

What Role for Aid in Sovereign Asset and Liability Management?*

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Abstract

Managing and identifying risks are a key challenge for Low Income Countries (LICs), which are extremely vulnerable to exogenous shocks. However, the use of risk management tools by developing countries is quite limited. The paper discusses in which ways aid could strengthen the capacity of LICs to deal with vulnerability to external shocks and to manage capital flows. We provide some novel empirical evidence on the potential role of aid as output stabilizer and shock absorber in recipient countries, and on aid unpredictability. The paper finally analyzes the potential role of foreign aid in an Asset and Liability Management (ALM) strategy, as an additional asset in the government balance sheet.

JEL Codes: F35; O11; O19.

Keywords: Foreign aid; Asset and Liability Management; Volatility; Vulnerability; Business cycle.

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Development aid fell by 4% in real terms in 2012, following a 2% fall in 2011. The continuing financial crisis and euro zone turmoil has led several governments to tighten their budgets, which has had a direct impact on development aid.

(OECD, April 3, 2013)

1 Introduction

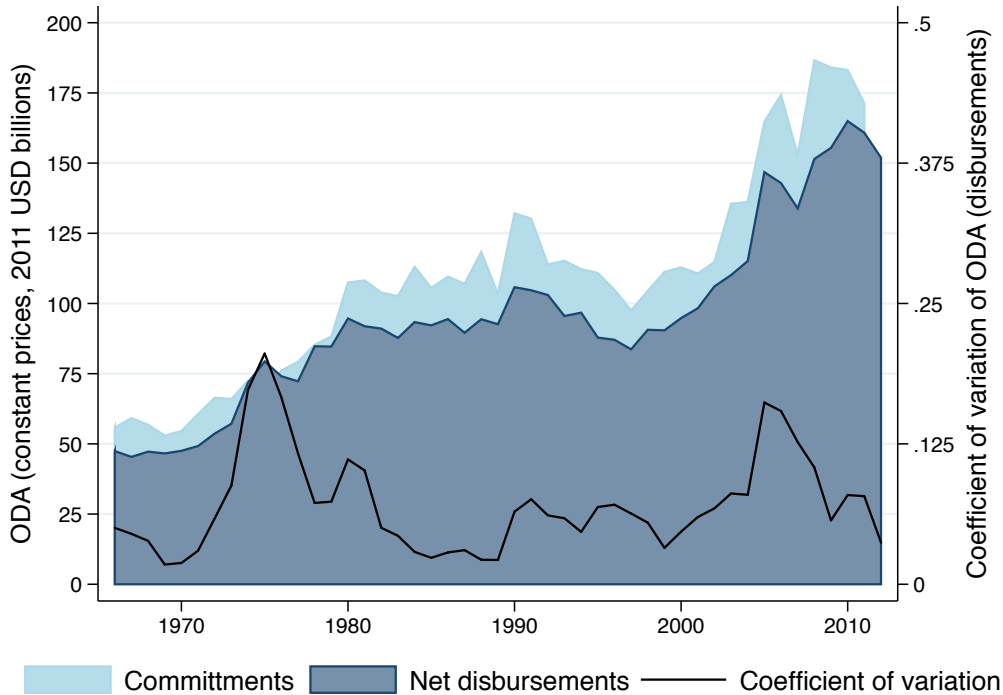
Managing and identifying risks are a key challenge for Low Income Countries (LICs). Poor countries are extremely vulnerable to exogenous shocks, such as natural disasters, commodity price shocks, a deterioration of the terms of trade, and capital outflows. These adverse shocks have severe and long-lasting consequences on the domestic economy: they generally dampen output growth, increase macroeconomic volatility and undermine public debt sustainability. However, the use of risk management tools by developing countries is quite limited. This fact is the result of the limited access to appropriate financial instruments to hedge sovereign risk, especially because of a lack of credibility and of poor institutional and political capacity (Claessens, 2005).

The paper discusses in which ways foreign aid could be part of a sovereign Asset and Liability Management (ALM), in order to strengthen the capacity of LICs to deal with vulnerability to external shocks, to manage their public debt and capital flows, and to promote growth. Taking into account the difficulties in applying the ALM to developing economies, the paper tries to analyze the potential of foreign aid to act as an additional asset in the government balance sheet. Within an ALM framework, we discuss under which conditions foreign aid may be considered as an asset and which liabilities it could cover.

Foreign aid is a primary source of external finance for developing countries, amounting to more than 10 percent of gross domestic product (GDP) in several low income countries. Notwithstanding the large amount of resources devoted to foreign assistance, aid effectiveness is a very much debated issue (Rajan and Subramanian, 2008; Bruckner, 2013; Juselius, Møller, and Tarp, 2013). One of the reasons why aid could not translate into higher growth is related to its volatility. The procyclicality of aid disbursements to donors' economic conditions may create a gap between aid flows and country needs. As the opening quotation makes it clear, the great recession has inverted a lasting upward trend in official development assistance (ODA), forcing developing countries to face an unexpected scenario. Some recent findings support the view that financial crises in advanced economies actually induced a contraction of official assistance to developing countries (Frot, 2009; Gravier-Rymaszewska, 2012).¹ In addition, one aspect that could mitigate the growth dividend of foreign aid is its unpredictability, generally measured as the deviation of aid commitments from disbursements (Celasun and Walliser, 2008; Kodama, 2012). Unpredictable aid has asymmetric negative effects on the level and composition of government expenditures, given that aid shortfalls

¹Financial crises have prolonged and severe effects. The historical work by Jorda, Schularick, and Taylor (2012) shows that financial-crisis recessions are more costly than normal recessions in terms of lost output; in the same vein, Reinhart and Rogoff (2009) calculate that past banking crises have been associated, on average, with a 9 percentage points decline in output and with a 86 percent increase in government debt. The global nature of the crisis and its changing nature from a banking to a sovereign debt crisis is likely to further dampen foreign aid in the near future.

Figure 1: Foreign aid to developing countries



Source: OECD - DAC database. The coefficient of variation is calculated on aid disbursements on rolling 5-year periods.

are likely to reduce investment projects, while windfalls are generally spent on consumption rather than investment. In this vein, volatile and unpredictable aid may represent a source of vulnerability for LICs, rather than acting as a shock absorber of exogenous shocks.

Figure 1 shows the evolution of aid commitments and disbursements since the late 1960s. Three issues are worth stressing. First, after two decades in which aid (at constant prices) was quite stable, ODA increased rapidly since 2000, but this increase came to an abrupt stop in 2009. This severe decline in aid inflows could have direct consequences on the fiscal balance and on the balance-of-payment of aid-dependent countries. Second, the variability of aid, measured by the coefficient of variation, did not increase over time. Third, even if volatility may be contained, unpredictability is an issue. The diagram, in fact, shows a significant difference between donors' pledges and actual allocations, especially in recent years.

The economic literature on foreign aid is extremely broad (see, among others, the seminal contributions by [Alesina and Dollar, 2000](#); [Boone, 1996](#)). The most recent contributions confirm that aid is not driven exclusively by economic conditions, but also by historical and cultural linkages between donors and recipients ([Fuchs, Dreher, and Nunnenkamp, 2012](#)). The amount and volatility of foreign assistance depend, among other things, on external conditions, such as the business cycle in donor countries. We formally test this hypothesis by looking at the determinants of bilateral donors' aid flows and we find that foreign aid shrinks when donors are in a recession or they experience a banking crisis. This suggests that aid inflows could be considered by recipient countries

as an asset on which they exercise a limited control and which is subject to a certain degree of volatility and uncertainty.

Against this backdrop, two main research questions need to be addressed in order to understand how aid can actively contribute to the development of a sovereign ALM strategy in LICs. First, we want to understand whether foreign aid can be a useful hedging resource. To this aim, we will look at the correlations between aid inflows and other public and private capital inflows in a sample of developing countries. In this perspective, the role of remittances may deserve a careful scrutiny, given their relevance in many countries and their potential role as substitutes of aid (Fuchs, Dreher, and Nunnenkamp, 2012). Second, we will focus on aid unpredictability. We will try to measure the extent of the problem and to identify the recipient characteristics which are likely to be associated with donors' renegeing their pledges.

To preview our main findings, we find that aid is quite persistent and it seems to act as an output stabilizer in recipient countries, since low-growth countries receive larger aid inflows than boom countries and aid flows increase when countries experience a deterioration of the terms of trade. In addition, the negative (positive) correlations between aid and foreign direct investment (debt service) suggests that aid could act as a stabilization tool, given that it increases in crisis periods and when the private sector reduces its exposition. This implies that aid is a critical asset to help developing countries coping with exogenous shocks and fluctuation in capital flows. However, in answering our second question, we find that aid unpredictability is a relevant source of concern. It increases with the per capita GDP of the recipient country and shows an hectic patten over time, with a sharp increase since the 2000s.

These results lead to two sets of implications. On the donor side, our results point to the necessity for a steady committment of providing stable and predictable aid flows to developing countries, reducing the dependency of aid from strategic considerations. On the recipient side, it becomes critical to understand how countries can deal with aid unpredictability. One way to address this problem is looking at reserve management to see whether international reserves react to aid flows in a way that help stabilizing them. We find that the picture is extermely heterogeneous across countries, with situations in which reserves seem to act as a stabilization fund, increasing with aid in order to smooth its fluctuations, and countries where there is a negative correlation between reserve accumulation and aid inflows.

The paper is articulated into three main sections. The first one provides a brief overview of the vulnerability of poor countries to external shocks, of the policy tools available to mitigate the effect of exogenous shocks (Section 2), and of the potential role of aid as an insurance mechanism (Section 3). Then, Section 4 focuses on the dependence of aid disbursements on donors' economic conditions, to measure the degree of control of recipients on aid flows. To discuss the role of aid in a sovereign ALM, we have to understand how it can act as a shock absorber. After a brief literature survey (Section 5), we empirically look at the correlation between aid, other capital flows and different measures of external shocks in recipient countries (Section 6), and on aid volatility and unpredictability (Section 7). In this way, we try to identify the channels through which aid can magnify or mitigate risks and vulnerabilities in LICs. The final part presents a more policy-oriented discussion of the conditions under which aid may actually be considered a reliable and

stable source of funding to introduce into an ALM framework. In particular, in Section 8 we illustrate some possible strategies that national governments in donor and recipient countries could pursue to cope with aid unpredictability. Finally, the concluding section will discuss how aid could be included into a sovereign ALM strategy in order to contribute to reduce risks and promote growth.

2 Managing vulnerability in low income countries

2.1 Exogenous shocks

Developing countries are particularly exposed to a variety of external shocks which hinder economic growth and magnify the volatility of real per capita GDP.² The vulnerability of a country stems from three factors: 1) the size and frequency of exogenous shock, 2) the exposure to shocks, and 3) the capacity to react to shocks (Guillaumont, 2011). The degree to which a country is exposed to external shocks can be measured by an index – the Economic Vulnerability Index (EVI), developed by the United Nations, – that includes several measures reflecting the country’s exposure to the impact of economic and natural shocks. As shown by Figure 2, even if economic vulnerability is a common feature of all the least developed countries, it is more relevant in Sub-Saharan Africa.

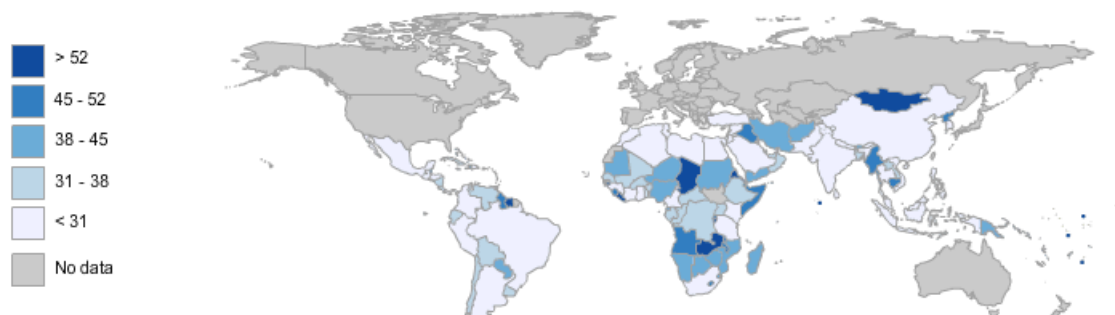
In a recent paper, Dabla-Norris and Bal-Gunduz (2012) propose an alternative index of vulnerability, based on external demand, FDI, aid, terms-of-trade, remittances and climatic shocks. The availability of the index for a large sample of low income countries since 1990 makes it possible to show that the vulnerability index is indeed a powerful predictor of growth crisis in LICs. Henceforth, mitigating vulnerability is a key policy target for poor countries. In this perspective, LICs are, on average, on the right path, reflecting their efforts toward macroeconomic stability, the undertaking of structural reforms, debt relief, strong GDP growth, and the global positive economic conditions during the ‘great moderation’. The average overall vulnerability index, as well as its sub-components (external, fiscal and institutional vulnerability), followed a declining trend over the last two decades (Figure 3).³ Nevertheless, the recent global crisis pointed out again the dependence of low income countries on external macroeconomic conditions, especially for what concern external and fiscal vulnerabilities, which suffered from the exceptional tail shocks to external demand, declining terms-of-trade, and low government revenue.

Abrupt changes in commodity prices and terms-of-trade instability are among the most significant sources of external macroeconomic shocks and, dampening export and productivity growth, are positively associated with changes in output growth (Deaton, 1999; Collier and Goderis, 2012). In particular, the trade balance in developing countries is strongly dependent on the exchange rate vis-a-vis the US dollar, given that the fragility of many LICs, at least those in Sub-Saharan Africa, depends on the concentration of export revenues in no more than three commodities and on their

²Economic volatility in developing countries is due also to a variety of internal (endogenous) factors, such as conflicts and economic mismanagement (Acemoglu, Johnson, Robinson, and Thaicharoen, 2003). Raddatz (2007), for instance, quantifies the relative magnitude of external and internal shocks on real per capita GDP in LICs and find that the former explains only 11 percent of the variance of real GDP.

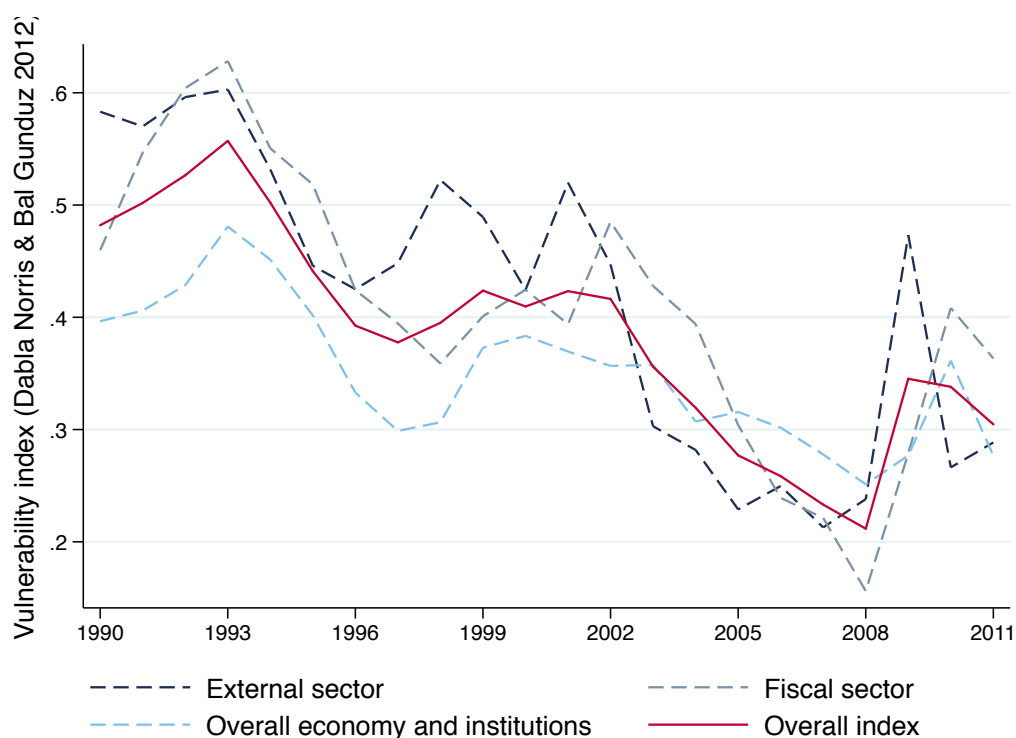
³We thank Yasemin Bal Gunduz for providing the detailed historical data set on the Vulnerability Index.

Figure 2: Economic vulnerability index in least developing countries



Source: [StatPlanet Graphical Interface](#), DESA, United Nations, Geneva. The Economic Vulnerability Index (EVI) is a composite index consisting of seven indicators: population size; remoteness; exports concentration; the share of agriculture, forestry and fisheries in gross domestic product; homelessness owing to natural disasters; instability of agricultural production; and instability of exports of goods and services. For more details, see [Guillaumont \(2011\)](#).

Figure 3: Vulnerability index in low-income countries

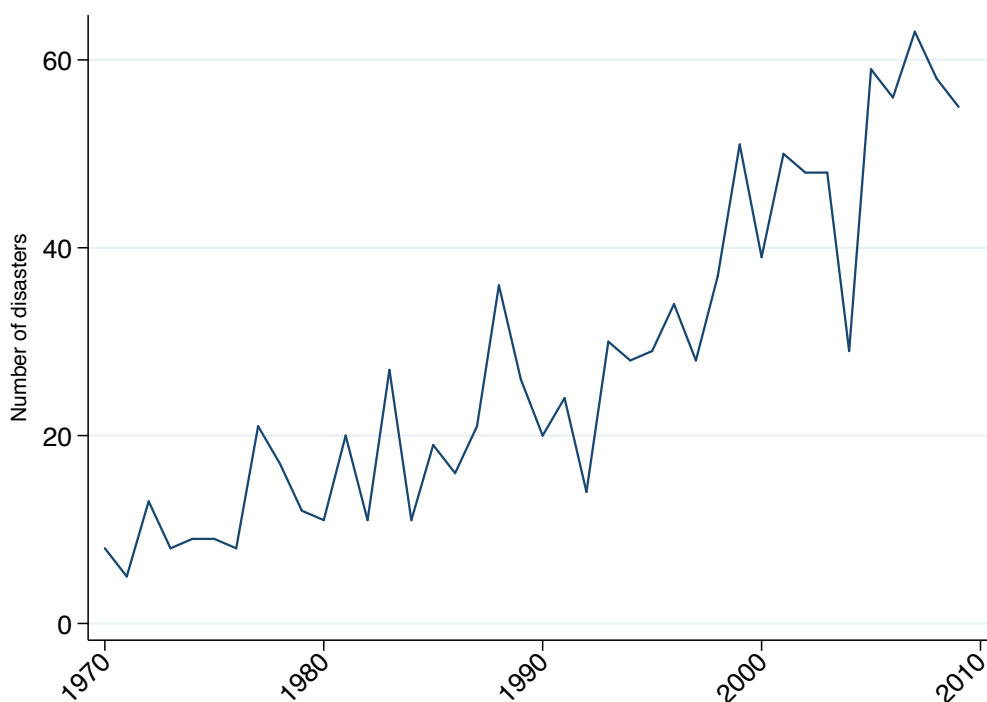


Source: elaboration on the Vulnerability Index data set. See [Dabla-Norris and Bal-Gunduz \(2012\)](#) for details on how the index and its sub-components are constructed.

proclivity to import natural resources ([Allen and Giovannetti, 2011](#)). [Raddatz \(2007\)](#) calculates that a one standard deviation negative shock to commodity prices results in about a 1 percent decrease in the per-capita GDP of LICs.

Other than being exposed to increasing food prices, over the last decades LICs have been

Figure 4: Natural disasters in least developing countries



Source: [OFDA/CRED International Disaster Database](#), Universite Catholique de Louvain, Brussels (Belgium).

increasingly subject to natural disasters (Figure 4). The economic costs of natural disasters in developing countries are extremely high, in terms of GDP growth, trade disruption and fiscal balance (Noy, 2009; Raddatz, 2009; Laframboise and Loko, 2012).

Finally, capital flows could contribute to the overall macroeconomic instability. The World Bank estimates that in 2013 net private inflows to developing countries will increase again after few years of slowdown, due to the crisis in advanced economies, and they will reach USD 1,123 billion, with FDI representing more than 70 percent of the total.

On theory, financial integration should help mitigating the macroeconomic effect of external shocks. Access to foreign private capital should promote economic diversification by developing countries – reducing risks – and facilitating consumption smoothing. However, contagion and herding in capital flows and the strong dependence from advanced economies could be an additional source of vulnerability for LDCs. The banking sector deleveraging by European banks that started in the second half of 2011, for instance, had significant spillover effects to lending to developing countries. At the same time, record-low interest rates and the investors' search for yield are two factors that are promoting the access of an increasing number of LICs to international capital markets (Sy, 2013).⁴ On the one hand, this move can make it possible for poor countries to complement (or even partially substitute) official assistance and domestic saving as a source of

⁴Rwanda is the last of this list of LICs and in April 2013 it started marketing a USD 400 million eurobond, which went heavily oversubscribed.

finance. On the other hand, this process should be carefully managed to avoid the accumulation of unsustainable debts, especially in countries with poor macroeconomic policies.

The empirical evidence suggests that the balance between risks and benefits of financial globalization in developing countries is mixed, at best (Kose, Prasad, Rogoff, and Wei, 2009). Even remittances and aid flows, which were supposed to be a more stable source of funding, shrunk during the global recession. We will deal explicitly with the role of aid in Section 4; here we briefly consider private capital flows.

Capital flows may bring a number of potential advantages to developing countries, making it possible to finance investment in infrastructures, fostering capital deepening and complementing limited domestic savings. However, it has long been established that financial globalization brings several risks and has differentiated effects on domestic investment and growth according to different sources of foreign finance (Bosworth and Collins, 1999). While foreign direct investment (FDI) are generally more stable and could bring additional advantages in terms of knowledge spillovers, debt and equity flows are much more volatile.⁵

In particular, the current global financial crisis is pointing out the risks of excessive reliance on foreign bank lending in developing countries. Detragiache, Tressel, and Gupta (2008) and Claessens and van Horen (2013) show that foreign bank presence in LICs is associated with lower credit to the private sector and with a stronger contraction of private credit during during the global crisis. In addition, foreign banks are likely to ‘cherry pick’ borrowers in emerging and developing countries, reducing access to credit to smaller and younger firms (Gormley, 2010). With respect to financial sector stability, foreign banks are better able than domestic banks to absorb domestic shocks (De Haas and van Lelyveld, 2010). However, foreign banks can be a relevant source of vulnerability, since they can act as a channel to propagate a local shock globally, through a decline in cross-border lending and in lending of their affiliates (Cetorelli and Goldberg, 2011; Haas and Horen, 2013), and because of the ‘home bias’ effect, according to which banks rebalance their portfolio favoring domestic borrowers (Giannetti and Laeven, 2012). However, cross-border flows to LICs are generally low, thus limiting the exposure to deleveraging risks.

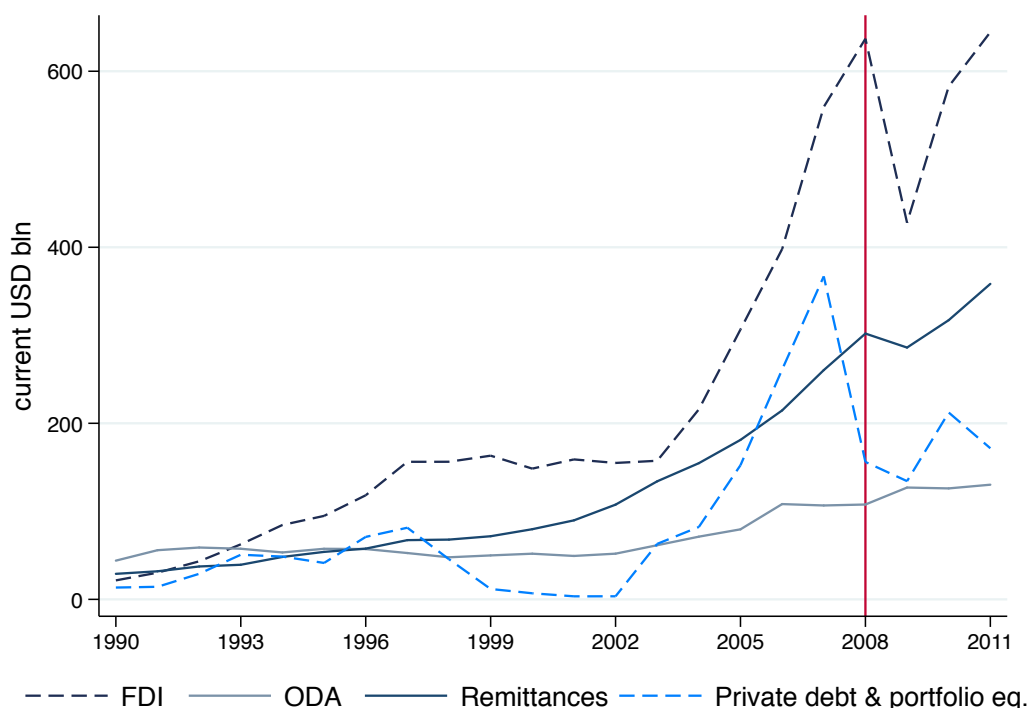
Finally, migrants’ remittances have been much less correlated with the global economic conditions during the recent crisis and they are projected to rise steadily in the coming years, being the second source of foreign finance for developing countries.⁶ However, the whole picture hides a great deal of heterogeneity, since many countries are extremely dependent on remittance flows (accounting for about 20 percent of GDP in Liberia, Nepal and Haiti, for instance) and have their migrants located in a few destination countries. In this case, the high dependence of remittance flows could be an additional source of vulnerability, given the positive correlation between international remittances and the economic conditions of host countries (Bettin, Presbitero, and Spatafora, 2013).

Figure 5 shows the recent path of aid, remittances, FDI, equity portfolio investment and debt flows. As already mentioned, the last decade has seen a great upsurge of foreign direct investment.

⁵For a review of the vast literature of financial globalization, growth and volatility, see Kose, Prasad, Rogoff, and Wei (2010) and Agénor (2013).

⁶The World Bank (2013) projects remittances to reach USD 515 billion in 2015.

Figure 5: Aid and the other resource flows to developing countries



Source: World Development Indicators and International Debt Statistics (developing countries are defined as low- and middle-income countries), The World Bank.

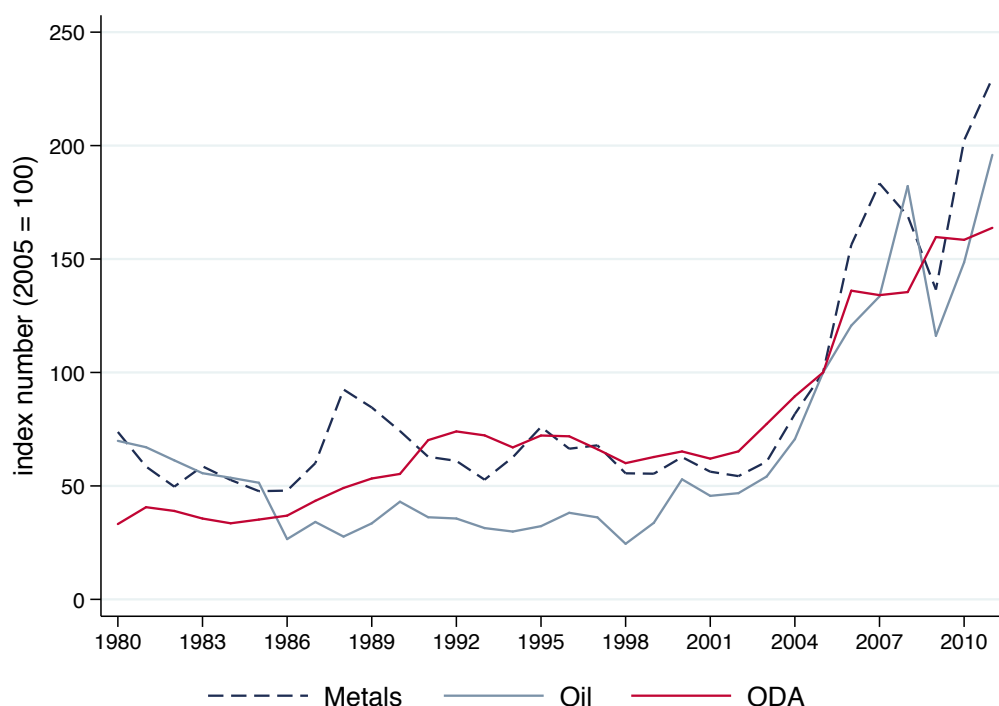
The increase of remittances is somewhat less steeper but also smoother and it has been less conditioned by the global crisis. The volumes of portfolio investment and foreign aid are smaller. The former are the most volatile, while aid is the stablest source of funding. Looking at the crisis years confirm the general trend: FDI and other portfolio and debt flows dramatically collapsed in 2008 and 2009, while remittances and aid proved more resilient.

Finally, Figure 6 shows the evolution of aid inflows to developing countries and two indexes of commodity prices. One is the metal price index and one is the index for crude oil. While there is a strong and positive correlation between aid and commodity prices over the whole period, this is mainly driven by the upsurge in commodity prices started in the 2000s, which went hand-in-hand with increasing aid. In the 1980s and 1990s, instead, the correlation between aid and oil prices is strongly negative.

2.2 Dealing with shocks

Traditionally, poor countries relied mainly on bilateral and multilateral assistance and to a growing government debt to deal with external shocks. Self-insurance, mainly in forms of accumulation of international reserves and savings of windfall revenues from natural resources, gained importance in the last global crisis, but it is extremely costly, especially in terms of missed productive investment

Figure 6: Aid to developing countries and commodity prices



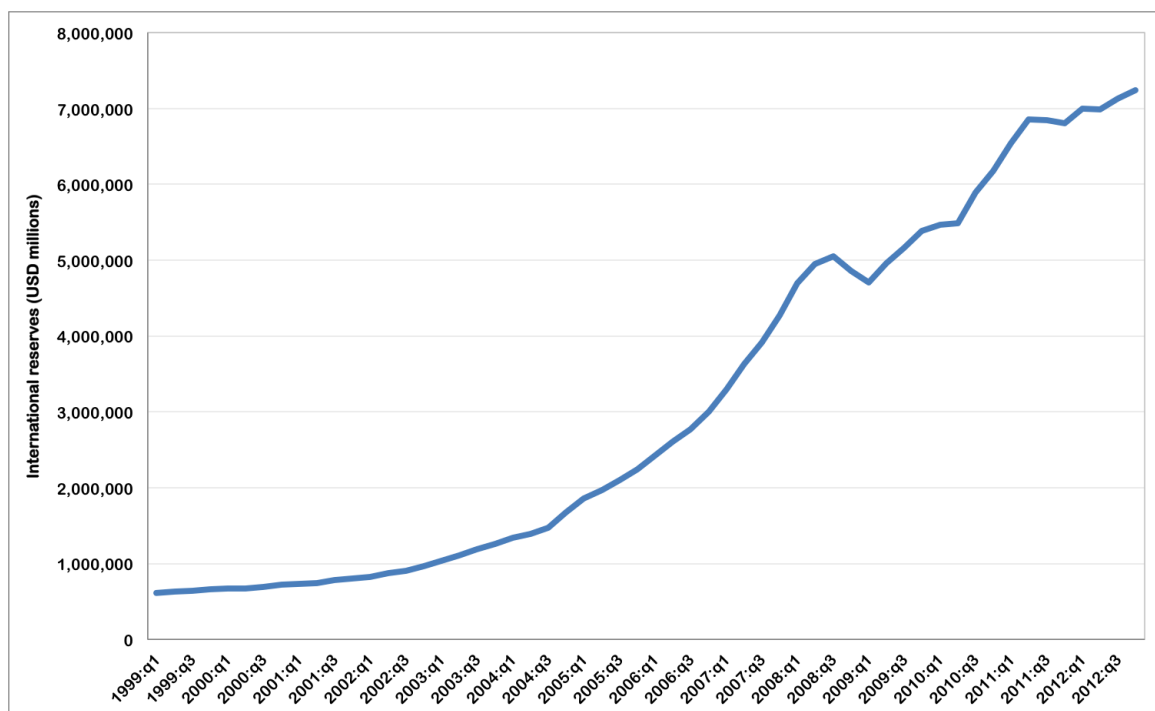
Source: World Development Indicators and IMF Primary Commodity Prices indexes. Developing countries are defined as low- and middle-income countries.

opportunities. Some of the tools designed by multilateral institutions are explicitly devoted to cope with external shocks, but they are *ex-post* instruments, which generally come with costly conditionalities. Some of the multilateral facilities below the IMF Poverty Reduction and Growth Trust (PRGT) and the World Bank’s International Development Association (IDA) are examples of *ex-post* financing. However, the conditionality that comes together with multilateral assistance has been associated with aid volatility and unpredictability (Bulír and Hamann, 2008; Celasun and Walliser, 2008). In last years, to make the financial support to LICs more predictable, the IMF and the World Bank have worked to streamline the conditionality and the access to financial facilities for emergency and short-term support.⁷ By contrast, the use of contingent financing instruments remains quite limited (International Monetary Fund and World Bank, 2011).

The capacity to cope with exogenous shocks depends, among other things, on the level and composition of international reserves. In the current climate of global financial crises, emerging and developing countries have further and steadily increased the demand for international reserves

⁷For instance, the IMF Rapid Credit Facility (RCF) provides low access, rapid, and highly concessional financial assistance to LICs facing an urgent balance of payments need, without the need for program-based conditionality. It can provide flexible support in a wide variety of circumstances, including shocks, natural disasters, and emergencies resulting from fragility. To deal with exogenous natural or economic shocks, the IDA Crisis Response Window (CRW) provides additional resources that will help countries to respond to severe economic crises and major natural disasters. For additional details, see the IMF and World Bank websites and International Monetary Fund and World Bank (2011).

Figure 7: Official foreign exchange reserves in emerging and developing economies



Source: International Monetary Fund, <http://www.imf.org/external/np/sta/cofer/eng/index.htm> database.

(Figure 7). The International Monetary Fund (2011) estimates this increase in the range between USD 800-1,600 billion over the period 2012-2016.

The current boom in reserve accumulation in developing countries is driven by self-insurance motives, given that countries with more reserves have done better in smoothing domestic investment and absorption during the recent food and financial crisis (International Monetary Fund, 2011).⁸ For indebted countries, reserve accumulation, reducing the probability of a sovereign default, lowers the sovereign spread over the risk-free return on reserve paid on the full stock of debt (Levy Yeyati, 2008).

However, reserve hoarding implies a social cost, measured by the benefit the country could derive from an alternative use of funds, be that in the form of productive investment or expenditures on social programs. In a multi-country perspective, the accumulation of reserves invested by developing countries in short-term liabilities issued by key-currency countries (primarily the United States) stands as one of the flaws of the current International Monetary System (IMS); it is known as the inequity bias (Ocampo, 2010) and permits rich countries to be financed by poor countries at low interest rates. Reserve accumulation imposes also potential costs through exchange rate valuation losses and maturity mismatches between long-term foreign liabilities and short-term international reserves. Large reserve transactions may have destabilizing effects on interest rates and exchange

⁸Reserve accumulation is generally due to two competing reasons: (1) the creation of a liquidity buffer to cope with capital outflows, terms of trade shocks and self-fulfilling financial crises (Aizenman and Lee, 2007), and (2) the necessity to avoid exchange rate appreciation due to “mercantilist” trade policies (Dooley, Folkerts-Landau, and Garber, 2004).

rates, and thus raise systemic risks (Obstfeld, 2011).

Rodrik (2006) calculates that the increase in reserves occurred in the early 1990s in developing countries (where reserves reached almost 30 percent of GDP and 8 months of imports) has been translated in an income loss close to 1 percent of national GDP. In the new millennium, the average cost of reserves has been estimated by the IMF to about 0.5 percent of GDP. Akyuz (2010) estimates that the annual cost of borrowed reserves for developing and emerging economies is about USD 130 billion, more than the total annual budget of official development assistance. In brief, “foreign-exchange reserves seem to offer an unfavourable risk-return trade-off” (Angeloni, Bénassy-Quéré, Carton, Destais, Darvas, Pisani-Ferry, Sapir, and Vallée, 2011, p. 5).

One way to mitigate poor countries’ vulnerability to external shocks, especially related to trade, capital flows and exchange rate fluctuations, is a reform of the IMS aimed at increasing the role of multilateralism, centered on a larger role played by the Special Drawing Rights (SDR). This debate has gained momentum around 2010, before the worsening of the global crisis in advanced economy (see, among others, Ocampo, 2010; Stiglitz and Greenwald, 2010). Within many proposals, Bird (2010) and Alessandrini and Presbitero (2012) moves from the old aid-link scheme (Grubel, 1972) to suggest the creation of an SDR aid-link within a reformed, multi-currency IMS. Specifically, poor countries could have access to a partially unconditional line of credit from the IMF, denominated in SDR: this would limit the adverse effects of aid unpredictability, the demand for costly reserves and the dependence on the US dollar.

Recent evidence on developing countries shows that migrants remittances significantly increase in response to natural disasters (Yang and Choi, 2007; Yang, 2008; Mohapatra, Joseph, and Ratha, 2012) and act as a shock absorber and reduce output volatility, especially in countries particularly exposed to food price shocks, natural disasters, fiscal shocks and financial crises (Chami, Hakura, and Montiel, 2009; Combes and Ebeke, 2011; Bettin, Presbitero, and Spatafora, 2013; Ebeke and Combes, 2013; Combes, Ebeke, Etoundi, and Yogo, 2014).

Finally, the recent global financial crisis has highlighted the importance of macroeconomic policies, since LICs with a sound fiscal stance, a buffer of international reserve and flexible exchange rates were able to dampen the effects of the crisis (Berg, Papageorgiou, Pattillo, and Spatafora, 2010). Collier and Goderis (2009b) focuses on microeconomic policies and underline how structural policies may help mitigating the negative effects of adverse shocks. In particular, they consider natural disasters and export price shocks and find that their effect is stronger when labor market regulation and firm regulation prevent an efficient re-allocation of capital and labor.

Aid flows could interact with other sources of external finance and react to macroeconomic conditions in different ways, amplifying or mitigating risks and vulnerabilities. In the following section we focus on the role of aid as a possible shock absorber in a sovereign ALM framework.

3 Aid in the Sovereign Asset and Liability Management

Asset and liability management (ALM) has been traditionally used by financial institutions to manage price risks with market-based instruments and it is now adopted by advanced and emerging countries to better manage public debt. Its application to developing countries has been widely

Table 1: Sovereign balance sheet

Assets	Liabilities
Present value of future incomes from:	Present value of future expenses on:
taxes	social development
fees	economic development
seigniorage	government administration
Balances of:	Balances of:
cash	monetary base
reserves	government debt
investment (pension and wealth funds)	pension liabilities
State-owned enterprises	Contingent claims:
Real estate	guarantees to banks and nonbanks
Other assets	guarantees on retirement income
	guarantees on social welfare
	Net worth
	Net financial worth

Source: Das, Lu, Papaioannou, and Petrova (2012).

discussed in the late 1980s and in the 1990s, on the backdrop of debt crisis and commodity price shocks faced by many developing countries (Masuoka, 1990). In an ALM framework, the main target is to manage and mitigate the financial risk exposure of the public sector as a whole, in order to preserve the macroeconomic conditions for a sustainable growth path. More broadly, ALM serves as a tool to identify long-term fiscal challenges and to help countries to achieve a more balanced asset and liability structure, so to minimize the adverse consequences of exogenous shocks (Das, Lu, Papaioannou, and Petrova, 2012). From a sovereign perspective, this means dealing with an increase of the value of government liabilities or with a fall in revenues without significant changes in the tax rate and in the provision of public services. A prudent asset and liability management ensures that the currency, interest rate, and risk characteristics of a balance sheet are within prescribed risk parameters. Table 1 reports a stylized sovereign balance sheet, which helps pointing out the potential sources of vulnerability for the government.

So far, notwithstanding the high vulnerability of several developing countries to external risks, the discussion about the use of asset and liability management to mitigate different risks in the sovereign balance sheet has been mainly targeted to advanced economies and emerging markets (Das, Lu, Papaioannou, and Petrova, 2012). Although the benefits from efficient policy responses to external shocks are high, risk management tools for developing countries have been traditionally limited (Claessens, 2005) and in several countries monetary and fiscal authorities have not been able to define coherent strategies capable of supporting the efficient macroeconomic management of risk and volatility. Recently, international institutions and national governments in poor countries are showing a growing interest in risk management.

The development of an ALM strategy in developing countries is hindered by obstacles related to the difficulty of identifying and evaluating properly asset and liabilities in the government balance sheet. In general, governments should invest in collecting and producing detailed data and multi-

year projections on fiscal position, on planned expenditures, and on contingent claims. In developing countries, other sources of revenues could be considered other than the ones listed in Table 1.

Specifically, given the long-lasting relevance of foreign aid in the government budget of several LICs, it may be possible, when certain conditions are met, to consider aid inflows as an asset that could be a part of a sovereign ALM.⁹

The discussion of the previous section and the picture emerging from Figure 5 would suggest that aid and remittances are two natural candidates to help countries mitigate the adverse effects of macroeconomic fluctuations. Some recent evidence support this claim. [Combes, Ebeke, Etoundi, and Yogo \(2014\)](#), for instance, show that aid and remittance flows mitigate the adverse effect of food price shocks on the level and instability of household consumption in vulnerable countries. However, remittances are private flows on which the national government has almost no command. Hence, among the possible relevant sources of foreign financing, aid is the one which could be part of an ALM strategy in developing countries. This could be the case if foreign aid were a reliable, stable and predictable source of external finance.¹⁰ However, the control of recipient governments over aid inflows could also be impaired, unless when they recur to IMF-supported concessional lending programs, since aid disbursements depend, among other factors, on donors' economic conditions ([Fuchs, Dreher, and Nunnenkamp, 2012](#)).¹¹ This positive correlation between aid and donors' business cycle is one key aspect which may increase recipients' vulnerability to external shocks. In addition, the predictability of aid and its capacity to mitigate the vulnerability to external shocks, rather than magnifying them, can not be taken as given. In the following sections we are going to discuss there issues in depth.

4 Donors' business cycle and aid inflows

The great recession has sparked the interest of academics and policy makers on the procyclicality of aid with respect to donors' GDP. [Dang, Knack, and Rogers \(2009\)](#) show that banking crises were associated with a severe and persistent contraction of aid disbursements between 1977 and 2007. [Dabla-Norris, Minoiu, and Zanna \(2014\)](#) analyze bilateral flows covering the period 1970-2005 and, controlling for donor-recipient pair fixed effects, find that foreign aid is positively correlated with the output gap of donor countries. Consistently with these evidences, [Gravier-Rymaszewska \(2012\)](#) adopts a panel VAR approach and finds that economic crises affect aid budgets and their trend, since prolonged recessions and banking crises have a lasting and negative effect on aid supply.

⁹This represent a novelty. For instance, in the extensive discussion of the sovereign ALM proposed by [Das, Lu, Papaioannou, and Petrova \(2012\)](#), the word 'aid' is never used.

¹⁰One issue that deserves further scrutiny is the increasing role of alternative sources of foreign aid, such as non-governmental charities, private-oriented companies and private foundations. Aid channelled through these sources is supplementing official ODA and its determinants (and dependence from donors economic conditions) are not necessarily the same ([Dreher, Nunnenkamp, Ohler, and Weissner, 2012](#)). In addition, non-DAC donors are also a growing source of external assistance for developing countries, even if the evidence on the determinants of aid disbursed by new donors is not encouraging ([Dreher, Nunnenkamp, and Thiele, 2011](#)).

¹¹In a very comprehensively review of the literature on the determinants of foreign aid, [Fuchs, Dreher, and Nunnenkamp \(2012\)](#) test 16 different hypotheses which could motivate aid spending. Among these, they find that few variables are robustly correlated with the aid effort. Specifically, they do not find sound evidence that the donor's business cycle influences its effort which, instead, is quite persistent.

4.1 The empirical exercise

Given the recent drop in aid flows following the global recession, we start the empirical analysis trying to assess to what extent aid is responsive to economic shocks in donor countries. We build on the literature discussed above and we estimate a basic model of aid determinants for a sample of 22 OECD donor countries.¹² The main novelty of the exercise is that the sample includes the recent global financial crisis.

To inspect how financial crises and business cycle are correlated with the aid effort, we estimate the following model on a panel of 22 donors, over the period 1985-2010:

$$AID/POP_{i,t} = \alpha AID/POP_{i,t-1} + \beta_1 TREND_{i,t} + \beta_2 OUTPUT\ GAP_{i,t} + \gamma' \mathbf{X}_{i,t} + \mu_i + \tau_t + \varepsilon_{it} \quad (1)$$

where $AID/POP_{i,t}$ is measured by per capita net ODA disbursements by donor i at time t .¹³ The standard set of explanatory variables includes the lagged value of net ODA disbursements per capita, to deal with the inertia of aid flows, and real GDP, which is decomposed in the potential output ($TREND$) and the output gap ($OUTPUT\ GAP$). The coefficient β_2 measures the impact of donors' business cycle on aid flows (Dabla-Norris, Minoiu, and Zanna, 2014). To better gauge the impact of economic adverse shocks in donor countries on aid flows, we follow Dang, Knack, and Rogers (2009) and Frot (2009) and include in the model also a dummy for the presence of a banking crisis. To assess the robustness of the estimation of β_2 , we augment the basic model with a set of additional control variables ($\mathbf{X}_{i,t}$): the logarithm of population, which accounts for the possibility that country size matters for generosity, the current account and fiscal balances, and the degree of openness. Finally, the model includes also country (μ_i) and year (τ_t) fixed effects, while ε_{it} is the spherical error term.

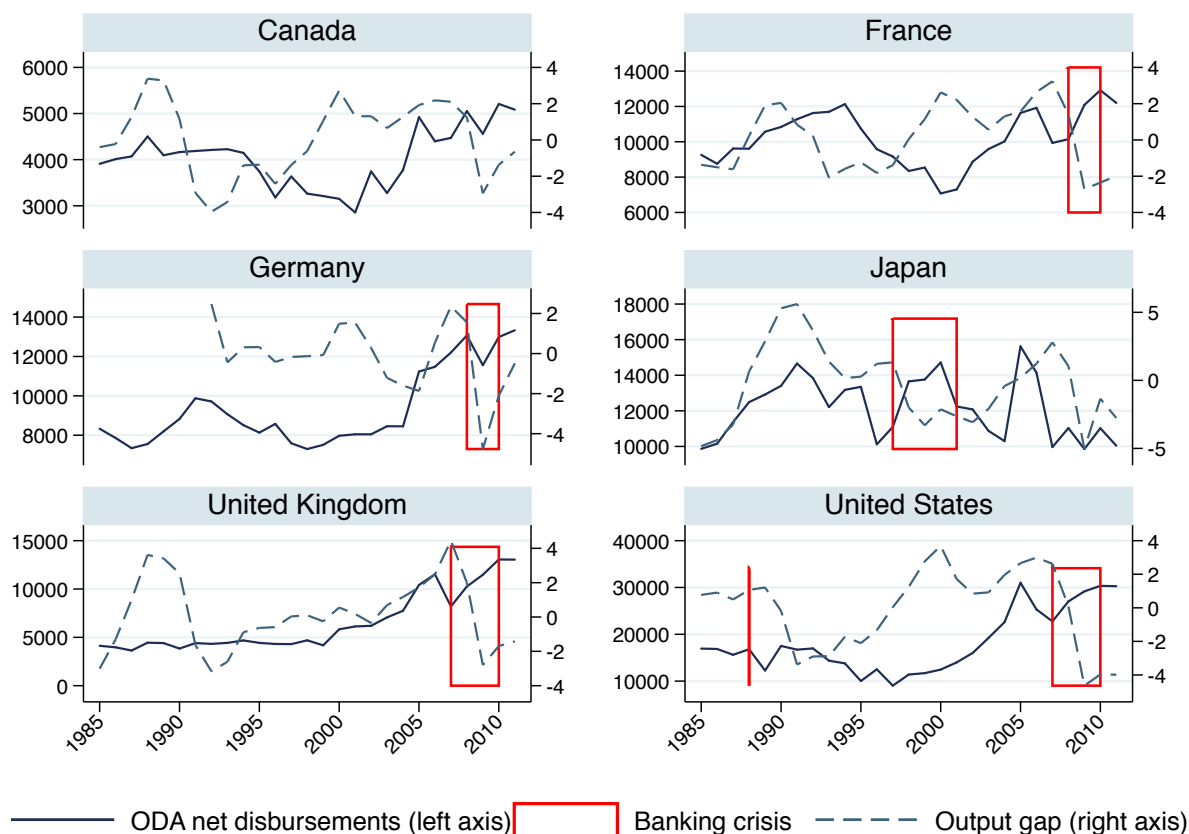
We estimate equation 1 using the Fixed-Effect (FE) estimator, in order to wash out any time-invariant country fixed effect μ_i which could influence aid generosity. Given the persistence nature of aid flows, we allow for autocorrelation in the error term using the Newey and West (1987) standard errors.

The main data sources are the OECD DAC data set for aid variables and the OECD Economic Outlook for macroeconomic data. Other data comes from the Penn World Tables (Version 7.1) and from other data sets. Variable definitions, summary statistics and sources are listed in Table 5.

¹²The donor countries included in the analysis are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Korea, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

¹³The definition of the dependent variable is not straightforward (see Fuchs, Dreher, and Nunnenkamp, 2012, Appendix C). In defining AID two main issues arise. First, aid can be measured in terms of ODA disbursements and commitments, and of net and gross flows. In the baseline model, we use net aid disbursements. The second issue has to do with the normalization of the aid variable. The literature generally measures the aid effort scaling ODA by country economic size. However, since we are interested in the correlation between aid and economic conditions, we normalize aid by population, in order to avoid any mechanical correlation between the dependent variable and out key explanatory variable $OUTPUT\ GAP$.

Figure 8: ODA, output gap and banking crises, main donors



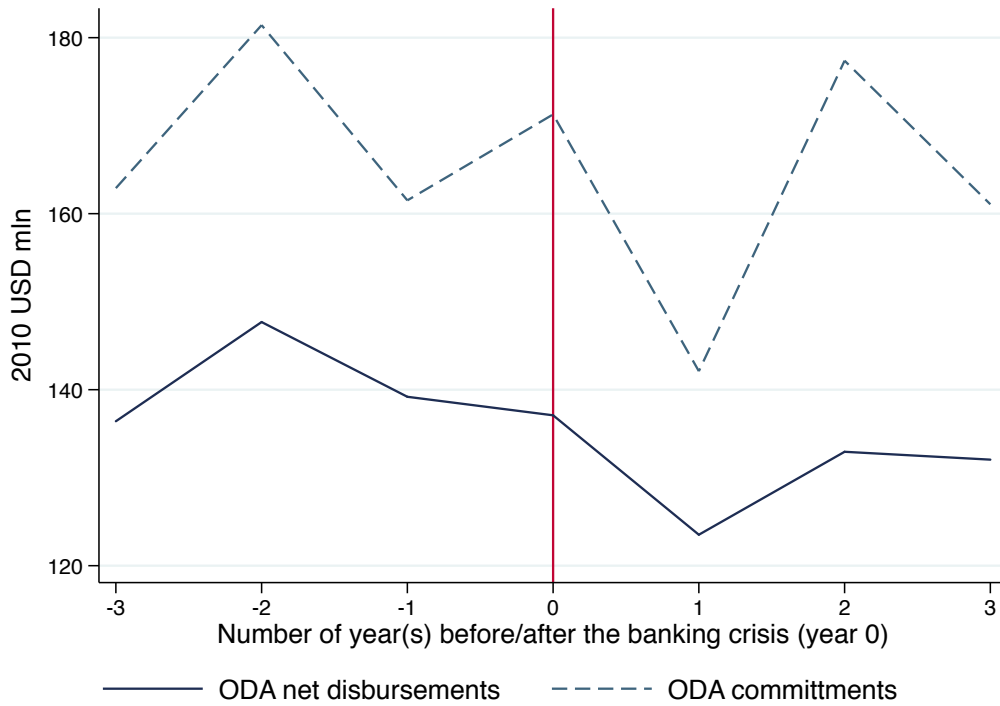
Notes: Elaboration on data from OECD and [Laeven and Valencia \(2012\)](#).

4.2 Results

Before turning to the regression results, we provide some descriptive evidence of the correlation between foreign aid and donors' economic conditions. Figure 8 plots the evolution of net ODA disbursements and of the output gap for six of the main donors. No clear pattern emerges. While the correlation is positive and large for Japan (0.40), it is large and negative for France (-0.35) and the United States (-0.21), smaller for Germany (-0.15) and closer to zero for the other countries. This result, however, is partially driven by the global financial crisis. The diagrams clearly show the decline in the output gap, which has not been matched by an equally significant drop in aid assistance. In fact, the same correlations, excluding the post-2007 years, are positive and large for all donors but France. Hence, this first preliminary finding suggests a weak correlation between aid and donors' business cycle. The diagrams identify also the years in which there was a banking crisis. In this case, again, we see a significant drop in the output gap, as expected, but not a similar decline in aid flows.

To better investigate the possible effects of banking crises on aid disbursements, Figure 9 plots

Figure 9: ODA before and after banking crises



Notes: Elaboration on data from OECD and [Laeven and Valencia \(2012\)](#).

the evolution of net ODA disbursements in a three-year window before and after the crisis year, for the whole sample of 23 donor countries. In this case, the diagram suggests a different picture. Official aid, in fact, is somewhat lower in the three-year period after the crisis than before and it does not seem to bounce back top the pre-crisis level. By contrast, aid commitments show a much steeper decline the year after the banking crisis, but they soon came back to the pre-crisis level. This would suggest that donors actually shrink their aid budget in response to a banking crisis more than they actually communicate through their pledges.

The results of the estimation of equation 1 are reported in Table 2. The baseline specification (column 1) shows that aid disbursements per capita are highly persistent (the autoregressive term is equal to 0.86) and that they are influenced by the donors' business cycle. In fact, while per capita aid flows are not significantly associated with potential GDP, they respond positively to the evolution of the output gap. In column 2 we replace *OUTPUT GAP* with a dummy for the occurrence of a banking crisis, finding that the latter is negatively correlated with *AID/POP*. When these two proxies of economic conditions in donor countries are jointly included in the regression, they are still statistically significant (column 3). This main result holds even controlling for other possible determinants of the donors' aid allocations. However, we do not find evidence that country size, current account, fiscal balance and openness significantly affect per capita aid disbursements.

The estimated coefficients indicates that the economic impact of adverse shocks in donor coun-

Table 2: Aid and the donors' business cycle: net disbursements

Dep. var.: <i>AID/POP</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>AID/POP</i> _{t-1}	0.862*** [0.029]	0.871*** [0.028]	0.867*** [0.028]	0.866*** [0.029]	0.863*** [0.030]	0.846*** [0.026]	0.860*** [0.033]
<i>TREND</i>	17.139 [11.662]	19.687 [13.189]	15.641 [12.272]	27.050 [17.005]	18.231 [12.907]	16.882 [12.986]	12.039 [12.884]
<i>OUTPUT GAP</i>	1.199*** [0.448]		0.895** [0.426]	0.862** [0.429]	0.999** [0.477]	1.023*** [0.385]	0.855* [0.446]
<i>BANKING CRISIS</i>		-12.483** [5.008]	-10.781** [5.137]	-10.381** [5.085]	-9.811* [5.143]	-9.787* [5.347]	-11.050** [5.194]
<i>POP</i>				-50.885 [39.849]			
<i>CAB</i>					0.344 [0.397]		
<i>NET LENDING</i>						0.332 [0.421]	
<i>OPENNESS</i>							0.122 [0.180]
Observations	518	518	518	518	516	511	518

Notes: The dependent variable is the log of net aid disbursements. The table reports the regression coefficients and, in brackets, the associated Newey-West standard errors (errors have an AR(4) structure). * significant at 10%; ** significant at 5%; *** significant at 1%. A constant and year dummies are included.

tries have a sizable impact on aid flows. In banking crisis years, per capita aid disbursements are about 11-12 USD less than in non-crisis years. Considering that the average value of *AID/POP* is 189 dollars per capita, this translates into a reduction of 6.1 percent. By contrast, the economic effect of *OUTPUT GAP* is much smaller: a contraction of GDP of one percentage points below its potential is associated with about one dollar per capita less in aid disbursements. Considering the coefficients reported in column 3, the joint effect of a banking crisis and of a three percentage point contraction of GDP below the trend are associated with a 7.1 percent reduction of per capita aid disbursements.

5 The role of aid as a shock absorber

Under a certain perspective, aid may be considered as an asset, such as revenues from natural resources, on which, however, recipient governments have a limited control, given its dependency on external conditions. Henceforth, three main questions have to be answered to understand if aid could be part of a sovereign ALM strategy. First, how does aid relate to other public and private sources of external finance? Second, does aid increase in response to adverse economic shocks? Third, is aid a stable and predictable source of finance?

The role of foreign aid as a shock absorber for developing countries is far from settled in the development literature and it is mainly hindered by its procyclicality, volatility, and its unpredictability. In the following sub-sections we briefly discuss the relevant literature and summarize the main empirical regularities. Then, in Section 6 we will investigate the correlation between aid

and other capital flows, to assess whether aid could compensate for large changes in private capital flows. To evaluate the potential role of aid in an ALM framework, a second key aspect we analyze is the correlation between aid inflows and economic growth and exogenous shocks in recipient countries. Finally, in Section 7 we will deal with aid unpredictability which, according to a recent strand of literature, is likely to have more severe consequences on government spending, investment and growth than aid volatility.

5.1 Aid procyclicality

In an influential paper, [Pallage and Robe \(2001\)](#) analyze foreign aid over the period 1969-1995 and find that the cyclical component of ODA is positively correlated with the cyclical component of domestic output in 25 out of the 35 Sub-Saharan African countries considered. Analyzing a longer dataset, [Bulír and Hamann \(2007, p. 730\)](#) find that the relative volatility of aid with respect to revenue increased in the early 2000s as compared with the late 1990s, and that “aid has been delivered in a mildly procyclical fashion”. The same authors conclude that “aid has failed to act either as a stabilizing force or as an insurance mechanism” ([Bulír and Hamann, 2007, p. 730](#)).

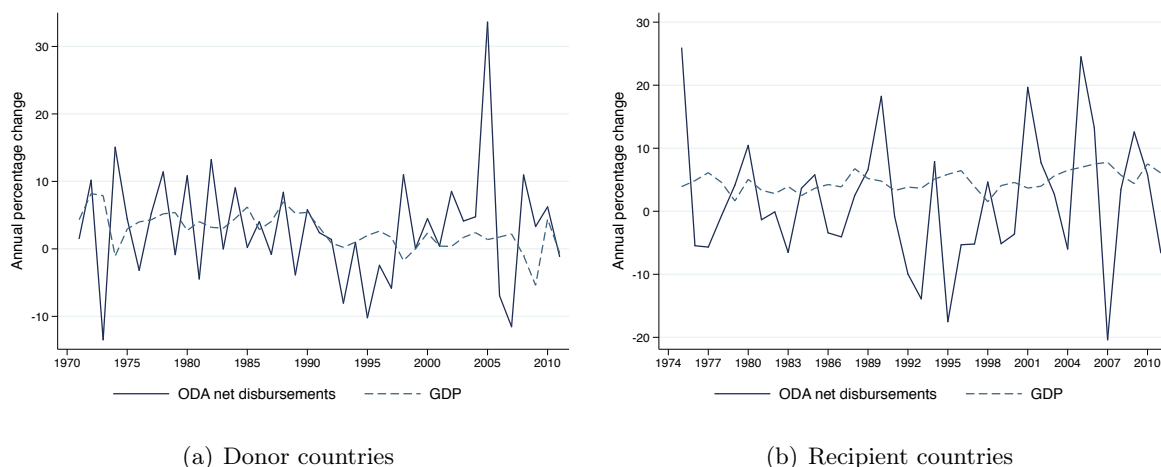
Against this framework, some recent evidences provide a more heterogeneous picture. [Dabla-Norris, Minoiu, and Zanna \(2014\)](#) show that, on average, aid seems procyclical, especially in middle-income countries and in response to episodes of civil wars. However, when considering large exogenous macroeconomic shocks (such as a decline in the terms of trade, growth collapses and natural disasters) aid turns out to be countercyclical. In a different setting, [Collier and Goderis \(2009a\)](#) find that foreign aid mitigates the effect of commodity export price shocks. In a similar vein, [Guilloumont Jeanneney and Tapsoba \(2012\)](#) argue that foreign aid could help stabilize income fluctuations, especially in countries heavily dependent on foreign assistance and exposed to frequent output fluctuations. This effect, however, is quite limited, especially in case of multilateral assistance, which should be more explicitly targeted at helping LICs coping with exogenous shocks. The new tools developed by the IFIs go in this direction (see Section 2.2), although a proper evaluation has not yet been possible.

5.2 Aid volatility

[Pallage and Robe \(2001\)](#) and [Bulír and Hamann \(2003, 2008\)](#) maintain that foreign aid to developing countries have been highly volatile and procyclical, possibly magnifying economic instability and hurting growth. [Hudson and Mosley \(2008\)](#) make the point that volatility depends on aid instruments, so that reactive aid – food and emergency aid and program aid – is indeed more volatile than technical assistance. In general, aid volatility has been found to depend on donors characteristics, on the concentration of the aid disbursements among a few donors, on recipient country’s governance and institutional setting and macroeconomic instability, and on frictions in the allocation process ([Hudson and Mosley, 2008](#); [Eifert and Gelb, 2008](#); [Fielding and Mavrotas, 2008](#)).

As showed in Figures 1 and 5, the volatility of aid does not significantly decrease over time (see also [Bulír and Hamann, 2008](#); [Hudson and Mosley, 2008](#)), neither it is high compared to other

Figure 10: Aid volatility



Notes: the diagrams plot the annual percentage change in real GDP and aid disbursements from donor countries (panel a) and to recipient countries (panel b). As for donors, we consider a balanced panel of 16 countries over 42 years (1970-2011). As for recipients, the balanced panel is made by 55 countries over 38 years (1974-2011).

sources of external finance (see also [Frot and Santiso, 2008](#)). However, the comparison between aid and private capital flows is not particularly meaningful, since they do not respond to the same factors, neither they are targeted to similar purposes. A better comparison is the one between aid and other sources of finance for public investment, such as government revenue. In this case, [Bulír and Hamann \(2007, 2008\)](#) clearly show that aid flows are much more volatile than domestic fiscal revenue. Figure 10, instead, plots the annual variation of aid disbursements and real GDP in donor and recipient countries and shows that aid flows are more volatile than GDP in donor and recipient countries. The left-hand side diagram suggests that donors' effort is not constant and depends on country-specific macroeconomic characteristics, mainly related to the business cycle (see Section 4). The right-hand side diagram further clarifies that aid inflows are indeed much more volatile than recipient output, as found also by [Pallage and Robe \(2001\)](#).

Significant year-on-year changes could have a number of adverse consequences on macroeconomic management in recipient countries. [Arellano, Bulír, Lane, and Lipschitz \(2009\)](#) present and calibrate a model showing that aid volatility exacerbates macroeconomic fluctuations and generates welfare losses, especially in countries which are poorly financially integrated, since households can not borrow to insure against fluctuations and smooth consumption.¹⁴ The empirical evidence corroborates these predictions and suggest that aid volatility exacerbates macroeconomic instability, complicates the conduct of monetary and fiscal policies, and hinders government spending and investment, generating a negative growth dividend (see, for instance [Pallage and Robe, 2003](#); [Torsvik, 2005](#)).

¹⁴It is worth noting the economic effect of aid volatility. The model, calibrated on the Ivory Coast, shows that “if donors delivered aid in a stable manner, they could reduce aid by 8% while maintaining the same level of well-being for citizens of aid-receiving countries” ([Arellano, Bulír, Lane, and Lipschitz, 2009](#), p. 95).

5.3 Aid unpredictability

The volatility and unpredictability of foreign aid refer to two different concepts, even if they are often considered as two faces of a same coin.¹⁵ Volatility is the *ex-post* realization of aid flows and refer to their degree of variability over time. In principle, the volatility of aid could be fully explained by the variability of the macroeconomic determinants of aid so that, as long as aid determinants can be reasonably projected, the volatility of aid flows does not necessarily generate adverse consequences for recipient governments, neither it spills over into aid ineffectiveness. By contrast, aid unpredictability can be assimilated to a shock, since countries have to deal with an (unexpected) shortage of aid disbursements with respect to donors' commitments. This implies that volatility and unpredictability can not be used interchangeably. Specifically, it is aid unpredictability which is more likely to generate adverse consequences on recipient domestic macro policies and to undermine aid effectiveness (Celasun and Walliser, 2008).

As shown in Figure 1, aid disbursements have traditionally felt short of commitments, especially in poorer countries (Bulír and Hamann, 2008), and this could have severe adverse effects on recipient countries. Lacking access to international capital markets and buffer stocks, aid unpredictability could affect the level and the composition of government spending. In fact, when there is an unexpected drop in aid, governments are forced to postpone investment projects. By contrary, aid windfalls would boost government consumption, given that the level of government expenditure can be adjusted more easily than public investment (Celasun and Walliser, 2008). Kodama (2012) presents a model according to which unpredictability generates a significant waste of aid inflows, undermining aid effectiveness and jeopardizing growth. The results of the model are consistent with the existing evidence on the adverse effects of aid uncertainty on investment and growth (Lensink and Morrissey, 2000). Furthermore, aid unpredictability may weaken governance, being associated with more corruption. Kangoye (2013) shows that this is the case and argues that aid unpredictability could provide incentives to risk-averse politicians for rent-seeking activities, aimed at over-extracting the current rent from aid without waiting for uncertain disbursements.

6 Aid, shocks, and other capital inflows

6.1 The empirical exercise

Having assessed to what extent aid flows are responsive to donors' business conditions, we now turn to the correlations between aid, recipient economic conditions, and other capital flows to developing countries.

First, we focus on the relationship between aid and international remittances, foreign direct investment, and debt service flows, in order to ascertain if aid is positively or negatively correlated with other sources of external finance. On the aggregate, Figure 5 would suggest that aid is a stable source of external finance, less prone to the volatile conditions which affect debt and investment

¹⁵For instance, Arellano, Bulír, Lane, and Lipschitz (2009, p. 87) consider the aid commitment-to-disbursements ratio as a measure of aid volatility and conclude that "Aid volatility results in substantial welfare losses, providing a motivation for recent discussions of aid architecture stressing the need for greater predictability of aid."

flows.

Second, we try to measure the degree of procyclicality of aid, looking at its correlation with GDP growth and terms of trade, as a measure of external shocks. This is a key aspect to understand the potential stabilization role of foreign assistance and its effectiveness, but is also an issue on which the literature is quite inconclusive (see Section 5.1).

In the following, we test these hypotheses looking at a panel of 62 low income and lower middle income aid recipient observed between 1975 and 2010.¹⁶ To test the cyclicity of aid, we look at its correlation with the GDP growth rate of recipient countries, which is taken as proxy of business cycle¹⁷, and the evolution of the terms of trade, taken as a proxy for shocks (this indicator has the advantage, with respect to output gap, of being exogenous to aid allocations). Thus, we estimate the following model:

$$\begin{aligned}
 AID/GDP_{j,t} = & \alpha AID/GDP_{j,t-1} + \beta_1 REM_{j,t} + \beta_2 FDI_{j,t} + \beta_3 TDS_{j,t} + \\
 & + \gamma_1 GROWTH_{j,t} + \gamma_2 TOT_{j,t} + \delta' \mathbf{X}_{j,t} + \mu_j + \tau_t + \varepsilon_{jt}
 \end{aligned} \tag{2}$$

in which aid inflows (AID/GDP) to country j at time t is a function of: (i) the past level of aid, (ii) a set of standard controls (\mathbf{X}_{it}) including the log of population and the logarithm of real per capita GDP, (iii) the three other sources of capital flows, and (iv) the two measures of output shocks, per capita real GDP growth ($GROWTH$) and the logarithm of the terms of trade (TOT). In particular, we test – separately and jointly – the simultaneous correlation between aid and remittances (REM), foreign direct investment (FDI) and debt service payments (TDS). Given that the three key explanatory variables are all scaled by GDP and that, in this case, we are less concerned with the correlation between aid flows and GDP, we measure aid inflows as the ratio of net ODA disbursements over GDP. As in equation 1, μ_j is the country-fixed effect, τ_t are the time dummies and ε_{jt} is the error term. To wash out individual effects, equation 2 is estimated with the within-group estimator.¹⁸ A description of the variable is in Table 5 in the Appendix, while results are presented in Table 3.

6.2 Results

The baseline model (column 1) shows that aid inflows are quite persistent – the autoregressive term is equal to 0.62 – and they are economically targeted since they higher flows in terms of national GDP go to poorer countries. The coefficient on GDP growth is negative, but statistically not significant. This is not surprising, given the contrasting findings discussed in the literature. The

¹⁶The countries included in the analysis are: Armenia, Bangladesh, Belize, Benin, Bolivia, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Rep., Comoros, Congo, Rep., Cote d'Ivoire, El Salvador, Egypt, Ethiopia, Gambia, Georgia, Ghana, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Kenya, Kyrgyz Rep., Laos, Lesotho, Madagascar, Malawi, Mali, Mauritania, Moldova, Morocco, Mozambique, Nicaragua, Niger, Nigeria, Pakistan, Papua New Guinea, Paraguay, Philippines, Rwanda, Senegal, Sierra Leone, Solomon Islands, Sri Lanka, Sudan, Swaziland, Syria, Tanzania, Togo, Uganda, Ukraine, Vietnam, Yemen, Zambia.

¹⁷We acknowledge that per capita GDP growth rate is not the best measure of business cycle. However, we have not the same data on trend and output gap as the ones for advanced economies used in Table 2. In addition, filtering the GDP series may lead to serious measurement errors because of limited time series for several countries.

¹⁸Given that some of the explanatory variables are likely to suffer from measurement errors, we show regression results excluding outliers, as identified by the leverage-versus-squared-residual plot.

Table 3: Aid, capital inflows and shocks in LDCs

Dep. var.: <i>AID/GDP</i>	(1)	(2)	(3)	(4)	(5)	(6)
<i>AID/GDP</i> _{<i>t</i>-1}	0.626*** [0.033]	0.617*** [0.029]	0.623*** [0.033]	0.626*** [0.032]	0.624*** [0.033]	0.612*** [0.030]
<i>POP</i>	-4.309 [3.174]	-4.477* [2.579]	-3.687 [3.041]	-4.190 [3.156]	-4.590 [3.176]	-3.951* [2.353]
<i>GDP – PC</i>	-4.469*** [1.268]	-4.281*** [1.259]	-4.572*** [1.245]	-4.342*** [1.257]	-4.496*** [1.267]	-4.329*** [1.215]
<i>GROWTH</i>	-0.040 [0.034]	-0.042 [0.034]	-0.035 [0.035]	-0.036 [0.035]	-0.039 [0.034]	-0.033 [0.036]
<i>REM</i>		0.079*** [0.029]				0.078*** [0.027]
<i>TDS</i>			0.034** [0.014]			0.039*** [0.013]
<i>FDI</i>				-0.080** [0.036]		-0.063** [0.028]
<i>TOT</i>					-0.003** [0.001]	-0.003** [0.001]
Observations	1,494	1,494	1,494	1,494	1,494	1,494
<i>R</i> ²	0.660	0.663	0.662	0.662	0.661	0.667
Number of recipients	62	62	62	62	62	62

Notes: The dependent variable is the ratio of net aid disbursements over GDP. The table reports the regression coefficients and, in brackets, the associated robust standard errors. * significant at 10%; ** significant at 5%; *** significant at 1%. A constant and year dummies are included.

coefficient of recipient population, instead, is not significant, indicating that there is no scale effect, in line with what found by [Dabla-Norris, Minoiu, and Zanna \(2014\)](#) on a sample of LICs.

Moving to columns 2-4, we see that aid is significantly correlated with other capital inflows in a way that help stabilizing their fluctuations. First, we see that aid is positively associated with remittances and debt service, while it is negatively associated with FDI. Hence, aid increases when foreign direct investment decreases and when countries face higher debt service payments, consistently with the evidence of *defensive granting* showed by [Marchesi and Missale \(2013\)](#) in a sample of developing countries. Again, even controlling for time and country fixed effects, we find that aid and remittances go along and they act as a counterbalancing mechanism to more volatile FDI and to debt service. In column 5 we focus on the potential role of aid as a stabilizer of external shocks and we find that, other than being negatively correlated with economic growth (albeit not significantly), it is also negatively and significantly associated with the terms of trade. Consistent with what found by [Collier and Goderis \(2009a\)](#), our results show that countries dealing with a negative shock on export prices are more likely to receive larger aid flows. Finally, in column 6 we control for all these additional variables jointly and we find that the correlations remain statistically significant and the size of the coefficients is almost unaffected.

On the whole, the results reported in Table 3 – which refer to a sample of 62 low and lower middle income countries – point out that aid is targeted to poorer countries and actively play a stabilization role. It generally increases as long as countries face an adverse shock and it is

negatively correlated to more volatile capital flows.

7 Aid unpredictability

7.1 The empirical exercise

As discussed in Section 5.3, aid unpredictability – more than its volatility – has severe macroeconomic consequences for recipient countries. Therefore, we now look at the factors associated with predictable aid flows. The most common way to measure predictability is comparing OECD-DAC data on aid disbursements and commitments, as reported in Figure 1.¹⁹

Before inspecting in greater detail the factors associated with the discrepancy between commitments and disbursements, we try to have a sense of aid predictability in our sample of recipient countries adopting a different approach. We take advantage of the empirical exercise run in the previous section to compare out-of-sample predictions with the actual aid disbursements to developing countries. Specifically, we re-estimate equation 2 over the period 1975-2005 and we predict the country specific level of aid for the years 2006-2010. The predictions are plotted in Figure 11 against actual aid disbursements. The diagram clearly outlines the magnitude of the forecasting error. In fact, the absolute difference between the predicted and actual aid-to-GDP ratios ranges from 0 to 16.8 percent, with a median equal to 3.8 percent and one fourth of forecast values which are 6 percentage points higher (or lower) than real aid flows. A second interesting issue is that there is a negative – but weak – correlation between the magnitude of the deviation of predicted from actual aid flows and the per capita GDP of recipient countries.²⁰ Hence, poorer countries seems to be less exposed to aid unpredictability, a fact that we will test more formally in the following exercise.

Given the importance of aid unpredictability, we try to identify which macroeconomic and institutional characteristics are more likely to be associated with less predictable aid flows. Hence, we estimate a simple equation in which the ratio of the difference between aid commitments and disbursements over GDP ($(COMM - DISB)/GDP$) is a function of its lagged value and a set of potential drivers (\mathbf{X}):

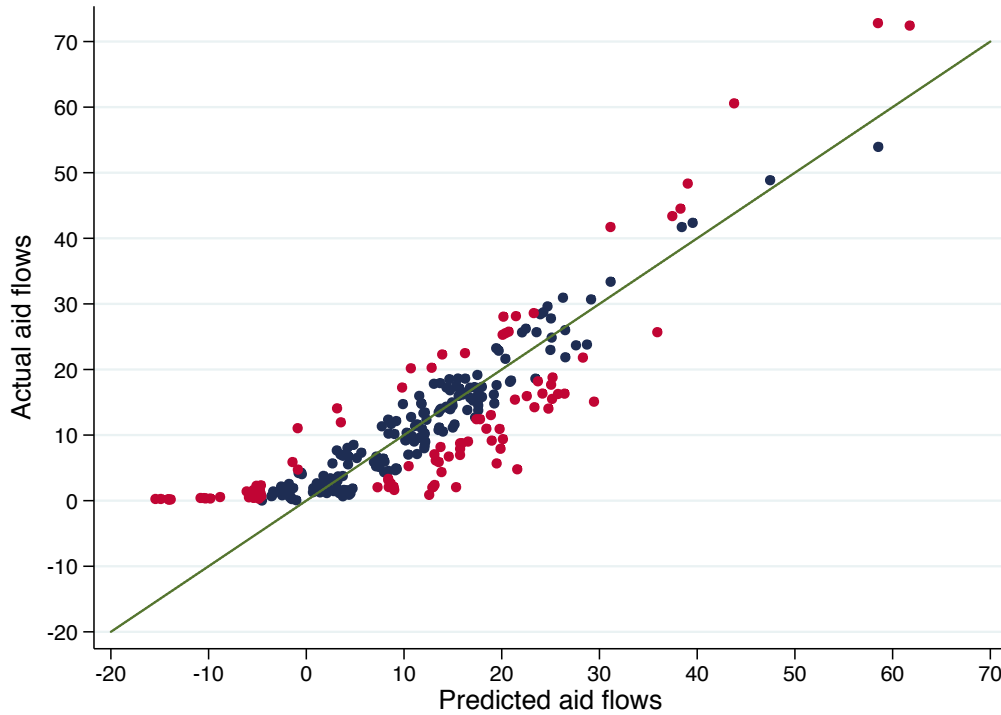
$$\left[\frac{(COMM - DISB)}{GDP} \right]_{j,t} = \alpha \left[\frac{(COMM - DISB)}{GDP} \right]_{j,t-1} + \beta' \mathbf{X}_{j,t} + \mu_j + \tau_t + \varepsilon_{jt} \quad (3)$$

where j refers to the recipient country, μ_j is the country-fixed effect, τ_t are the time dummies and ε_{jt} is the error term. In the baseline specification, the vector \mathbf{X} includes country size, per capita GDP, output growth, and the share of aid commitments over GDP. This simple set of variables has been chosen in order to identify which country characteristics are good predictors of the exposition to

¹⁹The OECD publishes data on Country Programmable Aid (CPA), defined as gross ODA minus humanitarian aid, debt relief, aid that does not entail cross border flows, and aid that is not part of a cooperation agreement before governments. The resulting aid flows generally involve multi-year forward expenditure plans by donors. According to this definition, CPA was equal to USD 93 billion in 2011 and declined by 2.1% with respect to 2010, notwithstanding the donors' agreement to try to offset the effect of the global crisis on developing countries (OECD, 2012).

²⁰The correlation between the difference between the predicted aid and the actual aid to GDP ratio and the per capita real GDP is equal to -0.22 (-0.11 if GDP is measured in purchasing power parity).

Figure 11: Aid unpredictability



Notes: Out-of-sample predictions based on regression results of equation 2, as reported in column 6 of Table 3. Red dots identify aid predictions which are 5 percentage points or more different from actual aid-to-GDP flows.

aid unpredictability. As in the previous models, we wash out individual effects estimating equation 3 with the within-group estimator. The sample includes a maximum of 70 recipient countries over the period 1975-2010.²¹ Results are reported in Table 4, while variables' definition is in Table 5.

7.2 Results

The estimates of equation 3 point out some interesting patterns. We start discussing the baseline specification reported in column 1 of Table 4. First, the lagged value of the dependent variable has a negative small and not significant coefficient, suggesting that the deviation of commitments from disbursements is actually a shock which does not have any persistence over time. This an interesting results corroborating the vulnerability of poor countries to external conditions. Second, the degree of aid unpredictability is higher for countries which have a higher share of aid commitments over GDP, so that major aid recipients are also the ones which have to deal more frequently

²¹The sample of low and lower middle income countries include: Angola, Armenia, Bangladesh, Belize, Benin, Bolivia, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Rep. , Chad, Comoros, Congo Dem. Rep., Congo Rep., Cote d'Ivoire, Egypt, El Salvador, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Georgia, Ghana, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Kenya, Kyrgyz Republic, Laos, Lesotho, Madagascar, Malawi, Mali, Mauritania, Moldova, Mongolia, Morocco, Mozambique, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Papua New Guinea, Paraguay, Philippines, Rwanda, Senegal, Sierra Leone, Solomon Islands, Sri Lanka, Sudan, Swaziland, Syria, Tanzania, Togo, Uganda, Uzbekistan, Vanuatu, Vietnam, Yemen, Zambia, Zimbabwe.

Table 4: Determinants of aid unpredictability

Dep. Var.: $(COMM - DISB)/GDP$	(1)	(2)	(3)	(4)	(5)	(6)
$(COMM - DISB)/GDP_{t-1}$	0.009 [0.052]	0.018 [0.056]	0.006 [0.052]	0.011 [0.051]	0.013 [0.054]	0.022 [0.055]
$COMM/GDP$	0.432*** [0.029]	0.430*** [0.033]	0.439*** [0.028]	0.436*** [0.031]	0.434*** [0.029]	0.442*** [0.033]
POP	9.421** [3.703]	10.341** [4.098]	9.789** [4.287]	9.572** [4.057]	9.554** [4.080]	10.642** [4.145]
$GDP - PC$	4.757*** [0.972]	5.156*** [1.136]	5.196*** [1.352]	4.842*** [0.989]	5.009*** [1.101]	4.699*** [1.148]
$GROWTH$	-0.026 [0.027]	-0.033 [0.032]	-0.039 [0.028]	-0.017 [0.029]	-0.017 [0.030]	-0.024 [0.028]
TOT		0.007** [0.003]				
$DEBT$			-0.234 [0.441]			
$OPENNESS$				-0.019 [0.012]		
$M2/GDP$					0.000 [0.000]	
$POLITY SCORE$						-0.067 [0.047]
Observations	2,213	1,958	2,159	2,194	2,095	1,949
R^2	0.485	0.472	0.486	0.487	0.474	0.477
Number of recipients	70	66	69	70	69	66

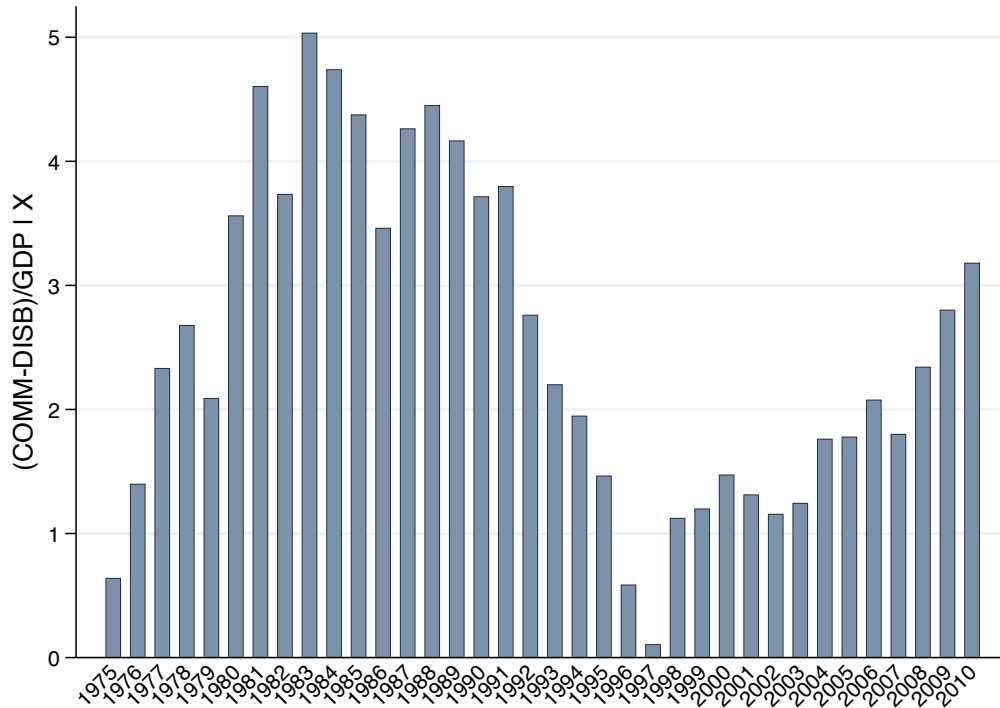
Notes: The dependent variable is the ratio of the difference between aid commitments and disbursements over GDP. The table reports the regression coefficients and, in brackets, the associated robust standard errors. * significant at 10%; ** significant at 5%; *** significant at 1%. A constant and year dummies are included.

with unpredictable flows. Third, other things equal, larger and richer countries are more likely to experience larger deviations of commitments from disbursements. This finding is consistent with the descriptive evidence of out-of-sample predictions (even if the two exercise use two complete different measures of aid unpredictability) and indicates that small and poor states, which are generally the most vulnerable ones, are, at least, less exposed to unexpected variations in aid inflows. Finally, the coefficient on $GROWTH$ is negative, but not statistically significant, and indicates that unpredictability is not an additional source of vulnerability for slow-growing countries.

In columns 2-6 we test the robustness of our main findings. The main result is the evidence of a positive correlation between terms of trade and aid unpredictability. Consistently with the finding on country size and per capita GDP, the results reported in column 2 indicate that the vulnerability due to aid unpredictability does not add to other existing country vulnerabilities. The other columns show that there is no statistical association between indebtedness, openness, financial sector development and governance, and the deviation of aid commitments from disbursements.

Finally, the estimates report a significant and interesting pattern of aid unpredictability over time. Each regression includes time dummies which, however, are not reported in Table 4. To see the effect of time on the dependent variable, in Figure 12 we plot the yearly averages of the deviation of aid commitments from disbursements over GDP, conditional on the set of explanatory

Figure 12: Aid unpredictability over time



Notes: calculations based on Table 4, column 2. Equation 3 is estimated using the standard set of control variables, excluding time dummies. The figure plots the yearly averages of predicted values across countries.

variables used in the preferred specification of column 2.²² From the diagram it is interesting to note that aid unpredictability has been a severe problem for all over the 1980s and the early 1990s. Its importance remarkably declined in the mid-1990s, while it gained again momentum since 2004. This pattern is consistent with the descriptive evidence of Figure 1 and justifies the renewed attention by policy-makers on aid predictability.²³

8 Which role for aid in the sovereign ALM?

For aid to be part of a sovereign ALM, it should contribute to risks mitigation and it should be expected and reliable. On the aggregate, the evidence presented in the previous sections consistently shows that aid disbursements are relatively stable (aid is strongly path dependent), at least compared with other capital flows, and they are positively (negatively) correlated with debt service (FDI). The role of aid a shock absorber is further confirmed by the fact that aid increases in years when countries suffer adverse economic shocks (Table 3). Nevertheless, there are at least two sources of concern. First, aid flows contract in response to economic shocks in donor countries, even

²²To be more precise, we estimate equation 3, controlling also for terms of trade (*TOT*) other than for the vector **X**, but excluding time dummies. Then, we retrieve the predicted values of $(COMM - DISB)/GDP$. As a third step, we take the average of these predictions in each year and we plot the averages over time.

²³See, for instance, the Accra agenda for action, following the 2008 [Accra Forum](#) on aid effectiveness.

if the magnitude of the effect is not that strong. This limits the control of recipients on foreign aid and contributes to its volatility. Second, aid is not always predictable and, in some circumstances, actual aid disbursements fall far short from expectations. While this may be obvious for some kind of aid (i.e. emergency aid), aid unpredictability may have adverse effect on long-run investment projects.

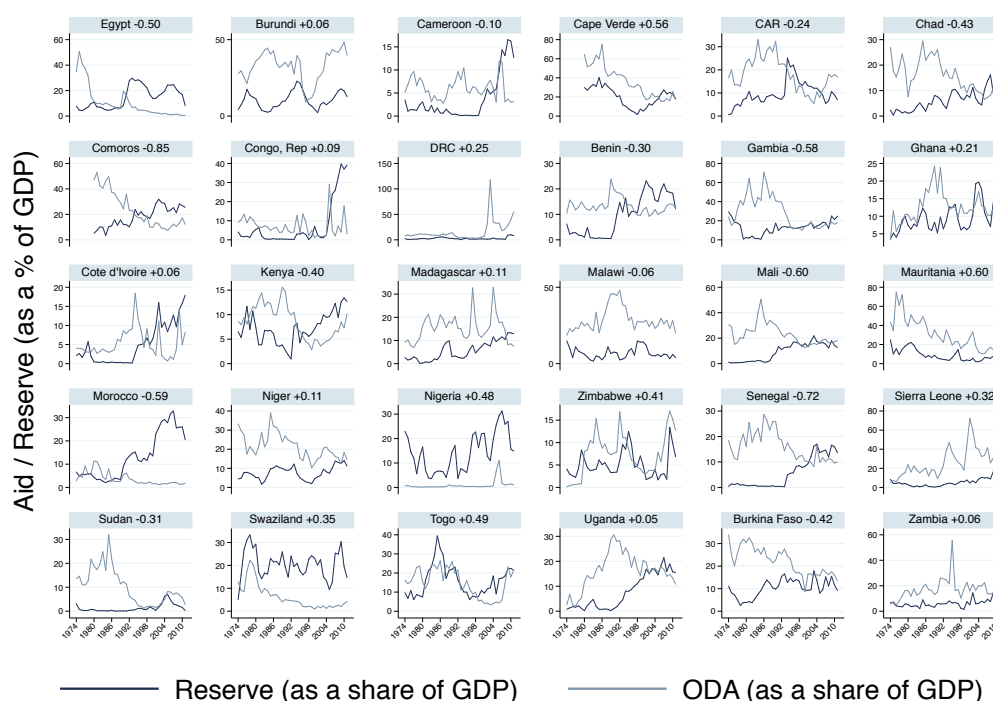
Hence, a first step on which the donor community and multilaterals should engage is increasing their efforts to make aid more predictable and less dependent on donors' business cycle. As regard the first issue, at the High Level Forum on Aid Effectiveness in Accra in 2008, donors committed to "*provide developing countries with regular and timely information on their rolling three- to five-year forward expenditure and/or implementation plans, with at least indicative resource allocations that developing countries can integrate in their medium-term planning and macroeconomic framework*". Against this background, the OECD has different projects aimed at fostering aid transparency and predictability, mainly through the Survey on Donors' Forward Spending Plans and the publication of data on country programmable aid (OECD, 2012).

More broadly, a reform of the aid allocation framework could increase predictability, especially if aimed at increasing the share of CPA in total ODA (i.e. raising project aid) and if conditionalities and eligibility criteria are related to slow-moving indicators rather than to annual (and volatile) economic and institutional indicators. As for the second issue, bilateral donors could think of building buffer stocks in their budget for aid assistance, to rely on during times of adverse economic conditions. While this strategy may make sense, it is politically unfeasible, especially during recessions when there are several conflicting requests for scarce domestic resources. A more viable solution would be a further shift from bilateral to multilateral aid, given that multilaterals should be less responsive to external economic conditions.

On the recipient side, the critical policy discussion is how to cope with unstable and unpredictable aid flows. Given that the command of recipient government on foreign aid is partially impaired, country authorities should adopt active strategies to smooth as much as possible aid inflows, in order to be able to include aid in the ALM. A possible strategy would involve reserve management. Over the past years several LICs accumulated reserves for precautionary purposes, mainly to deal with balance-of-payments crises (see Section 2.2). We argue that in an ALM framework, governments could actively manage international reserves as a stabilization tool, raising them during aid surges, implying that aid is not absorbed neither spent (Hussain, Berg, and Aiyar, 2009), and reducing them when aid unexpectedly falls below a certain level. Practically, this kind of strategy would require the definition of a (time-varying) desired level of aid, which should be envisaged in a realistic way and keeping into account the government financing needs over the medium-term. Thus, aid and reserves would jointly balance each others working as an insurance tool. In this framework, aid is saved for future years when it is above a given threshold, through reserve accumulation, while reserves will step-in when aid will fall short of its expected value.

The diagrams reported in Figure 13 try to shed some light on the actual response of the build up of international reserves to aid inflows. For 30 selected low and lower middle income countries for which there are long time series data on aid disbursements and international reserves, we plot their evolution over time as a share of GDP. If reserve accumulation were working as a stabilization

Figure 13: Reserve accumulation and aid inflows: selected countries



Notes: Aid-to-GDP ratio refer to aid disbursements and is from the OECD-DAC database, while reserves include gold and are taken as a percentage of GDP from the World Development Indicators. For each country we report, in the respective diagram, the correlation between the two series.

tool, we would expect a positive correlation with aid flows, since reserve should increase any time aid increases (or, at least, it is above a given threshold).

On average, we do not find support for the reserve stabilization hypothesis, given that the average correlation between reserves and aid inflows is very low (it is equal to 0.03). However, the common picture hides a more heterogeneous scenario. Reserve accumulation goes hand-in-hand with foreign aid for 13 countries – in some of them the correlation is significantly high –, while for 17 countries the correlation is actually negative, and for 6 of them even smaller than -0.5. Cape Verde, Mauritania and Togo (as well as Kenya in the last decade), for instance, show a pattern which is perfectly consistent with reserves acting as a stabilization tool; by contrast, the Comoros, Chad and Mali highlight an opposite pattern, with aid falling and reserves increasing.

Clearly, this simple exercise has many limitations. First, reserve management is likely to be driven by several other factors, which may affect the significance of their unconditional correlation with aid. Second, the relationship could be more complex, involving some non-linearity or threshold effect. Plus, it is reasonable to assume that the threshold could be time-specific, reflecting different external conditions and financing needs. We leave to future research a more precise test of the stabilization role of international reserves. Here we are just interested in pointing out a mechanism through which LICs could try to mitigate the unpredictability of foreign aid, allowing for a more

efficient management of sovereign risk.

9 Conclusions

The evidence discussed in the paper would suggest that aid could work as a stabilization fund and have a role in a sovereign ALM, assuming that donors make aid more predictable and recipients adopt the possible strategies to cope with aid volatility (i.e. use reserve accumulation as a stabilization tool). If this were the case, the first natural question is which liabilities should (and could) be matched with foreign aid. In the following, we briefly discuss the pros and cons of some possibilities:

- *Increasing fiscal space.* The future stream of foreign aid could be used to increase government spending (on the liability side) or to reduce taxation (on the asset side). Many developing countries are actually relying on foreign aid to close the gap between spending and revenues, so that incremental aid would serve to cover a structural fiscal deficit. However, aid spending could provide the wrong incentive to governments to try to adjust the fiscal positions, mainly through the reduction of non-productive public expenditures. For countries with a balanced fiscal position, a stable flow of aid could be used to finance long-term social and economic investment or to cover contingent liabilities on pensions and social welfare (i.e. unemployment benefits), with high benefits in terms of poverty reduction and aggregate welfare.
- *Reducing the stock of public debt.* In this case, the rationale would rely on the implicit assumption that the stock of public debt is a drag on growth in LDCs. While this may be true (Pattillo, Poirson, and Ricci, 2011; Presbitero, 2012), the recent waves of debt relief following the Heavily Indebted Poor Countries (HIPC) and the Multilateral Debt Relief Initiatives limit the scope of such a policy. In addition, the evidence so far on the impact of debt relief on growth and investment has been quite modest (Depetris Chauvin and Kraay, 2005; Presbitero, 2009; Johansson, 2010). If aid is absorbed and not spent, the government substitutes aid for domestic financing of the government deficit. This approach to aid can also be used to reduce the level of domestic public debt and crowd in the private sector (Hussain, Berg, and Aiyar, 2009). This may be a sound strategy for LICs in which domestic debt significantly increased since the mid-1990s. In some of those countries, in fact, a highly concentrated investor base and short term maturities are a potential source of macroeconomic risk (Bua, Pradelli, and Presbitero, 2013).
- *Fostering the development of the private sector and access to finance.* Given the importance of finance for economic well-being and growth, government could intervene along several lines to facilitate access to financial services. However, government interventions are costly and fraught with risks (Claessens, 2006). Just think at the debate about the impact of microfinance and the difficulties in targeting the right groups of firms and potential entrepreneurs. Nevertheless, considering the liability side of Table 1, one alternative use of aid would be to cover contingent liabilities on the financial system and/or to invest in policies directed at

promoting the development of the private sector. One possible way to do it is by facilitating access to credit by local firms, financing public programs of mutual guarantee schemes which could alleviate small firms' financing constraints ([Beck, Klapper, and Mendoza, 2010](#)).

In sum, there are ways through which foreign aid, assuming that it is predictable and stable, could help improving the risk management in developing countries, with positive effects on macroeconomic management, investment, and growth. Including aid in a more general framework, which should help coordinating monetary and fiscal policies and managing risks, would also have a direct impact on aid effectiveness, since aid would be targeted to the right destinations, according to country needs. For instance, for countries extremely vulnerable to external conditions, aid flows – at least part of the Country Programmable Aid – if actively connected with reserve management, may be considered as a shock absorber. This would spill over into additional and much-needed public investment in infrastructures. Moreover, for relatively richer and stable countries a predictable stream of foreign aid could be a better source of financing than government revenues for long-term poverty-reduction projects and to cover contingent liabilities related to guarantee schemes or welfare programs.

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Additional Tables

Table 5: Variables: definition and sources

Variables	Definition	Source
<i>AID/POP</i>	Per capita net aid disbursements	OECD-DAC
<i>AID/GDP</i>	Net aid disbursements over GDP	OECD-DAC
<i>TREND</i>	Logarithm of potential GDP	OECD
<i>OUTPUT GAP</i>	Deviations of actual GDP from potential GDP as % of potential GDP	OECD
<i>BANKING CRISIS</i>	Dummy equal to one for country-year observations in which there is a systemic banking crisis, and zero otherwise	Laeven and Valencia (2012)
<i>POP</i>	Logarithm of population	Penn World Tables 7.1
<i>CAB</i>	Current account balance, as a percentage of GDP	OECD
<i>NET LENDING</i>	Cyclically adjusted government net lending, as a percentage of potential GDP	OECD
<i>OPENNESS</i>	Exports plus imports over GDP at 2005 constant prices	Penn World Tables 7.1
<i>GDP – PC</i>	Logarithm of GDP per capita (constant 2000 USD)	World Development Indicators
<i>GROWTH</i>	Real GDP per capita growth (annual % change)	World Development Indicators
<i>REM</i>	Remittance inflows over GDP	World Bank
<i>TDS</i>	Total debt service (% of exports of goods, services and income)	World Development Indicators
<i>FDI</i>	Foreign direct investment over GDP	World Development Indicators
<i>TOT</i>	Terms of trade, total	World Economic Outlook (IMF)
<i>(COMM – DISB)/GDP</i>	ODA commitments minus disbursements over GDP	OECD-DAC
<i>COMM/GDP</i>	ODA commitments over GDP	OECD-DAC
<i>DEBT</i>	Logarithm of (1+) total external debt over GDP	World Development Indicators
<i>M2/GDP</i>	Money and quasi money (M2) over GDP	World Development Indicators
<i>POLITY SCORE</i>	Polity score, based on six measures that record key qualities of executive recruitment, constraints on executive authority, and political competition. The index is part of the Polity IV project and ranges from -10 (hereditary monarchy) to +10 (consolidated democracy)	Marshall, Gurr, and Jaggers (2010) and Teorell, Charron, Samanni, Holmberg, and Rothstein (2011)