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## Country Study

### **THE REDUCTION OF FISCAL SPACE IN ZAMBIA— DUTCH DISEASE AND TIGHT-MONEY CONDITIONALITIES**

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## **THE REDUCTION OF FISCAL SPACE IN ZAMBIA— DUTCH DISEASE AND TIGHT-MONEY CONDITIONALITIES\***

John Weeks\*\*

### **ABSTRACT**

During 2005-2006, appreciation of the Kwacha, Zambia's currency, had a significant negative impact on public income. This exchange-rate effect received little notice in the debate over macroeconomic policy. The appreciation reduced fiscal space largely because of binding IMF conditionalities on monetary policies. The fiscal effect had two major revenue components: a fall in the domestic-currency income equivalent of official development assistance and a fall in trade taxes. In 2005, the negative effect on the public budget of the Kwacha appreciation was largely balanced by the positive impact on reducing external debt service. This positive impact ended, however, with debt relief and was almost zero after 2005. Obviously, these revenue effects, though little noticed, had negative implications for Zambia's ability to achieve the MDGs. The Zambia experience underscores some important general lessons. It indicates, for example, the necessity to coordinate fiscal, monetary and exchange-rate policy in order to achieve sustained growth, employment generation and poverty reduction. Most important, this experience is also a clear example of the dysfunctional consequences of having low-inflation targets rule monetary policy. In the context of currency appreciation, setting limits on the domestic money supply prevents effective exchange-rate management. This necessarily creates, as a by-product, larger fiscal deficits and, consequently, more public borrowing. And these negative fiscal consequences could significantly constrict the resources that some developing countries need to achieve the MDGs.

### **1 INTRODUCTION**

In line with the orthodox consensus on macroeconomic policies, the governments of most sub-Saharan African countries have pursued, since the late 1980s, 'floating' exchange-rate regimes, which have been managed by central banks. An alleged benefit—and often the central goal—of this policy regime has been to achieve international competitiveness and an associated improvement in the efficiency with which domestic resources are allocated.

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Supporting this policy regime is Neoclassical trade theory, in which trade is assumed to be based upon primary factor endowments. Problematically, the theory, and the policy derived from it, has tended to ignore circumstances in which trade is derived from natural resource endowments—as is often the case in sub-Saharan African countries.

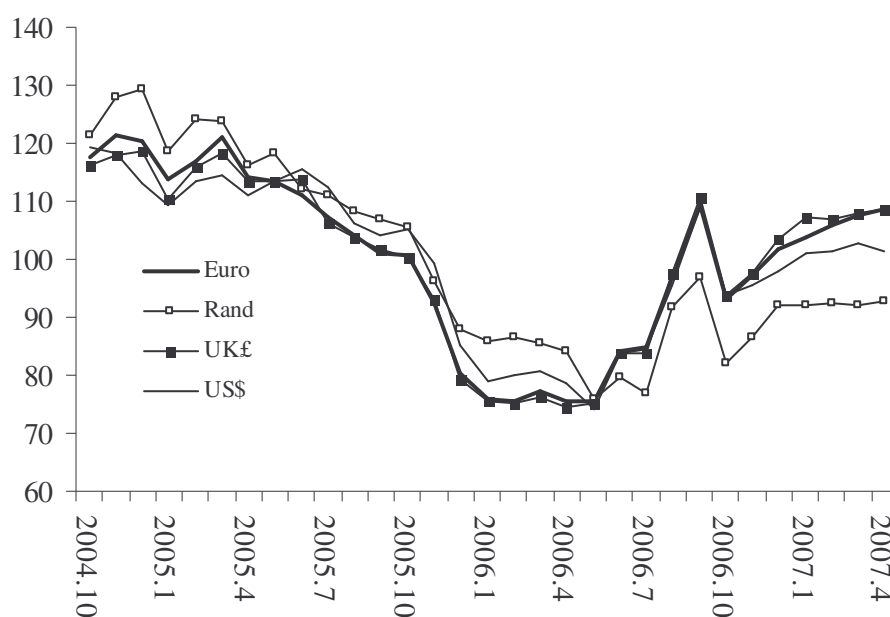
However, in the 2000s, governments of countries with large mineral exports confronted the unexpected problem of nominal exchange-rate appreciation. This phenomenon was most pronounced in petroleum-exporting countries, but it was also the experience of exporters of other natural resources. Zambia's experience in this regard has been a striking case in point.

During the second half of 2005, Zambia's Kwacha appreciated dramatically against all major currencies (see Figure 1). The appreciation resulted from a rapid rise in the world demand for copper, confirmed by a dramatic increase in its price. As a result of booming world demand, Zambia's trade balance changed from deficit to surplus (Figure 2).

FIGURE 1

**Nominal Kwacha Exchange Rate for Major Trading Partners, October 2004 – April 2007**

(period average = 100)



Note: Lower values indicate appreciation.

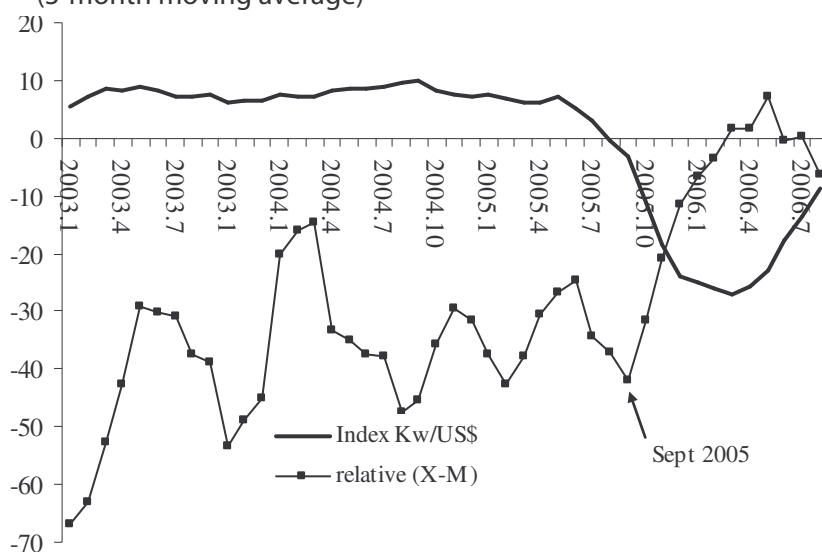
Source: Bank of Zambia, *Statistics Fortnightly*, <[www.boz.zm](http://www.boz.zm)>.

This sudden appreciation generated a domestic debate on its causes and consequences. While no international financial organisation expressed concern over the *fiscal* consequences of exchange-rate movements in Zambia, the private sector did (Fynn and Haggbale 2006). Agricultural and manufacturing exporters focused on the impact of appreciation on Zambia's international competitiveness.

Among some donors, there was concern about the implications for the domestic purchasing power of official development assistance.<sup>1</sup> Since the appreciation arose from the boom in demand for a natural resource, speculation intensified that Zambia would succumb to the copper equivalent of the 'Dutch Disease' (Calí and te Velde, 2007; Corden and Neary 1982), with a consequent decline of its other commodity producing sectors.

FIGURE 2

**Index of the Kwacha-US\$ Rate and the Relative Trade Balance, 2003-2006**  
(3-month moving average)



Notes: The Kwacha-US\$ rate is measured as the rate in any month divided by the average for all months, and the average of the index is set to zero. The relative trade balance is  $100 * [(X-M) / (.5(X+M))]$ .

Sources: Bank of Zambia, *Statistics Fortnightly*, <[www.boz.zm](http://www.boz.zm)>; and Central Statistical Office, *Monthly Bulletin*, <[www.zamstats.gov.zm](http://www.zamstats.gov.zm)>.

During 2003 and 2004, the Kwacha averaged over 4,700 to the U.S. Dollar (see Table 1, next page), and was still close to this figure in the second quarter of 2005. In the third quarter, a spectacular appreciation began, with the Kwacha dropping below 4,000 in the fourth quarter of 2005, and below 3,300 in the second quarter of 2006. A subsequent depreciation brought the Kwacha back to the vicinity of 4,000 during the third quarter of 2006 through the third quarter of 2007.

Nonetheless, the average for the first three quarters of 2007 was 14 per cent below that for the first three quarters of 2005. This 14 per cent represented nominal appreciation, with real appreciation being much larger (see Weeks, *et al.*, 2007, Chapter 7).

The national debate focused on the production of tradables, export competitiveness and domestic import substitutes, with only passing reference to the fiscal effects. In response to this oversight, this Country Study has attempted to assess the fiscal effects of appreciation, especially because such effects are likely to occur in a significant number of other countries that export primary commodities.

At issue is the fiscal capacity of the Zambian government to achieve its 2007 development plan, which stresses increasing growth, reducing poverty and achieving the Millennium Development Goals (MDGs) (Weeks *et al.* 2006).

While currency appreciation is a common outcome of commodity price fluctuations, Zambia's situation has had several unusual aspects. First, the suddenness and size of the appreciation at the end of 2005 had no precedent in the country's history, and is extremely rare in sub-Saharan Africa. Therefore, there is little relevant experience in designing and implementing appropriate and effective policies in such a context.

TABLE 1  
**Kwacha-Dollar Rate and Exports and Imports, 2003-2007**  
 (quarterly, US\$ millions)

| Month  | Kw/US\$ | US\$ millions |         |           |
|--------|---------|---------------|---------|-----------|
|        |         | Exports       | Imports | Exp - Imp |
| 2003.1 | 4652    | 207.2         | 414.6   | -207.4    |
| 2003.2 | 4779    | 240.1         | 369.7   | -129.6    |
| 2003.3 | 4741    | 253.5         | 345.7   | -92.3     |
| 2003.4 | 4694    | 246.4         | 424.3   | -177.9    |
| 2004.1 | 4751    | 367.4         | 431.4   | -64.0     |
| 2004.2 | 4774    | 408.0         | 572.5   | -164.6    |
| 2004.3 | 4809    | 398.3         | 581.2   | -182.9    |
| 2004.4 | 4782    | 389.0         | 557.8   | -168.8    |
| 2005.1 | 4751    | 343.0         | 503.7   | -160.6    |
| 2005.2 | 4684    | 485.5         | 661.3   | -175.8    |
| 2005.3 | 4555    | 502.5         | 711.0   | -208.5    |
| 2005.4 | 3930    | 516.2         | 710.2   | -194.0    |
| 2006.1 | 3316    | 577.3         | 617.6   | -40.2     |
| 2006.2 | 3286    | 740.8         | 726.9   | 13.9      |
| 2006.3 | 3826    | 747.8         | 753.7   | -5.9      |
| 2006.4 | 3982    | 786.6         | 775.5   | 11.1      |
| 2007.1 | 4245    | 1030.7        | 828.7   | 202.0     |
| 2007.2 | 4021    | 1170.8        | 911.1   | 259.7     |
| 2007.3 | 3934    | 1694.0        | 1101.5  | 592.5     |

Source: Bank of Zambia website, <www.boz.zm>.

Second, international experience suggests that Zambia could be the first aid-dependent country to experience more than minor appreciation of its currency (IMF 2005). This characteristic makes a case study focused on the impact of appreciation on development assistance and, more generally, on public revenue an important undertaking.

Third, the dramatic appreciation occurred in the context of external policy conditionalities predicated on currency weakness, slow growth and inflationary pressures. These assumptions contrasted with the actual situation of accelerating growth and falling inflation. Due, in great part, to the currency appreciation, inflation fell, for instance, from an average of over 18 per cent in 2005 to less than 10 per cent in 2006.<sup>2</sup>

Fourth, large currency appreciations are typically associated with large inflows of export earnings, most famously in petroleum-exporting countries. Because of the common combination of appreciation and a boom in public revenue, little attention has been given to revenue effects, except as a contributor to the so-called Dutch Disease.

In Zambia's case, however, the appreciation was not accompanied by a significant increase in public revenue from copper because of the extremely favourable tax breaks enjoyed by the privatised copper sector. Removing such unjustified favouritism should be, of course, a top priority for Zambian policymakers.

The purpose of this Country Study is to identify policy lessons that could guide other countries in sub-Saharan Africa, as well as elsewhere, in managing the effects of major appreciations of exchange rates that are not accompanied by compensating increases in

public revenue. Therefore, Section 2 presents a simple framework for estimating exchange-rate effects while Section 3 calculates the fiscal effect. The final section suggests policy measures—which are both specific to Zambia and more general in applicability—which could be used to counter such an effect.

## 2 ANALYTICAL BACKGROUND AND COUNTRY CONTEXT

Though it is obvious that exchange-rate changes would have effects on both public expenditures and revenue, there is in the economic literature an almost total absence of an examination of this subject. This omission is all the more surprising because of the considerable attention given to the reverse causality, namely, the impact of the fiscal balance on exchange rates.<sup>3</sup>

The standard framework for analysing the interaction of fiscal policy and exchange-rate movements, i.e., the Mundell-Fleming model, does not consider the impact of the exchange rate on the fiscal balance except via multiplier effects.

The relationship can be organised analytically by the following definitions:

$$FB = R - E$$

$$E = E_d + E_x$$

$$R = R_d + R_x$$

Where FB is the fiscal balance, E is public expenditure and R public revenue, with E and R each divided between those items affected by the exchange rate (noted by subscript x) and those unaffected by the exchange rate (noted by subscript d).

For expenditures, the most important item affected by the exchange rate would be external debt payments. Because of data limitations in the empirical work below, we ignore other possible exchange-rate affected expenditures, such as public-sector imports.

On the revenue side, there are two important elements, i.e., trade taxes and external public-sector grants and loans. Therefore, we can conclude:

$$E = E_d + e(rD + \alpha D), \text{ and}$$

$$R = R_d + e(t_1 X + t_2 M + K)$$

Where e is the exchange rate. For the expenditure definition, r is the average interest rate on external debt, D is the stock of external debt and  $\alpha$  is the required repayment of principal each period. For revenue, X, M and K are the foreign-currency values of exports, imports and official capital flows, and  $t_1$  and  $t_2$  are the average tax rates on the first two items. If the interest rate on external debt and the tax rates are constant, the impact of a change in the exchange rate on the fiscal balance is:

$$\Delta FB = [(t_1 X + t_2 M + K) - (r + \alpha)D + (x + m)]\Delta e$$

The symbols  $m$  and  $x$  are the partial derivatives of imports and exports with respect to the exchange rate, the first being positive and the second negative. For the calculations in the next section, we ignore export taxes and the impact of changes in the nominal exchange rate on the quantity of imports and exports. The exclusion of the former is sensible because export taxes were assessed in Kwacha values, which the nominal exchange rate would not affect directly. Therefore, the exchange-rate effect reduces to:

$$\Delta FB = [t_2M + K - (r + \alpha)D]\Delta e$$

In the empirical estimates of the exchange-rate effect, actual values will be compared to a counterfactual outcome ( $\Delta FB^*$ ), in which the Kwacha-Dollar rate remains constant:

$$\Delta FB^* = [t_2M + K - (r + \alpha)D][e^* - e]$$

In summary, an appreciation of the exchange rate improves the fiscal balance through its impact on debt service payments, and worsens it through its effect on the Kwacha valuation of imports and Official Development Assistance. There could also be an indirect effect through the domestic price level, which is also considered below.

### 3 EFFECTS OF APPRECIATION ON FISCAL SPACE

#### 3.1 THE COUNTRY CONTEXT

Before presenting calculations of the fiscal impact of the exchange rate, we consider its policy significance. Once a government has established its budget by specifying expenditures, taxes and expected income from abroad, several variables can cause the actual outcome to differ from the programmed outcome. With respect to the external factors that affect the budget, governments can exert influence on their impact through the exchange rate.

The purpose of our calculations is to assess whether managing the exchange rate would have a significant effect on fiscal space. To carry out such an exercise, we need to specify a counterfactual scenario in which the policy-managed exchange rate differs from the actual one.

Specifying the counterfactual requires a choice of the Kwacha rate to which the actual exchange rate would be compared. A practical approach would be to choose the exchange rate upon which the Zambian government would have based its budgetary planning for 2005 and subsequently.

From May 2003 through the end of 2004, the Kwacha exchange rate to the U.S. Dollar varied from a high of 4,896 to a low of 4,578 (with an average of 4,766). This represents a difference of less than five per cent, with a coefficient of variation of 1.5 per cent. In our calculations, we assume that the government would use this average for this period for its 2005 fiscal planning.<sup>4</sup>

On this assumption, we can estimate the three major fiscal effects of the appreciation: 1) trade taxes (the VAT on imports and tariffs); 2) external assistance (grants and loans); and 3) servicing of the external debt. With the data available, it was not possible to estimate the impact on the import content of public non-debt expenditures, but this was likely to be small.<sup>5</sup>



We also ignored the exchange-rate impact on direct foreign investment because it had no direct revenue effects. This impact could have had important monetary implications but this topic is beyond the scope of this paper.

To begin the analysis of the fiscal impact of changes in the exchange rate in Zambia, Table 2 presents the composition of the budget for 2005-2008. If we initially ignore debt relief, total domestic revenue affected by the exchange rate was slightly over 19 per cent of total revenue, and external grants and loans were another 20 per cent. So, the exchange rate could have affected 40 per cent of total public income. In the IMF reporting, the entire debt relief is attributed to fiscal year 2006,<sup>6</sup> when it was just over 100 per cent of all other public income (last line of table).

TABLE 2

**Structure of Zambian Public Income, 2005-2008**

|                                 | 2005  | 2006    | 2007  | 2008  |
|---------------------------------|-------|---------|-------|-------|
| <b>Millions of Kwacha</b>       |       |         |       |       |
| <b><u>Domestic</u></b>          | 5642  | 6622    | 8126  | 9043  |
| Income tax                      | 2455  | 2993    | 3491  | 3889  |
| VAT                             | 1633  | 1812    | 2339  | 2627  |
| Excise taxes                    | 768   | 936     | 1104  | 1217  |
| Customs duties                  | 656   | 641     | 874   | 951   |
| Other                           | 130   | 240     | 318   | 359   |
| <b><u>External</u></b>          | 1825  | 1604    | 2180  | 2238  |
| Budget support                  | 543   | 310     | 582   | 648   |
| Projects                        | 1282  | 1294    | 1598  | 1590  |
| Debt relief                     | 0     | 8410    | 0     | 0     |
| Total                           | 7467  | 8226    | 10306 | 11281 |
| Exchange rate affected          | 3249  | 3181    | 4158  | 4406  |
| Debt relief                     |       | [8410]  |       |       |
| <b>Percentages of the Total</b> |       |         |       |       |
| <b><u>Domestic</u></b>          |       |         |       |       |
| Taxes & Fees                    | 75.6  | 80.5    | 78.8  | 80.2  |
| Income tax                      | 32.9  | 36.4    | 33.9  | 34.5  |
| VAT                             | 21.9  | 22.0    | 22.7  | 23.3  |
| Excise taxes                    | 10.3  | 11.4    | 10.7  | 10.8  |
| Customs duties                  | 8.8   | 7.8     | 8.5   | 8.4   |
| Other                           | 1.7   | 2.9     | 3.1   | 3.2   |
| <b><u>External</u></b>          | 24.4  | 19.5    | 21.2  | 19.8  |
| Budget support                  | 7.3   | 3.8     | 5.6   | 5.7   |
| Projects                        | 17.2  | 15.7    | 15.5  | 14.1  |
| Total                           | 100.0 | 100.0   | 100.0 | 100.0 |
| Exchange rate affected          | 43.5  | 38.7    | 40.3  | 39.1  |
| Debt relief                     |       | [102.2] |       |       |

Notes: 2005, actual figures; 2006, preliminary; 2007 and 2008, projected.

Source: IMF 2007, p. 15.

Table 2 shows that revenue increased, though most of the increase was due to inflation. The question that we address is: what might public revenue have been had the Kwacha not appreciated? On the basis of a more detailed breakdown of revenues, we can calculate a counterfactual revenue and exchange-rate scenario.

### 3.2 THE LOSS OF FISCAL SPACE

Table 3 provides estimates of the counterfactual, which is based on the assumption that from 2005 through 2007 the exchange rate remained at the average for May 2003 through December 2004. As one would expect, the losses of trade revenue are substantial. After minimal effects in 2003 and 2004, the loss was over 100 billion Kwacha in 2005, almost 600 billion in 2006 and about 300 billion for the first three quarters of 2007.

TABLE 3

#### Estimates of the Counterfactual Exchange-Rate Effect, Import Tax Revenue, ODA and Debt Service, Gain (+) and Losses (-), 2003.1 – 2007.3<sup>7</sup>

| Quarter | Billions of Kwacha |      |              |       | Percentage of GDP |      |              |       |
|---------|--------------------|------|--------------|-------|-------------------|------|--------------|-------|
|         | Import taxes       | ODA  | Debt Service | Total | Import taxes      | ODA  | Debt Service | Total |
| 2003.1  | -6                 | -1   | 3            | -3    | -.1               | .0   | .1           | -.1   |
| 2003.2  | 1                  | 0    | -12          | -12   | .0                | .0   | -.2          | -.2   |
| 2003.3  | -1                 | 0    | 0            | -1    | .0                | .0   | .0           | .0    |
| 2003.4  | -5                 | -8   | 23           | 10    | -.1               | -.1  | .4           | .2    |
| 2004.1  | -1                 | 0    | 0            | -1    | .0                | .0   | .0           | .0    |
| 2004.2  | 1                  | 9    | -10          | 0     | .0                | .1   | -.2          | .0    |
| 2004.3  | 4                  | 2    | -2           | 4     | .1                | .0   | .0           | .1    |
| 2004.4  | 2                  | -18  | 12           | -3    | .0                | -.3  | .2           | .0    |
| 2005.1  | -1                 | 0    | 0            | -1    | .0                | .0   | .0           | .0    |
| 2005.2  | -6                 | -20  | 11           | -15   | -.1               | -.3  | .1           | -.2   |
| 2005.3  | -18                | -1   | 10           | -10   | -.2               | .0   | .1           | -.1   |
| 2005.4  | -89                | -120 | 192          | -18   | -1.0              | -1.3 | 2.2          | -.2   |
| 2006.1  | -141               | -63  | 43           | -161  | -1.5              | -.7  | .5           | -1.7  |
| 2006.2  | -258               | -32  | 16           | -275  | -2.7              | -.3  | .2           | -2.9  |
| 2006.3  | -100               | -71  | 59           | -111  | -1.0              | -.7  | .6           | -1.1  |
| 2006.4  | -88                | -35  | 14           | -110  | -.8               | -.3  | .1           | -1.1  |
| 2007.1  | -63                | -19  | 5            | -77   | -.6               | -.2  | .0           | -.7   |
| 2007.2  | -100               | -68  | 7            | -160  | -.8               | -.6  | .1           | -1.4  |
| 2007.3  | -133               | -18  | 17           | -134  | -1.1              | -.1  | .1           | -1.1  |
| Annual: |                    |      |              |       |                   |      |              |       |
| 2003    | -11                | -9   | 14           | -6    | -.1               | .0   | .1           | .0    |
| 2004    | 7                  | -7   | 1            | 0     | .0                | .0   | .0           | .0    |
| 2005    | -114               | -141 | 212          | -43   | -.4               | -.4  | .7           | -.1   |
| 2006    | -588               | -201 | 132          | -657  | -1.5              | -.5  | .3           | -1.7  |
| 2007    | -295               | -105 | 29           | -371  | -.8               | -.3  | .1           | -1.1  |

Sources: Debt service and ODA: Bank of Zambia, *Statistics Fortnightly*, <www.boz.zm>.

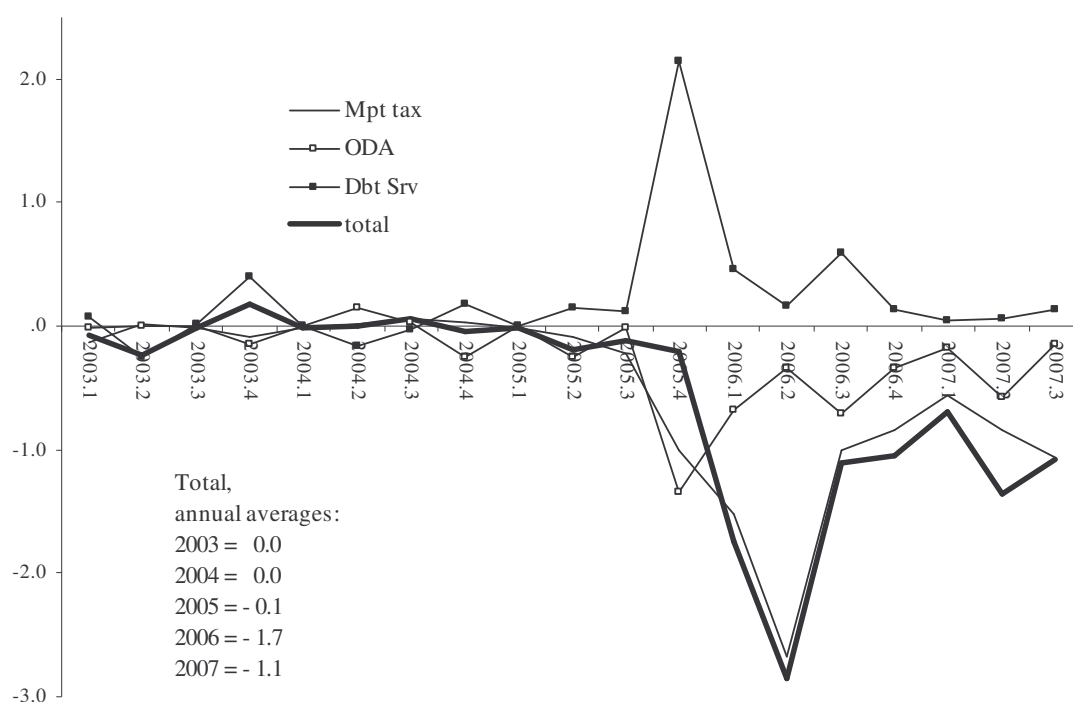
Import taxes (tariffs and import VAT): Zambia Revenue Authority, printed sheets supplied to author.

GDP: Ministry of Finance and Economic Planning, *Economic Report 2005*; and International Monetary Fund, <www.imf.org/external/pubs/ft/weo/2007/02/weodata/weoselgr.aspx>.

These counterfactual losses represented 0.4, 1.5 and 0.8 per cent of *ceteris paribus* GDP for those years. During 2005 and 2006, the counterfactual gains from debt service denominated in an appreciated Kwacha almost exactly cancelled the reduction in the domestic-currency value of Official Development Assistance (see Figure 3).

FIGURE 3

**Quarterly Trade Revenue, ODA and Debt Service Gains and Losses, 2003-2007, percentage of GDP**



Source: Bank of Zambia, *Statistics Fortnightly*, <[www.boz.zm](http://www.boz.zm)>; and Zambia Revenue Authority.

Due to HIPC and MDRI<sup>8</sup> debt relief on bilateral and multilateral debts in 2006, the calculated ODA losses substantially exceeded the gain from debt service in the first three quarters of 2007 (-0.3 vs. 0.1). As a result, the total counterfactual fiscal effect was a negative 1.7 per cent of GDP in 2006 and a negative 1.1 per cent in the first three quarters of 2007.<sup>9</sup>

These significant exchange-rate effects take on major significance in the context of the IMF programme under which the Zambian government operated during 2005-2007. The programme set a limit to public borrowing of 0.6 per cent of GDP, and thus a limit on the borrowing that would be necessary to cover the deficit resulting from exchange-rate appreciation.

Setting aside the issue of the wisdom of such a precise figure for a country with GDP data of problematic accuracy, this fractional percentage could easily be breached by unanticipated exchange-rate changes. For example, if in 2007 the public budget had been in balance, an appreciation of the exchange rate of one standard deviation from the 2005-2007 mean would have breached the 0.6 per cent limit on public borrowing.<sup>10</sup>

The general point is that such a borrowing limit made no sense in the Zambian context. Whether the limit was breached or over-achieved was, in great part, beyond the

control of the government when the exchange rate was allowed to float. When the IMF recommended that the government continue its policy of an exchange-rate float, it made no mention of any fiscal effect.<sup>11</sup>

### 3.3 THE COST OF MONEY-SUPPLY RESTRICTIONS

Because the budget limit was part of a broader policy of monetary restraint, the borrowing limit contributed, in effect, to exchange-rate appreciation—and, therefore, to breaching the limit itself.

Along with the limit on public borrowing, the IMF set money-supply limits, which prevented any effective intervention by the Bank of Zambia to moderate the appreciation of the Kwacha.

The recognised, orthodox way to moderate an appreciation would be for a central bank to purchase foreign exchange from the domestic private sector. These currency transactions would directly signal the exchange rate that the central bank sought to maintain, and would indirectly reduce pressure for appreciation by increasing the supply of domestic currency relatively and absolutely to foreign exchange.

By its nature, the purchase of foreign exchange is not a perfect instrument, because it increases foreign reserves that *via* private-sector expectations could strengthen the domestic currency. However, except under highly unusual conditions, the expectation effect should be substantially less than the impact of an increase in the domestic money supply.

Exchange-rate appreciation can be countered by increasing the domestic money supply. Placing limits on such supply, if they are enforced, require open market operations to draw domestic currency out of the economy. This option could cancel the desired effect of the original intervention in the currency market. This was the irresolvable dilemma forced upon the Bank of Zambia by IMF conditionality (see Weeks, *et al.* 2007, Chapters 5 and 8). Hence, the Bank of Zambia could not engage in supply-increasing currency-market intervention and sterilise such an intervention (i.e., sell bonds to soak up liquidity) at the same time.

### 3.4 ANALYTICAL FRAMEWORK

To analyse these inter-relationships further, we define the price level as the weighted sum of the price levels for non-traded and traded commodities, with the weights determined by the import share in GDP.

$$P = P_d^\alpha P_t^{1-\alpha}$$

Where  $P_d$  is the price index of non-tradables,  $P_t$  is the index of tradables, and  $\alpha$  is the marginal propensity to import. By letting small Latin letters stand for percentage rates of change, the expression becomes:

$$p = \alpha p_d + (1 - \alpha) p_t$$

For simplicity, we assume that non-tradable prices are determined by an equation based on a naïve quantity theory of money,  $P_d Y_d = vM$ , so

$$p_d = m - y_d$$

Where  $P_d$  is the price index of non-tradables ( $p_d$  its rate of change),  $Y_d$  real output ( $y_d$  its rate of change),  $v$  is the velocity of money (assumed constant), and  $M$  is the money base ( $m$  its rate of change). If the Law of One Price holds, the domestic price of traded commodities will be determined by the exchange rate. Therefore,

$$p = \alpha(m - y_d) + (1 - \alpha)\beta e$$

Where  $e$  is the rate of change of the exchange rate and  $\beta$ , the 'pass-through' coefficient,<sup>12</sup> is equal to unity if the economy is perfectly competitive, and less than unity if there is market power over tradable commodities.

The change in the money supply has three potential components: monetisation of deficits, open-market operations in domestic bonds and transactions in the currency market. For simplicity, we include open market operations with currency operations,  $\Delta M = \Delta C$ , where  $C$  is the domestic currency equivalent of the purchase of foreign exchange from the private sector, implying that  $\Delta C/M = m$ .

However, purchases or sales of foreign currency affect the exchange rate, so  $e = \chi m$ , where  $\chi$  is the elasticity of the exchange rate with respect to central bank transactions in foreign exchange. This elasticity is positive (an increase in  $M$  causes a devaluation).

After substitution, one obtains,

$$p = [\alpha + (1 - \alpha)\beta\chi]m - \alpha y_d$$

Continuing with the naïve quantity theory of money, one can assume that foreign exchange purchases would stimulate inflation less than proportionally to the money supply increase that they generate, because 1) the economy could be at less than full employment, so that there could be an increase in non-traded output that could absorb part of the additional money; 2) the domestic market for tradables might not be perfectly competitive ( $\beta$  is less than unity); and 3) the elasticity of the exchange rate with respect to foreign exchange transactions might be inelastic ( $\chi$  is less than unity).

The import propensity and the 'pass-through rate' for Zambia in the mid-2000s were about 0.3 and 0.5, respectively.<sup>13</sup> The report to the UNDP on the appreciation of the Kwacha estimated that the elasticity of the nominal exchange rate with respect to foreign exchange purchases was 0.8 (significant at less than one per cent probability) (Weeks, *et al.*, 2007, Table 4.1).

To approximate the inflationary effect of foreign currency purchases, we need only to estimate the output effect. If the increase in output is zero, then the inflationary consequence of a purchase would be  $0.82(m)$ ,<sup>14</sup> which is the maximum value. However, the rise in the price of non-traded commodities should provoke an increase in output. If we assume that the output response has a relatively low elasticity of 0.5, the inflation effect would be  $0.47(m)$ , or less than one half the increase in the money supply that the foreign exchange purchase creates.

This estimate can be compared to the budgetary effect of the foreign-exchange purchase. Assume that the Bank of Zambia seeks to reduce the appreciation of the Kwacha by 10 per cent (e.g., in the third quarter of 2007 to have had an exchange rate of 4,327 to the U.S. Dollar instead of 3,934). This would have required foreign exchange purchases of US\$ 41 million.

Such purchases would have increased foreign exchange holdings by 5.3 per cent and the money base (M1) by 4.6 per cent, implying at most an increase in the price level of 2.2 percentage points.<sup>15</sup> The same hypothetical reduction in the appreciation of the Kwacha would have contributed *plus* 1.1 percentage points of GDP to public revenue.<sup>16</sup>

This hypothetical exercise demonstrates the dysfunctional nature of money supply limits and, more generally, the restrictions imposed by focusing monetary policy on targeting low inflation in the short run. When public income is dependent upon official capital inflows and trade taxes, the effect of setting money supply limits in the context of currency appreciation is to increase the fiscal deficit, and, therefore, public borrowing.

If simultaneously there is a restriction on public borrowing, the money supply limit will force expenditure reductions by the government by preventing the alternative of intervening in the foreign exchange market to counteract appreciation.

#### 4 SUMMARY AND POLICY CONCLUSIONS

Strict and specific policy conditionalities that are imposed by donors and lenders, such as the limits on the money supply described above, can be questioned on many grounds. Most fundamentally, they contradict the principle of recipient ownership of economic policy and restrict the policy space of governments. When, in addition, they generate inconsistent and unintended adverse outcomes, they become obstacles to rational policy-making.

Zambia's experience in the mid-2000s provides a clear example of dysfunctional external conditionality that undermined, in effect, one of the goals of that conditionality, i.e., sound macroeconomic management.

In the mid-2000s, when the price of copper rose rapidly and caused the Kwacha to appreciate, the rational macroeconomic policy would have been for the Bank of Zambia to intervene in the foreign exchange market to weaken the domestic currency, and, thus increase the money supply. This would have been consistent with the international practice of exchange-rate management (see Fischer 2001 for a discussion of exchange-rate regimes; see also Buffie et al. 2004 and Ghosh et al. 1996)).

Intervention would have fostered the competitiveness of non-copper exports, as well as have increased public revenue. If large purchases had been required, it would have been necessary for the Bank of Zambia to consider the possibility of inflationary effects. Addressing such a trade-off is, however, an inherent accompaniment of implementing all macroeconomic policies.

However, the obviously appropriate policy response of increasing the domestic money supply was blocked because an IMF programme committed the government to setting strict money-supply limits. However, because the Bank of Zambia adhered to the money-supply limits, the government found it difficult to abide by another IMF conditionality, namely, limiting public borrowing to 0.6 per cent of GDP.<sup>17</sup>

Over 40 years ago the Mundell-Fleming model generated the conclusion that fiscal policy would not be effective under a floating exchange-rate regime (Mundell 1963). But that model ignored exchange-rate effects on public revenue and expenditure. Once these effects are recognised, one has to move beyond this standard analysis and recognize that under a floating exchange-rate regime, many developing countries would necessarily be ineffective in management of their fiscal deficits.

In the context of Zambia's development strategy, this implies greater difficulty in deploying the expenditures necessary to attain the Millennium Development Goals. This implies, in turn, the need to re-examine the usefulness of floating exchange rates, enforcing strict money-supply limits and setting low inflation targets as a foundation for scaling up fiscal resources to accelerate growth and human development.

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## NOTES

1. An early expression of concern over the impact of appreciation was the report by the Zambian Economic Society (Liebenthal 2006).
2. The annual averages were 18.4 per cent in 2005, 9.8 in 2006 and 10.8 for 2007. A simple regression between the inflation rate, as measured by the consumer price index, and the rate of change of the Kwacha-Dollar rate over the 28 months from September 2005 through the end of 2007 yields a correlation coefficient of 0.30. Thus, a 10 per cent appreciation was associated with a 3.3 per cent reduction in the inflation rate. But changes in the money supply were not correlated with the inflation rate.
3. Somewhat old but not out of date is the review article by Khan and Lizondo (1987).
4. On the basis of interviews, we concluded that this was *de facto* the case (see Weeks, *et al.* 2007).
5. Inspection of annual non-debt expenditures shows that the overwhelming majority were for wages and salaries. Public-sector imports would have been limited to 'consumables' (for example, printer ink) and the capital budget.
6. The IMF reported that debt relief was not an income to the government, but a reduction in expenditure obligations. The relief did not, in fact, eliminate debt repayments. Bank of Zambia statistics show continued debt service payments in 2006 and 2007 of US\$ 72 million and US\$ 40 million, respectively.
7. Counterfactual gains and losses on import taxes are estimated by using the following identity:  
Import taxes = [average tax rate]x[exchange rate]x[imports in U.S. dollars]  
For each year the implicit average tax rate is calculated using the actual value of imports each month and the exchange rate for that month. The counterfactual import tax per month is calculated by substituting the average exchange rate during May 2003 through December 2004 for the current exchange rate. The counterfactual calculation was subtracted from the actual values, and the results aggregated into quarters.  
For Official Development Assistance (ODA) and debt service, the actual U.S. dollar values were converted to Kwacha at the current monthly exchange rate, and at the counterfactual exchange rate. The difference between the two was aggregated to quarters.  
Quarterly GDP was calculated by assuming a constant quarterly growth rate such that the quarterly values summed to the annual values.
8. Heavily Indebted Poor Country initiative and Multilateral Debt Relief Initiative.
9. For details, see Weeks, *et al.*, 2007, Annex 3.
10. The mean exchange rate for 2007 was 4,043 Kwacha to the Dollar, and the standard deviation from September 2005 to September 2007 was 407. The implied decline in import revenue would have been 0.5 per cent of *ceteris paribus* GDP, and the revenue from ODA would have declined by 0.2 per cent of GDP.
- 11 To quote, 'Exchange-rate policy will continue to be based on a market-determined floating exchange rate. The BoZ will continue to confine its foreign exchange operations to maintaining orderly market conditions and avoiding excessive exchange rate fluctuations, and rely on sterilized purchases to meet its international reserves target' (IMF 2007, 10).
12. This is the coefficient that determines how much of an exchange rate change becomes a change of the domestic price of imports.
13. During 2004-2006, the ratio of imports to GDP was 0.28, with the marginal propensity to import slightly higher. The 'pass-through' coefficient was estimated to be 0.52 in the UNDP report on Kwacha appreciation (Weeks, *et al.*, 2007, Chapter 6, see Figure 6.1).
14. The equation,  
$$p = [\alpha + (1 - \alpha)\beta\chi]m - \alpha y_D$$
Becomes,  
$$p = [.7 + (.3 \times .5 \times .8)]m = .82(m)$$
If the elasticity of non-traded output to non-traded prices is 0.5, then the inflationary effect is,  
$$p = [.7 + (.3 \times .5 \times .8)]m - (.7 \times .5)m = .47(m)$$
15. See Bank of Zambia, *Statistics Fortnightly* (November 2007), the table entitled, 'Money Supply', for the statistics on foreign exchange and the money base.
16. The larger part of this is import taxes, which were over 10 times larger than the ODA inflows for the quarter.
17. Conditionality can be found in IMF (2006 and 2007).



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