value of their liabilities that were denominated in the local currency. The opposite changes occurred in the U.S., which was a net holder of equities and recorded a currency appreciation during the GFC.

In addition, FDI flows were less volatile than other forms of capital flows during the crisis. Wei (2011) examined capital flows to 24 emerging economies from 1990 to 2009. He found that that all the components of these flows rose in the years leading to the crisis and then were reversed. But international bank loans accounted for the sharpest rise and fall, while FDI flows were "comparatively stable." Globan (2012) also found that countries that relied on foreign loans rather than FDI in the pre-crisis period suffered larger capital flow reversals during the crisis.

Our results for the positive role of FDI liabilities in moderating the effects of the GFC on growth are similar to those of Ostry et al. (2010). They looked at how the stocks of financial FDI, non-financial FDI, debt and equity affected economic performance during the 2008–09 period as compared to the period of 2003–07. Non-financial FDI lowered the decline in growth, while debt liabilities raised it. Financial FDI in one specification contributed to the decline. The authors suggested that non-financial FDI might have provided additional finance during the crisis.

Our findings are also consistent with evidence from microeconomic studies of the GFC. Tong and Wei (2011) used firm-level data to analyze the impact of capital flows on stock prices during the GFC. They reported that the 2008–09 "credit crunch" was more severe for emerging economies with a higher pre-crisis exposure to foreign portfolio investment and foreign loans, but less severe for those with FDI

flows. Similarly, Alfaro and Chen (2012) examined the response of firms to the crisis and found that the sales of multinational subsidiaries fared better than those of domestic firms. They attributed the difference in performance to production and financial linkages between domestic subsidiaries and their parent firms.

5.2 Bank crises

Capital outflows have been linked to domestic bank crises, and we tested whether the composition of the balance sheets affected the probability of a bank crisis during the GFC. We drew upon past work, including the papers cited above, in specifying our model.[11] The dependent variable took the value of one if a systemic bank crisis was recorded in 2008 or 2009 in Laeven and Valencia's (2013) crisis database.[12] There were 20 crises in our sample, and these are noted in the list of countries in the Appendix Tables 8 and 9. The lagged control variables again include the change in domestic credit from 2004 to 2007, the logarithm of GDP per capita, and financial openness. We also included the lagged rates of real GDP growth ($\%\Delta Y$) and inflation ($\%\Delta P$) in 2007. Since the dependent variable is binary, we used a probit estimation.

The results are presented in Table 4. All the control variables have the expected signs and are significant in at least some of the estimations, and the pseudo R^2s are relatively high. The growth of domestic credit and inflation have positive coefficients significant at the 5% or 10% level in all the equations. Higher per capita income and financial openness also contributed to the incidence of bank crises.

Countries with larger net holdings of equity were more likely to suffer a bank crisis. When we replace the net equity variable with the net FDI and net portfolio equity positions, the coefficients of both are significant at the 10% level. We then test the significance of the various forms of liabilities. FDI liabilities have a negative coefficient that is significant at the 10% level, which explains the negative coefficient on net FDI. Portfolio equity liabilities also have a negative coefficient but it is not significant. The coefficient of the debt liability variable has the opposite sign, and is also significant at the 10% level.

Countries that had issued external debt to finance borrowing, therefore, were more likely to subsequently experience a banking crisis, while the use of FDI liabilities had the opposite impact. This linkage may be explained in part by the impact of debt flows on domestic credit growth before the crisis. Lane and McQuade (2014) reported that the positive impact of net debt flows on the growth of domestic credit in Europe was particularly strong during the pre-crisis period of 2003–2008.

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[11] Kauko (2014) provides a recent survey of the empirical literature on banking crises.

[12] Laeven and Valencia (2013) define a bank crisis as systemic if there are "significant signs of financial distress in the banking system" and "significant banking policy interventions in response to significant losses in the banking system."

Table 4 Bank crises and external assets and liabilities: Full sample

	(4.1)	(4.2)	(4.3)	(4.4)	(4.5)	(4.6)
ΔDm Cr/Y	0.13*	0.16*	0.16**	0.09*	0.05**	0.05*
	(0.07)	(0.09)	(0.08)	(0.05)	(0.03)	(0.03)
Y/Pop	5.25*	5.42*	5.05*	4.52*	4.45	5.27
	(2.84)	(3.14)	(2.80)	(2.69)	(2.78)	(3.27)
%ΔY	−0.74	−0.76	−0.42*	−0.43*	−0.41	−0.27
	(0.45)	(0.50)	(0.23)	(0.25)	(0.27)	(0.18)
%ΔP	0.95**	1.13*	1.04**	0.82**	0.75*	0.88*
	(0.48)	(0.58)	(0.50)	(0.40)	(0.41)	(0.48)
Fin	0.01*	0.01*	0.01	0.01**	0.01*	−0.01
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)
NIIP/Y	0.03*					
	(0.01)					
Net Eq/Y		0.08*				
		(0.05)				
Net Dbt/Y		0.01				
		(0.02)				
For Res/Y		0.06				
		(0.06)				
Net FDI/Y			0.10*			
			(0.06)			
Net Prt/Y			0.08*			
			(0.04)			
FDI Lbt/Y				−0.03*		
				(0.02)		
Prt Lbt/Y					−0.04	
					(0.03)	
Dbt Lbt/Y						0.05*
						(0.03)
Constant	−57.53*	−61.40*	−57.80*	−50.61*	−49.90*	−60.40*
	(29.92)	(33.83)	(30.73)	(28.83)	(29.80)	(35.65)
Pseudo R^2	0.78	0.81	0.82	0.77	0.76	0.79
N	64	64	64	64	64	64

The dependent variable takes the value of one if there was a bank crisis. The lagged independent variables include the change in domestic credit over 2004–2007/GDP, the logarithm of income per capita, the growth rate of real GDP, the rate of inflation, financial openness, the NIIP/GDP, net equity/GDP, net debt/GDP, foreign reserves/GDP, net FDI/GDP, net portfolio equity/GDP, FDI assets/GDP, FDI liabilities/GDP, portfolio equity assets/GDP, portfolio equity liabilities/GDP, debt assets/GDP and debt liabilities/GDP. The symbols *, **,*** denote statistical significance of 10%, 5% and 1%

5.3 IMF programs

The IMF played an active role in responding the global crisis, and 13 of the countries in our sample entered IMF programs during and after the crisis. [13] In this section we examine whether the participation by governments in IMF programs was affected by the composition of external balance sheets before the crisis. To choose appropriate control variables, we drew upon previous studies of IMF lending. [14] In addition to the lagged values of current account, the change in domestic credit, GDP per capita, and real growth, we also used lagged government consumption divided by GDP (Gov/Y) and a dummy variable for fixed exchange rate regimes (Fix). [15] The dependent variable has the value of one for the countries with IMF programs, and we used a probit estimation.

The initial estimations were heavily influenced by the size of Hungary's FDI assets, which were worth 97.8% of its GDP, twenty times larger than the average of the FDI holdings of the other IMF program countries. We excluded Hungary from our data set for these estimations, and the results are reported in Table 5. Those countries that had current account surpluses in 2007 were less likely to go to the IMF in 2008–09. The adjusted R^2 rises as the components of the balance sheet are added to the estimations.

Countries that were net holders of FDI were more likely to enter a Fund program. When we separate out FDI assets and liabilities, the liabilities have a negative coefficient significant at the 5% level. These results are consistent with those reported in the previous tables, which found that FDI liabilities were linked to higher growth rates and fewer bank crises. Moreover, the two debt variables are also significant at the 10% level, debt assets with a negative coefficient and debt liabilities with a positive sign. The latter finding corresponds to the result in the last table that showed that debt liabilities are associated with more bank crises.

The results demonstrate the importance of the composition of the external balance sheet in determining who needed IMF assistance. Those countries that were long debt and short FDI were less likely to enter an IMF program. Countries that issued debt, on the other hand, were more likely to need the IMF's assistance.

6 Extensions and robustness

We extended our estimations and tested them for robustness in several ways.

First, we introduced the exchange rate regime variable, FIX, into the estimations for GDP growth in Tables 1, 2 and 3. We used the variable and interacted it with each of the gross assets and liability measures to see if the existence of a fixed exchange rate

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[13] We included Greece and Portugal as program countries, as their need for IMF financing was related to their pre-crisis borrowing. The programs were all Stand-by Arrangements, except for Portugal's that was arranged as an Extended Fund Facility. We did not include the Flexible Credit Line programs as no credit was drawn through these. See Joyce (2012) for an account of the IMF's activities before and during the global financial crisis.

[14] Sturm et al. (2005) review the economic and political factors that appeared in previous studies of the determinants of Fund programs.

[15] The variable takes the value of one if a country's exchange rate regime ranges between 1 and 8 on the Reinhart and Rogoff (2004) scale of exchange rate regimes that has a total range of 1–13, Higher numbers denote more flexible regimes.

Table 5 IMF programs and external assets and liabilities: Full sample

	(5.1)	(5.2)	(5.3)	(5.4)	(5.5)	(5.6)
Cur Act/Y	−0.10**	−0.68	−0.38***	−0.32***	−0.09**	−0.07**
	(0.05)	(0.63)	(0.14)	(0.12)	(0.04)	(0.04)
ΔDm Cr/Y	−0.02	−0.04	−0.05	−0.06*	−0.01	−0.03
	(0.02)	(0.05)	(0.03)	(0.03)	(0.02)	(0.03)
Pop/Y	−0.39	−6.30	−1.48	−0.39	−0.48	−0.84
	(0.53)	(6.45)	(1.12)	(0.79)	(0.62)	(0.68)
%ΔP	0.12	0.80	0.24	0.24	0.12	0.26**
	(0.08)	(0.68)	(0.18)	(0.17)	(0.08)	(0.12)
Gov/Y	−0.03	−0.30	−0.08	−0.05	−0.03	−0.07
	(0.07)	(0.33)	(0.12)	(0.13)	(0.08)	(0.09)
Fix	0.35	0.55	0.88	0.76	0.28	0.11
	(0.55)	(1.03)	(0.88)	(0.83)	(0.55)	(0.64)
NIIP/Y	0.00					
	(0.01)					
Net Eq/Y		0.08				
		(0.06)				
Net Dbt/Y		−0.05				
		(0.06)				
For Res/Y		−0.41				
		(0.39)				
Net FDI/Y			0.11**			
			(0.04)			
Net Prt/Y			0.06			
			(0.04)			
FDI Ast/Y				0.07		
				(0.05)		
FDI Lbt/Y				−0.10**		
				(0.04)		
Port Ast/Y					0.01	
					(0.03)	
Port Lbt/Y					−0.01	
					(0.02)	
Debt Ast/Y						−0.03*
						(0.02)
Debt Lbt/Y						0.04*
						(0.02)
Constant	2.27	60.46	13.68	3.20	3.06	5.30
	(4.91)	(62.27)	(10.49)	(7.15)	(5.69)	(5.99)
Pseudo R^2	0.36	0.76	0.65	0.63	0.37	0.45
N	63	63	63	63	63	63

The dependent variable takes the value of one if a country entered an IMF program. The lagged independent variables include the current account/GDP, the change in domestic credit over 2004–2007/GDP, the logarithm of income per capita, the rate of inflation, government consumption/GDP, the dummy for a fixed exchange rate, the NIIP/GDP, net equity/GDP, net debt/GDP, foreign reserves/GDP, net FDI/GDP, net portfolio equity/GDP, FDI assets/GDP, FDI liabilities/GDP, portfolio equity assets/GDP, portfolio equity liabilities/GDP, debt assets/GDP and debt liabilities/GDP. The symbols *, **,*** denote statistical significance of 10%, 5% and 1%

Table 6 Average GDP growth (2008–09) and external assets and liabilities with eurozone: Full sample

	(6.1)	(6.2)	(6.3)	(6.4)	(6.5)
EU	−1.41	−0.96	−0.55	−1.21	−3.45**
	(1.28)	(1.56)	(1.18)	(1.81)	(1.48)
NIIP/Y	−0.04***				
	(0.01)				
EU*NIIP/Y	0.03				
	(0.02)				
Net Eq/Y		−0.08***			
		(0.02)			
EU*Net Eq/Y		0.06*			
		(0.04)			
Net Dbt/Y		−0.02			
		(0.02)			
EU*Net Dbt/Y		0.00			
		(0.03)			
For Res/Y		−0.05			
		(0.04)			
EU*For Res/Y		0.03			
		(0.11)			
Net FDI/Y			−0.07***		
			(0.02)		
EU*NFDI/Y			0.06**		
			(0.03)		
Net Prt/Y			−0.05		
			(0.03)		
EU*Net Prt/Y			0.05		
			(0.05)		
FDI Ast/Y				−0.08***	
				(0.03)	
EU*FDI Ast/Y				0.06*	
				(0.03)	
FDI Lbt/Y				0.06**	
				(0.03)	
EU*FDI Lbt /Y				−0.06*	
				(0.03)	
Prt Ast/Y					−0.06
					(0.05)
EU*Prt Ast/Y					0.05
					(0.07)
Prt Lbt/Y					0.02
					(0.03)
EU*Prt Lbt/Y					−0.01
					(0.06)

Table 6 (continued)

	(6.1)	(6.2)	(6.3)	(6.4)	(6.5)
Constant	25.57***	19.54**	19.29**	21.89***	22.14**
	(6.99)	(7.47)	(7.57)	(7.59)	(8.66)
Adjusted R^2	0.49	0.50	0.50	0.49	0.42
N	67	67	67	67	67

The dependent variable and the other independent variables (results not reported) are explained in the note to Table 1. In addition, the independent variables include a dummy for those countries in the Eurozone and those that tie their currencies to the euro, and their interactive terms with the balance sheet variables

regime affected the impact of the external balance sheet components on the change in GDP. The significance of the FDI variables did not change. The fixed exchange rate variable, however, and the interactive terms were not significant in any of the estimations.[16]

Next, we introduced regional dummies to see if these affected our results. We used variables for East Asia, countries in the Eurozone and those that pegged their currencies to the euro, Latin America, the Middle East and North Africa, and South Asia, with the specifications of Table 1. We also interacted the regional dummy with the balance sheet variables. In only one case, the Eurozone countries and those that pegged their currencies to the euro (EU), was there evidence of a regional effect. The results appear in Table 6. The eurozone variable is EU, and the interactive variables are those that begin with "EU*". We omit the results for the control variables, which are quite similar to those in Table 1, and for the last equation where there was no effect, to conserve space.

The interactive variable of the euro dummy and net equity has a positive coefficient that is significant at the 10% level. Similarly, in the case of net FDI, the interactive variable has a positive coefficient that is significant at the 5% level. The positive coefficients and the size of the coefficients indicate that the negative effect of the equity variables is largely offset in the case of the Eurozone countries and those that peg to the euro. Moreover, the interactive variables have a positive sign in the case of FDI assets and a negative sign in the case of FDI liabilities, opposite to the signs of those variables themselves and close in absolute value. These results suggest that the impact of FDI does not seem to be relevant in the response of these European countries to the GFC. This may reflect the fact that there is a great deal of regional FDI. In addition, the Eurozone dummy variable is negative in eq. 6.5, which includes the portfolio equity variables.

We also rescaled our balance sheet variables by total assets or total liabilities. We included equity assets and liabilities as a share of all assets or liabilities, respectively (Eq Ast/Ast, Eq Lbt/Lbt), and did the same for FDI (FDI Ast/Ast, FDI Lbt/Lbt), portfolio equity (Prt Ast/Ast, Prt Lbt/Lbt), and debt (Dbt Ast/Ast, Dbt Lbt/Lbt). We also included the ratios of equity to debt assets (Eq Ast/Dbt Ast) and liabilities (Eq Lbt/Dbt Lbt), and the ratios of FDI to debt (FDI Ast/Dbt Ast, FDI Lbt/Dbt Lbt).

The relative amounts of equity and debt usually depend on whether a country is an advanced or emerging market economy, and as a result the results are sensitive to the

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[16] Results available from author.

Table 7 Average GDP growth (2008–09) and external assets and liabilities: balance sheet ratios

	(7.1)	(7.2)	(7.3)	(7.4)	(7.5)	(7.6)
Cur Act/Y	0.22***	0.27***	0.20***	0.19**	0.20***	0.22***
	(0.07)	(0.07)	(0.07)	(0.08)	(0.07)	(0.07)
ΔDm Cr/Y	−0.04*	−0.04*	−0.05**	−0.05*	−0.06**	−0.05*
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Trad Opn	−0.02	−0.02	−0.01	−0.01	−0.01	−0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Fin	0.00	0.00	−0.00	−0.00	−0.00	−0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
NIIP/Y	−0.04***	−0.04***	−0.03**	−0.03**	−0.04***	−0.04**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Eq Ast/Ast	−0.09***					
	(0.02)					
Eq Lbt/Lbt	0.08***					
	(0.03)					
FDI Ast/Ast		−0.10***				
		(0.04)				
FDI Lbt/Lbt		0.06*				
		(0.03)				
Prt Ast/Ast			−0.10**			
			(0.05)			
Prt Lbt/Lbt			0.02			
			(0.04)			
Dbt Ast/Ast				0.03		
				(0.03)		
Dbt Lbt/Lbt				−0.07		
				(0.04)		
Eq Ast/Dbt Ast					−0.01**	
					(0.01)	
Eq Lbt/Dbt Lbt					0.02**	
					(0.01)	
FDI Ast/Dbt Ast						−0.01
						(0.01)
FDI Lbt/Dbt Lbt						0.02*
						(0.01)
Constant	−0.11	1.28	2.70*	4.35**	0.86	1.15
	(1.74)	(1.50)	(1.39)	(2.03)	(1.38)	(1.36)
Adjusted R^2	0.37	0.31	0.25	0.22	0.28	0.24
N	67	67	67	67	67	67

Note: The dependent variable is the difference in GDP growth rate during 2008–09 and its projected values. The lagged independent variables include the current account/GDP, the change in domestic credit over 2004–2007/GDP, the logarithm of income per capita, trade openness, financial openness, NIIP/GDP, equity assets/assets, equity liabilities/liabilities, FDI assets/assets, FDI liabilities/liabilities, portfolio equity assets/assets, portfolio equity liabilities/liabilties, debt assets/assets, debt liabilities/liabilities, equity assets/debt assets, equity liabilities/liabilities, FDI assets/debt assets, FDI liabilities/debt liabilities. The symbols *, **,*** denote statistical significance of 10%, 5% and 1%

inclusion of the income per capita variable in the regressions. Regressions of the composition of the balance sheet on income per capita show these linkages. For example, regressions of the equity assets (liabilities) as a share of all assets (liabilities) on the logarithm of income per capita yield the following results (standard errors in parentheses):

$$(\text{Eq Ast/Ast}) = -143.85^{***} + 17.12^{***}(Y/Pop)$$
$$\qquad\qquad\quad (5.04) \qquad\quad (2.55) \qquad\qquad \textit{adjusted } R^2 = 0.40$$

$$(\text{Eq Lbt/Lbt}) = 126.75^{***} \text{-} 8.20^{**} \ (Y/Pop)$$
$$\qquad\qquad\quad (26.09) \quad (2.66) \qquad\qquad \textit{adjusted } R^2 = 0.12$$

Therefore, we report the results in Table 7 without the income per capita variable. These results are consistent with those reported in Table 1. All the equity assets, including both FDI and portfolio, lowered economic growth rates, while equity and FDI liabilities raised it. There is no significant impact linked to debt assets or liabilities, except when they were part of the ratios with equities or FDI. The importance of the composition of the balance sheet is robust to this alternative specification.

Finally, we tried utilized another estimation method for Tables 4, 5 and 6, replacing the probit estimates with logit. There was no change in the levels of significance of the balance sheet variables. These results, which are available from the author, are consistent with those that we report.

7 Conclusions

Our results show that the composition of a country's external balance had a significant impact on how it fared during the global financial crisis, as Lane (2013) and others have claimed. Most of the emerging market countries learned the lessons of the crises of the late 1990s/early 2000s. The "long debt (and foreign reserves), short equity" external profile of these countries served as a countercyclical buffer against the impact of the crisis. Those advanced and emerging market economies with the opposite configuration of external assets and liabilities fared worse, as this composition had a procyclical impact.

If the vulnerability of a country to external shocks depends in part on the composition of its foreign assets and liabilities, then one policy implication could be support for implementing capital controls. Montiel and Reinhart (1999) demonstrated that the use of capital controls would not change the volume of capital inflows, but could influence their composition. Lane and Schmukler (2007) pointed out that the governments of China and India steered foreign investors into equity investments, FDI in the case of China and portfolio equity in India. Similarly, Campion and Neumann (2003, 2004) report evidence from Latin America that the use of controls did affect the composition of capital inflows. Klein (2012), however, investigated whether governments used controls to arrange capital inflows in order to avoid financial fragility as described by Ostry et al. (2010), and found little evidence that controls were used for this purpose. This remains an open area of research.

Finally, the configuration of external assets and liabilities as well as the size of global capital flows may be changing. Capital flows from the emerging markets, including FDI and bank loans, have risen. China's outward FDI has increased, for example, while its government has relaxed controls on foreign borrowing (He et al. 2012). Over time these patterns will alter the stocks of assets and liabilities of emerging markets, and may raise their vulnerability to external shocks. These balance sheet changes merit watching.

Appendix

Table 8 List of countries

Advanced Economies		
Australia	Greece[+],[*]	Slovenia[+]
Austria[+]	Israel	South Korea
Belgium[+]	Italy[+]	Spain[+]
Canada	Japan	Sweden[+]
Denmark[+]	Netherlands[+]	Switzerland[+]
Finland	New Zealand	United Kingdom[+]
France[+]	Norway	United States[+]
Germany[+]	Portugal[+],[*]	
Emerging Economies		
Algeria	Estonia	Peru
Azerbaijan	Guatemala[*]	Philippines
Belarus[*]	Hungary[+],[*]	Poland
Brazil	India	Romania[*]
Bulgaria	Indonesia	Russia[+]
Chile	Jordan	Slovak Republic
China	Kazakhstan[+]	South Africa
Colombia	Latvia [+],[*]	Sri Lanka[*]
Costa Rica[*]	Lebanon	Thailand
Croatia	Lithuania	Tunisia
Czech Republic	Malaysia	Turkey
Dominican Republic[*]	Mexico	Ukraine[+],[*]
Ecuador	Morocco	Uruguay
Egypt	Pakistan[*]	Venezuela
El Salvador[*]	Panama	

[+] Bank crisis 2008–09, [*] IMF program

Table 9 Data sources

Symbol	Definition	Source
Cur Act/Y	Current Account/GDP (%)	EWN
Dbt Ast/Ast, Dbt Ast/Y, Dbt Lbt/Lbt, Dbt Lbt/Y	Debt Assets/Assets, Debt Assets/GDP, Debt Liabilities/Liabilities, Debt Liabilities/GDP (%)	EWN
ΔDm Cr/Y	Change in Domestic Credit to Private Sector/GDP, 2004–2007 (%)	WDI
Eq Ast/Ast, Eq Ast/Dbt Ast, Eq Lbt/Lbt, Eq Lbt/Dbt Lbt	Equity Assets/Assets, Equity Assets/Debt Assets, Equity Liabilities/Liabilities, Equity Liabilities/Debt Liabilities (%)	EWN
FDI Ast/Ast, FDI Ast/Dbt Ast, FDI Ast/Y, FDI Lbt/Lbt, FDI Lbt/Dbt Lbt FDI Lbt/Y	FDI Assets/Assets, FDI Assets/Debt Assets, FDI Assets/GDP, FDI Liabilities/Liabilities, FDI Liabilities/Debt Liabilities, FDI Liabilities/Y (%)	EWN
Fin Opn	Financial Openness (External Assets + Liabilities/GDP) (%)	EWN
Fix	Fixed Exchange Rate Regime = 1 if Reinhart and Rogoff = 1–8	Reinhart and Rogoff (2004)
For Res/Y	Foreign Reserves/Y	EWN
Gov/Y	Government Consumption/GDP (%)	WDI
Net Dbt/Y, Net Eq/Y, Net FDI/Y, Net Prt/Y	Net Debt/GDP, Net Equity/GDP, Net FDI/GDP, Net Portfolio Equity/GDP (%)	EWN
NIIP/Y	Net International Investment Position/GDP (%)	EWN
%ΔP	Growth Rate of Consumer Price Index (%)	WDI
Prt Ast/Ast, Prt Ast/Y, Prt Lbt/Lbt, Prt Lbt/Y	Portfolio Equity Assets/Assets, Portfolio Equity Assets/GDP, Portfolio Equity Liabilities/ Liabilities, Portfolio Equity Liabilities/GDP (%)	EWN
Trad Opn	Trade Openness (Exports + Imports/GDP) (%)	WDI
%ΔY	Growth Rate of Real GDP (%)	WDI
Y/Pop	Logarithm of GDP per-capita (2011 international $)	WDI

EWN = External Wealth of Nations, *WDI = World Development Indicators*

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