Protection and the Own-Funds Window in Tanzania: An Analytical Framework

And Estimates of the Effects of Trade Liberalization

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Abstract

This paper presents a simple partial equilibrium framework for considering the economic implications of administered protection in Tanzania, against the background of the country's parallel exchange market and the establishment of the own-funds and open general license (OGL) facilities for authorizing imports. It also presents estimates of the range of possible adjustment in the real exchange rate and trade flows following from a unification of the highly-fragmented import licensing system, coupled with sufficient liberalization of the OGL facility to eliminate own-funded imports and the incentive to export smuggling.

JEL Classification Numbers:
F13, F31, O55

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Summary

This paper presents a simple analytical framework for considering the economic implications of administered protection in Tanzania, against the background of the country's long-standing parallel exchange market and the more recent establishment of the own-funds and open general license (OGL) facilities for licensing imports. It also presents an application of the framework to determining the magnitude of adjustment in the real exchange rate between exportables and nontraded goods necessary to accommodate liberalization of the country's highly fragmented exchange and trade regime.

The analytical framework considers a simple economy that trades in goods with the rest of the world. The model is partial equilibrium in nature, focusing solely on trade flows with all other domestic variables, including monetary and fiscal policy variables, assumed to be exogenous (and constant). Export smuggling and its financing of own-funded imports in the presence of restrictive licensing of other official imports are explicitly represented in the model. Although the own-funds facility contributes to a lessening of the overall extent of protection, the framework demonstrates that export smuggling is an inefficient means of marketing the country's exports. As a result, the level of Tanzania's imports, as well as exports, remains below the optimal free trade level.

The empirical estimates are derived from a comparative statics exercise in which the analytical model is used to estimate the relevant range of adjustment in the real exchange rate, the parallel real exchange rate, and trade flows following from the unification of the present exchange system, coupled with sufficient liberalization of the open general license facility to eliminate own-funded imports and the incentive to export smuggling. The exercise is based on Tanzania's structure and pattern of trade for 1989/90 and on alternative assumed values for the model's import demand and export supply parameters. The results suggest that unification of the exchange system may entail an adjustment in the real exchange rate of between about 14 and 28 percent. The analysis also indicates that the capacity of Tanzania's export producers to increase their output in response to changes in the real exchange rate is greater than generally estimated.
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I. Introduction

Until the mid-1980s exchange rate management in Tanzania was marked by considerable inflexibility. Over long periods during the 1970s and early 1980s, the country's authorities were often reluctant to adjust the nominal exchange rate in response to both monetary and real factors, including declining agricultural productivity and adverse terms of trade movements, as well as increasing lack of control over domestic monetary growth and inflation. A particularly unfortunate, though expected, result of this inflexible exchange rate policy was eventual resort to exchange and trade restrictions as a means of curbing the growing external payments imbalance. Thus, increases in the real value of the exchange rate tended to be "validated" by restrictive exchange controls, and the inward-orientation of the Tanzanian economy was steadily heightened.

By the mid-1980s, this situation reached a point of crisis. In particular, farmers found that production of the country's traditional export crops (coffee, cotton, tobacco and cashew nuts) was no longer as profitable, and consumers were faced with an increasing scarcity of basic imported goods. Reflecting this crisis, and the emergence of capital flight, the exchange rate in the country's parallel foreign exchange market depreciated dramatically, resulting in an average parallel market premium of nearly 500 percent during both 1985 and 1986. To avert economic collapse, the Government introduced a number of economic measures aimed at arresting Tanzania's declining economic productivity, increasing the availability of foreign goods, and encouraging the repatriation of "flight capital". Before undertaking substantial strides to "deconfine" agricultural marketing and to improve the country's rural transportation system, the country's trade and exchange regime was liberalized appreciably by the introduction at the end of 1984 of the so-called own-funds exchange facility, through which a relatively wide variety of goods can be imported so long as the importer does not require access to official foreign exchange resources. Combined with lax enforcement of the facility's restrictive nominal list of permissible imports, this measure enabled imports of consumer goods, as well as intermediate and capital goods, to be increased, but only as financed by foreign exchange earnings from illegal exports and other illicit means, including over- and under-invoicing of official trade transactions, and unofficial remittances and transfers from abroad. In subsequent years, additional reforms to the trade and exchange system were introduced; these included reduction and rationalization of import tariff duties and the introduction of an open general license (OGL) import facility supported by World Bank resources, but subject to a considerably narrower effective list of permissible imports than the own-funds facility. 1/

This paper develops a simple analytical framework for considering the economic implications of administered protection in Tanzania in the current circumstances, against the background of the country's long-standing

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1/ For more extensive discussion of the recent experiences and problems of the trade and exchange system in Tanzania, see Bank of Tanzania (1990) and Kaufmann and O'Connell (1990).
parallel exchange market and the establishment of the own-funds and OGL facilities for licensing imports. Reflecting the decline in importance in recent years of speculative capital inflows, unofficial exports are considered the predominant source of financing for own-funds imports in the analysis. 1/ The analytical framework itself is derived from incorporating illegal trade transactions into the model of trade and exchange rate determination outlined by Dornbusch (1974). 2/ The paper also presents an application of the framework to the problem of gauging the magnitude of adjustment in the real exchange rate between exportables and nontraded goods in Tanzania necessary to accommodate complete liberalization of the country's current trade and payments system, especially its still highly fragmented exchange regime. 3/ Specifically, using baseline information on the parallel market premium and trade flows, it presents estimates indicating the range of possible adjustment in the real exchange rate, exports, and imports following from the unification of the present exchange system, coupled with sufficient liberalization of the OGL facility to eliminate own-funded imports and the incentive to export smuggling.

II. Analytical Framework

1. Free trade equilibrium

The analytical model describes a basic barter economy that trades with the rest of the world in goods, but not in monetary or financial assets. The model is partial equilibrium in nature, focusing solely on trade flows with all other domestic variables, including monetary and fiscal policy variables, assumed exogenous (and constant). Thus, it consists of simple economic relationships describing the demand for imports (M); supply of exports (X); and equilibrium real exchange rate (e), defined as the price of exportables relative to nontraded goods, that ensures external balance is maintained between exports and imports for a given international terms of

1/ The fundamental importance of unofficial exports for financing own-funds imports is noted by Lipumba (1987) and, more recently, by Kaufmann and O'Connell (1990).

2/ For an illustration of the application of the Dornbusch model to the issue of protection and export performance in Sub-Saharan African countries, see DeRosa (1990). For a description of the theory and measurement of illegal trade transactions, see Bhagwati and Hansen (1973) and Bhagwati (1974).

3/ In Tanzania, imports are administered under nine different "windows." In addition to the own-funds facility, the most important other facilities are (a) "free" resources, reflecting imports funded from Tanzania's own foreign exchange receipts; (b) loans, grants and other import support funded directly by foreign donors and creditors; and (c) OGL imports, which are funded mainly by resources from the World Bank. In 1989/90, own-funds imports accounted for about 30 percent of the total value of imports, whereas imports under the three other major facilities accounted for about 60 percent.
trade \((P^*)\). 1/ As depicted in Figure 1, import demand and export supply are assumed to be negative and positive functions, respectively, of the real exchange rate. In the absence of import controls, the equilibrium exchange rate is \(e^0\) and exports of \(X^0\) finance imports of \(P^*M^0\). Consumers of imports and export producers enjoy the gains from trade labelled in the figure.

2. **Administered protection and the parallel exchange rate**

The implications of administered protection are seen in Figure 2. The government is assumed to enforce quantitative import restrictions to protect local producers and to support a more appreciated real exchange rate, say, \(e'\). The import controls and resulting "overvaluation" of the real exchange rate imply not only a lower level of imports \((M')\), but also a lower level of exports \((X')\) because the profitability of exports is reduced. Also, because imports are restricted, the local price of imports must rise until the excess demand for imports at the "official" real exchange rate \(e'\) (CB) is completely eliminated. The resulting domestic price of imports, \(r'P^*\), is determined by the so-called parallel real exchange rate, \(r\), which measures the rate at which consumers (and smugglers) are willing to exchange domestic resources for foreign goods in the presence of exchange and trade restrictions. This rate is depreciated relative to the official rate, and the divergence between the two rates, measured here by the ratio \(r/e\), may be termed the parallel market premium. 2/ If smuggling of traded goods (imports as well as exports) occurs, the parallel rate will be less depreciated than \(r'\). Specifically, it will be determined along the import demand schedule \(P^*M\), at a point between \(A'\) and \(A\) based on the "porousness" of import controls and the economic costs of smuggling. 3/

Some features of the administered protection equilibrium depicted in Figure 2 are important to note. First, the parallel real exchange rate, \(r'\), is "undervalued" relative to the free trade equilibrium rate, \(e^0\). Thus, although the parallel rate provides an indication of the existence of trade restrictions, it does not provide a reliable estimate of the free trade equilibrium rate itself. Second, the gains from trade are reduced substantially by the imposition of import controls; namely, the economy

1/ The price of importables relative to nontraded goods is \(eP^*\).

2/ This premium is identical to the parallel market premium computed with respect to nominal exchange rates. Assuming the law of one price holds for tradable goods, it is possible to write \(r/e = (RP^*_x/P_n)/(EP^*_x/P_n) = R/E\); where \(R\) and \(E\) are parallel and official nominal exchange rates respectively, and \(P^*_x\) and \(P_n\) are prices of exportables and nontraded goods expressed in foreign and domestic currency terms respectively.

3/ The porousness of import controls refers to the ability of national authorities to enforce quantitative restrictions on imports. The economic costs of smuggling, on the other hand, refer to the added costs of transportation and marketing typically thought to be associated with illegal international trade transactions, as well as the potential cost of penalties for (unsuccesful) smuggling. For further discussion, see especially Bhagwati and Hansen (1973).
incurs the "dead-weight loss" given by the area of the triangle $A'AC$. \(^1\)
Additional welfare costs to the economy may arise in connection with the
"rent" that importers garner from the ownership of import licenses (the area
$e'r'A'C$). When a number of potential importers vie for the ownership of
import licenses, real resources are frequently employed in unproductive
rent-seeking activities (including graft and corruption) until the entire
area of the potential gain to importers is lost. \(^2\) When state trading
organizations are the sole channel for imports, bureaucratic inefficiencies
lead typically to high marketing costs, with a similar result; specifically,
the area of the rectangle $e'r'A'C$ is again lost to unproductive employment
of resources.

3. The own-funds window

The implications of the own-funds facility are seen in Figure 3, where
consideration for smuggling of traded goods is explicitly introduced.
Export smuggling, which is assumed also to entail the marketing of imports
financed by the proceeds of unofficial exports, commands a premium because
of its presumed economic inefficiency as well as illegality. Thus, the
supply of exports beyond the level of officially recorded exports, $X'$, is
given by the schedule $CX''$. The precise steepness of the new export supply
schedule, however, also depends upon the effectiveness of the enforcement of
import controls. If foreign goods cannot be smuggled into the country to
meet demand, the export supply schedule $CX''$ will be nearly vertical, and the
parallel real exchange rate will be determined in the neighborhood of $r'$, as
previously discussed.

The own-funds facility eliminates the necessity of import smuggling.
Essentially, imports can be increased to a level above the target
administered level, so long as importers have sufficient access to
unofficial sources of foreign exchange -- in other words, financing from the
proceeds of smuggled exports. Consequently, the own-funds facility causes
the $CX''$ schedule to be more elastic (i.e., less steep) than elsewise, and
thereby contributes importantly to reducing the magnitude of the parallel

\(^1\) The dead-weight loss is comprised of losses in both consumer and
producer surpluses that result from the reduction in trade caused by the
official imposition of restrictions on imports. The dead-weight loss
concept and the underlying assumptions of applied welfare analysis are
discussed in Harberger (1971).

Figure 1

- Consumer Surplus
- Producer Surplus

\[ X^0 = P^* M^0 \]
Figure 2
Figure 3
market premium. 1/ If the quantitative import controls were previously highly effective in restricting imports to the target level \( M' \), the parallel rate adjusts from \( r' \) to a level such as \( r'' \). The real exchange rate, which is influenced by policymakers only indirectly, namely, through the enforcement of quantitative import restrictions, also adjusts, from \( e' \) to \( e'' \). This occurs because, to accommodate the expansion of trade to \( X''=P''M'' \), the relative price of exportables must rise sufficiently to cover the higher marginal resource cost of the expanded output of exportables. Notably, only the increase of imports will be recorded in the official trade statistics; the accommodating increase in exports \( (X''-X') \) will consist entirely of smuggled exports. Finally, economic welfare is also improved by the introduction of the own-funds facility; the gains from trade are increased by the area of the triangle \( A'A"C \), and the potential for rent-seeking is reduced to the area of the rectangle \( r"DFe" \). So long as export smuggling involves appreciable economic costs and legal penalties, however, the parallel real exchange rate will remain undervalued relative to the free trade equilibrium real exchange rate.

4. Trade liberalization

Complete removal of import restrictions implies a return to the free trade equilibrium. With reference to Figure 3, progressive relaxation of quantitative import restrictions will shift the illicit export supply schedule \( CX'' \) rightward along the free trade export supply schedule until point \( C \) corresponds to point \( A \). 2/ At point \( A \), own-funds imports and export smuggling disappear because quantitative import restrictions are eliminated, and, accordingly, both the production of exportables and the demand for imports are guided by the same real exchange rate. According to this view of the liberalization process, the level of the real exchange rate and the magnitude of the parallel market premium are essentially governed by the pace of the removal of quantitative import restrictions. Moreover, imports under the own-funds facility will dwindle as the parallel exchange market shrinks in importance. Finally, free trade eliminates the potential economic costs of rent-seeking entirely.

1/ This conclusion is an important one, but seems to be at some odds with the recent analysis of Kaufmann and O'Connell (1990), which suggests that establishment of the own-funds facility contributed to an increase in the parallel market premium. An explanation for this difference in conclusions may be that Kaufmann and O'Connell do not take into sufficient account the simultaneous adjustment in the official and parallel exchange rates implied by the simple model depicted in Figure 3. Instead, their focus may be simply upon the implications for adjustment in the parallel market premium given solely by the supply schedule for illegal exports, without demand entering into the picture.

2/ If, simultaneously, the enforcement (through customs surveillance and legal penalties) of restrictions against imports, or export smuggling, were also relaxed, the \( CX'' \) schedule in Figure 3 would become more elastic, thereby increasing the effective speed at which point \( A'' \) would approach point \( A \) along the import demand schedule in the figure.
III. Estimated Effects of Trade Liberalization

The simple analytical framework presented in the previous section can be used to estimate the magnitude of changes in the official real exchange rate, the parallel real exchange rate, and trade flows consistent with liberalization of the Tanzania's current trade and payments regime. The analytical framework can be represented by the following system of equations:

\[ (1) \quad M(rP^*) = M_0 + \bar{M}_{og} + \bar{M}_{ot} \quad \text{(total import demand and its components)} \]

\[ (2) \quad P^*M_0 = X_s(r/e) \quad \text{(own-funds financing balance)} \]

\[ (3) \quad P^*\bar{M}_{og} = \bar{A}_{wb} \quad \text{(OCL financing balance)} \]

\[ (4) \quad P^*\bar{M}_{ot} = X_o[e(r/e)] + \bar{A}_{ot} \quad \text{(other imports financing balance)} \]

where \( e \) and \( r \) continue to represent the official and parallel real exchange rates, respectively; \( A_{wb} \) and \( A_{ot} \) are the levels of external financing (measured in terms of exportables) from the World Bank and other sources, respectively; and bars (\( \bar{\} \)) denote variables that are exogenously determined.

Equation (1) stipulates that the total quantity demanded of imports, which is a function of the domestic price of imports and hence the parallel real exchange rate, must equal the sum of imports financed from three "windows": own-funds, open general license, and the aggregate of all other administered facilities for access to foreign exchange. Equations (2)-(4) indicate the level and source of financing under each of the three facilities. Under the own-funds facility, imports are financed predominantly by export smuggling \((X_s)\), which is assumed to be a function of the parallel market premium, \( r/e \). Under the OGL facility, imports are financed solely by external resources provided by the World Bank. And finally, under the combined remaining administered facilities, imports are financed by external resources from other foreign assistance agencies, plus...

\[ 1/ \text{Unrecorded remittances and private transfers as well as false invoicing of official trade flows are also sources of financing for own-funds imports. Like unofficial exports, however, these sources of financing arise mainly in response to the existence of the parallel market premium. Therefore, the implications of the analytical model would not be substantially altered by more comprehensive specification of the sources of sustainable financing for own-funds imports.} \]

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Tanzania's own official export earnings ($X_0$) which are determined jointly by the official real exchange rate and the parallel market premium. 1/

The level of OGL imports, $M_{og}$, is assumed to be administered by bureaucratic or other non-price rationing means to ensure that demand for OGL imports, at the official real exchange rate, does not exceed the available supply of World Bank-provided resources. More importantly, the level of other administered imports, $M_{ot}$, is also assumed to be controlled by the authorities to maintain the official real exchange rate at a sufficiently level to protect local industries and to provide privileged access to foreign resources to selected industries or other interests favored by the country's economic policies. As depicted in Figure 3, these restrictive trade and exchange practices give rise in the model to the parallel market premium and own-funds imports financed by unofficial exports.

Trade liberalization is envisaged to involve unification of Tanzania's administered import facilities into a single, enlarged, OGL facility ($M_{og}$):

$$\chi M_{og} = \chi (M_{og} + M_{ot}) = X_0[e, (r/e)] + \bar{A}_{wb} + \bar{A}_{ot}. \quad (5)$$

The effective expansion of the OGL facility is ultimately governed by the size of the facility's "negative" list. If the negative list is not sufficiently liberal to admit imports previously restricted by the country's system of "positive" import lists, the expanded facility will result in little change in either trade flows or the real exchange rate. If, however, the negative list is shortened to a minimum list of contraband items (i.e., military goods and illicit drugs), then the expanded OGL facility should be expected to foster appreciable increases in total imports and especially official exports, and substantial changes in both the official and parallel real exchange rate that, in the limit, would completely eliminate the parallel market premium and hence the present fragmentation of the exchange system supported by illegal export flows. 2/

The model formed by equations (1), (2) and (5) is applied here to consider the effects of complete import liberalization. More specifically, in a comparative statics exercise, the combined level of administered imports, $\chi (M_{og} + M_{ot})$, is increased by the amount necessary to eliminate the demand for own-funds imports, which in 1989/90 amounted to $450 million. All other factors -- in particular, the levels of external financing, $A_{wb}$ and $A_{ot}$ -- are held constant. Thus, in broad terms, the exercise depicts a

1/ The supply functions for total exports, smuggled exports and official exports in the model are derived from a mutually consistent profit-maximizing framework. See Appendix for details.

2/ In reality, of course, the continued maintenance by Tanzania of controls on capital flows, especially capital outflows, would imply that a parallel exchange market supported by unofficial exports will persist, albeit at a substantially reduced parallel market premium.
reform aimed at enlarging access to the OGL facility sufficiently to cover all imports under the own-funds facility. This reform necessarily involves a depreciation of the official real exchange rate, determined by market forces, in order to promote a greater volume of official exports and thereby to provide financing for the expanded OGL imports. Similarly, it involves a market-determined appreciation of the parallel real exchange rate, to the point at which the official and parallel exchange rates are merged, to reflect the complete liberalization of imports and elimination of the resource costs arising from export smuggling.

The comparative statics exercise is accomplished by totally differentiating the system of equations comprising the model and solving for the changes in variables -- principally, imports (M), official exports (Xq), the official real exchange rate (e), and the parallel rate (r) -- consistent with attainment of the free-trade equilibrium. 1/ The exercise is based on official trade statistics for 1989/90, coupled with imputed values for unofficial exports based on the level of own-funds imports. 2/ The values of the elasticity parameters in the model, which measure the responsiveness of import demand and export supply to changes in the official and parallel exchange rates, are based in part on the summary of published econometric estimates of foreign trade price elasticities presented in Table 1. The price elasticity of demand for total imports is assumed to take on a value between -0.5 and -1.5. The price elasticity of total export supply is assumed to range in value between 0.5 and 5.0. Estimates of the price elasticity of unofficial export supply -- that is, the proportional response of illegal exports to proportional changes in the parallel market premium -- are not available. The profit-maximizing conditions underlying the derivation of the export supply relationships in the model indicate that the price elasticity of supply for unofficial exports is smaller in magnitude than the corresponding elasticity for total exports. In the comparative statics analysis, however, the price elasticity of supply for unofficial exports is assumed to be very similar in value; specifically, it is assumed

1/ The algorithm used to solve the comparative statics exercise for the free-trade equilibrium is discussed in the Appendix. Essentially, it involves determining the responsiveness of the official and parallel exchange rates to changes in the level of administered imports, and then determining the change in the level of these imports that is consistent with the elimination of both the parallel premium and export smuggling.

2/ Problems of accurately measuring trade flows, associated mainly with over-invoicing imports and under-invoicing exports, are not considered in the present analysis. Such problems, however, are important in the case of most African countries, including Tanzania. For further discussion, see Yeats (1990).
Table 1. Representative Estimates of Price Elasticities of Import Demand and Export Supply

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<td>Individual Commodities</td>
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<tr>
<td>Bond (...)</td>
<td>...</td>
<td></td>
<td>0.80</td>
<td>0.51</td>
<td>0.27</td>
<td></td>
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</table>


Notes: Estimates generally refer to long-run price elasticities. Figures in parentheses denote total number of countries covered by the estimates; the number may be lower for individual categories of traded goods. Values are mean estimates across countries. Statistically insignificant estimates are not considered, including those found to have the wrong anticipated sign.

1/ Countries include Morocco and Tunisia.
2/ Predominantly African and Middle East countries.
3/ Estimates are based on pooled data.
4/ Predominantly Asian and Western Hemisphere countries.
5/ Estimates refer to the elasticity of the ratio of exports to GDP with respect to the real exchange rate.
6/ Estimate refers to exports by African countries as a group.
7/ Mean value of estimates for selected individual commodities. Countries include Egypt and Morocco.
8/ Mean value of elasticity estimates for five developing regions: Africa, Asia, Europe, Middle East and Western Hemisphere.
9/ Exports by Canada only.
10/ Principally non-electrical machinery exports by Germany, United Kingdom, and United States.
11/ Mean value of elasticity estimates for selected individual commodities.
to be nine-tenths of the value of the supply elasticity for total exports. 1/

The estimated changes in exchange rates and trade flows are presented in Table 2. They suggest that unification of the exchange system centered around complete liberalization of the OGL import facility might involve a substantial depreciation of the official real exchange rate, depending in particular upon the magnitude of the relevant foreign trade elasticities. In keeping with the assumption that licensing of imports is completely liberalized, the comparative statics results in all cases indicate that own-funds imports, and hence illegal exports, are eliminated entirely. The increases in total imports, OGL imports, and official exports, however, also depend upon the magnitude of the underlying elasticity parameters. In general, the (absolute) magnitude of the changes in both the real exchange rate and the parallel rate varies indirectly with the magnitude of the elasticity of supply for total exports; the more responsive exports are to changes in the real exchange rate, the less is the burden of adjustment to import liberalization on both domestic import prices \((rP^*)\) and export prices \((e)\). For a given output elasticity, however, changes in the real exchange rate are larger and those in the parallel rate are smaller, the larger is the absolute magnitude of the import demand elasticity precisely because, ceteris paribus, larger magnitudes of the latter parameter imply a greater burden of adjustment on the price of exports than the domestic price of imports. For similar reasons, the simulated changes in import and export flows bear similar patterns of adjustment, in relationship the elasticity parameter values, as those observed for the real exchange rate.

The estimated changes in the official and parallel real exchange rates vary widely. Depending upon the elasticity values assumed, those for the official rate range between 3 and 178 percent, while those for the parallel rate range between -16 and -85 percent. The range of estimates for the adjustment of these two variables can be narrowed, however, by considering the estimates of the adjustment in the parallel market premium -- that is, the difference between the estimated changes in the parallel and official real exchange rates. Series for the parallel exchange rate in Tanzania suggest that the parallel market premium, \(r/e\), is currently between about 1.5 and 2.0. 2/ Thus, the relevant range of adjustment in the parallel market premium is between about -33 percent and -50 percent. Based on this information, the range of estimates for the exchange rate adjustment is substantially narrowed and, notably, corresponds to relatively high values

1/ The conditions underlying the derivation the model’s export supply relationships also indicate that the price elasticity of supply for official exports is somewhat greater in value than the price elasticity of supply for total exports. This elasticity value, however, cannot be determined arbitrarily; accordingly, it is determined on the basis of the values selected for the model’s other parameters, particularly the other supply elasticity parameters and the baseline value of official exports to total exports. See Appendix for further discussion and details.

Table 2. Estimated Effects of Trade Liberalization

<table>
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<th>Price Elasticity of Demand for Imports</th>
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<th>-0.5</th>
<th>-0.5</th>
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<td>900</td>
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<td>1000</td>
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<tr>
<td>Unofficial</td>
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<td>450</td>
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<td>450</td>
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</tr>
</tbody>
</table>

Baseline trade levels, 1989/90

(In millions of U.S. dollars)

Changes in exchange rates and trade levels

```
| "Official" real exchange rate (e) 3/ | 128 | 45 | 14 | 3 | 162 | 84 | 22 | 5 | 178 | 74 | 28 | 6 |
| Parallel real exchange rate (r) 3/  | -95 | -66 | -42 | -20 | -60 | -47 | -33 | -17 | -44 | -37 | -28 | -16 |
```

(In millions of U.S. dollars)

Source: Comparative statics analysis using a partial equilibrium model of trade and exchange rate adjustment, assuming OGL and other administered imports are liberalized sufficiently to supplant all own-funds imports and to ensure adjustment of the official and parallel real exchange rates to the same level.

1/ The elasticity of unofficial exports with respect to the parallel market premium is assumed to be nine-tenths of the value of the price elasticity of supply for total exports. The implicit price elasticity of supply for official exports is substantially greater in value than the supply elasticity for total exports.

2/ Includes exports of services.

3/ Price of exportables relative to nontraded goods.

4/ Change in the parallel rate minus the change in the official rate.
for the model's supply elasticity parameter. 1/ For instance, assuming an export supply elasticity of 2.0, the estimated adjustment of the official real exchange rate to accommodate the import liberalization program lies between 14 and 28 percent, and the corresponding adjustment of the parallel exchange rate lies between -42 and -28 percent.

The estimated changes in trade flows are also important, particularly because they indicate the extent of increased integration with the world economy that trade liberalization would provide the Tanzanian economy. Total imports, of course, increase by less than the estimated increase in OGL imports because the latter reflect the substitution away from own-funds imports as well as the increase in total imports induced by the decline in the parallel exchange rate. Nonetheless, the estimated increase in total imports is significant, between about $280 million and $559 million. The increase in official exports, which is an important objective of import liberalization in Tanzania, is the most dramatic. The estimates suggest liberalization of the OGL facility sufficient to eliminate the vast bulk of illegal exports would expand official exports by between about $730 million and $1,009 million. Relative to total (official plus unofficial) exports, these estimates imply an increase in the production of exportables of between about 30 and 60 percent.

Finally, it should be emphasized that the estimated changes in export and import flows imply no worsening of Tanzania's external payments position. Specifically, the simulated changes in the official and parallel exchange rates ensure that the expansion of total imports induced by the import liberalization program is matched exactly by an increase in total exports.

IV. Conclusion

The economic reform measures begun in Tanzania in the mid-1980s continue today, with tangible signs of success. With the implementation of reforms to agricultural marketing and the gradual restoration of the rural transportation network, the productivity of the country's agricultural sector has risen, and positive rates of overall economic growth, in the neighborhood of 4 percent a year, have been restored to the economy. Moreover, the availability of intermediate and consumer goods in the economy has also improved as a result of the import liberalization introduced by the establishment of the own-funds and OGL exchange facilities.

1/ The estimated magnitude of the adjustment in the parallel market premium, r/e, is dependent solely upon the assumed value of the price elasticity of supply for total exports. This is because the bounds of the adjustment in the premium, in response to liberalization of the OGL facility, are circumscribed by the supply relationships for total exports and export smuggling in the model, and not by the relationship for import demand.
Nonetheless, the Tanzanian economy remains hindered by the need for further economic reforms in a number of areas, as judged by the still extensive degree of administered control over economic activity in the country. Among these areas, the trade and payments system remains highly fragmented and restrictive. While substantive trade reform measures have been implemented in recent years, the analysis presented in this paper identifies the financing of own-funds imports through earnings from illegal, rather than official, exports as an important remaining distortion to Tanzania's exchange system. Specifically, because export smuggling is an inefficient means of marketing much of the country's exports, especially its traditional agricultural exports, the level of export and import trade remains below the optimal free-trade level, and accordingly efficiency and other economic gains from trade are lower than elsewise.

The estimates presented to gauge the magnitude of the remaining distortion to the exchange system, as measured by the adjustment of the real exchange rate between exportables and nontraded goods necessary to accommodate complete liberalization of the trade regime, are imprecise at best. Indeed, they are based on a highly stylized model of Tanzania's trade and payments system, and the underlying economic relationships that determine the country's real exchange rate. Nonetheless, the estimates are appreciable in magnitude. The analysis also suggests, however, that the capacity of the country's export producers to increase their output in response to depreciation of the real exchange rate may be greater than generally believed. In particular, the results of the study's comparative statics analysis would indicate that the relevant magnitude of the export supply elasticity for Tanzania is higher than commonly found by more familiar econometric methods.
APPENDIX

I. Supply Relationships

1. Derivation

The specification of export supply functions in the model is based on familiar profit-maximizing conditions. First, define the profit \( L \) of a representative export producer, who is assumed to market his total output \( X_t \) abroad through both official \( X_o \) and unofficial channels \( X_s \), as

\[
L = eX_o + rX_s - C_p(X_t) - C_s(X_t)
\]

where \( C_p \) and \( C_s \) denote total costs of production and marketing illegal exports, respectively. First-order conditions for profit maximization imply

\[
\frac{dL}{dx} = e + r - \frac{dC_p}{dx} - \frac{dC_s}{dx} = 0
\]

where \( C_p' \) and \( C_s' \) denote marginal costs, which are assumed to be increasing functions of total production and illegal exports respectively. Equation (2) is the implicit supply relation for total exports as a function of the real exchange rate, and analogously equation (3) is the implicit supply relation for illegal exports as a function of the parallel premium, \( r - e = r - C_p'(X_t) \).

Finally, by definition, the supply of official exports is an increasing function of the real exchange rate and a decreasing function of the parallel market premium:

\[
X_o = X_t(e) + X_s(r-e) - X_o[e, (r-e)].
\]

2. Relative magnitude of elasticities

The output elasticity of total export production with respect to the real exchange rate \( (\alpha_t) \) is greater than the output elasticity of illegal exports with respect to the parallel premium \( (\alpha_s) \). Consider the total marginal cost \( [C_T'(X_s)] \) of illegal exports:

\[
1/ \text{ The parallel premium is expressed here in difference form. For greater analytical convenience in the main text it is represented in the ratio form } r/e.

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Multiplying both sides of equation (5) by \((X_s/r)\) yields the relationship between supply elasticities in the model:

\[
(6) \quad \frac{1}{\alpha_T} = \left(\frac{eX_S}{rX_T}\right)\frac{1}{\alpha_T} + \left[\frac{(r-e)}{r}\right]\frac{1}{\alpha_S}
\]

\[
(6') \quad \alpha_S = \alpha_T + \lambda = \left[\frac{(r-e)X_T\alpha_S\alpha_T}{rX_T\alpha_T + eX_S\alpha_S}\right].
\]

The magnitude of \(\alpha_S\) relative to \(\alpha_T\) is given by the sign of \(\lambda\). Solving the second equation in (6') for \(\lambda\) and recognizing (from Figure 3 in the main text) that \(\alpha_T > \alpha_S\), one finds that \(\lambda\) is negative and hence that \(\alpha_T > \alpha_S\).

### II. Comparative Statics Algorithm

The model described by equations (1), (2), and (5) in the text can be reduced to a system of two equations: the condition for financing balance in the own-funds facility (equation (2)) and that for financing balance in the enlarged OGL facility (equation (5)). Differentiating the two equations and solving for changes in the real exchange rate and the parallel exchange rate, for specified changes in the administered level of OGL imports, yields reduced-form equations of the form:

\[
(7) \quad e^* = C_e(\hat{M}\hat{O}_G^*); \text{ and } r^* = C_r(\hat{M}\hat{O}_G^*)
\]

where \(C_e\) and \(C_r\) are reduced-form coefficients and asterisks denote proportional change (e.g., \(X^* = dX/X\)).

Complete import liberalization entails expansion of OGL imports sufficient to eliminate own-funds imports and export smuggling. Thus, \(\hat{M}_{OG}^*\) is determined by the condition that illegal exports are reduced to zero:

\[
(8) \quad X_s^* = \alpha_s(r^*-e^*) - 1
\]

\[
X_s^* = \alpha_s(C_r - C_e)\hat{M}_{OG}^* - 1
\]

\[
\hat{M}_{OG}^* = -\left[1/\alpha_s(C_r - C_e)\right].
\]
Substituting $\hat{M}_0$ from equation (8) into equations (7) thus yields the equilibrium changes in $e$ and $r$ that are consistent with complete import liberalization and that result in the elimination of the parallel market premium (i.e., $r/e=1$).
References


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