

Exchange rate policy and the parallel market for foreign currency in Burundi

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Abstract

Government control over the allocation of foreign exchange in Burundi has led to the creation of a parallel market for foreign currency. Despite its negative impact on Burundi's economy, this market has not, so far, attracted the attention of researchers. This paper looks at the functioning of the parallel market and discusses macroeconomic policies in the country to shed light on the context within which the market evolved. Analysis of time series properties of the variables used in an empirical model covering 1970–1998 reveals that the premium is stationary, guiding the decision to estimate a stationary model of the premium. Econometric results show that the premium is determined by the expected rate of devaluation, trade policy variables and GDP growth. This conforms with empirical studies on other African countries, although the Burundian case is particular in one respect: The market is characterized by a relatively low premium, which, as a stationary variable, is also generated by stationary fundamentals, in contrast with findings for other African countries. This particularity reflects a relatively more flexible exchange rate policy over the sample period. In terms of policy, the paper argues that political stability and more fundamental changes in Burundi's economy and its management will be needed to ensure the success and sustainability of the current foreign exchange reforms.

1. Introduction

Despite liberalization measures undertaken after the adoption of a structural adjustment programme (SAP) in 1986, Burundi still administers its foreign currency allocation. This system is not unique to Burundi: even the CFA Franc Zone countries started controlling foreign currency allocation after the suspension of the CFA convertibility in 1993 (Azam, 1999), resulting in excessive exchange rate over-valuation.¹ Countries with over-valued currencies fail to match demand for foreign exchange with adequate supply. Therefore, they ration foreign currency and impose controls on importers and exporters, as well as on capital account transactions. Exporters are required to surrender their export proceeds to the government within a specified period of time after appropriation. Importers are required to acquire import licences, granted to individuals selected by government officials. An import licence usually but not always entitles the bearer to access foreign currency at the cheap official rate. Capital account transactions are restricted to a few transactions carried out selectively through a limited number of officially authorized channels. These restrictions have transformed normal economic transactions into privileges, creating economic rents that have benefited both the government officials who implement the policies and the few economic agents who enjoy the privileges. In Burundi, this incentive structure has perpetuated a system that favours a small group of individuals at the expense of the population at large. Some analysts have argued that this system explains, at least partly, why Burundi has been prone to conflicts (Ngaruko and Nkurunziza, 2000; Ndikumana, 1998).

Government's inability to meet the demand for foreign currency and its interference in the operation of the market have resulted in the creation of parallel markets for foreign exchange (hereafter called parallel markets). Unofficial markets for foreign currency have been variously defined in the literature. Terms such as curb markets, black markets, underground economy, fragmented markets, segmented markets, etc., have often been used indiscriminately. Lindauer (1989) discusses these terms and their differences. In the context of the present study, the term parallel market is more suitable. Based on Lindauer (1989: 1873), a parallel market for foreign currency is defined as the structure generated by excess demand for foreign exchange in response to government controls over foreign currency allocation. As Bagachwa and Naho (1994) have noted, a parallel market deals with activities that involve the illegal production and/or trade of goods and services that are legal in themselves, and therefore have an alternative legal market. These are different from "black market" activities, which produce and/or distribute market and non-market goods that are illegal and strictly forbidden by government statutes. They include unlicensed deals in arms, narcotics trafficking, and all sorts of illegal transfers, such as thefts and bribes.

The literature on parallel markets usually analyses movements in the premium instead of the parallel rate itself, as the premium is a more meaningful economic and policy variable. The premium is defined as the parallel rate minus the official rate over the official rate times 100. In developing countries, foreign exchange and other trade controls have had a negative impact on the external sector as they have taxed exports while subsidizing imports. The resulting trade and fiscal deficits, expansionary monetary policy, and debt overhang have led to macroeconomic instability and low economic growth (Dordunoo et al., 1997; Pinto, 1990). For example, an increase in smuggling following government rationing and other controls reduces a government's tax base, exerting pressure on the fiscal balance, which may result in macroeconomic instability. In this light, Pinto (1991) has argued that part of the current macroeconomic instability in sub-Saharan Africa (SSA) may be due to a failure to adjust policy for the existence of parallel markets. In addition, the existence of parallel markets reduces the flow of foreign currency to the central bank, hindering the capacity of the country concerned to import through official channels and to service its external debt. Nowak (1985) and Pfeffermann (1985) have underscored the economic and social costs of parallel markets,² while Gyimah-Brempong and Gyapong (1993) have empirically found a strong negative relationship between parallel market activities and economic growth in developing countries.

The analysis of the functioning of Burundi's parallel market is important because of the market's negative consequences on the country's economy. With the high cost associated with the current pattern of exchange rate allocation, its discriminatory approach, the expressed desire of the authorities to liberalize the economy since the mid 1980s—and in the light of liberalization experiences in other African countries—it is hard to find sound economic justification for the government's continued intervention in foreign exchange allocation. Nevertheless, even though the persistence of the parallel market has served the interests of a small group, it is also true that Burundi has never experienced the explosive premiums observed in other African countries in the 1970s and 1980s. Burundi had not been forced to abandon the policy as have many other African countries because the country has always kept the premium at a relatively low level, thanks to frequent devaluations of the official exchange rate. Consequently, as our econometric analyses will show, the premium and most of its fundamentals have remained stationary variables, in contrast to most other country experiences.³ However, the fact that Burundi has never recorded a three-digit premium over the 30-year sample period in no way reduces the need for a better system of foreign currency allocation. It is this need that motivates the present study on the functioning of the parallel market and the main determinants of the premium.

Political economy considerations have been identified as playing a large role in determining exchange rates.⁴ Therefore, the study analyses Burundi's economic policies, with an emphasis on its political economy, to highlight the contextual framework within which the parallel market for foreign currency has evolved. Given the country's recent political history, the study also highlights the consequences of Burundi's civil conflict for key economic variables and the impact on the parallel market for foreign currency. The analysis uses econometric time series modelling techniques to uncover the determinants of the premium, on the basis of which some policy conclusions are proposed.

The empirical analysis covers the period 1970 to 1998, so econometric results are based on a small sample of 29 annual observations. The small sample size should be kept in mind when interpreting empirical findings of the study.

The remainder of this study is organized as follows. Section 2 presents a brief overview of the literature on parallel markets as well as a simple framework of analysis of the premium. Section 3 discusses the patterns of the parallel market in Burundi, and Section 4 presents Burundi's monetary history and recent macroeconomic policies and performance. Section 5 discusses the econometric methodology, the data used in the empirical investigations and the empirical results. Section 6 presents conclusions and proposes some policy recommendations.

2. Brief literature overview and analytical framework

A brief overview of the theoretical and empirical literature is provided to guide the discussions in the following sections. In addition, a simple graph representing a parallel market in a context of a rationed economy helps to point out how parallel markets emerge and what determines the level of the premium.

Literature review

Research on parallel markets for foreign currency in developing countries has flourished since the 1980s.⁵ In general, three approaches have been adopted to analyse the parallel market premium. The “real trade” approach emphasizes the fact that a parallel market serves mainly commercial purposes. As pointed out earlier, in an economy where the government rations foreign exchange allocation and controls international trade flows, parallel markets emerge as a result of this incentive structure. The residual demand for foreign currency and for imported goods not satisfied by government channels is met in the parallel market, where supply and demand tend to clear through a price mechanism. Second, the monetary approach focuses on monetary factors in explaining the parallel market. This approach emphasizes the role of monetary policy in financing fiscal deficits resulting from losses in tax revenue due to economic agents evading excessive controls. Financing deficits by money creation usually results in high inflation and low or negative real interest rates, which often take place in a context of inappropriate credit policy. The combination of these factors results in even higher premiums in the parallel market. Third, the portfolio balance approach, also called currency substitution approach, is based on the assumption that agents use the parallel market to alter the composition of their assets between domestic and foreign currency. This is usually the case in economies with high capital flight because of political or economic uncertainty. It is also the case in high inflation economies or in economies experiencing high macroeconomic instability, given that foreign currency is used as an efficient hedge against inflation tax and domestic currency devaluations.

The second and the third approaches are related since they both emphasize currency substitution, albeit for different motives. Both approaches have been criticized on the basis of the weakness of their assumptions (Agénor, 1991). The first weakness is that these approaches assume a clear division of functions between the official market, which is supposed to serve current account activities, and the parallel market, which is supposed to be used only for capital account transactions. The second weakness relates mainly to

the currency substitution approach; this is the assumption that agents use the parallel market only to alter the composition of their assets, ignoring the market's use for current account transactions. This last criticism is especially relevant when analysing Africa. Relative to Latin America, where parallel markets were used more for portfolio motives in the context of hyper-inflation and currency devaluations, the parallel markets in Africa have served both current and capital account transactions. In Burundi, the central bank's tradition of granting import licences without providing official foreign exchange to importers implies that the parallel market has been used for current account purposes. However, the country's numerous devaluations since the mid 1980s may also have induced economic agents to hedge against the effects of devaluations, providing some support for the currency substitution motive.

Agénor and Montiel (1996: 577) conjecture that capital controls may have been the main cause of parallel markets in middle-income countries, while trade controls may have been the main determinant in low-income countries. Indeed, early studies focused on monetary determinants of parallel markets in Latin America in the 1970s–1980s, a period characterized by hyper-inflation in the region. It is hard to find specific data showing the relative importance of trade, capital account and currency substitution transactions in the parallel market in Africa. However, some information can help to determine the relative importance of these transactions. In Ghana, Osei (1996) found that individual traders are the most important currency buyers from foreign exchange bureaus, accounting for 55.8% of total demand. If the demand for foreign currency for travel is included, the proportion increases to 82.6%. In Tanzania, the legalization of the “own-fund” scheme⁶ in the late 1980s (O'Connell, 1992) also showed that the parallel market was used mostly for trade reasons. Pinto (1990) and Agénor (1991) reported that in view of the rationing of foreign currency in the official market in many developing countries, including those in Africa, parallel markets serve both current and capital account transactions. A more realistic framework for the analysis of parallel foreign exchange markets in Africa is, therefore, one where the parallel market is seen as serving both trade and capital account transactions.

Dornbusch et al. (1983) were among the first authors who adapted models on dual markets to the case of parallel markets for foreign currency.⁷ Their approach had a significant influence on subsequent empirical research on this subject as their methodology combined current account and portfolio factors that had been modelled separately before. In the same vein, in order to have a model reflecting the reality of most developing countries' parallel markets, Agénor (1991) expanded the monetary model of the premium by including trade transactions and currency substitution features. In an African context, May (1985) developed a framework that emphasized trade and exchange rate policy variables as the main determinants of the premium. Other empirical models have shown the narrow link between the parallel market premium and the fiscal deficit (Pinto, 1990) and the influence of the premium on key macroeconomic indicators such as inflation, foreign trade flows and the real exchange rate (Elbadawi, 1989). Similarly, Azam and Besley (1989) showed in a general equilibrium framework that the parallel market for foreign currency was linked to the parallel market for goods, highlighting some of the conduits through which the parallel market for foreign currency affects the real economy.

In the same connection, Azam and Debrée (1991) developed a macroeconomic model where they analysed the interactions of the parallel market with other sectors of an economy.

Empirical results on African countries have uncovered a number of relationships between parallel markets and macroeconomic variables. In Ghana, for example, the determination of the parallel rate was principally based on four fundamentals: the level of the official exchange rate, the level of government policing activities in the parallel market, exogenous increase in export revenue and exogenous decrease in the value of imports (May, 1985). Updating the study by May and using a simultaneous equation system, Gyimah-Brempong (1992) confirmed May's results. Furthermore, Mbire (1997) showed the close relationship between exchange rate policy and inflation in Uganda, and Elbadawi (1994) found that in Sudan, the premium was largely determined by the flow of remittances from Sudanese workers in foreign countries, particularly from the Middle East. Azam and Debrée (1991) concluded that the main determinants of the parallel rates in Nigeria, Zaire and Ghana were money supply, producer prices, import quotas, and import and export prices. In another study on Nigeria, Azam (1995) found that the parallel exchange rate was strongly linked to the consumer price level while the official exchange rate had a loose connection to it.

The size of a parallel market usually depends on the range of transactions under exchange controls, as well as the level and severity of government enforcement (Agénor and Montiel, 1996). The size of a parallel market's premium is also a good indication of the importance of the market. According to Kiguel and O'Connell (1994: 21), "The importance of parallel markets and their effect on overall economic performance generally depends on the size of the parallel premium", which varies across economies. For example, during the period 1970 to 1989, the average premium was 437% in Ghana, 199.93% in Algeria, 150.65% in Tanzania and 99.54% in Sudan. It was 96.77% in Egypt, 95.14% in DRC, 93.9% in Nigeria, 92.66% in Zambia, 83.36% in Ethiopia (Deresse, 1996) and 52.47% in Malawi (Ghei and Kiguel, 1992), while in Burundi it was 23%. A close look at the determinants of the relatively low premium in Burundi relative to the other countries reveals a fundamental difference in exchange rate management. Most of the countries had fixed official exchange rates for long periods, whereas Burundi reviewed its policy regularly to make its currency's parity relatively more flexible.⁸

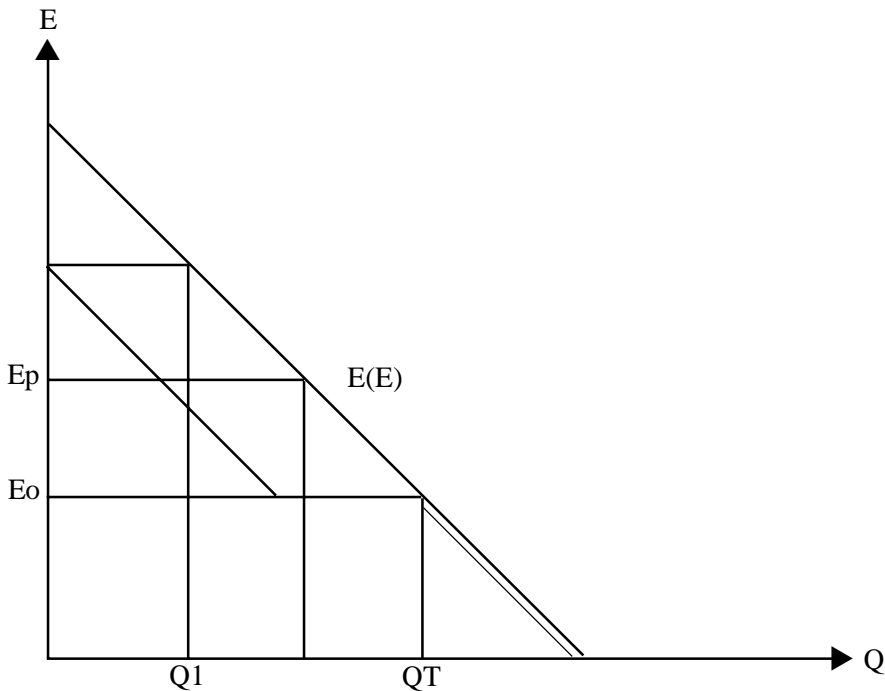
A simple analytical framework

We illustrate how the parallel market arises and how it co-exists with the official market in the simple theoretical framework in Figure 1, which sketches a rationed market with two suppliers who sell at two different prices.⁹

In the figure, E and Q are exchange rate and stock of foreign currency offered in the market, respectively. $D(E)$ is a downward sloping demand schedule for foreign currency. Government picks exogenously an exchange rate E_0 . At this price, demand is QT but the government is only offering quantity $Q1$. As a consequence of rationing, there is a residual demand, which creates a parallel market. However, as the fine lines (the lines parallel to

the demand schedule) show, this residual demand is met at a higher price E_p , which, unlike the official rate, depends on market factors. The residual demand curve is at the left of the market demand schedule for rates higher than the official rate. Below E_o , there is only one demand schedule $D(E)$; the line along the lower right part of $D(E)$ shows that the two markets coincide. As can be seen in this simple figure, the premium is the difference between E_p and E_o . It is determined by a number of factors, including E_o , Q_1 and $D(E)$. The demand schedule for foreign currency is, in turn, determined by the factors discussed in previous sections, such as portfolio motives and current and capital account transactions. The next section describes Burundi's parallel market and its economy in order to lay the basis for an empirical determination of the premium.

Figure 1: Graphic representation of a parallel market



3. Burundi's parallel market for foreign exchange

The factors that led to the creation of the parallel market in the 1960s are reviewed first, followed by a discussion of the sources of supply to the market.

Origins of the market

Research on parallel markets in Burundi is scant, so it is difficult to know exactly how these markets started and evolved over time. Most past studies on foreign exchange markets in developing regions including Africa (Kiguel et al., 1997), and in sub-Saharan Africa specifically (Aron and Ayogu, 1997), did not include Burundi in their samples, which covered Ghana, Sudan, Tanzania, Zambia, South Africa, Nigeria and Uganda. It seems clear, however, that the dynamics in Burundi's parallel market have followed a number of factors including political events, movements in international markets, government policy and other institutional factors. There are indications that the parallel market can be traced back to the early 1960s. Before 1960, owing to the economic union between Congo, Rwanda and Burundi, Congo was an important export market for Burundi. Following the loss of its export market resulting from the political and economic crises that erupted in Congo in the early 1960s, Burundi's economy entered an era of balance of payments and fiscal deficits. For the first time in Burundi's economic history, exchange restrictions were used to reduce the trade deficit and to prevent the deterioration of the value of the currency (McDonald et al., 1969).

At the same time, import restrictions and a system of dual exchange rates were instituted.¹⁰ Foreign exchange for the importation of "non-essential products" was acquired at rates far higher than those applied to "essential goods". Whereas foreign exchange for the second category was provided by the official market, imports for first category products relied on foreign currency purchased from the "free market". In 1963, the "free market" rate was Burundi franc (Fbu) 100 per US dollar compared with a rate of Fbu 50 per US dollar applied to the imports of essential goods. In response to these policies, exporters resorted to smuggling, resulting in a decline of production of exported goods in 1963. Subsequently, the stock of foreign currency plummeted, compounding the problem of rationing. In February 1965, the Burundi franc was devalued for the first time and accompanying monetary reforms led to a market regulated economy, which improved economic performance.

From the early 1970s, Burundi was hit by a number of shocks emanating from international markets, such as the two oil shocks of the 1970s and the commodity shocks of the 1980s. Exchange restrictions and other controls were adopted again to limit the

impact of these shocks on foreign reserves and on the economy in general, translating into active parallel markets. In the 1990s, the premium increased as the government grappled with a dwindling stock of foreign reserves amid an unprecedented political and economic crisis. In the latter part of the decade, the government further limited its allocation of foreign currency to the importation of a list of basic products while stopping the issue of foreign currency for almost all capital account transactions. As shown in Figure 2, the result was a sharp increase in the premium during this period. From an average of 23% for the period 1970–1989¹¹ and 28.7% for the full sample period, the premium increased to an average of 45% for the period 1990 to 1998.¹²

Figure 2: The premium, parallel and official rates

Note: The values for the year 2000 are an average of the first six months for the official and parallel rates.

As in other countries, the parallel market in Burundi is an urban phenomenon. Although some transactions are carried out at the country borders, most of the trading takes place in Bujumbura, the capital city, where the sale and purchase of foreign currency goes on in public places. Though considered illegal, the market has been tolerated and it has become part of other economic institutions. Even the government implicitly recognized its existence years ago by granting import licences without providing foreign currency to importers. During the foreign currency crisis of the late 1990s, the extent of tolerance of the parallel market went as far as asking civil servants travelling abroad on official missions to use the parallel market to change the allowances given to them in local currency. The US dollar is the most widely exchanged currency in the market, but others such as the French franc, the Belgian franc and, to a lesser extent, the German Deutsche mark, are also exchanged. Neighbouring country currencies such as the Rwandan franc and the Kenyan, Ugandan and Tanzanian shillings are also available. The very nature of this market makes it extremely difficult to estimate its importance. According to some sources, US\$200,000 is traded daily on average, with an interval of variation between US\$100,000 and US\$500,000.¹³ Most of the demand for foreign currency in the parallel market is from importers who are not big enough to lobby for foreign exchange from the government but who do get import licences, or individuals travelling abroad on private business. There is no indication that the market is used to support important outflows of capital other than for trade reasons.¹⁴

Sources of supply to Burundi's parallel market

Foreign exchange supply to the parallel market comes from a number of sources. First, as exporters are required to surrender their export earnings to government at a low official rate, optimization attitudes induce them to under-invoice their exports; obviously, this is done with the complicity of government officials involved in the process. From the total amount of their earnings, they surrender part of the income and keep the difference in foreign accounts for future use or channel the funds into parallel markets that offer higher exchange rates. Second, importers who have access to foreign currency at the low official rate have an incentive to over-invoice their imports so that the difference between the amounts they actually secure from the central bank and what they pay for their imports can be put into foreign accounts or channelled into parallel markets. In a context of low tax evasion, import over-invoicing is profitable only when import taxes are low, so that the gains made on the foreign exchange sold in the parallel market compensate for the extra taxes paid on non-imported merchandise. If there is corruption and high tax evasion, export over-invoicing is more profitable. The third source of supply is from Burundi residents and visitors coming from abroad who channel their foreign currency into the parallel market, given that it offers better exchange rates.

In addition to these traditional supply sources, transactions on gold, mainly from the neighbouring Democratic Republic of Congo (DRC), were another important source of supply until the mid 1990s. Quantities of gold were imported into the country's export processing zone (EPZ) for refining and re-export to European markets. A study covering

the period 1986 to 1993 established that export revenue from gold exports was, on average, higher than that from coffee, the latter having traditionally been considered the main provider of hard currency to the country.¹⁵ It should be noted that transactions on gold are essentially carried out in hard currency and that exporters of gold are not required to surrender their export income to the central bank. Statistical information about gold transactions is not made public; however, according to an informed source, until the 1990s, about 100 kilograms of gold worth about US\$1,200,000 were sold weekly to a refinery in the EPZ. Of this amount, one-fourth to one-third was spent in Burundi through the parallel market.

Remittances usually constitute a substantive source of supply of foreign currency to the parallel market. Unlike countries such as Sudan that have large communities of their nationals working in foreign countries, Burundians living abroad are mostly refugees in neighbouring states. They live in refugee camps in hard conditions and cannot reasonably be expected to transfer any resources back to Burundi. The few Burundians who have started to migrate to developed countries where they can potentially earn a living and send some money back home are generally too young and still in school.

4. Monetary and macroeconomic policies

To put the analysis of the parallel market in Burundi in context, we present a narrative of the main monetary and macroeconomic developments over the sample period. The first subsection briefly presents Burundi's monetary history; this is followed by an account of exchange rate policies and an overview of macroeconomic policies.

Monetary history

After the end of Burundi's economic union with Rwanda and Congo in 1960, Burundi and Rwanda maintained as their monetary unit the Rwanda-Burundi franc, which was issued by the Banque d'Emission du Rwanda et du Burundi. The exchange rate was 50 francs per US dollar.¹⁶ The union between Burundi and Rwanda ended in December 1963 and Burundi's Central Bank, the Bank of the Kingdom of Burundi, which later became the Bank of the Republic of Burundi (BRB), was officially established on 19 May 1964. The Fbu replaced the Rwanda-Burundi franc and maintained the link with the Belgian franc with unchanged parity at Fbu50 per US dollar. A multiple exchange rate system governed the new Burundi franc. It consisted of the official rate of Fbu50 per US dollar for "essential" imports and a rate of 117.00 per US dollar for other transactions. Including exchange taxes of 5 and 20%, effective selling rates were Fbu52.50, Fbu60.00 and Fbu122.85 per US dollar. On 26 January 1965, the link to the Belgian franc ended and an initial par value of Fbu87.5 per US dollar was established, translating into a 42.9% devaluation in terms of gold content. The multiple exchange rate structure was terminated on 11 February 1965, after which all transactions had to take place within prescribed margins of the new official rate.

After five years of relative stability, the Burundi franc entered a period of turbulence. On 21 April 1970, it was pegged to the US dollar with no change in parity. Subsequently, the currency's parity was affected by the changes in the value of the US dollar, including its depreciations in the early 1970s. On 3 May 1976, the gold content of the Fbu was reduced by 12.5%, establishing a new official rate of Fbu90.00 per US dollar. The Fbu's peg to the US dollar was terminated on 23 November 1983, when the currency was pegged to the IMF's SDR (Special Drawing Rights) with an exchange rate of Fbu122.70 per SDR. This resulted in the establishment of a controlled floating effective rate regime. Subsequently, the Fbu was devalued in several stages and by the end of 1991 the exchange rate was Fbu181.51 per US dollar and Fbu273.1 per SDR. The main criticism levelled against the policy of pegging the national currency to the US dollar and to the SDR was

that the rate of exchange was determined not on the basis of developments occurring in Burundi but on those in developed countries, particularly in the United States. In response to these limitations, the peg switched from the SDR to a basket of 19 currencies with periodic government adjustments to reflect not only changing underlying economic conditions in the economy but also exchange rate and inflation differentials in Burundi's trading partners' economies. Since the 1990s, as a result of a severe political and economic crisis, the value of the Burundi franc has plummeted. Devaluations have become frequent due to a decrease in production and exports, the freezing of international aid, and the depletion of foreign reserves. After eight years of crisis, the Burundi franc has lost 150% of its value, evaluated at the still over-valued official exchange rate. At the same time, the parallel rate and the premium have increased steadily (Figure 2).

Table 1 summarizes the main events that have marked Burundi's monetary history since the country's independence in 1962.

Table 1: History of Burundi's currency

Period	Exchange rate policy
Until 19 May 64	The currency, the Rwanda-Burundi franc, is pegged to the Belgian franc at 50 units to the United States dollar (US\$).
19 May 64	The Burundi franc replaces the Rwanda-Burundi franc; the peg to the Belgian franc is unchanged and the rate of exchange remains Fbu50 per US\$.
26 Jan 65	The peg to the Belgian franc is terminated. The rate of exchange becomes Fbu87.5 per US\$ in terms of gold value.
21 Apr 70	The Burundi franc is pegged to the US\$ with no change in parity (Fbu87.5 per US\$).
20 Feb 73	The franc appreciates to 78.75 per US\$ following the US decision to float the dollar and the Burundi franc's unchanged gold content.
3 May 76	Burundi decides to reduce the franc's gold content by 12.5%; the new exchange rate becomes Fbu90 per US\$.
23 Nov 83	The peg to the US\$ is terminated. The franc is pegged to the IMF's SDR at a rate of 122.70 per SDR.
10 Jul 86	The franc is devalued by about 15%; the exchange rate becomes Fbu141 per SDR. Several devaluations follow. By the end of 1991, the rate of exchange is 273.1 per SDR and 181.51 per US\$.
1 Apr 92	The peg to the SDR switches to a basket of 19 currencies representing the country's trading partners. The rate is about 199.83 per US\$.
15 Nov 99	Government publishes a law setting out the modalities for "free" trading in foreign exchange (trading is only open to commercial banks).
4 Jul 00	Foreign exchange auctions begin.
5 Jul 00	Large variations in commercial bank exchange rates of Fbu777.44 to Fbu845; the central bank's rate is Fbu761.22.

Exchange rate policies

Until the introduction of foreign currency auctions in July 2000, only the central bank was permitted to allocate foreign currency at the official exchange rate, and it was the sole institution that could authorize payments abroad and hold foreign currency. Even active implication of commercial banks in foreign currency trading was prohibited as they were required to apply to the central bank to make any payment abroad. Residents could not own foreign currency or foreign securities, nor could they maintain foreign bank balances abroad. Foreign exchange was allocated on a case-to-case basis, for both current and capital account motives. Exports required prior licences and the proceeds had to be surrendered to an authorized bank within a specified time after appropriation, with the exception of gold exports, which were exempted from the surrender requirement. Non-residents could remit only a fixed percentage of their net annual income after taxes. These exchange restrictions were widely used in an apparent attempt to reduce trade deficits and to prevent the deterioration of the value of the national currency.

Measures were introduced in the early 1990s to relax this system. The most important reforms of Burundi's exchange system were undertaken in 1992 when a system of open general licence (OGL) was adopted for imports and exports, and when commercial banks were accorded the freedom to purchase and sell foreign currency. Additional measures led to total liberalization of the capital account in the first half of the 1990s. Beginning in May 1992, commercial banks could intervene in the management of foreign currency, in both local and foreign markets. Moreover, the 0.3% exchange fee levied by the central bank on sales and purchases of foreign currency was abolished. In November 1995, reforms went further to allow tourists, e.g., travellers who were not on business trips, to have access to foreign currency at the official rate. By December 1995, most trade controls had been abolished. As further discussions will show, however, the political crisis of the 1990s, the imposition of an international embargo on Burundi in August 1996 and the economic hardship that ensued jeopardized the pursuit of these reforms. In fact, a number of these liberalization measures were reversed as the authorities struggled to control the balance of payments deficits. For comparison, progress in terms of Burundi's foreign exchange market liberalization was, by the mid 1990s, at about the level of Ghana's in 1986/87 just before launching the foreign exchange auction system, and Uganda's in the late 1980s (Dordunoo et al., 1997).

One consequence of the political turmoil in Burundi has been a high pressure on the parallel market due to both supply and demand factors. On the one hand, the crisis has forced thousands of Burundians to flee the country, taking with them as much foreign currency as they could afford. The parallel market supplied most of these amounts, creating an additional demand that has been pushing the premium upwards. On the other hand, disruption in production due to war and, more importantly, the decision by the international community to suspend its financial assistance to Burundi led to a foreign exchange crisis. The stock of foreign reserves, which stood at US\$178 million in 1992, dropped to US\$108 million in 1998¹⁷ and was almost completely depleted by the end of 1999. In response, the government tightened its allocation of foreign currency, reversing some of the

liberalization measures it had taken a few years earlier.¹⁸ Import licences were reintroduced and the negative list of products that required import authorization under the previous more liberal regime was replaced by a positive list of the few products that were eligible under the tight regime. Almost all capital account liberalization measures were reversed as the government even failed to provide foreign exchange to some of its officials travelling abroad on official missions. As a result, most current and capital account transactions were financed through the parallel market, while the government tried to cope with the crisis by resorting to regular devaluations. In this context, the parallel exchange rate increased substantially relative to its pre-crisis level. From Fbu310 to US\$1.0 in 1992, the rate stood at Fbu1,300 per US\$1.0 by the end of September 1999. This represents a more than threefold increase in just seven years.

Under pressure from the business community¹⁹ and realizing that the government's foreign currency reserves were depleted anyway, Burundi leaders agreed to "liberalize" the foreign exchange market in October 1999. However, they designed the liberalization measures in such a way that the bulk of foreign exchange allocation remained the prerogative of government officials. For example, export earnings from the country's cash crops, coffee, cotton and tea, which account for more than 95% of total exports, as well as international aid, remained under the control of the government. To date, only commercial banks can participate in the newly launched foreign exchange auction system. Foreign currency remains scarce because its sale even by commercial banks is still heavily regulated; therefore, it is not surprising that parallel markets are still thriving. Though still without substantial results, the measure to liberalize foreign exchange allocation in Burundi through auctions is important.²⁰ If it is sustained, it will be the first time since the late 1960s that Burundi authorities have allowed a free market for foreign exchange. One question remains: As the current auction scheme is fully based on external loans, what will happen once the loans are fully spent? This question is important because it has been suggested that some banks have been buying and stocking foreign currency in order to speculate when central bank resources dry up. This attitude would potentially cause market instability in the country.

Macroeconomic performance

Burundi's economy is essentially rural-based. Ninety-two percent of the population live in rural areas and 94% of the labour force are employed in the primary sector. More than 90% of the latter are occupied by agricultural activities, while the remaining 10% are employed by livestock, fisheries and forestry. Agriculture is dominated by the subsistence sector, which accounts for more than 80% of total agricultural output. Cash crop agriculture represents only 9% of total agricultural output; it occupies 8% of total cultivated land and accounts for 8% of the primary sector GDP. Despite its low importance in total agriculture, cash crop agriculture dominates the country's exports. Coffee, the main export, provides 80% of total export earnings. As one of the least developed countries, with GDP per capita estimated at US\$154 in 1997, Burundi is a marginal player in international trade. In 1998, the country's total imports of goods and services amounted

to US\$144 million, whereas its exports represented a mere US\$49 million. Due to instability in international market commodity prices, the country's export earnings have been fluctuating over the last three decades. One of the adverse consequences of this situation has been a high dependence on foreign financial resources, both aid and debt.

Burundi's economic performance over the last three decades presents a mixed picture. While the 1970s and the 1990s were marked by economic crisis, the 1980s and early 1990s were dominated by stabilization and liberalization policies implemented in the framework of SAP. In the first half of the 1970s, Burundi experienced three major crises. First was the bloody political crisis of 1972 in which the country lost at least 10% of its population.²¹ Second, Burundi was seriously hit by the first oil shock, as the country imported all its oil from the Middle East. Third, Burundi's economic decline was compounded by the collapse of international commodity prices in the early 1970s. For a country that depended so heavily on coffee export earnings, the crisis was so hard that its terms of trade dropped from 100 in 1970 to a mere 58 only five years later in 1975. By 1975, all macroeconomic indicators had worsened relative to 1970.

In 1976, there was a change of government through a bloodless coup d'état. The new government coincided with a boom in coffee prices from their record low levels in the first half of the 1970s. As a result, the country's export earnings increased substantially and the new government invested heavily in infrastructure such as roads and dams in subsequent years. The commodity boom did not last long, however. Most of the country's investment in infrastructure and the creation of state corporations were financed through foreign borrowing, sowing the seeds of a debt crisis that emerged ten years later. Excessive economic controls and their resulting fiscal deficits as well as the debt and commodity crises of the 1980s forced the country to adopt a structural adjustment programme in 1986.

The SAP intended to address macroeconomic imbalances, and some positive results were achieved. For instance, resource inflows to Burundi increased by 41% during the first six years of SAP implementation, translating into a positive budget balance. Exchange rate adjustments became frequent (see earlier discussions) and their frequency discouraged high premiums in the country's parallel market.²² Moreover, a number of additional measures were initiated to liberalize the external sector (Nkurunziza, 1997). The state monopoly on the export of cash crops such as coffee, tea, cotton and rice was suppressed, all imports of goods and non-factor services were liberalized, and requests for foreign currency were honoured upon presentation of an import declaration (which had replaced the import licence). One result of trade liberalization measures was the increase in licensed importers from 145 in 1985 to 400 in 1991; the replacement of the import licence by an import declaration was also an important improvement. The traditional 1% administrative tax levied on imports of fuel was suppressed on 2 March 1993, while the conditions for surrendering to the central bank foreign currency proceeds from non-traditional exports were made more flexible. Exporters were allowed to open foreign currency accounts and keep 30% of their export earnings in hard currency. Coffee exporters were allowed to borrow money in hard currency in order to cover their transactions against the risk of exchange fluctuations. However, as Burundi became engulfed in political chaos starting in October 1993, a number of these achievements were lost.

War in Burundi has disrupted agricultural production in rural areas. Infrastructure including schools, hospitals and health centres, roads, and bridges has been destroyed. Three years of chaos in the country after Ndadaye's assassination prompted Major Buyoya to come back to power in a bloodless coup on 25 July 1996, pledging to restore peace quickly. Burundi's neighbouring countries reacted to Buyoya's coup by putting the country under a total economic embargo in August 1996, and the international community suspended its cooperation with the country. Political instability and the embargo have dealt a serious blow to Burundi's economy. As hundreds of thousands of displaced people were unable to engage in farming activities, the country, which had been self-sufficient in food before the crisis, appealed for food assistance. In real terms, food production declined by 13% in 1997 relative to its 1992 level. The primary sector, which is dominated by agriculture and is the backbone of Burundi's economy, regressed by 18% over the same period. The poor performance of the primary sector led to negative GDP growth over the period from 1992 (0.7%) to 1996 (-8.4%), with a growth of 4.5% for 1998. The export sector, which has been traditionally dominated by coffee, collapsed (Figure 3). Coffee production dropped from 34,206 metric tons in 1991/92 to 17,436 metric tons in 1998/99; over the same period, earnings from coffee exports plummeted from US\$72.6 million to US\$38.6 million. The decline had a serious impact on the country's foreign reserves,²³ given that coffee has represented about 80% of the country's total export earnings.²⁴

Figure 3: Imports and exports (million Fbu)

In addition, following the decline in export earnings, the freezing of international aid and, more importantly, the embargo imposed on the country, imports contracted to their lowest level since 1970. Imports of goods and non-factor services decreased from US\$181.8 million in 1992 to US\$98 million in 1997 and were projected to be US\$102.6 million in 1998. This decline had a serious impact on welfare since a large proportion of these imports consisted of basic commodities such as fuel, food products, medicines, school material and agricultural inputs. Another devastating consequence was an increase in inflation. The annual change in the consumer price index (January 1991=100) increased from 4.5% in 1992 to 31.1% in 1997 and 17% in 1998. The high level of inflation from 1995 contrasts with the traditionally low level in the previous years, as Figure 4 shows.

Figure 4: GDP growth and inflation

As expected, the cost of financing war has weighed heavily on the country's budget, with an increase in budget deficits resulting in more dependence on external assistance. The budget deficit, including grants, increased from about 3% of GDP in 1992 to 10.1% in 1996; these figures represent Burundi's highest ever budget deficits. One of the reasons for the increase is military expenditure. As expected for a country at war, military spending almost doubled from 3.3% of GDP in 1992 to 6.2% in 1997. These percentages correspond to 11.6 and 28.1%, respectively, of total expenditure, including lending. The plummeting of foreign aid added to these difficulties. Before 1993, foreign aid had accounted for nearly twice as much foreign exchange as exports, representing more than 20% of government revenue. By 1997, donor assistance had dropped to US\$39 million, or a mere 4% of GDP, from US\$300 million in 1990–1992.

Summary: The premium in Burundi

Based on a stock/flow model similar to the one in Appendix A, Kiguel and O’Connell (1994) studied the determinants of the premium in Argentina, Ghana, Sudan, Tanzania, Turkey and Zambia. They concluded that short-term or stock determinants of the premium were real money balances, interest rate parity differential and the official real exchange rate. Long-term or flow determinants were the real exchange rate, terms of trade and aid, although the last two variables were in general not significant but did have the expected signs. In Burundi, we expect the short-term determinant to be the expected rate of devaluation, in view of the discussions of Burundi’s monetary history, especially the frequency of devaluations. This variable captures the dynamics in the parallel market better than the interest parity differential because the atomicity of foreign currency buyers in the parallel market, their motives and the amounts involved do not suggest the existence of important capital outflows fuelled by the differential between domestic and foreign interest rates. Expected devaluations should have a positive impact on the level of the premium: The ratio of M2/GDP has been relatively stable over the sample period (Figure 5), confirming that the country has, for a long time, pursued a conservative monetary policy. For this reason, we do not expect real money balances to be important in explaining the level of the premium.

Figure 5: Aid and money over GDP

The long-term determinants of the premium, uncovered in the model of the premium, are associated with the stock of foreign assets, which in turn is narrowly linked to the reported and unreported current account balance. In addition, given that the government's trade policy is usually linked with budget deficits as the government appears to have used trade rather than monetary policy to finance its deficits, there is a direct relationship between trade policy variables and government deficits. Therefore, the analysis focuses on trade policy variables—import and export taxes—for reasons discussed earlier. Considering that Burundi is a landlocked agricultural economy, the analysis needs to take into consideration the lagged impact of these variables on the premium. International trade price variables such as the terms of trade and foreign prices of coffee should have a direct and an income effect on the premium. The direct effect is linked to the supply of foreign currency in the country, with high levels of the price variables exerting a negative impact on the premium. On the other hand, however, the income effect implies that an increase in the variables increases imports, putting more pressure on the premium. The net impact is a matter for empirical estimation. The real exchange rate is also a trade policy variable because its appreciation encourages imports while discouraging exports. However, its impact may well be captured by the expected rate of devaluation. As already noted, foreign aid has been the main source of foreign currency in Burundi for many years. As a result, aid should also have a direct and an income effect on the premium, with the net effect left for empirical determination. Some empirical estimations have also included GDP as a revenue variable. An increase in GDP may induce more imports, increasing the premium. However, a GDP increase may also imply more exports, which would reduce the premium. The relationship with the premium cannot therefore be signed in advance. On the basis of this summary, the empirical model to be estimated is:

$$prem = f(dev, it, et, rer, aid, tot, gdp, dum) \quad (1)$$

where *prem* is the premium, *dev* is the expected rate of devaluation, *it* and *et* are ratios of import and export tax revenue over the value of total imports and exports, respectively, *rer* is the real official exchange rate, *aid* is the ratio of aid to GDP, *tot* is terms of trade, *gdp* is real GDP, and *dum* is a dummy variable capturing structural breaks in the dependent variable. It is expected that:

$$\begin{aligned} \partial prem / \partial dev \geq 0; \partial prem / \partial it \geq 0; \partial prem / \partial et \leq 0; \partial prem / \partial rer \leq 0; \partial prem / \\ \partial aid \leq 0; \partial prem / \partial tot \leq 0; \text{and } \partial prem / \partial dum \leq 0 \end{aligned}$$

5. Empirical estimation of the premium

Time series econometric techniques are used to identify the determinants of the premium. This section outlines the econometric approach, discusses the data and their statistical properties, and presents the empirical results of the econometric model.

Econometric approach

Most macroeconomic variables, especially those relating to developing economies, are usually integrated. As a result, their analysis requires a methodology designed to specifically study the behaviour of integrated variables. The order of integration of the variables in this study is established using two different tests: the Augmented Dickey–Fuller (ADF) and the Phillips–Perron (PP) tests.²⁵ Using these two different tests is a way of cross-checking the results obtained from one individual test. This may be valuable especially in the case of borderline significance with one test. The ADF test is an augmented version of a simpler test, the Dickey–Fuller test, specified as follows:

$$(1 - L)Y_t = \beta_1 + \beta_2 t + \rho Y_{t-1} + \varepsilon_t \quad (2)$$

where L is a lag operator, Y is the variable to be tested, β_1 is a drift term, t is a time trend and ε_t is assumed to be a Gaussian error term. Inclusion of a time trend and/or a drift term needs to be confirmed by testing the significance of the coefficients β_1 and β_2 . The DF test compares the null hypothesis that ρ is greater than or equal to zero against the alternative that it is less than zero. If the null is not rejected, then Y_t has at least one unit root so it is non-stationary. The problem with the DF test is that it relies on the assumption that ε_t is white noise. The ADF test addresses this limitation by adding lagged values of $(1 - L)Y_t$ to Equation 2 until ε_t becomes white noise. The ADF specification is :

$$(1 - L)Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_i \sum_{i=1}^m \Delta Y_{t-i} + \varepsilon_t \quad (3)$$

However, adding lagged values of the dependent variable reduces the power of the test due to the loss of degrees of freedom. This can be a serious problem, especially when dealing with short samples as this study does. A second test, the Phillips–Perron

(PP) test, is non parametric and usually produces superior results relative to the first two. The PP test corrects for serial correlation and heteroscedasticity in the DF test without the loss of information associated with the ADF. The PP test is based on ordinary least squares (OLS) estimates of Equation 2, namely ρ , β_1 , σ_p , and s , the last two measures being the standard error of p and the estimated standard error of the regression, respectively. The PP test is also known to be better in the presence of regime shifts and small samples, problems usually encountered with African macroeconomic data. The PP specification is:

$$Q(z) = \left(\begin{matrix} \hat{\gamma}_0 \\ \hat{\lambda}^2 \end{matrix} \right) \left[\frac{\frac{1}{2}(\hat{\lambda}^2 - \hat{\gamma}_0) \frac{T\hat{\sigma}_p}{s} \lambda}{\hat{\lambda}} \right] \tag{4}$$

where

$$\gamma_j = T^{-1} \sum_{t=j+1}^T u_t u_{t-j}$$

is a consistent estimate of the population covariance with $j = 1, 2, \dots, q$ being the first autocovariances deemed relevant; T is the number of observations; and

$$\hat{\lambda}^2 = \hat{\gamma}_0 + 2 \sum_{j=1}^q \left[1 - \frac{j}{q+1} \right] \hat{\gamma}_j$$

is the Newey–West (1987) consistent estimator of the variance of the sample mean, which is a consistent estimate of the population variance. Note that t is the value of the DF given in Equation 2. If the error term in (2) is Gaussian, $Q(z) = t$.

An important question that arises when testing for unit roots is what version of the ADF to use—the one that best mimics the data generating process (DGP). Put differently, should one use an ADF specification with a trend and drift terms, one with just a drift term, or one with no trend and no drift? This is a very important question as inclusion of a term in the equation when it should not be there or its omission when it should be may bias the result of the test. Given the low power of unit root tests, using the most general specification will have a tendency not to reject the null of no stationarity when it is false, suggesting that a series is integrated when it is not. When we do not know the form of the

DGP, we use a methodology suggested by Doldado et al. (1990), which starts with the most general DGP, testing iteratively for the significance of the three parameters in the ADF specification of Equation 2.²⁶

If the null that $\delta = 0$ is rejected, and given the low power of the test to reject the null, there is no need to proceed. It means the series is stationary. However, if the null is not rejected, it is probably due to the inclusion of too many parameters so we ascertain the significance of the trend term by testing whether $\beta_2 = 0$ under the null of a unit root. We may also test jointly that $\beta_2 = \delta = 0$ for confirmation of the previous result. Note that the critical values used are from the non-normal Dickey–Fuller distributions. If the trend is not significant, repeat the procedure by testing the null of $\delta = 0$ in a specification that contains a drift but not a trend term. If the null is not rejected, test whether $\beta_1 = 0$ and proceed in a similar way as at the previous step. If the trend term is significant, retest for $\delta = 0$ from the general specification of the DGP using the standardized normal distribution. The use of the normal distribution is justified by the fact that if a trend is included inappropriately, β_2 should be standard normally distributed, in the limit. The procedure is continued until the null of unit root is rejected or until a test of a model with no trend and no drift still fails to reject the null of unit root, indicating that the series has at least one unit root.

If the variables are found to be stationary, only a stationary model can be estimated, ruling out any possibility of cointegration. In such case, a simple OLS stationary model is estimated. However, if variables are integrated, we proceed to determine whether the model is cointegrating and hence may have an error correction representation. In a multivariate setting, the analysis of cointegration and error correction follows the Johansen (1995) vector autoregression (VAR) approach. This methodology is based on the Engle–Granger Representation Theorem,²⁷ which states that if two series are cointegrated, then they are most efficiently represented by an error correction specification. The theorem also implies that if the series are cointegrated and the error correction specification is validated, then the model encompasses any other specification, including the partial adjustment model. Johansen’s VAR is formulated as:

$$\Delta Y_t = \Pi Y_{t-k} + \sum_{i=1}^{k-1} T_i \Delta Y_{t-i} + \varepsilon_t \quad (5)$$

where $\Gamma_i = -(\mathbf{I} - \Pi_1 - \Pi_2 - \dots - \Pi_i)$ and $\Pi = (\mathbf{I} - \beta_1 - \Pi_2 - \dots - \Pi_k)$. The Γ_i are dynamic vector parameters of the model and the Π matrix contains the long-run and the feedback parameters of the model. Note that Π may or may not be cointegrated. The equation may be rewritten as:

$$\Delta Y_t = \alpha \beta^1 Y_{t-k} + \sum_{i=1}^{k-1} T_i \Delta T_{t-i} + \varepsilon_t \quad (6)$$

with α the matrix of parameters representing the feedback effects from equilibrium and β the cointegrating vectors. α and β are recovered using the concentrated likelihood function procedure due to Johansen (1995).

Preference for the cointegration and error correction approach is motivated by its appealing statistical and economic properties. A cointegrating relationship makes it possible to derive super consistent estimates, which minimize biases usually associated with macroeconomic modelling such as endogeneity, measurement errors and multicollinearity. Furthermore, cointegration ensures that the relationship established is not spurious and, in addition, it allows the characterization of the long-run (equilibrium) and short-run (disequilibrium) behaviour of the premium, all in a single model. Therefore, a cointegrating model captures the three relationships economists are interested in: the short-run effect of the explanatory variables on the dependent variable, their equilibrium effect and the error correction mechanism of the current level of the dependent variable towards its equilibrium level. Cointegration also allows the derivation of a parsimonious encompassing model. Given the small sample the empirical part of this study is based on, a single equation model of the premium is estimated as the most parsimonious model that satisfies all classical conditions of OLS estimation in a time series modelling framework. The theoretical and empirical motivation for a single equation estimation in the context of African macroeconomic data is well exposed in Baffes et al. (1999: 418–25).

Data definitions, sources and statistical properties

The data are contained in full in Appendix B. *The premium* is as defined earlier. Data on the official rate are the year averages from the International Financial Statistics (IFS) database. Data on the parallel rate are collected from several issues of *Pick's Currency Yearbook*, which was subsequently renamed *International Currency Analysis Inc.*, and lately *Currency Alerts*. *The terms of trade (TOT)* with two other alternative measures—the *real dollar price of coffee (COF)*, defined as the dollar price of coffee deflated by the US wholesale price index (USWP), and the *Deaton–Miller (1995) index (DM)*, defined as a weighted index of commodity export prices²⁸—can take either sign, as already discussed. Following the same arguments, *DM* and *LCOF* can also be of either sign. *TOT* is a 1985-base index; the original series is from IFS. *LCOF* and *DM* are also 1985-base indexes. *LCOF* is from the IFS. *The ratio of aid to GDP (A)* can be positive or negative, as already discussed. Most empirical research has uncovered a negative relationship with the premium. Data are from IFS and Burundi's Ministry of Finance. *Real export tariff (RET)*, which is export tax revenue over the value of exports, gives an approximation of the export tax rate; it is expected to be negative. The series on export tax revenue and value of exports are from IFS and the Ministry of Finance, Burundi. Similarly, *Real import taxes (RIT)* is a variable obtained by dividing import taxes by total imports to have import tax rates. The series for import taxes and import value are from IFS and Burundi's Ministry of Finance. According to earlier discussions, this variable is expected to be positive. *DEV* is the expected rate of devaluation, computed as

$$\frac{E_{t+1}^E - E_t}{E_t} \text{ where } E \text{ is the official rate of exchange (Fbu per US\$).}$$

The series is from IFS. *RER* is the real exchange rate, computed as $\frac{E}{P} * P^w$ where *P* represents Burundi's domestic price level (CPI) and P^w is the world price level (US wholesale price index). The series are from IFS. Finally, *GDP* is *gross domestic product*, also from IFS.

All indexes are based on 1985 values to balance the importance of observations in the sample. Adopting a base year from the 1990s would give undue weight to the 1990s, a period marked by political instability and unprecedented economic decline, which are not characteristic of the full sample. It should be noted that our data sources are the most widely used for macroeconomic analyses and are therefore assumed to be of good quality. The tests specified earlier are applied to determine the order of integration of the variables. Unit root testing is a crucial step in time series econometric modelling because it guides the researcher towards the right modelling methodology to follow. As Baffes et al. (1999: 427) note, "if we correctly characterise the order of integration, we gain efficiency in estimation and inference by applying the appropriate estimation technique; but a misclassification typically means that these techniques will deliver inconsistent estimates or standard errors". The results of ADF and PP tests are given below. For variables that appear to have at least one unit root, we apply the methodology due to Doldado et al. (1990); its results are presented in the last three columns of Table 2.

β_2 test is a test of the significance of the trend in Equation 3, using a 10% significance critical value of 2.39. β_1 test is a test for the significance of the drift in Equation 3 with a 10% significance critical value of 2.20. The critical values are from Dickey and Fuller (1981: 1062). δ re-test is a test of unit root, against a standard normal distribution, conditional on the trend or drift being significant. The results of this tedious procedure indicate that the following variables are stationary in levels: the premium, terms of trade, export tax rate, import tax rate, expected rate of devaluation, coffee export price and money supply. The variables that are not stationary in levels—the real exchange rate, Deaton–Miller index, real GDP and aid—need further investigation. All but aid are stationary when differenced once, suggesting that they are integrated of order 1. With regard to the variable aid, the ADF test fails to reject the null of unit root even when differenced once, although the PP test rejects the null of unit root for the differenced variable.

Before concluding that the variable is I(1), we analysed the break in the variable shown in Figure 5 to determine whether it may not be biasing the results. This is important because in the presence of a structural break, DF and PP tests are biased towards the nonrejection of a unit root (Enders, 1995: 243). We follow Perron (1989) and develop a model similar to Equation 3 for testing the stationarity of aid by including a pulse dummy variable (DUM_p) that takes value 1 in 1995 and zero otherwise, and a level dummy (DUM_L) that takes value 1 after 1994 and zero otherwise. As Perron (1989) makes the

Table 2: Unit root tests: Variables in levels (1970-1998)

	DGP	ADF	PP	β_2 test (2.39)	β_1 test (2.20)	δ retest
Premium	C+T	-3.42*	-5.72***			
	C	-2.33	-4.40***			
	N	-0.08	-0.45			
Terms of trade	C+T	-2.99	-2.99	-2.72*		-2.99***
	C	-1.30	-1.68			
	N	-0.76	-1.04			
Export tax	C+T	-3.76**	-3.70**			
	C	-3.38**	-3.47**			
	N	-1.58	-1.68*			
	DGP	ADF	PP	β_2 test (2.39)	β_1 test (2.20)	δ retest
Import tax	C+T	-2.74	-3.11			
	C	-1.38	-1.59			
	N	-2.10**	-2.58**			
Expected devaluation	C+T	-5.52***	-5.98***			
	C	-4.00***	-4.80***			
	N	-2.38***	-3.42***			
Real exchange rate	C+T	-1.38	-1.04	2.60*	-0.22	-1.38
	C	0.27	0.50			
	N	1.01	1.14			
Coffee price	C+T	-2.59	-2.51			
	C	-1.93	-2.10			
	N	-1.88*	-2.03**			
Deaton–Miller	C+T	-2.83	-2.36	-2.10	-1.17	
	C	-1.78	-1.60			
	N	-1.38	-1.20			
Real GDP	C+T	-2.47	-3.15	1.99	1.41	
	C	-1.40	-1.82			
	N	1.24	1.74			
Aid	C+T	1.05	-0.04	-1.77	1.05	
	C	-1.18	-1.44			
	N	-0.56	-0.71			
Money supply	C+T	-2.36	-3.28*	1.76	1.94	
	C	-1.82	-1.94			
	N	0.47	0.36			

Note: ***, **, * are significance at 1, 5 and 10% probability level, respectively. C, T and N are drift, trend, and no drift or trend, respectively.

point in his study of American macroeconomic data, including these two dummies is motivated by the fact that the structural break of 1995 not only changed the intercept but also the slope of the variable (see Figure 5). We estimate the following equation:

$$\Delta Aid_t = \alpha + \beta t + \gamma Aid_{t-1} + \delta \Delta Aid_{t-1} + \zeta DUM_p + \eta DUM_L + \varepsilon_t \quad (7)$$

As before, we estimate three models with and without the drift and the trend terms; the results are shown in Table 3.

Table 3: Unit root test results of variable aid

α	β	γ	δ	ζ	η
0.10	0.79	-0.09	-4.28	3.20	-6.83
0.02		1.30	-4.88	3.14	-7.52
		3.57	-5.07	3.25	-7.79

Although the two dummy variables are significant, the different values of the parameter of interest, α , systematically fail to reject the null of a unit root using the critical values computed by Perron (1989: 1377).²⁹ Given that the first difference of the variable becomes stationary, we treat aid as having one unit root. This result is also supported by the fact that both ADF and PP fail to reject the unit root hypothesis when the variable is tested in levels on the subsample 1970–1994, before the structural break occurred, but both tests reject the null when aid is differenced over the subsample. In the following analyses, since the dependent variable is stationary, we estimate a stationary model involving only stationary variables. All the variables found to have a unit root are differenced once before being integrated in the estimations.

Econometric estimation

A stationary model is estimated and cointegration between the premium and its determinants is ruled out. In fact, the long-run level of the premium in this case is just equal to its sample mean of 28.7%. A simple ADL model of the premium is run on its lagged values and on the levels and lagged values of the fundamentals. In view of the alternative variables identified in previous developments, we present the results of six different models, although the discussion of empirical results is based on the model that appears to best fit Burundi's parallel market.

Model 1 displays the best fit, so the discussion of empirical findings follows its results. However, before discussing the results, we test for the stability of the model parameters based on CUSUM and CUSUMSQ tests.³⁰ The usual practice is to plot CUSUM and CUSUMSQ functions and check whether they remain within the statistically critical bounds (Figure 6).

Table 4: Econometric results of alternative models (1970–1998)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	1.27 [1.54]	4.48 [3.09]***	1.87 [2.01]*	0.89 [0.99]	1.25 [1.53]	2.38 [1.91]*
Log premium (-2)	0.40 [2.60]***	0.35 [2.17]***	0.39 [2.04]**	0.40 [2.62]***	0.37 [2.38]**	0.33 [2.03]**
Expected devaluation	0.02 [2.56]**	0.02 [2.02]**	0.02 [1.85]*	0.02 [2.76]***	0.02 [2.67]***	0.02 [2.62]***
Export taxes	0.03 [2.64]***	0.03 [2.36]**	0.02 [1.82]	0.03 [2.84]***	0.03 [2.75]***	0.03 [2.73]***
Export taxes (-1)	-0.02 [-1.93]*	-0.02 [-2.43]**	-0.03 [-3.09]***	-0.01 [-1.53]	-0.02 [-1.87]*	-0.02 [-1.94]*
Import taxes	-0.09 [-2.92]***	-0.08 [-2.45]**	-0.10 [-2.78]***	-0.10 [-3.08]***	-0.09 [-2.91]***	-0.11 [-3.18]***
Import taxes (-1)	0.11 [3.31]***	0.11 [-2.95]***	0.10 [2.66]***	0.13 [3.37]***	0.12 [3.42]***	0.10 [3.07]***
Dummy premium	-2.32 [-4.98]***	-2.20 [-4.43]***	-2.04 [-3.94]***	-2.53 [-5.00]***	-2.44 [-5.08]***	-2.18 [-4.58]***
Diff. Log real GDP	-2.42 [-2.58]***	-2.90 [-2.77]***	-2.28 [-2.10]**	-3.04 [-2.74]***	-2.58 [-2.71]***	-2.07 [-2.12]**
Log coffee export price	-0.63 [-2.59]***			-0.74 [-2.80]***	-0.67 [-2.72]***	-0.65 [-2.70]***
Log terms of trade		-0.64 [-1.83]*				
Diff. Log Deaton–Miller			-0.35 [-0.96]			
Diff. Log aid				-0.40 [-1.04]		
Diff. Log aid (-1)					-0.43 [-1.01]	
Log premium (-1)						-0.19 [-1.18]
R-squared	0.79	0.75	0.72	0.80	0.80	0.81
Adj. R-squared	0.68	0.62	0.57	0.68	0.68	0.69
Log-likelihood	-4.37	-6.43	-8.15	-3.48	-3.53	-3.24
F-statistic	7.11	5.83	4.91	6.54	6.51	6.69
Q-statistic	7.67	7.29	5.88	5.99	8.97	8.61
LM-test for autocorrel.	0.04	0.68	1.33	0.39	0.62	1.97

***, **, * are significant at 1, 5 and 10% probability level, respectively. The values in brackets are t-statistics.

Both CUSUM and CUSUMSQ tests imply the same conclusion: As the different plots of the residuals remain within the 5% critical bounds, we can accept that the parameters of the model are stable. In other words, inference can be based on these parameters as they do not seem to vary significantly over time.

Figure 6: CUSUM and CUSUMSQ parameter stability tests

6. Conclusion and policy recommendations

The findings generally conform to both theory and the empirical results of other studies on African countries. Given the theoretical importance of the aid variable, we included it in models 4 and 5 but it turned out to be insignificant in both its contemporaneous and its lagged forms. Although this may appear a surprising result since aid is the main source of foreign currency in the country, the result conforms to other studies that found a negative but insignificant coefficient (Kiguel and O'Connell, 1994). The real exchange rate was also insignificant in all specifications, so it is not included in the models. The reason may be that its short-term impact is captured in the expected rate of devaluation while the other trade policy variables capture its long-term impact. The expected rate of devaluation may be a good proxy of the movements in the real exchange rate since the government devalues the currency in order to reduce exchange rate misalignments. Model 6 includes the first lag of the dependent variable; we show that it does not seem to explain the current level of the premium, while the second lag does. The different models show that the results are generally robust to a range of similar variables. The Ljung–Box or Q-statistic as well as the Breusch–Godfrey serial correlation LM test confirm that there is no serious autocorrelation in the residuals in any of the models presented.³¹

Conclusion

The study analysed the issue of exchange rate policy and foreign exchange allocation in Burundi with an emphasis on the functioning of the parallel market for foreign exchange. As in other countries, the parallel market for foreign currency in Burundi has arisen in response to government distortions in the allocation of foreign exchange to economic agents. For example, the allocation has been made on the basis of import licences, which in turn are accorded to a handful of importers handpicked not always on the basis of their economic merit, leading to inefficiencies, rent-seeking and smuggling. The main difference between the management of the external sector in Burundi relative to other African countries is that the country has maintained the premium at a relatively low level through frequent readjustments of the currency to keep up with an ever increasing parallel rate. However, attempts to seriously address the fundamental factors underlying the parallel market have been made only recently with the beginning of a foreign currency auction system. Since July 2000, foreign currency has been sold by the central bank; auctions were weekly at the beginning but due to the scarcity of foreign exchange, the frequency has changed to only once every two weeks. Auctioning foreign exchange is an

important step towards unification of the country's foreign exchange markets. So far, however, this step has not fundamentally changed the nature of the currency market. Only commercial banks are allowed to participate in the auctions and foreign currency allocation is still heavily controlled, with the imposition of bid ceilings since July 2001 just another sign that the market is far from being based on supply and demand fundamentals.³² As a result, the parallel market is still thriving.

The premium in Burundi is determined by its past values, the expected rate of devaluation, trade-related variables and real GDP. The premium has a strong persistence effect, with an elasticity of 0.4, which suggests that past values of the premium explain an important part of its current value. The expected rate of devaluation is highly significant and has a positive sign, in conformity with theory. This is not surprising, given the frequency of currency readjustments that have taken place during the sample period, as Table 1 showed. The result supports the hypothesis that agents may have been hedging against devaluations by substituting local currency into foreign denominated assets, which in Burundi are mainly limited to foreign currency.

The contemporaneous term of export taxes is positive, while the sign of the lagged value of the variable is negative. The positive sign may mean that when Burundi's government announces export controls, it signals economic hardship and high uncertainty. The immediate reaction of economic actors, especially those involved in international trade, is to turn to the parallel market to switch their holdings into foreign currency. The cyclical pattern of export tax rates shown in Figure 7 enables agents to accumulate experience in terms of interpreting government behaviour. For example, export taxes were raised from a near zero rate in 1982/83 to almost 30% in 1986/87, a period marked by economic crisis that eventually led to the initiation of a SAP with the Bretton Woods institutions in 1986.

The negative sign on the lagged value of the export tax variable implies that the impact of smuggling and export under-invoicing is felt in the parallel market with a lag after putting in place export control policies. This is not surprising, given Burundi's landlocked and agricultural economy. An increase of export taxes by 1% decreases the premium in the next period by 2%. Similarly, import taxes have an immediate positive impact on the premium but a negative impact with a lag. The negative relationship may imply that when import controls are put in place, a number of importers can no longer engage in profitable business and quit or wait for better times, reducing the demand for foreign currency in the parallel market. This interpretation is based on the similar experience of the "own-fund" scheme in Tanzania (O'Connell, 1992); as in Tanzania, a large portion of Burundi's official imports are financed through the parallel market foreign exchange. Importers relying on the more expensive parallel market foreign currency may become unable to import and sell profitably, leaving the market for imported goods to those with access to cheap foreign currency from the government. As a result, the demand for parallel foreign currency decreases and hence the premium. The positive sign on the lagged value of the variable is a result of the increase in smuggling shifting the demand for foreign currency from the official to the parallel market.

GDP and the export price of coffee are revenue variables that are significant and come out with a negative sign. What the result suggests is that the direct effect of price

Figure 7: Import and export tax rates

and GDP variables dominates the income effect. The strong negative impact of GDP on the premium can be explained through the export variable. High GDP growth leads to more export revenue and hence less rationing of foreign currency, reducing the premium. A 1 percentage point increase in GDP leads to an almost 2.5% decrease in the level of the premium. An increase in the export price of coffee, which accounts for nearly 80% of total export revenue in Burundi, has also a negative impact on the level of the premium due to the same effect. A dummy variable, which takes values 1 from 1970 to 1972 and zero otherwise, is also highly significant and negative. The dummy captures the change in the trend of the premium from a steady decline to its lowest value in 1972 to a more fluctuating pattern in subsequent years. The significance of the dummy may be that 1972 marked the end of an era: before 1972, the currency was pegged to the US dollar, which was itself fixed until the decision to float the dollar in August 1971. This provided a sense of stability and predictability to the currency, minimizing large speculative purchases of foreign currency in the parallel market. The floating of the dollar combined with the 1973 oil crisis created high uncertainty, which may have translated into a more fluctuating premium. It should also be noted that 1972 is the year when Burundi experienced its worst political crisis; the year recorded negative GDP growth and the following year saw a lower level of aid from the international community in reaction to the government's handling of the crisis. All these shocks may have had a permanent impact on the behaviour of the premium in the following years.

To the best of our knowledge, this is the first study that estimates a stationary model of the premium in an African context.³³ All previous studies we have consulted (Ghana,

Sudan, Zambia, Nigeria, Ethiopia, Uganda, Tanzania) were on countries with very high premiums and hence estimated models of integrated variables. Notwithstanding this difference, the empirical results from econometric estimations generally conform to both theory and the empirical findings of similar studies.

Policy implications

On the basis of the empirical results, there are a few policy conclusions that emerge. First, the persistence effect of the premium is strong. It suggests that the parallel market has gone beyond being just tolerated by the government to becoming a stable institution, despite the fact that it is still officially “illegal”. This finding suggests that successful unification of the parallel and the official markets will require long-term measures, strong and sustainable enough to “destabilize” the parallel market. Trade liberalization policies have been able to keep the premium at a relatively low level but they have not eradicated it. Moreover, the auction system has already hit a snag after only one year in operation. Resource scarcity and the central bank’s imposition of bid ceilings are but a few indications that the system is far from restoring market fundamentals in foreign exchange allocation and they have put in question its sustainability.³⁴ In view of the negative relationship between GDP growth and the size of the premium, the development of a more vibrant economy is probably the best policy path for a long-term impact on the premium.

A more predictable exchange rate will reduce the uncertainty associated with frequent devaluations of the domestic currency, given the positive impact of the expected rate of devaluation on the level of the premium. As long as firms and other investors are unable to make their decisions on the basis of a stable currency, it will be difficult to attract investment, whether domestic or foreign, depriving the economy of foreign exchange that would ease pressure on demand for foreign exchange. The adoption of appropriate trade policies is also crucial for a successful unification policy. Empirical results have shown that export and import taxes play an important role in determining the level of the premium. Because of inappropriate economic policies that have curtailed the expansion of the domestic economic tax base, Burundi has depended more and more on taxes on international trade to fund its budget. As a result, export taxes have been increased and decreased in cycles, depending on the government’s needs of the moment (see Figure 7). Since the net impact of export taxes on the premium appears to be positive, the government should rather strive to expand its domestic tax base and reduce its dependence on export taxes to allow the export sector to grow. It is ironic that a government in dire need of foreign currency should tax its export sector.

Export taxes have a double negative impact on the economy. The most direct impact is that they discourage the production of exportable products. Assuming that the elasticity of substitution between production for foreign and domestic markets is less than one, the result is a contraction in GDP, since what is lost in the production of exportables is not necessarily translated into an equal increase in production for the domestic market. The second impact of export taxes is that producers have an increased incentive to evade

taxation by smuggling their exports outside Burundi. Therefore, the country not only loses taxes on exports, it also loses the foreign currency it would have collected. Nkurunziza and Ngaruko (2001) have shown that taxation of coffee growers in Burundi, who received on average 34% of the world price on a kilo of coffee sold to the government parastatal for the period 1967–1998, has led to a sluggish coffee sector with a large impact on the country's export performance. In the same connection, considering that the net impact of import taxes on the premium is positive, high taxes will tend to perpetuate the parallel market rather than reduce it.

The last variable in the model that has an important impact on the level of the premium is the export price of coffee. Despite coffee's contribution of 80% of the country's export earnings, Burundi is a marginal coffee exporter and hence a price taker. As international prices of coffee increase, more foreign currency flows into Burundi through either official or unofficial channels, depending on the extent of smuggling. As a result, the availability of more foreign exchange reduces the pressure on the parallel market, explaining the negative relationship with the premium. Although this is a positive impact, its long-term effect on the premium is limited, as the performance of the coffee sector depends on exogenous variables such as the weather, oversupply on international markets and other agriculture-related shocks. In the long term, the dependence of the export sector on coffee will need to change through a policy of export diversification. Of course, diversification should be seen as a long-term goal since it requires a difficult structural transformation of the economy.

To be realistic, a prerequisite for these policies to succeed is, first and foremost, the restoration of the country's long-term political stability. Even if the authorities were willing to implement the trade and exchange rate reforms that are necessary for a successful unification policy, it will be difficult to achieve and maintain macroeconomic discipline in a war-torn economy. Bringing an end to Burundi's cycle of civil wars would not only lay the basis for long-term development initiatives, it will also reactivate international cooperation with the country and boost confidence in Burundi's economy. Obviously, although we have focused only on the policies suggested by the empirical results of our model, there are many more measures that will need to accompany the process of unification. For example, unification will need to be organized in such a way that it does not generate excessive inflation as has been noted elsewhere.³⁵ Also, although auctions have brought some flexibility to the system, strong distortions remain in foreign exchange allocation. Beyond auctions, the government should foster a more competitive banking sector in order to increase efficiency in the use of the country's limited financial resources, including foreign currency.

Notes

- 1 A detailed treatment of exchange rate misalignments is contained in Hinkle and Montiel (1999).
- 2 It could be, argued that in many cases where the parallel market is a way to circumvent cumbersome and pointless restrictions imposed by the political system, it may be seen as contributing to the restoration of market fundamentals in the allocation of foreign exchange. In this light, it is not the market itself that should be blamed but the policies that underlie its existence.
- 3 Ghei and Kamin (1999) compare the parallel and official exchange rates of a number of African and non-African countries over the period 1970–1994. Most African countries in the sample are characterized by a fixed official rate and an increasing parallel rate, resulting in a non stationary premium. Burundi's official rate follows the same trend as the parallel rate, suggesting a "catch-up effect" that keeps the premium stationary.
- 4 Lecture by Rudiger Dornbusch at the IMF in July 2000.
- 5 For a survey of the literature on parallel markets for foreign exchange, see Agénor (1992).
- 6 This is a scheme whereby an importer applies for and obtains an import licence without being asked any questions about the foreign currency to pay for the imports. It is an implicit acceptance by monetary authorities that importers purchase their foreign exchange in the parallel market.
- 7 A general derivation of the premium based on this methodology is presented in Appendix A.
- 8 See Section 4 for details.
- 9 Details on the economics of rationing in the context of industrial organization may be found in Tirole (1988).
- 10 More details on exchange rate policy are provided in Section 4.
- 11 According to Ghei and Kiguel (1992), high premiums are considered to be those in excess of 35%; those below are either low or medium premiums.
- 12 Some important measures have just been taken to liberalize the parallel market, including the institution of foreign currency auctions.
- 13 These data are from a study by the Secrétariat Permanent du Comité de Suivi du Programme d'Ajustement Structurel (1997), *Etude sur l'Opportunité de la Création des Bureaux de Change Privés au Burundi*, manuscript.
- 14 Personal discussion with money changers in Burundi.
- 15 Secrétariat Permanent du Comité de Suivi du Programme d'Ajustement Structurel, 1997.

- 16 Information in this section is based on *Pick's Currency Yearbook*, different issues; and unpublished sources from the Banque de la République du Burundi (BRB, Burundi's central bank).
- 17 Interpretation of the volume of reserves in terms of the number of months of imports, as is usually the case, would be misleading since imports themselves have dramatically contracted.
- 18 A similar phenomenon was observed in Nigeria in 1993 when the country reversed its foreign currency market reforms back to a controlled regime (Dordunoo et al., 1997)
- 19 It could be that the same group of people who had benefited from cheaper official exchange rates became rebellious when the government was unable to provide them with hard currency and pushed for market liberalization.
- 20 Although auctions do not, in themselves, guarantee a market-based allocation of forex, as experienced in Nigeria where supply and demand were manipulated (Dordunoo et al., 1997).
- 21 About 200,000 people were killed and more than 300,000 people left the country to seek refuge in foreign countries, especially those neighbouring Burundi. See Ngaruko and Nkurunziza (2000) for details.
- 22 On the other hand, regular devaluations increased economic uncertainty.
- 23 Most foreign exchange in Burundi comes traditionally from foreign aid. Therefore, strictly speaking, it is the decline in aid rather than in exports that has had the most devastating impact on the stock of foreign reserves.
- 24 Values for 1998/99 are projections.
- 25 The material in this section draws on Adam, *Lectures in Quantitative Methods*, University of Oxford, Trinity Term 1999.
- 26 The following brief summary of the procedure is based on Enders (1995: 256–8).
- 27 For a more formal treatment of the Engle–Granger theorem, refer to Engle and Granger (1987).
- 28 For a detailed discussion of this index, refer to Dehn (2000), who provided the series on Burundi.
- 29 The critical value for γ in a model with a drift and a trend (our first model) and with 90% of observations falling before the structural break (in our case it is 86%) is -3.52.
- 30 CUSUM is the cumulated sum of residuals while CUSUMSQ is the cumulated sum of the squared residuals. It would have been more interesting to implement a Chow breakpoint test for stability of the parameters before the 1990s and after, given the changes in trends of some variables shown in the different charts. However, the small sample we are using and the relatively short period after the 1990s do not allow implementation of such a test, which requires dividing the sample into subsamples with a number of observations in each subsample greater than the number of parameters of the model. Therefore, we only implement CUSUM and CUSUMSQ tests for parameter stability.
- 31 See, for instance, Cromwell et al. (1994) for details on Q-test for serial correlation.
- 32 In July 2001 the central bank imposed a ceiling on the bid price. Any buyer who

proposes a price beyond the ceiling loses the bid. On 8 August 2001, no buyer won the US\$1,000,000 on sale because they all proposed prices that were higher than the ceiling (Netpress, 29 August 2001). The government justifies the policy as a way of preventing inflation and the deterioration of the national currency. The fact that the bidders are proposing prices higher than the one expected by the government is just an illustration of the way even auctions are being manipulated.

- 33 One study with some methodological similarities is Baffes et al. (1999), which estimates a stationary model of the equilibrium real exchange rate for Burkina Faso.
- 34 Auctions were actually suspended for a few months in 2001 due to a lack of foreign exchange.
- 35 For instance, Pinto (1991) and Younger (1992) found an association between unification and inflation in Ghana. On the other hand, Morris (1995), using data on Uganda, argues that unification might not produce inflation if devaluation of the official exchange rate reduces money creation in the economy. Therefore, whether or not unification results in an increase in inflation is a matter for empirical analysis.

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Appendix A: Theoretical model of the premium

A general model of the premium is presented following closely Ghei and Kiguel (1992), which is in the same line of thought as Dornbusch et al. (1983). We assume a small open economy with two goods: one traded and one non-traded. All commercial transactions take place at the exchange rate E_o , which crawls at a rate π . All financial transactions take place at rate E_p . In this light, we have:

$$W = M + E_p F \quad (\text{A1})$$

where W is private sector nominal wealth, M is nominal money stock, E_p is parallel exchange rate and F the stock of foreign assets held by private agents. It is assumed that private sector financial transactions take place at the parallel market. Private sector consumption of traded goods is:

$$C_T = \alpha a (m + qF) \quad (\text{A2})$$

where α is the proportion of consumption of traded goods, α is the proportion of wealth used for consumption, $m = M/E_o$ is real money stock (E_o is official exchange rate) and q is E_p/E_o , the premium. Consumption of the non-tradeable is given by:

$$C_N = (1 - \alpha)a (m + qF)e \quad (\text{A3})$$

where e is the real exchange rate. Total government expenditure on traded and non-traded goods is:

$$G = G_T + G_N \quad (\text{A4})$$

Equilibrium in the non-traded sector is achieved under the following condition:

$$[(1 - \alpha)a (m + qF) + G_N]e = Y_N \quad (\text{A5})$$

where Y_N is total non-traded output. Since private sector capital account operations are carried out in the parallel market, as already assumed under Equation A1, capital account transactions have no influence on the level of international reserves in the hands of the government. Therefore, variation in international reserves is equal to the current account balance:

$$\dot{R} = Y_T - \alpha\alpha(m + qF) - G_T \quad (\text{A6})$$

where Y_T is total traded output. We also assume that domestic credit is used to finance government deficit. Therefore, change in domestic credit, D , is:

$$\dot{D} = E_o(G - T) \quad (\text{A7})$$

where T is government revenue. From (A6) and (A7), we get the equation for the change in real money stock:

$$\dot{m} = Y_T - \alpha\alpha(m + qF) + G_N - T - \pi m \quad (\text{A8})$$

where π is the rate of change of the official exchange rate.

The composition of the private sector portfolio depends on the expected rate of depreciation of the parallel rate. Assuming perfect foresight, we have:

$$m = \lambda \left(\frac{\dot{E}_p}{E_p} \right) qF = \lambda \left[\left(\frac{\dot{q}}{q} \right) + \pi \right] qF \quad (\text{A9})$$

which defines the evolution of the premium. To get steady-state conditions, we set

$$\dot{m} = \dot{q} = 0 \quad (\text{A10})$$

which yields:

$$\alpha\alpha(m + qF) = Y_T + G_N - T - \pi m \quad (\text{A11})$$

and

$$\lambda^{-1} \left(\frac{m}{qF} \right) = \pi \quad (\text{A12})$$

From these results, we derive the steady-state values for the money stock and the premium:

$$m^* = \frac{\lambda(\pi)[Y_T + G_N - T]}{\alpha a[\lambda(\pi) + 1] + \pi\lambda(\pi)} \quad (\text{A13})$$

and

$$q^* = F^{-1} \frac{[Y_T + G_N - T]}{\alpha a[\lambda(\pi) + 1] + \pi\lambda(\pi)} \quad (\text{A14})$$

Appendix B: Burundi macroeconomic data

YEARS	PARATE ¹	NEXRATE ²	PREMIUM ³	IMPORTS ⁴	EXPORTS ⁵	GDP ⁶
1970	107.60	87.50	23.00	1 956	2 132	19 014
1971	101.00	87.50	15.40	2 619	1 701	22 278
1972	92.40	87.50	5.60	2 736	2 302	21 595
1973	92.92	78.75	18.00	2 495	2 444	24 355
1974	92.92	78.75	18.00	3 396	2 440	27 190
1975	112.60	78.75	43.00	4 856	2 515	32 672
1976	125.00	90.00	38.90	5 027	5 420	38 676
1977	96.50	90.00	7.20	6 678	8 011	49 578
1978	114.00	90.00	26.70	8 843	6 243	54 821
1979	100.00	90.00	11.10	13 721	9 361	68 086
1980	106.00	90.00	17.80	15 114	5 884	85 607
1981	104.00	90.00	15.50	14 509	6 744	89 086
1982	120.00	90.00	33.30	19 280	7 901	94 094
1983	130.00	117.41	10.70	17 075	7 522	102 892
1984	176.00	124.95	40.80	22 383	12 367	120 451
1985	140.00	111.97	25.00	22 754	13 533	141 347
1986	147.70	124.17	18.90	23 195	17 674	140 842
1987	137.30	114.47	19.90	25 465	11 117	143 590
1988	169.60	149.94	13.10	28 885	18 589	152 907
1989	214.00	175.43	22.00	29 910	12 304	179 548
1990	186.10	165.35	12.50	40 179	12 784	196 656
1991	269.30	191.10	40.90	46 154	16 698	204 951
1992	310.90	236.55	31.40	65 698	19 638	226 200
1993	370.70	264.38	40.20	69 239	21 381	236 700
1994	409.40	252.70	65.80	66 600	24 029	233 300
1995	355.00	249.80	27.70	68 200	32 162	249 900
1996	534.00	322.53	65.56	41 500	15 200	272 600
1997	627.00	408.38	53.53	47 900	33 700	337 300
1998	615.00	505.16	21.74	62 000	24 800	425 100

1. PARATE: Parallel rate in Fbu for one US\$ (Source: *Pick's Currency Yearbook, World Currency Yearbook, Currency Alerts*).
2. NEXRATE: Nominal exchange rate in Fbu for one US\$ (Source: IMF, IFS).
3. PREMIUM: Parallel rate/official rate minus one times 100.
4. IMPORTS: Imports in current million Fbu (Source: IMF, IFS).
5. EXPORTS: Exports in current million Fbu (Source: IMF, IFS).
6. GDP: Gross domestic product in current million Fbu (Source: World Bank, *World Development Indicators*).

YEARS	M2 ⁷	BUDGBAL ⁸	RESERVES ⁹	AID/GDP ¹⁰	M2/GDP ¹¹	EXP/GDP ¹²
1970	2 138	119.80	15 395 913	8.12	11.24	11.21
1971	2 444	329.70	17 727 028	7.48	10.97	7.64
1972	2 440	202.30	18 549 169	8.47	11.30	10.66
1973	2 988	155.10	21 591 172	7.71	12.27	10.03
1974	3 451	300.40	14 367 927	9.04	12.69	8.97
1975	3 350	(80.70)	30 847 680	11.22	10.25	7.70
1976	4 713	238.90	49 159 795	10.16	12.19	14.01
1977	6 550	468.70	95 905 720	9	13.21	16.16
1978	8 902	6.20	83 359 470	12.54	16.24	11.39
1979	9 477	67.10	96 725 132	12.33	13.92	13.75
1980	12 860	(1 708.00)	104 654 069	12.71	15.02	6.87
1981	15 874	(1 873.00)	68 145 945	12.56	17.82	7.57
1982	15 305	(1 362.10)	37 357 632	12.57	16.27	8.40
1983	19 439	(917.80)	33 508 893	12.97	18.89	7.31
1984	20 206	231.40	25 040 943	14.35	16.78	10.27
1985	24 183	(148.50)	35 103 994	12.29	17.11	9.57
1986	24 347	3 475.00	75 804 780	15.86	17.29	12.55
1987	24 854	(1 433.20)	69 068 870	18.3	17.31	7.74
1988	28 241	1 116.10	76 449 626	17.81	18.47	12.16
1989	31 635	4 649.10	106 526 822	18.14	17.62	6.85
1990	34 920	1 273.70	111 668 470	23.76	17.76	6.50
1991	37 359	4 219.30	147 473 699	22.41	18.23	8.15
1992	36 100	1 796.80	179 911 231	29.07	15.96	8.68
1993	38 700	3 442.60	169 711 774	22.65	16.35	9.03
1994	52 300	6 743.10	211 303 331	29.61	22.42	10.30
1995	50 000	2 630.00	216 108 570	23.68	20.01	12.87
1996	57 200	(6 600.00)	145 960 150	18.15	20.98	5.58
1997	63 100	(5 300.00)	117 300 000	12.6	18.71	9.99
1998	70 900	(4 400.00)	70 000 000	4	16.68	5.83

Notes:

7. M2: Money and quasi money in current million Fbu (Source: World Bank, *World Development Indicators*).
8. BUDGBAL: Budget balance in current million Fbu (Source: IMF and government statistics).
9. RESERVES: Foreign reserves in US\$ (Source: IMF, IFS).
10. AID/GDP: Ratio of aid over GDP. Aid is defined as aid flows excluding technical assistance (IMF and government statistics).
11. M2/GDP: Ratio of M2 over GDP.
12. EXP/GDP: Ratio of exports over GDP.

YEARS	IMP/GDP ¹³	BUDG/GDP ¹⁴	RES/GDP ¹⁵	GDPGRO ¹⁶	INFLAT ¹⁷	INTEREST ¹⁸
1970	10.29	0.63	7.09	14.25	(0.20)	2.50
1971	11.76	1.48	6.96	7.90	3.90	2.50
1972	12.67	0.94	7.52	(10.80)	3.80	2.50
1973	10.24	0.64	6.98	7.20	6.00	2.50
1974	12.49	1.10	4.16	(0.80)	15.70	2.50
1975	14.86	-0.25	7.44	1.00	15.70	2.50
1976	13.00	0.62	11.44	7.90	6.90	2.50
1977	13.47	0.95	17.41	12.40	6.80	2.50
1978	16.13	0.01	13.69	(1.10)	23.90	2.50
1979	20.15	0.10	12.79	2.00	36.50	2.50
1980	17.66	-2.00	11.00	1.00	2.50	2.50
1981	16.29	-2.10	6.88	10.90	12.20	4.50
1982	20.49	-1.45	3.57	(0.40)	5.90	4.50
1983	16.60	-0.89	3.82	3.10	8.20	4.50
1984	18.58	0.19	2.60	(0.10)	14.30	4.50
1985	16.10	-0.11	2.78	11.70	3.80	4.50
1986	16.47	2.47	6.68	3.20	1.70	8.00
1987	17.73	-1.00	5.51	5.60	7.10	3.00
1988	18.89	0.73	7.50	5.00	4.50	6.00
1989	16.66	2.59	10.41	1.40	11.70	4.40
1990	20.43	0.65	9.39	3.60	7.00	6.00
1991	22.52	2.06	13.75	5.20	9.00	8.00
1992	29.04	0.79	18.81	2.70	4.50	9.40
1993	29.25	1.45	18.96	(6.00)	9.70	9.00
1994	28.55	2.89	22.89	-3.7	14.90	9.30
1995	27.29	1.05	21.6	-7.3	19.30	9.20
1996	15.22	-2.42	17.27	-8.4	26.4	9.1
1997	14.20	-1.57	14.2	0.4	31.00	9.3
1998	14.58	-1.04	8.32	4.5	17.00	9.4

Notes:

13. IMP/GDP: Ratio of imports over GDP.

14. BUDG/GDP: Ratio of budget balance over GDP.

15. RES/GDP: Ratio of foreign reserves over GDP.

16. GDPGRO: Real GDP growth.

17. INFLAT: Inflation-CPI change.

18. INTEREST: Deposit interest rate up to a term of three months (Source: Burundi Central Bank).

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