



# IMF Working Paper

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## Welfare Effects of Uzbekistan's Foreign Exchange Regime

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**IMF Working Paper**

European II Department

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Authorized for distribution by Leif Hansen

March 2000

**Abstract**

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In addition to transferring about 16 percent of GDP from exporters to importers, Uzbekistan's quasi-fiscal multiple exchange rate regime generates identifiable welfare losses of 2-8 percent of GDP on import markets and up to 15 percent on export markets. These excess burdens have increased substantially with the growing difference of exchange rates. The welfare analysis allows some conclusions regarding the optimal reform strategy: (i) welfare losses will decline overproportionally as exchange rates unify; (ii) exchange rate unification should be supplemented by changing the explicit fiscal system; (iii) at a minimum, Uzbekistan would benefit from moving to an explicit fiscal regime.

JEL Classification Numbers: F31, H29

Keywords: Multiple Exchange Rates, Welfare Analysis, Quasi-Fiscal Operations, Uzbekistan

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<sup>1</sup> The second author was an USAID fiscal policy advisor to the Ministry of Finance of Uzbekistan until December 1999. We would like to thank Galina Kostina for excellent research assistance and Leif Hansen, Wolfgang Wiegard, Tom Wolf, Jorge Márquez-Ruarte, Oleh Havrylyshyn, and Christian Mumssen for helpful comments. All remaining errors are ours.

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## I. INTRODUCTION

In January 1997, Uzbekistan formally (re)introduced a system of multiple exchange rates and restrictions on current account transactions with the aim of promoting import substituting industries, protecting foreign exchange reserves and subsidizing basic food imports. Several recent studies have dealt with the effects of this system on sectoral distribution, foreign investment and macroeconomic stability.<sup>2</sup> However, its consequences for economic efficiency and welfare, while acknowledged, have so far received little attention. This paper, which builds on an earlier article by Rosenberg, Ruocco, and Wiegard (1999) tries to address this question. Specifically, it attempts to identify and quantify the substantial microeconomic distortions on export and import markets that result from the existence of at least three distinct exchange rates in Uzbekistan. This analysis also shows how a simple exercise in welfare economics can provide insights into the appropriate sequencing of reforms. The approach presented here may thus serve as a blueprint for structural policies aiming at the removal of distortions in general.

Section II gives an overview of Uzbekistan's existing foreign exchange regime and the size of the foreign exchange flows involved. Section III discusses the quasi-fiscal nature of Uzbekistan's multiple exchange rate practices and provides arguments as to why it would be preferable to make implicit taxes and subsidies explicit in the budget. Special attention is given to the role of the central bank following the decree of July 1, 1998 which redirected some transactions to the commercial banks' market for foreign exchange. Section IV concentrates on the efficiency effects of the foreign exchange regime. These are highlighted in a brief theoretical analysis followed by some rough empirical estimates of the welfare losses involved. (The mathematics derivation of the equations to calculate net welfare losses is presented in Appendix I). The analysis is performed in the context of a static partial equilibrium model, which captures both the implicit taxation of exports and the implicit subsidization of priority imports. As welfare effects depend on elasticities (which are unknown), the estimates are based on a sensitivity analysis. The paper concludes with some remarks about the implications of this welfare analysis for the sequencing of reforms.

## II. UZBEKISTAN'S FOREIGN EXCHANGE REGIME SINCE 1996

Uzbekistan is one of only a few transition countries<sup>3</sup> that operates a segmented foreign exchange market and multiple exchange rates, in connection with strict controls of export and import markets. Basically, the foreign exchange market is split into three segments: two official and one unofficial.

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<sup>2</sup> See World Bank (1999), IMF (1998), IMF (2000), Terterov (2000).

<sup>3</sup> Among the countries of the Baltics, Russia, and other countries of the Former Soviet Union, only Belarus and Turkmenistan apply similar foreign exchange regimes to that of Uzbekistan.

In 1997, the largest segment was the so-called *auction market* at the Uzbek Republican Currency Exchange (URCE). In this market, the government determines administratively an appreciated exchange rate, well below the market clearing level. Since at this rate, demand for foreign exchange exceeds supply, the government has to restrict access and enforce supply. The supply of foreign exchange to the URCE mainly derives from the mandatory surrender of all foreign exchange proceeds from "centralized exports," in particular gold and cotton fiber which make about two-thirds of the country's total export earnings. On the demand side, the Republican Monetary Commission (RMC) decides who may buy foreign exchange at the URCE and how much. Access to the auction market rate is granted to certain importers of capital goods, raw materials, grains and some high-priority consumer goods as well as enterprises servicing foreign loans guaranteed by the government. Requests for foreign exchange have to be submitted by selected banks on behalf of their clients. The government itself also acquires foreign exchange at the URCE, mainly in order to service its own external debt. Starting in mid-1998, access to this market became somewhat more restricted (at least by law). Commercial banks were generally granted access to the URCE at the more depreciated commercial bank exchange rate (see below), with the profit from the exchange rate difference accruing to the central bank.

The second official segment of Uzbekistan's foreign exchange market is the *commercial bank market*, where commercial banks and exchange bureaus trade foreign exchange with other banks, enterprises and individuals. Formally, the commercial exchange rate is freely determined but in practice it is administratively set by the government below the market-clearing level. Until mid-1998, this rate was not allowed to deviate by more than 12 percent from the auction market exchange rate, but following a decree of July 1, 1998,<sup>4</sup> this margin has been adjusted upward.

In response to excess demand at this appreciated rate, the government also restricts access and enforces supply in this market. On the supply side, exporters in 1997 and 1998 had to surrender 30 percent of all foreign exchange proceeds from decentralized (i.e., non-gold and non-cotton fiber) exports; effective January 1, 1999, the surrender requirement was increased to 50 percent. The mandatory surrender had to be at the more appreciated auction rate until July 1, 1998, but is now at the commercial bank rate; in this connection, the buy/sell spread for commercial banks has been reduced from 12 percent to about 3 percent. In addition, the Central Bank of Uzbekistan (CBU) sells foreign exchange to commercial banks from the 100 percent surrender for centralized exports; in doing so, the CBU benefits from the growing spread between the auction rate and the commercial bank rate (see Box 1). On the demand side, only a limited number of traders are permitted to buy foreign exchange at the commercial bank market, and they need to obtain a special license and a foreign

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<sup>4</sup> Presidential Decree UP-2010 "On Measures to Further Develop and Liberalize the Off-Auction Foreign Exchange Market."

### Box 1. Quasi-Fiscal Operations Through the Central Bank

The decree of July 1, 1998 opened a new source of profit for the CBU, as it was now allowed to buy foreign exchange at the auction rate and sell it at the more depreciated commercial banks' exchange rate. In conventional accounting terms, this profit is recorded in the capital accounts of the CBU's balance sheet. These are augmented every time the CBU sells foreign exchange to a licensed importer or a commercial bank.<sup>1</sup> *Ceteris paribus*, these foreign exchange operations have reduced the growth of reserve money as the CBU withdrew money from the economy by implicitly taxing exporters. They, therefore, acted as an automatic stabilizer within a rather loose monetary policy.

This accounting profit only partly reflects the quasi-fiscal operation incurred by a central bank in a situation with a parallel market-determined exchange rate. In economic terms, the central bank makes an implicit profit or loss every time it buys or sells foreign exchange at the artificially appreciated exchange rate (see, for example, Agénor and Ucer, 1995, pp. 26-27). This is because the true market clearing exchange rate more accurately reflects the true marginal value of foreign exchange than the overvalued official exchange rates. Thus, there is an implicit tax (subsidy) associated with the central bank's foreign exchange operations if it is a net buyer (seller) of foreign exchange. This holds even in a situation when the central bank sells foreign exchange at the same rate as it buys it.

The table below summarizes the CBU's quasi-fiscal operations due to the existence of multiple exchange rates, including buying and selling foreign exchange at below market rates. To do this, one needs to estimate the true market exchange rate; here we choose a weighted average of the existing exchange rates using the relative share of the three market segments.

	1997		1998		1999	
	1 <sup>st</sup> half	2 <sup>nd</sup> half	1 <sup>st</sup> half	2 <sup>nd</sup> half	1 <sup>st</sup> half	2 <sup>nd</sup> half
	(In millions of U.S. dollars)					
CBU inflows	894	1,292	938	1,125	729	784
Gold production	392	359	341	339	323	337
Centralized exports (mainly cotton)	502	933	596	786	406	446
CBU outflows	1,441	1,501	1,095	982	984	576
CBU direct sales for priority purposes	1,441	1,501	1,095	502	503	402
CBU sales to commercial banks	0	0	0	480	481	174
	(In millions of sum, unless otherwise indicated)					
Balance of implicit taxes (+) and subsidies (-)	-11,934	-4,908	-4,817	14,293	-19,558	46,616
(as a percentage of GDP)	-3.8	-0.8	-1.0	1.5	-2.7	3.4
Because of different legal exchange rates	0	0	0	6,941	11,481	7,995
Because of buying/selling below estimated market clearing exchange rate	-11,934	-4,908	-4,817	7,352	-31,039	38,621
<i>Memorandum item:</i>						
Estimated market clearing exchange rate (average, sum per U.S. dollars)	80	98	116	156	237	320

Source: CBU; and authors' own calculations.

<sup>1</sup> The accounting profit can be calculated as the difference between the two exchange rates multiplied by the amount of foreign exchange sold. See Mackenzie and Stella (1996), pp. 20-21.

exchange quota from the RMC. Individuals are only allowed to purchase small amounts of foreign exchange for a very limited number of purposes, such as pilgrimages or authorized study abroad.

An inevitable consequence of these strict regulations of official markets for foreign exchange is the emergence of an *unofficial (illegal) curb market* for foreign exchange. The exchange rate on this market is largely determined by the demand that cannot be satisfied on the two official markets. Therefore, the curb market premiums reflect, inter alia, the extent to which access to the official markets is restricted. The mark-up for foreign exchange on the domestic curb market was about 100 percent until mid-1998, but has since increased to more than 400 percent (see Figure 1).

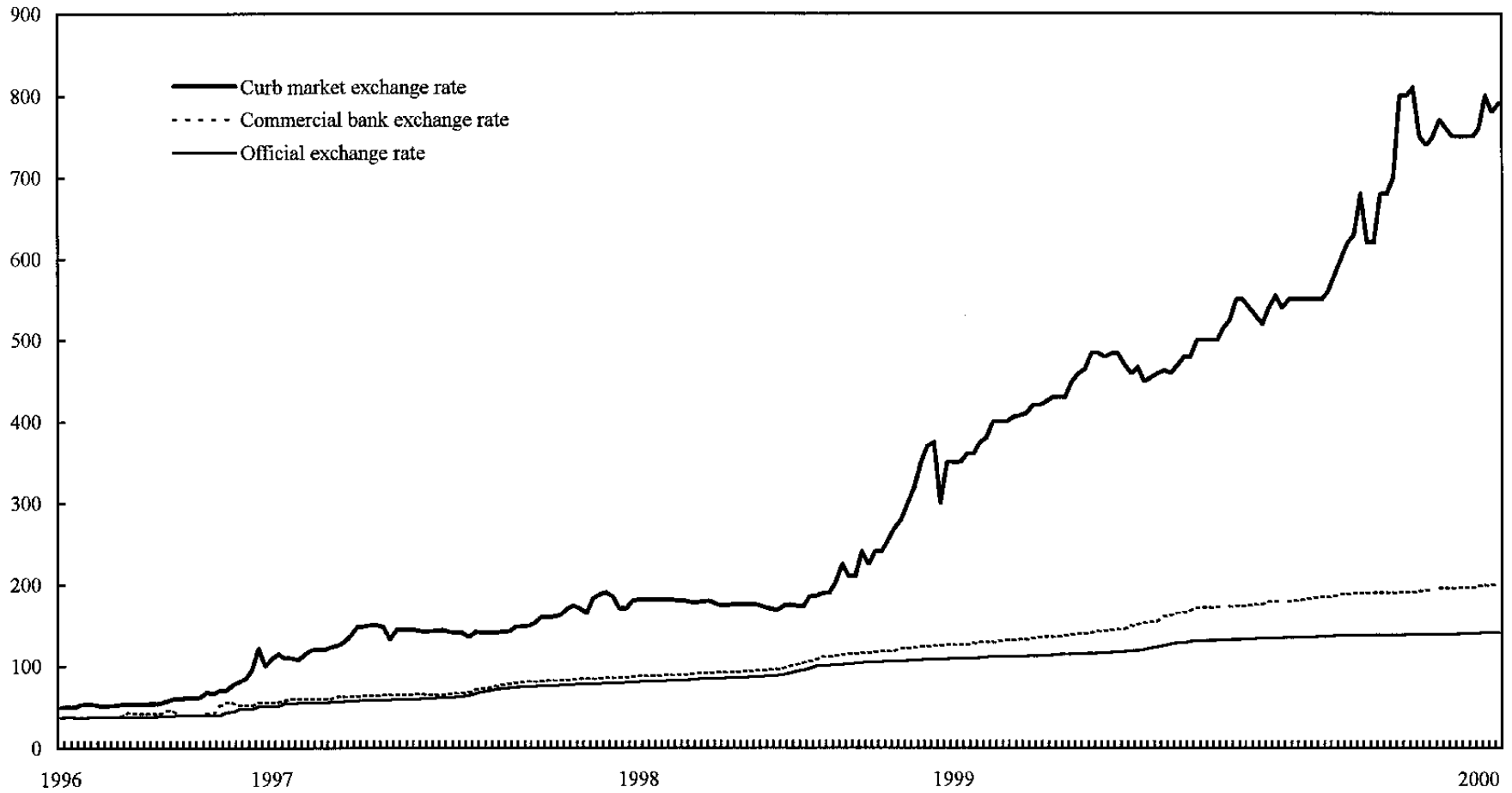
In addition, there is a *non-cash offshore curb market* where the exchange rate is up to 50 percent more depreciated than at the domestic curb market, due to the existence of cash withdrawal restrictions in Uzbekistan's banking system. However, the size of this market is unknown and it is less observable than the other three. For the sake of simplicity we exclude this market segment from our further analysis.

Figure 2 shows foreign exchange flows in Uzbekistan's two official markets in the three years following the introduction of convertibility restrictions in late 1996. Total inflows declined because low commodity prices (especially for gold and cotton) in combination with the overvalued official exchange rate, convertibility restrictions and a general deterioration of the business climate led to a decline of exports and foreign direct investment as well as an increase of unofficial capital outflows. As one can see from Figure 2, the government reacted to this trend by curtailing currency conversions for imports and by drawing down foreign assets. In addition, there were substantial unrecorded foreign exchange transactions on the illegal curb market. One estimate by the World Bank (1999, p. 113) puts purchases on this market segment in 1997 at some US\$1.4 billion or 26 percent of all foreign exchange sales, excluding capital account transactions (Table 1).<sup>5</sup>

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<sup>5</sup> Sales of foreign exchange may in fact be higher, as households and enterprises build up cash foreign exchange assets. Persistently high inflation rates, restrictions in the banking system and negative real interest rates discourage savings in national currency.

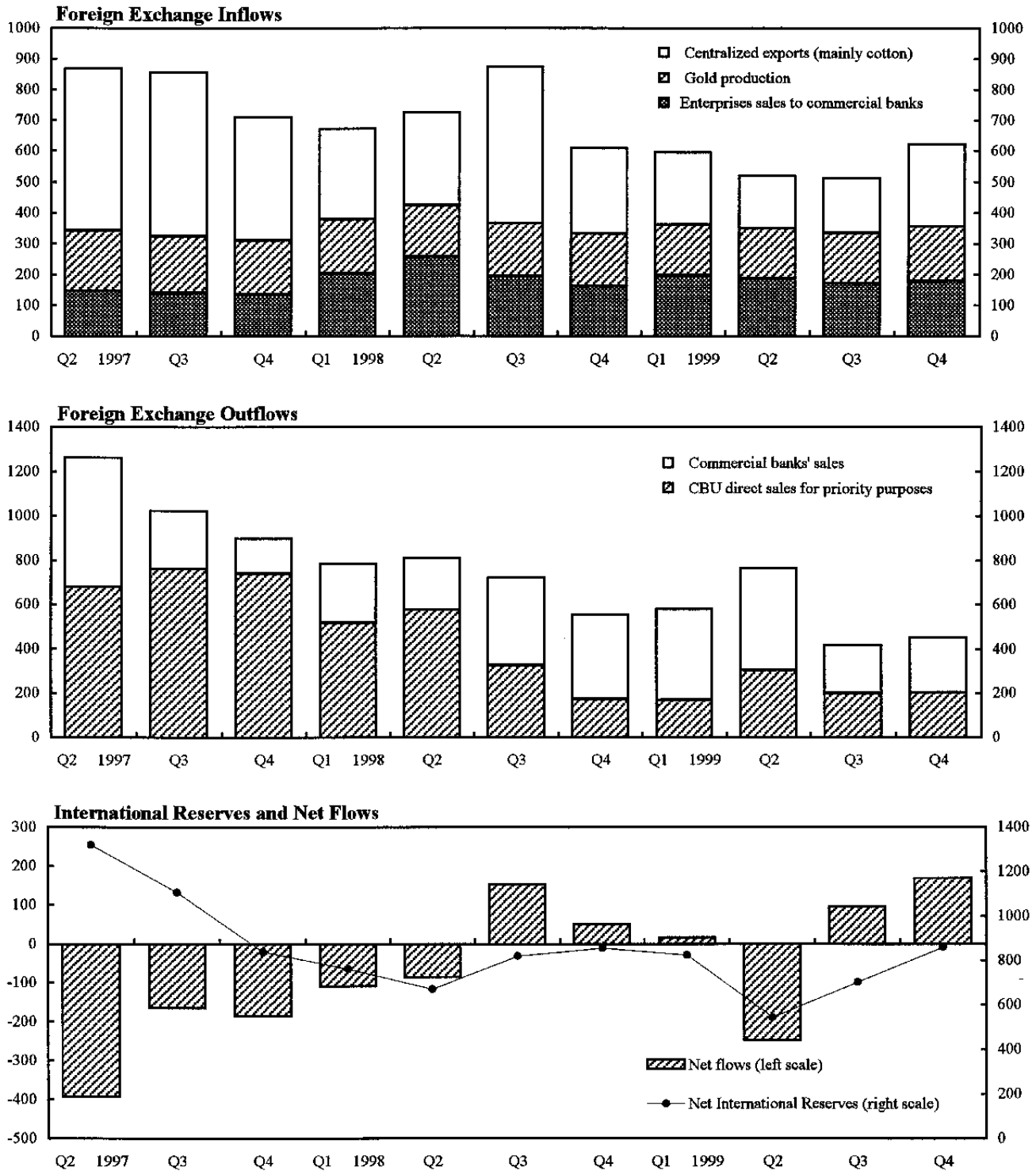
Figure 1. Uzbekistan: Exchange Rates, April 30, 1996 - January 1, 2000  
(In sums per US dollar)



Sources: Central Bank of Uzbekistan; and IMF staff estimates.



Figure 2. Uzbekistan: Banking System Foreign Exchange Flows, 1998-99  
(In millions of US dollars)



Sources: Central Bank of Uzbekistan; and authors' own calculations.

Table 1. Uzbekistan: Average Exchange Rates and Market Shares, 1997-99  
(In sums per U.S. dollar)

	Average Exchange Rates			Estimated Market Share		
	Auction market (CBU)	Commercial bank market	Curb market 1/	Auction market (CBU)	Commercial bank market	Curb market
				(In percent)		
1997	67	75	150 (124 %)	55	19	26
1998	95	105	270 (184 %)	39	31	30
1999	125	163	540 (334 %)	26	39	35

Sources: CBU; World Bank (1999), p. 113; and authors' own calculations.  
1/ Curb market premium in parenthesis.

The shares of the three market segments have shifted markedly since 1996. Following the essence of the decree in July 1998, some foreign exchange purchases were moved from the auction market (at the official exchange rate) to the commercial bank market (at the commercial bank exchange rate). The curb market gained importance as tightened convertibility restrictions led more and more importers to purchase foreign exchange illegally.

### III. QUASI-FISCAL OPERATIONS THROUGH THE FOREIGN EXCHANGE REGIME

Governments can collect revenues and redistribute income among sectors and household groups by means other than explicit taxes and subsidies. Such activities are usually referred to as quasi-fiscal operations because they are fiscal in all but name although they are often carried out by central banks and other public financial institutions.<sup>6</sup> The Uzbek authorities use a wide range of such mechanisms, including multiple currency practices, inflation tax, subsidized and directed lending, non-remunerated reserve requirements and credit ceilings, price interventions in product markets and wage regulation. Of these, the multiple currency regime is probably the most significant—although it is in the nature of quasi-fiscal operations that they cannot be easily quantified. According to one study (IMF, 1998, pp. 58-68), the array of implicit taxes and subsidies related to multiple currency practices amounted to almost 13 percent of GDP in 1997, if one assumes a hypothetical market clearing rate for that year of sum 100 per U.S. dollar. As will be shown below, the size of these government activities has increased in the years 1998–99 as the difference between the official exchange rates and the true market clearing rate widened. In addition, the changes introduced in July 1998 have made the system more complex, certainly with regard to the CBU's quasi-fiscal operations (see Box 1).

<sup>6</sup> For a survey of quasi-fiscal operations in general, see Mackenzie and Stella (1996).

In this paper, we concentrate on the immediate impact of multiple exchange rates on legal export and import markets alone, i.e., we abstract from their side effects on illegal trade, households, banks and the budget. These are partly dealt with in IMF (1998, pp. 58-68) and World Bank (1999, pp. 17-24).

The quasi-fiscal impact of Uzbekistan's multiple exchange rate regime on exporters and importers can be illustrated by means of a simple numerical example which assumes no behavioral reactions (i.e., elasticities of zero). Suppose that the true market clearing exchange rate is sum 200 per U.S. dollar (US\$). In total, exporters of some commodity, say cotton, receive US\$500 million by selling their commodity on the world market. Now, the government forces cotton exporters, by means of a 100 percent surrender requirement, to sell their foreign exchange to the central bank at an appreciated exchange rate of sum 100 per U.S. dollar. The quasi-fiscal tax on cotton exports is then calculated as

$$(200 - 100) \text{ sum/US\$} \times \text{US\$500 million} = \text{sum 50,000 million.}$$

If the central bank was selling foreign exchange at sum 200 per U.S. dollar, this amount would accrue as central bank profit. Thus the implicit export tax would not appear in the government's budget as export tax revenue but as a profit transfer from the central bank (provided, of course, that a profit sharing arrangement exists). This is not the case if the government (or the central bank on behalf of the government) sells its foreign exchange at the same overvalued exchange rate of sum 100 per U.S. dollar to selected importers, say those of capital goods such as machinery. Assuming for a moment that total imports at world market prices are equal to centralized exports, i.e., US\$500 million, the implicit import subsidy would be

$$(200 - 100) \text{ sum/US\$} \times \text{US\$500 million} = \text{sum 50,000 million.}$$

In this case, the net effect of quasi-fiscal operations would be zero and even consolidation of the central bank's accounts with the government's budget would give no indication of the implicit taxation of cotton exports and subsidization of capital good imports. If priority imports are less than cotton exports, the central bank in our example would make a profit. For example, in case centralized exports are US\$500 million and centralized imports are only US\$300 million, the CBU's extra profit would amount to

$$(200 - 100) \text{ sum/US\$} \times \text{US\$}(500 - 300) \text{ million} = \text{sum 20,000 million}$$

If, as is partly the case in Uzbekistan since July 1998, the central bank sells foreign exchange to importers at a more depreciated exchange rate than the one it applies to exporters, say sum 150 per U.S. dollar, and imports are again US\$500 million, its subsidy would be reduced to

$$(200 - 150) \text{ sum/US\$} \times \text{US\$500 million} = \text{sum 25,000 million}$$

with the remaining sum 25,000 million accruing to the central bank as profit.

The example and the numbers are not too far from reality in Uzbekistan. Table 2 shows the implicit tax rate applying to (legal) exports and the implicit subsidy applying to (legal) imports for 1997-99. The indicative (equilibrium) exchange rate is calculated as the weighted average of the three existing exchange rates, using the market shares shown in Table 1. This is, of course, only a rough approximation of the true market clearing rate, which would depend on factors beyond the scope of this paper. However, the indicative exchange rate may suffice to illustrate the magnitude of transfers and distortions involved.

Table 2. Uzbekistan: Implicit Tax and Subsidy Rates  
on Foreign Trade, 1997-99  
(In percent, unless otherwise indicated)

	1997	1998	1999
<b>Implicit tax rates</b>			
Centralized exports	26	37	56
Other exports	5	9	21
<b>Implicit subsidy rates</b>			
Centralized imports	26	37	56
Other imports	17	30	43
<i>Memorandum items:</i>			
Surrender requirement on non-centralized exports	30	30	50
Official exchange rate (sum/U.S. dollar, average)	67	95	125
Commercial banks' exchange rate (sum/U.S. dollar, average)	75	105	163
Curb market exchange rate (sum/U.S. dollar, average)	150	270	540
Indicative exchange rate (sum/U.S. dollar, average)	90	151	285

Sources: CBU; and authors' own calculations.

Not surprisingly, implicit tax and subsidy rates applying to foreign trade operations have more than doubled with the increase of the curb market premium which started in the summer of 1998. Note, however, that the implicit tax rate on non-centralized exports is much lower than that on centralized exports both because the more depreciated commercial bank exchange rate applies and only a part of foreign exchange receipts needs to be surrendered.

The size of the quasi-fiscal transfer between exporters and importers can be calculated by comparing the domestic currency equivalent of foreign exchange flows based on actually applied exchange rates with those based on the market clearing rate. Table 3 shows that producers of centralized exports are the main losers, paying an implicit tax to the tune of 12 percent of GDP in 1999, while the recipients of foreign exchange through official channels gained about 15 percent of GDP. Both the implicit tax and subsidy burden have increased over the last three years, despite the fact that the U.S. dollar value of foreign trade declined. In 1997, the subsidy for imports was higher than the tax on exports because the

CBU drew down net reserves. After the changes to the foreign exchange regime in July 1998, the CBU moved from being a net loser to becoming a net gainer, which explains why for 1998 as a whole implicit taxes exceed implicit subsidies. This trend continued in 1999, especially after the CBU substantially reduced its foreign exchange sales in the second half of the year (see Box 1).

Note that in addition to the transfer from legal exports to legal imports examined here, there is an equivalent implicit subsidization of illegal exports and implicit taxation of illegal imports (which benefit/suffer from the overly depreciated curb market exchange rate). The size of this transfer cannot be quantified since the size of these illegal transactions is unknown. It can be assumed, however, that this set of quasi-fiscal transfers has increased with the widening of the exchange rate premium and the rise of the shadow economy.

Table 3. Uzbekistan: Implicit Taxes and Subsidies  
on Foreign Trade, 1997-99  
(In percent of GDP)

	1997	1998	1999
<b>Foreign exchange inflows</b>	<b>6.0</b>	<b>10.7</b>	<b>16.2</b>
Centralized exports	5.2	8.1	11.8
Cotton	3.4	5.4	6.7
Gold	1.8	2.7	5.2
Other exports	0.9	2.6	4.4
<b>Foreign exchange outflows</b>	<b>8.5</b>	<b>10.4</b>	<b>15.1</b>
Centralized imports	7.0	6.3	7.1
Other imports	1.5	4.1	8.0

Sources: CBU; and authors' own calculations.

Quasi-fiscal operations through the foreign exchange regime not only redistribute resources between sectors. As is the case with any government intervention that distorts relative prices, they also cause efficiency losses. In principle, these welfare effects are the same as an equivalent explicit system of taxes and subsidies. For example, the government could levy an export tax equivalent to the difference between the official exchange rate and the hypothetical market clearing rate on centralized exports. Nevertheless, direct government interventions such as price regulations combined with outright rationing cause larger microeconomic distortions than interventions such as explicit taxes. The size of these excess burdens of multiple exchange rate practices is the subject of Section IV.

Note that the equivalence of explicit and implicit government intervention also applies to the welfare-theoretical argument that the government is unlikely to be sufficiently informed about consumers' preferences and investors' profits to make decisions on the Pareto-optimal

ranking of imports. Nevertheless, the Uzbek authorities do not justify their market interventions by the existence of negative market externalities, but rather insist that the government knows better than the private sector whose imports benefit the country, especially in the long term.<sup>7</sup>

Before turning to the exact nature and size of the welfare losses associated with Uzbekistan's foreign exchange regime, let us review the reasons why an explicit fiscal regime would be preferable to the implicit system practiced now.

First, the present system suffers from a **lack of transparency**. Because of the hidden nature of quasi-fiscal operations, policy makers as well as voters have no clear picture of the existence of the tax or subsidy, its size, and the extent to which it was intended by the government. There is little accountability, putting the system at odds with a main principle of democratic administration. For example, the rules determining eligibility for currency conversion are established without a mandate by parliament. In a sense, implicit taxation is similar to tax evasion where the taxpayer does not report that he should pay tax—implicit taxation means that the government does not report that it is taxing.

Secondly, quasi-fiscal operations through the foreign exchange regime confine the **government's flexibility when conducting fiscal policies**. While revenues from explicit taxation can be saved or spent on the provision of public and merit goods (which are recognized to be a welfare-neutral form of public expenditure), implicit tax "revenues" from Uzbekistan's foreign exchange regime cannot be used for anything else but the subsidization of certain industries. Thus, the system automatically generates distortions both on the revenue and expenditure side. Moreover, the size of implicit subsidies is determined arbitrarily by the amount of implicit tax revenues which are funding them. An explicit import subsidy combined with a free market for foreign exchange would not have these drawbacks.

Third, multiple exchange rate practices entail a considerable **administrative burden**. Issuing foreign exchange licenses and quotas is not only a costly and inefficient use of the government's administrative resources, it also invites corruption and rent-seeking behavior. This is particularly the case if, as is the case in Uzbekistan, many different agencies and officials are involved in the approval process. One of the macroeconomic implications is that such a cumbersome and corruption-prone system discourages foreign direct investment and exports, thus putting further pressure on the balance of payments.

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<sup>7</sup> See, for example, the following quote from an Uzbek government publication: "There is also great demand for foreign currency from shuttle traders importing consumer goods of unknown firms, without quality certificates. This cannot be considered sound from an economic point of view. Currency regulations, including restrictions on convertibility, prevent the influx of such goods" (Chepel, 1998).

Finally, multiple exchange rate practices introduce an element of **uncertainty regarding the availability of foreign exchange**. This encourages dollarization with all its associated problems for the sustainability of the banking system and monetary policy (see Baliño, Bennett and Borensztein, 1999). More generally, it impedes planning by economic agents and implicitly imposes a risk premium to doing business in Uzbekistan.

#### IV. THE WELFARE COSTS OF MULTIPLE EXCHANGE RATES

In this section we attempt to identify and quantify some of the welfare losses associated with Uzbekistan's foreign exchange regime. As shown in Section III, there is no difference from the welfare analytical point of view between the effects of explicit and implicit taxes and subsidies. Therefore, we can use standard trade theory when analyzing the welfare costs associated with the quasi-fiscal operations which is the subject of this paper. For simplicity, we abstract from other distortions in these markets, such as state procurement at below market prices and government subsidies for inputs.<sup>8</sup> We also omit an analysis of the welfare effects arising from the implicit subsidization of illegal exports and implicit taxation of illegal imports mentioned above. A formal variant of the model (described in Appendix I) allows us to calculate the actual size of the net welfare losses involved, depending on some rough parameterizations.

##### A. Theoretical Considerations

The welfare effects of taxes and subsidies are typically examined in a static partial equilibrium model of an open economy using the concept of consumer and producer surpluses, the so-called Harberger triangles. A graphical exposition can be found in any standard textbook on foreign trade. For an application to the case of Uzbekistan's quasi-fiscal foreign exchange operations, see Rosenberg, Ruocco and Wiegard (1999).

First, consider the welfare effects on the exports side. If Uzbekistan is modeled as a small open economy (i.e., it is a price taker for all of its exports), it faces a horizontal excess demand curve from the rest of the world. By imposing an implicit export tax (equivalent to the difference between world market prices at the official and the market clearing exchange rate), the government gains some implicit revenue in the form of cheap foreign exchange. On the other hand, the implicit export tax causes economic distortions and leads to a decrease of the producer surplus. In the small country case, the latter unambiguously outweighs the increase in consumer surplus and the country on balance loses economic welfare.

This may change if Uzbekistan is modeled as a sufficiently large exporter, for example of cotton fiber. In this case, the country faces an upward sloping rather than horizontal excess world demand function. By imposing an implicit export tax and hence curtailing its own supply of cotton to world markets, Uzbekistan could tilt the terms of trade of cotton in its own favor and gain welfare at the expense of the rest of the world. In theory,

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<sup>8</sup> These are partly analyzed in Rosenberg, Ruocco and Wiegard (1999).

the authorities could set an “optimal” exchange rate differential (equivalent to an optimal export tax) where the welfare gain and the implicit tax revenue outweigh the domestic distortions. The exact result will depend on the elasticities of demand and supply. When setting such an optimal export tax, the authorities may also want to take into account possible retaliations from trading partners as well as the size of the welfare cost imposed on the rest of the world. The latter may be of particular importance if Uzbekistan aims at acceding the WTO.

Does Uzbekistan indeed have some monopolistic power on world cotton markets that would allow it to affect the international terms of trade in its favor? In the 1997–98 harvest season, Uzbekistan had a share in world exports of cotton fiber of about 15 percent (second after the United States) and a share in world production of about 6 percent, suggesting that it may indeed be able to drive up world market prices by keeping its crop in stock. In practice, however, the country is very much dependent on the foreign exchange earned from its cotton crop and has therefore shown no signs that it is deliberately curtailing its supply. On the contrary, the authorities have made the increase of cotton yields one of their main priorities. Moreover, the quality of Uzbek cotton is below average, limiting its market power further. Finally, the empirical evidence of the last years does not seem to support a role for Uzbekistan as a price maker: while cotton production in Uzbekistan has steadily fallen, so have world cotton prices. We can therefore safely ignore the case of Uzbekistan as a large country.

Now consider the implicit subsidy granted to those importers who have access to foreign exchange at the preferential exchange rates. Again, Uzbekistan loses welfare if modeled as a small, price taking country for imports. In the unlikely event that Uzbekistan can be considered a “large country” (maybe for the import of specialized capital goods, such as cotton harvesting machines), the standard model leads to the conclusion that it unequivocally loses net welfare. This is because the improvement of the terms of trade for imported machinery is more than compensated by the loss of producer surplus due to subsidization. If the country wanted to use its market power, it should tax not subsidize certain capital goods imports.

## B. Quantitative Analysis

The net welfare effects of implicit taxation and subsidization can be quantified by using a standard partial equilibrium model. For simplicity, consider the more realistic case of Uzbekistan as a small open economy, both for exports and imports. We assume a constant elasticity export supply function.

$$P^X = BX^\beta \quad \beta > 0 \quad (1)$$



with  $P^X$  the export price (measured in foreign currency units) and  $X$  the exported quantity and the export elasticity defined as

$$\varepsilon_{XP} := \frac{dX}{dP^X} \frac{P^X}{X} = \frac{1}{\beta} \quad (2)$$

After a number of manipulations, which are shown in Appendix I, the net welfare losses can be expressed as a function of implicit tax revenues and elasticities.

Table 4 shows the net welfare losses in 1997-1999 as a percent of GDP for alternative export elasticities. Overall, welfare losses increase with export elasticities, which is in line with the Ramsey rule. Most importantly, our calculations show that welfare losses have increased more than proportionally during the past three years.<sup>9</sup> As the difference between the administered exchange rates and the true market clearing exchange rate has widened, Uzbekistan's foreign trade has become increasingly distorted and inefficient. This is, *inter alia*, reflected in the decline of foreign trade and the low quality of government-subsidized investments.

Table 4. Uzbekistan: Net Welfare Losses on Exports Markets, 1997–99

	1997	1998	1999
<b>Centralized exports</b>	Implicit tax rate (in percent)		
	26	37	56
Elasticity	Net welfare loss (in percent of GDP)		
0.5	0.42	1.09	3.22
1.0	0.88	2.34	7.47
1.5	1.42	3.88	13.49
<b>Other exports</b>	Implicit tax rate (in percent)		
	5	9	21
Elasticity	Net welfare loss (in percent of GDP)		
0.5	0.01	0.06	0.29
1.0	0.02	0.13	0.59
1.5	0.04	0.20	0.94

Sources: CBU; and authors' own calculations.

The sensitivity analysis shows that for a plausible range of parameter values the welfare loss for centralized exporters is much larger than for other exporters facing a lower

<sup>9</sup> This confirms a standard result in the theory of taxation. See for example Connolly and Munro (1998, pp. 196-202).

implicit tax burden. This is the case even if we assume that for centralized exports (mainly cotton and gold) the elasticity is less than unity, which seems more likely, at least in the short term.<sup>10</sup> The results highlight the need to address the overvaluation of the official exchange rate and the 100 percent surrender requirement for cotton and gold producers. Unifying only the curb market exchange rate with the commercial banks' exchange rate, as is sometimes suggested, would do little to reduce the efficiency losses entailed by Uzbekistan's foreign exchange regime.

The calculation of the welfare effects of subsidizing imports is analogous to the export side. Table 5 shows the results, again for a range of plausible parameter values. As on the export side, the net welfare loss increased more than proportionally as the implicit subsidy rates more than doubled over the past three years. While in 1997 the total welfare loss due to these subsidies was less than 2 percent of GDP, it was in the range of 2 to 8 percent of GDP in 1999.

Table 5. Uzbekistan: Net Welfare Losses on Imports Markets, 1997-99

	1997	1998	1999
<b>Centralized imports</b>	Implicit subsidy rate (in percent)		
	26	37	56
	Net welfare loss (in percent of GDP)		
Elasticity			
0.5	0.52	0.72	1.44
1.0	0.98	1.33	2.51
2.0	1.79	2.32	3.99
<b>Other imports</b>	Implicit subsidy rate (in percent)		
	17	30	43
	Net welfare loss (in percent of GDP)		
Elasticity			
0.5	0.07	0.37	1.11
1.0	0.13	0.69	2.01
2.0	0.25	1.24	3.42

Sources: CBU; and authors' own calculations.

<sup>10</sup> One may argue that the short-term supply elasticity of cotton is close to zero since inputs provided under the government procurement system are fixed and state orders aim at maximizing production irrespective of world prices. In practice, however, farmers have resorted to illegal exports in order to avoid the implicit taxation through the overvalued exchange rate. Therefore, their surrenders of cotton to the government for legal exports (which are captured here) in effect depend on the producer price in foreign currency terms.

Note that in general one cannot simply add up the excess burdens from Table 4 and Table 5, not even if expressed in monetary terms. The reason is that the two distortions partly overlap each other, for instance when the subsidization of exporters partly compensates for the implicit tax imposed on them. Some other caveats are in place when drawing conclusions from these calculations: the additional welfare effects from implicitly taxing and subsidizing illegal trade are omitted; export and import markets are not independent from one another; consumer and producer surpluses are of limited importance in the case of multiple price changes; and results may change if Uzbekistan is modeled as a large open economy, especially on the export market for cotton. Finally, the standard "second best" argument holds.

## V. CONCLUSIONS AND POLICY IMPLICATIONS

This paper focused on the welfare effects associated with the multiple exchange rate practices in Uzbekistan.<sup>11</sup> An analysis of the implicit tax on centralized exports and the implicit subsidy on preferential imports shows that there now is a (measurable) net transfer of about 16 percent of GDP from exporters to importers. For plausible elasticity values, the efficiency loss caused by this quasi-fiscal operation is between 2 and 8 percent of GDP for importers and up to 15 percent of GDP for exporters, but may be much larger if the distortions in the growing illegal trade are included; the welfare loss is especially strong for centralized exports of cotton and gold, the sectors which are faced with the most unfavorable exchange rates. With increasing implicit subsidy rates (measured by the difference between the official and hypothetical market clearing rate), the welfare loss on the import side is limited to the amount actually spent on imported goods. With increasing implicit tax rates, the welfare loss on the export side increases with the elasticity of export supply and is theoretically unlimited. Welfare losses may be somewhat smaller if Uzbekistan has some monopolistic power on the world cotton market.

Several policy conclusions arise from our analysis. First, Section III showed that even if the welfare effects of explicit and implicit taxes and subsidies are the same, there are several reasons why an explicit fiscal system would be preferable. These include considerations of: (i) transparency, accountability and associated issues of governance; (ii) the government's flexibility to conduct fiscal policy; (iii) the administrative costs; and (iv) uncertainty.

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<sup>11</sup> In addition, Uzbekistan's foreign exchange regime has implications for economic equity. The implicit tax on centralized exports (mainly cotton) is regressive, as it levies a heavy burden on the poorest part of the population, i.e., agriculture. The same applies to the expenditure side: social assistance through price regulation is not targeted to the poor, but extended to all consumers of certain commodities, including the higher income groups. Moreover, rationing of scarce capital or foreign exchange is usually associated with favoritism and outright discrimination.

Secondly, the analysis shows that welfare losses rise more than proportionally with the implicit taxation or subsidization, approximated by the ratio of the curb market exchange rate and the official exchange rate. Thus, the rise of the curb market premium from 100 percent to more than 400 percent inflicts growing efficiency losses on the Uzbek economy, severely undermining the country's ability to utilize its growth potential. From the economic policy point of view, our analysis at a minimum supports the conventional wisdom that the spread between these various exchange rates needs to be reduced, if not eliminated, as soon as possible.

Thirdly, the finding that excess burdens increase more than proportionally in response to an increase in tax or subsidy rates supports even a gradual dismantling of these distortions. If two distortions work in the same direction, the whole is larger than the sum of the parts, i.e., the excess burden of the two distortions together is larger than the sum of the two excess burdens measured when each distortion is considered separately. For reform, this means that if only one of several cumulated distortions is removed, the beneficial effect on consumer or producer welfare will be more than proportional. If a gradualist reform approach would ever be effective, it would be in situations like these.

Finally, any reform of the existing foreign exchange regime will also need to take account of the fact that distortions arising from explicit and implicit fiscal operations often work in directions opposite to each other. Examples include:

- Uzbekistan on the one hand grants no value-added tax credit for the purchase of capital goods, adding 20 percent to their price; on the other hand, there is an implicit subsidy on imported capital goods of more than 50 percent (for centralized imports) and 40 percent (for other legal imports).
- Imports of sugar and vegetable oil are subsidized under the current regime while at the same time both imports are taxed by regressive "import excises" of 20 percent.
- As shown above, there is a large implicit tax on centralized exports of more than 50 percent. At the same time profits earned by exporting enterprises are taxed at half of the standard rate of 33 percent. In addition, exporters enjoy several other tax exemptions and implicit subsidies.

The consequences of reform in such situations are not clear a priori. Removing the smallest distortion while leaving the biggest in place would exacerbate, not improve, welfare losses. Removing the biggest while leaving the smallest in place would turn net taxation into net subsidization and vice versa, with an increase in welfare costs if the smallest price distortion was larger than half of the biggest. Therefore, it is essential for fiscal reform to identify distortions which work in opposite directions (like the examples above) and to abolish them simultaneously. Such reform packages would be superior to step-by-step reform or the elimination of the multiple exchange rate regime alone.

We conclude that the Uzbek authorities should reduce, if not eliminate, the above-mentioned explicit and implicit distortions as soon and as simultaneously as possible.

### Calculation of the Net Welfare Loss Due to the Foreign Exchange Regime

The welfare loss (NWL) or excess burden due to Uzbekistan's foreign exchange regime is derived in Rosenberg, Ruocco and Wiegard (1999). Here we replicate only the case of implicit subsidies. Analogous manipulations apply for the case of implicit export taxes.

Let  $P_{FT}^M$  denote the fixed world market price and  $M_{FT}$  be the import quantity that would result under free trade (FT). By *sub* we denote the ad valorem subsidy rate and by  $P_{sub}^M = P_{FT}^M(1 - sub)$  the subsidized price for Uzbekistan's importers.  $M_{sub}$  is the corresponding import quantity under the subsidized exchange rate regime. Assuming the constant elasticity import demand function and using the concept of Harberger triangles from their graphical analysis, Rosenberg, Ruocco and Wiegard (1999) show that for the small country case, the net welfare loss for Uzbekistan due to implicit import subsidies is

$$\begin{aligned}
 NWL_M &= sub P_{FT}^M M_{sub} - \left\{ \left[ A \int_0^{M_{sub}} M^{-\alpha} dM - P_{sub}^M M_{sub} \right] - \left[ A \int_0^{M_{FT}} M^{-\alpha} dM - P_{FT}^M M_{FT} \right] \right\} \\
 &= sub P_{FT}^M M_{sub} - \frac{\alpha}{1 - \alpha} A M_{sub}^{1-\alpha} \left[ 1 - \left( \frac{M_{FT}}{M_{sub}} \right)^{1-\alpha} \right]. \tag{i}
 \end{aligned}$$

From the import demand function (1) in the main text we obtain

$$\frac{M_{FT}}{M_{sub}} = \left( \frac{P_{FT}^M}{P_{sub}^M} \right)^{-\frac{1}{\alpha}} = \left( \frac{1}{1 - sub} \right)^{-\frac{1}{\alpha}}. \tag{ii}$$

Furthermore, we have

$$\begin{aligned}
 A M_{sub}^{1-\alpha} &= P_{sub}^M M_{sub} \\
 &= (1 - sub) P_{FT}^M M_{sub}
 \end{aligned}$$

$$= \frac{1 - sub}{sub} sub P_{FT}^M M_{sub} \cdot \tag{iii}$$

Inserting (ii) and (iii) into (i), and factoring out results in

$$\frac{NWL_M}{sub P_{FT}^M M_{sub}} = 1 - \frac{1 - sub}{sub} \frac{\alpha}{1 - \alpha} \left[ 1 - \left( \frac{1}{1 - sub} \right)^{\frac{\alpha - 1}{\alpha}} \right] \tag{iv}$$

If  $\alpha = 1$ , the derivation is slightly different, but the outcome is basically the same. In this case the primitive function of  $M^\alpha$  is not  $M^{1-\alpha} / (1-\alpha)$  but  $\ln(M)$ , so that  $NWL_M = sub P_{FT}^M M_{sub} + A (\ln M_{FT} - \ln M_{sub})$ , or, for that matter,  $sub P_{FT}^M M_{sub} + A \cdot \ln (M_{FT} / M_{sub})$ .

If  $\alpha = 1$ ,  $A = (1-sub) \cdot P_{FT}^M \cdot M_{sub}$ , so that  
 $NWL_M = sub P_{FT}^M M_{sub} + A \cdot \ln (M_{FT} / M_{sub}) =$   
 $sub P_{FT}^M M_{sub} + (1-sub) \cdot P_{FT}^M \cdot M_{sub} \cdot \ln (M_{FT} / M_{sub}) =$  (using eq. iv)  
 $sub P_{FT}^M M_{sub} + (1-sub) \cdot P_{FT}^M \cdot M_{sub} \cdot \ln (1-sub)$ .

That means that

$$NWL_M / sub P_{FT}^M M_{sub} = \{ 1 + (1-sub) / sub \cdot \ln (1-sub) \}.$$

The same result would be obtained by applying the rule of l'Hôpital to the bottom line of equation (i) or to equation (ii). If  $\alpha \rightarrow 1$ , not only the denominator  $1-\alpha \rightarrow 0$ , but also the numerator  $[1 - (\dots)^{1-\alpha}] \rightarrow 0$ . In those cases L'Hôpital's rule is applicable (under certain regularity conditions, which are met here). Saying that if  $\lim_{\alpha \rightarrow 1} f(\alpha) = 0$  and  $\lim_{\alpha \rightarrow 1} g(\alpha) = 0$ , then  $\lim_{\alpha \rightarrow 1} f(\alpha)/g(\alpha) = \lim_{\alpha \rightarrow 1} f'(\alpha)/g'(\alpha)$ .

Applying this to equation (iv) yields that if  $\alpha = 1$ ,

$$NWL_M / sub P_{FT}^M M_{sub} = \{ 1 + (1-sub)/sub \cdot \ln(1-sub) \}.$$

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