

## **Exchange Market Reform, Inflation, and Fiscal Deficits**

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This paper examines the effects of exchange market reform on inflation and quasi-fiscal deficits in developing countries. The first part presents the conceptual framework, which identifies a variety of implicit taxes and subsidies that must be taken into account (in addition to implicit taxes on exports, as emphasized by Pinto (1991)) in assessing the fiscal and inflationary effects of exchange market reform. A formula that attempts to capture explicitly these taxes and subsidies is derived. The second part applies the formula to six countries (Guyana, India, Jamaica, Kenya, Sierra Leone, and Sri Lanka). The results suggest that exchange market reform may lead to a significant reduction in reliance on the inflation tax.

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### **1. Introduction**

It is now well recognized that attempts at imposing restrictions on foreign exchange transactions conducted through official markets in developing

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countries have almost invariably led to the emergence of parallel markets. The evidence gathered in numerous studies suggests that the existence of such markets may entail a variety of economic costs, such as an increase in exchange rate and price volatility, a narrowing of the tax base (associated with the development of illegal activities), reduced flows of foreign exchange through official channels (as a result of the diversion of export remittances and private transfers from the official to the parallel market) and efficiency losses, resulting from incentives to engage in rent-seeking activities—such as corruption and bribery of government officials (Montiel, Agénor and Haque, 1993).

Recognition of the importance of these adverse and distortionary effects has led policymakers in many developing countries in recent years to seek ways to unify official and parallel markets for foreign exchange.<sup>1</sup> The purpose of this paper is to examine the effects of exchange market reform on inflation and quasi-fiscal deficits in developing countries. Our analytical framework is presented in Section II; it extends Pinto's (1991) analysis of the budgetary and inflationary effects of exchange market unification, which emphasizes the role of implicit taxation of exports. In particular, we identify a variety of implicit taxes and subsidies that are associated with multiple exchange rate regimes. Section III presents illustrative calculations of the net fiscal effect of exchange market reform for a group of developing countries that have recently attempted to unify their foreign exchange markets. Section IV summarizes the main results.

## **2. A Conceptual Framework**

The fiscal and inflationary effects of exchange market reform have been studied most notably by Pinto (1991). In Pinto's framework, exports are partly smuggled out and partly sold through the official market. As a result, the parallel market premium acts as an implicit tax on exports repatriated through official channels. By unifying foreign exchange markets, the government loses the tax revenue implicit in the premium. In the presence of fiscal rigidities, policymakers must compensate for a fall in revenue by an increase in monetary financing of the fiscal deficit and a higher tax on money holdings. The larger the implicit tax on exports is prior to reform, the larger will be the jump in inflation upon unification.

While the emphasis on the implicit taxation of exports appears warranted in view of the experience of some developing countries (notably

in Sub-Saharan Africa), Pinto's analysis neglects several potentially important sources of explicit or implicit taxes and subsidies that are often associated with informal dual exchange rate regimes.<sup>2</sup> The first important issue is the extent to which the assumption of the central bank being a net seller or a net buyer of foreign exchange affects Pinto's analysis of exchange market unification. In general, the existence of a large differential between the official and parallel exchange rates has been shown to carry significant implications for the quasi-fiscal deficit of the public sector (see for instance Leone, 1994). In conventional accounting terms, the Central Bank makes a profit every time it buys foreign exchange (from, say, exporters) at a given official rate and sells it to importers at a more depreciated rate. Conversely, it incurs a loss when it sells foreign exchange (to, say, the government) at the given official rate and buys it at a more depreciated rate. Put differently, if the central bank buys foreign currency from exporters at an exchange rate that is more depreciated than the rate at which it sells it to domestic agents, it will provide a net implicit subsidy. Both types of operations affect central bank profits and the consolidated public sector deficit.

If all sales and purchases occur at the official exchange rate, there will typically be no effect on the central bank's profit and loss account as conventionally calculated. However, in a broader economic sense, the central bank would still collect a net implicit tax or provide an implicit subsidy (depending on whether it is a net buyer or a net seller of foreign exchange) in the presence of a parallel market for foreign exchange—even if all its foreign exchange operations occur at the same official exchange rate. Formally, let  $E(S - P)$  denote the domestic-currency value (measured at the official exchange rate) of net sales of foreign exchange by the Central Bank. Assuming that the parallel exchange rate  $E^b$  is a good approximation of the "equilibrium" exchange rate, this quantity can be decomposed as

$$E(S - P) \equiv E^b (S - P) - (E^b - E)(S - P)$$

The first term on the right-hand side of this identity measures the "true" value—or shadow value, as defined by Ghei, Kiguel and O'Connell (1997)—of net sales of foreign exchange, while the second term measures the implicit profit or loss associated with an overvalued official rate. Since  $E^b - E$  is generally positive, this term will be negative (positive) if sales of foreign exchange are larger (smaller) than purchases. The central bank will therefore provide an implicit subsidy if it is a net seller of foreign exchange.

Conversely, the Central Bank will collect an implicit tax on private agents if it is a net buyer of foreign exchange.

Thus, in broad economic terms, whether exchange market unification raises or reduces implicit profits accruing to the Central Bank depends not only on the conventionally-measured quasi-fiscal effects of foreign exchange operations but also on whether the central bank is a net buyer or seller of foreign exchange.<sup>3</sup> Net sales to the private sector tend to generate losses while net purchases tend to generate profits. This is, in substance, the point emphasized by Pinto (1991). In Pinto's formal framework, all foreign exchange operations of the central bank (sales to the government as well as sales to private agents) take place at the official exchange rate; the central bank is a net buyer of foreign exchange from the private sector. As a result, therefore, prior to reform there exists a quasi-fiscal surplus (in a broad sense), which is eliminated by unification. In general, of course, this needs not be the case, as discussed above.<sup>4</sup>

In addition, there are a variety of implicit taxes and subsidies associated with multiple exchange rate regimes that are not directly related to foreign exchange operations between the Central Bank and domestic agents. In countries where inflows of foreign assistance take the form of direct budgetary support for the government, a depreciation of the official exchange rate towards its market value may raise revenue and reduce the deficit in domestic currency terms, whereas an appreciation would worsen the deficit.<sup>5</sup> In practice, exchange market unification has often taken place in the context of a comprehensive reform program calling for substantial aid inflows. In such conditions, the Central Bank's position can switch from being a net buyer to being a net seller of foreign exchange. Agents would thus expect a decrease, rather than an increase, in money financing of the fiscal deficit following unification. In other cases where guaranteed prices to local producers of exported goods are fixed in domestic currency terms, unification will tend to reduce expenditure and thus also reduce the fiscal deficit.

More importantly perhaps, as recently reemphasized by Burgess and Stern (1993) and Nashashibi and Bazzoni (1994), import taxes are an essential source of fiscal revenue in the developing world, notably in Sub-Saharan Africa. In many countries, the official rather than the parallel market exchange rate (which reflects the marginal cost of foreign exchange, and is often highly correlated with changes in domestic prices) is used for customs valuation purposes. This practice is tantamount to providing an implicit subsidy to importers.<sup>6</sup> In an inflationary environment, the size of this subsidy will tend to grow over time when the official, fixed exchange

rate serves as a basis for customs valuation of imports. Nashashibi and Bazzoni (1994) have argued that this was the case notably during the early 1980s in Nigeria, Tanzania and Zambia.<sup>7</sup> To the extent that the subsidies provided through this channel are large relative to the revenue generated from the implicit tax on exports, it is intuitively clear that the net effect of exchange market unification may be a *fall* in the steady-state inflation rate—in contrast to Pinto's view.

Estimating the net effect of exchange market unification on implicit taxes and subsidies depends, in particular, on whether the focus of attention is the quasi-fiscal balance of the Central Bank (in a broad sense), or the overall balance of the consolidated public sector. Let us begin by considering the effect on the Central Bank's accounts. Suppose that all central bank foreign exchange operations take place at the same exchange rate, so that profits and losses as conventionally estimated in measuring quasi-fiscal deficits do not exist. *Ceteris Paribus*, the net effect of unification on the monetary authorities' quasi-fiscal deficit (measured in percent of output,  $Y$ ) can be estimated by determining the net position of the central bank in terms of its foreign exchange operations, and taking into account the over-valuation of the official exchange rate:

$$\text{net effect} = 100\left(\frac{E^{eq}}{E^{in}} - 1\right)[(\theta \text{Exp} + P_0^{cb}) - S^{cb}]/Y, 0 < \theta \leq 1 \quad (1)$$

where  $E^{eq}$  is a measure of the "equilibrium" exchange rate (that is, an estimate of the "true" cost of foreign exchange),  $E^{in}$  the exchange rate prevailing immediately prior to reform,  $\text{Exp}$  officially-recorded exports (measured in domestic currency terms),  $P_0^{cb}$  other sources of foreign exchange for the central bank, such as disbursements of foreign assistance as well as purchases corresponding to foreign exchange operations with the private sector (such as those related to private unrequited transfers),  $S^{cb}$  the domestic-currency value of total sales of foreign exchange by the central bank to the rest of the economy (for the purpose of imports and other transactions in foreign exchange, such as external debt payments) at the official exchange rate, and  $\theta$  the "effective" surrender requirement imposed on exporters (including public enterprises), which may differ—in countries where enforcement is weak—from the legislated surrender rate. The expression in (1) measures the difference between the implicit revenue resulting from acquisition or purchases of foreign exchange at the official exchange rate and the implicit subsidy provided to buyers of foreign exchange. The formula indicates that, as long as the central bank is a net buyer of foreign exchange prior to reform ( $(\theta \text{Exp} + P_0^{cb}) - S^{cb} > 0$ ), the quasi-

fiscal deficit of the monetary authorities will deteriorate after reform—assuming, in particular, that inflows and sales of foreign exchange by the central bank are not immediately and directly affected by the reform.<sup>8</sup> Conversely, if the central bank is a net seller of foreign exchange prior to reform (and is thus incurring an implicit loss), the quasi-fiscal balance will improve.

We now turn to the determination of the effects of foreign exchange market reform on the consolidated public sector, which we define as consisting of the central bank and the rest of the public sector (that is, the government and public enterprises). To do so requires accounting for *a*) foreign exchange operations of the rest of the public sector; and *b*) the implicit subsidies provided to importers as a result of taxation of foreign goods at the official exchange rate prior to reform.

Regarding the first issue, the rest of the public sector buys foreign exchange for the purpose of imports and servicing its external debt, whereas it sells foreign exchange obtained through disbursements of foreign loans, grants, or export proceeds of public enterprises. Assuming that all such operations are conducted through the central bank, deriving the net effect of exchange market unification on the broadly-defined quasi-fiscal deficit of the consolidated public sector requires netting out sales of foreign exchange by the rest of the public sector to the central bank (or equivalently purchases of foreign exchange by the central bank from the rest of the public sector, denoted by  $P_g^{cb}$ ), and sales by the central bank to the rest of the public sector (or purchases by the rest of the public sector from the central bank) for the payment of its imports and other foreign exchange transactions ( $S_g^{cb}$ ) from our formula (1):

$$\text{net effect} = 100 \left( \frac{E^{eq}}{E^{in}} - 1 \right) [ (\theta \text{Exp} + P_0^{cb} - P_g^{cb}) - (S^{cb} - S_g^{cb}) ] / Y, \quad (2)$$

since the rest of the public sector's net foreign exchange position is  $(S_g^{cb} - P_g^{cb})$ . If the foreign exchange operations of the rest of the public sector are approximately balanced, then formulas (1) and (2) will yield equivalent results.

Regarding the second issue, let  $I$  be the domestic-currency value of total imports, and let  $t_I$  denote the average (effective) rate of taxation of imports. Assuming that tariff duties are assessed on imports valued at the official exchange rate,<sup>9</sup> our modified formula becomes

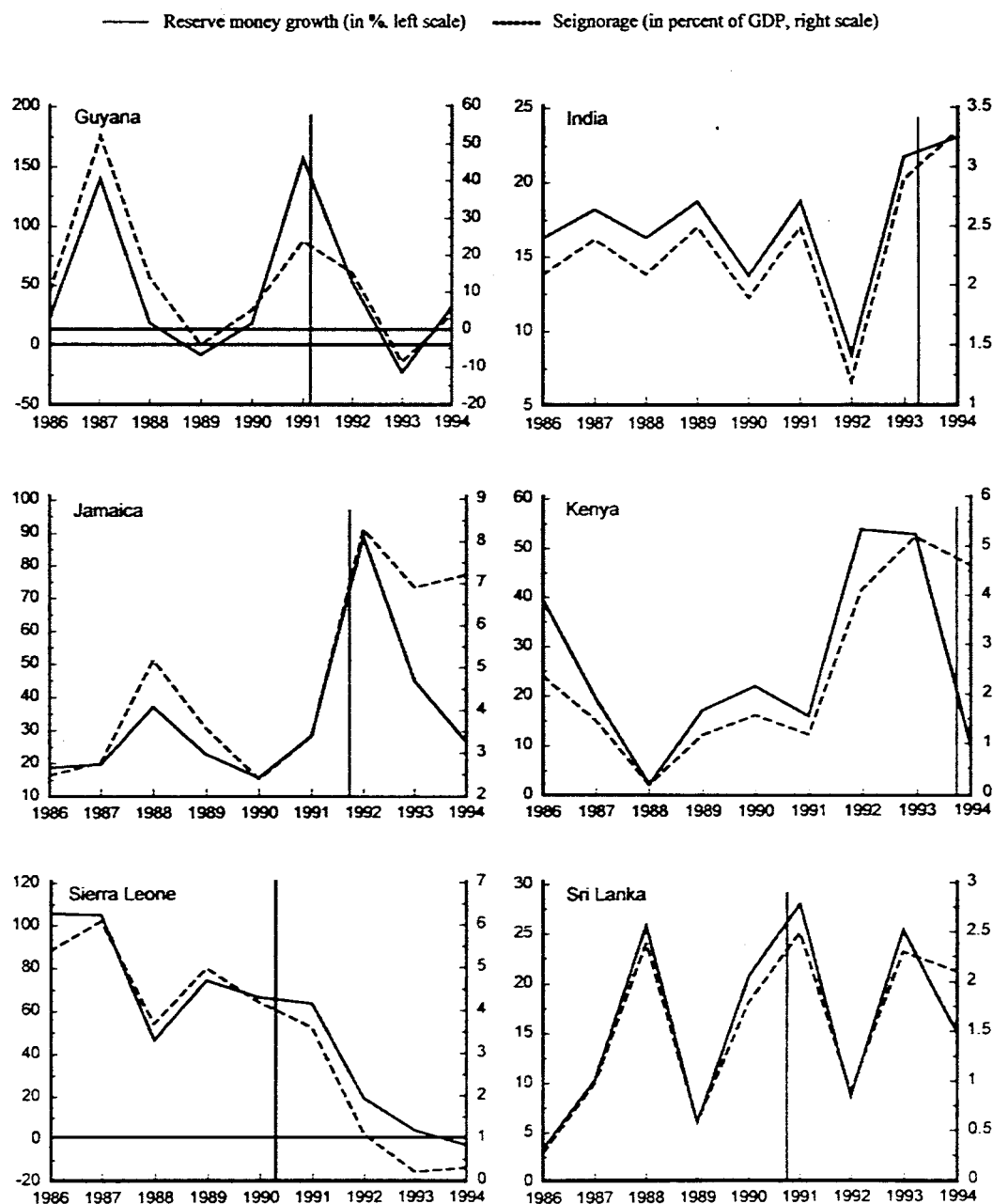
$$\text{net effect} = 100 \left( \frac{E^{eq}}{E^{in}} - 1 \right) [ (\theta \text{Exp} + P_0^{cb} - P_g^{cb}) - S_P^{cb} - t_I I ] / Y, \quad (3)$$

where  $S_P^{cb} \equiv S^{cb} - S_g^{cb}$  denotes sales of foreign exchange by the central

bank to the private sector. For a positive premium, the sign of the expression in brackets in (3) therefore determines whether exchange market unification leads to the elimination of an implicit subsidy to the private sector (which is the case if the expression in brackets is negative), thereby worsening the (broadly-defined) consolidated public sector deficit—and eventually increase reliance on the inflation tax, as discussed above.<sup>10</sup>

### **3. Illustrative calculations**

In practice, estimating the net effect of exchange market reform on implicit tax and subsidy schemes is a complex and difficult task. A first approach consists in examining to what extent the reliance on seigniorage as a source of fiscal revenue changes in the aftermath of reform. Figure 1 shows the experience of a group of countries (Guyana, India, Jamaica, Kenya, Sierra Leone, and Sri Lanka) that attempted to unify their foreign exchange markets in recent years, and suggests that, in that regard, the results are mixed.<sup>11</sup> In terms of pre- and post-reform averages, seigniorage revenue appears to have declined in the case of Guyana and Sierra Leone, was broadly unchanged in Sri Lanka, and increased significantly in Jamaica. Although it is too early to pass judgement, it also appears to have increased in Kenya and India. Clearly, it is difficult to attribute the developments in inflation and seigniorage revenue to the impact of exchange market reform per se, particularly in cases where reform was part of a comprehensive stabilization package or structural adjustment program. However, judging from the cases reviewed here, and in contrast to Pinto's (1991) analysis, one could surmise that the outcome of reform was generally positive—an example of "pleasant quasi-fiscal arithmetic", to use the expression of Ghei, Kiguel and O'Connell (1997). Specifically, as noted in Agénor and Ucer (1995), inflation remained broadly under control in almost all countries, or at least displayed a reversal from an increasing trend—despite the mixed picture on the seigniorage front. It is possible that this favorable outcome might have partly resulted from downward revision in inflationary expectations, fostered by significant fiscal adjustment. Furthermore, taking into account the reserve build-up in virtually all countries, it appears that most of the increase in reserve money reflected changes in the foreign component of the monetary base, rather than a recourse to monetary financing of fiscal deficits, as evidenced in low levels of credit growth (Agénor and Ucer, 1995). Jamaica is a case in point.



Source: International Monetary Fund.

Note: A vertical line indicates the date of exchange market reform (see Agénor and Ucer, 1995).

FIGURE 1 Unification Attempts: Reserve Money Growth and Seignorage

As indicated above, to estimate the full potential effect of exchange market reform on quasi-fiscal deficits and inflation requires consideration of all public sector entities, rather than only the central bank. We, nevertheless, used formula (3) to estimate the potential effect of exchange market reform on quasi-fiscal deficits and inflation.



The first step is to determine, as indicated earlier, whether the Central Bank is a net buyer/net seller of foreign exchange. To do so we use changes in net foreign assets of the Central Bank which, by definition, should reflect developments in the Bank's net foreign exchange position; or equivalently the net effect of market sales and purchases. Thus, when changes in the net foreign asset position of the central bank are broadly negative prior to reform (indicating a net seller position), the central bank should be gaining from reform as long as the post-reform exchange rate is more depreciated than the official pre-reform rate. Admittedly, this is a crude indicator. It would require several adjustments, most notably pertaining to foreign exchange operations of the rest of the public sector channelled through commercial banks, valuation changes (owing to exchange rate movements) as well as developments in specific items in the central bank's balance sheet, such as international arrears as well as the effect of changes in world interest rates on international reserves. Increases in net foreign assets may thus reflect other factors than "purchases" of foreign exchange—such as operations related to exports repatriated at the official exchange rate—or acquisition of foreign exchange (such as through official borrowing and foreign grants). Furthermore, owing to the existence of multiple exchange rates in many cases prior to reform, specific components of the central bank's foreign exchange budget would need to be tracked down to determine transactions conducted at these multiple exchange rates—as conventionally done in estimating quasi-fiscal deficits. Nevertheless, changes in net foreign assets of the central bank are still a useful estimator to calculate the net amount of subsidies provided, or taxes levied, by the central bank. Furthermore, we also take into account post-reform fiscal gains from international trade taxes. By adding the two figures, we then obtain some measure of the net effect of reform at the level of both monetary and fiscal authorities, as summarized in equation (3).

We use the post-reform exchange rate as a proxy for the equilibrium rate.<sup>12</sup> To obtain a proxy for the net foreign exchange position of the central bank, we take an average for three years prior to the year of reform. As regards the premium, we use the differential between the post- and pre-reform rates, and take 12-months average around the month of reform. We use that same rate at each period, as an average indicator for the extent of disequilibrium.

Our results are summarized in Table 1.<sup>13</sup> They indicate that the implicit revenue derived by the Central Bank amounted to 0.2 percent of GDP for India and Jamaica, -0.2 percent for Kenya, -21 percent for Sierra Leone, and approximately 0 for Sri Lanka. Thus, while the Central Bank might have been benefiting slightly from operating with an overvalued exchange rate in India and Jamaica, in the case of Sierra Leone it was experimenting siz-

TABLE 1 Fiscal Effects of Foreign Exchange Market Unification

	<i>Guyana</i>	<i>India</i>	<i>Jamaica</i>	<i>Kenya</i>	<i>Sierra Leone</i>	<i>Sri Lanka</i>
<i>Date of Unification</i>	<i>Feb. 1991</i>	<i>Mar. 1993</i>	<i>Sep. 1991</i>	<i>Oct. 1993</i>	<i>May 1990</i>	<i>Aug. 1990</i>
	(units of domestic currency per US dollar)					
Official Exchange Rate <sup>1/</sup>						
Pre-unification	41.0	26.0	9.0	52.4	83.7	39.8
Post-unification	122.5	31.4	22.4	60.8	195.2	40.8
	(percent)					
Inflation <sup>2/</sup>						
Pre-unification	64.4	11.2	14.8	20.9	91.4	11.1
Post-unification	16.2	8.3	50.1	39.7	62.5	10.2
	(in percent of GDP)					
Period (t-1)						
Change in NFA						
of the Central Bank <sup>3/</sup>	-63.7	0.6	-2.5	-0.1	-18.2	-0.5
Implicit revenue <sup>4/</sup>	-126.5	0.1	-3.7	-0.0	-24.3	-0.0
International trade taxes	6.2	3.7	6.6	2.0	4.0	6.5
Subsidy to importers <sup>5/</sup>	12.3	0.8	9.8	0.3	5.3	0.2
Net implicit revenue <sup>6/</sup>	-138.9	-0.6	-13.5	-0.3	-29.6	-0.2
Period (t-2)						
Change in NFA						
of the Central Bank <sup>3/</sup>	-192.9	1.8	-1.7	-1.5	1.9	-1.2
Implicit revenue <sup>4/</sup>	-383.4	0.4	-2.6	-0.2	2.5	-0.0
International trade taxes	5.3	3.9	6.1	3.0	3.7	5.6
Subsidy to importers <sup>5/</sup>	10.5	0.8	9.1	0.5	4.9	0.1
Net implicit revenue <sup>6/</sup>	-393.9	-0.4	-11.6	-0.7	-2.4	-0.2
Period (t-3)						
Change in NFA						
of the Central Bank <sup>3/</sup>	-5.3	0.4	4.6	-1.5	-31.9	-0.5
Implicit revenue <sup>4/</sup>	-10.4	0.1	6.8	-0.2	-42.5	-0.0
International trade taxes	3.8	4.0	6.3	3.3	2.4	6.6
Subsidy to importers <sup>5/</sup>	7.6	0.8	9.4	0.5	3.2	0.2
Net implicit revenue <sup>6/</sup>	-18.0	-0.8	-2.6	-0.8	-45.7	-0.2
Average						
Change in NFA						
of the Central Bank <sup>3/</sup>	-87.3	0.9	0.1	-1.0	-16.1	-0.8
Implicit revenue <sup>4/</sup>	-173.5	0.2	0.2	-0.2	-21.4	-0.0
International trade taxes	5.1	3.9	6.3	2.8	3.4	6.2
Subsidy to importers <sup>5/</sup>	10.1	0.8	9.4	0.4	4.5	0.2
Net implicit revenue <sup>6/</sup>	-183.6	-0.6	-9.3	-0.6	-25.9	-0.2

Source: Author's calculations; World Economic Outlook: staff reports.

<sup>1/</sup> 12-month averages around the month of reform, and maintained constant across periods below; for Kenya 11-months average only.

<sup>2/</sup> 3-year annual averages.

<sup>3/</sup> Stock figures are for Guyana, Kenya, and Sri Lanka, end of December; for India and Jamaica, end of March; for Sierra Leone, end of June. A positive sign indicates a net buyer position of the central bank.

<sup>4/</sup> Premium multiplied by the change in net foreign assets in domestic currency. See equation 3 in the text. A positive sign indicates an implicit revenue on foreign exchange operations of the central bank.

<sup>5/</sup> Premium multiplied by international trade taxes. A positive sign indicates a subsidy to the importers.

<sup>6/</sup> Net revenue to the fiscal and monetary authorities: implicit revenue to the central bank adjusted for subsidy to importers.

able losses. As regards the subsidy provided to importers through taxation at the official exchange rate, given the relative importance of international trade taxes (measured in percent of GDP) in all these countries, the effect appeared very large. The net subsidy to importers amounted prior to reform to about 10 percent of GDP for Guyana and Jamaica, 5 percent for Sierra Leone, 1 percent for India, 0.4 percent for Kenya, and 0.2 percent for Sri Lanka. Consequently, the net overall effect of operating an overvalued official exchange rate turned out negative in virtually all cases, indicating large losses prior to reform to the monetary and fiscal authorities combined—and large gains associated with unification. Everything else equal, therefore, the net effect of exchange market reform appeared to have been a reduction in the (broadly-defined) quasi-fiscal deficit of the central bank and the fiscal authorities, thus reducing also reliance on seigniorage revenue. This conclusion appears to be consistent with our review of country experiences.

Our findings compare well with those obtained in a recent study by Ghei, Kiguel and O'Connell (1997), which summarizes the results of a World Bank research project on parallel exchange markets involving detailed case studies of exchange market reform in eight developing countries during the 1980s (Argentina, Ghana, Mexico, Sudan, Tanzania, Turkey, and Zambia). The sample of countries reviewed by Ghei, Kiguel and O'Connell (1997) covers both cases of rapid unification (Argentina at the end of 1989, Mexico in December 1987, and Venezuela in February 1989), and cases of gradual unification (Ghana, Sudan, Tanzania, Turkey, and Zambia). An important finding of the country studies reviewed by Ghei, Kiguel and O'Connell is that the existence of a parallel market for foreign exchange was often associated with large quasi-fiscal losses.<sup>14</sup> To a large extent, these implicit losses (which therefore did not appear directly in budgetary accounts) resulted from net sales of foreign exchange to the private sector at below market exchange rates. Ghana, Mexico, Tanzania, Venezuela and Zambia, in particular, incurred large (broadly-defined) quasi-fiscal losses as a result of the existence of parallel markets in foreign exchange.<sup>15</sup> In Venezuela for instance, the loss was estimated at between 4.7 to 25.4 percent of GDP, depending on the value used to measure the "true" market value of foreign exchange. In most of these countries (particularly Mexico, Venezuela and Zambia), the reason why the central bank was a net seller of foreign exchange was related to the position of the consolidated public sector as a net "producer" of foreign exchange, either as a result of large external transfers to this sector, or because public sector enterprises were among the main exporters of the economy—thus repre-

senting “captive sources” of foreign currency. In a few other cases, such as Argentina and Tanzania, the central bank was a net buyer of foreign exchange from the private sector, thus generating sizable profits. Ghei, Kiguel and O’Connell (1997) estimate that on net the multiple exchange rate system in Argentina led to profits of the order of 3.5 percent of GDP, while in Tanzania it generated a positive effect on the domestic currency budget equivalent on an annual basis to 2.1 percent of output.<sup>16</sup> As argued earlier, therefore, exchange market reform has led to lower reliance on inflationary finance in some cases—Venezuela, for instance—by reducing the broadly-defined quasi-fiscal deficit.<sup>17</sup>

#### **4. Summary and Conclusions**

In recent years, growing recognition of the substantial economic costs associated with the distortions induced by large differentials between official and parallel exchange rates has led numerous countries to attempt to unify their foreign exchange markets in the context of their stabilization and adjustment programs. The purpose of this paper has been to examine the fiscal and inflationary effects associated with the unification process.

Pinto’s (1991) analysis of the unification process emphasized that the loss of the implicit tax on exports induced by exchange market unification may lead to a permanently higher inflation in the presence of fiscal rigidities. We argued in Section II that, in addition to issues raised in Pinto’s analysis, there are a variety of implicit taxes and subsidies that must be taken into account in assessing the fiscal effects of exchange market reform. The first issue is to determine whether in general the public sector is a net buyer or a net seller of foreign exchange. The second and perhaps more important issue for many countries is to assess the extent to which the use of the official exchange rate for the valuation of imports for duty purposes provides an implicit subsidy to importers. Pinto’s (1991) emphasis on the inflationary effect of the loss of the implicit tax on exports is therefore not necessarily warranted. It was argued in particular that if the reduction in implicit subsidies to importers resulting from levying tariffs at the official exchange rate outweighs the loss in implicit taxes levied on exports repatriated at the official rate, exchange market reform may lead to a fall in the inflation.<sup>18</sup> Although accounting for all implicit and explicit taxes in existence prior to reform is difficult in practice, we provided illustrative results in Section III for several developing countries (Guyana, India,

Jamaica, Kenya, Sierra Leone, and Sri Lanka) that have attempted to unify their foreign exchange markets in recent years. These results, which accord well with some recent studies, suggested that unification of foreign exchange markets may indeed lead to lower reliance on seigniorage.

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### Endnotes

1. In choosing the post-reform regime, an increasing number of countries have tended to adopt an interbank market, owing in part to its more flexible nature (Galbis, 1993).
2. Some of the fiscal effects discussed below were recognized very early on in the literature on multiple exchange rate regimes. See notably Bernstein (1950) and Sherwood (1956).
3. Put differently, there are two types of quasi-fiscal taxes and subsidies: those generated by different exchange rates being applied to particular categories of foreign exchange transactions; and those that are related to the existence of a parallel exchange market, where the exchange rate reflects better than the (overvalued) official rate the marginal value of foreign exchange. Both sets of taxes and subsidies are in a sense implicit, but the former are reflected in (or can be traced from) the accounts of the central bank more directly than the latter.
4. Morris (1995) shows formally that in Pinto's model, if it is assumed that the government is a net seller of foreign exchange—so that, for instance, a devaluation of the official exchange rate lowers the rate of money creation—exchange market unification will lead to a reduction in inflation in the steady state.
5. This point has been emphasized by Kaufman and O'Connell (1997). It should be noted, however, that if foreign assistance is treated as a financing item (as is often the case), valuation changes would have no effect on the deficit. The composition of public expenditure financed by foreign aid may, nevertheless, affect indirectly the level of implicit subsidies.
6. If imported goods sold on the domestic market are valued at market-clearing exchange rate and prices, indirect taxes on domestic sales (such as a value added tax or excise duties) will not be subject to distortions of this type. However, to the extent that the exchange rate used to value imports is more depreciated than the equilibrium rate, indirect taxes will provide an implicit revenue (see below).
7. A large premium may also act to reduce declared imports, thereby lowering revenue from import taxes by reducing the tax base. There is, however, an offsetting wealth effect which may dominate the former in a general equilibrium context.
8. The assumption that exchange market reform has no immediate effect on offi-

cially-recorded exports and sales of foreign exchange by the central bank—thereby allowing us to focus only on valuation effects—is not necessarily appropriate. To the extent, for instance, that exchange market unification eliminates incentives to smuggle and underinvoicing of exports, officially-recorded flows of exported goods may be subject to large and immediate shifts. Similarly, a large jump in the relative price of imports (associated with a significant depreciation of the official exchange rate upon unification) may sharply curtail demand for foreign goods and reduce sales of foreign exchange by the central bank. In practice, indirect effects can also be large: exchange market reform may take place in the context of a comprehensive adjustment program which calls for large inflows of capital to the public sector at the outset.

9. Importers may value taxable imports at the parallel (more depreciated) exchange rate, rather than the official exchange rate, to increase their domestic access to foreign exchange. However, they would have no incentives to do so if the tariff rate is higher than the parallel market premium. To the extent that some transactions prior to reform are conducted at market-related exchange rates, our formula would overestimate the subsidy provided to importers.
10. As noted earlier, to the extent that the domestic sale price of imports ( $I$ , valued as before at the official exchange rate) tends to reflect an exchange rate  $E^{do}$  that is more depreciated than the “equilibrium” exchange rate  $E^{eq}$ , the public sector would also realize an implicit revenue on the indirect taxation (at the effective rate  $t_d$ ) on the sale of imported goods, equal to  $t_d I (E^{eq} / E^{in}) (E^{do} / E^{eq} - 1) / Y$ , which would lower the cost of the implicit subsidy to importers.
11. The experience of these countries with exchange market reform is reviewed in detail in the working paper version of this article (Agénor and Ucer, 1995).
12. An alternative approach, followed by Ghei, Kiguel and O’Connell (1997), consists in using the pre-reform parallel exchange rate as a proxy for the equilibrium rate. However, such a rate may be subject to severe distortions. To the extent that exchange market reform is accompanied by the removal of restrictions on foreign exchange transactions, the use of the market-related, unified rate prevailing immediately after reform as we do here may be more appropriate.
13. Additional details on our calculations are provided in the footnotes to Table 1.
14. Evidence for other countries also suggests the existence of sizable losses associated with multiple exchange rate systems. For instance, the multiple exchange rate system operating in Peru prior to unification is believed to have generated foreign exchange losses of the order of 2 percent of GDP.
15. In addition, the high premium that prevailed in Ghana in the early 1970s had an adverse effect on declared exports and imports, which limited the revenue generated by trade taxes.
16. However, the figure cited above for Tanzania is a 15-year average, and is somewhat deceiving. Kaufman and O’Connell (1997) have argued that persistent parallel market premia during the 1980s were driving activity increasingly underground (with a concomitant loss in tax revenue), and that by the mid-1980s, large quasi-fiscal losses were being incurred.
17. Ghei, Kiguel and O’Connell do not present systematic evidence suggesting that the inflation rate rose or fell in the aftermath of the unification attempts. As noted above, isolating the effect of exchange market reform on inflation is in any case difficult.

18. It is perhaps worth noting that, in practice, the effect of exchange market unification on inflation may not be in the same direction as the effects on the fiscal accounts—even if the economy is on the “correct” side of the inflation-tax Laffer curve. This is because unification may be part of an overall package of financial liberalization. For instance, if capital controls are liberalized at the same time as exchange market unification occurs (a likely case in practice) large shifts in portfolio composition may take place. If the overall package of financial reform lacks credibility, large capital outflows may take place, with potential effects on the monetary base and inflation. We are grateful to an anonymous referee for drawing our attention to this issue.