Exchange Controls and Parallel Market Economies in Sub-Saharan Africa

Focus on Ghana

Ernesto May

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ABSTRACT

This paper provides a theoretical framework to understand the way in which exchange controls modify the behavior of the different agents in the economy, leading to the creation of a parallel economy. It gives the necessary theoretical elements to analyze this parallel economy and provides a simple methodology to obtain relevant quantitative information about it. Finally, it elaborates some of the policy implications of the existence of such an economy.

The model developed shows that parallel market activities can be explained through the optimizing behavior of exporters and importers. Exporters will keep shifting their exports from official to parallel market channels until the expected marginal benefit in both activities is the same. Import traders will devote resources to rent-seeking activity until the moment in which an additional unit spent in this activity is equal to the savings derived from being able to use official channels instead of the parallel markets. Their combined behavior determines the amount of import and export smuggling, the level of the rent-seeking activity, and the black market exchange rate that is consistent with an equilibrium position where no one has any more incentives to move from their attained position.

A methodology has been developed to detect the presence and assess the magnitude of the parallel market economy, as well as to explain its behavior in a quantitative fashion. This methodology is applied to Ghana, a country in Sub-Saharan Africa, where parallel market activities seem to be widespread and relatively open in the economy.

In the first part, a reduced form equation of the black market exchange rate that is derived from the context of our model is estimated for Ghana. There is a definite negative relationship between the real official exchange rate and the black market rate in this case. By letting the real official exchange rate appreciate, the Government of Ghana has been losing an important amount of foreign exchange related to the exports that are now being smuggled out of Ghana instead of going through the official channels. This has meant an important reduction in the amount of foreign exchange allocated to imports and, therefore, an increase in the demand for smuggled imports in the economy. In all, the real appreciation of the official exchange rate seems to be very much related to the increasing importance of parallel market activities in the economy.

The second part of the methodology focuses on the estimation of the size of the parallel market economy and its evolution in time. The approach emphasizes the fact that there is a demand for currency related to the activities of the parallel market economy. It is based on the methodology developed by Tanzi (1982) to estimate the underground economy in the United States.
The yearly estimates of the parallel market economy seem to indicate a very clear trend: the government has been losing control over the economy as more and more transactions are being diverted to the parallel markets. The parallel market economy rose almost steadily to a 32.4 percent of the official GDP in 1982.

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Cette étude propose un cadre théorique destiné à faire mieux comprendre la façon dont le contrôle des changes modifie le comportement des différents agents de l'économie, aboutissant à la création d'une économie parallèle. Elle fournit les éléments théoriques nécessaires pour analyser cette économie parallèle en même temps qu'une méthode simple pour obtenir les données quantitatives pertinentes à son sujet. Enfin, elle examine certaines des implications de l'existence d'une telle économie sur le plan des politiques.

Le modèle élaboré montre que les activités du marché parallèle peuvent s'expliquer par la volonté des exportateurs et des importateurs d'optimiser leur situation. Les exportateurs s'efforceront de faire passer leurs exportations du marché officiel au marché parallèle tant que les avantages marginaux attendus des deux marchés ne seront pas les mêmes. Les importateurs consacreront leurs ressources à des activités susceptibles de produire un revenu jusqu'à ce que l'unité supplémentaire dépensée à de telles activités soit égale à l'économie qui résulterait de la possibilité d'utiliser les voies officielles au lieu des marchés parallèles. Ensemble, par leur comportement, les uns et les autres déterminent le volume d'importations et d'exportations passées en contrebande, le niveau d'activité à but lucratif et le taux de change du marché noir compatible avec une position d'équilibre où personne n'a plus de raison de vouloir bouger de sa position.

Une méthode a été mise au point pour déceler la présence et évaluer l'ampleur de l'économie du marché parallèle, ainsi que pour expliquer son comportement de façon quantitative. Cette méthode est appliquée au Ghana, pays de l'Afrique au sud du Sahara où les activités du marché parallèle semblent florissantes et semblent se pratiquer d'une manière relativement ouverte dans l'économie.

Dans la première partie est établie une estimation pour le Ghana du taux de change sur le marché noir à partir d'une équation sous forme réduite découlant de notre modèle. Il existe dans ce cas une relation négative entre le taux de change officiel réel et le taux du marché noir. En laissant le taux de change officiel réel monter, le Gouvernement du Ghana a perdu un volume appréciable de devises du fait de la sortie en contrebande d'exportations qui auraient dû normalement emprunter les voies officielles. Cela a entraîné une forte réduction du volume de devises alloué aux importations et, par conséquent, un accroissement de la demande de produits importés en contrebande. En somme, la remontée en valeur réelle du taux de change officiel semble étroitement liée à l'importance accrue des activités du marché parallèle pour l'économie.
Le second volet de cette méthode porte sur l'estimation de l'ampleur de l'économie du marché parallèle et sur son évolution dans le temps. L'étude souligne le fait qu'il existe une demande de devises liée aux activités de cette économie. Elle se fonde sur la méthode mise au point par Tanzi (1982) pour estimer l'économie clandestine aux États-Unis.

Les estimations annuelles de l'économie du marché parallèle semblent indiquer une tendance très claire : l'État perd le contrôle de l'économie à mesure qu'un nombre croissant de transactions se trouvent détournées vers les marchés parallèles. En 1982, l'économie du marché parallèle, en hausse presque constante, a atteint 32,4 % du PIB officiel.
Este estudio proporciona un marco teórico para comprender la manera en la que los controles cambiarios modifican el comportamiento de los diversos agentes que actúan en la economía y conducen a la creación de una economía paralela. Brinda los elementos teóricos necesarios para analizar esta economía paralela, así como una metodología simple para obtener la información cuantitativa pertinente acerca de la misma. Finalmente, explica en detalle algunos de los efectos en materia de políticas derivados de la existencia de tal economía paralela.

El modelo elaborado muestra que las actividades del mercado paralelo pueden explicarse mediante el comportamiento de los exportadores e importadores tendiente a la optimización. Los exportadores persistirán en trasladar sus exportaciones de los cauces del mercado oficial a los del mercado paralelo hasta que el beneficio marginal esperado en ambas actividades sea el mismo. Los importadores dedicarán recursos a actividades de búsqueda de renta hasta el momento en que una unidad adicional gastada en tales actividades sea igual al ahorro derivado de la posibilidad de usar cauces oficiales en vez de los del mercado paralelo. Su comportamiento combinado determina la cantidad de contrabando de importaciones y exportaciones, el nivel de actividades de búsqueda de renta y el tipo de cambio de mercado negro que guarde armonía con una posición de equilibrio en la que nadie tenga más incentivos para salir de la situación alcanzada.

Se ha elaborado una metodología para detectar la existencia de la economía del mercado paralelo y evaluar su magnitud, así como para explicar su comportamiento de una manera cuantitativa. Esta metodología se ha aplicado a Ghana, país de África al Sur del Sahara donde las actividades del mercado paralelo parecen muy difundidas y relativamente abiertas en la economía.

En la primera parte del estudio se calcula con respecto a Ghana una ecuación de formato reducido del tipo de cambio del mercado negro que se desprende del contexto de nuestro modelo. Hay en este caso una relación negativa definida entre el tipo de cambio oficial real y el del mercado negro. Al dejar que se valorice el primero de los dos, el Gobierno de Ghana ha venido perdiendo una suma apreciable de divisas en relación con las exportaciones que ahora se realizan clandestinamente, en vez de a través de los cauces oficiales. Esto ha significado una reducción considerable de la cantidad de divisas asignadas a las importaciones y, por lo tanto, un aumento de la demanda de los productos importados clandestinamente. En conjunto, la valorización real del tipo de cambio oficial parece estar muy vinculada a la importancia creciente de las actividades del mercado paralelo dentro de la economía.
La segunda parte de la metodología se centra en el cálculo de la magnitud de la economía del mercado paralelo y su evolución en el curso del tiempo. El método destaca el hecho de que existe una demanda de moneda vinculada a las actividades de la economía del mercado paralelo. Se basa en la metodología elaborada por Tanzi (1982) para calcular la economía sumergida en los Estados Unidos.

Las estimaciones anuales de la economía del mercado paralelo parecen indicar una tendencia claramente definida: el Gobierno ha venido perdiendo el control sobre la economía a medida que se ha desviado hacia el mercado paralelo un número cada vez mayor de transacciones. La economía del mercado paralelo se elevó en forma casi sostenida a un 32,4% del PIB oficial en 1982.
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I. INTRODUCTION

The fact that economists have for so long regarded exchange controls as "obviously nonoptimal from the resource allocation viewpoint" 1/ has resulted in a very small amount of effort, in terms of economic theory, to explain the behavior of economies where exchange controls are a "fact of life." An increasing number of economists have recognized that the standard models developed by the economic theory in the field of open macroeconomics, which has been mainly concerned with convertible currencies, may not be applicable to an economy in which there is rationing in the official foreign exchange market. 2/ To a great extent, this has to do with the emergence of a parallel market economy that is related to the imposition of exchange controls. It is the purpose of this paper to take the first steps in developing a unified analytical framework to study the behavior of economies with exchange controls, by providing a framework to analyze parallel market activities (i.e., smuggling of imports and exports, rent-seeking, and trading of currencies in the black market).

In a first approximation, there is no difference in the economic analysis of a direct quantitative restriction on imports, or an import restriction through the use of exchange controls. The use of the more elaborate administrative procedure of exchange controls can only be justified to the extent to which governments find that foreign trade is more easily and effectively controlled through the foreign exchange market. Traders need to change from foreign to domestic money (or vice versa).


2/ See, for example, Krueger (1983).
This similarity falls apart the moment we consider illegal transactions. A direct import quota may create incentives to smuggle imports as long as the import-related premium outweighs the risks ensuing from the illegal transactions. If the quota is imposed through exchange controls, then the foreign exchange needed to smuggle goods into the country needs to be purchased through the black market. In this case there is an incentive to smuggle imports as long as the import premium outweighs the black market premium together with the risks involved in illegal transactions. As has been pointed out by the literature, direct import quotas can only create incentives for smuggling but do not give incentives for the creation of a black market in foreign exchange. 3/

In the case of exchange controls it is not very meaningful to pose the question of import smuggling and its effects on welfare without exploring the means of its finance. This possible black market aspect of smuggling is not captured by the existing literature on smuggling in international trade. The reason is that the analysis of smuggling has always been carried out in a framework of trade restrictions (quotas, tariffs) and not of exchange controls. But in the former, black markets of foreign exchange are never an issue.

There is another phenomenon related to quantitative restrictions on trade that has not been related either to smuggling or black markets: rent-seeking. 4/ Anne Krueger (1974) shows how quantitative restrictions, which


4/ Defined as the activity undertaken to benefit from rents or revenues created by trade restrictions. This may involve the use of resources such as manpower to carry out all the administrative procedures to obtain an import license, bribes, increase of installed capacity if this is used as an indicator by the authorities to allocate licenses, etc.
carry premiums, attract the use of resources in order to earn them. This use of real resources entails a greater loss of welfare than a Bhagwati equivalent tariff would. Krueger avoids in her analysis the direct relation between the activities of smuggling and rent-seeking. With trade restrictions and no exchange controls we can think of a "constrained importer" as having two options to acquire its desired imports: (i) use resources to smuggle the goods into the country and (ii) use resources to get hold of the import license. An increase in the amount of smuggled goods decreases the import premium of a given license and therefore diminishes the incentives for rent-seeking. To understand rent-seeking activities it is important to relate them to smuggling activities. Furthermore, the moment we enter into a world of exchange controls we have to face the interrelation between smuggling, rent-seeking and black markets.

It seems then that the theory of international trade has yet to develop a single unifying analytical framework to study parallel market activities. There has been an extensive amount of related work done in the literature, but there are still some important loose ends. We now try to tie up some of these loose ends by developing a model of exchange controls. It brings together, through an analytical framework, the phenomena of smuggling, rent-seeking, and black markets which have been so far analyzed separately in the literature. By relating the official exchange rate, the black market rate, and the import premium through the activities of smuggling and rent-seeking, the model helps to understand the way in which exchange controls affect the behavior of the different agents in the economy, leading to the creation of a parallel market economy.
The remainder of this introductory section serves as a reader's guide by presenting the outline of the paper and reviewing its major findings with an indication where these are located in subsequent sections.

The next section gives an historical perspective of exchange controls in Sub-Saharan Africa, the region that is emphasized throughout the paper. It analyzes the different exchange rate regimes in Sub-Saharan Africa trying to establish their common characteristics as well as their marked differences. For countries where the common pattern of response to foreign exchange scarcity has been to rely on exchange controls, a detailed summary of their exchange control measures is presented in Appendix A.

Section III presents the theoretical framework to analyze exchange controls. The first part describes the range of policy instruments available to the authorities for dealing with balance-of-payments problems. Exchange control is primarily a balance-of-payments policy and this part relates it to all the other policy alternatives. It also presents a brief discussion on the possible rationale behind the prevalent use of exchange controls in LDCs, particularly in Africa. The second part outlines the ways in which exchange controls have been analyzed in the literature and develops a model of exchange controls.

The model developed shows that parallel market activities can be explained through the optimizing behavior of exporters and importers. Exporters will keep shifting their exports from official to parallel market channels until the expected marginal benefit in both activities is the same. Import traders will devote resources to the rent-seeking activity until the moment in which an additional unit spent in this activity is equal to the savings derived from being able to use official channels instead of the parallel markets. Their combined behavior determines the amount of import and
export smuggling, the level of the rent-seeking activity, and the black market exchange rate that is consistent with an equilibrium position where no one has any more incentives to move from their attained position.

In this context, rent-seeking, smuggling, and black markets are phenomena that coexist in an economy with exchange controls. Indeed some very interesting interrelationships between these variables are determined in the model.

On one side, the rent-seeking activity seems to be inversely related to the official exchange rate, and directly related to the black market rate and the level of government policing activity. On the other side, the fraction of exports that is channelled through parallel markets is directly related to the black market rate, and inversely related to the official exchange rate and the level of government policing activity.

There are nevertheless some relationships that cannot be determined a priori by the model. The most important relationship is the one between the black market rate and the official exchange rate. For the case of a country with severe foreign exchange constraints one can expect this relationship to be negative. On the one hand, the productivity of the rent-seeking activity is very limited as a result of the overall scarcity of foreign exchange, and on the other hand, we can expect that any increase in the government foreign exchange earnings will be reverted to the economy by relaxing the exchange controls. But as a general conclusion, the way in which a depreciation of the official exchange rate affects the black market rate seems to be an empirical question that can only be determined for each particular country under its specific circumstances.

Section IV develops a simple methodology to detect the presence and assess the magnitude of the parallel market economy, as well as to explain its
behavior in a quantitative fashion. This methodology is presented through a case study for Ghana, a country in Sub-Saharan Africa where parallel market activities seem to be widespread and relatively open in the economy. But, in principle, the methodology outlined in this section could be applied, by the country economist, to each particular country where exchange controls are imposed.

In the first part, a reduced form equation of the black market exchange rate that is derived from the context of our model is estimated for the case of Ghana. There is a definite negative relationship between the real official exchange rate and the black market rate in this case. By letting the real official exchange rate appreciate, the government of Ghana has been losing an important amount of foreign exchange related to the exports that are now being smuggled out of Ghana instead of going through the official channels. This has meant an important reduction in the amount of foreign exchange allocated to imports and therefore an increase in the demand for smuggled imports in the economy. In all, the real appreciation of the official exchange rate seems to be very much related to the increasing importance of parallel market activities in the economy.

The estimation results are encouraging and give ample support to the key determinants of the black market exchange rate derived from the context of our model. They also seem to indicate that the exchange rate policies pursued by the government of Ghana have led to the emergence and growing importance of the parallel market economy in this country.

The second part of the section focuses on the estimation of the size of the parallel market economy and its evolution in time. We use the general methodology developed by Tanzi (1982), with which he estimates the underground economy and tax evasion in the United States. In our case, the approach
emphasizes the fact that there is a demand for currency related to the activities of the parallel market economy. In particular, we postulate that the demand for currency in Ghana is directly related to the amount of domestic currency that is being traded in the black market.

In this way, the method of estimating the size of the parallel market economy involves a two-stage procedure. First, the amount of domestic currency traded in the black market has to be determined. This is, of course, an unobservable variable. We can, therefore, only estimate a proxy variable for the amount of domestic currency traded in the black market which we do by estimating the quantity of cocoa smuggled out of Ghana. Second, we use this proxy variable in the estimation of the demand-for-currency equation. This gives an estimate of the amount of "illegal money" in the economy, which can then be transformed into a GDP estimate of the parallel market economy by assuming that the velocity of money is the same in the parallel market economy as it is in the "official" economy.

The yearly estimates of the parallel market economy show the increasing importance of parallel market activities in the Ghanaian economy. From a situation where parallel market activities were nearly non-existent in 1965, the parallel market economy rose almost steadily to a 32.4 percent of official GDP in 1982.

This discouraging picture of the Ghanaian economy pushed its government to undertake the policy measure it tried to avoid for so many years: by April 1984 the official exchange rate had been depreciated to 33 Cedis per U.S. Dollar, from the original 2.75 Cedis per U.S. Dollar, after having followed a transitional arrangement of a multiple exchange rate system introduced in April 1983.
The historical lesson that Ghana embodies should be clear, its policy implications understood: Governments that impose exchange controls based on a hostile attitude toward exchange-rate changes, thinking that they are gaining control of the economy by having a "direct" allocative mechanism for foreign exchange, as distinct from an amorphous and unpredictable price mechanism, may find themselves losers in their own battle. With higher domestic inflation rates than world inflation rates these governments are progressively losing control of the economy as more and more transactions are diverted to the parallel markets. Furthermore, this loss of official control over the economy comes with an additional cost given by the inefficiencies related to the discriminatory process in which import licenses are assigned, as well as the increasing amount of resources that the economy loses in the rent-seeking activity.

Finally, Section V elaborates on some of the policy implications of our analysis. It shows that the existence of a parallel market economy has a significant effect on the repercussions that follow exchange controls. For example, the imposition of exchange controls as a substitute for a formal devaluation does not avoid the adverse repercussions on prices or real wages of a devaluation. The emergence of a parallel market economy in response to such controls and the depreciation of the black market exchange rate have similar consequences to those of an official devaluation. Thus, the overall results of this paper indicate that the use of a more integrated framework to analyze exchange controls has important policy implications. Hopefully the paper will inspire further work along these lines.
II. A HISTORICAL PERSPECTIVE OF EXCHANGE CONTROLS IN SUB-SAHARAN AFRICA

During the last few years there has been a growing recognition that part of the roots of economic stagnation in Sub-Saharan Africa lie on domestic policy deficiencies. Although the external environment has been an aggravating factor, the record of poor growth in most Sub-Saharan African countries suggests that policymakers have given inadequate attention to increase the efficiency of resource allocation. This was the conclusion of the Sub-Saharan Africa report (1981) and is now being confirmed by the analysis done for the new Sub-Saharan report (1984).

A generalized impression is that trade and exchange-rate policy is at the heart of the failure to correct deep distortions in relative prices in these economies. To analyze this further we can, as a first approximation, divide Sub-Saharan Africa into three analytical groups of countries 5/, as shown in Table 1.

5/ This division is made on the basis of traditional balance-of-payments analysis that asserts: there are essentially three means by which a country's external accounts may be kept in balance: monetary and fiscal policies under fixed exchange rates responding to the imperatives of the balance-of-payments; flexible exchange rates; and exchange control, under which quantitative restrictions on international transactions are adjusted to restrict payments to foreigners to a level commensurate with foreign exchange availability from earnings and borrowing (Krueger, 1983, p. 173).
### Table 1: Exchange Rate Regimes in Sub-Saharan Africa: Three Analytical Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Country</th>
<th>Currency Pegged to</th>
</tr>
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<tr>
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<td>1. Botswana</td>
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<tr>
<td></td>
<td>2. Burundi</td>
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</tr>
<tr>
<td></td>
<td>3. Ethiopia</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>6. Guinea</td>
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</tr>
<tr>
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<td>7. Guinea-Bissau</td>
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</tr>
<tr>
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<td>SDR</td>
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<td>12. Mauritius</td>
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<td></td>
<td>13. Nigeria</td>
<td>a/</td>
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<td></td>
<td>14. Rwanda</td>
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</tr>
<tr>
<td></td>
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<td>a/</td>
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<td></td>
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</table>

\(a/\) Country follows a managed floating policy.


As expected, no country in Sub-Saharan Africa follows a flexible exchange rate policy. In 1983 there were three countries: Nigeria, Sierra Leone, and Uganda that followed a managed floating system. The rest of the countries determined their exchange rates on the basis of a peg to a given currency or a composite of currencies, including the SDR.

In the first group of countries, which is the largest one, the common pattern of response to foreign exchange scarcity has been to rely on exchange controls. Governments have imposed import restrictions rather than resorting to devaluation or restrictive monetary and fiscal policies to conserve foreign exchange. The second group of countries have basically no restrictions on payments for current transactions and therefore rely on exchange rate adjustments and corresponding fiscal and monetary polices for balance-of-payments adjustments. Finally, the third group is represented by the CFA Franc Area. In this case the members of the two monetary unions, the Central African Currency Union and the West African Currency Union, signed an agreement of monetary cooperation with France whereby the exchange rate between the French franc and the franc of African Financial Cooperation (CFA) was fixed, foreign exchange reserves were pooled, exchange controls were common to the whole zone, and an "operation account" at the French Treasury guaranteed the convertibility of the CFA franc.

R. Mundell explains the outcome of this arrangement concisely:

Balance of payments equilibrium is maintained by rigid financial discipline of the member countries, the governments of which are prevented from using the Central Bank as a source of inflationary finance. Government accounts must be balanced except insofar as

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6/ In general, when we talk about exchange controls in this paper, we focus on the related restrictions on payments for current transactions. Most countries in Sub-Saharan Africa have restrictions on payments for capital transactions.
the government has cash reserves at its disposal or can acquire extra credits from one of the common banks or from abroad. 7/

This does not mean that these countries have not employed quantitative restrictions, but rather that any such restriction has been imposed for motives other than balance-of-payments constraints, and have been relatively invariant with respect to the availability of foreign exchange.

The marked differences in the exchange rate regimes followed by the countries in the analytical groups can be appreciated by observing the behavior of their nominal and real effective exchange rates. 8/ This is presented in Tables 2 and 3, and Figures 1 and 2. 9/


8/ The nominal effective exchange rate is here defined as the import-weighted geometric average of the relevant individual bilateral exchange rates. The actual formula is given by:

$$\text{NEER} = \left( \frac{E_{it}}{E_{io}} \right)^{w_i}$$

where $E_{it}$ represents the price of domestic currency in terms of the $i$th partner country at time $t$ ($E_{io}$ is for the base period), and $w_i$ is the import weight for the $i$th trading partner.

The real effective exchange rate is an import-weighted geometric average of the bilateral exchange rates adjusted by the ratio of domestic consumer price index to the corresponding trade partner consumer price index. They are calculated according to the formula:

$$\text{REER} = \pi \left( \frac{E_{it} P_t}{E_{io} P_{it}} \right)^{w_i}$$

where $P_{it}$ represents the price level of the $i$th country at time $t$ relative to the base period, and $P_t$ represents the price level of the home country, also relative to the base period. For a good review study of the major conceptual and methodological problems involved in the use of real effective exchange rate indices see Maciejewski (1983).

9/ The indices were only computed for countries in which data were readily available. Central African Republic, Chad, Benin, Guinea, Guinea-Bissau, Mali, Uganda, Seychelles, Botswana, Zimbabwe, Lesotho, and Swaziland were not included.
Table 2: REAL EFFECTIVE EXCHANGE RATE INDICES, 1972-1982

(Indices, 1972 = 100)

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<th>Ghana</th>
<th>Kenya</th>
<th>Madagascar</th>
<th>Malawi</th>
<th>Mauritania</th>
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Group Avg. 1/ 100.00 96.93 101.58 113.59 126.15 166.09 178.93 158.71 176.11 316.07 397.28

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1/ Individual country indices are aggregated for each group by using GNP weights.
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1/ Individual country indices are aggregated for each group by using GNP weights.
Figure 1: REAL EFFECTIVE EXCHANGE RATES, 1972 - 1982

(1972 = 100)
Figure 2: NOMINAL EFFECTIVE EXCHANGE RATES, 1972 - 1982
(1972 = 100)
The GNP weighted average of real effective exchange rates in Sub-Saharan Africa appreciated by 54 percent between 1972 and 1982. But the difference between analytical groups is enormous, and can be seen clearly in Figures 1 and 2.

At one extreme, most CFA countries experienced relatively stable nominal and real effective exchange rates over the period. On average, the rates of these countries appreciated in real effective terms by only 11 percent from 1972 to 1982.

By contrast, real effective exchange rates in Group I appreciated by 77 percent over the same period, even after having a 31 percent depreciation of their average nominal effective exchange rates. These figures are heavily influenced by the experience of some of the countries in the group where the need to offset relatively high domestic inflation rates by exchange rate changes is precluded by the existence or imposition of exchange controls.

This result tends to confirm the general expectation that "relatively appreciating" countries must eventually intensify import restrictions to maintain overvalued exchange rates and avoid running out of reserves.

The characteristics of these analytical groups reflect the marked differences in historical experience between Francophone and Anglophone countries. As Mundell (1972) puts it, it is not surprising that the differences in cultural patterns arising from the different methods and

10/ The percentage changes in effective exchange rates referred to in the text were computed disregarding Ghana, which is a very extreme case.
techniques of colonization reveal themselves in the currency and banking systems inherited by the African countries, on the approaches to economic policy, and the settings within which policies are carried out. Overall

Better monetary policy has been the beneficiary in the French countries; greater monetary experience in the English. Some of the former British colonies gained financial experience and institutional development in the process, but the experience has not been acquired without cost and as a consequence more rigid systems of exchange control, with its consequences for illicit trading and distortions, have been imposed. ¹¹/²

It is the purpose of this paper to analyze some of these consequences of exchange controls for the countries that have relied on them. ¹²/² In particular, the paper will focus on the way in which exchange controls affect the behavior of the different agents in the economy, leading to the creation of a parallel market economy.

¹¹/ Mundell, op. cit., p. 27.

¹²/ A detailed summary of the exchange control measures adopted by the different countries in Group I is presented in Appendix A.
III. EXCHANGE CONTROLS: THE THEORETICAL FRAMEWORK

A. Exchange Controls as a Balance of Payments Policy

Exchange control is primarily a balance of payments policy, but it is just a particular option within a wide range of balance-of-payments policy instruments available to achieve external balance. We will now make a quick review of these policy alternatives. We will do so by analyzing their impact on the foreign exchange market, depicted in Figure 3.

As we know, the exchange market is a conceptual device that allows us conveniently to summarize the forces determining equilibrium in exchange between countries. Lurking behind the demand and supply curves of Figure 3 are people's desires to hold currencies as financial assets as well as to use them as means of payment. We must remember that the demand and supply for foreign exchange shift with any of innumerable real and monetary economic conditions.

To begin with, let us assume that the exchange rate is overvalued at $e_o$, and, therefore, we have an excess of ex-ante payments over receipts. The theory of international economics has shown that there are essentially two automatic adjustment mechanisms to an imbalance of international transactions. If the exchange rate is flexible, the price of foreign exchange will immediately be bid up and domestic money will depreciate. The gap between autonomous demand and supply of exchange will be closed by movements along the existing schedules to the equilibrium exchange rate, $e^*$. Alternatively, if the exchange rate is pegged, the deficit will gradually reduce the net foreign liquidity of the country.
Figure 3: FOREIGN-EXCHANGE MARKET
The balance of payments affects the money stock over time and, as a result, the cash balances fall as does the level of spending, eventually contracting autonomous demand for foreign exchange and expanding the supply. The gap between the two schedules will be closed as both of them shift until they intersect at the prevailing parity.

We now turn to consider the range of balance of payments adjustment policies, and the specific ways in which the government can intervene in the adjustment process. Essentially, the authorities have two alternatives. They can either reinforce the automatic adjustment process, or they can resist it. 13/

If the government chooses to, or is forced to by the unsustainable low level of reserves, reinforce the market response, it can either (1) keep the exchange rate pegged and encourage the necessary price and income changes by means of deflationary monetary and fiscal policies, or (2) depreciate the exchange rate. These are the classical adjustment methods. A possible combination of these instruments may be necessary in order to achieve internal as well as external balance. For example, in the case of a balance of payments deficit accompanied by unemployment, the authorities could try to reduce expenditures to close the gap between income and expenditure, while at the same time switch domestic and foreign expenditures from foreign output to domestic output to prevent the drop in output caused by the reduction in expenditure. In this context, we can characterize the alternative policies outlined before as expenditure reducing and expenditure switching policies, respectively.

13/ This idea is taken from B. J. Cohen (1969) and the reader is referred to this book for a more detailed presentation.
On the other hand, if the government decides to resist the market adjustment, it can either (3) impose trade restrictions through tariffs or quotas, and/or give incentives to exports through export subsidies, or (4) suspend convertibility and resort to exchange controls, rationing foreign exchange. The first alternative brings equilibrium in the foreign exchange market by shifting both curves until they intersect at the given parity. The second alternative simply suppresses excess demand by rationing. In Figure 3, this alternative means that the foreign exchange earned at the overvalued exchange rate, $Q_o$, is rationed. If a foreign exchange auction were held, licenses to buy foreign exchange would sell domestically at $e_c$. There is an implicit subsidy for international payments of $\frac{e_c e^*}{e^* e_0}$, and an implicit tax for international receipts of $\frac{e^* e_0}{e c}$.

Any of the four alternative balance of payments policies ultimately achieves external balance by forcing a reallocation of resources that leads to the necessary changes in the volume of exports, imports, and capital movements. The questions that then seem to arise are: Is the new allocation of resources efficient? What is the income distribution related to each outcome?

It should be clear that the use of any of the four policy alternatives or any combination will produce a different income distribution pattern. For the time being we will not pursue this scope of analysis. Our main concern is allocative efficiency.

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14/ Up until now, we have been speaking in loose terms, without bringing up any of the conditions by which a certain instrument will actually lead to a balance of payments improvement. This is granted by the context in which we are talking about the different policy instruments. But the reader should keep in mind that we can relate each instrument to the conditions by which it can improve the balance of payments, and, similarly, output.
While there are conditions under which tariffs or export subsidies are a first-best policy, or given a constraint to resort to frequent parity changes may be considered as useful second-best instruments, quantitative restrictions and exchange controls are always considered inefficient instruments. As Bhagwati puts it:

This is not to assert that, in principle, one cannot combine direct allocations (as in the operation of a QR regime) with an optimal allocation and utilization of resources. Rather the argument relates to the operation of the "visible hand" system, as typically observed in the developing countries examined.

But if this is a general consensus among economists, why then are exchange controls still used by so many countries? As already shown in the previous section, for more than half the countries in Sub-Saharan Africa the common pattern of response to foreign exchange scarcity has been to rely increasingly on exchange controls.

As McKinnon (1979) asserts, the answer to this question may lie in the realm of politics as much as in economics. Many governments in LDCs view their legitimate mandate to be one of extending state control over domestic economic activity. But these same governments are usually too weak to seize full control of the economy in the mode of a centrally planned economy.

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15/ For an extensive discussion of this issue see J. Bhagwati (1968).

16/ J. Bhagwati (1978). By developing countries examined Bhagwati is only referring to the ten countries studied by the NBER project.

Without such a strong planning apparatus for allocating resources directly, governments in our LDCs find that foreign trade is more easily controlled than domestic trade because of (i) the need of traders to change from foreign to domestic money (or vice versa), and (ii) because of the long history of raising revenue by tariffs and licensing at a limited number of border crossing stations and ports that conveniently encompass the economy. Hence, by this ideological argument, QR regimes are an indirect but second-best method of exercising a socialist or otherwise interventionalist mandate.

Within this political context we can see that exchange controls can be used to reward the government's political friends, while repressing groups who are politically unfriendly. It can be used as a very effective political instrument to achieve economic and non-economic goals (i.e., create a government firm that controls all the exports of a particular product from the country, create a government monopoly in the production of certain products by controlling the access to essential intermediate inputs, etc.).

On the side of economics not much has been said as possible rationale for having exchange controls. McKinnon (1979) hypothesizes that widespread financial repression can provide some economic rationale for the persistent use of QRs in LDCs. His explanation also applies for exchange controls and goes as follows:

In a financially repressed economy, an open capital market barely exists and is incapable of channelling funds for investment into high priority uses. Even in the highly protected import competing sector, entrepreneurs find that they cannot effectively bid for bank credits. In this context, possession of an exclusive license to import some necessary intermediate good -- industrial materials or capital equipment -- performs an important dual role:

18/ McKinnon, op. cit., p. 438.
(a) the holder of a license gets a capital grant in the form of a premium that could be applied towards investment; and (b) the exclusivity of the license allows the holder to bid more easily for funds from the repressed financial system. The license is itself a form of collateral indicating that the enterprise in question is economically viable.19/

Another economic argument, and a more persuasive one, that can be given to explain the persistent use of exchange controls is, essentially, that their immediate effects are relatively certain. Governments that do not want to resort to exchange rate changes and cannot deplete their reserves anymore can, when confronted by an excess demand for foreign exchange, by administrative fiat directly restrict certain or all foreign expenditures to whatever level is desired at the given exchange rate. Thus, in the short-run at least, exchange controls are a more effective instrument for managing the foreign exchange market than the policy alternatives that might be considered. This does not mean that the government does not foresee some of the costs of this measure, only that the government, after considering the political and economic costs of the different adjustment policies prefers the immediate benefits of exchange controls. One cannot blame as irrational a government that undertakes exchange control measures instead of a devaluation when the risk of the later is its own overthrow.20/

19/ McKinnon, op. cit., p. 440.

20/ For example, the 1971 devaluation in Ghana prompted the overthrow of the civilian government through a military coup three weeks later, in January 1972 (see Y. Ansu (1984)).
The fact that economists have for so long regarded exchange controls as "obviously non-optimal from the resource allocation viewpoint" 21/ has meant a very small amount of effort, in terms of economic theory, to explain the behavior of economies where exchange controls are a "fact of life". That is why we do not have a unified analytical framework to understand the way in which exchange controls affect the behavior of the different agents in the economy and to perceive how these economies react to different disturbances.

The next part of this section develops a model of exchange controls that takes the first steps in this direction.

B. Analysis of Exchange-Control Regimes

"An exchange control regime is one wherein an ex-ante balance of payments deficit is eliminated through foreign exchange rationing". 22/ In its most extreme form, the government assumes a complete control of foreign exchange. The currency is made totally inconvertible. Local residents are required to surrender all foreign-exchange earnings to the authorities. In turn, residents wishing to make payments of foreign exchange must obtain it from the authorities. Going back to Figure 3, in this case excess demand for foreign exchange, $Q_d^o - Q_s^o$ is suppressed and $Q_s^o$ is rationed such that $Q_{d^o}^d = Q_{s^o}^s$. To understand the impact of this policy in the economy one could translate the foreign exchange rationing scheme into a

set of quotas for imports and then simply use the analysis of quantitative restrictions in the trade-theoretic literature. Under perfect competition and given terms of trade the imposition of a quota on an importable good is depicted in Figure 4.

**Figure 4:** IMPOSITION OF AN IMPORT QUOTA
At given international prices $P^m_I$, $OA$ is supplied by domestic firms and $AB$ is imported. If a quota on imports, $CD$, is imposed, the market will then clear at import-premium inclusive price $P^m_I + P_F$, where $OC$ is now supplied by domestic firms and the full $CD$ quota is used. The shadowed rectangle is collected as a rent by the importers who gained access to the import licenses. The imposition of the quota allows the government to maintain an overvalued exchange rate at $e_0$, as in Figure 3. The effective exchange rate for exports would be $e_0$, while the effective exchange rate on imports (inclusive of the premium) would be $e_c$.

As it can be seen, up until this point there is no difference in the economic analysis of a direct quantitative restriction on imports, or an import restriction through the use of exchange controls. The use of the more elaborated administrative procedure of exchange controls can only be justified to the point at which governments find that foreign trade is more easily and effectively controlled through the foreign exchange market. Traders need to change from foreign to domestic money (or vice versa).

It is using this theoretical framework that most of the analysis of exchange controls is conducted in the economic literature, in general, and in The World Bank, in particular. We now turn into the area that has not been studied as much, and is the main focus of this paper and the methodology we develop: parallel market activities.
The similarity between the economic analysis of a direct quantitative restriction on imports and an import restriction through the use of exchange controls falls apart the moment we consider illegal transactions. A direct import quota may create incentives to smuggle imports as long as the import related premium outweighs the risks ensuing from the illegal transactions. If the quota is imposed through exchange controls then the foreign exchange needed to smuggle goods into the country needs to be purchased through the black market. In this case there is an incentive to smuggle imports as long as the import premium outweighs the black market premium together with the risks involved in illegal transactions. As has been pointed out by the literature, direct import quotas can only create incentives for smuggling but do not give incentives for the creation of a black market in foreign exchange. 23/

In the case of exchange controls it is not very meaningful to pose the question of import smuggling and its effects on welfare without exploring the means of its finance. This possible black market aspect of smuggling is not captured by the existing literature on smuggling in international trade. The reason is that the analysis of smuggling has always been carried out in a framework of trade restrictions (quotas, tariffs) and not of exchange controls. But in the former, black markets of foreign exchange are never an issue.

There is another phenomena related to quantitative restrictions on trade that has not been related either to smuggling or black markets: rent seeking. Anne Krueger (1974) shows how quantitative restrictions, 23/ M. Sheikh (1976), pp. 9-10.
which carry premiums, attract the use of resources in order to earn them. This use of real resources entails a greater loss of welfare than a Bhagwati equivalent tariff would. Krueger avoids in her analysis the direct relation between the activities of smuggling and rent-seeking.

With trade restrictions and no exchange controls we can think of a "constrained importer" as having two options to acquire its desired imports: (i) Use resources to smuggle the good into the country; (ii) use resources to get hold of the import license. 24/ An increase in the amount of smuggled goods decreases the import premium of a given license and therefore diminishes the incentives for rent seeking. To understand rent-seeking activities it is important to relate them with smuggling activities. Furthermore, the moment we enter into a world of exchange controls we have to face the interrelationship between smuggling, rent-seeking, and black markets.

It seems, then, that the theory of international trade has yet to develop a single unifying analytical framework to study exchange controls. There has been an extensive amount of related work done in the literature, but there are still some important loose ends. We now try to tie up some of these loose ends by developing a model of exchange controls. It brings together, through an analytical framework, the phenomena of smuggling, rent-seeking, and black markets which have been so far analyzed separately in the literature. By relating the official exchange rate, the black market rate, and the import premium through the

24/ This can involve manpower to carry out all the administrative procedures, bribes, increase of installed capacity if this is used by the authorities as an indicator to allocate licenses, etc.
activities of smuggling and rent seeking, the model tries to capture the way in which exchange controls affect the behavior of the different agents in the economy, leading to the creation of a parallel market economy. It gives the necessary analytical elements to understand the behavior of this parallel market economy.

1. The Model

This model is a variant of a model developed by Yaw Ansu (1984). In this model, he analyzes the relationship of the markets for warrants and for illegal trade in foreign currency in a policy-making setup. We take his approach of looking at the parallel market activities through the optimizing behavior of exporters and importers. We incorporate into the model rent-seeking as an importer’s activity, while we disregard the analysis of warrants.

The stylized facts that the model tries to capture are given by the following scenario.

A government has imposed exchange controls in its effort to protect its reserve positions and to avoid official exchange rate adjustments. In the face of balance of payments pressures, the number of requests for import licenses (with its respective foreign exchange) far exceeds the number of licenses actually given. This has the impact of a quantitative restriction on imports. The import related premium gives incentives to rent-seeking, and smuggling. But in order to smuggle goods into the country, one needs to get the foreign exchange to buy them. This can only be done through the black market where the exporters can provide
foreign exchange acquired through illegal exports in return for an appropriate reward: the black market premium. The importer has to decide how to allocate its resources, either to try and get the import license and its related premium, or get the import through smuggling by paying the black market premium and running the risks of being involved in illegal transactions. On the other hand, the exporter also has to decide whether to channel its exports through official markets and get the official exchange rate, or through parallel markets and get the black market rate while running the risks of illegal transactions. Their behavior will determine the amount of import and export smuggling, the level of rent-seeking activity, and the black market exchange rate that is consistent with an equilibrium position where no one has any more incentives to move from their attained positions.

We now turn to the analysis of the behavior of the different agents in the economy. The notation used throughout the model follows, as closely as possible, that of Yaw Ansu in order to be able to relate both models easily.

(a) The Importer's Optimization Problem

We consider that imports are carried out by a "representative" trader who has a fixed contract to import an amount $\bar{M}$. We assume that the trader is a price taker in the market where he sells the imports. It is also assumed that all imports purchased at the official market rate are resold. Hence, while the imported good may be purchased at two different exchange rates, the price at which it is sold is uniform, being determined
by its (marginal) cost on the parallel market.

The trader then tries to minimize the costs to obtain its amount $\tilde{M}$ of imports. There are two ways through which the trader can obtain its imports. It can try to get an import license, with its respective foreign exchange at the official exchange rate, by spending $z$ (in domestic currency). This rent-seeking activity can be thought as: (i) increasing the probability of being eligible for an import license under a given set of criteria; (ii) influencing the decision on how to allocate a given import license. Let $q(z)$ be the share of imports that is actually channeled through official markets.

In principle the correct specification of $q$ is something like $q(z, \tau)$ where $\tau$ is a government import-restriction parameter. It can be thought as being determined by the level of reserves with respect to a desired level, that is $\tau(R-R)$. If the foreign exchange reserves are above the desired level $\tilde{R}$, the exchange controls could be relaxed and therefore a higher proportion of imports could be channeled through the official market. There are two extreme assumptions that could be made in regards to this government reaction function. On the one hand we can assume that the exchange control is independent of the level of reserves. In this case, for any policy change we will have a drop or an increase in reserves. On the other hand, the stock of reserves in foreign currency may be treated as a target variable. This implies that any parametric shift in the supply function for foreign exchange in the official market will be accompanied by an intensification or relaxation of controls so as to maintain the reserve or balance of payments target. For the time being, to maintain the model as simple as possible, we will assume that exchange
controls are independent of the level of reserves. Therefore, we let q(z) be the share of imports that is actually channeled through official markets. This function q(z) captures the inescapable reality in most LDCs of people being able to influence, in one way or another, the government allocation of import licenses. It relates the rent-seeking activity to its achievements. We assume that q'(z) > 0, that is, an increase in the rent-seeking activity will allow the importer to channel a larger amount of its imports through official markets.

On the other hand, the "representative" trader can allocate its resources through the parallel markets. As Yaw Ansu (1984) points out, parallel market activity involves two steps. First, foreign currency has to be obtained on the black market, and second, the foreign goods purchased with it have to be smuggled into the country. If we let ϕ be the conditional probability of success of this composite illegal transaction, the problem faced by the representative importer can be written as:

25/ Our analysis of smuggling can also be readily extended to quasi-smuggling phenomena, such as under invoicing imports in this case.

26/ For a detailed interpretation of this function see Y. Ansu (1984). ϕ is a decreasing function of m, the fraction of imports that is channeled through parallel markets, and of ρ, the level of government policing activity.
where: $q'(z) > 0$

$$m = 1 - q(z)$$

$$\phi'_m < 0$$

$$\phi'_\rho < 0$$

$e = \text{official exchange rate}$

$E^b = \text{black market rate}$

$\rho = \text{level of government policing activity}$

$P^*_m = \text{fixed import expenditure, in foreign currency, for the "representative" trader.}$

The sum of the first and second terms in expression (1) represents the total costs, in domestic currency, of importing a fraction $q$ of total imports through the official channels. The first term gives the costs of these imports at the official exchange rate, while the second one gives the costs of the rent-seeking activity. The third term represents the expected costs of imports channeled through parallel markets.

For the maximization exercise we normalize $P^*_m$ to unity. After rearranging terms the first order condition would then be:

$$q'(z) \left[ \frac{E^b}{\phi(m, \rho)} - e \right] - \frac{\phi'(m, \rho) q'(z)}{\phi(m, \rho)} m \frac{E^b}{\phi(m, \rho)} = 1$$
The first term is the expected saving in black market premiums from being able to use official channels instead of parallel markets. The second term is the reduction in costs of imports being smuggled into the country, given by the increase in the probability of success in that activity of \( \frac{\phi_m(m, \rho) q'(z)}{\phi(m, \rho)} \) percent.

The sum of both terms gives the total amount of savings that comes about from an increase in one unit on the amount spent in the rent seeking activity. The trader will devote resources to the rent-seeking activity until the moment in which an additional unit spent in this activity is equal to the savings derived from being able to use official channels instead of parallel markets.

A nice interpretation that comes out of this first order condition is given for the case in which activities in the parallel markets are as safe as those in the official markets, that is, when \( \phi = \text{cte} = 1 \). The first order condition would then look like:

\[
q'(z)(E^b - e) = 1
\]

The savings in this case only come from the black market premium.

The second order condition for an interior minimum is:

\[
\frac{d^2B}{dz^2} = q''(z)e + \phi^2(m, \rho) [-q'^2(z) E^b \phi_m(m, \rho) - m E^b \phi''_m(m, \rho) q^2(z)]
\]
Sufficient conditions for the second derivative to be positive are:

(i) \( q''(z) < 0 \)  Non-increasing returns to scale of the rent-seeking activity.

(ii) \( \phi''_m(m,\rho) < 0 \)  The probability of success in illegal transactions is a decreasing function of the amount of smuggling at a non-decreasing rate.

Both conditions are very reasonable assumptions about the behavior of \( q \) and \( \phi \). We keep these assumptions for the rest of the model.

We now turn to find the effects of other variables on \( z \) in the neighborhood of the optimum. The first order condition given by (2) is totally differentiated to get:

\[
\frac{d^2E}{dz^2} + q^{\prime\prime}(z)\frac{de}{dz} + \left( \frac{\phi_m^{\prime\prime}(m,\rho)q^{\prime\prime}(z) - q^{\prime}(z)\phi^{\prime}(m,\rho)}{\phi^2(m,\rho)} \right) \frac{dE}{dz} + \frac{\phi^{\prime\prime}_m(m,\rho)\phi^{\prime\prime}_m(m,\rho) - q^{\prime}(z)\phi^{\prime}_m(m,\rho)}{\phi^4(m,\rho)} + \frac{[m\phi^{\prime\prime}_m(m,\rho)q^{\prime}(z) - q^{\prime}(z)\phi^{\prime}(m,\rho)]2\phi(m,\rho)\phi^{\prime}(m,\rho)}{\phi^4(m,\rho)} \right) dp = 0
\]
Rearranging terms, from this equation we can see that:

\[
(6) \quad \frac{dz}{de} = - \frac{q^\prime(z)}{d^2 B} < 0
\]

\[
- \frac{m \phi'_{m}(m, \rho)q^\prime(z) - q^\prime(z)\phi(m, \rho)}{d_2 B}
\]

\[
(7) \quad \frac{dz}{dE^b} = - \frac{\phi^2(m, \rho)}{d^2 B} > 0
\]

\[
\begin{align*}
&\left[ m E^b q^\prime(z) \phi''(m, \rho) - 2 m E^b \phi^\prime(m, \rho) q^\prime(z) \phi(m, \rho) \phi^\prime(m, \rho) + q^\prime(z) E^b \phi^2(m, \rho) \phi^\prime(m, \rho) \right] \\
&\quad m \phi_{m}^\prime(m, \rho)
\end{align*}
\]

\[
(8) \quad \frac{dz}{d\rho} = - \frac{\phi^4(m, \rho)}{d^2 B} > 0
\]

Assuming \( \phi''_{m \rho} < 0 \), that is, that the probability of success in illegal transactions is a decreasing function of the amount of smuggling at a non-decreasing rate as the level of government policing activity is increased, then \( \frac{dz}{d\rho} > 0 \). This is a very intuitive assumption and we keep it for the rest of the model.

We can now write:

\[
(9) \quad z = z(e, E^b, \rho)
\]

where \( z^\prime_e < 0, z^\prime_{E^b} > 0 \), and \( z^\prime_{\rho} > 0 \).
The rent-seeking activity is inversely related to the official exchange rate, and directly related to the black market rate, and the level of government policing activity. As it can be seen, this is a very intuitive result.

(b) The Exporter's Optimization Problem

The set up of the exporter's optimization problem is taken directly from Yaw Ansu (1984), the only difference being that we do not consider the warrant scheme. This set up is only commented briefly here and the reader is referred to Yaw Ansu (1984) for a detailed presentation.

To focus on how smuggling behavior is related to the black market we will assume that the total volume of exports of the "representative" exporter is fixed $P_X$. The problem faced by this exporter is to decide what fraction of its exports to channel through the official market, and what fraction through the parallel markets. We should refer as $s$ to the fraction of exports channeled through parallel markets. Again, activity through parallel markets involves two steps. First, the exporter has to smuggle its product out of the country to sell it abroad, and second, the foreign exchange that it gets from its illegal export has to be changed to domestic currency through the black market. Having $\theta$ as the probability of success of this composite activity, we can state the "representative" exporter maximization problem as:

\[
\begin{align*}
\text{MAX } A &= e(1-s) \frac{b}{P_X} + \theta(s, \rho) s E \frac{b}{P_X} \\
\end{align*}
\]
The first term of this expression represents the amount of domestic currency that is obtained by exports through the official channel, and the second term is the expected value, in domestic currency, of the exports through parallel markets.

For the maximization exercise we normalize \( \frac{P^*}{X} \) to unity. After rearranging terms, the first order condition would then be:

\[
(11) \quad e = [\theta(s, \rho) + s \theta'(s, \rho)] E^b
\]

The exporter will keep shifting its exports from official to parallel channels until the expected marginal benefits in both activities are the same. In the particular case in which illegal transactions are as safe as legal ones, that is, when \( \theta = \text{cte} = 1 \), we have:

\[
(12) \quad \frac{dA}{ds} = E^b - e
\]

If the black market rate is higher than the official exchange rate, the exporter will send all of his exports through parallel markets.

The second order condition for an interior optimum is:

\[
(13) \quad \frac{d^2A}{ds^2} = [2 \theta'(s, \rho) + s \theta''(s, \rho)] E^b < 0
\]

A sufficient condition for the second derivative to be negative is \( \theta'' < 0 \), which is the assumption made about the behavior of \( \theta'' \). We keep this assumption also for \( \theta'' \).
We now turn to find the effect of other variables on \( s \) in the neighborhood of the optimum. The first order condition given by (11) is totally differentiated to get:

\[
- dE + \left( \frac{d^2A}{ds^2} \right) ds + \left[ \theta^\prime(s, \rho) + s \theta^\prime \theta^\prime(s, \rho) \right] E^b d\rho + \frac{e}{E^b} dE^b = 0
\]

From this equation we can see that:

\[
\frac{ds}{de} = \left( \frac{d^2A}{ds^2} \right)^{-1} < 0
\]

\[
\frac{ds}{dE^b} = - \frac{E^b}{\frac{d^2A}{ds^2} \frac{E^b}{e}} = - \left( \frac{d^2A}{ds^2} \frac{E^b}{e} \right)^{-1} > 0
\]

\[
\frac{ds}{d\rho} = - \left( \frac{d^2A}{ds^2} \frac{\theta^\prime \theta^\prime(s, \rho)}{e} \right) E^b
\]

Assuming \( \theta^\prime \theta^\prime < 0 \), which is the same behavioral assumption for \( \phi^\prime \phi^\prime \), we have that \( \frac{ds}{d\rho} < 0 \).

We can now write:

\[
s = s(e, E^b, \rho)
\]

where \( s_e^e < 0 \), \( s_{E^b} > 0 \), and \( s_{\rho} < 0 \).
The fraction of exports that is channeled through parallel markets is directly related to the black market rate, and inversely related to the official exchange rate, and the level of government policing activity. Again, a very intuitive result.

(c) Black Market for Foreign Exchange

We can now use the results of the previous sub-sections, summarized by equations (9) and (18), to understand the behavior of the black market for foreign exchange.

The black market for foreign exchange can be presented as:

\[
Q^d = \frac{(1 - q(z(e,E^b,\rho)))}{\phi(1-q(z(e,E^b,\rho)),\rho)} \frac{P^*_M}{P^*_X}
\]

(19)

\[
Q^s = \theta(s(e,E^b,\rho),\rho) s(e,E^b,\rho) \frac{P^*_X}{P^*_M}
\]

(20)

which solving for \[Q^s = Q^d\] gives the market clearing condition:

\[
\frac{(1-q(z(e,E^b,\rho)))}{\phi(1-q(z(e,E^b,\rho)),\rho)} \frac{P^*_M}{P^*_X} = \theta(s(e,E^b,\rho),\rho) s(e,E^b,\rho) \frac{P^*_X}{P^*_M}
\]

(21)
To do some comparative statics let us first derive the slope of the demand and supply equations in (19) and (20).

\[
dQ_d = \left[ \frac{\phi^* m_q^* q^* P^* M - \phi^* q^* P^* M}{\phi^2(m, p)} \right] dE_b
\]

(22)

It is clear that \( \frac{dQ_d}{dE_b} < 0 \). Demand for foreign currency in the black market is inversely related to the black market rate.

For the supply side,

\[
dQ_s = (\theta + s \theta_s^*) s_b^* \frac{P^* X}{E_b} dE_b
\]

(23)

where

\[
\theta + s \theta_s^* < 1
\]

(24)

The expression in (24) is the new probability of success of illegal transactions given the change in the fraction of total exports that goes through those channels.

From (23) and (24) we can see that \( \frac{dQ_s}{dE_b} > 0 \). Supply of foreign currency in the black market is directly related to the black market rate.
2. **Comparative Statics**

Here we shall draw on the model of black markets to study how various disturbances affect the black market rate, the smuggling activity, and the intensity of rent-seeking. In particular, we will consider a depreciation of the official exchange rate, an increase in the level of government policing activity, an increase in imports, and an increase in exports.

(a) **Depreciation of the Official Exchange Rate**

Consider the scenario in which the government has decided to depreciate the official rate without abolishing exchange controls. Differentiating the market-clearing condition (21) we get:

\[
\frac{dE_b}{de} = \frac{(\theta + s\theta^s)g_s}{\phi_m q^e z^e - \phi q^e z^e} \frac{P^* x}{P^* m} - \frac{m \phi_m q^e z^e - \phi q^e z^e}{\phi ^2} \frac{P^* X}{P^* M} - \frac{(\theta + s\theta^s) \phi q^e z^e}{E_b} \frac{P^* M}{P^* X}
\]

Looking at the sign of each expression in (25) it is clear that \( \frac{dE_b}{de} > 0 \). We can also prove that equation (25) implies
0 < \frac{dE_b^e}{de} < 1 \quad \text{27/}

This means that a depreciation of the official exchange rate will lead to a less than proportional depreciation of the black market rate. In other words, after all the adjustment takes place, the new equilibrium black market premium, \( \frac{E_b^e}{e} \), will fall.

27/ Going back to equations (6) and (7) we see that:

\[ z_E^\prime = z_e^\prime\left(\frac{m\phi^e(m,\rho) - \phi(m,\rho)}{\phi^2(m,\rho)}\right) \]

Using equations (15) and (16) we have that:

\[ s_e^e = - \frac{s_e^e}{E_b^e} \]

Substituting these expressions into (25) we get:

\[ \frac{dE_b^e}{de} = \frac{(\theta + s_e^\prime)S_e^e P_X^* - \frac{m\phi^e(m,\rho) - \phi}{2}q_e^e P_M^*}{(\theta + s_e^\prime)E_b^e S_e^e P_X^* - \frac{m\phi^e(m,\rho) - \phi}{2}q_e^e P_M^*} \]

Multiplying both sides by \( \frac{e}{E_b^e} \):

\[ \frac{dE_b^e}{de} \cdot \frac{e}{E_b^e} = \frac{(\theta + s_e^\prime)S_e^e P_X^* - \phi q_e^e P_M^*}{(\theta + s_e^\prime)E_b^e S_e^e P_X^* - \phi q_e^e P_M^*} \]

Since \( \frac{\phi - m\phi^e}{\phi^2} > 1 \), for the normal case in which \( \frac{E_b^e}{e} > 1 \) we get

\[ \frac{dE_b^e}{de} \cdot \frac{e}{E_b^e} < 1 \quad \text{Q.E.D.} \]
This can be interpreted by using Figure 5. On the demand side, the depreciation of the official exchange rate makes rent-seeking a less attractive activity by increasing the marginal costs of using official channels to import. This means that less resources are going to be spent in rent-seeking activities and a greater fraction of total imports will now be channeled through parallel markets. This increases the demand for foreign exchange in the black market in two ways. First, to finance the increase in the share of imports that is obtained through smuggling, given by \(- \frac{q^e \hat{z}^e}{\hat{\phi}} \frac{\hat{p}}{\hat{m}} \). Second, to finance the increase in the amount of goods that now have to be smuggled because of the decrease in the probability of success in illegal transactions, given by

\[
\frac{m}{\hat{\phi}} \left( \frac{q^e \hat{z}^e}{\hat{\phi}} \right) \frac{\hat{p}}{\hat{m}} .
\]

The demand curve then shifts to the right. On the supply side, the depreciation makes the official channels more attractive for exports, which means that the foreign exchange supplied in the black market will drop. The supply curve shifts to the left. Deriving
the corresponding \( \frac{dQ}{de} \) in the black market \(^{28/}\) we can see that it is non-positive, which is precisely what Figure 5 shows.

\(^{28/}\) From the supply equation (20) we get:

\[
\frac{dQ}{de} = \left[ (\theta + s\theta^*) s^{-} P^* X \right] + \left[ (\theta + s\theta^*) s^{-} P^* X \right] \frac{dE^b}{de}
\]

Substituting \( s^{-} = \frac{e}{E^b} \):

\[
\frac{dQ}{de} = \left[ (\theta + s\theta^*) s^{-} P^* X \right] - \left[ (\theta + s\theta^*) s^{-} P^* X \right] \frac{dE^b}{de} \frac{e}{E^b}
\]

For the normal case in which \( E^b > e \), \( 0 < \frac{dE^b}{de} \frac{e}{E^b} < 1 \).

Therefore \( \frac{dQ}{de} < 0 \).

Q.E.D.
Figure 5: DEPRECIATION OF THE OFFICIAL EXCHANGE RATE
Summing up, the depreciation of the official exchange rate leads to a less than proportional depreciation of the black market rate. This follows from the increase in the use of black markets by import smugglers and domestic tourists (increase in \( m \)), and the decrease in its use by export smugglers and foreign tourists (decrease in \( s \)). The level of the rent-seeking activity falls given the decrease in its incentives. And there is a definite reduction in the amount of foreign exchange traded in the black market.

Because of its partial equilibrium nature, the above analysis disregards the traditional effect of a depreciation of the official exchange rate of increasing the amount of exports and reducing the amount of imports by reducing the relative cost of domestic traded goods. The same qualitative results may still hold if these effects, which would shift \( S' \) to the right and \( D' \) to the left, do not overcome the impact of those analyzed previously.

The case we just presented is based on the initial assumption of the model that exchange controls are independent of the level of reserves. If we now relax this assumption by considering the case in which the government has set a target for the stock of reserves, the results can change significantly.

The depreciation in the official exchange rate increases the supply of foreign exchange to the official market. This follows from the resulting increase in the share of exports that is channeled through the official markets, \((1-s)\), as shown above. For the case in which exchange controls are independent of the level of reserves, this means that the previous results would be accompanied by an increase in reserves. But for the case in which the government has a target for the level of reserves, the increase in the supply of foreign exchange in the official market will be accompanied by a relaxation of exchange controls so as to maintain the reserve target. This
means that more import licenses can be granted from the increase in reserves which in turn may imply a fall in the demand for imports through smuggling despite the drop in the level of the rent-seeking activity analyzed in the previous case. These movements in the supply and demand curves of the black market are shown in Figure 6 by the shifts of $S$ to $S'$ and $D$ to $D'$ respectively. If in addition, we now consider the more traditional effect of a depreciation of the official exchange rate of increasing the amount of exports and reducing the amount of imports, we may have the situation depicted in Figure 6 by the shifts of $S'$ to $S''$ and $D'$ to $D''$. At $E^b_0$, the depreciation of the official exchange rate gives rise to an excess supply of foreign exchange in the black market. This then leads to an appreciation of the black market exchange rate.

Figure 6: DEPRECIATION OF THE OFFICIAL EXCHANGE RATE WITH RESERVES' TARGET
In this particular case then, the depreciation of the official rate leads to an appreciation of the black market rate. Again, the amount of foreign exchange traded in the black market drops. By depreciating the official exchange rate the government can generally decrease the level of activity in the black market.

This last case seems to be closer to the reality of a country with severe foreign exchange constraints. On one hand, the productivity of the rent-seeking activity in this context is very limited because of the overall scarcity of foreign exchange. On the other, an increase in the government's foreign exchange earnings will generally be reverted to the economy by relaxing the exchange controls.

The way in which a depreciation of the exchange rate affects the black market rate seems then to be an empirical question that can only be determined for each particular country under specific circumstances. This indeterminacy in the relationship between the movements in the official exchange rate and those of the black market rate explains the existent controversy on the direction of this relationship in the literature. Gupta (1981) and Sheikh (1976) find that this relationship is negative. Blejer (1978) argues that it is positive. The results just derived show that they may both be correct. A key assumption seems to lie on the way in which the government handles its reserves.

(b) **Increase in the Level of Government Policing Activity**

Let us assume that the government has decided to increase the resources spent to prevent illegal transactions in the economy. To understand
its impact on the black market, we differentiate the market-clearing
condition (21):

\[
\frac{dE^b}{dp} = \frac{m\phi' + \phi qz' - m\phi qz' P^*M + [(\theta + s\theta^s) s' + \phi's] P^*X}{\phi^2 - \frac{m^2 qz' - \phi qz' b}{E_b} \left(\frac{E_b}{\phi^2} \right)}
\]

(26)

The sign of \( \frac{dE^b}{dp} \) is indeterminate. The denominator is negative
but the numerator is indeterminate. The first term in brackets in the
numerator is \( -\frac{dQ^d}{dp} \), while the second one is given by \( \frac{dQ^s}{dp} \). The shift
of the supply curve is defined. The increase in patrolling activity makes
export smuggling less attractive and therefore reduces the amount of foreign
exchange supplied to the black market. On the demand side, however, we have
two forces working in opposite directions. On one side, the increase in
patrolling activity makes rent-seeking a more profitable activity to avoid
illegal channels for imports. This means that more resources are spent to get
import licenses and more imports can be channeled through official markets.
On the other side, having more patrols along the border means that the
probability of success of import smuggling is lower and, therefore, that more
goods have to be smuggled so that after considering the losses in the activity
\( 29/ \) we can get the amount of imports we are interested in.

Assuming that the effect of the rent-seeking activity dominates, the
demand curve shifts to the left. This case is represented in Figure 7 where
both curves shift to the left as a result of the increase in the level of

\[ 29/ \text{These losses can be thought as the goods that have to be disposed of}
\text{by the smugglers to avoid being captured, or as the goods surrendered}
\text{to the authorities in the event of being captured.} \]
policing activity. We have a decrease in the amount of foreign exchange traded in the black market. The new black market rate can either be above or below the old one. It depends on the relative magnitude of the shifts.

Figure 7: INCREASE IN POLICING ACTIVITY, CASE 1
If on the other hand, we assume that the smuggling effect dominates the shift of the demand curve, then the increase in patrolling activity will lead to an increase in the black market exchange rate. The impact on the amount of foreign exchange traded in the black market will be undetermined in this case. This is depicted in Figure 8.

Figure 8: INCREASE IN POLICING ACTIVITY, CASE 2
We can think that this is the relevant scenario for a country with severe foreign exchange constraints where the productivity of the rent-seeking activity is very limited because of the overall scarcity of foreign exchange. In this case, the increase in the level of government policing activity will be associated with a risk premium in the black market exchange rate given by the corresponding change in the rate.

It seems then that, as in the case of the depreciation of the official exchange rate, the way in which an increase in the level of government policing activity affects the black market rate can only be determined empirically.

(c) Exogenous Increase in Exports

Let us consider the case in which a sudden increase in income of a foreign country that buys our exports, leads to an increase in their demand for our products. Differentiating the market-clearing condition (21):

$\frac{dE}{dX} = \frac{\theta s P_x^*}{m_P q^b z^* - \phi q^b z^* E b P_M^* - (\theta + s_0^*) s^* E b P_x^*}$

For this case, switching to the assumption that the government has a target for the level of reserves does not give any definite results. This is because the movement of the share of exports that is channeled through the official market, $1-s$, is indeterminate. On the one hand, we have an increase in the government policing activity which tends to increase this share of exports. But on the other, we have an increase in the black market rate which induces a decrease in the share of exports channeled through the official market.
It is clear that $\frac{dE^b}{dX} < 0$. This is shown in Figure 9 where the increase in exports shifts the supply curve to the right. The black market rate drops and the amount of foreign exchange traded in the black market increases. The drop in the black market premium leads to a decrease in the fraction of total exports going through parallel markets (decrease in $s$), as well as an increase in the share of illegal imports in the economy (increase in $m$). The drop in the premium also explains the decrease in the level of the rent-seeking activity.

Figure 9: EXOGENOUS INCREASE IN EXPORTS
Let us now consider the case in which the government has set a target for the stock of reserves. In this scenario, the increase in total exports will expand the supply of foreign exchange in the official market both, by the part of the increase in exports that goes through the official channels, and by the increase in the share of total exports that is now channelled through the official market, \(1 - s\). This would then mean a more relaxed system of exchange controls as more licenses can be granted with the increase in reserves. This implies a drop in the demand for illegal imports and therefore of foreign exchange in the black market. This case is depicted in Figure 10.

*Figure 10: Exogenous Increase in Exports Having a Reserves' Target*
The relaxation of the import control system accentuates the drop in the black market exchange rate observed in the previous case, while it reverses the effect on the amount of foreign exchange traded in the black market.

Overall, the model predicts a definite negative relationship between the total amount of exports in the economy and the black market exchange rate.

(d) **Exogenous Decrease in Imports**

The last disturbance we consider is a shift in demand from imports to domestic goods. Differentiating the market clearing condition (21):

\[
\frac{dE^b}{dM} = -\frac{m}{\phi p^* m} \frac{\phi q^* z^b}{E^b} - \frac{q^* z^b}{E^b} \left[ \frac{E^* p^* M}{\phi^2} - (\theta + s^* \theta^* s) \frac{s^*}{E^b p^* X} \right]
\]

In this case \( \frac{dE^b}{dM} > 0 \). The decrease in imports is shown in Figure 11 by the shift of the demand curve to \( D^*_1 \). The black market rate drops and the amount of foreign exchange traded in the black market decreases. The drop in the black market premium has the same consequences as in the previous exercise, a decrease in the fraction of total exports going through illegal channels (decrease in \( s \)), an increase in the share of illegal imports in the economy (increase in \( m \)), and a drop in the level of rent-seeking activity.

By switching to the assumption that the government has a target for the level of its reserves we only accentuate the drop in the demand curve we
just analyzed. The fall in the black market rate leads to an increase in the share of exports that is channeled through the official market, 1 - s. This means that the government can now relax its exchange controls and allocate an increasing number of import licenses. This will decrease the demand for smuggled imports and therefore of foreign exchange in the black market. This only accentuates the previous movements of the different variables. This is shown in Figure 11 by the shift in the demand curve to $D_2'$. 

The model predicts a definite positive relationship between total imports in the economy and the black market exchange rate.

Figure 11: EXOGENOUS DECREASE IN IMPORTS
IV. EXCHANGE CONTROLS AND THE PARALLEL MARKET ECONOMY: 
THE CASE OF GHANA

The model developed in the previous section provides a theoretical framework to understand the behavior of the parallel market economies that have emerged, under the presence of exchange controls, in Sub-Saharan Africa. It does so by analyzing the relationship between the phenomena of smuggling, rent-seeking, and black markets.

The analysis clearly implies that country economists should be aware of these illicit phenomena, not only because they vitiate the accuracy and possible use of official statistics, but because they could affect the type of policy prescriptions given to the governments. They should, therefore, be incorporated into the policy analysis conducted in the region.

But to do so, country economists need more than a framework to think about the different and interrelated phenomena that constitute the parallel market economy. They need quantitative information on the behavior of this parallel market economy in specific contexts, as well as a way to detect the presence, and assess the magnitude of such phenomenon. This section presents a simple methodology that will enable the country economist to obtain this type of information.

The empirical work done in this section refers only to the case of Ghana. This country was chosen for the case study for a very simple reason. It is a country where parallel market activities seem to be widespread and relatively open in the economy. Although considered illegal, they are conspicuously public and, it would appear, officially
tolerated. This gives us the possibility to compare our estimates with available educated guesses, and allow our results to be criticized by economists acquainted with this economy. This would test, in some way, the results of our methodology. Such results could otherwise be very difficult to evaluate.

The lack of data on parallel market activities in the economy precludes the estimation of the underlying structural model outlined in the previous section. But, unlike smuggling or rent-seeking activities, data on black market rates are readily available. In Ghana, the ruling rates for any particular day are common knowledge. Thus, the black market rate data can be used with confidence.

This enables us to estimate, in the first part of this section, a reduced form equation of the black market exchange rate. This serves two main purposes. First, it determines empirically, for the case of Ghana, the way in which the real official exchange rate and the government policing activity are related to the black market rate. These relationships proved to be theoretically ambiguous and have very important policy implications. Of course, it also quantifies the rest of the relationships which were, at least theoretically, unambiguous. Second, it gives a first notion of the appropriateness of the model to explain the parallel market economy through the behavior of the black market for foreign exchange. The empirical evidence provides ample support for the role of the key determinants of the black market exchange rate outlined by our model.

In the second part of this section we try to measure the size of the parallel market economy in Ghana. Of course, it is not possible to measure it directly, but the traces it leaves in other spheres of the
The economy can be analyzed and to some extent measured. To do so, we use Vito Tanzi’s (1982) approach to the estimation of the underground economy in the United States. By relating the demand for currency as a fraction of total money supply to the activity in the parallel markets, we can estimate the amount of "illegal money" in the economy. This estimate is then transformed into a GDP estimate of the parallel market economy by assuming that the velocity of money is the same in the parallel market economy as it is in the "official" economy.

In our case, the approach emphasizes the fact that there is a demand for currency related to the activities of the parallel market economy. In particular, we postulate that the demand for currency in Ghana is directly related to the amount of domestic currency that is being traded in the black market.

A. Black Market Exchange Rate Determination

Using the theoretical model presented in the previous section as the basis, we could derive a reduced form equation for the black market exchange rate that could be specified for econometric estimation as:

\[ \ln E^b = a_0 + a_1 \ln e + a_2 \ln M + a_3 \ln X + a_4 \rho + \varepsilon \]

where \( \varepsilon \) is an error term.

Equation (29) gives the principal determinants of the exchange rate in the black market derived from the context of our model. They are, respectively, the real official exchange rate, the total value of imports,
the total value of exports, and a dummy variable to distinguish between periods of aggressive and non-aggressive government policing activities. The theoretical model only predicts the sign for the imports coefficient \( a_2 \), which is expected to be positive, and for the exports coefficient \( a_3 \), which is expected to be negative. The sign of the rest of the coefficients cannot be determined a priori.

From the same context of the model, it is clear that the existence of smuggling and faked invoicing vitiate the accuracy of the data on total exports and total imports as compiled by official statistics. 31/ It is clear then that we have a problem of errors in variables and that the method of instrumental variables has to be used for the estimation. Official statistics of imports and exports are used as suitable proxy variables, and domestic GDP and an index of foreign GNP are used as the respective instruments. This method of estimation also takes care of the actual endogeneity of imports and exports not being considered in the partial equilibrium framework of the model. 32/

The period of estimation is 1972-1982, and quarterly data are used. 33/ Table 4 presents the regression estimates of equation (29).

---

31/ This problem on the accuracy of foreign trade statistics has been noted by many writers over a long period of time. A classical article related to this subject was written by Morgenstern (1950).

32/ This underlines the fact that equation (29) is only based on our partial equilibrium model but tries to integrate a more general equilibrium framework. We do not do this in a formal way.

33/ The complete data set used for the estimation is presented in Appendix B together with the definition and sources of data.
Table 4: THE BLACK MARKET EXCHANGE RATE, GHANA  
1972-1982

<table>
<thead>
<tr>
<th>Variable (ln)</th>
<th>Coefficient</th>
<th>t-Value</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-2.297</td>
<td>-5.76**</td>
<td>$R^2$ 0.960</td>
</tr>
<tr>
<td>$e$</td>
<td>-1.095</td>
<td>-7.00**</td>
<td>Adjusted $R^2$ 0.956</td>
</tr>
<tr>
<td>$M$</td>
<td>0.793</td>
<td>3.31**</td>
<td>F-Statistic 231.648</td>
</tr>
<tr>
<td>$X$</td>
<td>-0.252</td>
<td>-1.62*</td>
<td>SSR 2.575</td>
</tr>
<tr>
<td>$\rho$</td>
<td>0.371</td>
<td>3.52**</td>
<td>Rho 0.675</td>
</tr>
</tbody>
</table>

** Significant at the 1 percent level.  
* Significant at the 6 percent level.

All coefficients but one, that of exports, are significant at the one percent level. The export coefficient is significant at the six percent level. Both imports and exports have the expected sign. The equation seems to explain a substantial part of the variation in the black market exchange rate as shown by the relatively high adjusted $R^2$, although a correction for serial correlation is required.

We can now analyze the relationships which could not be determined a priori in the theoretical model. There is a definite negative relationship between the real official exchange rate and the black market exchange rate. By letting the real official exchange rate appreciate, the government in Ghana has been losing an important amount of foreign exchange related to the exports that are now being smuggled out of Ghana instead of going through official channels. This has meant an important reduction in the amount of foreign exchange allocated to imports and therefore an increase in the demand for smuggled imports in the economy. This process
has evolved hand in hand with the continuous fall in the ability of the
country to export and to produce import substitutes that is related to the
appreciation of the official exchange rate. In all, the real appreciation
of the official exchange rate seems to be very much related to the
increasing importance of parallel market activities in the economy. With
higher domestic inflation rates than world inflation rates, the government
of Ghana, by maintaining a fixed official exchange rate and imposing
exchange controls, is progressively losing control of the economy as more
and more transactions are diverted to the parallel markets.

The dummy variable shows a statistically significant risk premium
associated with government policing activity. Specifically, we can see
that there is a 44.6 percent risk premium that is being collected by the
sellers of foreign exchange in the black market in periods of significant
patrolling activity.

The results are encouraging and give ample support to the key
determinants of the black market exchange rate derived from the context of
our model. As a first approximation, the model seems to be useful to
understand the behavior of the parallel market economy in Ghana.

B. The Size of the Parallel Market Economy

The empirical evidence we just presented seems to indicate that
the exchange rate policies pursued by the government of Ghana have led to
the emergence and growing importance of the parallel market economy in this
country. We will now try to estimate the size of this economy and its
evolution in time. 34/ As we mentioned before, it is not possible to measure the size of the parallel market economy directly, but we can analyze and to some extent measure the traces it leaves in other spheres of the economy.

In recent years, there has been an increasing attention, on the part of policymakers, economists and other social scientists, devoted to the study of the general phenomenon that goes under the name of underground economy. As one should expect, the basic reasons for the existence of this phenomenon vary from country to country and so have the methods that scholars have used in trying to assess the size of the underground economy. 35/

We use the general methodology developed by Tanzi (1982), in which he estimates the underground economy and tax evasion in the United States. In our case, the approach emphasizes the fact that there is a demand for currency related to the activities of the parallel market economy. In particular, we postulate that the demand for currency in Ghana is directly related to the amount of domestic currency that is being traded in the black market.

---

34/ This is an appropriate time to mention that the emergence of a parallel market economy is not only related to exchange control policies. It is the foreign trade regime as a whole, as defined in Bhagwati (1978), that determines the behavior of the parallel market economy.

35/ A basic book for the reader that covers this broad subject is Tanzi (1982). It presents a good survey of the different methods that have been used to measure the underground economy, as well as a nice compilation of empirical studies for a variety of countries. In general, this book shows that economists have risen to the challenge of trying to measure something that up to now was considered relatively unmeasurable.
In this way, the method of estimating the size of the parallel market economy involves a two stage procedure. First, the amount of domestic currency traded in the black market has to be determined. This is, of course, an unobservable variable. We can, therefore, only estimate a proxy variable for the amount of domestic currency traded in the black market. We do this by estimating the quantity of cocoa smuggled out of Ghana. Cocoa smuggling is admittedly the main supplier of foreign exchange to the black market in Ghana. Therefore, by estimating the amount of cocoa smuggled we can approximate the amount of foreign exchange supplied in the black market, and get a first approximation to the amount of domestic currency traded in the black market. Second, we use this proxy variable in the estimation of the demand-for-currency equation. This gives an estimate of the amount of "illegal money" in the economy, which can then be transformed into a GDP estimate of the parallel market economy by assuming that the velocity of money is the same in the parallel market economy as it is in the "official" economy.

1. Cocoa Smuggling and the Amount of Domestic Currency Traded in the Black Market

The growing of cocoa is Ghana's most important economic activity. This key sector has contributed in the last few years about 10 percent of GDP, generated around 60 percent of export earnings, and has been a significant
It has also been the main source of foreign exchange to the black market.

But, although cocoa smuggling is a widely accepted phenomenon in Ghana, and every study related to the cocoa sector discusses the fact that smuggling has increasingly become a significant feature of this sector, there has been no real analytical effort to determine its magnitude. Educated guesses vary from one source to another and suggest that the amount of cocoa being smuggled annually out of the country may go from about 10,000 tons to 50,000 tons. Franco (1981) puts together a set of guess-estimates of Ghanaian cocoa officials and international cocoa traders for 1960-1979. This is presented in Table 5.

These figures show in a quantitative fashion the perceived importance of cocoa smuggling in Ghana. The extreme concern of government officials about the impact of this activity has also been translated into political action. On September 21, 1982 all of Ghana's land borders were closed. One of the main reasons given was to prevent smuggling into neighboring Togo and Ivory Coast. In 1983, George Agyekum, the chairman of the country's public tribunal, stated that cocoa-smugglers will be executed by firing squad. He also announced an anti-smuggling operation in the cocoa-growing region of Brong-Ahafo. 37/

36/ For a complete description of this sector in Ghana see World Bank (1983).

Table 5. COCOA SMUGGLING AND PRODUCTION, GHANA
1960-1979
(Thousand of metric tons)

<table>
<thead>
<tr>
<th>Year</th>
<th>Production 1/</th>
<th>Smuggled Cocoa 2/</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960/61</td>
<td>430</td>
<td>10</td>
</tr>
<tr>
<td>1961/62</td>
<td>409</td>
<td>8</td>
</tr>
<tr>
<td>1962/63</td>
<td>413</td>
<td>14</td>
</tr>
<tr>
<td>1963/64</td>
<td>428</td>
<td>11</td>
</tr>
<tr>
<td>1964/65</td>
<td>538</td>
<td>14</td>
</tr>
<tr>
<td>1965/66</td>
<td>401</td>
<td>17</td>
</tr>
<tr>
<td>1966/67</td>
<td>368</td>
<td>17</td>
</tr>
<tr>
<td>1967/68</td>
<td>415</td>
<td>21</td>
</tr>
<tr>
<td>1968/69</td>
<td>323</td>
<td>17</td>
</tr>
<tr>
<td>1969/70</td>
<td>403</td>
<td>25</td>
</tr>
<tr>
<td>1970/71</td>
<td>413</td>
<td>31</td>
</tr>
<tr>
<td>1971/72</td>
<td>454</td>
<td>37</td>
</tr>
<tr>
<td>1972/73</td>
<td>407</td>
<td>42</td>
</tr>
<tr>
<td>1973/74</td>
<td>340</td>
<td>34</td>
</tr>
<tr>
<td>1974/75</td>
<td>376</td>
<td>30</td>
</tr>
<tr>
<td>1975/76</td>
<td>396</td>
<td>38</td>
</tr>
<tr>
<td>1976/77</td>
<td>320</td>
<td>40</td>
</tr>
<tr>
<td>1977/78</td>
<td>271</td>
<td>45</td>
</tr>
<tr>
<td>1978/79</td>
<td>265</td>
<td>50</td>
</tr>
</tbody>
</table>

1/ Source: World Bank (1983). Based on data provided by the Cocoa Marketing Board.

In all, it is clear that cocoa smuggling is a very important activity in Ghana. We will now try to determine its behavior in time. As explained before, this is done as a necessary step to estimate a proxy variable for the amount of domestic currency traded in the black market which will then be used to estimate the size of the parallel market economy in Ghana.

(a) The Econometric Model

All the information on cocoa production is provided by the Cocoa Marketing Board (CMB). But, for this reason, the data corresponds to cocoa sales to the CMB instead of total production. With a given amount of production available in any year, the farmers face the decision of where to sell that production. On the one hand, they can sell it directly to the CMB and get the official price for cocoa in return. On the other hand, they can smuggle it out of the country, sell it to farmers in a neighboring country and then change the corresponding amount of foreign exchange in the black market. This process can be captured by:

\[ Q_{CMB} = s(P_s) Q_t(v) \]

This equation gives the basis for the econometric estimation that will follow. It states that total cocoa sales to the CMB, \( Q_{CMB} \), is a

---

38/ The CMB, organized in 1950, is the sole government agency responsible for organizing and financing the local purchases and transport of cocoa beans to port or to local processing plants. It is also solely responsible for selling Ghanaian cocoa abroad.
fraction $s$ of total cocoa production, $Q_t$ (which we do not observe). This fraction $s$ is a function of the ratio of producer prices in Ghana and its neighboring countries, $P_s$, where the producer price in the neighboring country is translated into Cedis using the black market exchange rate. Total cocoa production is, in itself, a function of a set of variables $v$ which will be discussed in detail shortly.

This type of specification is very convenient, not only because it allows us to estimate the supply equation with the data provided by the CMB. But, in addition, the estimates obtained can then be used to determine the amount of cocoa smuggled out of Ghana, $Q_s$, by:

$$Q_s = \frac{(1-s)}{s} Q_{CMB}$$

Specifying $Q_t(v)$ is an extremely difficult task. Fairly detailed supply equations for major Ghanaian regions were specified and estimated by Bateman in March 1972. 39/ His method has then been used in the econometric estimations for the cocoa sector within the Bank. Here, we will use the specification of $Q_t(v)$ being used in the Bank. Nevertheless, we encourage the reader that is interested in the theory and previous results to consult World Bank (1972) and World Bank (1983).

The econometric specification of equation (30) is given by:

$$\ln Q_{CMB} = a_0 + a_1 \ln PCAP + a_2 \ln P + a_3 \ln R + a_4 \ln P_s + \varepsilon$$

39/ See World Bank (1972).
The explanatory variables are:

(i) Production Capacity (PCAP).

The econometric model developed by Bateman contains two equations. The first phase equation attempts to capture the average production capacity (PCAP) of the available tree stock. The second phase accepts the capacity projections generated in the first phase and attempts to estimate the deviations caused by price and weather conditions. This type of specification distinguishes between the long-run relationships affecting the secular trend of supply (which are assumed additive), and the short-run relationships causing its year-to-year fluctuations (which are assumed multiplicative).

The specification that is now being used in the Bank uses the tree stock variable, as defined by Bateman, as a proxy of the average production capacity. 40/ This type of specification allows the two equation model to be estimated by a single equation since all the relationships in the model are now multiplicative, and use the CMB data on production for the estimation.

In the absence of planting and tree stock data, Bateman used real producer prices to construct the proxy variable. This is defined as:

---

40/ This is only one of the three variables used by Bateman to estimate the average capacity. The other two variables are: survival variable and Gammalin yield variable. The first one captures the effects of Gammalin application, which is an insecticide, on the survival of young trees. The second one explains the effects of Gammalin on the yield of mature trees. However, these variables have not been incorporated in recent estimations of the supply equations in the Bank for the regions we are interested in. The implicit assumption being made is that the effect of insecticides on the average capacity is already being captured by the proxy of the tree stock variable. This comes from the strong correlation found between insecticide sales and real producer prices. For a detailed explanation see World Bank (1983), p. 16.
The proxy variable for the tree stock in a given year is a weighted sum of past real producers prices, $P_t$, less planting costs, $\tilde{P}_t$, over the average length of tree life (55 years is assumed in this study). The product of the price incentive, $\hat{P}_t$, and the farmer effort coefficient, $C_t$, is a proxy for the plantings of any given year. The sum of this product over the past 55 years would determine a proxy for the tree stock. But to determine the effect of the tree stock on production, the plantings of the past 55 years must be weighted by a yield coefficient, $b_i$. Yield is a function of age. Therefore, the contribution of trees planted in year $t-i$, $1 < i < 55$, to capacity in year $t$ is the plantings (the product of the price incentive and farmer effort) weighted by the yield coefficient for trees which are $i$ years old. The summation of this weighted value over 55 years becomes the proxy for the productive tree stock or average production capacity. The farmer's effort coefficient and tree yield coefficients used here are those of Bateman.
(ii) Real Producer Prices (P)

Current prices have a cumulative effect upon production because they affect, in any year, both harvesting and farm maintenance. The price variable $P$, which is constructed to capture both of these effects, is computed as a three-year moving average of the real producer price centered on the last year. Thus, farm maintenance during the previous two years is assumed to affect output. One period lag is used for this variable to consider the fact that the cocoa production year October to September is being treated as January to December.

(iii) Rain (R)

Heavy rainfall during the latter half of the year collects below ground and supports the trees during the dry season. It takes a period of twelve to eighteen months for changes in soil-moisture levels to be reflected in tree developments. Therefore, the rain variable is constructed by lagging the July-October rainfall by one or two periods.

(iv) Ratio of Producer Prices Faced by the Farmer ($P_s$)

As explained before, the amount of cocoa sold to the CMB is a fraction of total production. This fraction depends on the ratio of producer prices in Ghana and the neighboring country where cocoa may be smuggled to, $P_s$, where the producer price in the neighboring country is translated into Cedis using the black market exchange rate. In this way, the econometric specification defines the fraction of total production sold
to the CMB, at time $t$ as: $^{41/}$

$$s_t = (P_{st})^{\hat{a}_4}$$

(b) **Estimation of the Cocoa Supply Equation**

The difficulties involved in moving cocoa from one place to another, now exacerbated by the serious transportation problem in Ghana, indicate that most cocoa smuggling has to be done from the regions located near Ghana's borders. From the six major cocoa-producing regions in Ghana, three of them: Brong-Ahafo, Western, and Volta, have this characteristic. The first two share a border with Ivory Coast, and the last one shares it with Togo.

The supply equation (30) is estimated here for the Brong-Ahafo and Volta regions $^{42/}$. The relevant ratio of producer prices faced by farmers, $P_s$, is different in both regions. For the Brong-Ahafo region,

$^{41/}$ The econometric specification of equation (32) does not allow us to distinguish between $s_t = (P_{st})^{\hat{a}_4}$ and $s_t = b (P_{st})^{\hat{a}_4}$. We assume, for all our computations, that the scale factor $b$ is equal to one. Unfortunately, there is no way of testing the validity of this assumption.

$^{42/}$ The econometric work done by Akiyama (some of which is reported in World Bank (1983)) on the Western region seems to indicate that the production trend in this region does not follow Bateman's specification. This precludes the estimation of cocoa smuggled out of the Western region using equation (30). Further work on this region seems to be necessary to be able to estimate the share of cocoa that is being sold to the CMB in this region, and the related amount of cocoa smuggled.
this ratio is computed using the producer price of cocoa in Ivory Coast as the neighboring-country price. Correspondingly, the producer price of cocoa in Togo is used for the Volta region. For notation purposes, we distinguish these two variables as $P_{\text{SIC}}$ and $P_{\text{ST}}$ respectively. Most of the data used for the estimation is obtained from data used in World Bank (1983). We reproduce these figures, together with our own, in Appendix B. The results of the estimation are presented in Tables 6 and 7.
### Table 6: COCOA SUPPLY EQUATION FOR BRONG-AHAFO REGION 1960-1981

<table>
<thead>
<tr>
<th>Variable (ln)</th>
<th>Coefficient</th>
<th>t-Value</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>2.596</td>
<td>2.06***</td>
<td>$R^2$</td>
</tr>
<tr>
<td>PCAP</td>
<td>0.234</td>
<td>1.32*</td>
<td>Adjusted $R^2$</td>
</tr>
<tr>
<td>$P(-1)$</td>
<td>0.306</td>
<td>1.10</td>
<td>F-Statistic</td>
</tr>
<tr>
<td>$R_{BR}(-1)$</td>
<td>0.140</td>
<td>1.56**</td>
<td>SSR</td>
</tr>
<tr>
<td>$P_{SIC}$</td>
<td>0.295</td>
<td>2.35***</td>
<td>Rho</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>D.W. Statistic</td>
</tr>
</tbody>
</table>

*** Significant at the 5 percent level
** Significant at the 7 percent level
* Significant at the 11 percent level.

### Table 7: COCOA SUPPLY EQUATION FOR VOLTA REGION 1960-1981

<table>
<thead>
<tr>
<th>Variable (ln)</th>
<th>Coefficient</th>
<th>t-Value</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.906</td>
<td>0.52</td>
<td>$R^2$</td>
</tr>
<tr>
<td>PCAP</td>
<td>-0.013</td>
<td>-0.02</td>
<td>Adjusted $R^2$</td>
</tr>
<tr>
<td>$P(-1)$</td>
<td>0.851</td>
<td>1.15</td>
<td>F-Statistic</td>
</tr>
<tr>
<td>$R_{V}(-2)$</td>
<td>-0.223</td>
<td>-1.17</td>
<td>SSR</td>
</tr>
<tr>
<td>$P_{ST}$</td>
<td>0.606</td>
<td>2.01*</td>
<td>Rho</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>D.W. Statistic</td>
</tr>
</tbody>
</table>

* Significant at the 5 percent level.
In the supply equation estimated for the Volta region the only significant variable is the ratio of producer prices faced by the farmer, \( P_{ST} \). Two of the variables, PCAP and \( R_V(-2) \), have the wrong sign although they are not statistically different from zero. As a whole the equation does not perform as expected by the original specification, and it is not used to estimate the amount of cocoa smuggled to Togo.

The supply equation for the Brong-Ahafo region, on the other hand, does seem to support our initial specification. The signs are as expected, positive for all the variables. All of them with reasonable statistical significance except for the price variable. The regression equation is significant at the one percent level. And the equation explains a substantial part of the variation of the cocoa sales to the CMB in the Brong-Ahafo region, although a correction for serial correlation is required. The coefficient for \( P_{SIC} \), which is the one needed to estimate the amount of cocoa smuggled to Ivory Coast, is significant at the 1.6 percent level.

From the supply equation for the Brong-Ahafo region we can, therefore, proceed to estimate the amount of cocoa smuggled out of this region to Ivory Coast. The estimates are derived as follows. For each year, the fraction of total production sold to the CMB can be calculated by using equation (34) with the estimated coefficient for \( P_{SIC} \). Then, using these estimates in equation (31), the amount of cocoa smuggled to Ivory Coast can be calculated. These estimates are presented in Table 8.
Table 8: ESTIMATED GHANAIAN COCOA SMUGGLED TO IVORY COAST
1960-1982

<table>
<thead>
<tr>
<th>Year</th>
<th>QCMBBR (thousand metric tons)</th>
<th>s</th>
<th>Qs (thousand metric tons)</th>
<th>Related Amount of Cedis Traded in the Black Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>96.30</td>
<td>0.94</td>
<td>6.58</td>
<td>1813.28</td>
</tr>
<tr>
<td>1961</td>
<td>85.20</td>
<td>0.94</td>
<td>5.90</td>
<td>1632.97</td>
</tr>
<tr>
<td>1962</td>
<td>80.90</td>
<td>1.02</td>
<td>-1.89</td>
<td>-384.01</td>
</tr>
<tr>
<td>1963</td>
<td>88.90</td>
<td>1.09</td>
<td>-7.65</td>
<td>-1222.07</td>
</tr>
<tr>
<td>1964</td>
<td>121.20</td>
<td>1.05</td>
<td>-6.11</td>
<td>-1017.25</td>
</tr>
<tr>
<td>1965</td>
<td>100.10</td>
<td>0.99</td>
<td>0.93</td>
<td>175.15</td>
</tr>
<tr>
<td>1966</td>
<td>86.30</td>
<td>0.70</td>
<td>37.79</td>
<td>19617.21</td>
</tr>
<tr>
<td>1967</td>
<td>107.30</td>
<td>0.77</td>
<td>31.48</td>
<td>14884.86</td>
</tr>
<tr>
<td>1968</td>
<td>84.00</td>
<td>0.81</td>
<td>19.25</td>
<td>9606.72</td>
</tr>
<tr>
<td>1969</td>
<td>113.60</td>
<td>0.83</td>
<td>23.27</td>
<td>12186.75</td>
</tr>
<tr>
<td>1970</td>
<td>110.31</td>
<td>0.86</td>
<td>17.90</td>
<td>8752.49</td>
</tr>
<tr>
<td>1971</td>
<td>117.30</td>
<td>0.85</td>
<td>21.42</td>
<td>11365.32</td>
</tr>
<tr>
<td>1972</td>
<td>110.00</td>
<td>0.89</td>
<td>13.79</td>
<td>7427.98</td>
</tr>
<tr>
<td>1973</td>
<td>77.30</td>
<td>0.89</td>
<td>9.18</td>
<td>5170.17</td>
</tr>
<tr>
<td>1974</td>
<td>80.00</td>
<td>0.83</td>
<td>15.88</td>
<td>14208.14</td>
</tr>
<tr>
<td>1975</td>
<td>87.10</td>
<td>0.81</td>
<td>20.79</td>
<td>24826.20</td>
</tr>
<tr>
<td>1976</td>
<td>77.10</td>
<td>0.78</td>
<td>21.38</td>
<td>33277.35</td>
</tr>
<tr>
<td>1977</td>
<td>69.50</td>
<td>0.65</td>
<td>37.33</td>
<td>161166.90</td>
</tr>
<tr>
<td>1978</td>
<td>50.40</td>
<td>0.63</td>
<td>29.80</td>
<td>230376.07</td>
</tr>
<tr>
<td>1979</td>
<td>74.90</td>
<td>0.70</td>
<td>31.79</td>
<td>348821.32</td>
</tr>
<tr>
<td>1980</td>
<td>47.60</td>
<td>0.60</td>
<td>31.35</td>
<td>685394.01</td>
</tr>
<tr>
<td>1981</td>
<td>49.71</td>
<td>0.67</td>
<td>24.07</td>
<td>489570.92</td>
</tr>
<tr>
<td>1982</td>
<td>50.00</td>
<td>0.70</td>
<td>21.24</td>
<td>855233.15</td>
</tr>
</tbody>
</table>

1/ Computed by multiplying column (3) with column (8) in Table B3.
Analyzing the fraction of total cocoa production that is being sold to the CMB in the Brong-Ahafo region, there seems to be an obvious decline in farmers' incentives to sell cocoa to the CMB. By 1982 only 70 percent of total available production was being sold to the CMB. The fall in production as seen by the government, that is, the fall in $Q_{\text{CMBBR}}$, is not only related to the fact that by maintaining low real producer prices the government is not giving the necessary incentives for cocoa farmers to plant new trees and take proper care of existing ones, but also to the significant amount of cocoa that is being smuggled out of Ghana for a better return. In 1982, the producer price in Ghana was only 30 percent of the price in Ivory Coast at the black market exchange rate (see Table B3 in Appendix B).

The estimates on the amount of cocoa smuggled to Ivory Coast are presented in column (3) of Table 8. All estimates lie between the boundaries of educated guesses we talked about before. Comparing our estimates with the educated guesses presented in Franco (1981) we can see that they are different. Nevertheless, we think that we can rely on them with a greater degree of confidence. In particular, our estimates seem to capture an interesting fact that the numbers given by Franco do not. According to Pick's:

Black market transactions in Ghana's currency did not reach sizeable proportions until late 1964 and remained

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43/ Besides those presented by Franco (1981), there are only a few available "guess-estimates" but, for example, our estimate for 1981 is very close to the estimate of 20,000 tonnes of cocoa smuggled to Ivory Coast presented in Coffee and Cocoa International (1981, fourth issue).
mostly limited to the local trade, centering in Accra.44/

Our estimates indicate that the amount of cocoa smuggled to Ivory Coast from the Brong-Ahafo region did not reach any sizeable proportions until 1966. Actually, during three years in the preceding period smuggling seems to have taken place from Ivory Coast to Ghana. And it is not until 1965 that this trend shifted back again.

The amount of cocoa smuggled can then be converted into the related amount of Cedis traded in the black market. These calculations are presented in column (4). And it is these figures that are used as a proxy variable for the total amount of Cedis traded in the black market, in the following part of this paper.

2. The Size of the Parallel Market Economy

Economists have used a number of alternative approaches to the measurement of the underground economy. A good summary of these approaches is presented in the first chapter of Tanzi (1982), entitled "Measuring the Hidden Economy: Though This be Madness, There is Method in it" and written by B. Frey and W. Pommereline. As they show, the number of methods to measure the underground economy is related to the different traces it may leave in other spheres of the economy. The approach we use here lies within, what they call, the monetary sphere. It was used by Tanzi (1982) to estimate the underground economy and tax evasion in the United States, and is based on the derivation of a demand-for-currency equation. A very

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important advantage of using this approach for a developing country, is that monetary data are generally the most reliable ones within the official statistics.

The method consists in specifying a demand-for-currency equation that measures the sensitivity of currency demand to black market activities, which then gives an estimate of currency held for parallel market transactions. From this illegal currency, estimates of the parallel market economy can then be derived.

The specification of the demand-for-currency equation used by Tanzi (1982) is actually derived from a very comprehensive study of the factors that determine the demand for currency written by Phillip Cagan (1958). In this study, the various factors that might affect the ratio of currency to money (defined as M2) were identified. In particular, three main explanatory variables were underlined: (i) the cost of holding currency; (ii) the expected real income per capita; and (iii) the rate of tax on transactions. Black market activities were also postulated as a possible variable affecting currency demand but were found not to be important for the case under study: the United States.

Both types of illegal activities, tax evasion and black market activities, use currency to conceal their transactions. The means of transaction in the underground economy is, because of its illegal nature, predominantly cash.

Of these two illegal factors that affect currency holdings in an economy, Tanzi (1982) concentrates his effort on the effect of tax evasion on the currency ratio in the United States. In our case, the approach emphasizes the role of black market activities in the determination of the
currency ratio in Ghana.

The specification of the demand for currency relative to total money used for the estimation is given by:

\[ \ln \frac{C}{M2} = \alpha + \alpha_1 \ln R + \alpha_2 \ln Y + \alpha_3 \ln DCTBM + \alpha_4 D + \epsilon \]

where the ratio of currency holdings, C, to money, defined as M2, is the dependent variable, and where the explanatory variables are:

(i) The cost of holding currency (R).

A rise in the opportunity cost of holding currency leads people to substitute deposits for currency, and conversely. We can then expect R to be negatively correlated with \( \frac{C}{M2} \). The foregone cost of holding currency is measured here by the current rate of interest on time deposits.

(ii) Real income per capita (Y).

The income elasticity of deposits is expected to be greater than that of currency. A rise in real income would then lead to a decline in the currency ratio.

(iii) Domestic currency traded in the black market (DCTBM).

An increase in the amount of domestic currency traded in the black market is expected to lead to an increase in the demand for currency in the economy.

But, as we mentioned before, the total amount of domestic
currency traded in the black market is an unobservable variable. We use here, as a proxy for this variable, the amount of domestic currency traded in the black market that is related to the cocoa smuggled out of Ghana. This proxy variable is computed in the preceding part of this paper. But, this means that we have a problem of errors in variables since the domestic currency traded in the black market is measured with error. Other cocoa smuggled as well as other sources of foreign exchange to the black market are omitted. For this reason, the method of instrumental variables is used for the estimation.\footnote{This method of estimation also takes care of the possible endogeneity of the amount of domestic currency traded in the black market with respect to the currency ratio. Blejer (1978) shows that the black market exchange rate is related to monetary disequilibriums in the economy.}

From the estimation of the black market exchange rate equation in the first part of this section, we know that the real official exchange rate can be used as an instrumental variable for the total amount of domestic currency traded in the black market. We do this for the estimation.

In order to be able to solve equation (35) for the case in which we assume that no domestic currency is traded in the black market, the Cedis traded in the black market computed in the preceding section are transformed into an index form by dividing all the numbers in column (4) of Table 8 by 855233.15, which is the amount of Cedis traded in the black market in 1982. We then define DCTMB as one plus the above index.
(iv) Dummy variable for "unruly situations" (D).

As Taylor (1979) points out "all people prefer cash in hand to checking deposits in the bank in unruly situations". We construct a dummy variable that captures these type of situations, i.e., military coups, etc., in Ghana for the period under study.

Equation (35) is estimated for the period of 1965 to 1982. We use 1965 as the starting year for the estimation based on Pick's perception that it is in this year when black market activities reached a sizeable proportion. As mentioned before, the method of instrumental variables is used for the estimation. The data used in the estimation is reproduced in Appendix B. The results are presented in Table 9.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Value</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-1.414</td>
<td>-0.56</td>
<td>R²</td>
</tr>
<tr>
<td>R</td>
<td>-0.022</td>
<td>-0.39</td>
<td>Adjusted R²</td>
</tr>
<tr>
<td>Y</td>
<td>0.069</td>
<td>0.16</td>
<td>F-Statistic</td>
</tr>
<tr>
<td>DCTBM</td>
<td>0.627</td>
<td>1.99*</td>
<td>SSR</td>
</tr>
<tr>
<td>D</td>
<td>0.008</td>
<td>0.19</td>
<td>D. W. Statistic</td>
</tr>
</tbody>
</table>

* Significant at the 5 percent level
The adjusted $R^2$ is relatively high and the regression equation is significant at the one percent level. The D. W. statistic is 2.4, suggesting absence of first-order serial correlation. The latter also suggests that no important variable has been omitted from the theoretical specification. All the variables have the right signs except the real income per capita variable, $Y$. But the latter is not significantly different from zero. The coefficient for DCTBM, which is the one needed to estimate the values of currency holdings that are related to parallel market transactions, is positive and significant at the 3.4 percent level.

The first necessary step to estimate the size of the parallel market economy is to obtain the values of currency holdings related to parallel market transactions. To do so we use the estimated equation in two different calculations. First, we determine the predicted value of the equation $(\hat{C}/M2)$, for each particular year. Second, assuming the amount of domestic currency traded in the black market to be zero we determine the corresponding $(\hat{C}/M2)$ by solving the equation with DCTBM equal to one for each and every year. Then, given the actual figures of $M2$, we can calculate the predicted levels of currency holdings, $\hat{C}$, for the case that considers the actual amount of domestic currency traded in the black market, and $\hat{C}$, for the case that assumes there are no parallel market activities. The difference between these two predicted values, $\hat{C} - \hat{C}$, gives the estimation of how much currency is held to carry out parallel market transactions. It yields an estimate of the "illegal money" in the economy. These estimates are presented in Table 10.

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47/ From this point on we proceed following Vito Tanzi's methodology. For a detailed description of this methodology see Tanzi (1982).
Table 10: ACTUAL AND PREDICTED VALUES OF CURRENCY HOLDINGS, GHANA 1965-1982
(In millions of Cedis)

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
<th>Predicted with Parallel Market Activities</th>
<th>Predicted without Parallel Market Activities</th>
<th>Illegal Money</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>115.90</td>
<td>107.97</td>
<td>107.96</td>
<td>0.01</td>
</tr>
<tr>
<td>1966</td>
<td>115.50</td>
<td>117.62</td>
<td>115.96</td>
<td>1.66</td>
</tr>
<tr>
<td>1967</td>
<td>119.24</td>
<td>113.05</td>
<td>111.84</td>
<td>1.22</td>
</tr>
<tr>
<td>1968</td>
<td>125.27</td>
<td>125.96</td>
<td>123.09</td>
<td>0.87</td>
</tr>
<tr>
<td>1969</td>
<td>150.67</td>
<td>138.64</td>
<td>137.41</td>
<td>1.23</td>
</tr>
<tr>
<td>1970</td>
<td>150.61</td>
<td>151.55</td>
<td>150.59</td>
<td>0.96</td>
</tr>
<tr>
<td>1971</td>
<td>158.78</td>
<td>166.21</td>
<td>164.84</td>
<td>1.37</td>
</tr>
<tr>
<td>1972</td>
<td>239.22</td>
<td>234.10</td>
<td>232.83</td>
<td>1.27</td>
</tr>
<tr>
<td>1973</td>
<td>245.01</td>
<td>278.03</td>
<td>276.98</td>
<td>1.05</td>
</tr>
<tr>
<td>1974</td>
<td>335.97</td>
<td>355.31</td>
<td>351.66</td>
<td>3.65</td>
</tr>
<tr>
<td>1975</td>
<td>485.56</td>
<td>483.79</td>
<td>475.18</td>
<td>8.61</td>
</tr>
<tr>
<td>1976</td>
<td>706.90</td>
<td>665.04</td>
<td>649.31</td>
<td>15.74</td>
</tr>
<tr>
<td>1977</td>
<td>1157.11</td>
<td>1156.81</td>
<td>1038.06</td>
<td>118.74</td>
</tr>
<tr>
<td>1978</td>
<td>2121.60</td>
<td>2034.28</td>
<td>1751.57</td>
<td>282.71</td>
</tr>
<tr>
<td>1979</td>
<td>2458.54</td>
<td>2501.69</td>
<td>2018.54</td>
<td>483.15</td>
</tr>
<tr>
<td>1980</td>
<td>3521.28</td>
<td>3872.72</td>
<td>2677.10</td>
<td>1195.62</td>
</tr>
<tr>
<td>1981</td>
<td>6049.49</td>
<td>5312.33</td>
<td>3999.17</td>
<td>1313.16</td>
</tr>
<tr>
<td>1982</td>
<td>6957.16</td>
<td>7776.02</td>
<td>5034.03</td>
<td>2741.99</td>
</tr>
</tbody>
</table>
We can then use the estimates of illegal money to estimate the size of the parallel market economy in the following way. We subtract the amount of "illegal money" from the total money in circulation, \( M_1 \), to determine the corresponding figure of "legal money." The income velocity of legal money is then obtained by dividing GDP by legal money. Finally, assuming that the velocity of legal money is the same for illegal money, \(^{48/}\) we can multiply illegal money by the income velocity of legal money to obtain an estimate of the parallel market economy. These results are presented in Table 11.

\(^{48/}\) This is clearly a debatable assumption. But, as Tanzi (1982) points out, it is not clear whether the velocity of illegal money is below or above that of legal money. In any case, as Cagan (1958) argues, it is hard to believe that the assumption that they are equal is grossly inaccurate.
### Table 11: ESTIMATES OF THE PARALLEL MARKET ECONOMY, GHANA 1965-1982

(In millions of Cedis)

<table>
<thead>
<tr>
<th>Year</th>
<th>(1) Official GDP</th>
<th>(2) M1</th>
<th>(3) Illegal Money</th>
<th>(4) Legal Money</th>
<th>(5) Income Velocity of Legal Money</th>
<th>(6) Parallel Market Eco. as Percentage of Official GDP</th>
<th>(7) Parallel Market</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>1466.40</td>
<td>246.90</td>
<td>0.01</td>
<td>246.89</td>
<td>5.94</td>
<td>0.08</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>1966</td>
<td>1518.40</td>
<td>261.40</td>
<td>1.66</td>
<td>259.74</td>
<td>5.85</td>
<td>9.71</td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td>1967</td>
<td>1504.30</td>
<td>241.00</td>
<td>1.22</td>
<td>239.78</td>
<td>6.27</td>
<td>7.64</td>
<td>0.51</td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>1700.20</td>
<td>258.50</td>
<td>0.87</td>
<td>257.63</td>
<td>6.60</td>
<td>5.71</td>
<td>0.34</td>
<td></td>
</tr>
<tr>
<td>1969</td>
<td>2000.70</td>
<td>289.60</td>
<td>1.23</td>
<td>288.38</td>
<td>6.94</td>
<td>8.50</td>
<td>0.42</td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>2259.30</td>
<td>305.90</td>
<td>0.96</td>
<td>304.94</td>
<td>7.41</td>
<td>7.15</td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>1971</td>
<td>2500.50</td>
<td>321.10</td>
<td>1.37</td>
<td>319.73</td>
<td>7.82</td>
<td>10.72</td>
<td>0.43</td>
<td></td>
</tr>
<tr>
<td>1972</td>
<td>2815.40</td>
<td>462.60</td>
<td>1.27</td>
<td>461.33</td>
<td>6.10</td>
<td>7.73</td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td>1973</td>
<td>3501.20</td>
<td>563.80</td>
<td>1.05</td>
<td>562.75</td>
<td>6.22</td>
<td>6.53</td>
<td>0.19</td>
<td></td>
</tr>
<tr>
<td>1974</td>
<td>4660.10</td>
<td>697.40</td>
<td>3.65</td>
<td>693.75</td>
<td>6.72</td>
<td>24.54</td>
<td>0.53</td>
<td></td>
</tr>
<tr>
<td>1975</td>
<td>5283.00</td>
<td>1008.60</td>
<td>8.61</td>
<td>999.99</td>
<td>5.28</td>
<td>45.47</td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td>1976</td>
<td>6526.20</td>
<td>1428.80</td>
<td>15.74</td>
<td>1413.06</td>
<td>4.62</td>
<td>72.68</td>
<td>1.11</td>
<td></td>
</tr>
<tr>
<td>1977</td>
<td>11163.40</td>
<td>2392.60</td>
<td>118.74</td>
<td>2273.86</td>
<td>4.91</td>
<td>582.96</td>
<td>5.22</td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td>20986.10</td>
<td>4126.00</td>
<td>282.71</td>
<td>3843.29</td>
<td>5.46</td>
<td>1543.73</td>
<td>7.36</td>
<td></td>
</tr>
<tr>
<td>1979</td>
<td>28170.80</td>
<td>4679.80</td>
<td>483.15</td>
<td>4196.65</td>
<td>6.71</td>
<td>3243.21</td>
<td>11.51</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>40994.70</td>
<td>6085.10</td>
<td>1195.62</td>
<td>4889.48</td>
<td>8.38</td>
<td>10024.37</td>
<td>24.45</td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>76654.80</td>
<td>9413.20</td>
<td>1313.16</td>
<td>8100.04</td>
<td>9.46</td>
<td>12427.07</td>
<td>16.21</td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td>85866.00</td>
<td>11202.90</td>
<td>2741.99</td>
<td>8460.91</td>
<td>10.15</td>
<td>27827.27</td>
<td>32.41</td>
<td></td>
</tr>
</tbody>
</table>

1/ Source: The World Bank, World Tables.

The yearly estimates of the parallel market economy presented in Table 11 show the increasing importance of parallel market activities in the Ghanaian economy. From a situation where parallel market activities were nearly non-existent in 1965, the parallel market economy rose almost steadily to 32.4 percent of official GDP in 1982.

We should again emphasize that these results cannot be taken as a precise measure of the parallel market economy; they are, at best, broad indications of trends, and also of orders of magnitude because they are sensitive to the assumptions made, as well as the data used. However, as shown in Figure 12, the trend they seem to follow is very clear. The government has been losing control over the economy as more and more transactions are being diverted to the parallel markets. This has important policy implications which we now turn to analyze in the next section of the paper.

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49/ For example, these numbers could be underestimating the parallel market economy based on the fact that some of the transactions in this economy can be expected to be carried out in CFA Francs, other foreign currencies or directly in goods, avoiding the use of domestic currency completely.
Figure 12: The size of the parallel market economy, Ghana

Percent of GDP
V. CONCLUSIONS: SOME POLICY IMPLICATIONS
OF THE EXISTENCE OF A PARALLEL MARKET ECONOMY

The model developed in this paper provides important insights into the way in which exchange controls modify the behavior of the different agents in the economy, leading to the creation of a parallel market economy. The empirical work done for the case of Ghana seems to indicate that this particular aspect of the effects of exchange controls in an economy can be very important. We now turn to analyze some policy implications of the existence of this parallel market economy.

For this analysis, let us consider the typical scenario in which a government pursuing an unwarrantable expansionary policy, imposes exchange controls to avoid a loss in reserves, and to control the allocation of the scarce foreign exchange. In this scenario, the emergence of a parallel market economy has important consequences which should be considered by the policymaker. Some of them are the following:

(1) Persistent loss of control on the allocation of foreign exchange.

The emergence of a parallel market in response to the imposition of exchange controls, and the continuous depreciation of the exchange rate in this market leads the exporting sector to shift an increasing fraction of its exports to parallel markets. This means that the supply of foreign exchange to the government decreases over time and, therefore, the amount of foreign exchange the government is able to allocate will also be falling. The
control the government was aiming for is being eroded over time by its own inflationary policy.

But the control the government is losing over time does not only refer to the amount of foreign exchange it can allocate. As the gap between demand and supply of foreign exchange in the official market widens, the number of requests for import licenses increases while the number of licenses that can be given is reduced. This makes the job of allocating foreign exchange a more difficult one. The costs of maintaining the exchange control system keep on increasing, not only because the administrative process keeps on growing, but because as policymakers find themselves caught up in running the control system, there tends to be an increase in the discriminatory process of foreign exchange allocation. As Leith (1974) points out: "Failure to recognize the old adage that quantitative controls work best when they are needed least lies at the heart of the matter." 50/

Furthermore, the rise in the amount of resources spent in rent-seeking activities nourishes an environment conducive to corrupt practices within the government. So, even if the prescribed criteria to allocate foreign exchange follow strict economic considerations, the final outcome may be quite different from the one being pursued.

As time goes by, the control the government thought it was gaining by imposing exchange controls may not be more than a mere illusion, for which the economy will be paying harshly.

(2) Loss of tax revenue.

We know that, independently of the parallel market economy, exchange controls deprive the government of revenue that could otherwise be captured through tariffs. In addition, there is a loss in government revenue associated with the existence of a parallel market economy. As the black market exchange rate depreciates, the fraction of exports that is channeled through the official market keeps falling. This also implies that the amount of official imports is being cut. For countries in which trade related taxes are an important source of government revenue, this process means a significant loss in revenue.

In turn, this loss in revenue may imply that the government will need to finance its increasing deficit by borrowing from the central bank. This will only exacerbate the original expansionary policy and start the cycle over again.

Imposing exchange controls to avoid a balance-of-payments disequilibrium when an unwarranted expansionary policy is being pursued not only does not solve the original problem, but it may also tend to nourish it. The medicine can then be worse than the sickness.
(3) Exchange controls do not avoid the "undesirable" consequences of a devaluation.

The imposition of exchange controls as a substitute for a formal devaluation does not avoid the adverse repercussions on prices or real wages of a devaluation. The emergence of a parallel market in response to such controls and the depreciation of the exchange rate in this market have similar consequences to those of an official devaluation.

With a widespread parallel market economy, most of the prices of importable goods will be determined by their marginal costs in the parallel market. This means that as the black market exchange rate depreciates, the price of importables will rise. Avoiding a loss in reserves through exchange controls does not come without tears, as the government might expect. The reduction in the purchasing power of domestic goods does represent a real cost, namely, a reduction in the standard of living.

The existence of a parallel market economy has, in all three cases, a significant effect on the repercussions that follow the imposition of exchange controls. These reverse links between the parallel market economy and exchange controls can actually preclude the achievement of policy objectives pursued by the government through the imposition of exchange controls, i.e., control of foreign exchange allocation, etc. It is important for policymakers to be aware of these consequences when they plan to impose exchange controls as a balance-of-payments policy.
APPENDIX A

EXCHANGE CONTROL POLICY IN SUB-SAHARAN AFRICA 1/

All of the countries that impose exchange controls rely on similar instruments. However, the degree of control and the authority with which they are used differs between countries. These differences will be highlighted in this cross-country comparison of exchange control policies that focus on the agencies which oversee exchange control, the surrender requirement of foreign exchange proceeds, the restrictions on import transactions, the restriction on non-resident accounts, and the restrictions on currency brought in and out of the country. The main differences will be summarized in the text; country-by-country details can be found in Table A1.

It is not our purpose to provide the most recent description of the exchange controls in Sub-Saharan Africa, but to give a flavor of their variety and the type of instruments they use. The analysis is made on the basis of the latest IMF publication on Exchange Arrangements and Exchange Restrictions, which is the 1983 Annual Report. Changes from that date on are not incorporated in the analysis.

* This appendix was written by Janet Entwistle.

1/ The analysis in this appendix refers basically to the countries in Group I of Table I. In addition, Cape Verde, Equatorial Guinea, and Sao Tome and Principe were considered. These are member countries that impose exchange controls, but are generally not considered in the Sub-Saharan studies in the Bank because they are such small economies.
Multiple Exchange Rates

Guinea, Sierra Leone, Sudan, and Uganda quote two separate exchange rates based on an official market and a commercial market. The official market is generally for transactions relating to essential imports, and all official transactions. In Sierra Leone and Uganda, specified traditional export transactions are also made at the official rate. The rest of the transactions are carried out through the commercial market.

Other countries follow practices which lead to multiple exchange rates in a more subtle way. Many countries place a tax or service charge on the sale of foreign exchange, as is the case in Equatorial Guinea. Other countries have export bonus schemes, for example Ghana and Kenya. In addition, many countries have import deposit schemes. Rwanda, for example, requires an advance import deposit for some automobiles.

Exchange Control Policy and Administration

Exchange control policy is generally made by a ministry of the government, for example, the Ministry of Finance. However, in some countries, for example in Somalia, a committee comprised of various ministries and/or the Central Bank advises on policy questions. In other countries, a ministerial committee actually sets policies, as is the case in Zambia. In Cape Verde, the Central Bank is the final authority on all exchange transactions.

The Central Bank always handles the administration of foreign exchange except in Madagascar where the Directorate of the Treasury is in charge. In some countries, for example, Guinea Bissau, the Central Bank is
the sole authority. Most countries delegate authority to other banks. In Ethiopia, for example, authorized banks can perform all foreign exchange related functions of the Central Bank. In Nigeria, even certain hotels and rest houses can purchase foreign currency.

The administration of import and export licenses is usually handled by a ministry, for example the Ministry of Commerce. In some countries, the Central Bank must approve the awarding of license, as in Mauritania, whereas in other countries the ministry is the authorized body, for example in Sierra Leone. In Guinea, a state enterprise grants licenses for trade. In Tanzania, on the other hand, export and import license are handled by separate entities; the Central Bank controls imports and the Ministry of Trade controls exports.

Surrender Requirements of Exchange Proceeds

The surrender of all foreign exchange proceeds from both exports and invisibles to an authorized bank is required. Sometimes the only authorized bank is the Central Bank; other times the responsibility is delegated to commercial banks. In Zaire, authorized banks can keep all foreign exchange from invisibles, but surrender 30 percent of export receipts to the Central Bank. In other countries, for example, Uganda, all proceeds must be surrendered by the authorized banks to the Central Bank within three business days of receipt.

Some countries require that payment for exports be in foreign currency. Others require payment in a "convertible" currency. Still others will accept domestic currency or the currency of the recipient country. In
Ghana, there is an export bonus of 20 percent if payment is in an African or a convertible currency. In many countries, such as Rwanda, the Central Bank must approve the currency of payment.

When payment is in a foreign currency, it generally must be surrendered to an authorized bank. However, the due date of surrender varies from as little as three days to as much as six months. In Tanzania, payment must be collected within six months of date of shipment and sold to an authorized bank within three business days. While in Cape Verde, export proceeds must be surrendered within three months of the date of the issuance of the license. If payment is from Rwanda's neighbors, proceeds must be surrendered 30 days after shipment; otherwise, the time period is 120 days.

Some countries have more checks on compliance of the surrender requirement than other countries. For example, some countries require domiciliation of all export transactions, whereas others require domiciliation of such transactions only valued above a specified amount. This is the case in Madagascar, where the exporter must also sign a commitment to repatriate any foreign currency proceeds. In Sao Tome and Principe, the exporter must not only domicile his export transactions, he must also have a license. In Nigeria, exporters must sign an export control declaration at the time of shipment. Some countries, like Uganda, require an export license for all exports; other countries, for example Mauritius, only require a license for exports valued above a certain amount. Tanzania has a much stricter export procedure; the exporter must register with the Central Bank, have an account with a commercial bank, and acquire an export license.

Countries with multiple exchange rates require some firms to surrender their foreign currency at one exchange rate and other firms at
another exchange rate. For example, in Sierra Leone all export proceeds may be surrendered at the commercial rate except for proceeds from a few specified exports. In Guinea 40 percent of export proceeds must be converted at the official rate, and 60 percent are auctioned to producers by the Central Bank.

Complete surrender of foreign exchange proceeds from exports is not required in all countries. In Nigeria, foreign exchange received in payment for petroleum is exempt. Retained accounts at banks abroad are permitted in Botswana for residents who make frequent foreign payments. These accounts are subject to ceilings. In Sudan, exporters can retain some of their export proceeds for the purchase of goods and services related to their export business. This foreign exchange must be kept with an authorized bank and resold if not used within a specified period of time. In other countries, for example Mauritius, large import/export companies can retain export proceeds in order to meet import payments.

Partial surrender of proceeds from invisibles is permitted only in Sudan, where residents can keep all foreign exchange except that earned through tourism. The time period to meet the requirement also varies with invisibles. Surrender is required within 15 days in Equatorial Guinea, while in Zimbabwe a "reasonable period of time" is sufficient.

**Restrictions on Import Transactions**

Foreign exchange for imports is generally allocated through licensing. The importer must apply for a license through the appropriate agency, and on approval foreign exchange can be purchased. This is the case for all the countries except Mauritius where foreign exchange must be applied
for separately. However, the extent of licensing varies considerably across countries.

An annual import program and a monthly license budget is drawn up in Equatorial Guinea, where a license is required for all imports. In contrast, many countries allow some imports under an open general license. For example, in the Gambia, there is an open general license for most imports, but the government prohibits some items for social, health or public policy reasons. Often goods are prohibited because they are produced locally, are considered non-essential, or are considered a threat to public safety (as in the case with weaponry and narcotics). In Guinea-Bissau licenses are issued according to the availability of foreign exchange, except for imports of essential foodstuffs which are controlled by a state monopoly. In Sudan, where there is a multiple exchange rate system, essential imports are transacted at the official rate and other imports are transacted at the free market rate. In Zaire, only an import declaration is necessary if the importer finances his imports outside of the banking system. Finally, many countries, including Cape Verde, require a license only for goods valued above a specified limit.
Restrictions on Non-Resident Accounts

Most countries place restrictions on the accounts of non-residents. However, these accounts differ in respect to which currency they can be denominated in, whether they are interest bearing, whether they are transferrable, who can open them, and what their funds can be used for.

In some countries, non-residents can open accounts only in domestic currency, while in other countries accounts may be held in foreign currency. In Burundi, non-residents temporarily residing in the country can only hold domestic currency accounts whereas non-residents living abroad can hold accounts in foreign currency. In Ethiopia, non-residents may hold both domestic and foreign currency accounts, but both must be credited only with foreign exchange. In Sierra Leone, on the other hand, all non-resident accounts are denominated in domestic currency.

In Burundi, non-resident accounts do not bear interest, whereas in Zambia, not only are some accounts interest bearing, but the interest is also transferrable.

Some countries keep non-transferrable funds of non-residents in Blocked Accounts. These accounts hold funds that are due to non-residents that are, for example, in excess of their emigration allowance or are from disinvestments. Approval is always required from the government for debits or credits. Most other funds in non-resident accounts are freely transferrable. One exception is Tanzania where balances from non-convertible non-resident accounts can only be transferred with approval.

In many countries embassies and the foreign officials of embassies are required to open non-resident accounts. This is the case in Cape Verde. Other non-resident accounts are held by former residents who still have funds
in Blocked Accounts, or by non-residents with an interest in holding them.

All countries place strict restrictions on the nature of credits and debits to non-resident accounts. Generally, transactions through these accounts must be authorized.

**Restrictions on the Import and Export of Currency**

All countries place restrictions on the import and export of currency by travelers. Once more, the extent of these restrictions varies across countries.

The import and export of domestic currency is prohibited in Cape Verde, as it is in many of these countries. In contrast, in the Gambia an unlimited amount of domestic currency can be brought into the country, but only a limited amount can be re-exported. However, most countries allow the import and export of a specified limited amount of domestic currency. Some countries, for example, Tanzania, only allow resident travelers this option, in order that they will have domestic currency with them upon their return to meet their local expenses.

Restrictions on the import and export of foreign currency are also widespread. Generally, foreign travelers may import unlimited amounts of foreign currency, and upon departure can take the same amount with them (usually less local expenses). However, non-residents generally must apply for foreign exchange. The amount allocated for travel purposes usually depends on the nature of the trip, i.e., whether the journey is for tourist travel, business travel, medical reasons, or education. Some countries, for example Zaire, do not allocate any exchange for tourist travel, but do for official travel. In Zaire, airline tickets can be purchased with domestic
currency, but exchange needed must be obtained outside of the banking system.

Remittances abroad by foreign nationals working in Africa are generally allowed up to a certain percentage of their income. However, remittances abroad by residents are often prohibited, as is the case in Tanzania.

Conclusions

All twenty-five countries examined here have similar types of exchange control policy although they implement this policy to varying degrees. In summary, in almost all 25 countries, (1) there is a practice which leads to multiple exchange rates, (2) the Central Bank is the primary administrator of exchange control policy, (3) exchange proceeds for exports and invisibles must be surrendered to the government, (4) most items cannot be imported freely, (5) there are restrictions on non-resident accounts, and (6) currency cannot be imported and exported freely.
## Table A1: EXCHANGE CONTROL POLICY IN SUB-SAHARAN AFRICA, 1982

### Multiple Exchange Rate Regimes

<table>
<thead>
<tr>
<th>Country</th>
<th>Practice which leads to multiple exchange rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burundi:</td>
<td>There is an exchange fee on the purchase and sale of foreign exchange.</td>
</tr>
<tr>
<td>Equatorial Guinea:</td>
<td>There is a tax on exchange sales and on some transfers.</td>
</tr>
<tr>
<td>Gambia:</td>
<td>The domestic currency counterpart of all payment arrears must be placed in a Blocked Account.</td>
</tr>
<tr>
<td>Ghana:</td>
<td>There is an export bonus scheme, tax on letters of credit, and surcharges on some exchange allocations.</td>
</tr>
<tr>
<td>Guinea:</td>
<td>Multiple exchange rate system: Official market is only for all official transactions, including a specified list of import transactions. The free parallel market is for all other transactions.</td>
</tr>
<tr>
<td>Kenya:</td>
<td>There is an advance import deposit scheme and an export compensation scheme for some exports.</td>
</tr>
<tr>
<td>Malawi:</td>
<td>Some imports require prepayment of some duties and clearing charges.</td>
</tr>
<tr>
<td>Mauritius:</td>
<td>There is a stamp duty on outward capital transfers and purchases of gold coin and bullion.</td>
</tr>
<tr>
<td>Nigeria:</td>
<td>There is an advance import deposit scheme for some goods.</td>
</tr>
<tr>
<td>Rwanda:</td>
<td>There is an advance import deposit scheme for some automobiles.</td>
</tr>
<tr>
<td>Sao Tome &amp; Principe:</td>
<td>There are various commissions and stamp duties on exchange transactions.</td>
</tr>
<tr>
<td>Sierra Leone:</td>
<td>Multiple exchange rate system. Certain imports and traditional exports are transacted through the official</td>
</tr>
</tbody>
</table>
market. There is a fortnightly auction held by the Central Bank which determines the commercial rate in U.S. dollar terms. Certain imports, certain exports and all invisibles are transacted at this rate. In addition, some transactions in the commercial market are subject to a selling commission.

**Sudan:** Multiple exchange rate system: Essential imports and official invisibles are transacted through the official market. Non-essential imports, travel, most private invisibles and certain capital transfers are transacted through the free market. In addition, there is an advance import deposit for some goods.

**Uganda:** Multiple exchange rate system: Transactions with traditional exports, official loans and essential imports are conducted at the official exchange rate. A weekly auction held by the Central Bank determines the exchange rate of the second market where transactions relating to all other imports and invisibles take place. In addition, there is a service charge on some exchange transactions.

**Zaire:** Practice which leads to multiple exchange rates: There are commission charges and exchange control fees for purchases and sales of foreign exchange.
Agency Which Oversees Exchange Control

Botswana: Ministry of Finance and Development Planning has delegated authority to the Central Bank which has delegated certain powers to authorized banks. The Ministry of Finance and Development Planning is in charge of policy.

Burundi: The Central Bank has the authority to oversee exchange control procedures. Some responsibilities are delegated to three authorized banks.

Cape Verde: The Directorate of Foreign Relations and Exchange Control, a department of the Central Bank, controls all foreign exchange transactions.

Equatorial Guinea: The Central Bank is in charge of exchange control, but import and export licenses are issued by the Ministry of Finance and Commerce. However, the Technical Cabinet approves a monthly import license budget and oversees its implementation.

Ethiopia: The Central Bank controls all foreign exchange transactions, but has delegated some control to authorized dealers. The Exchange Controller, a division of the Central Bank, administers licenses. The Minister of Foreign Trade has veto power over the Central Bank.

Gambia: The Central Bank is in charge of day-to-day administration of exchange control. Some authority has been delegated to the commercial banks and authorized dealers. Exchange Control policy is determined by the Ministry of Finance and Trade.

Ghana: The Central Bank administers the allocation of foreign exchange. The Controller of imports and exports at the Ministry of Trade issues licenses and enforces the import program drawn up by a committee of secretaries (representing various ministries). Foreign exchange transactions must be made through authorized banks.

Guinea: The Central Bank is in charge of Exchange Control under the supervision of the Presidency. Import and export licenses are issued by IMPORTEX, a state enterprise.

Guinea Bissau: The Foreign Exchange Department of the Central Bank controls all foreign exchange transactions.

Kenya: The Central Bank is in charge of the administration of exchange control. The Minister of Finance has delegated this responsibility to the Central Bank and some authority is also delegated to authorized banks. Import and Export controls are administered by the Director of Internal Trade in the Ministry of Commerce.
Madagascar: Exchange controls are administered by the External Finance Office of the Directorate of the Treasury. Some authority is delegated to authorized intermediaries. Import licenses and some export permits are issued by the Directorate of External Trade in the Ministry of Economy and Commerce. Other export permits are issued by other public agencies.


Mauritania: Both the Central Bank and the Ministry of Finance have exchange control authority. Some approval authority has been delegated to authorized banks. Import and export licenses are issued by the Foreign Trade Department after exchange control approval is acquired from the Central Bank.

Mauritius: The Central Bank is responsible for exchange control with authority delegated by the Financial Secretary. The commercial banks have been delegated authority to approve all current payments. The Ministry of Commerce and Industry issues import and export licenses.

Nigeria: Basic exchange control policy and the approval of related applications is delegated to the Central Bank by the Federal Ministry of Finance. In addition, most commercial and merchant banks act as dealers of foreign exchange and approve some applications. Certain hotels can buy foreign currency. Import and Export Control is administered by the Federal Ministry of Commerce and the Import Quota Committee comprising officials from different ministries, the Central Bank and the Department of Customs and Excise. The Nigeria National Petroleum Corporation issues licenses for import products.

Rwanda: The Central Bank has authority over foreign exchange transactions and foreign trade. Some authority is delegated to authorized banks. Exchange Control Policy is decided by a government committee.

Sao Tome & Principe: The Central Bank controls foreign exchange. Import and export licenses are granted by the Directorate of External Commerce.

Sierra Leone: Administration of exchange control policy is the responsibility of the Central Bank as dictated by the Ministry of Finance. Import and export licenses are granted by the Ministry of Trade and Industry.

Somalia: The Central Bank implements exchange control policy on behalf of the Ministry of Commerce. In addition, the Central Bank delegates some functions to authorized dealers. The Ministry of Commerce is advised on policy issues by a committee.
consisting of various ministries, the Central Bank, the Customs Authority, and the police. A separate committee authorizes import and export licenses.

Sudan: The Central Bank administers exchange control and delegates some authority to authorized banks. The Ministry of Cooperation, Commerce and Supply issues trade licenses as accorded in the foreign exchange budget decided upon by the Ministry of Finance and Economic Planning, the Central Bank and the Ministry of Cooperation, Commerce and Supply.

Tanzania: The Central Bank is in charge of exchange control policy and has delegated some responsibility to two commercial banks. The Central Bank also administers import control; the Ministry of Trade administers export control. Policy is the authority of the Minister of Finance.

Uganda: The Central Bank administers exchange control on behalf of the Minister of Finance. Import and export licenses are issued by the Ministry of Commerce.

Zaire: The Central Bank has regulatory authority over all foreign trade and payments.

Zambia: The Central Bank administers exchange control policy on behalf of the Minister of Finance. Some authority has been delegated to the commercial banks. Import and export licenses are issued by the Ministry of Commerce. The Ministerial Committee on Foreign Exchange is in charge of import policy.

Zimbabwe: The Central Bank administers exchange control policy on behalf of the Minister of Finance. Some authority has been delegated to authorized banks.
Surrender Requirement of Foreign Exchange Proceeds

Botswana:

Invisibles: Retained accounts in banks abroad are permitted for residents who make frequent foreign payments. These accounts are subject to ceilings.

Burundi:

Invisibles: Receipts from invisibles must be surrendered to authorized banks.
Export Proceeds: Have eight days after their collection to surrender exchange proceeds from exports. Payments for exports must be made in currency quoted by the Central Bank.

Cape Verde:

Invisibles: Receipts from invisibles must be surrendered to the Central Bank.
Export Proceeds: Exchange proceeds must be surrendered within three months from date of license issuance. The currency of payment is decided by the Central Bank.

Equatorial Guinea:

Invisibles: Receipts from invisibles must be surrendered to the Central Bank within 15 days.
Export Proceeds: Proceeds must be surrendered within 45 days of their receipt to the Central Bank. Payment must be made in convertible currencies.

Ethiopia:

Invisibles: Receipts from invisibles must be surrendered.
Export Proceeds: Exchange receipts must be surrendered within three months to the Central Bank. Export payments must be made on a convertible currency.

Gambia:

Invisibles: Receipts from invisibles must be offered for sale to authorized dealers.
Export Proceeds: Payment for exports must be through an authorized dealer. Payment must be in any currency.

Ghana:

Invisibles: Receipts from invisibles must be sold to authorized dealers.
Export Proceeds: Exchange proceeds must be surrendered to a commercial bank upon receipt. If no payment agreement exists between Ghana and the importing country, payment must be in the currency of the importing country (if that currency is quoted by the Central Bank), deutsche mark, pounds sterling or U.S. dollars. If payment is surrendered in a convertible or external African currency, the exporter receives a 20 percent bonus (except on cocoa, residual oil and electricity). Some companies can retain proceeds in an account abroad for essential imports.

Guinea:

Invisibles: Receipts from invisibles must be surrendered.
Export Proceeds: Exchange proceeds must be surrendered upon receipt. Mixed-economy companies (the Friguia Company and the Guinea Bauxite Company) can retain proceeds abroad to finance imports. Payment must be in convertible currencies quoted by the Central Bank.
Guinea Bissau: Invisibles: Proceeds must be surrendered to the Central Bank.
Export Proceeds: Proceeds must be surrendered to the Central Bank. All payments must be in a foreign currency as prescribed by the Central Bank.

Kenya: Invisibles: Receipts from invisibles must be sold to an authorized bank.
Export Proceeds: Exchange proceeds must be collected within three months of export and offered to authorized banks for sale. Payment can be in domestic currency of any foreign currency.

Madagascar: Invisibles: Proceeds must be surrendered within one month from the due date.
Export Proceeds: Exchange proceeds must be surrendered within one month. Exports valued above certain limits must be domiciled through an authorized intermediary.

Malawi: Invisibles: Receipts from invisibles must be sold to authorized dealer.
Export Proceeds: Exchange proceeds must be sold to authorized dealer. Payments must be in domestic currency or any convertible foreign currency.

Mauritania: Invisibles: Proceeds from invisibles must be collected and surrendered within four months of the due date.
Export Proceeds: Proceeds must be surrendered within 60 days after shipment. Exports valued above a certain limit must be domiciled with authorized bank. Payment must be in convertible currency.

Mauritius: Invisibles: Exchange receipts from invisibles must be offered for sale to authorized dealer.
Export Proceeds: Exchange proceeds must be offered for sale to an authorized dealer. Some large import/export firms can retain proceeds for a limited time to meet import payments. A license is required for exports valued above a certain amount. Payments from former Sterling Area countries must be in domestic currency or any currency of the former Sterling Area. Payment from other countries must be made on domestic currency, pounds sterling or any non-Sterling Area currency.

Nigeria: Invisibles: Receipts from invisibles must be offered for sale to an authorized bank which must surrender them to the Central Bank.
Export Proceeds: Proceeds must be surrendered through commercial banks to the Central Bank within three months of shipment. An export control declaration must be signed at the time of shipment. Payment can be made in domestic or foreign currency.

Rwanda: Invisibles: Receipts from invisibles must be surrendered to authorized banks within 8 days of collection.
Export Proceeds: Proceeds must be surrendered within 8 days of collection which must be 30 days after shipment for Rwanda's neighbors and 120 days after shipment for other countries. All exports must be declared to the Central Bank. Payments must be made in currencies approved by the Central Bank.

Sao Tome & Principe: Invisibles: Receipts must be surrendered to the Central Bank.

Export Proceeds: Proceeds must be surrendered to the Central Bank. Export transactions must be licensed and domiciled through the Central Bank.

Sierra Leone: Invisibles: Receipts from invisibles must be surrendered to authorized banks.

Export Proceeds: Proceeds must be sold to authorized banks within 60 days of shipment (45 days for coffee). Proceeds from specified traditional exports must be surrendered directly to the Central Bank at the official rate. Payment must be in a convertible currency.

Somalia: Invisibles: Receipts must be surrendered to the Central Bank or authorized dealer within five business days.

Export Proceeds: Proceeds must be offered for sale within five business days of their receipt. An advance payment deposit of 30 percent is required for exports not made under letter of credit agreements. Payment must be in domestic or convertible currencies.

Sudan: Invisibles: Residents can keep foreign exchange from invisibles unless it is derived from tourism.

Export Proceeds: Proceeds from exports must be repatriated to the banking system within four months from date of shipment. Commercial banks can retain 50 percent (25 percent for cotton exports) of these proceeds for import financing. The rest must be surrendered to the Central Bank. Exporters can retain some proceeds for purchase of goods and services related to the export business. A license is required for most exports. Payment must be in domestic or convertible currency.

Tanzania: Invisibles: Receipts from invisibles must be sold to authorized banks upon collection.

Export Proceeds: Proceeds must be collected within two months of shipment and surrendered to an authorized bank. Exporters must be registered with the Central Bank, have an account in an authorized bank and obtain a license. Payment must be in domestic or convertible currency.

Uganda: Invisibles: Proceeds from invisibles must be sold to an authorized bank within 48 hours.
Export Proceeds: Proceeds must be collected within six months and sold to an authorized bank which must surrender to the Central Bank within three business days. Payment must be in any convertible currency quoted by the Central Bank.

Zaire: Invisibles: Exchange receipts from invisibles can be held by authorized banks.
Export Proceeds: Proceeds must be surrendered to the authorized banks, which must surrender 30 percent to the Central Bank. Some state enterprises can retain foreign exchange for import payments or marketing costs. Payment must be made in any convertible currency quoted by the Central Bank.

Zambia: Invisibles: All receipts from invisibles must be offered for sale to an authorized bank.
Export Proceeds: Proceeds must be offered for sale within six months of shipment. All exports must be registered with the Central Bank, and exports valued above a certain limit must be licensed. Payment must be made in domestic currency, sterling, or any foreign currency convertible to U.S. dollars or sterling.

Zimbabwe: Invisibles: Receipts from invisibles must be sold to an authorized bank within a reasonable period of time.
Export Proceeds: Proceeds must be sold to authorized banks. Payments must be made in denominated currencies that are freely convertible.
Restrictions on Import Transactions

Botswana: There are no restrictions on imports from Lesotho, South Africa, and Swaziland because of the customs union with these countries. Also imports from Zimbabwe are unrestricted because of a customs agreement. However, some imports require a license regardless of country of origin, including firearms and some agricultural products. Most goods imported from outside the customs union require an import license.

Burundi: License required for all imports except trade sample and goods valued below a certain amount. Licenses can be denied for goods which domestic stocks are adequate or are produced locally.

Cape Verde: License required for all imports except for goods valued below a certain limit. Licenses are granted freely for essentials, but restricted for non-essentials.

Equatorial Guinea: License required for all imports. These licenses are issued according to an annual import program and a monthly license budget.

Ethiopia: License required for all imports. Non-essential goods or goods produced domestically (or substitutes) are denied licenses.

Gambia: Most imports permitted under an open general license. Exceptions include goods prohibited for social, health or public policy reasons. Also imports of rice, sugar and wheat flour are licensed in order to ensure an adequate supply.

Ghana: Some goods may be imported under an open general license including samples and personal items. Other goods are prohibited such as luxury goods, textiles, goods produced locally or goods considered harmful to public health or order. A special license is awarded where no foreign exchange is needed from the banking system. Most goods require a specific license.

Guinea: License required for all imports. There are two types of licenses: "Licenses with settlement" and "Licenses without settlement". The former is financed through the banking system, the latter with the importer's own foreign exchange. Imports of the first type are imported by the government through the import program. A specific list of goods can be imported only in this way. Imports of the second type are generally through the private sector.

Guinea Bissau: License required for all imports. Must first register with Ministry of Commerce and Handicrafts. Licenses issued depending on availability of foreign exchange except licenses
for imports financed by foreign loan or grant provided automatically. Imports of essential foodstuffs are a state monopoly.

Kenya: License required for all imports. Licenses awarded according to three schedules. Schedule I contains high priority items automatically approved. Schedule IIA items require state approval. Schedule IIB comprises items that are domestically produced or substitutable by domestic goods and luxury goods. Items on Schedules IIA and IIB are subject to quotas.

Madagascar: License required for all imports. Only those goods approved under annual import program are eligible to be granted licenses. However, since mid-1981, an ad hoc committee consisting of the Ministry of Economy and Commerce, the Ministry of Finance, the Central Bank and the commercial banks, budgets the limited foreign exchange. All import transactions valued above a certain mark must be domiciled with an authorized bank.

Malawi: There is an open general license for most imports originating in GATT or Commonwealth countries (except Poland). License required for some goods including many agricultural products, certain military equipment and certain office supplies regardless of country of origin. Import licenses are also required for goods originating outside of the GATT or Commonwealth countries. Some goods may be freely imported regardless of the country of origin including petroleum products, exposed cinematographic films, samples and advertising materials.

Mauritania: Importers must obtain an importer/exporter card and get approval from the Central Bank. There is no formal import program, but there is a state monopoly on the importation of sugar, rice and green tea. Some imports are denied for reasons of health or public policy. Import transactions must be domiciled with an authorized bank.

Mauritius: License required for all imports. Imports are classified according to four schedules. Schedules 1 and 2 contain goods which are approved automatically except for certain luxury goods or goods manufactured locally which are subject to quotas. Schedules 3 and 4 contain goods which are prohibited. The permits are essentially for statistical and tax purposes. Importers must be licensed and must apply for foreign exchange approval separately.

Nigeria: License required for all imports. Importers must be registered separately. Certain imports are prohibited in order to protect local industries and to reduce imports of luxury goods. Others are prohibited for health, safety or religious reasons. Some imports are subject to specific
license; others need only general license.

Rwanda: Import licenses required only for imports valued above a certain mark, or if payment is required to be in foreign exchange. Some goods, such as explosives, require prior authorization for reasons of public security.

Sao Tome & Principe: License required for all imports. Imports or certain essentials are a state monopoly. Licenses for other goods are granted on the basis of the annual import program, but foreign exchange availability and domestic supply are taken into account when awarding individual licenses.

Sierra Leone: License required for all imports. Imports are classified into three categories. Category A and B lists essential items that are subject only to an open general license. Rice is also in this category, but can be imported only by a state monopoly and authorized dealers. List C includes items prohibited or luxury goods which are subject to quotas and, therefore, specific import licensing. Some import transactions are made at the official exchange rate; other import transactions must enter the commercial market.

Somalia: License required for all imports. License granted on case-by-case basis except for fuels and fuel products which are imported by a state monopoly.

Sudan: License required for all imports. Essential imports are financed through the Bank of Sudan and transactions are made through the official exchange rate. Other imports are financed through the commercial banks or private sources and transactions are made through the free market.

Tanzania: There is an open general license for certain imports listed in the Import Control Notice. Other goods require a specific license. Licenses can be denied for health or security reasons, and are subject to the semi-annual foreign exchange plan.

Uganda: Traditional imports require a license and transactions are made at the official exchange rate. Other imports transactions take place in the second market (rate determined at a weekly auction) and only require a license if valued above a certain limit.

Zaire: Most imports require a license. If imports are to be financed without recourse to the foreign exchange of the banking system, only an import declaration is required. A few import items are required only to be declared, regardless of financing. Import licenses can be denied on grounds of public or economic policy including military equipment, narcotics and luxury items.
Zambia: License required for all import transactions made with foreign exchange or if goods valued above a certain limit. The two major mining companies and the Ministry of Health are granted priority on imports. Licenses can be denied for health safety or public policy. Specifically licenses are not issued for goods that are produced locally. Licenses issued within an exchange allocation framework established half-yearly.

Zimbabwe: Most imports require specific licensing, although a few items are covered under the Open General Import License. Licenses are allocated according to foreign exchange availability and according to five categories rating imports by degree of essentiality. Certain imports must be approved by the Ministry of Agriculture, the Grain Marketing, Cotton Marketing Boards, or other delegated authority for approval.
Restrictions on Non-Resident Accounts

Burundi:
Non-resident Accounts in Burundi Francs: For non-residents temporarily residing in Burundi, embassies and internal organizations. Accounts do not bear interest. May be credited with foreign currency. May be debited for withdrawals of domestic currency, normal current payments in Burundi and conversion into foreign exchange.

Non-resident Accounts in Foreign Currencies: For non-residents living abroad. May be credited with foreign currency from abroad. May be debited for payments in Burundi, payments abroad. Accounts do not bear interest.

Cape Verde:
Non-resident Accounts: Domestic currency accounts. May be credited with proceeds from the sale of convertible currencies. May be debited for payment of obligations in Cape Verde and external transfers. Embassies and foreign officials of embassies are required to open accounts in foreign and domestic currency.

Ethiopia:
Domestic Currency Accounts: Held at authorized banks. May be credited only with foreign exchange. Members of diplomatic community must use for payments of local expenses.

Foreign Currency Accounts: Held at authorized banks. May be credited only with foreign exchange. Balances may be freely transferred abroad.


Gambia:
External Accounts: Accounts held by authorized dealers for residents of other countries. May be credited with authorized payments from residents of other countries, transfers from other External Accounts, and the proceeds of sales of other currencies. May be debited for payments to residents of other countries, transfers to other External Accounts and purchases of other currencies.

Blocked Accounts: Accounts held by authorized dealers under the direction of the Central Bank.

Ghana:
Official Accounts or Territorial Accounts: May be credited with authorized outward payments by residents, transfers from Foreign Accounts, payments received through the Bank of Ghana for settlements with bilateral payment agreement countries and proceeds from sales of external currencies (except restricted currencies). May be debited for payments to residents of Ghana, transfers to other Official Accounts and transfers to the related clearing account at the Bank of Ghana.
Blocked Accounts: For funds not placed at free disposal of non-residents.

Non-resident Accounts: Available to diplomatic community and foreign registered companies. May be credited with authorized outward payments, transfers from other foreign accounts, the proceeds from sales of any convertible currency (except restricted currencies). May be debited for inward payments, transfers to other Foreign Accounts and purchases of external currencies.

Guinea:
Non-resident Transferrable Accounts: Foreign currency accounts.
Non-resident Accounts: Domestic currency accounts.

Kenya:
External Accounts: Domestic currency accounts. May be credited with payments to non-residents by residents, transfers from other External Accounts and proceeds from sale of any currency and gold by non-residents. May be debited for payments to residents and non-residents.

Blocked Accounts: For non-transferrable funds of non-residents. Interest is transferrable.

Madagascar:
Foreign Accounts: Domestic currency accounts. May be credited and debited freely for transactions between non-residents, but only with authorization for transactions between residents and non-residents.

Special Accounts: For funds of non-residents not eligible for credit to a Foreign Account. May be used by holder for personal expenses in Madagascar, subject to limitations.

Malawi:
Non-resident Accounts: Domestic currency accounts. May be credited with proceeds from sales of convertible currency, authorized payments in domestic currency by residents to non-residents and transfers from other non-resident accounts. May be debited for payments to residents and for holder's personal use while in Malawi.

Blocked Accounts: All debits and credits require prior approval. Interest is transferrable.

Mauritania:
Convertible Accounts: Domestic currency accounts. May be credited only with proceeds from sale of foreign exchange or transfers from other convertible accounts and Internal Non-resident Accounts. May be debited for any payment without Central Bank approval except payments made in foreign currency.

Internal Non-resident Accounts: Domestic currency accounts. May be credited with domestic currency.
Mauritius: **Sterling Area Accounts:** May be opened by residents in countries of the former Sterling Area (United Kingdom, the Channel Islands, the Isle of Man and the Republic of Ireland).

**External Accounts:** For non-residents of both Mauritius and the former Sterling Area.

**Blocked Accounts:** For funds made from investments before April 5, 1966 and funds of emigrants in excess of the emigration allowance.

Nigeria: **External Accounts:** May be credited with authorized payments by residents to non-residents, payments from other External Accounts and proceeds from sales of foreign currency. May be debited for payments to residents of Nigeria and purchases of foreign currencies.

**Non-resident Accounts:** May be credited only with funds derived from local sources with approval from the Central Bank.

**Blocked Accounts:** For funds blocked by directives under the Exchange Control Act.

Sierra Leone: **External Accounts:** Domestic currency accounts. For non-residents of both Sierra Leone and the former Sterling Area.

**Sterling Area Accounts:** Domestic currency accounts. For residents of the former Sterling Area countries.

**Blocked Accounts:** For non-transferable funds due to non-residents.

Somalia: **Non-resident Accounts:** Domestic currency accounts. May be opened by Somalia nationals residing abroad, foreign nationals, foreign institutions with diplomatic status and foreign companies in mineral prospecting or consulting.

**External Accounts:** U.S. dollar accounts. May be opened by Somalian workers abroad and under certain conditions, other Somalians.

Tanzania: **Convertible Non-resident Accounts:** Balances are eligible for transfer without scrutiny.

**Non-convertible Non-resident Accounts:** Balances transferrable only after approval by Central Bank. Six subcategories: External, Shipping/Airline, Special, Ordinary, Expatriate, and Unspecified.
Uganda: 

**External Accounts:** Domestic currency accounts. May be credited with authorized payments of residents to non-residents, transfers for other external accounts, and the proceeds from sales of foreign currency and gold. May be debited for payments to non-residents, and purchases of foreign currencies.

**Blocked Accounts:** For non-transferrable funds of non-residents.

Zaire:

**Non-resident Accounts in Zaire:** If opened by diplomatic missions and international organizations in Zaire, may be credited only with proceeds from the sale of foreign exchange and with payments from the government. May be debited only with approval by the Central Bank.

**Non-resident Foreign Currency Accounts:** May be credited freely. May be debited for transfers to accounts abroad, transfers to resident convertible accounts, transfers to non-resident Foreign Currency Accounts, sales of foreign currency. Non-residents may open these accounts freely, except Non-resident Zairian nationals require special permission.

**Convertible Accounts in Zaire:** May be credited with foreign currency exchanged at the official rate, transfers from another convertible account, payments by resident to non-residents. May be debited freely for conversion into foreign currency or payments in domestic currency. Can be held by residents and non-residents.

Zambia:

**External Accounts:** Domestic currency accounts. May be credited with payments from residents to non-residents, transfers from other External Accounts, and proceeds of sales of foreign currency. May be debited for any payments to residents, and purchases of foreign currency.

**Blocked Accounts:** For non-transferrable funds in domestic currency. Approval required for debits and credits except for permitted anniversary allowance for emigrants. Interest is transferrable.

Zimbabwe:

**Non-resident Accounts:** For non-residents who have never been resident. May be credited with foreign currencies, payments from other non-resident accounts, and payments by residents to non-residents. May be debited for payments to residents and payments abroad.

**Blocked Accounts:** For former residents who have emigrated. Credits and debits allowed subject to various exchange restrictions.
Restrictions on the Import and Export of Currency

Botswana: There are no restrictions on the import of domestic currency by travelers, but only a limited amount can be taken back out of the country. Business travelers are authorized a greater exchange allowance than tourist travelers. Tourist travel by temporary residents receives a greater remittance.

Burundi: Travelers may bring in and take out a limited amount of domestic currency. Residents must apply for needed exchange for travel. The amount granted depends on the nature of the travel. Emigrants can transfer abroad all their domestic currency, their unremitted savings and proceeds from the sale of their personal items. Fifty percent of income from rental properties can be transferred immediately. The balance plus interest can be transferred three years later.

Cape Verde: The import of domestic currency is prohibited as is its export. Foreign travelers may bring in foreign currency, but may only take out the same amount. Residents traveling must receive prior authorization. The amount remitted depends on the type of travel, and there are limits on the amount designated to each person per year.

Equatorial Guinea: Travelers may bring in a specified amount of domestic currency and can exit with the same amount. In addition, non-residents may bring in any amount of foreign currency, but can only take out an equal amount. An additional sum can be approved if obtained from a resident legally. Resident travelers are designated a certain amount of foreign exchange per year, depending on the nature of the trip.

Ethiopia: Travelers may import and re-export the same limited amount of domestic currency. Any amount of foreign exchange can be brought into the country, but its re-export is subject to authorization (except for temporary visitors). Travelers must apply for exchange and the amount designated depends on the nature of the trip and is subject to limitations. Foreign nationals working in Ethiopia take only 50 percent of their total earnings on departure. Other emigrants take only a limited amount of currency.

Gambia: The import of domestic currency is unrestricted, but only a limited amount can be exported. The export of pound sterling is subject to the same restrictions, but travelers may take out the amount declared upon entry of other currencies. Travel remittances for residents are awarded depending on if the travel is business, professional, official, or otherwise. The former types of travel receive higher remittances. Applications for excess amounts are approved if no capital outflow is involved.
Ghana: Travelers can bring in and take out the same limited amount of domestic currency. Any amount of foreign currency can be imported into the country, and only that amount can be re-exported. Foreign exchange is allocated for business travel in exceptional cases, but has been suspended for tourist travelers. Resident travelers can take foreign currency out of the country up to a limited amount.

Guinea: The import and export of domestic currency is prohibited. Foreign currency can be imported, but must be surrendered within 24 hours. This foreign exchange can be repurchased and re-exported after deduction for expenses. Each application for travel is approved individually; there is no official limit.

Guinea Bissau: Travelers may bring in any amount of foreign currency. Foreign exchange allocations for tourism have been temporarily suspended, but airline tickets can be bought with domestic currency. Foreign exchange allowances for business travel, for study abroad and for health reasons are granted up to a limited amount. Remittances to close relatives living abroad are permitted up to a limited amount.

Kenya: The import and export of domestic currency is prohibited, except Kenya residents traveling abroad can export and re-import a limited amount for local expenses on return. Any amount of foreign currency (except from Tanzania and Uganda) can be brought into the country and the same amount can be re-exported. There is an exchange allocation for travel, which is different, depending on the type of travel. Foreign nationals working in Kenya can remit a certain percentage of their incomes abroad. Non-resident property owners may also remit only a certain percentage of their rental income abroad. Residents must get exchange control approval to send abroad a cash gift exceeding certain limitations.

Madagascar: A limited amount of domestic currency can be imported and exported by travelers. Any amount of foreign currency can be brought into the country, and non-resident travelers can take out any such remaining currency. Resident travelers can purchase foreign exchange up to a specified limit depending on the type of travel and must surrender any excess on return. Applications for amounts above the specified amount are usually approved if the nature of the travel is not tourism. Foreign workers living in Madagascar can remit a limited amount of their salary abroad.

Malawi: Domestic currency can be imported and exported up to a specified limit. Any amount of foreign currency can be brought into the country, but only a limited amount can be re-exported. Foreign exchange is allocated to travelers in
an amount depending on the type of travel. Applications are accepted for amounts exceeding the limitations. Foreign nationals working in Malawi can remit a certain percentage of their income abroad.

Mauritania: The import and export of domestic currency is prohibited. Foreign exchange is allocated for travel expenses depending on the nature of travel. Foreign nationals working in Mauritania can remit a certain percentage of their income abroad, and on emigration can transfer all their assets abroad.

Mauritius: A limited amount of domestic currency can be imported and exported; the amount allowed to be imported is twice as much as that to be exported. There is no limit on the amount of foreign currency that can be brought into the country by non-residents, and the same amount can be exported upon departure. The amount of exchange awarded for travel depends on the nature of the travel. Salary remittances by foreign nationals must follow certain established limits.

Nigeria: Travelers may import and export a specified amount of domestic currency. Non-residents may bring in any amount of foreign currency and can re-export it on departure. Exchange is allocated for travel depending on the nature of the travel. Foreign nationals working in Nigeria can remit part of their income abroad.

Rwanda: A specified amount of domestic currency can be imported and exported. Any amount of foreign exchange can be brought into the country by non-residents and the same amount can be re-exported, less the amount of expenditures while in Rwanda. Foreign exchange for travel is allocated on an ad hoc basis, and the purchase of tickets for travel abroad requires the approval of the National Bank. Foreign nationals working in Rwanda can remit all of their income abroad, however, the Central Bank has a right to prescribe their transfer in installments.

Sao Tome & Principe: Travelers can bring in unlimited amounts of foreign exchange and can re-export that amount on exit less the sum of expenditures while in Sao Tome & Principe. Airline tickets for travel abroad can be purchased in domestic currency, and foreign exchange for expenses is allocated depending on the type of travel.

Sierra Leone: The import and export of domestic currency is limited to a specified amount. Non-residents may bring in any amount of foreign currency and may re-export it upon entry. Residents are entitled to a basic exchange allowance for travel abroad. This basic allowance is transacted at the commercial
market rate. Applications are considered for extra allocations, and when approved the foreign exchange must be purchased at the Central Bank's fortnightly auction.

Somalia:
The import and export of domestic bank notes is limited to a specific amount. Non-residents can bring in any amount of foreign exchange and on departure can take the same amount out. Foreign exchange is allocated for travel up to specified limits, depending on the nature of the travel.

Sudan:
The import and export of domestic currency is permitted up to a specified amount. The import of foreign exchange by travelers must be declared upon entry. Upon exit, proof of purchase through official means is required for an amount in excess of a specified limit. There is a specified exchange allocation for tourist travel to Egypt, but travel to other countries must be acquired outside of the banking system at the free market exchange rate. Foreign nationals working in Sudan are permitted to remit their savings abroad. Egyptian teachers can remit only a percentage of their income abroad.

Tanzania:
Residents may export a limited amount of domestic currency and re-import it upon return. Travelers may bring in an unlimited amount of foreign exchange, and non-residents can re-export this currency minus their expenses while in Tanzania. There are no exchange allocations for tourist travel, and residents may remit none of their income abroad to family. Non-residents may remit abroad a certain percentage of their income; this percentage can be increased if applied for through the Central Bank.

Uganda:
Travelers may export a limited amount of domestic currency and re-import the same amount on return. Travelers may bring in unlimited amounts of foreign currencies (specified by the Central Bank). There is an exchange allocation for business travel, medical treatment and higher level education. Foreign nationals working in Uganda can remit a specified percentage of their income abroad.

Zaire:
The export and import of domestic currency is prohibited. Travelers may bring in unlimited amounts of foreign exchange and can re-export that amount less expenses incurred while in Zaire. Non-residents may purchase airline tickets for travel with domestic currency, but there is an exchange allocation only for official travel. It is possible to purchase a limited amount of exchange for trips to Burundi or Rwanda. Foreign nationals working in Zaire may remit part of their income abroad.

Zambia:
Travelers may import and export a specified amount of domestic currency. Non-resident travelers may bring in unlimited amounts of foreign exchange, but resident travelers can only import a specified amount. There is an exchange
allocation for travel which depends on the nature of the travel. Foreign nationals working in Zambia on a contract made after December 4, 1971 can remit a specified percentage of their income abroad. There is a ceiling on the amount of currency that can be exported by these foreign nationals on departure.

Zimbabwe: There is a specified limited on the import and export of domestic currency. Any amount of foreign currency can be imported, and non-residents may take with them on departure the same amount less any foreign currency sold to authorized dealers. There is an exchange allocation for travel which depends on the nature of the trip. Emigrants may only take with them a specified amount of currency.

Table B1: Regression Data for the Black Market Rate Equation
1972 - 1982

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1/ Black market exchange rate.
Source: Pick's Currency Yearbook, various issues.
Quarterly rates derived by averaging end of month figures.

2/ Real effective official exchange rate, import weighted.
Source: IMF, International Financial Statistics, and IMF, Direction
Of Trade Statistics. Quarterly rates derived by averaging end of
month figures.

3/ Imports and exports.

4/ Government Policing Activity. \( p \) equals 1 when government increases
border control, and 0 otherwise. The variable was constructed from
statements in the text of Quarterly Economic Review of Ghana, Sierra
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Table B3: BLACK MARKET EXCHANGE RATES AND COCOA PRICES
GHANA, IVORY COAST, AND TOGO
1960-1981

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Source: Black Market Rates were obtained from Pick's Currency Yearbook (various issues). Because black market activity was negligible in Ghana from 1960-1962, and in the CFA countries from 1960-1970, the official rates from the IMF, International Financial Statistics were used for those years.

Cocoa Prices for Ghana and the Ivory Coast were obtained from the data used for World Bank (1982). For Togo, different World Bank Country Economic Memoranda were used. The cocoa price for Togo in 1962 is an estimate.
Table B4: REGRESSION DATA FOR COCOA SUPPLY EQUATIONS  
1960 - 1981

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<td>1.4</td>
<td>122.490</td>
<td>3.104</td>
<td>17.95</td>
<td>24.73</td>
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<td>81</td>
<td>49.7</td>
<td>1.7</td>
<td>119.270</td>
<td>2.798</td>
<td>19.51</td>
<td>25.49</td>
<td>0.262</td>
<td>0.358</td>
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</table>

1/ Because its computation depends upon an index of farmer effort and an index of tree yield, it does not have dimensions by itself.

2/ These ratios were obtained from Table B3.

Source: All data except the last two columns is taken from the data used for World Bank (1983).
Table B5: REGRESSION DATA FOR CURRENCY-DEMAND EQUATION
1965 - 1982

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<th>Year</th>
<th>C/M2 1/</th>
<th>Y 2/</th>
<th>R 3/</th>
<th>DCTBM 4/</th>
<th>D 5/</th>
<th>Instrumental Variable 6/</th>
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<td>0.377520</td>
<td>306.6560</td>
<td>3.5</td>
<td>1.000205</td>
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<td>1966</td>
<td>0.351490</td>
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<td>3.5</td>
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<td>1967</td>
<td>0.373560</td>
<td>290.8310</td>
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<td>1.017404</td>
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<td>1.011233</td>
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<td>1.014250</td>
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<td>1970</td>
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<td>318.5630</td>
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<td>1.010234</td>
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<td>1971</td>
<td>0.334480</td>
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<td>7.5</td>
<td>1.013289</td>
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<td>1972</td>
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<td>7.5</td>
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<td>1973</td>
<td>0.308750</td>
<td>308.6410</td>
<td>5.0</td>
<td>1.006045</td>
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<td>1974</td>
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<td>1975</td>
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<td>8.0</td>
<td>2.000000</td>
<td>1</td>
<td>16.51</td>
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</table>

1/ Currency to Money Supply Ratio.  

2/ GDP per capita, cedis.  
Source: The World Bank, World Tables.

3/ Savings Deposit Rate.  
Source: Bank of Ghana, Quarterly Economic Bulletin

4/ Domestic currency traded in the black market index.  
Source: Column (4) in Table 8.

5/ Dummy Variable for "unruly situations".  

6/ Real effective official exchange rate, import weighted.  
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