

DESA Working Paper No. 12

ST/ESA/2006/DWP/12

February 2006

What is the Most Effective Monetary Policy for Aid-Receiving Countries?*Alessandro Prati and Thierry Tressel*

Abstract

This paper analyses how monetary policy can enhance the effectiveness of volatile aid flows. We find that monetary policy is effective in reducing trade balance volatility. We propose the following taxonomy, excluding the case of emergency assistance. Monetary policy should slow down consumption growth and build up international reserves when aid is abundant and deplete them to finance imports and support consumption when aid is scarce. If foreign aid also affects productivity growth, monetary policy should take this productivity effect into account in responding to aid flows.

JEL classification: O11 (Macroeconomic Analyses of Economic Development); O4 (Economic Growth and Aggregate Productivity); O23 (Fiscal and Monetary Policy in Development); E5 (Monetary Policy, Central Banking, and the Supply of Money and Credit); F35 (Foreign Aid).

Keywords: Aid effectiveness, monetary policy, real exchange rate, Dutch disease.

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Copy editor: *June Chesney*

Typesetter: *Valerian Monteiro*

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What is the Most Effective Monetary Policy for Aid-Receiving Countries?

Alessandro Prati and Thierry Tresselt¹

At the recent G-8 meeting in Scotland, world leaders announced a \$50 billion increase in official development assistance (ODA) to poor countries. The objective was to help poor countries achieve the Millennium Development Goals (MDGs) that emerged from the Millennium Declaration in 2000 and, thereby, reduce poverty. With foreign aid already representing a large share of recipients' GDP and the precise timetable of the surge in new aid yet to be decided, it is critical that aid-receiving countries be ready to manage the macroeconomic consequences of large and potentially volatile aid flows.

This paper focuses on how monetary policy can enhance the effectiveness of volatile aid flows. There is growing evidence that such flows tend to be associated with real exchange-rate overvaluation, which hurts manufacturing exports and, ultimately, growth (Rajan and Subramanian, 2005a). Aid-receiving countries are well aware of this problem and tend to adjust their monetary policy stance to limit real exchange-rate appreciation and trade balance fluctuations. Such monetary response to aid inflows raises three questions: (i) does monetary policy have the intended effect of containing aid-induced trade balance volatility and real exchange-rate appreciation? (ii) if so, why?—that is, what allows monetary policy to affect *real* variables in aid-receiving countries? and (iii) under what circumstances does monetary policy improve welfare?

This paper addresses each of these questions in a separate section. The first section presents evidence of aid volatility and of the effectiveness of monetary policy in containing the associated trade balance fluctuations. The next section discusses the features of aid-receiving countries that allow monetary policy to reallocate resources over time and across sectors by affecting the trade balance. The last section argues that the extent to which this monetary policy activism is welfare-improving depends on whether aid flows affect only consumption or also productivity growth.

Excluding the case of aid given for humanitarian purposes or emergency assistance, which has no reason to be saved, the last section proposes the following taxonomy. *If foreign aid affects only consumption*, then monetary policy should slow down consumption growth and build up international reserves when aid is abundant and deplete them to finance imports and support consumption when aid is scarce. *If foreign aid also affects productivity growth* and, thereby, future consumption, then monetary policy should take this productivity effect into account in responding to aid flows. If the effect of aid on productivity—net of possible Dutch-disease effects—is *positive*, then the higher productivity will contribute to support future consumption as aid dwindles. This implies that, in the face of a surge in aid flows, there would be a smaller need to accumulate reserves and the trade deficit could increase somewhat. Conversely, if the

1 This paper was prepared for the UN/DESA Development Forum on Integrating Economic and Social Policies to Achieve the United Nations Development Agenda, held at United Nations Headquarters, New York, on March 14 and 15 2005. We are particularly thankful to Ratna Sahay, with whom we had many useful discussions that helped us think through the issues associated with monetary policy in aid-receiving countries. Manzoor Gill provided excellent research assistance. The views expressed in the paper are those of the authors and do not necessarily represent those of the IMF or IMF policy.

Dutch disease makes the productivity effect of aid *negative*, monetary policy should be more aggressive in containing the trade deficit and save resources in the form of international reserves for more productive future uses.

Aid volatility and monetary policy practice

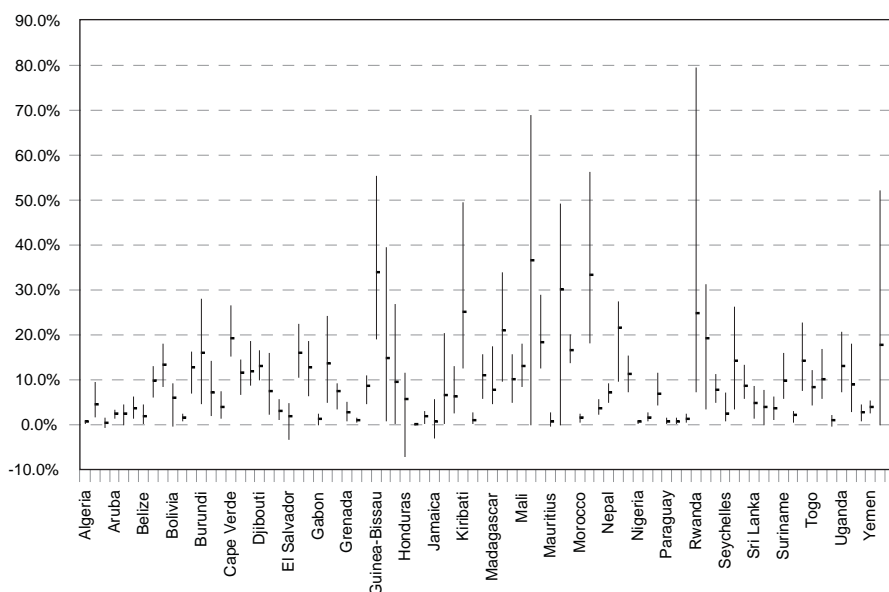
Aid is very volatile

Figure 1 shows that, in several countries, the average annual ratio of net official development assistance (ODA) to GDP is in the 10 to 30 per cent range, with some massive differences between minimum and maximum annual inflows.² Average annual absolute changes can easily exceed 10 per cent of GDP and, in some instances, they have plummeted by as much as 30-40 per cent of GDP in a single year. These sudden reversals surpass those of net capital inflows in emerging markets, which reached, for example, 13 per cent of GDP in Mexico (1993-1995) and 24 per cent of GDP in Thailand (1996-1998).

In light of the critical role of foreign aid in supporting domestic consumption, there is little doubt that aid volatility has negative welfare implications for aid-receiving countries. Pallage and Robe (2003) estimate the median welfare cost of business cycles in developing countries to be between 10 and 30 times that of the United States. Arellano and others (2005) present numerical simulations showing that aid variability of the magnitude found in previous literature may have substantial detrimental welfare effects, albeit not large enough to wipe out the welfare benefits of the aid itself. This suggests that reducing the volatility of aid and, thereby, of consumption would yield considerable gains. There is also a substantial body of evidence showing that volatility has negative effects on long-term growth (e.g., see Ramey and Ramey, 1995).

2 Bulfř and Hamann (2002) and Celasun and Walliser (2005) discuss the fiscal implications of the volatility and (un)predictability of foreign aid.

Figure 1:
ODA flows in per cent of GDP during the 1990s
(average, minimum, maximum)



Source: Authors' calculations.

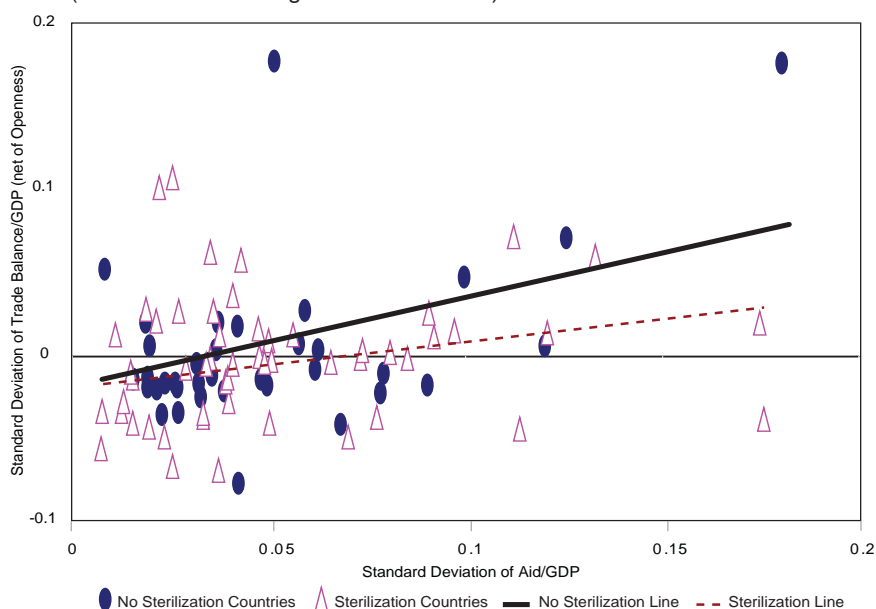
Monetary policy’s response to aid volatility

A widespread practice among aid-receiving countries is that of reducing the net domestic assets of the central bank in response to higher foreign aid inflows. This policy is dubbed *sterilization*. Over the period 1960-1998, we found 704 episodes—out of 1,935 episodes of foreign aid inflows greater than 2 per cent of GDP—during which net domestic assets fell. More recently, several African countries—including Ghana, Ethiopia, Mozambique, Uganda and the United Republic of Tanzania—have drastically reduced their net domestic assets in response to a surge in foreign aid to prevent the real exchange rate from appreciating (e.g., see Buffie and others, 2004).

But is sterilization policy of any consequence for real variables? To assess its effectiveness, we have computed a country-specific correlation coefficient between changes in foreign aid and changes in the central bank’s net domestic assets (both measured as ratios to GDP). We have then divided up the sample of aid-receiving countries into a group where this correlation coefficient is negative (‘sterilization group’) and a group where it is positive (‘no sterilization group’). Figure 2 shows that in the sterilization group there is a weaker transmission from aid volatility to the volatility of the trade balance.

This evidence of monetary policy effectiveness is robust. In Prati and Tressel (2006), we show that the positive association between aid volatility and trade balance volatility, as well as the difference between the two groups of countries, remains statistically significant when: (i) we restrict the sample to include countries with average aid-to-GDP ratios larger than 3, 4 or 5 per cent of GDP; (ii) we control for other variables that may affect trade balance volatility, such as trade openness (whose effect is already netted out in figure 2), the volatility of commodity export prices, the size of a country (measured by population), the fraction of years in the sample during which the country was at war and whether a

Figure 2:
Aid and Trade Balance Volatility
(countries with average ODA/GDP > 2%)



Source: Authors’ calculations.

country exports oil; (iii) we use instrumental variables to correct for a possible reverse causation from trade balance volatility to aid volatility; and (iv) we take into account the *intensity* of sterilization policy by interacting the correlation coefficient between changes in aid and changes in net domestic assets with the aid volatility variable.

What makes monetary policy effective?

In this section, we discuss why sterilization policy can modify real variables and, specifically, the trade balance in a typical aid-receiving country.

Characteristics of aid-receiving countries

Prati and Tressel (2006) develop a stylized general equilibrium model where monetary policy affects real variables as long as the capital account is closed to both inflows and outflows and the prices of a country's traded goods are set in international markets. This model also shows that monetary policy could have real effects not only in the short run but also in the long run if aid inflows tend to shrink the tradable sector and, thereby, reduce positive productivity spillovers from it to the rest of the economy. Most aid-receiving countries satisfy these conditions.

International capital mobility is limited in aid-receiving countries

Countries receiving large aid inflows usually enjoy limited international capital mobility. First, only a handful of aid-receiving countries have no capital account restrictions (IMF, 2005). Even when the capital account is relatively free of restrictions, the high levels of official indebtedness of these countries *de facto* limits their capacity to borrow on international capital markets. Indeed, over the 1990s, the median external debt was about 80 per cent of GDP for the countries receiving more than 2 per cent of GDP in foreign aid. As a consequence, in the 1990s, the total of inward and outward private portfolio investments was much smaller in aid-receiving countries than in industrial countries, both as share of GDP and in relation to exports and imports (table 1).

In this context, monetary policy controls the nominal interest rates because there are no capital flows that can offset the tightening or loosening of the monetary policy stance. For example, if the central bank raises domestic interest rates above international rates, foreign capital will not flow into the country to push rates back down. Moreover, domestic investors have usually no access to foreign financial assets. This restriction limits their saving instruments to domestic bonds and cash. As a consequence, any in-

Table 1.
Private portfolio investments in aid-receiving countries

	<i>Average, 1990s</i>			
	<i>Portfolio investment assets + liabilities (percentage of GDP)</i>		<i>Exports + imports (percentage of GDP)</i>	
	<i>Aid-receiving countries</i>	<i>Industrial countries</i>	<i>Aid-receiving countries</i>	<i>Industrial countries</i>
Median	0.7	8.0	53.2	51.2
Minimum	0	2.6	18.3	15.9
Maximum	10.3	49.4	199.5	130.2

crease or decrease in the supply of public sector bonds must be met by an increase or a decrease of private non-cash financial savings.

Finally, governments of countries receiving large amounts of foreign aid are not allowed to save aid directly, nor can they borrow against future aid disbursements. Indeed, donors usually require recipients to spend development assistance when it is disbursed and aid flows are too uncertain to be pledged as collateral.

Aid-receiving countries are small open economies with internationally determined prices of tradable goods

Aid-receiving countries are open economies where international trade usually represents a large share of GDP (table 1). Hence a large share of their domestic price index is accounted for by the price of tradable goods. At the same time, given that exports and imports of each of these countries represent small shares of total exports and imports of the products in which they trade (table 2), the prices of their traded goods are likely to be set internationally. This implies that their domestic demand conditions are unlikely to affect their import and export prices.

Foreign aid can hurt tradable industries (Dutch disease)

Dutch disease usually refers to the adverse effects on the (manufacturing) traded sector of natural resource discoveries, or of foreign aid. Its origin is the overvaluation of the Dutch real exchange rate that followed the discovery of natural gas deposits in the North Sea, within the borders of the Netherlands, in the 1950s and 1960s.³

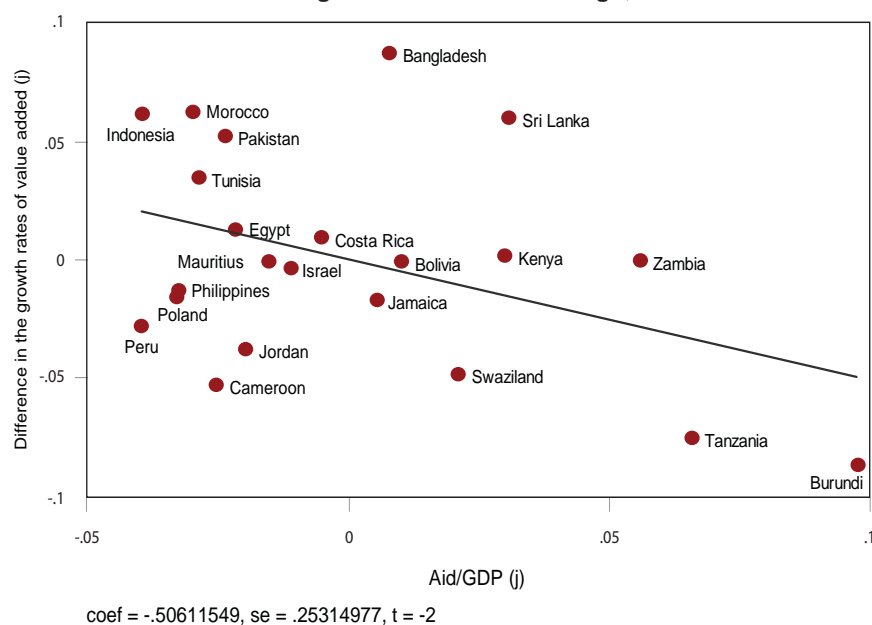
When part of foreign aid is spent on domestic non-tradable goods, the price of non-tradable goods rises relative to tradable goods. This real appreciation draws resources out of the tradable goods sector into the non-tradable goods sector. While this reallocation is not inefficient per se, the shrinking of the tradable goods sector will reduce growth *if the source of productivity expansion*—e.g., learning-by-doing (LBD) externalities—is in the tradable goods sector. In a recent cross-section study, Rajan and Subramanian (2005a) have found strong evidence that aid negatively affects the growth of tradable sectors. Specifically, they show that foreign aid reduces output growth of the more labour-intensive industries, which tend to constitute the export sectors of developing countries (figure 3).

3 Theoretical models of the Dutch disease have been developed by van Wijnbergen (1984), Krugman (1987), Sachs and Warner (1995) and Gylfason, Herbertson and Zoega (1997), among others.

Table 2.
Size of tradable sectors in aid-receiving countries
 (percentage of total exports and imports of aid-receiving countries)

	<i>Average, 1990s, countries receiving aid > 2% GDP</i>	
	<i>Exports</i> (percentage of total exports)	<i>Imports</i> (percentage of total imports)
Median	0.037	0.060
Minimum	0.000	0.002
Maximum	4.737	3.580

Figure 3:
Tradable industries grow less when aid is high, 1980s^a



Source: Rajan and Subramanian (2005a).

a The difference in average growth in annual value added between industries with above and below median labour intensity in each country is plotted against the average aid-to-GDP received by each country (Rajan and Subramanian, 2005a).

There are also several country-specific studies presenting evidence of productivity benefits from exporting. Blalock and Gertler (2004) show that Indonesian manufacturing firms became more productive by ‘learning through exporting’. Van Biesebroeck (2005) finds that productivity of manufacturing plants in African countries increases after entering export markets. Fernandes and Isgut (2005) present evidence of ‘learning-by-exporting’ by young Colombian manufacturing plants between 1981 and 1991.⁴

Finally, Dutch disease concerns cannot be simply dismissed by observing that small manufacturing sectors and commodity-dominated export sectors limit the scope for productivity gains in aid-receiving countries. Manufacturing sectors actually account for non-negligible shares of exports, making up, for example, 15 per cent of exports in Tanzania and Kenya, 25 per cent in Ghana, and 90 per cent in Bangladesh (World Bank, 2002). Moreover, manufacturing export shares in several countries that successfully developed over the past 40 years were initially small and comparable to those of today’s aid-receiving countries. In the early sixties, manufacturing exports represented, respectively, 2, 5 and 20 per cent of total exports in Thailand, Malaysia and the Republic of Korea (South Korea). At the end of the nineties, the same shares were 75 per cent in Thailand and 90 per cent in Malaysia and South Korea. Finally, productivity gains (and/or quality improvements) could also take place in the commodity-exporting sectors because commodities are often processed domestically to meet international standards, creating some scope for positive LBD spillovers.

How does monetary policy affect real outcomes?

But how do the characteristics of aid-receiving countries listed above allow monetary policy to have real effects? This section describes the channels and the mechanisms through which monetary policy can help manage volatile aid inflows.

⁴ By contrast, Adam and Bevan (2003) find that the impact of aid on the real exchange rate can be complex, and may not be large, in a model calibrated on Ugandan data.

Does monetary policy matter for nominal magnitudes only?

In standard macroeconomic models, monetary policy only affects nominal magnitudes in the long run (see Obstfeld and Rogoff, 1999: chaps. 8 and 9). The main exception is the case of high-inflation countries where inflation beyond a certain threshold has been shown to have negative effects on welfare. For example, high inflation exacerbates frictions in the financial system (Boyd, Levine and Smith, 2001) and affects the poor disproportionately (Easterly and Fischer, 2001). The level of inflation is also generally included in indices of ‘good policies’ that may enhance aid effectiveness (Burnside and Dollar, 2000, 2004a, 2004b) together with fiscal and trade policies.⁵ However, these are *not* the channels through which monetary policy can reduce the impact of aid volatility and contribute to making aid effective. This effectiveness depends, instead, critically on the monetary policy’s ability to reallocate resources over time and across sectors.

Monetary policy can redistribute resources over time and sectors by modifying real interest rates.

Monetary policy can affect national savings when capital markets are not complete. This is the case when agents cannot borrow or lend internationally and have access to a limited set of domestic financial saving instruments. In this context, a monetary tightening (or equivalently an increase in the nominal interest rate controlled by the central bank) compresses aggregate demand by raising the demand for domestic bonds and reducing money balances. With a closed capital account, capital inflows cannot undo this rise in nominal interest rates. Moreover, aggregate savings increase as the central bank withdraws liquidity because domestic agents cannot substitute domestic bonds for foreign bonds.

At the same time, the creation of base money through the improved current account and accumulation of foreign exchange reserves feeds back into the money supply and *partially* offsets the impact of the initial sale of government bonds. This offset is only partial because the demand for non-tradables also falls and the improvement in the current account is smaller than the reduction in aggregate demand.

Finally, to the extent that prices of tradable goods are set internationally, the fall in the aggregate price index that follows the reduction in domestic demand is less than proportional to the reduction in the stock of money. Therefore, *real* money balances fall (equivalently, *real* interest rates rise) following a monetary tightening, and national savings increase. Symmetrically, a monetary expansion would lead to a fall in real interest rates and a reduction in national savings. This implies that monetary policy can influence agents’ decisions about allocating consumption over time.

A corollary of monetary policy’s effectiveness in reallocating resources over time is its ability to reallocate resources across sectors and, thereby, offset Dutch disease effects. Given that the price of tradable goods is set internationally, aggregate demand changes induced by monetary policy affect the relative price of tradable and non-tradable goods (the real exchange rate) and, therefore, the relative size of tradable and non-tradable sectors.⁶ For example, a monetary tightening compresses aggregate demand and puts downward pressure on prices of non-tradable goods while leaving the price of tradable goods unchanged. This real depreciation tends to increase the size of tradable sectors and prevent aid inflows from diminishing the associated positive productivity spillovers.

5 Easterly, Levine and Roodman (2004), among others, have raised doubts on the robustness of Burnside and Dollar’s results.

6 Of course, factors of production (in particular labour) must be relatively mobile across sectors for changes in relative prices to translate into changes in the size of tradable and non-tradable sectors.

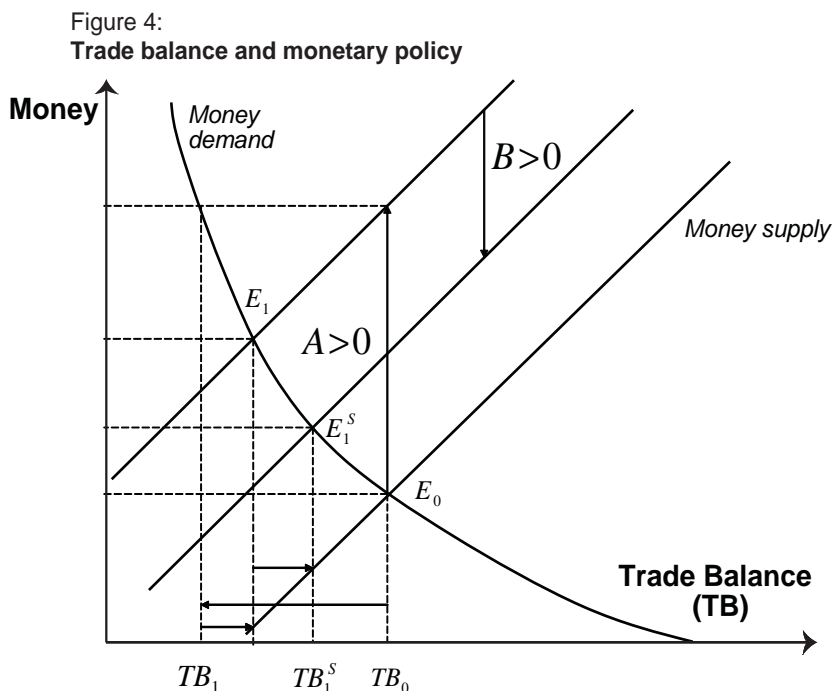
When should monetary policy take action?

Monetary policy and the distribution of aid over time

Aid inflows tend to be associated with money supply expansions irrespective of the exchange-rate regime. Spending foreign aid requires donors or recipient governments to exchange foreign-currency-denominated aid into the domestic currency of the recipient. In fixed exchange-rate regimes, international reserves and base money would then increase at impact. This can be seen as a benchmark case as the large majority of aid-receiving countries have adopted either a fixed exchange-rate regime or a managed float.^{7, 8}

Figure 4 illustrates how money supply and money demand determine the equilibrium trade balance for a given distribution of aid over time. We will use it to discuss the appropriate monetary policy response to a shift in donors' policies that leads to front-loading aid disbursements while keeping their total net present value unchanged. Recent donors' initiatives aimed at helping countries achieve the MDGs by 2015, such as the International Financing Facility (IFF) proposed by the United Kingdom of Great Britain and Northern Ireland, would have similar effects.⁹

- 7 According to the classification of exchange-rate regimes in Reinhart and Rogoff (2004), during all instances of aid inflows greater than 2 per cent of GDP in the 1990s, the median exchange-rate regime was a de facto crawling peg with freely floating regimes accounting for less than 1 per cent of the observations.
- 8 Foreign aid is often associated with an increase in base money also *in floating exchange-rate regimes*. When aid is aimed at budgetary support, the government usually deposits foreign aid at the central bank. Initially, this operation increases both international reserves and government deposits, leaving total base money unchanged. But, as soon as the government draws down the balance on its deposit account at the central bank, net domestic assets and base money increase.
- 9 The IFF amounts to *front-loading* aid disbursements. Under the IFF proposal, donors would make off-budget pledges of future increases in their aid commitments that would be used as backing to issue AAA-rated bonds. Bond proceeds would be channelled through existing aid programmes. Over time, the IFF would draw down the donor pledges to pay off its bonds. Conversely, debt relief amounts to *back-loading* aid disbursements in a predictable, albeit potentially erratic, manner because the transfer of resources to recipient countries will materialize when future debt-service payments are due.



Source: Prati and Tressel(2006).

First, consider the case in which foreign aid impacts only on consumption and has no effect on productivity. Suppose that the trade balance prior to the front-loading of aid is TB_0 and that, from the welfare perspective of smoothing consumption over time, the economy would need to raise current consumption and lower the trade balance to TB_1^S . This new allocation could be achieved by bringing the *right* amount of aid forward. Figure 4 shows, however, a case in which lack of donors' coordination leads to an excessive front-loading of aid (A) with an unwarranted expansion of money supply, current consumption and the trade deficit.¹⁰

To bring the trade balance back from TB_1 to TB_1^S , the central bank can undo some of the money supply expansion associated with the front-loading of aid. The appropriate sterilization policy would require the central bank to sell an amount B of bonds to the private sector. This sale would bring the economy to the new equilibrium E_1^S , where higher real interest rates make agents augment their savings and a more depreciated real exchange rate reduces the trade deficit.

The reason the central bank needs to take action is that a closed capital account prevents domestic agents from acquiring foreign financial instruments and from saving part of the aid proceeds directly. In practice, the central bank ends up making the purchase of foreign financial assets in their place by accumulating international reserves.¹¹

Second, consider the case in which aid impacts not only on consumption but also on productivity, and more generally on medium-term growth. The sign of this effect is a mooted issue in development economics. Some recent studies have shown that certain categories of foreign aid accounting for about 45 per cent of aid flows—budget and balance-of-payments support, investments in infrastructure and aid for sectors such as agriculture and industry—have large effects on *short-run* growth (e.g., see Clemens, Radelet and Bhavnani, 2004). Others have emphasized that *absorptive capacity* problems may lead to positive but decreasing marginal returns.¹² Another set of studies has failed to find any evidence of a positive association between aid and productivity growth (e.g., see Easterly, Levine and Roodman, 2004; Rajan and Subramanian, 2005b). Finally, there is also some evidence that the marginal returns of foreign aid do not only diminish with size but turn *negative* beyond a certain threshold (Hansen and Tarp, 2000). This result can be attributed to the presence of Dutch disease or to the potential corrupting effects of large amounts of aid on institutions.¹³

Given that productivity growth affects future income and consumption, there is little doubt that monetary policy should take the productivity impact of aid flows into account. If aid flows have *positive* productivity effects, the appropriate front-loading of aid is larger than in the case where aid impacts only on consumption. This happens because future growth would augment future consumption, thereby reducing the need for future aid. In this case, the consumption smoothing trade balance would be somewhat

10 Of course, this example does not apply to the case of humanitarian, emergency or post-conflict aid, where an aid-induced increase in consumption would merely return consumption to its pre-crisis level.

11 International reserves increase because the deterioration in the trade balance from the initial level TB_0 is smaller than the additional aid inflow.

12 Aid volatility worsens absorptive capacity problems. Consider the case of projects requiring repeated inputs over the years with donors disbursing aid in a single instalment or irregularly. For example, donors could disburse aid to build a school or a hospital, but leave recipient countries without a regular source of funds to keep the buildings in good condition or to pay teachers and doctors in the following years.

13 Tornell and Lane (1998, 1999) and Sala-i-Martin and Subramanian (2003) stress that powerful groups tend to appropriate windfall earnings, leading to a 'voracity' effect. Similarly, Svensson (2000) and Torvik (2002) emphasize how aid may increase rent-seeking.

smaller than TB_1^S , implying that the central bank's bond sales would need to be smaller than the amount B shown in figure 4. In other words, the central bank should engage in fewer sterilization operations and tolerate a larger trade deficit than in the case where aid flows impact only on consumption.

Conversely, if the marginal returns of aid on productivity decline or become *negative* beyond a certain threshold, then front-loading aid disbursements would curtail future consumption, and monetary policy should conduct bond sales in excess of B with the objective of saving more resources for future use and raising the trade balance above TB_1^S .

Figure 4 allows us also to discuss a possible scenario in which there is no front-loading of aid ($A=0$) although some would be appropriate ($TB_1^S < TB_0$). This is a case in which the immediate consumption benefits of aid are large but disbursements are too back-loaded. Can monetary policy substitute for the donors and bring resources forward to boost current consumption? The answer to this question is positive, provided that the central bank has enough reserves to decumulate and to finance the larger trade deficit TB_1^S . Monetary policy would need to be expansionary with the central bank purchasing bonds rather than selling them. Domestic agents would use the additional liquidity to consume more tradable and non-tradable goods, causing real appreciation and a higher trade deficit. With unchanged aid and capital inflows, international reserves would then be needed to finance the latter.

What are the limits to monetary policy effectiveness?

Individual characteristics of aid-receiving countries may vary considerably and with them the scope for monetary policy to take effective action in response to volatile aid disbursements.

As already discussed in the previous section, the key prerequisites for monetary policy effectiveness are a relatively closed capital account and an economy small enough to take the prices of tradable goods as given. In the few aid-receiving countries that have open capital accounts, monetary policy may either be ineffective or have effects opposite to what is desired. A standard Keynesian model with capital mobility would predict, in fact, that monetary tightening would not lead to real exchange-rate depreciation but rather to both *nominal* appreciation, as higher interest rates fuel private capital inflows, and temporary *real* appreciation, as prices remain sticky in the short run.¹⁴ The evidence presented in the previous section on the ability of sterilization policy to contain trade balance fluctuations is, however, consistent with monetary tightening leading to real depreciation as a model with no capital mobility would predict.

Another issue is whether monetary policy effectiveness depends critically on the central bank's ability to buy and sell bonds. This is an important issue because many aid-receiving countries do not have well-developed domestic bond or money markets (Christensen, 2004, and IMF, 2005), although the size of such markets has grown recently in several of those countries. The effectiveness of money market operations has often been limited by problems of fiscal dominance, limited market size and underdeveloped interbank market, or weak financial intermediaries. In practice, other forms of sterilization are available, including: (i) the central bank's issuance of its own debt certificates; (ii) higher reserve requirements, which, for a given level of base money, reduce the money multiplier and overall money supply; and (iii) fiscal surpluses or a

14 Krugman (1987) develops a variant of this class of models where learning-by-doing externalities create the potential for Dutch disease. As in the analytical framework we used, these externalities allow temporary monetary policies to have *permanent* effects on competitiveness. In Krugman's model, however, the current account has to be balanced in every period. As a consequence, tight money leads to real *appreciation* because exports need to fall in line with the lower imports caused by the monetary contraction.

shift of government deposits from the banking sector to the central bank, depending on whether the government banks with the central bank or not.

The possibility of using fiscal balances to sterilize the monetary impact of a surge in aid inflows raises the question of whether fiscal policy could not take responsibility for modifying aggregate demand and redistributing the effects of aid over time, leaving other goals to monetary policy. *In principle*, fiscal policy could be just as effective as monetary policy in managing aid inflows, especially if taxes and transfers are lump-sum. *In practice*, this is the case only when foreign aid is delivered in the form of budgetary support and recipient governments can delay spending the aid disbursed by donors, thereby raising the fiscal balance and sterilizing the impact of foreign aid on aggregate demand. Instead, in the case of project aid or of donors requiring all aid to be spent immediately, the volatility of aid flows makes fiscal policy unsuitable for sterilization purposes. Fiscal policy would need to change taxes or expenditures frequently and in opposite directions to offset the large year-to-year swings in aid flows (figure 1). This would be a daunting task even in countries with efficient tax and expenditure systems because there are much longer decision-making lags associated with fiscal policy than with monetary policy and because of likely political resistance to raising taxes and cutting expenditures. In aid-receiving countries, notoriously weak tax administration and public expenditure management systems would give even less latitude to the fiscal authority in timing tax and expenditure changes as required by the vagaries of aid flows.

An important limit to pursuing sterilization policy is the sterilization costs associated with bond issuance, which cannot be overlooked in practice. If the taxes needed to finance the differential between the interest rates on sterilization bonds and international reserves are distortionary or costly to be levied, sterilization would have welfare costs that should be weighed against the benefits of consumption smoothing. These costs would be even larger if high interest rates depressed interest-sensitive *private* investment that might enhance productivity. When sterilization is implemented through fiscal surpluses, it may involve other costs. The government may, in fact, decide to achieve the required fiscal surpluses by postponing the very public investment that the aid increase was supposed to finance (as opposed to reducing current expenditure). In this case, the loss of productivity gains due to public investment might offset the benefits in terms of smaller productivity losses due to Dutch disease. This implies that monetary policy cannot be seen in isolation from, and should be coordinated with, fiscal policy.

Finally, when aid flows are too back-loaded and monetary policy needs to be expansionary, insufficient international reserves could become a binding constraint. This constraint is all the more tight when aid-receiving countries keep international reserves for other purposes as well, including the need to cope with volatile terms-of-trade shocks and the risks of not being able to roll over short-term external debt. Table 3 shows that, indeed, the average aid-receiving country has only a limited amount of reserves that can be used to finance higher imports and consumption.

Table 3.
International reserves in aid-receiving countries
(in months of imports)

	<i>Average, 1990s, countries receiving aid > 2% GDP</i>
Median	3.46
Minimum	0.01
75th percentile	5.30
Maximum	36.00

Conclusions

This paper points to both opportunities and risks for the conduct of monetary policy in aid-receiving countries. The challenge is twofold: while undoing some of the monetary expansion associated with aid inflows might help smooth consumption over time and contain Dutch disease, excessive sterilization may stunt current consumption and reduce other sources of productivity growth or factor accumulation. Choosing the appropriate monetary policy stance requires factoring in a multitude of elements, ranging from the benefits of higher current consumption to determinants of aid effectiveness and productivity growth such as the quality of institutions, corruption and capacity constraints. A reliable forecast of future aid inflows is, of course, another critical input to monetary policy formulation.

What is clear is that, in a typical aid-receiving country where aid flows are often disbursed in a typically haphazard manner and access to capital markets is limited, monetary policy decisions can have a vital bearing not only on nominal magnitudes but also on real ones such as consumption and productivity growth. When aid flows are excessively front-loaded, monetary policy can improve welfare by increasing gross national savings in the form of higher international reserves. Conversely, when aid flows are excessively back-loaded, an expansionary monetary policy can improve welfare, provided that the stock of international reserves is large enough.

While the theoretical arguments for welfare-improving monetary policy intervention are compelling, some perspective is in order. There are, in fact, limits to the extent monetary policy can correct the effects of an inappropriate distribution of aid over time. When aid flows are excessively front-loaded, sterilization costs may induce central banks to accumulate a less-than-optimal amount of reserves. By contrast, when aid flows are deemed excessively back-loaded, insufficient international reserves can prevent monetary policy from bringing resources forward.

Faced with these limits of monetary policy, donors could demonstrate a new found resolve and decide to coordinate their actions, minimize aid volatility and, thereby, reduce the need for monetary policy intervention. Increasing multilateral and bilateral donors' coordination in disbursing aid—a key objective of the Poverty Reduction Strategy Paper (PRSP) process introduced in the late 1990s—is then essential.

Allowing recipient countries to save aid directly for later use is an alternative to be considered if greater coordination of donor countries turns out to be an unrealistic objective. Donors could set up country-specific reserve funds in which aid is accumulated and then spent when aid flows or other resources dry up. The key challenge would, however, be the governance of such funds, which requires resolving the tension between predictable and timely assistance, on the one hand, and donors' desire to subject the use of the Fund's resources to conditionality, on the other. Indeed, for aid-receiving countries, international reserves are an appealing alternative, as they allow these countries to save resources and use them at their discretion. Nonetheless, given that sterilization policy may be costly, there is still scope for future work aimed at designing a governance structure of aid reserve funds that might become acceptable to both recipients and donors.

Finally, the idea that there are circumstances in which some aid is better saved owes nothing to the notion that foreign aid might be too generous. Our results do not provide any indication that an increase in the *overall* net present value of aid can reduce welfare. They pertain, instead, to the welfare

implications of the *distribution* of a given net present value of aid over time. From this perspective, the declared objective reiterated at the International Conference on Financing for Development, held in Monterrey, Mexico, in March 2002—to raise ODA to 0.7 per cent of industrial countries' GDP from a level that is currently only about one third of that target—can only be welcome.¹⁵

References

- Adam, C., and D. Bevan (2003). Aid, Public Expenditure and Dutch Disease. WPS/2003-2, Centre for the Study of African Economies, Oxford University, Oxford.
- Arellano, C., A. Bulíř, T. Lane and L. Lipschitz (2005). The Dynamic Implications of Foreign Aid and Its Variability. IMF Working Paper No. 05/119, International Monetary Fund, Washington, DC.
- Blalock, Garrick, and Paul Gertler (2004). Learning from Exporting Revisited in a Less Developed Setting. *Journal of Development Economics* 75 (2): 397-416.
- Boyd, John H., Ross Levine and Bruce D. Smith (2001). The Impact of Inflation on Financial Sector Performance. *Journal of Monetary Economics* 47 (2): 221-48.
- Buffie, E., C. Adam, S. O'Connell and C. Pattillo (2004). Exchange Rate Policy and the Management of Official and Private Capital Flows in Africa. *IMF Staff Papers* 51: 126-60.
- Bulíř, Aleř, and A. Javier Hamann (2003). Aid Volatility: An Empirical Assessment. *IMF Staff Papers* 50 (1): 64-89.
- Bulir, Ales, and Timothy D. Lane (2002). Aid and Fiscal Management. IMF Working Papers 02/112, International Monetary Fund, Washington, DC.
- Burnside, Craig, and David Dollar (2000). Aid, Policies, and Growth. *American Economic Review* 90 (4): 847-68.
- Burnside, Craig, and David Dollar (2004a). Aid, Policies, and Growth: Revisiting the Evidence. Policy Research Working Paper No. 3251, World Bank, Washington, DC.
- Burnside, Craig, and David Dollar (2004b). Aid, Policies, and Growth: Reply. *American Economic Review* 94 (3): 781-4.
- Celasun, Oya, and Jan Walliser (2005). Predictability of Budget Aid: Experiences in Eight African Countries. Presented at the World Bank Practitioners' Forum on Budget Support, May 5-6, Cape Town.
- Christensen, Jakob E. (2004). Domestic Debt Markets in Sub-Saharan Africa. IMF Working Paper 04/46, International Monetary Fund, Washington, DC.
- Clemens, M., Steve Radelet and R. Bhavnani (2004). Counting Chickens When They Hatch: The Short-Term Effect of Aid on Growth. Processed, Center for Global Development, Washington, DC.
- Easterly, William (2000). *The Elusive Quest for Growth: Economists' Adventures and Misadventures in the Tropics*. MIT Press, Cambridge, MA.
- Easterly, William, and Stanley Fischer (2001). Inflation and the Poor. *Journal of Money, Credit, and Banking* Part 1, May: 159-78.
- Easterly, William, R. Levine and D. Roodman (2004). New Data, New Doubts: A Comment on Burnside and Dollar's 'Aid, Policies, and Growth'. *American Economic Review* 94 (3) : 774-780.
- Fernandes, Ana, and Alberto Isgut (2005). Learning-by-Doing, Learning-by-Exporting, and Productivity: Evidence from Colombia. Policy Research Working Paper No. 3544, World Bank, Washington, DC.
- Gylfason, T., T.T. Herbertson and G. Zoega (1997). A Mixed Blessing: Natural Resources and Economic Growth. *Macroeconomic Dynamics* 3: 204-25.
- Hansen, H., and Finn Tarp (2000). Aid Effectiveness Disputed. *Journal of International Development* 12: 375-98.
- Heller, P., and S. Gupta (2002). "More Aid - Making It Work for the Poor", *World Economics*, December, vol. 3, No. 4.
- IMF (2005). *Annual Report on Exchange Arrangements and Exchange Restrictions*. International Monetary Fund, Washington, DC.

15 Tripling ODA is viewed as a necessary step to achieve the Millennium Development Goals by 2015 (Heller and Gupta, 2002). The Millennium Development Goals (MDGs), which emerged from the September 2000 United Nations Millennium Declaration, are a set of measurable targets for halving world poverty between 1990 and 2015.

- IMF (2005), "Monetary Policy Implementation at Different Stages of Market Development", Occasional Paper 244, International Monetary Fund, Washington, DC.
- Krugman, Paul (1987). The Narrow Moving Band, the Dutch Disease, and the Competitive Consequences of Mrs. Thatcher: Notes on Trade in the Presence of Dynamic Scale Economies. *Journal of Development Economics* 27: 41-55.
- Obstfeld, Maurice, and Kenneth Rogoff (1999). *Foundations of International Macroeconomics*. MIT Press, Cambridge, MA.
- Pallage, Stephane, and Michel A. Robe (2003). On the Welfare Costs of Economic Fluctuations in Developing Countries. *International Economic Review* 44 (2), May: 677-98.
- Prati, Alessandro, and Thierry Tressel (2006). "Aid Volatility and Dutch Disease: Is There a Role for Macroeconomic Policies?". IMF Working Paper forthcoming, International Monetary Fund, Washington, DC.
- Rajan, Raghuram G., and Arvind Subramanian (2005a). What Undermines Aid's Impact on Growth. IMF Working Paper No.05/126, International Monetary Fund, Washington, DC.
- Rajan, Raghuram G., and Arvind Subramanian (2005b). Aid and Growth: What Does the Cross-Country Evidence Really Show?. IMF Working Paper No. 05/127, International Monetary Fund, Washington, DC.
- Ramey, Garey, and Valerie A. Ramey (1995). Cross-Country Evidence on the Link between Volatility and Growth. *American Economic Review* 85 (5): 1138-51.
- Reinhart, Carmen M., and Kenneth S. Rogoff (2004). The Modern History of Exchange Rate Arrangements: A Reinterpretation. *The Quarterly Journal of Economics* 119 (1): 1-48.
- Sachs, Jeffrey, and Andrew Warner (1995). Natural Resource Abundance and Economic Growth. NBER Working Paper No. 5398, National Bureau of Economic Research, Cambridge, MA.
- Sala-i-Martin, Xavier, and Arvind Subramanian (2003). Addressing the Natural Resource Curse: An Illustration from Nigeria. IMF Working Paper 03/139, International Monetary Fund, Washington, DC.
- Svensson, J. (2000). Foreign Aid and Rent Seeking. *Journal of International Economics* 51: 437-461.
- Tornell, A., and P. Lane (1998). Are Windfalls a Curse? A Non-Representative Agent Model of the Current Account. *Journal of International Economics* 44: 83-112.
- Tornell, A., and P. Lane (1999). The Voracity Effect. *The American Economic Review* 89 (1): 22-46.
- Torvik, R. (2001). Learning by Doing and the Dutch Disease. *European Economic Review* 45: 285-306.
- Torvik, R. (2002). Natural Resources, Rent Seeking and Welfare. *Journal of Development Economics* 67: 455-70.
- Van Biesebroeck, J. (2005), "Exporting Raises Productivity in Sub-Saharan African Manufacturing Firms", *Journal of International Economics*, vol 67(2), p. 373-391.
- World Development Indicators 2002, World Bank, Washington, DC.