

United Nations Development Programme



## The Impact of the Global Financial Crisis on the Economy of Sierra Leone:

A Report for UNDP Freetown and the Ministry of Finance  
and Economic Development, Republic of Sierra Leone

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## Executive summary

### Global Crisis and Poverty Prevention

Most recent statistics indicate that the global financial crisis will cause a fall in export earnings in Sierra Leone of approximately fifteen percent in 2009 compared to 2008. A regression-based model estimates that this decline in exports earnings could result in a fall in national income of almost ten percent. Based on the income distribution in the 2003 household survey, a ten percent decline in national income would increase poverty by twelve percent of the population, or about 600,000 people.

A fiscal stimulus of two percent of GDP could stabilise the economy at the level of 2008, preventing this disastrous increase in poverty. A stimulus package consisting of employment intensive public works programmes could be designed to return the economy to its pre-shock level with a *reduction* in poverty.

### The Global Context

Since mid-2008 it has been clear that aggregate demand is insufficient to permit the world economy to achieve its potential. The governments of the major industrial countries have introduced ‘stimulus packages’ designed to replace the fall in private sector demand with public sector expenditure. What is true for the advanced countries can apply to Sierra Leone. World trade in Sierra Leone’s major export commodities has fallen in the last twelve months, at fifteen percent below the 2008 level. The problem is a deficiency of demand at any price and at any set of relative prices.

African governments have two policy options. They can ‘hope-for-the-best’ and continue with the policy framework designed for a robust world economy, and await international recovery. This would mean placing primary emphasis in macro policy on preventing inflation, setting a target for the fiscal deficit, and a free-floating exchange rate.

This option would represent a triumph of hope over experience. When the world economy is deflating a fiscal policy guided by fears of inflation would result in a contraction of demand for domestic goods aggravating the contraction in exports. A deficit target would become more difficult to realise. A reduction in expenditure, or an

increase in taxes, would further depress private domestic expenditure, and reduce revenue from sales taxes. The nominal depreciation of a floating exchange rate when global demand falls could result in an economic decline compounded by an inflationary spiral.

The other option, adopted by most governments in rich countries, is an active fiscal policy to reduce the impact of the international downturn through management of the public budget, to compensate for fluctuations in private sector demand by use of 'countercyclical' fiscal policy. After it fell out of political fashion for almost three decades, opinion has moved back in favour of countercyclical fiscal intervention. Recent recommendations by international agencies suggest that a new policy consensus has emerged in favour of countercyclical responses to the world downturn.

### A stimulus package for Sierra Leone

To counter the international crisis, this report recommends that the government of Sierra Leone initiate a macroeconomic stimulus, fiscal expansion of 1.9 percent of GDP, complemented by a managed currency depreciation of 18 percent from the current rate. The fiscal expansion would be financed by borrowing from the Bank of Sierra Leone, with some additional external assistance. Exchange rate management is a necessary complement 1) to decrease imports and increase exports to prevent an unsustainable trade deficit; and 2) to achieve a real exchange rate that is sufficiently trade altering but not excessively inflationary.

The stimulus package is a temporary, countercyclical measure in response to the 15 percent fall in export value. Some fiscal stimulus may be necessary beyond 2010, but it would be smaller than that recommended in this report. The recommended stimulus package specifically addresses the global recession over approximately eighteen months from mid-2009 to the end of 2010.

### Countercyclical fiscal policy

Public expenditure is a more effective instrument for counter-cyclical intervention than taxation, because of the inflexibility of the latter. Capital projects are inappropriate because they cannot be initiated quickly enough, nor be stopped without wastage when the economy becomes over-heated. Much of current expenditure is inappropriate because it is not practical or rational to suspend it.

Effective counter-cyclical expenditure would be based on programmes that use relatively simple capital equipment to create rapidly-completed facilities that have a large component of repair and maintenance, similar to what the ILO defines as ‘labour-intensive public works’: digging sanitation ditches, repair of public buildings, environmental improvement through erosion reduction, and clearing of rural footpaths.

The primary purpose of these projects is to generate income for those employed directly and indirectly. These programmes would be:

- 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) designed so that wages and salaries are the major element of expenditure, implying a low capital component.

Clear rules are needed for the initiation and termination of counter-cyclical 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. Using the method in this paper, MoFED experts could construct a ‘leading indicator’ series that appropriate for countercyclical planning.

The programmes that could effectively serve as counter-cyclical interventions are being executed by the National Commission for Social Action (NCSA) and the Youth Employment Scheme (YES). Currently supported by donors, these programmes could be funded by the government as its counter-cyclical instruments.

This report recommends that the countercyclical stimulus be largely funded by monetising the deficit. If the implied increase in the deficit exceeds a level consistent with achieving other policy goals, an inflation target or size of the domestic public debt, increased grants should be sought to fill the funding shortfall.

The proposed increase in the fiscal deficit would be unlikely to generate inflationary pressures, and even less likely to provoke a ‘crowding out’ of private expenditure. The increase in interest cost would be minor. For Sierra Leone there is no important technical argument against a stimulus package that relies on financing increased expenditure by monetising the deficit.

## Exchange rate management

Fiscal expansion would be accompanied by a rise in the exchange rate to prevent a decline in the economy. The exchange rate adjustment should be consciously managed. Management is necessary in order to prevent 1) excessive exchange rate induced inflation, and 2) a deterioration of the trade balance.

Limits on the stimulus package include:

- 1) avoiding 'excessive inflation', defined as greater than fifteen percent, because a higher rate might excessively increase the nominal demand for credit and stimulate an inflationary spiral;
- 2) the trade deficit should remain constant as a portion of GDP because it must be financed by donor grants which are inflexible in the short term, and by remittances from abroad which may decline in the short term; and
- 3) the exchange rate management would be implemented by a series of nominal devaluations to avoid excessive inflationary impact, through government intervention in the weekly foreign exchange auction.

Exchange rate management would not maintain a 'fixed' rate. The purpose is to control the depreciation to prevent a growing trade gap as the economy expanded.

## Constraints on implementation

The policy package of fiscal expansion and currency depreciation faces two types of constraints: 1) arising from the adjustment dynamics of the policy package; and 2) resulting from donor behaviour and conditions. The most important constraint on a successful outcome of the stimulus package is the inflation induced by the exchange rate. The inflation constraint is made tighter by the estimation of a structural rate of inflation of five percent per year. The government should identify an inflation rate which it considers to be the maximum consistent with macroeconomic stability. This report suggests that the inflation constraint to be the highest annual rate during the economy's rapid growth during 2004-2008, which was fifteen percent.

Sierra Leone may not require a substantial increase in grants for the fiscal stimulus to be effective in stabilising the economy. However, the government will need donors and the IMF to grant it 'policy space' through the following measures:

- 1) elimination of pro-cyclical conditionalities and 'benchmarks' for deficit limits, foreign exchange accumulation, and inflation rates;

- 2) donor predictability on delivery of assistance because the fiscal stimulus will be 'finely tuned' and late delivery of assistance would provoke macroeconomic instability; and,
- 3) a suspension of the 'business as usual' approach which emphasises policy issues that the external crisis has rendered of less immediate importance.

A carefully calibrated stimulus package and donor flexibility offer the 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 effect of the global depression on poverty and public welfare.

### Specification of the stimulus package

Modelling-based calculations indicate that the effective policy response to the global crisis is to combine devaluation with an increase in public expenditure. This could stabilize output, maintain the trade deficit, and reduce the fiscal deficit while avoiding excessive inflation. A 15 percent decline in foreign exchange flows is close to the limit of what policy could compensate in one year without additional grants. A larger decline would require a devaluation that would be excessively inflationary and/or an unsustainable fiscal deficit.

A fiscal expansion of 1.9 percent of GDP could be used to increase two employment generation programmes, those of the National Commission on Social Action (NCSA) and the Youth Employment Schemes (YES). This would create eighty thousand full time jobs. The poverty this job creation reduces would depend on how the employment was generated across the income distribution. If the new workers were randomly distributed through the distribution, the poverty prevented would be equal to that created by the fall in GDP. Implementing the employment generation in a redistributive manner would result in substantial gains in poverty reduction. Drawing workers from the lowest sixty percent of the distribution would result in net poverty reduction of 17 percentage points.

# 1 Introduction

## Policy Recommendation

To counter the effects of the international crisis on the domestic economy, this report recommends that the government of Sierra Leone initiate a macroeconomic stimulus package, fiscal expansion complemented by currency depreciation implemented through exchange rate management. The fiscal expansion would be largely financed by borrowing from the central bank (Bank of Sierra Leone), with a component of additional external assistance. Exchange rate management is a necessary complement in order to 1) to raise the relative price of tradables to prevent the fiscal expansion from generating an unsustainable trade deficit; and 2) to achieve a real exchange rate associated with the fiscal expansion that is sufficiently trade altering but not excessively inflationary.

The stimulus package is a temporary, countercyclical measure in response to the fall in export value caused by the international crisis. A new product, iron ore, will come on line in 2010 which should bring exports back to their annual 2008 value by 2011. Some fiscal stimulus may be necessary beyond 2010, but it would be smaller than that recommended in this report. The recommended stimulus package addresses the external contractionary tendencies over approximately eighteen months from mid-2009 to the end of 2010, and its analytical structure is shown in Table 1.

In Section 2 the instruments for the policy package, fiscal expansion and exchange rate management, are explained and analytically justified. In Section 3 the institutional constraints to implementing the package are discussed, with emphasis on the policies of donor agencies. With a simple macroeconomic model, the impact of the policy package on output, fiscal and external balances, and employment and poverty is calculated and presented in an annex. The annex demonstrates that a prudent fiscal expansion supported by exchange rate management is feasible, consistent with macro stability, and would be effective in preventing economic decline.

An early and effective fiscal response to the domestic impact of the international crisis is necessary in Sierra Leone because of the legacy of the disastrous civil war during the 1990s that resulted in terrible human suffering. The economy of Sierra Leone began recovery in the early 2000s, driven by inflows of development assistance and rejuvenation of the export sector. The economy remained quite fragile, especially the

balance of payments, whose stability depended on the official capital flows and remittances from abroad.

In 2008 the global crisis manifested its impact on Sierra Leone. Production of diamonds and other mining products fell in response to declining global demand. In recognition of the seriousness of global decline for the economy and welfare of the population, the Ministry of Finance requested support from UNDP for a study to focus on: 1) the likely short-term impact of the global downturn on the domestic economy; and 2) measures which the government could take to mitigate that impact. This report seeks to rigorously treat these two tasks.

Because of its underdeveloped financial sector, the purely financial effect of the global crisis would not be substantial for Sierra Leone.<sup>1</sup> However, the global crisis would and has affected Sierra Leone through three other mechanisms: 1) impact on export quantity and prices, 2) direct foreign investment, and 3) remittances. Because of data limitations it was not possible at this stage to consider FDI or remittances.<sup>2</sup>

A few general remarks can place the recommended policy package in context. First, monetary policy is not an effective instrument for short term macroeconomic management in Sierra Leone. This is primarily the result of the absence of a domestic market for public sector bonds and the limited role of commercial banks in funding investment. Second, at the margin the economy has a high import propensity, which implies that domestic inflation is sensitive to the nominal exchange rate and international prices, especially of petroleum. Third, public finances are also sensitive to the exchange rate, via the domestic currency value of development assistance and trade taxes.

And fourth, because of underdeveloped and the disruption of the civil war, economic statistics are limited, even by comparison with other low-income countries. It is impressive what the various public agencies have been able to achieve in the marshalling of economic and social statistics. The availability of statistics has conditioned the method which this study can use to assess the impact of the global downturn.

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<sup>1</sup> This is also the conclusion reached by the research unit of the Ministry of Finance and Economic Development (MoFED 2009).

<sup>2</sup> At the time of this report a study of remittances was in planning by the Office of the President.

Table 1: Policy Action to Mitigate the Global Crisis:

External shock from financial crisis >>	Domestic Consequences >>	Counter measures by the public sector			
Fall in export earnings, import prices, and remittances	Decline in aggregate demand, with import prices falling more than domestic prices; lower export incomes	Goal/Objective: Neutralise the external shock	Method of implementation	Consequences of policy measures	Constraints, dangers and their management
		↓ <b>Increase government expenditure</b> (counter-cyclical and temporary) >>>	Priority to 'cash for work' programmes >>>	Target of enough new jobs to keep poverty from rising	Unsustainable domestic debt [set deficit rule]
		<b>Devaluation</b> to stabilise the trade balance (stimulate exports & reduce imports) >>>	<b>Temporary</b> exchange rate management for the real exchange rate to depreciate enough to be effective for trade effects but not excessively inflationary >>>	Recovery of exports except for rutile & bauxite, lower imports than before the external shock	Inflationary spiral [set devaluation rule]

## 2 Analytical Framework

### Role of fiscal policy

Because of their dependence on commodity exports with volatile world prices, growth rates of developing countries tend to fluctuate more than rates for advanced industrial countries. This is particularly true of sub-Saharan countries, which have few manufactured exports except for South Africa. Part of the orthodoxy before the financial crisis was that liberalising the external current account and deregulating the capital account would create relative price adjustments that would reduce the effects of the external ‘shocks’ that destabilise growth. However, empirical evidence suggests that in the 1990s and 2000s growth rates in the sub-Saharan region were as or more unstable than before the liberalising policies of the 1980s (see Weeks 2008 and 2009; Weeks and Geda 2007).

The pre-2008 macro framework common to most sub-Saharan countries was based on the belief that relative price changes would allow economies to approach their growth potential. A programme generalising deregulation across all markets, combined with a cautious monetary policy and a neutral fiscal policy would enable these relative price changes to be realised in practice. This analysis, known technically as the ‘price constrained framework’, has as its prerequisite that the world economy is operating near its potential. However, since mid-2008 it is clear that the world economy is demand constrained; that is, aggregate demand is insufficient to permit the world economy to achieve its potential. For this reason the governments of the major industrial countries have introduced ‘stimulus packages’ of varying sizes, designed to replace the fall in private sector demand with public sector expenditure.

What is true for the world economy also applies to small and vulnerable economies, such as that of Sierra Leone. Lower demand from the advanced countries means lower expenditures by households and businesses on trade commodities. World trade in Sierra Leone’s major export commodities, cocoa, diamonds and minerals will fall, and have fallen in the last twelve months. Declining prices of these commodities cannot restore their quantities and values to their pre-2008 level. The fundamental problem is not that the commodities are too expensive, but that there is a deficiency of

demand at any price of a specific commodity and at any set of relative prices. Were it the case, for example, that Sierra Leone's exports of cocoa did not fall, this would mean that the cocoa exports of some other country fell.

In the context of a demand constrained world economy, the government of Sierra Leone (and governments of other countries) have two general policy options. Governments can pursue a 'business-as-usual' and 'hope-for-the-best' option in which they continue with the policy framework designed for a robust world economy and await international recovery. For the government of Sierra Leone this would mean continuing to follow advice to place primary emphasis in macro policy on preventing inflation, attempting to reach a target for the fiscal deficit, and maintaining a free-floating exchange rate.<sup>3</sup>

Choosing this option would represent a triumph of hope over experience. Fiscal policy guided by fears of inflation when the world economy is deflating would result in contraction of the demand for domestic goods to aggravate the contraction in exports. As the economy contracted due to the world recession and a restrictive fiscal policy, any deficit target would become more difficult to realise. A reduction in expenditure, or an increase in taxes, would further depress domestic expenditure, which would reduce revenue from sales taxes. A reduction of the fiscal deficit of one percentage point would require a reduction of national income by a multiple of one percent. The nominal depreciation of a floating exchange rate in the context of lower export demand could result in an inflationary spiral.

The other option, adopted by most governments in rich countries has been an active fiscal policy, to reduce the impact of the international downturn through purposeful management of the public budget. The policy objective is to compensate for fluctuations in private sector demand by use of 'counter-cyclical' fiscal policy. After falling out of political fashion for almost three decades, opinion has moved in favour of counter-cyclical fiscal intervention.

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<sup>3</sup> A clear statement of this approach is found in an IMF report on the global financial crisis, Countries should focus on macroeconomic stability. In some countries with falling inflation there may be scope for monetary easing; others, however, still experience continued or renewed price pressures. Those with flexible exchange rates should allow them to move, so that they function as shock absorbers. (IMF 2009a, viii)

A January 2009 IMF report on the world economy called for a ‘firm commitment’ to a ‘timely implementation of fiscal stimulus across a broad range of advanced and emerging economies’. Following this commitment, a May 2009 press release reported that the IMF recommended a fiscal stimulus for a low income country, Mozambique.<sup>4</sup> In its survey of the impact of the financial crisis, the World Bank also recommended that governments ‘assess their ability to undertake countercyclical policies’.<sup>5</sup> The African Development Bank as well has recommended this type of fiscal intervention.<sup>6</sup> Specifically for Sierra Leone, the IMF in 2009, while not mentioning counter-cyclical policy by name, recommended that the country’s fiscal deficit be allowed to increase to respond to the impact of the financial crisis on import prices.<sup>7</sup> It would appear that a new policy consensus is emerging in favour of counter-cyclical responses to the world downturn. It is appropriate that policy makers in Sierra Leone take advantage and follow this emerging view.

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<sup>4</sup> The complete passage reads as follows,

In current circumstances, the timely implementation of fiscal stimulus across a broad range of advanced and emerging economies must provide a key support to world growth. Given that the current projections are predicated on strong and coordinated policy actions, any delays will likely worsen growth prospects. Countries that have policy room should make a firm commitment to do more if the situation deteriorates further. Fiscal stimulus packages should rely primarily on temporary measures and be formulated within medium-term fiscal frameworks that ensure that the envisaged build up in fiscal deficits can be reversed as economies recover and that fiscal sustainability can be attained in the face of demographic pressure. (IMF 2009c, 1)

A press release titled ‘IMF Mission Calls for Fiscal Stimulus in Mozambique’ states, ‘In the short term, given Mozambique’s low level of public debt, the [IMF] mission sees scope to at least partly offset the impact of the global economic crisis on Mozambique with somewhat more expansionary fiscal and monetary policies. (IMF 2009d).

<sup>5</sup> ‘The challenge for policymakers in this environment is to assess their ability to undertake countercyclical policies given the resources available to them as well as their institutional and administrative capacity to rapidly expand and adapt existing programs.’ (WB 2009, 10)

<sup>6</sup> The AfDB’s 2009 report calls on donors and lenders to ‘[Focus] on results, rather than prescribing rigid policies and actions, allowing countries space to respond according to their particular needs and circumstances.’ More specific, it recommends that donors and governments ‘[i]ncrease flexibility in macroeconomic frameworks to allow more scope to balance macroeconomic stability and the need to stimulate domestic demand.’ (ADB 2009, 2)

<sup>7</sup> ‘[IMF] Staff is proposing that the primary fiscal deficit be revised upward by 0.4 percentage points of GDP to accommodate the unanticipated budget impact of the rise in world oil prices.’ (IMF 2009b, 5).

## Deficits and countercyclical intervention

Taxes can be used for countercyclical intervention, but in practice they are a clumsy instrument for demand management. Changing the public sector's net contribution to aggregate demand with the tax instrument requires either new taxes or altering tax rates. In most countries, including Sierra Leone, both require legislative action, followed by changes in administrative procedures. This can be a lengthy process that fails to achieve demand changes with the speed necessary to respond to short falls in private demand. Public expenditure offers the more effective mechanism for compensating for private demand fluctuations.

A country's medium and long term growth rates are determined by the development of capacity, skills and technical change, with the latter embodied in capital investment. Since public investment contributes to increasing capacity, it is unwise to use it as a counter-cyclical instrument. Counter-cyclical expenditure increases when the economy grows below its long run potential, and decreases when output rises close to potential, causing resource scarcities and inflationary pressure. Because public investments by their nature mature over several years, to use them as a counter-cyclical instrument would imply abandoning or suspending capital projects, resulting in waste of resources. The expenditure flexibility necessary for an effective counter-cyclical policy must be found in the current account of the public budget.

To summarise, if a country's potential growth rate is low, increasing public investment subject would be the appropriate response. Simultaneously a government would use current expenditure to generate the demand necessary to reach the greater potential created by the public investment. Public expenditure is a more effective instrument for counter-cyclical intervention than taxation, because of the inflexibility of the latter. Capital projects are inappropriate because they often cannot be initiated quickly enough to respond to demand declines, and cannot be stopped without wastage when the economy becomes over-heated. Much of current expenditure is also inappropriate because it is not practical or rational to suspend it. For example, it would not be rational health or education policy to hire more medical staff or teachers during a downturn and lay them off when the economy recovers.

## Counter-cyclical expenditures

Effective counter-cyclical expenditure would be based on what might be called ‘semi-capital’ programmes, defined as programmes that use relatively simple capital equipment to create rapidly-completed facilities that have a large component of repair and maintenance, similar to what the ILO defines as ‘labour-intensive public works’.<sup>8</sup> Examples of such programmes are digging sanitation ditches, repair of public buildings, environmental improvement through erosion reduction, and clearing of rural footpaths. These activities are currently being implemented throughout Sierra Leone by the National Commission for Social Action.

While projects would make a contribution to community welfare, their primary purpose is to increase expenditure through the consumption outlays of those employed directly and indirectly. These programmes would be:

- 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) designed so that wages and salaries are the major element of expenditure, implying a low capital component.

Some issues that plague public works projects with debate need not be relevant for ones whose purpose is primarily counter-cyclical. For example, the wage at which workers are paid is a secondary consideration because these are not long or even medium term employment schemes. While projects for a counter-cyclical demand impact should not pay wages that disrupt local labour markets, their impact on internal migration will be limited because of their short term nature. Further, these programmes would be introduced when the labour is in excess supply. Thus, they would be unlike to affect prevailing wage rates. A recent study by MoFED experts recommended this type of employment programme, ‘cash for work’, as a possible policy measure to counter the effects of the financial crisis (MoFED-EPRU 2009).

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<sup>8</sup> See, for example, the ILO website on this type of project, <http://www.ilo.org/public/english/employment/recon/eiip/index.htm>

Finally, and of great practical importance, clear rules should be established for the initiation and termination of counter-cyclical projects. A ‘counter-cyclical’ 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. Sierra Leone has few quarterly macro indicators other than trade statistics. However, following the method used in this paper, MoFED experts could construct a ‘leading indicator’ series that could be used for countercyclical planning (see Annex A4).

The programmes that could effectively serve as counter-cyclical interventions exist in Sierra Leone, administered or executed by the National Commission for Social Action (NCSA) and the Youth Employment Scheme (YES). Both have demonstrated their effectiveness. Both are relatively small and their primary function is not to have an impact on the macro economy but to generate employment.<sup>9</sup> Currently supported by donors, the World Bank in the case of the NCSA projects, these programmes could be funded by the government as its counter-cyclical instruments.

Given the size of the stimulus required to prevent the economy from declining, some donor support in addition to current commitments might be required. Donor funding does not lend itself to countercyclical expenditure because of its fixed schedule of allocation and disbursement. Donors could adjust their allocation procedures to allow for an ‘aid fund’ analogous to funds created for resource booms. Funds could be drawn from such a fund when the economy was below potential, and ‘hoarded’ when the economy approach full potential. If donor grants are primarily used to fund public investment, they would not be used for countercyclical expenditures for reasons explained above.

This report recommends that the countercyclical stimulus be largely funded by monetising the deficit. If the implied increase in the deficit exceeds a level consistent with achieving other policy goals, such an inflation target or size of the domestic public

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<sup>9</sup> The most important NCSA project is supported by US\$ 4 million from the World Bank. It employs about 14,000 people in activities of infrastructure maintenance. The YES projects are more varied including both employment and ‘franchising’, which in practice means selling goods on commission.

debt, increased grants should be sought to fill the funding shortfall. Inflationary pressures and domestic debt accumulation are discussed in the next section.

### Arguments against deficits

As discussed above, the use of the public sector balance between revenue and expenditure as a tool to stabilise economies near full potential was generally accepted as sound macro management prior to the 1980s. This passed out of fashion due to political changes in advanced countries, and was justified on technical grounds by two arguments: the possible inflationary effect of deficits, and the putative tendency for public borrowing to ‘crowd out’ private borrowing by causing interest rates to rise. The analysis of the relationship between public deficits and inflationary pressures is straight-forward.

*If the economy is operating at full potential*, increased spending from any source, public or private, must result in a reduction of expenditure of another type. If the expenditure is by the public sector, its inflationary impact will depend on how it is financed. If the expenditure is financed through borrowing, thus creating or increasing the fiscal deficit, the borrowing can be through sales of government securities to the private sector (‘open market operations’) or by the ministry of finance borrowing from the central bank (monetising the deficit’).

Bonds sales to the private sector ensure that the expansion of the deficit is not inflationary, 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. In theory it would be necessary to offer the bonds above the prevailing interest rate in order to sell them successfully, and ‘crowding out’ of private sector borrowing would occur if private investment is sensitive to formal sector interest rates. If the government borrows directly from the central bank, the money supply increases and, with the economy at full potential, inflation results. There is an important exception to this analysis. If the economy is open, the increased money in circulation will in part or whole be spent on imports, reducing the inflationary impact, but creating or increasing a trade deficit.

*If the economy is operating a less than full potential*, neither type of deficit financing should generate more than minor and transitory inflation, though ‘crowding

out' could occur. An increase in government expenditure financed by bond sales to the private sector would increase aggregate demand. However, with no change in the money supply, as implied by open market operations, the increased output would generate upward pressure on interest rates, depressing private expenditure, with the result that the net change in aggregate demand would be less than the increase in public expenditure, though still positive. Financing the expenditure by direct borrowing from the central bank would insure that the increase in aggregate demand would equal the increase in public expenditure. Monetising the deficit generates an increase in the money supply sufficient to circulate the increased output that results from more public expenditure.

Few sub-Saharan countries have sufficiently developed bond markets to allow for effective open market operations. In the absence of an effective secondary bond market (re-sale market), the major motivation of commercial banks to hold public bonds is statutory requirements on the composition of bank reserves. As a result, high interest rates are required to induce banks to purchase bonds beyond legal requirements. In addition, commercial banks play a limited role in financing productive investment in most sub-Saharan countries. The combination of the absence of a secondary market and high yields on public bonds implies that financing deficits by bond sales has the perverse effect of further discouraging commercial banks from funding productive investment, which are riskier than holding government securities. The financial markets of Sierra Leone are so narrow that the government has no practical alternative to monetising deficits.

With the economy of Sierra Leone well below its potential with idle land and labour, monetising the deficit is an effective tool for the expansion of aggregate demand, generating neither inflation nor 'crowding out' of private expenditure. The government's expenditures on infrastructure should 'crowd in' private investment by lowering costs of transport, electricity and water supply.

In the context of Sierra Leone, a concern about deficits is more relevant than inflation or 'crowding out' is the cost of servicing the public debt. In 2007 interest on the public debt was sixteen percent of current expenditure, down from twenty-three percent in 2004, but the third largest item after 'general public services' (32 percent) and education (23 percent). However, the total domestic debt was a relatively low 22 percent

of GDP (IMF 2009e, 34, 52). The moderate increase in the fiscal deficit recommended in this report would not increase significantly the interest share of current expenditure, and, via the multiplier effect of the expenditure, lower the domestic debt as a proportion of GDP.

In summary, the proposed increase in the fiscal deficit would be unlikely to generate inflationary pressures, and even less likely to provoke a ‘crowding out’ of private expenditure. The increase in interest cost would be minor. There is no important technical argument against a stimulus package that relies on financing increased expenditure by monetising the deficit.

### Exchange rate management

In Sierra Leone, 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 preventing a decline in the economy, the exchange rate adjustment accompanying the fiscal stimulus should be consciously managed. Management is necessary in order to prevent 1) excessive exchange rate induced inflation, and 2) a deterioration of the trade balance.

While any inflation limit is partly arbitrary, in the Sierra Leone case, ‘excessive inflation’ is defined as greater than fifteen percent, because a higher rate could increase the nominal demand for credit and stimulate an inflationary spiral. The trade deficit should remain constant as a portion of GDP because it must be financed by donor grants which are inflexible in the short term, and by remittances from abroad which may decline in the short term. The exchange rate management would be implemented by a series of nominal devaluations through government intervention in the weekly foreign exchange auction.

As fashion moved against active fiscal policy over the last three decades, there was a shift to a view that ‘flexible’ exchange rates are the only practical policy choice for governments. Therefore, it is necessary to explain why exchange rate management in Sierra Leone would be both feasible and possible.<sup>10</sup> Because in practice almost all

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<sup>10</sup> 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

governments intervene in foreign exchange markets,<sup>11</sup> the policy choice is not between ‘fixed’ and ‘flexible’ exchange rate regimes, but selection of the most appropriate point on a range of forms and degrees of intervention given the characteristics of the economy (Fischer 2001).

The exchange rate management that would be part of the proposed stimulus package would not seek to maintain a ‘fixed’ rate for the Leone against any currency. The purpose of the intervention would be to control the rate of depreciation of the Leone against the currencies of its 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 the Leone and another in which it provokes depreciation.<sup>12</sup>

The *devaluation case* is if there is no market pressure to weaken the Leone rate, in which the government must act directly on the exchange rate. The purpose is to increase the price of tradables which will reduce private import demand and raise the return to exporters. Devaluing the Leone would be achieved by setting a higher Leone price for major currencies in the foreign exchange auction. In the absence of market pressure to weaken the Leone there would be no private speculation to undermine the devaluation. In effect, the government would be implementing temporarily 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 Leone. Exchange rate management becomes more complicated, but remains manageable. While the market pressure to weaken the Leone serves the government’s purpose, intervention is potentially necessary in order to prevent it from

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system is feasible and should be established. Theory shows it feasible, and overlooked empirical evidence shows it possible.’

<sup>11</sup> 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.

<sup>12</sup> 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.

depreciating at a rate that generates unmanageable inflation pressures. Because the intervention seeks to slow the depreciation rather than stop it, the likelihood of speculative attack is greatly reduced.

### 3 Constraints on Macro Policy

The recommended policy package of fiscal expansion and currency depreciation faces two types of constraints on its effectiveness: 1) those arising from the adjustment dynamics of the policy package itself; and 2) those derivative from donor behaviour and conditions (also called ‘benchmarks’). The first type can be managed by the government. The second type requires a new flexibility on the part of donors and the IMF.

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. If the ‘pass through’ rate from the devaluation equals the margin propensity to import, then the domestic price level rises by approximately fifty percent of any nominal devaluation. 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 that the economy’s structural rate of inflation of five percent per year (Annex A4). It would be prudent for the government to identify an inflation rate which it considers to be the maximum consistent with macroeconomic stability. With no empirical work to identify that rate, we set the inflation constraint to be the highest annual rate during the economy’s rapid growth during 2004-2008, which was fifteen percent.

Less important than inflation but significant constraints are the trade balance and the fiscal deficit. In the absence of additional donor support, the stimulus package should not increase the trade deficit, which in 2008 was marginally sustainable on the basis of donor inflows and remittances. This constraint would be loosen by the real devaluation. As discussed above, statistical analysis indicates that a small increase in the fiscal deficit is not inflationary. With the goal of not generating a burdensome public debt, the fiscal deficit should be well below ten percent of GDP after grants.

Depending on the size of the external shock to be redressed, Sierra Leone may not require a substantial increase in grants for the fiscal stimulus to be effective in stabilising

the economy at the level of 2008. However, the government will need donors and the IMF to grant it 'policy space' through the following measures:

- 1) elimination of pro-cyclical conditionalities and 'benchmarks' for deficit limits, foreign exchange accumulation and inflation rates;
- 2) donor reliability on delivery of assistance because the fiscal stimulus will be 'finely tuned' and late or non-delivery of assistance would provoke macroeconomic instability; and, more generally,
- 3) a suspension of the 'business as usual' approach to negotiations over assistance which emphasise policy issues such as tax reform that the external crisis has rendered of less immediate importance.

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.

## Annex: Impact on Sierra Leone and Policy Response

### 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 ten percent for developing countries.<sup>13</sup> 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 by about five percent (US\$ 99 million);
- 2) rutile export value will fall due to the loss of a dredger, but 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 and 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).

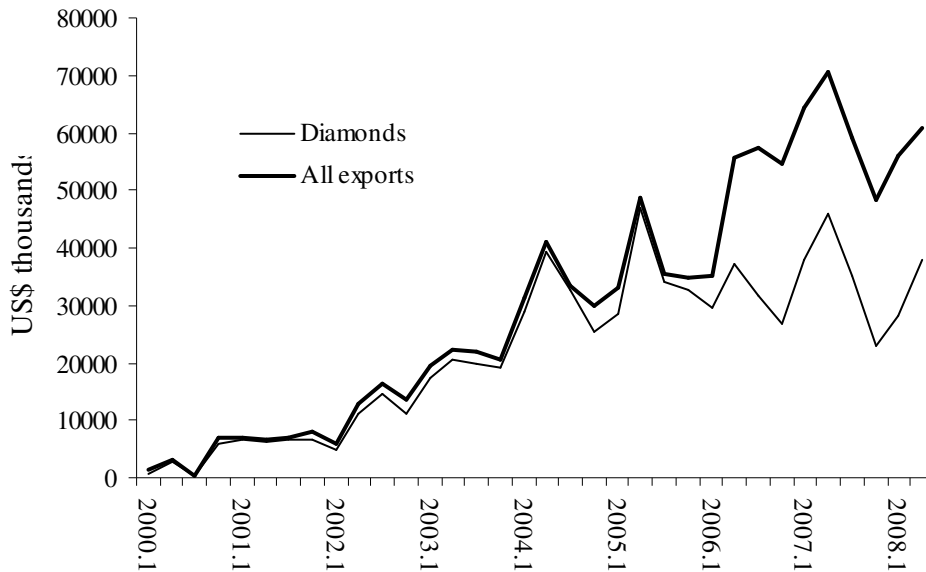
The Ministry of Finance anticipates a substantial recovery of export value in 2010 due to iron ore production from a mine under construction in 2009. Therefore, the drop in exports at the end of 2008 and through 2009 can be treated as a transitory external shock. No separate estimate is attempted of the likely decline in remittances from abroad. It is implicitly assumed that any decline in remittances is part of the fall in

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<sup>13</sup> 'The collapse in global demand brought on by the biggest economic downturn in decades will drive exports down by roughly 9% in volume terms<sup>1</sup> 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](http://www.wto.org/english/news_e/pres09_e/pr554_e.htm).

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 an Annex A4 to which the reader can refer for behavioural assumptions and statistical details.

Figure 1: 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.

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

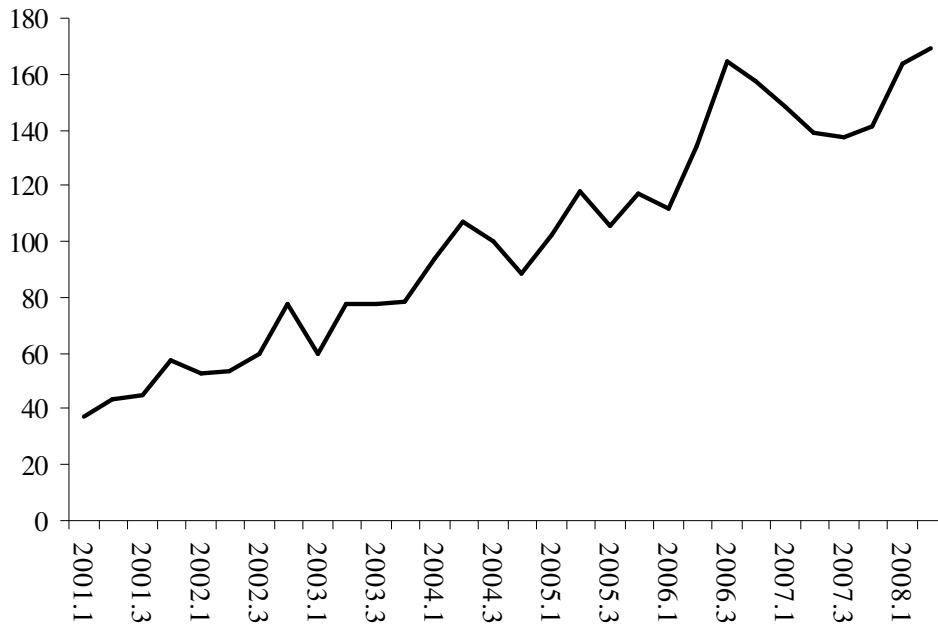
$\beta = 1/[1 - a_1(1 - a_2) + a_3]$  = the autonomous expenditure multiplier

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

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

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 2.

Figure 2: 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 the 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 International 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 in part A1 above, and making the assumption of no change in private investment, one obtains:

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

$\beta$  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 following, with small letters growth rates and the  $\alpha_i$ 's are shares in GDP:

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

$\epsilon_t$  is the sum of the absolute values of the import and export elasticities.<sup>14</sup>

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,  $a_3$ ):

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

Substituting for  $e^*$ :

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

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

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

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 the 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 which 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 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

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<sup>14</sup> The algebra is demonstrated in Weeks (2009b).

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 1 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 To 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 earnings times the autonomous expenditure multiplier. Imports fall less than GDP, so the import share 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 destabilising 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 at 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 2: Alternative Policy Responses to a 15 percent fall in export earnings

	<u>T0</u>	<u>T1</u>	<u>T2a</u>	<u>T2b</u>	<u>T2c</u>	<u>Notes:</u>
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.

T0 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 public expenditure of 9.8%.

Table 3: Results of model-based calculations for a 15 percent 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 poverty of 12.5% percentage points**
	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	

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 by definition are 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 4 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 lost 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 price effect of minus US\$ 5.6 million. The sum of the 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 news and bad 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 overwhelming 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<sup>15</sup> 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.

Table 4: 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	
<u>Exports</u>							
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	
						Export effect	-40,613
<u>Imports</u>							
Petroleum	100	51	-48.8	172,496	88,251	-84,246	
Rice	100	65	-35.2	59,250	38,393	-20,857	
						Import effect	-105,102
						Total effect	+64,489
						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](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](http://beta.irri.org/solutions/index.php?option=com_content&task=view&id=250)

<sup>15</sup> 'Industrial policy' refers to macro, trade and public investment policies that foster any of the sectors of the economy including agriculture.

## Labour Market, Poverty and Employment

As important as the potential decline in GDP is the impact of that decline on employment and poverty, considered in this section. To do so, 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 3 shows the Lorenz Curve generated by this method of calculation.

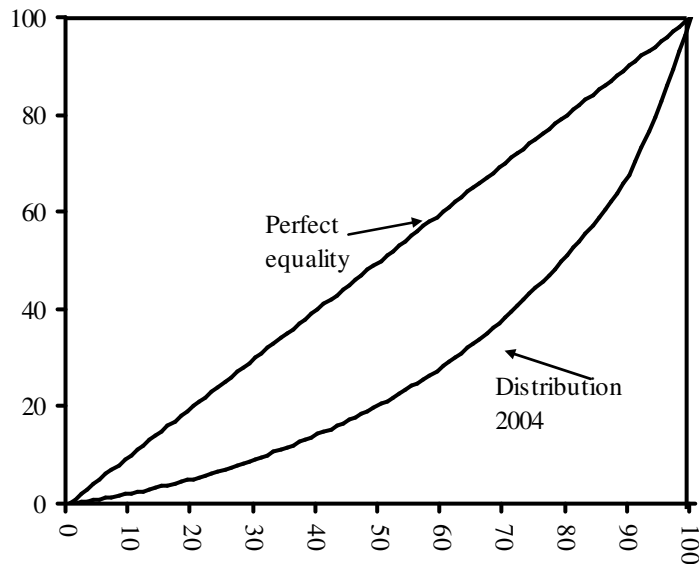
By international comparison Sierra Leone's distribution is relatively equal, with a Gini coefficient of less than .30. This implies a relatively high elasticity of poverty with respect to growth. The calculations generate an elasticity of poverty with respect to income of almost minus three for the first 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 2). 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 on Social Action (NCSA) and the Youth Employment Schemes (YES). Table 5 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.

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

schemes were randomly distributed through the distribution, the poverty prevented would be equal to that created by the fall in GDP (Table 6). Despite the relatively equal distribution of income, implementing the employment generation 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.

Figure 3: 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 5: Employment Outcome for a Fiscal Stimulus of 1.9 percent of GDP\*

<u>Item</u>	NCSA	YES
	<u>Ln bn</u>	<u>Ln bn</u>
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	<b>79,427</b>	
New employment as percent of labour force*	<b>4.1</b>	

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, prevents a fall in GDP. Wage rates and total cost of employing a worker provided by NCSA and YES officials.

Table 6: Poverty prevented by creating almost 80,000 jobs with expenditure of 1.9 percent of GDP, by benefit shares

<u>Benefit share</u>	<u>Poverty prevented</u>	<u>Poverty reduced</u>
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 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 increase revenue 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 7.1: Export Function (quarterly, 2001 Q1 through 2008 Q2)

A. Summary statistics

<u>R stat</u>	<u>R Square</u>	<u>Adjusted R Square</u>	<u>Std Error</u>	<u>Durbin-Watson*</u>	
.972	.945	.939	.190	1.866	
<u>Sum of</u>	<u>Squares</u>	<u>Degrees of freedom</u>	<u>Mean Sq</u>	<u>F</u>	<u>Sig.</u>
Regression	15.625	3	5.208	143.515	.000
Residual	.907	25	.036		
Total	16.532	28			

\*No evidence of positive or negative autocorrelation.

B. Coefficients

	<u>Coeff</u>	<u>Std. Error</u>	<u>T stat</u>	<u>Sig of T</u>
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 7.2: Import Function (quarterly, 2001 Q1 through 2008 Q2)

A. Summary statistics

<u>R stat</u>	<u>R Square</u>	<u>Adjusted R Square</u>	<u>Std Error</u>	<u>Durbin-Watson*</u>	
.883	.781	.753	.132	1.853	
<u>Sum of</u>	<u>Squares</u>	<u>Degrees of freedom</u>	<u>Mean Sq</u>	<u>F</u>	<u>Sig.</u>
Regression	1.488	3	.496	28.452	.000
Residual	.418	24	.017		
Total	1.907	27			

\*No evidence of positive or negative autocorrelation.

B. Coefficients

	<u>Coeff</u>	<u>Std. Error</u>	<u>T stat</u>	<u>Sig of T</u>
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 7.3: Domestic Revenue Function (quarterly, 2001 Q1 through 2008 Q2)

A. Summary statistics

<u>R stat</u>	<u>R Square</u>	<u>Adjusted R Square</u>	<u>Std Error</u>	<u>Durbin-Watson*</u>	
.988	.976	.970	.062	1.882	
<u>Sum of</u>	<u>Squares</u>	<u>Degrees of freedom</u>	<u>Mean Sq</u>	<u>F</u>	<u>Sig.</u>
Regression	3.538	6	.590	151.740	.000
Residual	.085	22	.004		
Total	3.624	28			

\*No evidence of positive or negative autocorrelation.

B. Coefficients

	<u>Coeff</u>	<u>Std. Error</u>	<u>T stat</u>	<u>Sig of T</u>
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 7.4: Price Level and Inflation Functions

(quarterly, 2001 Q1 through 2008 Q2)

A1. Summary statistics (Price level)

<u>R stat</u>	<u>R Square</u>	<u>Adjusted R Square</u>	<u>Std Error</u>	<u>Durbin-Watson*</u>	
.974	.948	.945	.053	1.711	
<u>Sum of</u>	<u>Squares</u>	<u>Degrees of freedom</u>	<u>Mean Sq</u>	<u>F</u>	<u>Sig.</u>
Regression	1.579	2	.790	284.064	.000
Residual	.418	31	.017		
Total	1.907	33			

\*No evidence of positive or negative autocorrelation.

B1. Coefficients (Price level)

	<u>Coeff</u>	<u>Std. Error</u>	<u>T stat</u>	<u>Sig of T</u>
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 7.4: Price Level and Inflation Functions (continued)

A2. Summary statistics (Inflation)

<u>R stat</u>	<u>R Square</u>	<u>Adjusted R Sq</u>	<u>Std Error</u>	<u>Durbin-Watson*</u>	
.580	.336	.287	.052	.579	

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

\*Evidence of positive autocorrelation.

B2. Coefficients (Inflation)

	<u>Coeff</u>	<u>Std. Error</u>	<u>T stat</u>	<u>Sig of T</u>
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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