Discussion Paper

Active Macroeconomic Policy for Accelerating Achievement of the MDG Targets

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POVERTY REDUCTION

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Abstract

This paper argues that, although the global financial crisis is undermining the achievement of the MDGs, active macroeconomic policies can mitigate the negative impacts. The paper shows that MDG-focused countercyclical macroeconomic policies: fiscal, monetary and exchange rate are feasible in developing countries. Such policies include 1) elimination of the countercyclical conditionalities and "benchmarks" for deficit limits, inflation rates and foreign exchange holdings; and 2) reliability on delivery of external assistance. The combination of a carefully calibrated stimulus package and donor flexibility offers the firm prospect of overcoming the potentially serious effects of external shocks. While any stimulus package involves risks, these are minor compared to the certain effect of the global recession on poverty and public welfare.

Disclaimer

1 Introduction

Two decades of slow growth in many low-income countries created pessimism that the Millennium Development Goals would be reached by the target date of 2015. However, several years of rapid expansion in the late 2000s raised hopes that most, if not all, countries could and would achieve most if not all of the MDGs. The global financial crisis that swept the developed countries in 2008 moved on to the developing world with great force, undermining these hopes.

Purposeful and active macroeconomic policy can overcome the recessionary effects in middle- and low-income countries in much the same manner that stimulus programmes arrested the decline of the developed countries. To implement an MDG-focused countercyclical macroeconomic policy in an effective and timely manner in middle- and low-income countries, the governments of these countries should make the same break with orthodox thinking that occurred in the developed countries, and many have (UN 2010, 20, Table 1.4).

The analytical discussion of this paper is appropriate for all governments of developing countries as they struggle with the challenge to reduce poverty in the context of a global economic recession. The institutional discussion of examples is directed towards the low-income countries, especially those in the sub-Saharan region where, with a few exceptions, the challenge to meet the MDG targets is greatest. The paper does not consider economic performance, which the author has done in other reports that focus on the least developed countries and the countries of Africa (Weeks 2010a and 2010b). The paper begins with an analytical discussion of policy coordination, followed by sections that deal with each of the areas of macro policy: fiscal, monetary and exchange rate. In each section the feasibility of policy implementation is addressed. The final section summarises the discussion and stresses the urgency of combining a short-term countercyclical policy with a medium-term growth strategy in order that the MDG targets be met.

2 Policy Coordination

2.1 Analytics of Coordination

2.1.1 Fallacy of the Flexible Exchange Rate

The generally accepted analytical framework for the coordination of macroeconomic policy in open economies is the Mundell-Fleming model (Fleming 1962, Mundell 1963). This model concludes that if a government operates a flexible exchange-rate regime, fiscal policy is ineffective in influencing the level of output, implying that monetary policy must bear the major burden of macroeconomic management.

If this conclusion were valid there would be very little scope for macro management of any type because the IMF orthodoxy requires that the first priority of monetary policy be control of inflation. However, the Mundell-Fleming model contains an internal contradiction in its logic that renders the conclusion invalid.[1] Once this is demonstrated, the analysis can address appropriate principles of coordination for developing country governments as they attempt to reduce poverty and achieve the MDGs.

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1. A full technical presentation including algebraic derivation is found in Weeks (2008), and a later revision in Weeks (2009e).

The Mundell-Fleming analysis of a flexible exchange rate regime ignores an obvious, simple and fundamental economic relationship, the impact of exchange-rate changes on the price level.[2] In the "small country" case,[3] the logically complete story of a monetary expansion would be:

1) an increase in the money supply results in a trade deficit; with perfect capital flows this deficit is instantaneously eliminated by depreciation of the currency;

2) the depreciation of the currency raises the price level via its impact on imported goods;

3) this price increase lowers the real money supply, and makes the real depreciation less than the nominal;

4) therefore, monetary policy would not be completely effective because of the price effect on the real money supply and the real exchange rate.

The implication of this logical sequence is that the effectiveness of monetary policy to manage the level of output depends on two parameters: the marginal propensity to import, which determines the price-level impact of a devaluation or depreciation; and the sum of the elasticities of export and import volumes with respect to the real exchange rate, which determines the required magnitude of the real change in the exchange rate to equilibrate the current account.[4]

Under neoclassical assumptions,[5] in a closed economy with excess capacity, the elasticity of output with respect to the nominal monetary supply is unity. The effectiveness of monetary policy in an open economy can be defined as this elasticity divided by the closed economy value (i.e., one). Table 1 applies different sums of export and import elasticities to the average import share for over one hundred developing countries to calculate the effectiveness index, expressing it as a percentage with a maximum value of one hundred.[6] On the reasonable assumption that the sum of short-term trade elasticities would be less than one, the effectiveness of monetary policy is always less than sixty percent. If the sum of trade elasticities were .755, monetary policy would be fifty-percent effective for only half the countries. Further, the price effect of a depreciation of the exchange rate implies that the effectiveness of fiscal policy increases as that of monetary policy decreases.

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2. A typical treatment where price effects are ignored is found in Romer:

> …[T]he exchange rate does not affect money demand…

> The fact that the LM curve is vertical means that output for a given price level – that is, the position of the AD curve – is determined entirely in the money market… [S]uppose that government purchases rise. This change shifts the IS curve to the right…At a given price level this leads only to appreciation of the exchange rate and has no effect on output. (Romer 1996, 207)

In their introduction to the discussion of flexible exchange rates, Dunn and Milner point out the price effect of exchange rate changes: "Since the exchange rate, rather than the balance of payments, moves constantly, domestic prices of traded goods are affected (Dunn & Mutti 2004, 434). On the following and subsequent pages, exchange-rate changes are analyzed assuming all prices are fixed. For example, they write, "…depreciation also increases domestic prices of tradable goods…*The original increase in the domestic money supply remains intact*…" (*Ibid.*, 436, emphasis added).

However, in what they call a "monetarist" analysis the price effect of exchange rate changes renders monetary policy ineffective except in the short run. No comment is made on the implicit contradiction between the standard Mundell-Fleming argument and the "monetarist" analysis, though they are presented within a few pages of each other (Dunn & Mutti 2004, 438-440).

3. That is, the case of a country for which changes in its exports and imports would affect world prices. This is the case for almost all developing countries, with China being one of the rare exceptions.

4. The formula is:

$$\mathcal{E}_{y,m} = [(1 - a_3)\mathcal{E}_T]/[a_3 + (1 - a_3)\mathcal{E}_T]$$

$\mathcal{E}_{y,m}$ is the effectiveness of monetary policy, a_3 is the marginal propensity to import (assumed equal to the average), and $\mathcal{E}_T$ is the sum of the export and import volume elasticities with respect to the real exchange rate.

5. In specific, we assume that the velocity of money is constant.

6. We assume that the marginal propensity to import is equal to the average, which understates the former in the short run, strengthening our conclusions about the effectiveness of monetary policy.

The practical implication of this analysis is that exchange-rate flexibility does not, as a general rule, imply that monetary policy is a more effective tool of macro management than fiscal policy. Monetary policy is never more effective than fiscal policy when the exchange rate is fixed. Whether monetary policy is the more effective instrument for economic management when the exchange rate is flexible depends on the values of key structural parameters of each economy, and the most important are the propensity to import and trade elasticities with respect to the real exchange rate.

Agricultural products typically have low export elasticities because of the time between sowing and harvest, which is rarely less than three to four months. For many crops the time required for a price response is increased by planting being limited to specific times of the year. Therefore, there is a very low likelihood that monetary policy will be accompanied by an automatic balance of payments adjustment in countries exporting agricultural commodities.

TABLE 1

Effectiveness of Monetary Policy ($\varepsilon_{y,m}$), Flexible Exchange Rate, Median Import Share (N/Y), 108 Countries, 2005-2007*

$\varepsilon_T =$	$\varepsilon_{y,m}$ for international median, N/Y = .39	Percent of countries for $\varepsilon_{y,m} > 50\%$
.500	43.7	27.8
.755	53.8	50.0
1.000	60.8	63.0

Notes: ε_T is the sum of the export and import volume elasticities with respect to the real exchange rate.

N/Y is the average propensity to import, assumed equal to the marginal.

Excluding developed countries, China and very small countries excluded (see text).

Source: Import shares from World Bank, *World Development Indicators*, 2009.

2.1.2 Targets and Instruments

A successful active macroeconomic policy requires coordination of policy goals and instruments. So while fiscal, monetary and exchange-rate policy should each be treated in detail, they cannot successfully be considered in isolation from each other. The analysis of how each of these macro instruments can be designed to accelerate the achievement of the MDGs is proceeded by a discussion of how they interact and support each other.

Once it is recognised that economic objectives will not be achieved by market adjustment alone, macroeconomic policy must be guided by the principles of policy coordination. The minimum purpose of coordination is to prevent the different policy instruments from conflicting with one another. A clear example of contradictory use of policy instruments occurred in Zambia in the mid-2000s.

In an attempt to prevent further appreciation of the Kwacha, the Bank of Zambia carried out foreign-exchange purchases (sold Kwacha), while at the same time making open-market operations to prevent the money supply from exceeding limits set by an IMF agreement. The intention of the first instrument was to increase the availability of the domestic currency, while the effect of the second was to cancel that increase (Weeks, *et. al.*, 2007).

The purpose of coordination is to achieve multiple and complementary objectives as specified in the Tinbergen principle that successful policy outcomes require that the number of government objectives be matched by the number of policy instruments (summarised in Arrow 1958). In seeking to achieve the MDGs, a government has several simultaneous and complementary policy objectives at the macroeconomic level: 1) stabilisation of output near full potential; 2) a sustainable balance-of-payments position; 3) avoidance of a destabilising rate of inflation or deflation; 4) faster growth of potential output; and 5) an equitable distribution of the gains from growth. These five objectives require at least five instruments, which would be found among the fiscal and monetary tools and exchange rate management. Initially the analysis will focus on countercyclical policy.

2.1.3 Policy in Common Currency Countries

The governments of a substantial minority of developing countries are constrained in their ability to coordinate policy because of their currency arrangements with regard to other countries. The more flexible form of this constraint is a fixed link to another currency, and the less flexible form is the case of a country which has no currency if its own.

Common currency arrangements fall into two types: 1) those made up of members of with economies of similar size for which a currency was created specifically for the group, and 2) those arrangements in which one or more small countries adopted the currency of a much larger country. Table 2 provides a list of the groups and members of both types of arrangements for developing countries. In the three monetary unions, all countries in the group use the same currency and have a common Central Bank. In these countries no monetary policy is possible at the country level and devaluation is impossible by definition.

This type of arrangement is most important in the sub-Saharan region, where it accounts for almost a fourth of the countries. The two monetary unions also have formal limits to the public sector deficit derivative because of agreements with the French government. The public currency account must be in balance, and each government must demonstrate the method by which it would finance borrowing for the capital account.

Similar in form is the policy position of two countries that use the US dollar, Panama since its creation in 1903 and Ecuador since 2004. The substantial difference from a monetary union is that the governments of Ecuador and Panama have no influence over the monetary policy affecting the currency they use.

A hybrid case of a common currency is the arrangement in southern Africa, in which Lesotho, Namibia and Swaziland have national currencies, but the link to the South African rand is so strict that devaluation or depreciation would be extremely unlikely because of the formal monetary and customs arrangements with the government of South Africa. Similarly strict is the link between the currencies of Bhutan and Nepal and the Indian rupee.

The practical result of these currency arrangements is that monetary and exchange rate tools are not available to the governments. Fiscal policy is also quite limited, most obviously for the two CFA franc groups. Even without a formal rule, financing deficits are difficult with a common currency because of restrictions on issuing bonds.

The MDG-focused macroeconomic strategy developed in the rest of this paper would not apply to the countries in Table 2. Those countries are almost entirely dependent upon external assistance to finance recovery and growth programmes, with the exception of those countries that enjoyed fiscal and current account surpluses at the end of the 2000s. These were natural resource-rich countries (Equatorial Guinea for example) or quite atypical cases such as the rand zone countries that enjoyed large customs revenues.

TABLE 2
Common Currency Arrangements, 2010

Currency group	Currency	Members
Monetary Unions		
Economic and Monetary Community of Central Africa	Central African CFA franc	(6) Cameroon, Central African Republic, Chad, Republic of Congo, Equatorial Guinea, Gabon
West African Economic and Monetary Union	West African CFA franc	(8) Benin, Burkina Faso, Cote d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, Togo
East Caribbean Currency Union	East Caribbean dollar	(8) Anguilla, Antigua and Barbuda, Dominica, Grenada, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines
French Overseas Collectives	CFP franc	(3) French Polynesia, New Caledonia, Wallis and Futuna
Common currency or fixed link		
Common currency	United States dollar	(2) Ecuador, Panama
Common Monetary Area (fixed link)	South African rand	(3) Lesotho, Namibia, Swaziland
Fixed link	Indian rupee	(2) Bhutan, Nepal

2.2 Algebra of Countercyclical Policy

A successful countercyclical policy package must be consistent with a sustainable balance of payments and manageable inflation. Achieving the appropriate balance requires careful use of available policy instruments. For most low-income countries monetary policy is not effective except to accommodate fiscal policy. The lack of effectiveness is the result of the openness of economies (see discussion above) and inefficient or non-functional financial markets, which are discussed in the section on monetary policy. The purpose of short term, countercyclical intervention is to stabilise the level of output. The complementary objective of faster growth is achieved with a different mix of tools.

In the absence of an effective monetary policy, the tools available to stabilise the level of output are fiscal policy and exchange rate management. With underutilized resources both measures should stimulate output. This section considers the algebra of a stimulus package for countries in which both instruments can be used. A subsequent section considers a strictly fiscal stimulus for countries locked into fixed exchange rate arrangements.

As for all policy instruments, devaluation and fiscal expansion have potentially negative effects that require careful management. Since the income elasticity of taxes is typically less than unity in sub-Saharan countries, increasing government expenditure will always increase the fiscal deficit, relative to national income. Simultaneously, there would be an increased and possibly unsustainable trade deficit. The policy goal is to prevent the latter through devaluation, which has its own problem in the inflation it generates. Distributional effects are considered in the section on exchange-rate management.

Algebra facilitates the identification of the appropriate balance between increased expenditure and devaluation. The rate of growth of the real demand for output (y) for a time period can be specified as the weighted sum of the growth of autonomous expenditures times the multiplier:

$$y = \beta[a_1 i + a_2 g + a_3 x - a_4 z], \ \sum a_i = 1$$

The lower case letters i, g, x and z are the rates of change of categories that are exogenous with respect to national income, including the exchange-rate-induced components of trade (private investment, government expenditure, exports, and the exchange rate determined component of imports, respectively). The a_i terms are the shares in national income of each variable and β is the multiplier. Exports have an autonomous component whose rate of change is x^O, and a component determined by the real exchange rate. Imports are a function of national income and the real exchange rate. Define ε_x and ε_z as the elasticities of exports and imports with respect to the real exchange rate, p as the price level and δ as the marginal propensity to import:

$$x = x^O + \varepsilon_x e^*$$

$$z = \delta y - \varepsilon_z e^*$$

The change in the real exchange rate (e*) is the change in the nominal rate (e) minus the rate of inflation (p). The *ceteris paribus* rate of inflation is the pass-through rate of a devaluation (the marginal propensity to import, δ).

$$e^* = e - p = e - \delta e = (1 - \delta)e$$

$$x = x^O + \varepsilon_x (1 - \delta)e$$

$$z = \delta y - \varepsilon_z (1 - \delta)e$$

These can be substituted into the growth-of-demand equation. We interpret x^O as an external shock to export demand, and assume that it causes depressed expectations that render the growth of private investment zero. The government seeks to prevent national income from falling (y = 0). To simplify, write a_3/a_2 as α and define $(\varepsilon_x + \varepsilon_y) = \varepsilon_T$. If the trade elasticities are positive, $(\varepsilon_T > 0)$, a real devaluation improves the trade balance (Marshall-Lerner condition).[7] For zero growth, the real demand equation is:

$$0 = a_2 g + a_3 x^O + a_3 \varepsilon_T (1 - \delta)e$$

For any shock to exports (x^O) the relationship between the change in expenditure and the devaluation is determined by three parameters: the ratio of exports to government expenditure, the real exchange rate elasticity of trade, and the propensity to import.

If the exchange rate is constant, the government expenditure that stabilizes output is:

$$g = \alpha x^O$$

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7. The more familiar condition of greater than unity refers to the nominal exchange rate and export and import values.

For no increase in government expenditure, stabilizing output requires the nominal devaluation to be:

$$e = x^0/[\varepsilon_T(1 - \delta)]$$

The relationship between e and g for zero growth is shown in the upper right quadrant of Figure 1. The upper left quadrant relates the nominal exchange rate to its inflationary effect (e and p), and the lower left quadrant links the change in the real exchange rate to the trade deficit (e* and X-Z).[8] An export shock decreases national income and increases the trade deficit. We assume that the government must return to the initial trade deficit within one time period or suffer an unsustainable loss of reserves. Regaining the initial trade deficit requires a real devaluation of e^*_1, which implies a nominal devaluation of e_1. This sets the lower limit of the devaluation, which defines a feasible range for the increase of government expenditure to prevent a fall in output ($g > g_1$).

Two other goals of the government may constrain policy, inflation and deficit limits. In Figure 1 in the upper right quadrant there is a feasible policy range, below an "inflation limit" and above a "deficit limit." If the inflation rate acceptable to policymakers is below p1, then no combination of devaluation and increased expenditure is consistent with restoring the trade balance and stabilizing output in the short run, though it would be possible with a series of devaluations in the medium term. This analysis demonstrates the necessity for policy coordination and, specifically, exchange rate management. Leaving the currency to float when public expenditure increases can result in excessive inflation as the depreciation seeks balance-of-trade sustainability. If the limit for policymakers for the fiscal deficit were below what would be generated by expenditure increase g1, there might remain a feasible short-term region involving a low expenditure increase and a large devaluation.

FIGURE 1
Policy Coordination for Countercyclical Intervention

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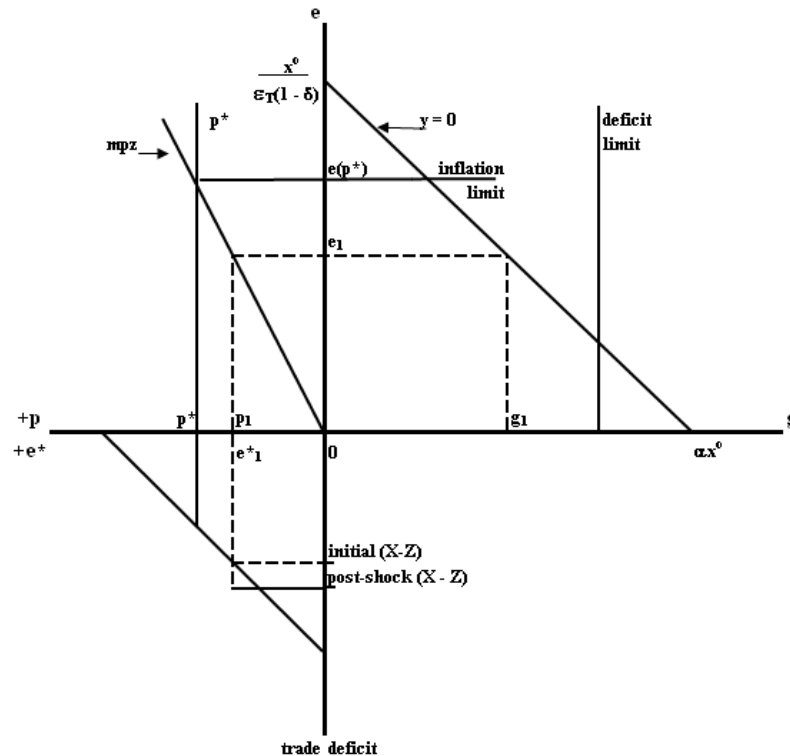
8. Figure 1 is a simplified presentation. It does not include the effect of changes in national income on import demand.

If at the initial conditions the fiscal deficit is close to that set by donor and lender "benchmarks" and/or the inflation rate is near its conditionality limit, the government has no space for a policy response to the export shock. It is this policy constrained situation to which African leaders in 2009 objected in clear and unambiguous terms. Those objections are specified in the Freetown Declaration,[9] adopted unanimously by the finance ministers of more than thirty-five countries.

Prior to the hegemony of the Washington Consensus, macroeconomic policy was the management of priorities and trade-offs, in which policy instruments were used to seek the optimal outcome as chosen by national policymakers. This pragmatic approach was abandoned and policy tools decommissioned by an ideological belief in the self-adjusting nature of markets. Those who support a rational and pragmatic approach to economic policy must hope that the most important long-term impact of the great financial collapse of 2008 will be the demise of the Washington Consensus orthodoxy of balanced budgets, deflationary monetary policy and non-interventionist currency regimes.[10]

3 Fiscal Policy for MDGs

3.1 Design of Countercyclical Fiscal Policy

An MDG-focused fiscal policy would have complementary short-term and long-term components. The first maintains output near potential and the second enhances that potential. The short-term component relies on the current fiscal budget and tax instruments for "countercyclical intervention" (Hailu and Weeks 2009). The long-term component employs public investment to directly increase the productive potential of the economy and to "crowd in" private investment. The MDG focus is primarily long-term in nature, while the countercyclical interventions prevent poverty and social indicators such as infant mortality from increasing in reaction to external and internal economic shocks.

Countercyclical policy increases demand when the economy grows below its long-run potential and decreases it when output encounters resource scarcities that provoke inflationary pressure. This output stabilization policy maintains an economy as close to its potential as is consistent with other goals of policymakers. It is not a growth policy, which would involve public investment to contribute to increasing productive capacity.

When countercyclical fiscal intervention is institutionalised as part of normal macro policy, as it should be in a rational economic strategy, its basic strategy is to render fiscal policy neutral over the economic cycle, described by Gardner Ackley and Walter Heller as rendering "fiscal drag" equal to zero.[11] The concept of fiscal drag is central to an active macro policy, because it produces the key insight that for a given level of expenditure, a fiscal deficit may be an indicator that tax rates are too high rather than two low. This would be the case if an economy below its potential were shifted *ex machina* to full potential with the

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9. The declaration was adopted on 12 August 2009, by the Caucus of African Governors of the IMF, World Bank and African Development Bank. The full text can be found at http://www.mofed.gov.sl/index2.php?option=com_content&do_pdf=1&id=99. The Caucus is an annual meeting of finance ministers to discuss the issues which would arise at the subsequent IMF-World Bank meeting, which in October 2009 was held in Istanbul.

10. See Stiglitz (1998) for further elaboration of the constraints imposed by Washington Consensus type policies.

11. Ackley defined fiscal drag as follows in testimony before the US Congress: "a constant set of tax rates and a constant level (total) of Government expenditures exerts an increasingly restrictive influence as time passes…[O]ver the years we need to offset much or all of the drag in order to permit the growth of demand to keep up with the growth of potential output." (Ackley 1965). Also, see Heller (1966).

unchanged expenditure and tax rates, at which level the budget would be in surplus and aggregate demand would fall short of aggregate supply.[12] In this example taxation is too high even though the public budget is in deficit.

Translating the theory of fiscal intervention into practice requires analysis of the economic and institutional characteristics of each country. For example, to be relevant for the low-income countries of sub-Saharan Africa, countercyclical intervention requires a specification quite different from what would be relevant for the middle-income countries of Latin America and East Asia. Reducing taxes in almost all sub-Saharan countries would be relatively ineffective because of the nature of revenue generation. In low-income countries personal income taxes are rarely important. Most tax revenue comes from tariffs and other charges on trade, except for mineral-rich countries that can tax corporations.[13] Almost all company taxes are collected from foreign enterprises engaged in extractive activities, and reducing their taxes would have little impact on their domestic investment decisions.

The alternative to tax reduction, enhancing demand by public expenditure, requires that the increases are flexible enough to be initiated quickly when there is a demand shock, and terminated with similar dispatch as the economy approaches its potential. Public investments do not meet this condition because of their relatively long and inflexible construction time. Much of current expenditure is also inflexible. For example, it might be possible to increase the number of school teachers if trained people were available, but it might not be rational to terminate them when the economy approaches its potential. If it were judged rational from an educational point of view, it might prove politically difficult.

The countercyclical expenditures that can be implemented effectively are closely related to a country's level of development because the more developed a country, the more are the alternatives. Because a substantial proportion of the labour force is in wage employment, governments in middle-income countries can implement a range of cash-transfer programmes, including unemployment benefits, pensions and family allowances. With few exceptions, one being Vietnam (Weeks *et. al.* 2004), these schemes could not be successful in low-income countries because of problems of implementation and monitoring.

In sub-Saharan countries with low population densities and limited implementation capacity, governments could rely on temporary employment schemes, "cash for work." Appropriate activities for these would be rapidly completed activities using employment-intensive techniques that have a large component of repair and maintenance.[14] Examples of such programs are digging sanitation ditches, repair of public buildings, environmental improvement through erosion reduction, and clearing of rural footpaths. These activities were implemented in 2009 throughout Sierra Leone by the National Commission for Social Action as part of a countercyclical policy (Weeks 2009c). The projects would make a contribution to community welfare, though

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12. The algebra of fiscal drag is simple. Let Y be national income, and I and G be private investment and government expenditure. Let α be the marginal propensity to consume and β the marginal propensity to tax. Assume that at a less-than-full potential level of income, saving equals investment and the public budget is balanced. In the simple case of a closed economy, national income equals:

$$Y_O = \mu[I_O + G_O]$$

$\mu = [1 - \alpha(1 - \beta)]$, the multiplier.

Given the propensity to consume, the marginal propensity to save out of post-tax income is $(1- \alpha)(1 - \beta)$, so the level of saving is:

$$S_O = [(1- \alpha)(1 - \beta)]Y_O$$

If by magic income rose to its full potential level, Y_f, total leakages would exceed total injections because saving would exceed investment and the public budget would be in surplus. National income would fall back to Y_O. Reducing tax rates eliminates the fiscal drag.

13. The World Bank data base World Development Indicators gives disaggregated tax statistics for twenty sub-Saharan countries in the 2000s. For all but two trade taxes were at least twenty percent of revenue. The exceptions were South Africa and the Republic of Congo. Sales taxes accounted for thirty percent or more for eleven of the twenty countries. Personal and company taxes brought in twenty percent or more of revenue in only four of the countries (Ghana, Kenya, South Africa and Zambia). The source provides no information for the major petroleum exporters, Angola, Cameroon, Chad, Equatorial Guinea, Gabon and Sudan. http://ddp-ext.worldbank.org/ext/DDPQQ/

14. The International Labor Organization calls such projects "labor-intensive public works." The ILO website provides further information on short term employment programs. http://www.ilo.org/public/english/employment/recon/eiip/index.htm

their primary purpose is to increase aggregate demand through the expenditures of those directly and indirectly employed. To be effective, the employment schemes would have the following characteristics:

1) identified and "stock-piled" prior to the need for them, with accounting procedures in place to reduce the likelihood of misuse of funds;

2) easily initiated and quickly terminated, implying that they should be implemented by the central government in order to avoid delays due to limited administrative capacity of local governments; and

3) wages and salaries are the major element of expenditure, with a low capital component.

Some issues that plague public works projects with controversy need not be relevant for those, where the purpose is countercyclical.

For example, the wage at which workers are paid is a secondary consideration because these are not long-term or even medium-term employment schemes. The appropriate wage will vary across countries and regions, guided by the principle that the primary purpose of the projects is to increase demand quickly. This would be best achieved by hiring as many people as possible, which implies paying wages at or below prevailing rates. These programs would be introduced when labour is in excess supply, thus making them unlikely to affect prevailing wage rates. A Ministry of Finance study in Sierra Leone recommended this type of employment program as a policy measure to counter the effects of the financial crisis (MoFED-EPRU 2009).[15]

Clear rules should be established for the initiation and termination of countercyclical projects. A "countercyclical" expenditure that becomes permanent negates its purpose. Initiation and termination could be triggered by a policy rule based on appropriate macroeconomic indicators. The specific indicator will vary by country, determined by the development and structure of the economy. Among sub-Saharan countries, employment statistics in South Africa are sufficiently current and reliable to serve as a trigger indicator. In other countries, employment statistics might need to be supplemented with proxies based on trade statistics.[16]

As shown in the next section, external support in addition to current aid levels would be required to support a stimulus in some countries. It is unfortunate, but the case is that donor funding does not lend itself to countercyclical programs because of the fixed, but often unreliable, schedule of allocation and disbursement.[17] To make their funding more appropriate for countercyclical programs, donors should accelerate disbursement and adjust their allocation procedures to allow for an "aid fund" analogous to national mechanisms created for resource booms. Money could be drawn from such a fund when the economy is below potential, and "hoarded" when near full potential. Donor grants ear-marked for investment could not be used for countercyclical expenditures, for reasons explained above. As a result, domestic public borrowing would be necessary to fund a stimulus, the practicalities of which are discussed in the next section.

The necessity and feasibility of countercyclical intervention in response to the global crisis prompted many governments to act quickly and contrary to the pre-crisis orthodoxy, most notably in the United States where a stimulus initiated in 2009 appeared in the second quarter of 2010 to have generated recovery. Recognising the need to act purposefully and quickly, many

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15. In Sierra Leone the most important cash-for-work project in 2009 was supported by US$ 4 million from the World Bank. It employed about 14,000 people in infrastructure maintenance.

16. In a study of Sierra Leone, quarterly export revenue and government expenditure were used to estimate quarterly GDP (Weeks 2009d).

17. At the annual Caucus of African governors of the IMF, World Bank and African Development Bank held in Freetown in August 2009, a frequent criticism of IMF and World Bank practice by ministers was the slow-disbursing nature of lending and grant programs. This criticism was directed specifically at three programs of the IMF: the Extended Credit Facility (ECF), the Stand-by Credit Facility (SCF) and the Rapid Credit Facility (RCF). The ECF replaced the Poverty Reduction and Growth Facility (PRGF).

governments of developing countries also embarked on countercyclical interventions. Table 3 provides a list of twenty-six developing countries in which such programmes were in process by the second quarter of 2010. It is noteworthy that the list includes both middle- and low-income countries, and countries with relatively small economies as well as large ones.

Table 3
Developing Country Governments Implementing Fiscal Countercyclical Expansion in the Late 2000s

Country	% GDP	Country	% GDP
Argentina	1.2	Mexico	2.1
Bangladesh	0.6	Mozambique	nd
Brazil	3.6	Nigeria	0.7
Chile	4.0	Peru	2.6
China	13.3	Philippines	4.1
Egypt	1.7	Saudi Arabia	12.5
Georgia	10.3	Sierra Leone	1.5
Honduras	10.6	South Africa	1.5
India	3.2	Sri Lanka	0.2
Indonesia	1.4	Thailand	14.3
Kazakhstan	13.8	Tanzania	6.4
Kenya	0.9	Vietnam	9.4
Korea, Rep	5.6	Average,	5.2
Malaysia	5.5	26 countries	

Sources: Sierra Leone (Weeks 2009c), Mozambique (IMF 2009b), all others UN (2010, 20).

3.2 Deficits and Deficit Finance

Two technical arguments are frequently presented to justify abandoning fiscal policy for economic management: the possible inflationary effect of deficits, and the putative tendency for public borrowing to "crowd out" private by causing interest rates to rise. These alleged problems are closely related to the coordination of fiscal and monetary policy.

An informed discussion of the role of deficit finance in developing countries should begin with information on current fiscal deficits. Figure 2 shows that for the overwhelming majority of countries for which we have data, the fiscal deficit was less than five percent of GDP ("greater than" in the chart where the deficit is a negative number). For almost eighty percent of the countries the deficit would have met the Maastricht Criterion of three percent or less. Therefore, for all but a few countries the fear that countercyclical intervention might result in deficits of excessive absolute or relative size was without empirical basis in the mid-2000s. This conclusion allows the analysis to proceed to consider the likely impact of a moderate increase in deficits implied by a countercyclical fiscal expansion.

As noted above, an increase in spending from any source results in a reduction of expenditure of another type if an economy is at full potential. If the expenditure is by the public sector, its inflationary impact will depend on how it is financed. The expenditure can be financed through borrowing by sales of government securities to the private sector ("open market operations") or by the ministry of finance borrowing from the central bank ("monetizing the deficit"). An increase in a public deficit is not inflationary if financed by bond sales to the private sector, because the net change in the money supply is zero. The government takes money out of circulation by the bond sale, and returns the same amount to circulation through its increased expenditure.

Assuming that the private sector holds its desired amount of bonds before the additional public borrowing, the government must offer the bonds above the prevailing interest rate. If the increased bond rate transmits to private financial markets and investment is sensitive to interest rates, "crowding out" results. In contrast, if the government borrows directly from the central bank, the money supply increases and inflation results, with an important exception. In an open economy, part of the increased money in circulation will be spent on imports, reducing the inflationary impact, but creating or increasing a trade deficit.

If the economy is operating at less than full potential, neither type of deficit financing should generate more than minor and transitory inflation, though "crowding out" could occur. More government expenditure financed by bond sales to the private sector would bring a net increase in aggregate demand. As before, no change in the money supply occurs. Also as before, if the public held their desired amount of government debt prior to the bond sale, the new issues must be at a higher interest rate, creating upward pressure on private interest rates, depressing private investment expenditure.

FIGURE 2
Cumulative Percentage Distribution of 70 Low and Middle Income Countries
by Size of Overall Fiscal Deficit in GDP, 2005-2007
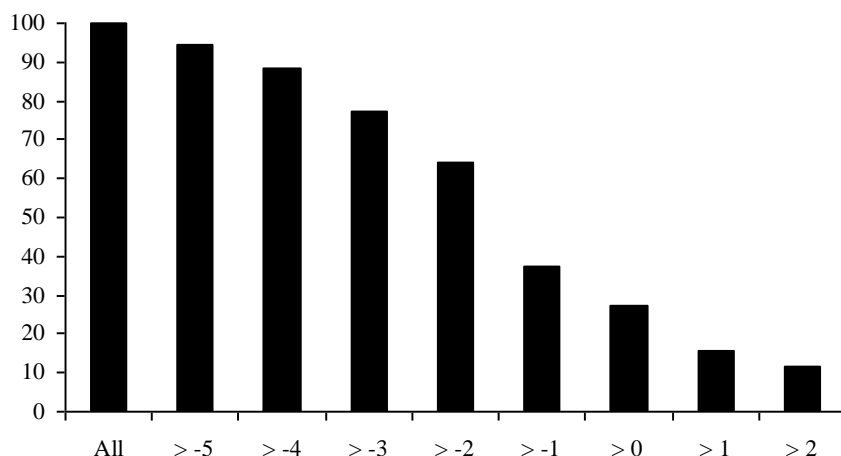
Source: World Development Indicators 2010, online.

The net change in aggregate demand would be positive and less than the increase in public expenditure unless private investment is extremely elastic with respect to the domestic interest rate, which is extremely unlikely in low-income countries. It is unlikely because most productive investment is not financed through the domestic banking system. A substantial portion of capital formation is non-monetized micro enterprise and farm investment through personal effort. Capitalist enterprises, especially foreign ones, finance their investments internally or borrow from abroad.

Financing the expenditure by direct borrowing from the central bank would not require a higher bond rate. The increase in aggregate demand would equal the increase in public expenditure, and monetizing the deficit generates an increase in the money supply sufficient to circulate the increased output that results from more public expenditure. With the economy well below its potential, monetizing the deficit is an effective tool for the expansion of aggregate demand, generating neither inflation nor "crowding out" of private expenditure.[18] The government's expenditures on infrastructure could be consciously

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18. In 2009 and 2010 the fiscal stimulus in both the United States and the United Kingdom was financed by monetization.

designed to "crowd in" private investment by lowering costs of transport, electricity and water supply.[19] In many African countries (Zambia, for example) the increased cost of servicing the public debt as a result of bond sales should be a greater concern than inflation or "crowding out."

4 Monetary Policy for MDGs

In the short term, an MDG-focused monetary policy should be supportive of the active, countercyclical fiscal policy, and in the long term foster private investment through low real interest rates. The manner in which any monetary policy can be implemented is strongly influenced by the development of financial markets. When these markets are underdeveloped, the monetary authorities still can play a major role in the management of external and internal debt, and, therefore, in the use of deficits as policy instruments.

Few low income countries in Africa and Asia have sufficiently developed bond markets to allow for effective open market operations. This is shown for the sub-Saharan region in Table 4. Of the forty-four countries in the table, only twelve had a secondary market for public bonds, the minimum requirement for a feasible monetary policy. In the absence of a completely effective secondary bond market such as in South Africa, the major motivation of commercial banks to hold public bonds is in statutory requirements on the composition of reserves. This implies that high interest rates are required to induce banks to purchase bonds beyond their legal obligation. No secondary market and high yields on public bonds means that financing deficits by bond sales has the perverse effect of discouraging commercial banks from funding productive investments, which are riskier than holding government securities.[20]

If crowding out of private investment, to which we referred above, occurs in developing countries, it is through this mechanism, seeking to induce private banks to hold public bonds when financial markets are inefficient, not as a result of public borrowing itself. In practice it is a public sector subsidy of private banks. The crowding out process that the IMF and the World Bank have in mind results from higher interest rates, allegedly discouraging productive investors. The real process of crowding out results from selling high-interest-rate bonds to banks, which leaves those banks uninterested in taking on the risk of lending to productive investors. Both types of crowding out, the unlikely IMF and World Bank variety and the common bank subsidy variety, are avoided by monetization.

A second major effect of high interest rates is to increase the cost of servicing the domestic public debt. The burden of public debt is overwhelmingly determined by the interest rate at which it must be serviced. Maintaining a real interest rate on public debt below the real growth rate of the economy is the *sine qua non* of domestic debt management. Monetization of public borrowing facilitates this.

In summary, for the majority of developing countries, monetary policy is an illusion that can have little impact on aggregate output or inflationary pressures because of the absence of functioning financial markets. As a result, the rational use of the central bank is to facilitate fiscal policy.

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19. An example is the repair of the Bumbuna hydroelectric site, which could greatly reduce power cuts and the use of private generators in Sierra Leone, especially Freetown. See <http://siteresources.worldbank.org/EXTDEVCOMMENG/Resources/sierraleone.pdf>.

20. This process is discussed in detail for Zambia in Weeks, *et al.* (2006). This represents what might be called "bank squeezing out." The typical use of the term "crowding out" refers to a fall in private investment that results from government borrowing that pushes up interest rates, discussed in the previous section. More relevant in sub-Saharan countries is the decision by private banks not to lend because the risk-adjusted return on public bonds is greater than that for lending to private non-financial borrowers. The return on public bonds is high because of the oligopsonistic power of private banks in sub-Saharan countries.

Table 4
Monetary Policy and Bond Markets in Sub-Saharan Countries, late 2000s

Country	Monetary policy	Country	Monetary policy
Angola	NSM	Liberia	NSM
Benin	NCB, WAEMU	Madagascar	LSM
Botswana	NSM	Malawi	LSM
Burkina Faso	NCB, WAEMU	Mali	NCB, WAEMU
Burundi	NSM	Mauritania	NSM
Cameroon	NCB, CAEMC	Mauritius	LSM
Cape Verde	LSM	Mozambique	NSM
Central African Rep	NCB, CAEMC	Namibia	LSM, CMA (rand)
Chad	NCB, CAEMC	Niger	NCB, WAEMU
Comoros	NSM	Nigeria	LSM
Congo DR	NSM	Rwanda	LSM
Congo, Rep	NCB, CAEMC	Senegal	NCB, WAEMU
Cote d'Ivoire	NCB, WAEMU	Seychelles	NSM
Equatorial Guinea	NCB, CAEMC	Sierra Leone	NSM
Eritrea	NSM	South Africa	ESM
Ethiopia	NSM	Sudan	NSM
Gabon	NCB, CAEMC	Swaziland	NSM, CMA (rand)
Gambia	NSM	Tanzania	NSM
Ghana	LSM	Togo	NCB, WAEMU
Guinea	NSM	Uganda	LSM
Guinea-Bissau	NCB, WAEMU	Zambia	LSM
Kenya	LSM	Totals	Feasible monetary policy 12/44
Lesotho	NSM, CMA (rand)		

Notes:

The CFA franc zone is the West African Economic and Monetary Union (WAEMU, Benin, Burkina Faso, Cote d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, Togo). In addition to a common currency, the governments of these countries are constrained to balance the current account of the public budget. The capital account can have a deficit if the method of funding the deficit is specified. The Central African Economic and Monetary Community (CAEMC, Cameroon, Central African Republic, Chad, Republic of Congo, Equatorial Guinea, Gabon) also has a common currency with a fixed parity to the euro. Both are commonly called the CFA franc. They are not freely interchangeable, except via euro convertibility that is guaranteed by the French Treasury, which holds at least sixty-five percent of the pooled reserves of each area.

CMA is Common Monetary Area, rand (South Africa, Lesotho, Namibia, Swaziland).

NCB is no central bank, including countries sharing a common central bank.

NSM is "no secondary market", which includes cases in which the government does not issue bonds, issues them but does not sell them on the open market, or sells them but there is no secondary (resale) market.

LSM is "limited secondary market" and refers to the number of buyers and sellers.

ESM is "effective secondary market".

Sources:

Monetary institutions: Wharton Financial Institutions Center of the University of Pennsylvania, all but Mauritius, Namibia, Nigeria and Seychelles, and http://www.afdb.org/en/news-events/article/donor-workshop-on-african-bond-market-4443/

Economic indicators: World Development Indicators 2009 and IMF country reports.

5 Exchange Rate Policy for MDGs

By increasing output and private demand an active macro policy will tend to increase imports and generate a trade deficit or make an existing deficit larger. This problem has in the past undermined the use of active fiscal policy in developing countries and discredited it as an instrument of macro management, especially in Latin America in the 1970s. Short-term exchange-rate

management can be used to counter the tendency of an MDG-focused fiscal expansion to create an unsustainable trade balance.

As a consequence, fiscal expansion will need to be accompanied by a rise in the exchange rate, either as an automatic response (depreciation) or by conscious management (devaluation). To achieve the desired outcome of stablizing the level of output, the exchange rate adjustment accompanying the fiscal stimulus should be consciously managed. Management is necessary in order to prevent a deterioration of the trade balance.

The fiscal expansion, by increasing output and private demand, will increase imports and generate a trade deficit or make an existing deficit larger. This is the problem that tended to undermine the use of active fiscal policy in developing countries in the past, and to discredit it as an instrument of macro management. Exchange rate depreciation or devaluation can be used to counter the tendency of fiscal expansion to create an unsustainable trade balance. To be effective, the depreciation or devaluation must increase the price of traded commodities compared to non-traded commodities.

A necessary and intended result of the depreciation or devaluation is a rise in the domestic price level equal to at least the "pass-through rate" (marginal propensity to import) times the change in the nominal exchange rate. While necessary and intended, this exchange-rate-induced increase in the price level creates the risk of destabilizing inflation if the nominal devaluation is large. Managing this risk is an essential part of a successful active fiscal policy, as explained in Section 2.2.

As fashion moved against active fiscal policy over the last three decades, there was a shift to a view that "flexible" exchange rates were the only practical policy choice for governments. Therefore, it is necessary to explain why exchange-rate management by governments in developing countries would be both feasible and possible as part of a policy to counter the global crisis and macroeconomic strategy in general.[21] Because in practice almost all governments intervene in foreign exchange markets,[22] the real policy choice is not between "fixed" and "flexible" exchange rate regimes, but the selection of the most appropriate point on a range of forms and degrees of intervention in the context of the characteristics of the economy (Fischer 2001). Governments and central banks repeatedly shift between "flexible" and "fixed" exchange rates. Any time a central bank intervenes to moderate the rise or fall of the national currency it is "fixing" the exchange rate, however briefly.

The exchange rate management that would be part of the proposed stimulus package would not seek to maintain a "fixed" rate for the domestic currency against any foreign currency. The purpose of the intervention would be to control the rate of depreciation of the national currency against the currencies of major trading partners in order to prevent a widening of the trade gap as the economy expanded. The exchange rate managers would face two possible contexts, one in which the fiscal expansion was accompanied by no "weakening" of their currency and another in which fiscal expansion automatically provokes depreciation.[23]

The *devaluation case* occurs if there is no market pressure to weaken the national currency as public expenditure increases. In this case the government must act directly on the exchange rate. The purpose is to raise the price of tradables, which will reduce private import demand and raise the return to exporters. How devaluing the currency would be achieved would be

21. An argument in favour of a global return to managed exchange rates is found in Rolnick and Webber (1989), who write, "we maintain there is a convincing case that a fixed exchange rate system is feasible and should be established. Theory shows it feasible, and overlooked empirical evidence shows it possible."

22. The IMF categorises countries by exchange rate regime, and the Annual Report for 2007 lists only thirty-five countries out of over 150 as having an 'independently floating' exchange rate. Only two were in the sub-Saharan region: Democratic Republic of Congo and Somalia. The listing of the latter seems an anomaly in light of the political turmoil in the country. Another anomaly is the absence of Sierra Leone from the table of exchange rate regimes.

23. The well-known Fleming-Mundell model predicts that a fiscal expansion would result in exchange rate appreciation. That analysis is not relevant to Sierra Leone because the country has no significant level of portfolio capital flows due to lack of the necessary financial institutions.

determined by the characteristics of financial and foreign exchange markets in each country. In the absence of market pressure to weaken the national currency there would be no private speculation to undermine the devaluation. In effect, the government would temporarily be implementing a "crawling peg" exchange-rate regime. In this case exchange-rate management is necessary to achieve a real devaluation in the absence of market pressure for depreciation.

The *depreciation case* occurs if the fiscal expansion is accompanied by market pressure to weaken the national currency. Exchange rate management becomes more complicated, but is still required and remains manageable. While the market pressure to weaken the exchange rate serves the government's purpose, intervention is potentially necessary to prevent the currency from depreciating at a rate that generates unmanageable inflation pressures.[24] Because the intervention seeks to slow the depreciation rather than stop it, the likelihood of speculative attack is greatly reduced. In summary, even in the depreciation case, the exchange rate authority should implement *depreciation* in order to foster competitiveness while preventing excessive nominal exchange rate weakening.

6 Stimulus and Growth Packages for MDGs

A macroeconomic policy strategy to achieve the MDGs faces two types of constraints on its effectiveness: 1) those arising from the adjustment dynamics of the economy; and 2) those derivative from donor behaviour and conditions. The first type can be managed by the government. The second type requires flexibility on the part of donors and the IMF.

As explained, the most important constraint on a successful outcome of the implementation of the policy package is the inflation induced by the weakening of the exchange rate. Exchange-rate-induced inflation feeds back into the external sector by reducing the real depreciation associated with any nominal depreciation. The inflation constraint is made tighter by the calculation if the economy suffers from a substantial structural rate of inflation. It would be prudent for the government to identify an inflation rate that it considers to be the maximum consistent with macroeconomic stability. This would constrain the nominal devaluation managed by the central bank.

Less important than inflation, but posing significant constraints, are the trade balance and the fiscal deficit. In the absence of additional donor support, the stimulus package should not substantially increase the trade deficit, which in many countries is sustainable on the basis of those donor inflows and remittances. This constraint would be loosened by the real devaluation. With the goal of not generating a burdensome public debt, the fiscal deficit should be carefully monitored, though not made a binding constraint.

Depending on the size of the external shock to be redressed and existing donor flows, a country may not require a substantial increase in grants for the fiscal stimulus to be effective in stabilizing the economy. However, the government will need donors and the IMF to grant "policy space" through the following measures:

1) elimination of the countercyclical conditionalities and "benchmarks" for deficit limits, inflation rates and foreign exchange holdings, since the stimulus package requires a modest increase;

2) donor reliability on delivery of assistance because the fiscal stimulus will be "finely tuned" and late or non-delivery of assistance could provoke macroeconomic instability; and, more generally,

3) a suspension of the "business as usual" approach to negotiations over assistance that emphasize policy issues, such as tax reform, that the external crisis has rendered of less immediate importance.

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24. Exchange rate management in Zambia is discussed in detail in Weeks, et al. (2007).

The combination of a carefully calibrated stimulus package and donor flexibility offers the firm prospect of overcoming the potentially serious effects of the external shock to the economy. While the stimulus package involves risks, these are minor compared to the certain effect of the global depression on poverty and public welfare.

Within the context of accommodating donor and lender policies, a countercyclical fiscal policy focussed on poverty reduction and achieving the MDGs should be possible in most countries, including low-income countries and the Least Developed Countries.

The annex to this study provides a case study of one of the world's poorest countries, Sierra Leone. That case study, which recommends policies implemented by the government beginning in late 2009, demonstrates the possibility of effective recovery policies under relatively unfavourable post-conflict conditions.

Annex A: Country Study – Recovery and Growth Strategy for Sierra Leone

This annex presents a study for the Ministry of Finance and Economic Development of the Republic of Sierra Leone, funded by UNDP Freetown, and submitted to the Minister of Finance and Economic Development in August 2009 (Weeks 2009b).

A1. Data, Assumptions and Model Structure

Impact of the Global Crisis

Sierra Leone has a small economy by the analytical definition, confirmed statistically by the non-significance of variables measuring global demand when estimating its export supply function. The country's demand for imports is negligible in world markets. However, it is reasonable to assume that changes in demand at the global level would be transmitted to the economy. The WTO estimates a decline in world trade in 2009 of nine percent, and a ten percent decline in exports for developed countries.[25] Recent statistics from the Ministry of Finance indicate a large fall for Sierra Leone, of fifteen percent. This study calculates a scenario of a fifteen percent fall in export earnings. The decline is the result of the following expectations by commodity in 2009 (export value in 2008 in parenthesis):

1) the quantity of diamonds exported will fall slightly and prices will drop by about five percent (US$ 99 million);

2) rutile export value will fall due to the loss of a dredger, but will recover in 2010 (US$ 38 million);

3) bauxite production will collapse to zero because of the suspension of production (US$ 29 million);

4) cocoa exported will not decline, but prices will fall slightly (US$ 11 million);

5) fish and shrimp exports will remain the same, with a nine percent rise in price (US$ 2 million); and

6) coffee exports will remain the same with a ten percent fall in price (US$ 1.5 million).

The Ministry of Finance anticipates a substantial recovery of export value in 2010 due to iron ore production from a mine under construction in 2009. Therefore, the drop in exports at the end of 2008 and through 2009 can be treated as a transitory external shock. No separate estimate is attempted of the likely decline in remittances from abroad. It is implicitly assumed that any decline in remittances is part of the fall in export earnings. The method used to calculate the impact of the global downturn is to construct a simple macroeconomic model with parameters derived from regression analysis. The regressions are presented in Annex A4, to which the reader can refer for behavioural assumptions and statistical details.

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25. "The collapse in global demand brought on by the biggest economic downturn in decades will drive exports down by roughly 9% in volume terms in 2009, the biggest such contraction since the Second World War, WTO economists forecast today. The contraction in developed countries will be particularly severe with exports falling by 10% this year." For further discussion, see http://www.wto.org/english/news_e/pres09_e/pr554_e.htm.

FIGURE A1
Commodity Export Value by Quarter, 2000Q1 - 2008Q2
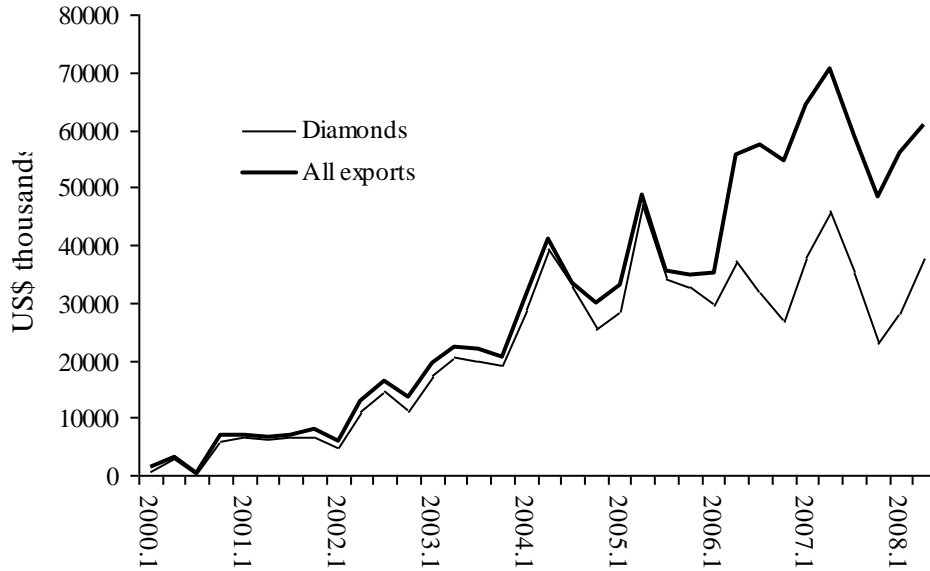
Source: Government of Sierra Leone

Characteristics of the Model

In order to calculate the impact of the specified fall in exports, it is necessary to generate a key statistic and make several assumptions about the behaviour of the domestic and international economies. These are listed below.

1. Quarterly GDP

Gross national production statistics are calculated by the statistics office on an annual basis. Government expenditure and exports are available by quarters. These quarterly data can be used to produce a series for GDP. The following national income identity becomes an equilibrium condition if inventory change is assumed to be zero ($\Delta inv = 0$).

C = household consumption, I = business investment, G = government expenditure, X = exports, N = imports, and Y = national income:

$C + I + G + (X - N) + \Delta inv \equiv Y$, identity

$C + I + G + (X - N) = Y$, equilibrium

Applying standard behavioural functions:

$C = a_1(Y - T) = a_1(1 - a_2)Y$

$N = a_3Y$

a_1 is the propensity to consume, a_2 is the propensity to tax and a_3 is the propensity to import.

$Y = \beta(I + G + X)$,

$\beta = 1/[1 - a_1(1 - a_2) + a_3]$ = the autonomous expenditure multiplier

Quarterly GDP is calculated as $\beta(G + X)$, with the annual value of β applied to each quarter, adjusted so that

[calculated]$(GDP_{tq1} + \ldots + GDP_{tq4}) = $ [actual](GDP_t).

Investment is implicitly assumed to be a constant portion of GDP. This calculation produces a quarterly nominal GDP series that is used in some of the regressions, and is shown in Figure A2.

FIGURE A2
Index of Quarterly Nominal GDP, 2001Q1 - 2008Q2
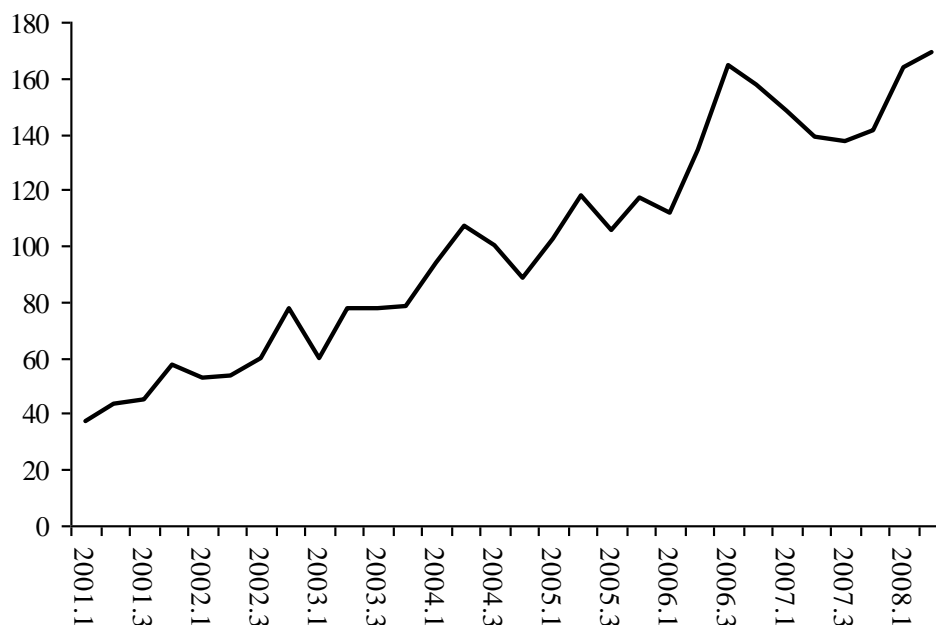
Source: See text.

2. Assumptions

a) The import price of petroleum is constant at its January 2009 average.

b) The policy choices are constrained by the rules that the trade deficit should not increase as a share of GDP, that the fiscal deficit should not increase, and that inflation should be no more than fifteen percent.

c) An increase in government expenditure is financed by monetizing the deficit and induced public revenue.

d) No change in aid commitments by donors.

3. Key Behaviour Parameters

The regression equations in this annex produce the following key parameters that determine the calculation of the impact of the export decline:

a) There is a structural rate of inflation of five percent per annum (the statistically significant intercept of the inflation equation); otherwise, inflation is determined by the nominal exchange rate and petroleum prices.

b) The elasticity of export earnings with respect to the real exchange rate is approximately unity (from the export equation).

c) The marginal propensity to import is .54, and the elasticity of import value with respect to the real exchange rate is approximately .9 (from the import equation).

d) Domestic revenue is determined by GDP (elasticity .22), the nominal exchange rate (via trade taxes, .90), and the domestic price level (via taxes on domestic commodities, .84).

A2. Calculation of the Impact of the Global Crisis

Monetary tools are not effective instruments of macroeconomic management in Sierra Leone. This leaves the government with two policy instruments by which it can manage the economy in the short run to mitigate the effects of the global crisis, the nominal exchange rate and net government expenditure. The role of these instruments can be demonstrated with a simple algebraic model. Taking the first difference of the national income equation (Section A1, above), and making the assumption of no change in private investment, one obtains:

1) $\Delta Y = \beta[\Delta G + \Delta X + a_t \Delta E]$

> β is the multiplier;
> G is government expenditure, determined by policy;
> X is the autonomous component of the export function;
> E is the nominal exchange rate and E* the real exchange rate; and
> a_t is the sum of coefficients relating exports and imports to the real exchange rate;

Dividing by Y and treating $\Delta Y/Y$ as infinitesimally small, one obtains the following, with small letters indicating growth rates and the α_i's are shares in GDP:

2) $y = \beta[\alpha_g g + \alpha_x x + \varepsilon_t e^*]$

> ε_t is the sum of the absolute values of the import and export elasticities.[26]

The real exchange rate is the nominal rate minus the rate of inflation. Ignoring the structural component, inflation equals the change in the exchange rate times the 'pass through' rate (marginal propensity to import, a_3):

> $e^* = e - p, \ p = e - a_3 e = (1 - a_3)e$

> Substituting for e*:

> $y = \beta[\alpha_g g + \alpha_x x + \varepsilon_t(a_3/1 - a_3)e]$

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26. The algebra is demonstrated in Weeks (2009b).

The term $\alpha_x x$ is the impact on growth of a fall in world demand. The condition that growth does not decline is y = 0.

$$\alpha_x x = \alpha_g g + \varepsilon_t(a_3/1 - a_3)e$$

The rate of change of the nominal exchange rate is constrained by the inflation constraint, $a_3 e < p^*$. If x is known, alternative combinations of g and (e < p*) can be calculated for the stimulus package. As shown below, if x = -15 percent, then the inflation and deficit constraints are satisfied with a devaluation of eighteen percent and an increase in public expenditure of slightly less than ten percent (e = 18.1, g = 9.8).

The regression results in this annex indicate that the exchange rate would be effective in stimulating output by increasing exports and reducing imports. Its use is constrained by its inflationary effect. Because the economy is open, nominal devaluation results in an increase in the price level via import prices. The regression results should be interpreted as indicating outcomes for marginal changes. A "large" devaluation might generate instability that could induce unmanageable inflation. To avoid this we set the policy constraint that, to be viable, a policy response should not generate an aggregate price increase of more than fifteen percent.

Use of government expenditure to compensate for a fall in export demand is constrained by its financing. On the assumption that official development assistance would not increase, more public expenditure would be financed by monetizing the deficit (the government borrowing directly from the Bank of Sierra Leone). Because the economy is open, this borrowing would have a limited inflationary impact. The excess supply of money would tend to go to purchases of imports and domestic goods. Already suffering from a large trade deficit, the economy could be destabilized by a surge in imports. This effect dictates the constraint that the policy response to the export decline should not cause the trade deficit as a share of GDP to exceed its initial level.

Table A2 presents the estimate of the impact of the global crisis if its effect is limited to a fifteen percent fall in export earnings. The column T0 gives the initial position and column T1 the outcome in the absence of a policy response. Via the demand effect, the fifteen percent fall in exports reduces GDP by 9.6 percent. The trade deficit rises to almost twenty-five percent of GDP, and the fiscal deficit increases slightly as a percentage of GDP. The decline in GDP is equal to the fall in export earning times the autonomous expenditure multiplier. Imports fall less than GDP, so the import share of GDP increases. The structural element in inflation increases the price level by five percent, which causes a real appreciation of the constant nominal exchange rate, adding to the export decline.

In column T2a, the policy response is a nominal devaluation sufficient to return GDP to its initial level. Due to structural inflation of five percent and the inflation induced by devaluation itself, an exchange rate adjustment of almost forty percent is required to return to the initial level of GDP. This provokes inflation of almost twenty percent, which is above the policy constraint. It is likely that, in practice, a devaluation of this size over a short time period would generate uncontrollable inflation, as well as destabilizing the formal credit market.

In the next column, T2b, fiscal policy is used to stimulate demand with a constant nominal exchange rate. An increase in public expenditure of almost twenty percent is required, which raises the fiscal deficit to over nine percent of GDP. As well as generating a deficit that might be unsustainable, this policy response violates the rule on the trade deficit, which rises from below nineteen to twenty-four percent of GDP.

Devaluation and increased public expenditure are combined in T2c, and the binding policy constraint is inflation. To return to the initial level of the trade deficit as a share of GDP, a nominal devaluation of eighteen percent is required, provoking inflation of just over ten percent. When this is combined with an increase in public expenditure of 9.8 percent, GDP returns to its initial

level. The fiscal deficit is not a constraint. The effect of devaluation and inflation is to increase public revenue sufficiently to lower the fiscal deficit from minus six to minus 4.3 percent of GDP.

These calculations indicate that the appropriate and effective policy response to the global crisis is for the government of Sierra Leone to combine a moderate devaluation with a moderate increase in public expenditure. This combination could stabilize the level of output at its pre-shock level, maintain the initial trade deficit, and reduce the fiscal deficit while avoiding excessive inflation. On the negative side, a fifteen percent decline in export earnings (or, more generally, a fifteen percent decline in foreign exchange inflows) is close to the limit of what policy could compensate in one year without additional external assistance. A larger decline would require a devaluation that would be excessively inflationary and/or an unsustainable fiscal deficit. Without more assistance, the policy response to a larger external shock would need to be phased over more than a year, implying a short term decline in GDP.

TABLE A2
Alternative Policy Responses to a 15 Percent Fall in Export Earnings

	To	**T1**	**T2a**	**T2b**	**T2c**	**Notes:**
GDP* =	100.0	90.4	100.0	100.0	100.0	level (index)
exports =	19.0	15.4	19.0	15.3	17.1	level (index)
imports =	37.8	37.4	32.8	39.5	35.9	level (index)
(X-M)/GDP =	-18.8	-24.4	-13.8	-24.1	-18.8	percentage
Dm rev =	13.0	13.2	20.1	13.5	16.6	level (index)
Pub Exp =	19.0	19.0	19.0	22.6	20.9	level (index)
Deficit/GDP =	-6.0	-6.4	1.1	-9.1	-4.3	percentage
Price level =	100.0	105.0	118.1	105.0	111.5	level (index)
Changes:						
Exchange rate		0%	+38.3%	0%	+18.1%	percentage
Public spending		0%	0.0%	+19.2%	+9.8%	percentage

* GDP is adjusted for inflation in outcome T1 through T2c.

To is the initial level of output with trade and public sector shares equal to those of 2008.

T1 is the calculated impact of a fifteen percent decline in export earnings.

T2a is a policy response in which the nominal exchange rate is devaluated sufficiently to return to the initial level of GDP. This generates inflation of almost twenty percent.

T2b is a policy response in which public expenditure is increased sufficiently to return to the initial level of GDP. This violates the policy rule that the trade deficit in GDP should not rise.

T2c is a policy response that seeks to maintain the initial trade deficit (-18.8% of GDP), achieved by an 18% devaluation and an increase in pubic expenditure of 9.8%.

TABLE A3
Results of Model-based Calculations for a 15% Decline in Export Earnings:
Policy Instruments: Public Expenditure (+9.8%) and Devaluation (+18.1%)

External "shock" (assumed)	Policy response (calculated)*	Induced changes in macro variables	Yielding macro balances	Employment & poverty	
Export earnings fall by 15%	Increase in public expenditure (G) by 9.8%	G/GDP rises to 20.9% R/GDP rises to 16.6% Price level rises by 11.5%	(G-T)/GDP = -4.3 (from -6.0)	Employment schemes generate 4.1% of labour force	Prevents rise in
	Managed nominal devaluation of 18.1%	X/GDP falls to 17.1% M/GDP falls to 35.9%	(X-M)/GDP = -18.8 (no change)	Income of exporters down 1.9 percentage points	poverty of 12.5% percentage points**

Notes:

* See model in statistical annex.

** Assuming that the distribution of income after the "shock" is the same as before it.

A3. Sectoral Effects

Trade Balance

This study has focused on export earnings as the major transmission mechanism for the global crisis. This section investigates the effect of changes in international prices on the trade balance. Foreign currency export earnings are by definition determined by the border price of a commodity and the quantity sold. Similarly, the import bill is the product of the border price and quantity imported. By its effect on commodity demand, the global downturn impacts on both exports and imports: in the export effect, it reduces earnings directly through both the quantity and price; and for the import effect the direct impact is through border prices. The trade balance measured in foreign currency will tend to increase *via* the export effect and decline *via* the import effect. The net impact is determined by the volatilities of export quantity and export and import prices.

Table A4 calculates the impact of changes in export and import prices on the assumption that the quantities of the commodities were the same in 2009 as in 2008. This assumption is appropriate because it allows a focus on price effects uncomplicated by quantity changes except for rutile and bauxite for which quantity changes are anticipated. As a result of primarily considering price effects, the change in export value does not necessarily equal the fall of fifteen percent assumed in the model-based calculations.

The 2009 prices by commodity are the monthly average through June. If in 2009 Sierra Leone exports the same quantity of commodities as for 2008 (except rutile and bauxite), and the average price for 2009 is the same as for the first six months, the decline in export earnings would be US$ 40.6 million. The largest components of this are rutile production, which is assumed to fall as a result of the loss of a dredger at the major rutile mining site, and bauxite, for which production was suspended in 2009. The next largest component is diamonds, with a negative price effect of US$ 5.6 million. The sum of the price effects for cocoa, coffee and marine products is a loss of less than fifty thousand dollars.

On the import side, the two dominant products are petroleum and rice. For the first six months of 2009 the petroleum price was almost fifty percent below its 2008 average, and rice prices were down thirty-five percent. If the same amounts of petroleum and rice were imported in 2009 as 2008, the bill for the former would be US$ 84 million lower, and US$ 59 million lower for rice. The net change in the value of the trade balance would be a positive US$ 64.4 million, equal to twelve percent of the 2008 import bill. Since, in 2008, imports were 2.5 times larger than exports, this result is not surprising.

The net positive impact on the trade balance of falling world prices is both good and bad news for the economy. It is good news for dealing with the impact of the international downturn. To a substantial degree, the relative price changes generated by the global depression offset the declines in the quantity of export commodities, an effect not included in the modelling calculations. In addition, the fall in the border price of petroleum and rice are deflationary, reducing the inflationary effect of the devaluation recommended in the previous section. These conclusions are unlikely to be altered if commodity prices continued to fall in 2009.

It is quite bad news for the medium-term growth prospects of the economy, because the recovery of the world economy and commodity prices will increase the country's trade deficit as rising petroleum prices overwhelm rising export prices. This implies that the recovery and growth of the economy will continue to be dependent on official development assistance to fill the trade deficit. Solving this fundamental distortion in the economy would be achieved in the medium and long run through an integrated industrial policy[27] that generates the incentives for diversification of the export base and production for the domestic market. Discussion of this issue is not within the scope of this study.

Labour Market, Poverty and Employment

To estimate the employment and poverty impacts, it is necessary to estimate the income distribution across households, which uses as a proxy the household quintile distribution of consumption reported in the 2004 household survey. First, the quintile distribution is converted to percentiles by use of a simple distribution function between the mid-points of each quintile. With the application of a poverty line, this allows calculation of the elasticity of poverty with respect to GDP, and a count of the percentiles falling into or rising out of poverty for any income change. The calculations use the 2008 World Bank estimate of per capita income, US$230, and set the poverty line at media income (US$ 160). Figure A3 shows the Lorenz Curve generated by this method of calculation.

By international comparison, Sierra Leone's distribution is relatively equal, with a Gini coefficient of less that .30. This implies a relatively high elasticity of poverty with respect to growth. The calculations generate an elasticity of poverty with respect to income of almost minus three for the first quintile, less than minus one-half for the fifth quintile, and -1.3 across the entire distribution. The impact of the crisis on national income was calculated as -9.6 percent (see Table A2). If this decline were equally distributed with regard to household income, the increase in poverty would be 12.5 percentage points of the population (average elasticity times the fall in national income).

The fiscal expansion of 1.9 percent of GDP could be used to substantially increase two employment generation programmes, those of the National Commission for Social Action (NCSA) and the Youth Employment Schemes (YES). Table A5 calculates the employment creation if eighty percent of the expenditure increase were divided equally between these two programmes (about US$ 16 million each). The NCSA programmes, with higher cost per worker and a lower wage share, would generate more than 26,000 full-time annual jobs, and the lower wage YES schemes would create almost 53,000. Together the total increase in employment would be almost 80,000, or about four percent of the active labour force.

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27. "Industrial policy" refers to macro, trade and public investment policies that foster any of the sectors of the economy including agriculture.

How much poverty this job creation reduces would depend on how the employment was generated across the income distribution.

If the new workers benefitting from the schemes were spread randomly across the income distribution, the poverty prevented would be equal to that created by the fall in GDP (Table A6). Despite the relatively equal distribution of income, implementing the employment generation schemes in a redistributive manner would result in substantial gains in poverty reduction. Were it possible administratively to restrict the recruitment of workers to ninetieth percentile of the distribution and below, poverty would be reduced by 1.4 percentage points compared to before the fall in exports. Drawing workers from the lowest sixty percent of the distribution would result in net poverty reduction of seventeen percentage points.

TABLE A4
Calculated Impact of Changes in Export and Import Prices, 2008-2009

	Average prices (index)			Export/Import value US$		US$
	2008	**2009**	**Change**	**2008**	**2009**	**Gain/loss**
Exports						
Cocoa	100	99	-.7	11,653	11,577	-76
Coffee	100	90	-10.4	1487	1332	-155
Fish, Shrimp	100	109	+9.0	2046	2230	184
Diamonds	100	94	-5.7	99,000	93,396	-5,604
Rutile	100	na	na	38,146	22888	-15,258
Bauxite	100	60	-40.0	29,704	10,000	-19,704
Other				10,000	10,000	0
						-40,613
					Export effect	
Imports						
Petroleum	100	51	-48.8	172,496	88,251	-84,246
Rice	100	65	-35.2	59,250	38,393	-20,857
					Import effect	-105,103
					Total effect	+64,490
				Percent of	2008 imports	+12.1

Notes and sources:

Assumptions

1. No change in export or import quantities except for rutile, for which it is assumed that the loss of the dredger reduces export value by half; and bauxite, which falls to zero after first quarter estimate of US$ 10 million. For all other commodities, value for 2009 calculated by multiplying the 2008 value by the price index for 2009.

2. Average price for first five months of 2009 holds for the year.

3. All fish products have the same price change as farmed shrimp.

Price sources

Cocoa: International Cocoa Organisation, http://www.icco.org/

Coffee: International Coffee Organisation, http://www.ico.org/

Fish, shrimp: http://www.indexmundi.com/commodities/?commodity=shrimp&months=60

Diamonds: http://www.diamondse.info/

Rutile & bauxite: London Metal Exchange, http://www.lme.co.uk/

Petroleum (crude): US Energy Information Agency, http://tonto.eia.doe.gov/dnav/pet/pet_pri_top.asp

Rice (broken): International Rice Research Institute, http://beta.irri.org/solutions/index.php?option=com_content&task=view&id=250

FIGURE A3
Lorenz Curve for Per Capita Consumption, Sierra Leone 2005
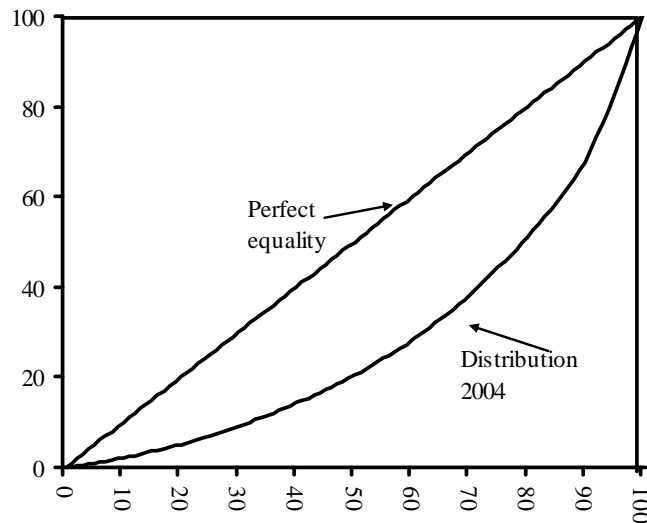
Notes:

Calculations based on the quintile distribution of household consumption in 2004 household survey (GSSL 2007), as follows:

1. World Bank value of US$ 230 used for per capital income;

2. saving rate assumed constant, so income growth equals consumption growth;

3. deciles expanded to percentile by assuming a constant growth rate between the consumption values at the mid-point of each quintile (yielding four rates); and

4. because the total income in each quintile is known (average times twenty percent of households), values below the mid-point of the lowest quintile and the highest could be estimated by using growth rates described above.

TABLE A5
Employment Outcome for a Fiscal Stimulus of 1.9 Percent of GDP*

	NCSA	YES
Item	Ln bn	Ln bn
GDP billion Leone	7109	7109
Increase in public expenditure, % of GDP	1.9	1.9
Increase in billions of Leone	132	132
Increase in millions of US dollars	39	39
Percent to employment programmes	.80	.80
Percent to each programme	.50	.50
Wage share in each programme	.60	.70
Total cost of a worker per day	10.0	5.0
Total worker years	26,476	52,951
Total employment, both programmes	**79,427**	
New employment as percent of labour force*	**4.1**	

Notes:

* Labour force is the population 15-59, with a forty percent participation rate for females and eighty percent for males. Participation rates reflect "home workers" for females and full-time students for both sexes. Estimated from (GSSL 2007).

NCSA - National Commission for Social Action employment projects; YES - Youth Employment Schemes

The increase in government expenditure is that amount, when combined with devaluation that prevents a fall in GDP. Wage rates and total cost of employing a worker provided by NCSA and YES officials.

TABLE A6
Poverty Prevented by Creating Almost 80,000 Jobs with Expenditure of 1.9 Percent of GDP, by Benefit Shares

Benefit share	Poverty prevented	Poverty reduced
100	-12.5	
90	-13.9	-1.4
80	-18.2	-5.7
70	-25.2	-12.7
60	-29.4	-16.9

Notes:

1. Poverty line is median income.

2. "Benefit share" refers to the income percentile range from which the workers come (0 to 100, 0 to 90, etc.).

Explanation: A fall in exports of fifteen percent reduces GDP by 9.6 percent (15% times the multiplier times the share of exports in GDP).

If equally distributed across percentiles of households, the decline would increase poverty by 12.5 percentage points. If the employment and its multiplier effects of the 1.9% fiscal stimulus are also equally distributed across the distribution, the poverty fall of 9.4 percentage points is prevented (no net change). Excluding the ten percent of households with the highest incomes from the employment generation scheme results in a net gain of 1.4 percentage points in poverty reduction; similarly for the other rows of the table.

A4. Parameter Estimates

This annex reports the regression estimations that provide the coefficients for the model estimating the impact of an export decline. The data were provided by the Ministry of Finance and Statistics Sierra Leone (http://www.statistics.sl/). The calculation of quarterly GDP is explained in the text, above.

Export and Import Functions

The export and import functions indicate an elasticity of the real exchange rate that is not significantly different from unity in both cases (negative for imports). The estimated marginal propensity to import with respect to GDP is considerably higher than the average (.54 compared to .42).

Domestic Revenue Function

The domestic revenue function conforms to theoretical prediction: while low, the elasticity of revenue with respect to GDP is positive and significant (.22); devaluation increases revenue via its effect on the domestic price of imports and exports; and increases in the domestic price level via the ad *valorem tax* on the domestic price of commodities. There is a significant difference across quarters, perhaps due to the agricultural production cycle.

Price Level and Inflation Functions

Sierra Leone has a highly open economy. The price level and, therefore, inflation are determined by the exchange rate and the most important import, petroleum. As theory would predict, the coefficient for the exchange rate is not significantly different from the average propensity to import. The inflation equation suggests a structural inflation rate of five percent per annum (the intercept, which is highly significant).

Exchange Rate Changes

As theory would predict, a nominal devaluation/appreciation does not generate an equal real devaluation/appreciation. For example, a ten percent devaluation/appreciation results in a 2.7 percent increase/decrease in the domestic price level, which makes the real exchange rate increase/decrease by 7.3 percent. To achieve a desired real devaluation, the nominal devaluation must be large enough to overcome structural inflation and the exchange-rate-induced increase of the price level.

TABLE A7
Export Function (quarterly, 2001 Q1 through 2008 Q2)

A7.1. Summary statistics

R stat	R Square	Adjusted R Square	Std Error	Durbin-Watson*
.972	.945	.939	.190	1.866

	Sum of Squares	Degrees of freedom	Mean Sq	F	Sig.
Regression	15.625	3	5.208	143.515	.000
Residual	.907	25	.036		
Total	16.532	28			

* No evidence of positive or negative autocorrelation.

A7.2. Coefficients

	Coeff	Std. Error	T stat	Sig of T
Constant	5.568	2.283	2.439	.022
LnRUSDt1	1.034	.513	2.014	.055
Time	.066	.006	10.838	.000
D1	-.466	.146	-3.195	.004

Variables:

The dependent variable is commodity export value in US dollars.

LnRUSDt1 is the natural log of the "real" exchange rate lagged one quarter, defined as the nominal rate to the US dollar multiplied by the Freetown cost of living index ("domestic prices") and divided by the US wholesale price index ("international' prices").

Time is a trend variable.

D1 is a "dummy" variable, equal to 1 for 2001.

Table A8
Import Function (quarterly, 2001 Q1 through 2008 Q2)

A8.1. Summary statistics

	R stat	R Square	Adjusted R Square	Std Error	Durbin-Watson*
	.883	.781	.753	.132	1.853

	Sum of Squares	Degrees of freedom	Mean Sq	F	Sig.
Regression	1.488	3	.496	28.452	.000
Residual	.418	24	.017		
Total	1.907	27			

* No evidence of positive or negative autocorrelation.

A8.2. Coefficients

	Coeff	Std. Error	T stat	Sig of T
Constant	11.629	1.754	6.629	.000
LnGDPt1	.535	.106	5.054	.000
LnRUSDt1	-.897	.348	-2.576	.017
D1	-.256	.098	-2.617	.015

Variables:

The dependent variable is commodity import value in US dollars.

LnGDPt1 is the natural log of nominal GDP lagged one quarter. See text of the annex for the method of estimation of quarterly GDP.

LnRUSDt1 same as for Table 4.1.

D1 is same as for Table 4.1.

TABLE A9
Domestic Revenue Function (quarterly, 2001 Q1 through 2008 Q2)

A9.1. Summary statistics

	R stat	R Square	Adjusted R Square	Std Error	Durbin-Watson*
	.988	.976	.970	.062	1.882

	Sum of Squares	Degrees of freedom	Mean Sq	F	Sig.
Regression	3.538	6	.590	151.740	.000
Residual	.085	22	.004		
Total	3.624	28			

* No evidence of positive or negative autocorrelation.

A9.2. Coefficients

	Coeff	Std. Error	T stat	Sig of T
Constant	-5.149	.472	-10.907	.000
LnGDPt-1	.217	.103	2.111	.046
LnUSDnmt	.908	.202	4.499	.000
LnDnCPIt	.847	.146	5.786	.000
q1	.070	.033	2.097	.048
q2	.189	.034	5.624	.000
q3	.058	.034	1.717	.100

LnGDPt1-1 see Table 4.2.
LnUSDnmt is the nominal exchange rate to the US dollar, lagged one quarter.
LnDnCPIt is the domestic price level (Freetown consumer price index).
q1, q2, q3 assume the value of one for the specified quarter. The fourth quarter is the omitted variable.

TABLE A10
Price Level and Inflation Functions (quarterly, 2001 Q1 through 2008 Q2)

A10.1. Summary statistics (Price level)

	R stat	R Square	Adjusted R Square	Std Error	Durbin-Watson*
	.974	.948	.945	.053	1.711

	Sum of Squares	Degrees of freedom	Mean Sq	F	Sig.
Regression	1.579	2	.790	284.064	.000
Residual	.418	31	.017		
Total	1.997	33			

* No evidence of positive or negative autocorrelation.

A10.2: Coefficients (Price level)

	Coeff	Std. Error	T stat	Sig of T
Constant	1.541	.387	3.977	.000
LnUSDnmt	.364	.106	3.417	.002
LnOilPrt1	.395	.034	11.706	.000

LnUSDnmt see Table 4.3.
LnOilPrt1 is the import price of petroleum, lagged one quarter.

TABLE A11
Price Level and Inflation Functions (continued)

A11.1. Summary statistics (Inflation)

	R stat	R Square	Adjusted R Square	Std Error	Durbin-Watson*
	.580	.336	.287	.052	.579

	Sum of Squares	Degrees of freedom	Mean Sq	F	Sig.
Regression	.037	2	.019	6.838	.004
Residual	.073	27	.003		
Total	.111	29			

* Evidence of positive autocorrelation.

A11.2. Coefficients (Inflation)

	Coeff	Std. Error	T stat	Sig of T
Constant	.050	.012	4.102	.000
DExRUSDt1	.267	.103	2.590	.015
DOilPrt1	.122	.041	3.009	.006

DExRUSDt1 is the logarithmic first difference of the nominal exchange rate lagged one quarter.
DOilPrt1 is the logarithmic first difference of the import price of petroleum lagged one quarter.

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