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Exchange Rate Policy and Devaluation in Malawi

Karl Pauw

Paul Dorosh

John Mazunda

Development Strategy and Governance Division

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

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AUTHORS

Karl Pauw, International Food Policy Research Institute
Research fellow, Development Strategy and Governance Division
K.Pauw@cgiar.org

Paul Dorosh, International Food Policy Research Institute
Division Director, Development Strategy and Governance Division

John Mazunda, International Food Policy Research Institute
Policy Analyst, Development Strategy and Governance Division

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ABSTRACT

The Malawian economy has in recent months been plagued by a severe foreign exchange crisis, fueled in part by a steadily rising import bill, sharp successive declines in tobacco export prices, the suspension of direct government budget support from several development partners in 2011, and an all-time low in international investor confidence. Up until the regime change in April 2012, the government resisted calls for a devaluation, which at the time resulted in a thriving parallel foreign exchange market. At its peak, the Malawi kwacha was trading at a premium of up to 100 percent in this secondary market. Economic theory shows that such a situation has adverse implications for an economy in terms of the balance-of-payments adjustment process and income distribution in the economy. Those with access to foreign exchange at the official rate are able to extract rents by selling foreign currency or imported goods at inflated prices. Imports sold domestically are then often valued at the parallel exchange rate rather than the official rate, with the parallel market rate serving as the only adjustment mechanism through which equilibrium can be restored in the balance of payments. This has a significant impact on domestic inflation to the detriment of consumers, while those with preferential access to foreign exchange at the official rate capture large rents. A simulation exercise using an economywide model for Malawi considers how the economy responds to different types of foreign exchange shocks under fixed and flexible exchange rate regimes. While the foreign exchange crisis in itself has severe negative implications for the economy, our results suggest that the economy responds much better to these types of shocks under a flexible exchange rate regime (that is, devaluations or a free-floating currency). Our main simulation shows that under the latter policy, gross domestic product growth, although negative, is 1.5 percentage points higher than under a fixed exchange rate policy. Similarly, poverty is 6.9 percentage points lower. A relaxation of the exchange rate policy, however, is only part of the solution; in the longer run, good governance and sound macroeconomic policy that is conducive to growth are needed to address the underlying structural problems in the economy that also contribute to foreign exchange shortages.

Keywords: exchange rate policy, foreign exchange rationing, devaluation, CGE modeling, Malawi

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AUTHORS' NOTE

At the time this paper was written (December 2011–March 2012) Malawi suffered a severe foreign exchange crisis. A fixed exchange regime was in place, but despite the severe balance-of-payments deficit, the president, Bingu wa Mutharika, insisted that a currency devaluation was not an option. This paper echoes concerns from many policy analysts and development partners about Mutharika's economic policy in general and his stance on exchange rates in particular, and argues in favor of a more relaxed exchange rate policy, which would include either devaluations as and when needed or a free-floating exchange rate. Mutharika passed away unexpectedly in April 2012, upon which his successor, Joyce Banda, immediately introduced a range of reforms, key among which was a sharp devaluation of around 50 percent followed by the introduction of a flexible exchange rate policy. The exchange rate, now determined by market forces, is currently more than double the rate of just one year ago, which reflects the severity of the previous crisis. While some revisions have been made to this paper to reflect the change in policy, the paper and its findings should be read in the context of its having been written prior to Mutharika's death. It is also worth noting that the foreign exchange crisis was not immediately solved by the introduction of a flexible exchange rate regime, and in no way do we try to claim that such a policy change is the sole solution to Malawi's woes. Many of the structural problems in the economy remain: The trade deficit remains large, as a result of both weak exports and the high import intensity in the economy; foreign direct investments are slow to recover, given concerns about growth prospects, inflation, infrastructure, and service delivery in Malawi; and the government is not out of the woods yet in terms of gaining approval from the international donor community for improved governance and economic management of the country.

1. INTRODUCTION

Most of Malawi's exchange rate regimes over the past several decades have involved some kind of peg to a single currency or basket of currencies, with devaluations implemented when balance-of-payments problems arose. Until recently the country pursued a de facto pegged exchange rate policy. During the latter part of 2011 and early in 2012, however, Malawi found itself in a severe foreign exchange crisis brought on by several factors, including a steadily rising import bill, fueled in part by fertilizer imports under the Farm Input Subsidy Program implemented since 2006; sharp successive declines in tobacco export prices, particularly in 2010 and 2011; the suspension of foreign aid under the Common Approach to Budgetary Support to Malawi in 2011; and an all-time low in international investor confidence, leading to a decline in foreign direct investment.

At the time, the Malawian government resisted calls to devalue the currency, arguing that devaluation would lead to inflation and thus harm poor consumers. However, shortly after the unexpected demise of President Bingu wa Mutharika in April 2012, his successor, Joyce Banda, introduced a series of reforms, including an immediate 50 percent devaluation and subsequent flotation of the Malawian currency, the kwacha. Until April 2012, only small devaluations had been approved in Malawi, none of which were sufficient to significantly reduce the excess demand for foreign exchange. This led to the development of a parallel foreign exchange market, which at its peak traded at around double the official exchange rate. Mutharika's regime provided no alternative solution to the foreign exchange crisis and continued to borrow from abroad to cover the balance-of-payments shortfall and pay for essential imports. Although external debt never reached truly unsustainable levels (for example, in June 2011 external debt was 16.8 percent of gross domestic product), alarm bells did start to sound, with commentators suggesting that if the fundamental macroeconomic imbalances (that is, the trade deficit in particular) were not addressed, the government's vision of a vibrant economy was simply not achievable.

This study demonstrates why devaluation was ultimately necessary in Malawi and also what its eventual impact might be in terms of prices, income distribution, and domestic production. Our approach is to use a computable general equilibrium (CGE) model to evaluate the economywide impacts of foreign exchange shortages in Malawi under two alternative exchange rate regimes. The foreign exchange shortages are modeled by simulating the effect of actual shocks, including tobacco price declines and reductions in direct budgetary support or foreign direct investments. We then evaluate the economy's response to these shocks under a fixed exchange rate regime (that is, similar to the policy during Mutharika's presidency) and a flexible exchange rate regime (that is, a free-floating exchange rate or regular, managed exchange rate adjustments). Under a fixed exchange rate regime, the simulated foreign exchange supply shock leads to the development of a parallel foreign exchange market, or black market, where foreign exchange is traded at a premium. As explained in more detail in the paper, this is tantamount to assuming that importers with access to foreign exchange at the official rate extract a premium on the price of imported goods sold in the domestic market. Under a flexible exchange rate regime there is no rent seeking and the currency is permitted to depreciate to clear the foreign account imbalance.

The paper is structured as follows. Section 2 provides an overview of historical and current exchange rate policy in Malawi and introduces the concept of the undervaluation index based on the real exchange rate. Section 3 explains in theoretical terms the impact of devaluation under restricted and unrestricted foreign exchange markets, the former being one where foreign exchange is rationed and the exchange rate is fixed. Section 4 describes the CGE model for Malawi used for the analysis, and introduces and justifies the simulations. Section 5 presents and discusses the model results, while Section 6 draws brief conclusions.

2. EXCHANGE RATE POLICY IN MALAWI: A HISTORICAL PERSPECTIVE

Historically, Malawi's exchange rate regimes have mostly involved some kind of peg to a single currency or basket of currencies. The government has always maintained a strong level of control over the nominal exchange rate, using it as a tool to promote growth while at the same time protecting consumers and investors from inflation. These are challenging and (sometimes) conflicting objectives. On the one hand, the Malawian economy is highly import intensive, which means devaluation harms consumers as domestic prices of imports increase. On the other hand, the economy is highly dependent on the agricultural sector, which accounts for nearly one-third of gross domestic product (GDP) and provides more than 80 percent of export revenues. Malawian agriculture is largely rainfed and hence growth in the sector is volatile. During periods in which the exchange rate is overvalued, agricultural exports are constrained, which leads to a slowdown in agricultural and national growth.

It was within this context that Cammack (2011) stressed the importance of a properly managed exchange rate to ensure long-term economic growth in Malawi. Lea and Hanmer (2009) concurred, finding that GDP in Malawi is highly sensitive to export revenues in real local currency terms, which implies that exchange rate management can have large beneficial impacts on incomes, perhaps even more so than any other policy instrument. Based on extensive cross-country analysis, Rodrik (2008) argued that developing countries should in fact attempt to maintain an undervalued currency, since this strategy stimulates long-term economic growth. An overvalued exchange rate, these authors found, is associated with a number of problems, including foreign exchange shortages, rent-seeking behavior and corruption, large current account deficits, balance-of-payments pressures, and stop-and-go macroeconomic cycles, all of which have adverse effects on long-term economic growth.

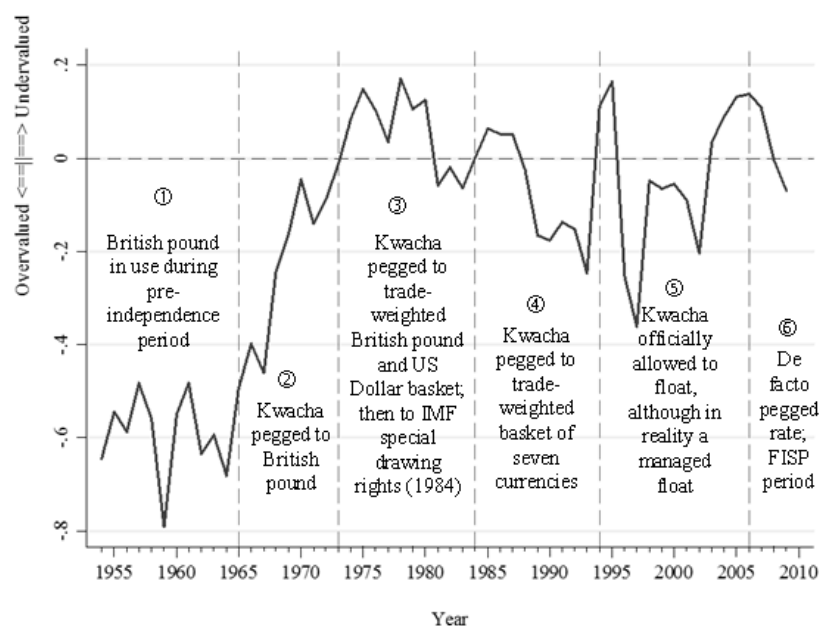
It is useful to consider how Malawi's exchange rate competitiveness has varied over the past decades, during which several exchange rate regime shifts have taken place. The information gathered here on the different regimes comes mostly from a Reserve Bank of Malawi publication on the evolution of exchange rate determination in Malawi (RBM 2006), unless otherwise cited. Many of the regime shifts have been subtle, most regimes involving some kind of peg to a single currency or basket of currencies. However, regime changes, together with domestic policy shocks, external economic shocks, and weather shocks, have all been important determinants of fluctuations in the value of the Malawian currency and its competitiveness.

The real exchange rate (RER) of a currency indicates whether the currency is overvalued or undervalued. The RER is effectively a measure of the purchasing power of a currency. Mathematically, the RER is calculated as the nominal exchange rate (NER) (that is, the rate officially set by the government in a fixed exchange rate regime) multiplied by the ratio of foreign to domestic prices (that is, the average price of a basket of goods in a foreign country divided by the average price of that basket of goods domestically). If, for example, inflation is higher in Malawi than in the United States, and the NER is fixed, it means that imports from the United States become relatively cheaper from a Malawian consumer's perspective. More people would want to import the good rather than purchase it domestically, while at the same time domestic producers would no longer be able to compete as effectively in foreign markets. This situation leads to a deficit on the trade balance. In effect, in *real* terms, the Malawian kwacha (MKW) therefore becomes stronger (or appreciates) relative to the US dollar (USD) even though the NER remains constant. The currency is then said to be overvalued, and a depreciation of the NER is required to restore the trade balance.

Figure 2.1 provides a long-run overview of exchange rate competitiveness and undervaluation in Malawi, drawing on an undervaluation index derived from the RER and conversion factors from the Penn World Tables (see Rodrik 2008 for a detailed explanation). The index, which is comparable across countries and time, shows that a currency is overvalued when it falls below zero and undervalued otherwise. During Malawi's preindependence period (marked ① in the figure) the British pound (GBP) was used as currency. The country had no reserve bank and as a result no independent monetary policy.

The GBP was clearly unsuitable for the Malawian economy and was hugely overvalued given Malawi's trading partners and export products at the time.

Figure 2.1—Exchange rate valuation and competitiveness



Sources: Primary data from Dani Rodrik, Kennedy School of Government, Harvard University (see Rodrik 2008). Additional calculations by Inigo Verdusco Gallo, Development Strategies and Governance Division, International Food Policy Research Institute.

Notes: IMF = International Monetary Fund, FISP = Farm Input Subsidy Program.

When Malawi gained independence in 1964, the dominant perception was that floating exchange rates were not desirable for developing countries. The argument was that foreign exchange markets were thin, causing free-floating exchange rates to be volatile, which was ultimately damaging to small, developing economies (Harrigan 2006). Pegs to currencies or baskets of currencies were therefore the norm, and such was the case for Malawi during the early postindependence years (1965–1973) ②. The Malawi pound, as the new currency was initially called, thus remained pegged to the GBP, which meant it moved in parallel to the GBP, including when the latter was devalued (for example, by 14 percent in 1967). By the end of this period the currency was no longer overvalued thanks to a series of devaluations of the GBP.

By 1973, Malawian monetary authorities wanted more control over their currency's exchange rate. The GBP at the time followed the gold standard, a system that began to collapse between 1971 and 1973. A change in exchange rate regime was necessary; therefore, between 1973 and 1975 the new MKW was pegged to a trade-weighted basket made up of the GBP and the USD ③. In 1975 the peg was changed to the International Monetary Fund's (IMF's) special drawing rights (SDR). The SDR peg, which was maintained until 1984, was effectively a USD peg (most other major international currencies experienced volatility in the mid-1970s and were therefore excluded from the SDR). During this period a number of overt devaluations were implemented whenever the need arose, thus ensuring that the MKW remained undervalued for most of the period. However, the dominance of the USD in the SDR peg meant that the MKW appreciated whenever the USD appreciated, and whenever this happened, Malawian exports were constrained. In an effort to prevent further deterioration of the terms of trade, the MKW was devalued against the SDR by 15 percent in 1982 and 12 percent in 1983, which ensured that the currency was only slightly overvalued toward the latter part of this period.

Further deterioration of the external situation led to the abandonment of the SDR and the adoption of a new peg in 1984, which linked the MKW to a trade-weighted basket of seven currencies ④. For a brief period (1985–1987), the undervalued currency brought about improvements in the balance of payments, but disruptions to the Nacala and Beira trade routes during the war in Mozambique worsened trade margins (for example, trade margins increased from 22 percent in the 1970s to 40 percent in the 1980s, according to RBM 2006). A series of devaluations, including 15 percent in 1985, 10 percent in 1986, 20 percent in 1987, 15 percent in 1988, 7 percent in 1990, and 26 percent in 1992, did little to prevent the currency from sliding back to an overvalued position by 1994.

Malawi's experience during the 1980s and 1990s was not dissimilar to that of other developing countries in preceding decades. Harrigan (2006) wrote that many countries with pegged rates experienced increasingly overvalued currencies during the 1970s and 1980s, prompting the IMF and World Bank to recommend floating exchange rate regimes as part of their structural adjustment programs of the 1990s. The emergence of banking and exchange rate crises (for example, in Mexico in 1994, East Asia in 1997, Brazil in 1999, and Argentina in 2002) further brought into question the appropriateness of fixed exchange rate regimes, especially in developing countries with open capital accounts where large sums of foreign currency were needed to back the peg, and where speculative attacks were easily launched against weak currencies.

From 1994 onward, the MKW was officially allowed to float ⑤. Munthali, Simwaka, and Mwale (2010) argued that the exchange rate was really fixed within a band—also called a managed float—from 1994 to 1997. Nevertheless, a series of sharp devaluations was still inevitable due to balance-of-payments disequilibrium following severe droughts in 1992 and 1994 and the withdrawal of nonhumanitarian aid due to poor governance. The fact that several members of the preferential trade area to which Malawi belonged had already adopted a variety of market-determined exchange rates also influenced the country's decision to float. By the end of 1994 the MKW had depreciated by 290 percent in nominal terms against the USD. The nominal rate remained stable during most of 1996 and 1997, but the sharp step devaluations of the previous years, coupled with poor fiscal discipline, led to rampant domestic inflation, which in turn caused the RER to reappreciate, as indicated by the sharp drop in the undervaluation index. Authorities were forced to once again devalue the MKW in 1997. The volatile RER during the mid-1990s created great uncertainty and ultimately hampered economic growth (Lea and Hanmer 2009).

With the adoption of a three-year structural adjustment program in 1998, which prescribed a flexible exchange rate policy, the MKW was allowed to float more freely, leading to an immediate reduction in overvaluation. However, this regime was abandoned once again for a managed float during 2004–2006 following economic instability linked to low foreign exchange inflow and the knock-on effects of the country's suspension from the IMF Poverty Reduction and Growth Facility in 2000 (Munthali, Simwaka, and Mwale 2010). During this period the NER was devalued by 25 percent, which was considered one of the leading causes of inflation of around 15 percent shortly thereafter. The net effect, however, was that the currency was once again undervalued by 2006.

The period from 2006 onward is of particular interest for this study. Since 2006, Malawi has pursued a de facto pegged exchange rate policy ⑥. The devaluation of 2006 provided the impetus for strong growth in exports, led by rapid growth in tobacco exports. During the same period, Malawi implemented its much-acclaimed Farm Input Subsidy Program (FISP), an expanded version of an earlier targeted input subsidy program. The sheer scale of FISP—about half of rural households received generous amounts of fertilizer and seed—led to a sharp rise in the fertilizer import bill. The trade deficit increased rapidly and spiked in 2008 when international fertilizer prices more than doubled. This led to severe balance-of-payments problems (see Malawi, NSO 2011). In 2008/09 the program costs accounted for around 74 percent of the budget allocation to agriculture and 16 percent of the total national budget, up from 61 and 8 percent, respectively, in 2006 (Dorward and Chirwa 2011).

Throughout 2006–2011 the authorities remained adamant that devaluation was not an option despite significant import demand (and payment backlogs) and foreign exchange shortages, arguing that it would lead to domestic inflation and would not solve the problem of foreign exchange shortages.

Although inflation levels had subsided somewhat compared with 2000–2005 (see Table 2.1 and Figure 2.2), the inflation rate still averaged 5–6 percent during 2006–2010, fueled in part by high levels of domestic spending by the government and by private households. This led to a systematic decline in the RER since 2006, with the MKW going from a position of being undervalued in 2006 and 2007 to being overvalued from 2008 onward (see Figure 2.1). By late 2010, the MKW was overvalued in real terms by about 10–20 percent according to some sources, and a vibrant parallel market for foreign exchange had developed. Foreign exchange shortages led to contraction of businesses, external payment arrears, fuel scarcity, and increased costs of local production (Cammack 2011). These were the early signs of the severe economic crisis that lay ahead for Malawi.

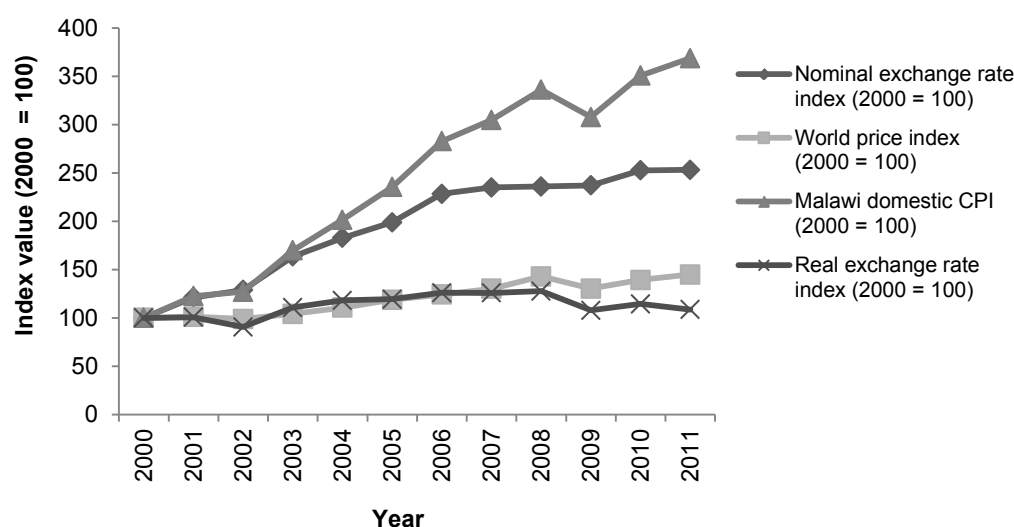
Table 2.1—Nominal and real exchange rates in Malawi, 2000–2010

Year	Nominal exchange rate (MKW/USD)	Nominal exchange rate index (2000 = 100)	World price index (2000 = 100)	Malawi domestic CPI (2000 = 100)	Real exchange rate index (2000 = 100)	
2000	59.5	100.0	100.0	100.0	100.0	
2001	72.2	121.3	101.2	122.5	100.7	
2002	76.7	128.8	98.8	127.0	90.6	
2003	97.4	163.6	104.2	169.9	110.7	
2004	108.9	182.9	110.6	201.6	118.0	
2005	118.4	198.9	118.6	235.5	119.4	
2006	136.0	228.4	124.2	282.8	126.0	
2007	140.0	235.0	130.1	304.8	125.8	
2008	140.5	236.0	142.9	336.1	127.7	
2009	141.2	237.1	130.4	307.9	107.8	
2010	150.5	252.7	139.3	350.7	114.3	
2011	150.8	253.3	144.8	368.8	108.6	
<i>Percent changes (year-on-year average)</i>						
2000	□	14.8	14.7	3.5	18.7	3.6
2006	□	2.1	2.1	3.1	5.5	-2.9

Source: Droppelmann, Makuwira, and Kumwenda 2011, based on IMF international financial statistics.

Notes: MKW = Malawi kwacha, USD = US dollar, CPI = consumer price index.

Figure 2.2—Malawi nominal and real exchange rate trends, 2000–2011



Source: Malawi, NSO 2011.

Note: CPI = consumer price index.

Only minor corrections in the NER were approved during 2006–2010, including devaluations of 3 percent in 2007 and 8 percent in 2009. This did little to reverse the trend of an increasingly overvalued exchange rate and a vibrant parallel foreign exchange market. A further 10 percent devaluation late in August 2011 was regarded by many observers as too little too late, given the serious foreign exchange crisis and crippling fuel shortages that ensued.

3. IMPACT OF DEVALUATION: THEORETICAL CONSIDERATIONS

A common response to sustained foreign exchange shortages is to devalue the currency. This lowers demand for imports as import prices rise in domestic currency terms, while at the same time foreign exchange earnings from exports rise as demand for more competitively priced exports rises. When the devaluation is large enough, demand for and supply of foreign exchange will return to equilibrium. This may lead to imported inflation, especially in import-intensive countries such as Malawi. When monetary authorities deem a foreign exchange shortage to be short term in nature (for example, until such time as exports recover from a shock), they may attempt to maintain the level of the nominal exchange rate by borrowing in the international market and buying local currency to prop up the exchange rate. While this is an effective strategy in the short run to limit exchange rate volatility, it raises government debt and is therefore not sustainable in the long run.

Under a fixed exchange rate regime any excess demand for foreign exchange will lead to the development of a parallel market for foreign exchange, where foreign exchange is sold at a premium (and often illegally so). Foreign exchange shortages may be the result of insufficient export revenues or declines in foreign exchange from other sources such as donor grants or foreign direct investments. Under a fixed exchange rate regime, a typical response to foreign exchange shortages is for monetary authorities to ration the supply of foreign exchange available to the “regular person on the street.” This is often done in order to prioritize the importation of essential goods such as fuel or medical supplies. Often only certain people gain access to foreign exchange at the official rate (for example, those with the “right” connections). If those with access to foreign exchange at the official exchange rate are importers, the limited supply of imported goods means that the importers can charge a premium for the goods they bring into the country. Similarly, if those with access to foreign exchange are currency traders, they can sell the acquired foreign exchange to importers, who then have no choice but to price the imported goods at the parallel exchange rate rather than at the official exchange rate. At the height of the foreign exchange rate crisis in Malawi, a premium of up to 100 percent over and above the official exchange rate existed. In modeling terms, following Dervis, de Melo, and Robinson (1982), the domestic price of imports (PM_c) for commodity c in a restricted foreign exchange market is thus defined as

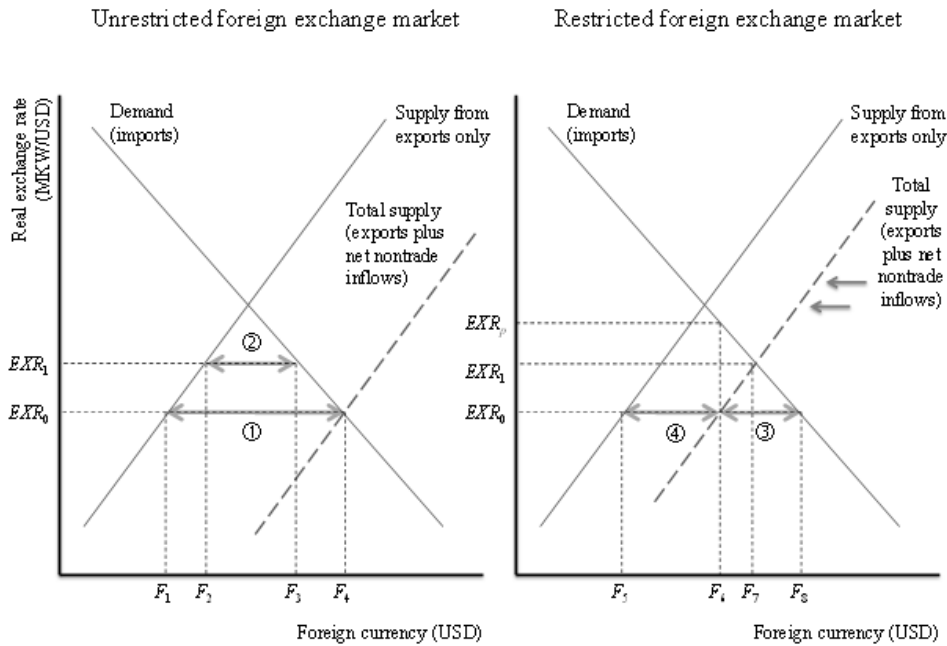
$$PM_c = \overline{PWW}_c \cdot (1 + tm_c + PR) \cdot EXR, \quad (1)$$

where \overline{PWW} is the world price of imports (that is, the foreign currency–denominated price of imports, typically treated as exogenous), tm_c is the import tariff applicable to commodity c , PR is the premium rate on foreign exchange or import prices, and EXR is the official nominal exchange rate (note that under a flexible exchange rate regime, PR is fixed and takes on the value zero). The total premium value or rent extracted from the economy ($PRVAL$) accrues to those with access to foreign exchange at the official rate and is defined as

$$PRVAL = \sum_c \overline{PWW}_c \cdot QM_c \cdot PR \cdot EXR. \quad (2)$$

An exchange rate devaluation in a market with foreign exchange rationing has a very different impact than one in a market without. Figure 3.1, adapted from Dorosh, Robinson, and Hashim (2009), compares the two scenarios. The left-hand panel shows the general case with no foreign exchange rationing (that is, an unrestricted market), and an exchange rate initially set at EXR_0 , where the total supply of foreign exchange equals the total demand for foreign exchange (that is, the amount of foreign exchange required to finance imports). Total foreign exchange supply is made up of foreign exchange earnings from exports and net nontrade inflows. The trade deficit is denoted by $F_4 - F_1$ ①. Devaluation to EXR_1 will cause imports to decline and exports to increase, and hence will cause the trade deficit to shrink to $F_3 - F_2$ ②.

Figure 3.1—Impact of devaluation



Source: Adapted from Dorosh, Robinson, and Hashim 2009.
 Notes: MKW = Malawi kwacha, USD = US dollar.

Devaluation may be required when, say, net nontrade inflows decline, causing the total supply curve to shift to the left such that foreign currency availability in the economy shrinks to F_3 . In the right-hand panel of the figure, we examine the impact of such a leftward shift in the total foreign exchange supply curve. At the official exchange rate (EXR_0), the total demand for foreign exchange is still equal to F_8 . However, since the foreign exchange supply curve has shifted to the left, supply at EXR_0 is now only F_6 , with $F_8 - F_6$ representing excess demand for foreign exchange at the official rate ③.

While the rate at which exporters convert foreign currency to domestic currency remains unchanged (EXR_0), importers bid the price of foreign currency up to the level EXR_p , which is the equilibrium level in the parallel foreign exchange market. $F_6 - F_5$ represents the trade deficit ④, which is funded by net nontrade inflows. Devaluation of the currency to EXR_1 will be required to match demand and supply of foreign exchange (F_7). A smaller devaluation (that is, between EXR_0 and EXR_1) will lower the parallel market rate but will fail to eliminate it completely.

4. MODEL AND SIMULATION SETUP

A Computable General Equilibrium Model for Malawi

The Malawi computable general equilibrium (CGE) model is calibrated to a social accounting matrix (SAM) for Malawi with base year 2004 (Benin et al. 2008). The model includes 36 economic sectors, including 17 in agriculture, 9 in industry, and 10 in services. The agricultural sectors are further disaggregated into urban areas and small-, medium-, and large-scale farms in rural areas. Producers in each sector maximize profits when combining intermediate inputs with land, labor, and capital. Agricultural land includes small-, medium-, and large-scale rural plots, and urban plots (that is, four classes); labor is split into elementary (farm) workers, unskilled workers, and skilled workers (that is, three types of labor); and the capital account specifies agricultural and nonagricultural capital (two classes). This gives a total of nine types of factors of production. Production is specified using nested constant elasticity of substitution (CES) functions, which reflect region-specific technologies and allow for imperfect substitution between factors.

Household income and expenditure patterns are important in determining how economic shocks affect household incomes in the model. The model identifies farm and nonfarm households in rural and urban areas, with further disaggregation by land holdings (that is, small-, medium-, and large-scale farms) to give a total of seven household groups. Factor incomes are distributed among households based on their factor endowments. Households save and pay taxes, and the balance of income is used for consumption expenditure. Consumption patterns are based on a linear expenditure system of demand, which allows for nonunitary income elasticities and fixed marginal budget shares. Income elasticities determine the responsiveness of demand for different household consumption items to real income changes.

Household poverty is affected through both income (employment) and expenditure (price) channels. For example, when agricultural production and revenues expand, households that derive income from land ownership and on-farm employment are more likely to benefit. However, revenues may not increase if producer prices fall sufficiently. Falling prices, in turn, benefit consumers, particularly nonfarm households, but also net consuming farm households (that is, those producing less than they consume). The use of aggregate household groups in CGE models prevents a nuanced analysis of the differential poverty effects on households. The Malawian model therefore incorporates a poverty module in which changes in prices and consumption at the representative household group level (that is, as observed in the CGE model) are linked to corresponding member households in the underlying survey data, where changes in standard income poverty measures are computed.

Economic outcomes are also affected by trade and movements in market prices. The standard CGE model assumes that producers supply their output to national product markets. Transaction costs separate producer and national consumer prices. International trade is modeled by allowing production to shift imperfectly between domestic and foreign markets depending on the relative prices of exports and domestic products. This is governed by a constant elasticity of transformation function. Similarly, a CES function is used to model consumers' choice between imported and domestically supplied goods, which depends on relative import prices. Malawi is a small economy and generally cannot exert any market power in world markets such that changes in domestic supply or demand might affect world prices. We therefore adopt a so-called small-country assumption whereby prices for imports and exports (PWM_c and PWE_c) are fixed, unless changed exogenously as part of a simulation experiment.

Traditionally, in standard CGE models, the current account balance is maintained either via a flexible exchange rate (EXR) or flexible foreign savings ($FSAV$). The addition of the premium variable (PR) in the import price equation (equation (1)) allows for the introduction of a third current account closure, namely one where both EXR and $FSAV$ are fixed, and where the external account equilibrium is achieved through changes in PR . The basic principle is that any shock leading to a current account deficit will cause PR , and hence import prices (PM_c), to increase. This causes domestic consumers to switch to domestically produced goods, and the quantity of imports (QM_c) declines to such an extent that the

current account balance is maintained. In contrast to a flexible exchange rate regime, whereby the burden of adjustment is shared between exports and imports, the burden of adjustment in the external account is entirely on imports when a fixed exchange closure is used (Dervis, de Melo, and Robinson 1982).

For a more detailed discussion of the features of the Malawi model, refer to Benin et al. (2008). The International Food Policy Research Institute’s standard model was also described in detail by Löfgren, Harris, and Robinson (2002). For technical details on the modeling of restricted foreign exchange markets in CGE models, see Dervis, de Melo, and Robinson (1982); Dorosh and Sahn (2000); and Dorosh, Robinson, and Hashim (2009).

Simulation Design

The Malawian economy has in recent times experienced a series of shocks that have led to severe foreign exchange shortages. Prior to the April 2012 devaluation and subsequent flotation of the currency, the previous government largely resisted calls to devalue the currency, arguing that it would lead to inflation. During 2011 the only exception was a 10 percent devaluation in August. The simulations here are designed not to demonstrate the impact of a devaluation per se, but instead to demonstrate how economic shocks leading to foreign exchange shortages differ in terms of their economywide impacts depending on the prevailing exchange rate regime. The modeling approach follows closely that of Dorosh and Sahn (2000), and more recently Dorosh, Robinson, and Hashim (2009). Five sets of simulations are conducted (see Table 4.1). The first three shocks consider impacts of actual events in 2011, namely tobacco export price declines, reductions in direct budgetary support to government, and a decline in foreign direct investments. The fourth and fifth sets are combined scenarios wherein we consider the joint effect of these three shocks under various assumptions.

Table 4.1—Summary of simulations

Simulation name	Shock applied			Exchange rate regime		
	Tobacco export price decline	Reduction in government grants from abroad	Reduction in foreign direct investment	Fixed nominal exchange rate	Free floating	Exogenous devaluation
<i>Sim 1a</i>	-35%			X		
<i>Sim 1b</i>	-35%				X	
<i>Sim 2a</i>		-30%		X		
<i>Sim 2b</i>		-30%			X	
<i>Sim 3a</i>			-30%	X		
<i>Sim 3b</i>			-30%		X	
<i>Sim 4a</i>	-35%	-30%	-30%	X		
<i>Sim 4b</i>	-35%	-30%	-30%		X	
<i>Sim 5a</i>	-35%	-30%	-30%	X		+5%
<i>Sim 5b</i>	-35%	-30%	-30%	X		+10%
<i>Sim 5c</i>	-35%	-30%	-30%	X		+20%

Source: Authors.

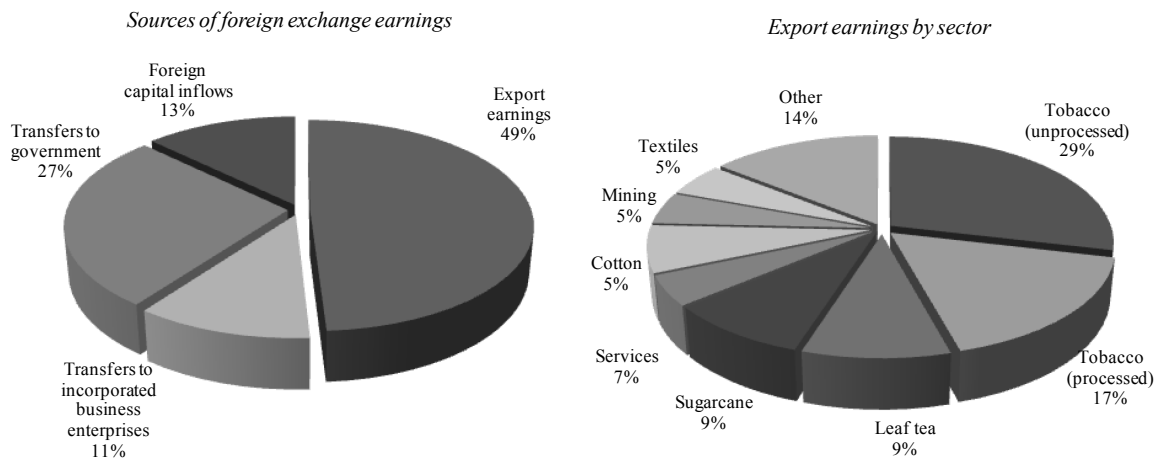
In all simulations we assume that investment is determined by the level of savings in the economy, which means that the average savings rates of households and other domestic nongovernment institutions are fixed. Government expenditure is fixed in real terms, while government savings are flexible and vary depending on the amount of revenue collected. Government savings (that is, the budget deficit or surplus) determine the level of public investment in the economy. The current account closure switches between a fixed exchange rate regime and a flexible or free-floating exchange rate regime. These closure switches are denoted by the suffixes (a) and (b), respectively, in the simulation names. Under the fixed exchange rate regime, we assume that foreign savings are exogenously determined and the exchange rate is fixed. A parallel market develops when foreign exchange shortages arise, with the premium on import prices acting as the equilibrating variable for the external account. Under the flexible

exchange rate closure foreign savings are also fixed, but the balance of payment equilibrium is restored via a flexible exchange rate regime which prevents a parallel market from developing (i.e., the premium rate is fixed and equals zero).

All scenarios assume a short run closure whereby capital stock is fully employed and fixed (or specific to an activity). Agricultural land, however, is mobile across the different agricultural subsectors, with the exception of land allocated to tobacco. Under a longer-run closure, we relax this assumption and evaluate the impact should tobacco farmers divert land away from tobacco in response to tobacco price declines. This methodology is explained in more detailed below, while the results from this alternative closure are reported in the appendix. With respect to labor, we adopt a neoclassical full-employment closure for self-employed farm labor and skilled labor, which means wages adjust to ensure full employment for these two labor groups. In the case of agricultural subsectors, this implies reallocation of self-employed family farm labor to more profitable subsectors within the agricultural sector. For unskilled workers, who can be employed both in agriculture (as so-called *ganyu* day laborers) and nonagriculture, we adopt an “unemployment closure” as the default. This closure assumes flexible employment levels at fixed wages (that is, when the economy contracts, unemployment increases as wages are unable to adjust downward to maintain a level of full employment). We also run additional simulations under a standard full-employment closure to test the robustness of our results as well as the sensitivity of our gross domestic product (GDP) results to the labor market closure adopted, mainly because unskilled workers make up such a large proportion of the total workforce. Throughout all the simulations, the domestic price index (that is, a producer price index) is used as numéraire, which means all price changes should be interpreted as changes *relative* to the fixed domestic price index.

Figure 4.1 serves as a reference point for the discussions to follow, showing the sources of foreign exchange earnings in Malawi as captured in the 2004 SAM (Benin et al. 2008). A breakdown of export earnings from different sectors is also provided. The discussion below provides further details of the simulations conducted, while a summary of the full simulation set appears in Table 4.1.

Figure 4.1—Sources of foreign exchange in Malawi, 2004



Source: Malawi 2004 social accounting matrix (Benin et al. 2008).

Tobacco Prices (Simulation 1)

Malawi's strong economic performance during 2005–2010 is credited by many to the Farm Input Subsidy Program (FISP). Implemented in 2005/06 as a response to low input use generally and severe food supply shortages during the 2004/05 growing season in particular, the policy primarily aimed to provide low-cost maize and tobacco fertilizer and improved maize seeds to poor smallholders. According to official statistics, maize yields more than doubled, from around 0.8 to 2.0 metric tons per hectare, between 2004/05 and 2009/10. Tobacco farmers also expanded production at an average annual rate of 13.1 percent over the same period. Since maize and tobacco are key agricultural sectors in Malawi, the growth in these two sectors was largely responsible for Malawi's strong agricultural GDP growth of 7.5 percent per year during 2005–2010. Agriculture, in turn, is the backbone of the Malawian economy, contributing almost one-third to national GDP; hence, growth in the agricultural sector served as a key driver of overall GDP growth, which averaged almost 7 percent during this period.

Although FISP is largely a maize-focused policy, the contribution of tobacco has been extremely important for the economy. According to the Malawi SAM (Benin et al. 2008), export earnings from raw and processed tobacco accounted for around 45 percent of overall export earnings (see Figure 4.1). Earnings more than doubled between 2007 and 2009 alone, which increased the importance of this sector even further. Strong growth in tobacco exports during this time provided much-needed foreign exchange for imported fertilizer required for FISP.

However, successive slumps in the world price of tobacco in 2010 and 2011 marked the start of a period during which export earnings declined rapidly. Malawi itself has been blamed for its contribution to the growing excess global supply of tobacco and the consequent decline in world prices; as Lea and Hanmer (2009) predicted, it is unlikely that Malawi can increase tobacco production without bringing about a decline in world prices. In 2010 export values declined by 31 percent compared with 2009. Both export volumes and prices declined in that year, by 14 and 20 percent, respectively (Malawi, NSO 2011). An even larger shock occurred in 2011, when prices plummeted by almost 35 percent compared with 2010 (Malawi, TCC 2011). Export volumes were unchanged compared with the previous year, but the decline in export earnings was larger.

Several scenarios explore the impact of declines in world tobacco prices (see Table 4.1). The first models a 35 percent decline, which is similar to the 2010–2011 shock. A short-run closure is adopted whereby farmers are unable to reallocate land away from tobacco, under the assumption that farmers did not anticipate the decline in world prices at the time of planting and that it is too late to change their land allocation. The same price shock is applied in a second simulation, but here we take a medium- to longer-term view in which farmers are able to reallocate land away from tobacco to other, more profitable crops. The simulations are first conducted under a fixed exchange rate scenario, where a parallel foreign exchange market develops, and then under a free-floating exchange rate regime, where the exchange rate adjusts (depreciates) so that the parallel market is eliminated.

The Malawi SAM (Benin et al. 2008) gives us a good sense of the size and potential effect of this shock. Of the MKW 98 billion foreign exchange earnings in 2004, just over MKW 23 billion came from tobacco (this includes both raw and processed tobacco exports). The direct effect of a 35 percent decline in tobacco prices is therefore roughly equivalent to MKW 8 billion, or an 8 percent loss, in foreign exchange earnings prior to any economywide effects or adjustments (see Figure 4.1). Any such indirect spillover or adjustment effects are captured in the model.

Decline in Government Grants from Abroad (Simulation 2)

Since 2010 several foreign donors have raised concerns over governance issues in Malawi. Historically, Malawi has received significant assistance in the form of direct budget support from donors under the so-called Common Approach to Budgetary Support (CABS), including the African Development Bank, the UK Department for International Development, the European Union, Germany, Norway, and the World

Bank. During budget year 2009/10 Malawi received more than US\$200 million¹ in support, which accounted for just under one-third of total grants as reported in Malawi's public finances (Malawi, NSO 2011). Pledges were revised downward to \$162 million in the 2010/11 budget cycle, of which only \$97 million was eventually disbursed as the governance situation deteriorated. In the 2011/12 budget year, support under CABS was suspended indefinitely, forcing the government to adopt an ambitious zero-deficit budget.

The suspension of CABS thus implied a 30 percent reduction in direct transfers (grants) to the government. This revenue source also contributes more than one-quarter of foreign earnings (see Figure 4.1). Effectively, therefore, the 30 percent shock was equivalent to an 8 percent reduction in foreign exchange earnings, which is similar to the tobacco price shock. It is also equal to around 12 percent of government consumption expenditure plus transfers to domestic nongovernment institutions, a shortfall that has to be made up through external borrowing or a drawdown of government savings. This will ultimately negatively affect current investment flows, a situation with long-run implications for capital formation that are not explicitly considered in this static modeling exercise.

Decline in Foreign Direct Investment into Malawi (Simulation 3)

Foreign savings are less important as a source of foreign exchange for Malawi, accounting for 13 percent of total foreign exchange supply (see Figure 4.1). Roughly half of what is captured as foreign savings in the SAM (Benin et al. 2008) can be classified as foreign direct investments. Recent balance-of-payments data show that in real terms, foreign direct investment peaked in 2007 and has since declined by almost 54 percent. This translates roughly to a 30 percent reduction in net foreign savings into Malawi during the last year or so. Hence, in the third set of simulations we evaluate the impact of this shock, which translates to a 4 percent direct reduction in total foreign exchange earnings (that is, about half the size of the other two shocks).

Combined Simulations (Simulations 4 and 5)

In the combined scenarios (Simulation 4) we consider the joint effect of the tobacco price shock (35 percent decline), suspension of budget support under CABS (30 percent reduction in government grants from abroad), and a decline in foreign direct investment (also by 30 percent). Once again outcomes are considered under a fixed and flexible exchange rate regime. An additional set of combined scenarios (Simulation 5) are also run, where in addition to the foreign exchange shock the currency is devalued by 5, 10, and 20 percent to see what effect such "partial" devaluations have on the economy and the parallel market for foreign exchange. These additional scenarios assume a fixed exchange rate regime, but the authorities adjust the exchange rate exogenously.

A Note on Fuel, Fertilizer, and Chemicals Import Prices

The period 2004–2008 was characterized by extreme price increases for key commodities. Fuel prices increased by almost 180 percent during this period, while fertilizer prices increased by a staggering 370 percent (Heady and Fan 2011). The biggest spike in fuel and fertilizer prices occurred in 2008. This had a major impact on Malawi's FISP: Between 2007/08 and 2008/09 the face value of fertilizer vouchers increased from about MKW 3,300 to MKW 7,950 (141 percent), while overall program costs increased by 154 percent compared with budgeted increases of only 69 percent (Dorward and Chirwa 2011). Given the potential effects of these shocks, we also considered modeling their impact. However, since our 2004 SAM (Benin et al. 2008) predates the FISP, the amount of fertilizer captured in our base data is relatively small compared with the actual amount imported post-2006. In our model, at least, a simulated increase in international fertilizer prices therefore has a small impact. This particular simulation is earmarked for a possible future update of this study once a new Malawi SAM has been developed.

¹ All dollar amounts are in US dollars.

5. RESULTS AND DISCUSSION

Impacts on Gross Domestic Product and Prices

We first consider the impact of the decline in world tobacco prices (Table 5.1). Real gross domestic product (GDP), measured at factor cost, declines by 4.2 percent in the short-run scenario with fixed exchange rate (Simulation 1a). This contraction is caused largely by the 23.7 percent decline in the agricultural export sectors, of which tobacco is the dominant sector. Also severely affected are the agroprocessing sectors. These include the tobacco processing sector, which by assumption is also faced with the same price decline that affects raw tobacco. In the absence of a free-floating exchange rate, the premium on foreign exchange is 18.3 percent. The effect of this scenario on the textiles sector is particularly interesting. This sector imports unfinished clothing products, adds value to these goods domestically, and then re-exports the finished product. Since the current account adjustment only affects import prices but leaves export prices unchanged, this sector faces a significant cost–price squeeze, with GDP in the sector declining by 7.5 percent.

Under the fixed exchange rate regime, GDP at market prices declines sharply, as a result of a drop in both real consumption (-6.1 percent)—mostly because of large import price increases due to the parallel exchange rate—and real investment (-10.8 percent) in the economy. Consumer prices (the consumer price index, or CPI), which are determined both by import and domestic prices, rise by around 6.5 percent relative to the numéraire, the domestic price index. Some households are also directly affected by the decline in tobacco revenues, especially medium- and large-scale farmers, who are more likely to engage in the export market. Imports decline due to the premium on foreign exchange, but exports decline by even more because there is little incentive to export as intermediate input costs increase while export prices remain unchanged.

The adoption of a flexible exchange rate regime (Simulation 1b) helps to mitigate the adverse effects of declining tobacco prices. National GDP still declines, also within most sectors, but losses are smaller compared with the fixed exchange rate scenario. The decline in foreign exchange earnings from tobacco exports leads to a 10.2 percent nominal exchange rate depreciation, which as expected, is lower than the comparable premium rate on foreign exchange of 18.3 percent (see earlier discussion and Figure 3.1). Since the adjustment now falls on both imports and exports, the flexible exchange regime leads to a much-improved economic climate for exporters compared with that under the fixed regime: GDP losses for agricultural exporters are now only 11.8 percent (compared with 23.7 percent before), while GDP in some export sectors (such as textiles) even increases.

The first shaded column of Table 5.1 shows the gains of changing from a fixed to a flexible exchange rate regime. In the short run, real GDP at market prices will be 2.1 percent higher. Exports increase by 18.3 percent, which provides much-needed foreign exchange to allow domestic consumers to also raise imports relative to the fixed exchange rate regime. Imports are of course also boosted by the fact that import prices in domestic currency terms do not rise by as much as they do under the fixed exchange rate, due to the elimination of the parallel foreign exchange market.

We also consider outcomes for the tobacco simulations under an alternative factor market closure whereby farmers are able to reallocate land away from tobacco. This greater flexibility in fact leads to a much larger decline in tobacco GDP and national GDP, with GDP falling by 7.0 percent in the fixed exchange rate scenario and 4.3 percent in the flexible exchange rate scenario (see Table A.1 in the appendix). Under another alternative closure, we assume unskilled workers who are laid off in the short run are able to find employment in other sectors. Table A.2 shows that this closure leads to a somewhat improved outcome in terms of GDP measured at factor cost (that is, GDP declines by 1.1 and 0.6 percent in the fixed and flexible exchange rate scenarios, respectively). In the absence of an adjustment in the nominal exchange rate, however, the premium on foreign exchange continues to increase in the longer run, reaching 23.0 percent, compared with 18.3 percent previously as a result of the simulated tobacco price shock.

Table 5.1—Individual scenarios: Changes in gross domestic product and prices with unemployment closure for unskilled workers

	Simulation 1: 35% decline in world tobacco export prices			Simulation 2: 30% decline in government budget support from abroad			Simulation 3: 30% decline in foreign direct investments		
	Sim 1a	Sim 1b	Sim 1b change relative to Sim 1a	Sim 2a	Sim 2b	Sim 2b change relative to Sim 2a	Sim 3a	Sim 3b	Sim 3b change relative to Sim 3a
	Fixed exchange rate regime	Flexible exchange rate regime		Fixed exchange rate regime	Flexible exchange rate regime		Fixed exchange rate regime	Flexible exchange rate regime	
Real GDP at factor cost**	-4.2	-2.1	2.1	-1.0	-0.1	0.9	-0.4	0.0	0.4
<u>Agriculture</u>	<u>-5.7</u>	<u>-3.2</u>	<u>2.6</u>	<u>-0.1</u>	<u>0.8</u>	<u>0.9</u>	<u>0.0</u>	<u>0.4</u>	<u>0.4</u>
Export crops	-23.7	-11.8	15.6	-2.2	2.6	4.9	-1.1	1.3	2.3
<u>Mining</u>	<u>-1.1</u>	<u>1.2</u>	<u>2.3</u>	<u>-0.9</u>	<u>0.3</u>	<u>1.2</u>	<u>-0.4</u>	<u>0.2</u>	<u>0.6</u>
<u>Manufacturing</u>	<u>-7.4</u>	<u>-4.9</u>	<u>2.7</u>	<u>0.9</u>	<u>2.2</u>	<u>1.3</u>	<u>0.5</u>	<u>1.0</u>	<u>0.6</u>
Agroprocessing	-13.3	-10.1	3.6	0.9	2.4	1.6	0.4	1.2	0.7
Textiles	-7.5	1.5	9.7	-2.6	2.1	4.9	-1.2	1.0	2.2
<u>Construction</u>	<u>-8.7</u>	<u>4.1</u>	<u>14.1</u>	<u>-23.4</u>	<u>-16.8</u>	<u>8.6</u>	<u>-10.8</u>	<u>-7.5</u>	<u>3.7</u>
<u>Services</u>	<u>-1.9</u>	<u>-1.1</u>	<u>0.8</u>	<u>-0.7</u>	<u>-0.3</u>	<u>0.4</u>	<u>-0.3</u>	<u>-0.1</u>	<u>0.2</u>
Prices									
Consumer price index	6.5	3.4	-3.0*	3.9	2.5	-1.4*	1.9	1.2	-0.7*
Nominal exchange rate	-	10.2	10.2*	-	5.8	5.8*	-	2.7	2.7*
Foreign exchange premium	18.3	-	-18.3*	9.5	-	-9.5*	4.5	-	-4.5*
Real GDP at market prices**	-4.9	-2.6	2.4	-1.6	-0.6	1.0	-0.7	-0.3	0.5
<u>Domestic absorption</u>	<u>-5.8</u>	<u>-4.3</u>	<u>1.6</u>	<u>-4.4</u>	<u>-3.6</u>	<u>0.9</u>	<u>-2.1</u>	<u>-1.7</u>	<u>0.4</u>
Consumption	-6.1	-6.5	-0.5	-1.5	-1.6	-0.1	-0.7	-0.8	-0.1
Investments	-10.8	5.0	17.7	-28.6	-20.5	11.3	-13.2	-9.2	4.7
Government	-	-	-	-	-	-	-	-	-
Exports	-21.2	-6.8	18.3	-3.3	3.5	7.0	-1.6	1.7	3.3
Imports	-15.2	-9.0	7.4	-9.6	-6.3	3.7	-4.6	-2.9	1.7

Source: Authors' computable general equilibrium model results.

Notes: GDP = gross domestic product. * Percentage point changes shown, rather than percentage changes. ** Only results for selected subsectors are shown here

We next consider the impact of government grant reductions (Simulation 2) and reduced foreign direct investments (Simulation 3). The impact channels of these simulations are very different from that of the tobacco price shock in that the impact on agriculture is not as pronounced. The reduction in government grants leads to a significant reduction in government income, and the resulting increase in the budget deficit causes investments to fall sharply. Domestic absorption, which is the sum of household consumption, investments, and government expenditure (the latter is fixed in our model setup), declines by 4.4 percent. The foreign exchange shortage leads to a 9.5 percent exchange rate premium in the fixed exchange rate scenario. Moving to a flexible exchange rate regime and allowing the currency to depreciate by 5.8 percent has the effect of boosting exports, which now grow at 3.5 percent. This boost leads to increased economic activity in key export sectors such as the agricultural export crops and textiles sectors, both of which experience an increase in GDP at factor cost. This brings in much-needed foreign exchange to relieve the shortage, thus allowing for relatively more imports compared with the fixed exchange regime scenario. Sectors such as construction, however, still experience a large decline in demand due to the investment slump associated with foreign exchange shortages, which means overall GDP still declines marginally.

The foreign direct investment shock has a very similar effect on the economy, although the magnitude is smaller. Foreign savings directly enter the domestic pool of savings, where they are used to finance investment projects. In fact, about 43 percent of investment in Malawi is financed from abroad. The 30 percent reduction in foreign savings therefore leads to a fairly large reduction in investments (for example, by 13.2 percent under the fixed exchange rate closure). Consumption expenditure also declines somewhat as household earnings are negatively affected by the decline in economic activity. Once again the construction sector is most severely affected by the large decline in investments (-10.8 percent), which causes overall GDP to decline by 0.4 percent. Many other investment-type goods (for example, machinery and equipment) are imported into Malawi. A premium of around 4.5 percent on foreign exchange is established in the parallel market. Under a flexible exchange rate regime, a 2.7 percent depreciation is sufficient to correct the imbalance on the current account while at the same time mitigating about half the losses in GDP at market prices experienced under the fixed exchange rate regime.

Under both these scenarios the longer-term outcome with full employment for unskilled workers is more favorable, but as was the case in the tobacco scenarios, the premium rate increases somewhat more compared with the short-run scenario (see Table A.2). Since this is a static model, the impact of current investment flows on future production capacity is not taken into account. It is obvious, however, that a decline in investment of the magnitudes reported for Simulations 2 and 3 does not bode well for productive capacity and economic growth in the future.

We next turn to the combined scenarios (Simulations 4 and 5), which allow us to gauge the possible combined implications of the events that have contributed to the foreign exchange crisis of 2011. These scenarios, whose results are shown in Table 5.2, are not meant to serve as actual predictions of the impact of the foreign exchange crisis—many other external shocks, positive and negative, are not modeled—but merely to sketch potential effects and outcomes under various assumptions. Starting with the results in Simulation 4, we note an 8.7 percent decline in GDP at market prices under the fixed exchange rate regime, caused largely by a staggering 54.2 percent reduction in investments. Domestic absorption declines by 31.2 percent in this scenario. A foreign exchange premium of 37 percent emerges, with the resulting import price increase being largely responsible for the 12.9 percent increase in domestic prices. Under the flexible exchange rate scenario, there is a significant recovery in investments, which now decline by 27.9 percent (put differently, investments are 57.6 percent higher than in the fixed exchange rate scenario). Exports are boosted by the more favorable exchange rate and remain roughly unchanged compared with the baseline level (that is, exports are 37.1 percent higher than in the fixed exchange rate scenario).

Table 5.2—Combined scenarios: Changes in gross domestic product and prices with unemployment closure for unskilled workers

	Combined scenarios			Change relative to fixed exchange rate regime (Simulation 4a)		
	Sim 4a	Sim 4b	Sim 4b change relative to Sim 4a	Sim 5a: Fixed exchange rate with 5% devaluation	Sim 5b: Fixed exchange rate with 10% devaluation	Sim 5c: Fixed exchange rate with 20% devaluation
Real GDP at factor cost**	-6.6	-2.3	4.6	1.4	2.6	4.6
<u>Agriculture</u>	<u>-6.9</u>	<u>-1.8</u>	<u>5.5</u>	<u>1.7</u>	<u>3.2</u>	<u>5.5</u>
Export crops	-29.3	-7.0	31.5	9.7	18.0	31.3
<u>Mining</u>	<u>-2.7</u>	<u>1.7</u>	<u>4.5</u>	<u>1.4</u>	<u>2.6</u>	<u>4.5</u>
<u>Manufacturing</u>	<u>-7.0</u>	<u>-1.4</u>	<u>6.0</u>	<u>1.5</u>	<u>2.9</u>	<u>6.0</u>
Agroprocessing	-12.9	-6.1	7.8	1.9	3.8	7.7
Textiles	-13.6	5.6	22.2	5.5	11.0	22.0
<u>Construction</u>	<u>-44.2</u>	<u>-22.8</u>	<u>38.5</u>	<u>9.8</u>	<u>19.4</u>	<u>38.1</u>
<u>Services</u>	<u>-3.7</u>	<u>-1.5</u>	<u>2.3</u>	<u>0.7</u>	<u>1.3</u>	<u>2.3</u>
Prices						
Consumer price index	12.9	7.5	-5.3*	-1.5*	-2.8*	-5.3*
Nominal exchange rate	-	20.2	20.2*	5.0*	10.0*	20.0*
Foreign exchange premium	37.0	-	-37.0*	-11.0*	-20.7*	-36.7*
Real GDP at market prices**	-8.7	-3.7	5.5	1.7	3.1	5.4
<u>Domestic absorption</u>	<u>-13.2</u>	<u>-9.9</u>	<u>3.8</u>	<u>1.2</u>	<u>2.2</u>	<u>3.8</u>
Consumption	-9.3	-8.9	0.4	0.3	0.5	0.4
Investments	-54.2	-27.9	57.6	14.7	29.1	57.1
Government	-	-	-	-	-	-
Exports	-27.2	-0.2	37.1	10.1	19.5	36.8
Imports	-29.6	-18.0	16.5	4.4	8.6	16.4

Source: Authors' computable general equilibrium model results.

Notes: * Percentage point changes shown, rather than percent changes. ** Only results for selected subsectors are shown here.

Simulation 5 is mainly for illustrative purposes in the sense that it shows how government, under the combined scenario with foreign exchange rationing and a parallel market trading at a premium of 37.0 percent, could achieve some gains even if the currency is not devalued by the full 20.2 percent required to restore equilibrium in the foreign exchange market (see Simulations 4a and 4b). Since it is not always possible to determine the premium rate and the required devaluation precisely, it is more likely that governments adopt a trial-and-error approach in setting the correct exchange rate level. It is noteworthy that the current exchange rate regime in Malawi, where the currency is permitted to float freely, is quite unusual given Malawi's history; hence, in Simulation 5 we assume the exchange rate is exogenously determined by the monetary authorities. The partial-devaluation scenarios illustrate how devaluations of 5, 10, and 20 percent, respectively, reduce the premium rate by 11.0, 20.7, and 36.7 percentage points, respectively. Compared with the fixed exchange rate scenario with rationing, even partial devaluations lead to higher levels of GDP and investments, improved export performance, and higher levels of imports. Consumer prices are also lower, which bodes well for poorer consumers. The longer-term outcomes under Simulations 4 and 5 are shown in the appendix (Table A.3), but a detailed discussion is omitted here.

Rents from Foreign Exchange Rationing, Household Incomes, and Poverty

Household welfare is affected via both income and price channels. Depending on the shocks simulated, changes in prices or taxation may affect disposable income levels. Households may also see their disposable income levels affected by changes in income from employment or other sources. In the fixed exchange rate simulations, we assume rents from the foreign exchange premium to be one such source of income. Table 5.3 provides information about population shares, income shares, poverty rates, and our

assumptions about how rents are distributed across household groups. Assumptions in this regard are potentially important for the overall income distribution results obtained under the fixed exchange rate scenarios. In the absence of any data on what this distribution might look like, we assume that three-quarters of rents accrue to urban households and the remainder to rural households. Within the latter group, nonfarm households, which include rural traders, possibly with access to foreign exchange, capture the greatest share of the rents (16.3 percent). Within urban areas metropolitan households earn most of the rents (64.1 percent). Given these assumptions, it is also clear that rents will benefit wealthier households, thus skewing the rural–urban income distribution further, and particularly benefiting those urban and rural households in the nonfarm sector of the economy.

Table 5.3—Population shares, income shares, and assumptions about the distribution of rents

	Malawian population		Initial income and poverty				Assumed distribution of rents (%)
	Population ('000)	Population share (%)	Income level (MKW millions)	Income distribution share (%)	Per capita income (MKW)	Poverty head count rate (%)	
All households	12,173	100.0	210,170	100.0	17,265	52.4	100.0
<u>Rural households</u>	<u>10,793</u>	<u>88.7</u>	<u>114,284</u>	<u>54.4</u>	<u>10,589</u>	<u>55.9</u>	<u>25.0</u>
Small-scale farm	3,731	30.7	20,165	9.6	5,405	61.0	2.6
Medium-scale farm	6,240	51.3	56,825	27.0	9,106	55.6	4.8
Large-scale farm	363	3.0	17,144	8.2	47,166	30.6	1.3
Nonfarm	458	3.8	20,150	9.6	44,043	37.5	16.3
<u>Urban households</u>	<u>1,381</u>	<u>11.3</u>	<u>95,886</u>	<u>45.6</u>	<u>69,453</u>	<u>25.4</u>	<u>75.0</u>
Metropolitan	652	5.4	56,913	27.1	87,347	20.6	64.1
Small centers	729	6.0	38,973	18.5	53,459	29.7	10.9
Nonfarm	75	0.6	3,390	1.6	45,050	26.8	7.1
Farm	654	5.4	35,584	16.9	54,427	30.0	3.8

Source: Malawi 2004 social accounting matrix (Benin et al. 2008) and authors' calculations.

Table 5.4 presents results on changes in household incomes. We focus only on the combined scenario (Simulation 4). On average, household incomes decline by 0.3 percent in the fixed exchange rate scenario. While rural and urban farm households (and large-scale farmers in particular) see their incomes decline due to unfavorable export conditions, urban households in general experience large increases in their real income, mainly due their reaping the bulk of the benefits of the foreign exchange premium. Under the flexible exchange rate regime, no rents are earned, and household incomes decline by 2.7 percent. Although the average Malawian household is worse off, there are important distributional effects, with rural households benefiting as foreign exchange rents are eliminated and export opportunities abound. The long-run results are shown in Table A.4. The most notable outcome here is that household income inequalities are bound to increase if the fixed exchange rate regime is maintained and the premium increases.

Table 5.4—Combined scenario: Changes in household income with unemployment closure for unskilled workers

	Base value (MKW million)	Change relative to base (%)		Sim 4b change relative to Sim 4a
		Sim 4a: Fixed exchange rate	Sim 4b: Flexible exchange rate	
All households	210,170	-0.3	-2.7	-2.3
<u>Rural households</u>	114,284	-6.1	-1.3	5.0
Rural farm households	94,134	-9.5	-0.9	9.5
Small-scale	20,165	-4.6	0.6	5.4
Medium-scale	56,825	-7.7	-0.5	7.9
Large-scale	17,144	-21.2	-4.1	21.6
Nonfarm households	20,150	10.0	-3.2	-12.0
<u>Urban households</u>	95,886	6.5	-4.2	-10.1
Metropolitan	56,913	15.5	-5.7	-18.4
Small centers	38,973	-6.6	-2.1	4.8
Nonfarm	3,390	41.1	-5.2	-32.8
Farm	35,584	-11.1	-1.8	10.5

Source: Authors' computable general equilibrium model results.

6. CONCLUSIONS

Malawi's current foreign exchange crisis is not a short-term crisis that the country can ride out by borrowing on international markets or implementing foreign exchange rationing measures. There are no immediate signs of a recovery in tobacco prices, and the long-term prospects are not good. Despite important reforms introduced under the new government, it may take some time for foreign investors and donors to regain confidence in the country amid continued governance concerns, deteriorating service delivery and infrastructure, and very high levels of inflation. Results show that a foreign supply crisis similar to the one that Malawi currently faces could have a substantial negative impact on gross domestic product (GDP). In our simulations, which in effect try to capture the kinds of shocks experienced prior to April 2012, we assume a 35 percent decline in tobacco export prices, and 30 percent declines in foreign government budget support and foreign direct investments, respectively.

Some key results are reproduced in Table 6.1. Under a fixed exchange rate regime, the combined shock causes GDP at factor cost to decline by 6.6 percent. Losses in agricultural GDP amount to 6.9 percent, driven by the large decline in the tobacco sector. Manufacturing sectors, and particularly those facing a cost-price squeeze associated with rising costs of imported inputs, also see their real output levels decline. As far as the components of GDP are concerned, the most worrying aspect is the 54.2 percent decline in investments, which reduces Malawi's productive capacity in future periods. As a result of foreign exchange shortages and rationing, a parallel foreign exchange market develops, and the Malawi kwacha (MKW) trades at a premium of around 37.0 percent. This is lower than the actual premium seen in the market in March 2012, which suggests the actual foreign exchange shortages were perhaps a lot more severe than what is modeled here. Also under this scenario, the rising cost of imports leads to inflation domestically, with the consumer price index rising by 12.9 percent relative to the fixed producer price index, which serves as the model numéraire.

Table 6.1—Summary results: Impact of foreign exchange supply shock under fixed and flexible exchange rate systems in Malawi

	<i>Fixed exchange rate regime, no devaluation</i>	<i>Fixed exchange rate regime, 10% devaluation</i>	<i>Flexible exchange rate regime (equiv. to 20% devaluation)</i>
Real GDP at factor cost (% change)	-6.6	-4.2	-2.3
Agriculture	-6.9	-3.9	-1.8
Manufacturing	-7.0	-4.2	-1.4
Services	-3.7	-2.4	-1.5
Real GDP at market prices (% change)	-8.7	-5.8	-3.7
Consumption	-9.3	-8.8	-8.9
Investments	-54.2	-40.9	-27.9
Government	-	-	-
Exports	-27.2	-13.0	-0.2
Imports	-29.6	-23.6	-18.0
Consumer price index (% change)	12.9	10.1	7.5
Nominal exchange rate (% change)	-	10.0	20.2
Foreign exchange premium (level)	37.0	16.3	0.0
Household income (% change)			
Rural households	-6.1	-3.6	-1.3
Urban households	6.5	5.8	-4.2

Source: Authors' computable general equilibrium model results

Our results show that devaluation can bring about significant gains compared with the bleak picture painted above. While a devaluation of around 20 percent would be required to eliminate the parallel foreign exchange market, even a partial devaluation would improve GDP growth; for example,

under a 10 percent devaluation, GDP growth declines by only 4.2 percent. Under the flexible exchange rate scenario, the MKW depreciates by 20.2 percent and real GDP losses are only 2.3 percent (or 4.6 percent higher than in the fixed exchange rate scenario). We note a significant recovery in investments as much of the lost foreign exchange revenue is made up by improved exports, which ultimately supplement the pool of savings in the economy. Inflation levels are also lower once the currency is devalued. This reflects the fact that imports are no longer derived from the much higher parallel exchange rate that existed prior to the devaluation.

On the socioeconomic front, the most profound outcome of the devaluation is its impact on the distribution of income. While our results are determined to some extent by our assumptions about how rents associated with the exchange rate premium are distributed among households, it is probably very safe to assume that it is not the poor that benefit from such a premium. The poor are, however, affected by rising prices. Under a flexible exchange rate regime, wealthier households no longer capture the rents, while rural households (and farm households in particular) benefit from improved export opportunities and lower domestic prices. This result challenges the perception that devaluation will harm the poor more than will a fixed exchange rate regime. Many of the poor live in rural areas and are employed in the agricultural sector, a sector that has suffered losses in recent times due to an uncompetitive exchange rate. Although poverty has been severely affected by the foreign exchange crisis, the welfare effects may indeed be softened by a devaluation.

The driving force behind the improved outcome is a recovery of exports. An often-heard government response to the foreign exchange crisis is that Malawi should diversify its exports and export more. The results here clearly demonstrate that as long as the exchange rate remains overvalued, exporters will not be competitive in international markets and investors are unlikely to invest in domestic productive capacity. The consistent message from our simulation exercise is that a more flexible exchange rate system allows for a more balanced current account adjustment process.

There are of course some caveats. First, government has ambitious plans to promote diversification of exports in an attempt to reduce the overreliance on tobacco and improve the foreign exchange supply situation. While a more competitive exchange rate will support this goal, high levels of inflation and the uncertain economic outlook mean that the propensity to invest remains low. Investment propensities have, in fact, been low for some time now, evidenced by the inability of domestic producers to expand production capacity even during Malawi's period of rapid growth around the middle of the first decade of the 21st century (see Cammack 2011). Devaluation will therefore not *automatically* boost exports or create a favorable investment climate. Various other complementary policies should be implemented to achieve macroeconomic and price stability that is more conducive to investments.

Second, the existence of a parallel market may be indicative of a longer-term structural problem in Malawi, namely one whereby residents are increasingly looking at ways to extract money from the economy. Capital flight is a real problem in Malawi as reflected by the large "errors and omissions" entry in the balance of payments. The parallel market and the accompanying rent-seeking behavior will never be completely eliminated as long as Malawian residents seek to extract funds through illegal channels. Apart from legal measures, the only way to reduce capital flight is to establish credibility in government as the custodian of a stable and prosperous economy in the long run.

APPENDIX: SUPPLEMENTARY TABLES

Table A.1—Tobacco scenarios: Changes in gross domestic product and prices with unemployment closure for unskilled workers and reallocation of land away from tobacco

	<i>Simulation 1: 35% decline in world tobacco export prices</i>		
	<i>Sim 1a</i>	<i>Sim 1b</i>	<i>Sim 1b change relative to Sim 1a</i>
	<i>Fixed exchange rate regime</i>	<i>Flexible exchange rate regime</i>	
Real GDP at factor cost	-7.0	-4.3	2.9
<u>Agriculture</u>	<u>-10.7</u>	<u>-7.6</u>	<u>3.5</u>
Export crops	-47.7	-32.9	28.3
<u>Mining</u>	<u>-1.4</u>	<u>1.5</u>	<u>3.0</u>
<u>Manufacturing</u>	<u>-10.3</u>	<u>-5.9</u>	<u>4.9</u>
Agroprocessing	-18.3	-12.3	7.4
Textiles	-9.6	2.4	13.3
<u>Construction</u>	<u>-11.4</u>	<u>5.4</u>	<u>18.9</u>
<u>Services</u>	<u>-3.0</u>	<u>-1.9</u>	<u>1.1</u>
Prices			
Consumer price index	8.3	4.4	-4.0*
Nominal exchange rate	-	13.3	13.3*
Foreign exchange premium	24.3	-	-24.3*
Real GDP at market prices	-8.0	-4.9	3.5
<u>Domestic absorption</u>	<u>-7.1</u>	<u>-5.1</u>	<u>2.2</u>
Consumption	-7.3	-7.8	-0.5
Investments	-14.1	6.5	24.0
Government	-	-	-
Exports	-37.0	-17.9	30.3
Imports	-20.2	-12.0	10.2

Source: Authors' computable general equilibrium model results.

Note: * Percentage point changes shown, rather than percentage changes.

Table A.2—Individual scenarios: Changes in gross domestic product and prices with full-employment closure for unskilled workers

	<i>Simulation 1: 35% decline in world tobacco export prices</i>			<i>Simulation 2: 30% decline in government budget support from abroad</i>			<i>Simulation 3: 30% decline in foreign direct investments</i>		
	<i>Sim 1a</i>	<i>Sim 1b</i>	<i>Sim 1b change relative to Sim 1a</i>	<i>Sim 2a</i>	<i>Sim 2b</i>	<i>Sim 2b change relative to Sim 2a</i>	<i>Sim 3a</i>	<i>Sim 3b</i>	<i>Sim 3b change relative to Sim 3a</i>
	<i>Fixed exchange rate regime</i>	<i>Flexible exchange rate regime</i>		<i>Fixed exchange rate regime</i>	<i>Flexible exchange rate regime</i>		<i>Fixed exchange rate regime</i>	<i>Flexible exchange rate regime</i>	
Real GDP at factor cost	-1.1	-0.6	0.5	-0.2	-0.1	0.1	-0.1	0.0	0.0
Agriculture	-2.0	-1.4	0.6	0.8	0.8	0.0	0.4	0.4	0.0
Export crops	-20.6	-9.4	14.1	-1.5	2.6	4.2	-0.8	1.3	2.0
Mining	0.2	1.9	1.7	-0.6	0.3	0.9	-0.3	0.2	0.4
Manufacturing	-1.8	-2.1	-0.3	2.4	2.2	-0.2	1.2	1.0	-0.1
Agroprocessing	-7.6	-7.1	0.5	2.4	2.5	0.1	1.2	1.2	0.0
Textiles	-1.1	5.8	6.9	-0.9	2.2	3.1	-0.4	1.0	1.4
Construction	-6.9	6.3	14.2	-22.8	-16.8	7.8	-10.5	-7.5	3.4
Services	0.1	-0.2	-0.3	-0.1	-0.3	-0.1	0.0	-0.1	-0.1
Prices									
Consumer price index	7.9	3.7	-4.2*	4.2	2.5	-1.7*	2.1	1.2	-0.9*
Nominal exchange rate	-	11.4	11.4*	-	5.8	5.8*	-	2.7	2.7*
Foreign exchange premium	23.0	-	-23.0*	10.6	-	-10.6*	5.0	-	-5.0*
Real GDP at market prices	-2.1	-1.1	1.0	-0.9	-0.6	0.3	-0.4	-0.3	0.1
Domestic absorption	-3.6	-3.2	0.5	-3.8	-3.6	0.2	-1.8	-1.7	0.1
Consumption	-3.5	-5.4	-2.0	-0.8	-1.6	-0.9	-0.4	-0.8	-0.5
Investments	-8.8	7.5	17.9	-27.9	-20.5	10.3	-12.9	-9.2	4.3
Government	-	-	-	-	-	-	-	-	-
Exports	-18.3	-4.0	17.5	-2.6	3.5	6.2	-1.3	1.7	3.0
Imports	-14.2	-7.9	7.3	-9.3	-6.3	3.3	-4.4	-2.9	1.5

Source: Authors' computable general equilibrium model results.

Note: * Percentage point changes shown, rather than percentage changes.

Table A.3—Combined scenarios: Changes in gross domestic product and prices with full-employment closure for unskilled workers

	Combined scenarios			Change relative to fixed exchange rate regime (Sim 4a)		
	Sim 4a	Sim 4b	Sim 4b change relative to Sim 4a	Sim 5a: Fixed exchange rate with 5% devaluation	Sim 5b: Fixed exchange rate with 10% devaluation	Sim 5c: Fixed exchange rate with 20% devaluation
	Fixed exchange rate regime	Flexible exchange rate regime		Fixed exchange rate with 5% devaluation	Fixed exchange rate with 10% devaluation	Fixed exchange rate with 20% devaluation
Real GDP at factor cost	-1.9	-0.7	1.3	0.5	0.8	1.2
<u>Agriculture</u>	<u>-1.3</u>	<u>0.0</u>	<u>1.4</u>	<u>0.6</u>	<u>1.0</u>	<u>1.4</u>
Export crops	-24.4	-4.6	26.1	7.9	14.5	24.9
<u>Mining</u>	<u>-0.7</u>	<u>2.4</u>	<u>3.1</u>	<u>1.0</u>	<u>1.8</u>	<u>3.0</u>
<u>Manufacturing</u>	<u>1.5</u>	<u>1.7</u>	<u>0.2</u>	<u>0.0</u>	<u>0.0</u>	<u>0.2</u>
Agroprocessing	-4.1	-2.9	1.4	0.2	0.4	1.2
Textiles	-4.7	10.4	15.8	4.0	7.8	14.8
<u>Construction</u>	<u>-40.8</u>	<u>-20.6</u>	<u>34.3</u>	<u>8.1</u>	<u>16.2</u>	<u>32.0</u>
<u>Services</u>	<u>-0.6</u>	<u>-0.5</u>	<u>0.1</u>	<u>0.2</u>	<u>0.2</u>	<u>0.1</u>
Prices						
Consumer price index	15.0	7.9	-7.2*	-1.9*	-3.6*	-6.8*
Nominal exchange rate	-	21.4	21.4*	5.0*	10.0*	20.0*
Foreign exchange premium	45.2	-	-45.2*	-13.1*	-24.3*	-42.9*
Real GDP at market prices	-4.3	-2.1	2.3	0.8	1.4	2.2
<u>Domestic absorption</u>	<u>-10.0</u>	<u>-8.8</u>	<u>1.3</u>	<u>0.5</u>	<u>0.9</u>	<u>1.3</u>
Consumption	-5.5	-7.8	-2.4	-0.3	-0.8	-2.2
Investments	-50.3	-25.2	50.5	12.0	23.8	47.2
Government	-	-	-	-	-	-
Exports	-22.4	2.7	32.4	8.4	16.1	30.4
Imports	-27.8	-16.8	15.3	3.9	7.5	14.3

Source: Authors' computable general equilibrium model results.

Note: * Percentage point changes shown, rather than percentage changes.

Table A.4—Combined scenario: Changes in household income with unemployment closure for unskilled workers

	Base value (MKW million)	Change relative to base (%)		Sim 4b change relative to Sim 4a
		Sim 4a: Fixed exchange rate	Sim 4b: Flexible exchange rate	
All households	210,170	6.2	-0.9	-6.7
<u>Rural households</u>	114,284	-0.2	0.8	1.0
Rural farm households	94,134	-3.7	1.5	5.3
Small-scale	20,165	0.4	2.3	2.0
Medium-scale	56,825	-2.4	1.6	4.1
Large-scale	17,144	-12.5	0.1	14.4
Nonfarm households	20,150	16.0	-2.5	-15.9
<u>Urban households</u>	95,886	13.8	-2.9	-14.6
Metropolitan	56,913	24.9	-4.5	-23.6
Small centers	38,973	-2.6	-0.5	2.1
Nonfarm	3,390	55.5	-4.5	-38.6
Farm	35,584	-8.1	-0.1	8.6

Source: Authors' computable general equilibrium model results.

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www.ifpri.org

IFPRI HEADQUARTERS

2033 K Street, NW
Washington, DC 20006-1002 USA
Tel.: +1-202-862-5600
Fax: +1-202-467-4439
Email: ifpri@cgiar.org

IFPRI LILONGWE

PO Box 31666
Lilongwe 3
Malawi
Tel.: +265-1-789747
Email: IFPRI-Lilongwe@cgiar.org