IMPORT DEMAND AND NON TARIFF BARRIERS
AN APPLICATION TO MOROCCO

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Division Working Paper No. 1987-2
January 1987

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We would like to thank E. Grilli, N. Rossi and the participants to the EPDCO workshop at the World Bank for very helpful comments and suggestions.

ABSTRACT

The pervasive presence of quantitative restrictions on imports in LDCs make the prediction of import response following trade liberalization a particularly arduous task. It is true that historically estimated elasticities could be of some guidance, even if they did not allow for the impact of QRs, provided that we knew the direction of their bias. In this respect conventional wisdom would suggest that price responsiveness of imports should increase following the liberalization measures. We show in this paper that this is not necessarily the case and, under plausible conditions, the opposite will be true. Drawing on the work of Neary and Roberts (1980), we analyse the demand for imports where quantity restrictions cover only a subset of a given commodity category. The model is then estimated on data from Morocco. The results suggest that quantity restrictions had a significant impact on both the level of imports and their sensitivity to income and price variations. We also discuss some of the implications of our findings for the trade liberalization process in Morocco.

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INTRODUCTION

It is by now widely agreed (Krueger, 1978: Khan and Zahler 1985) that imports flows will respond more rapidly to trade liberalization than exports. This differential response is one of the main justifications used by international organizations like the World Bank to supplement structural adjustment measures with external loans. Accurate prediction of import response to liberalization would then appear to be essential to the design of a structural adjustment package. Insufficient capital inflows would exacerbate any balance of payments problems and may even lead to a later reversal of the trade liberalization policy. On the other hand, an excessive inflow may bring an unwelcome appreciation of the real exchange rate. Unfortunately, the pervasive presence of quantitative restrictions on imports in LDCs make the prediction of import response following trade liberalization a particularly arduous task. Past evidence cannot be relied upon to predict future import flows unless quantitative restrictions are explicitly accounted for. However, non-tariff barriers are usually treated in a fairly cursory function and even more accurate treatments, like the one in Moran (1986), do not permit to isolate the impact of QRs and recover structural behavioural parameters.

It is true that historically estimated elasticities could still be of some guidance, even if they did not allow for the impact of QRs, provided that we knew the direction of their bias. In this respect conventional wisdom would suggest that price responsiveness of imports should increase following the liberalization measures. We show in this paper that this is not necessarily the case and, under plausible conditions, the opposite will be true. Estimated elasticities, which

do not allow for the impact of QRs, are therefore an even worse guide to future developments than previously thought. Drawing on the work of Neary and Roberts (1980), we analyse the demand for imports where quantity restrictions cover only a subset of a given commodity category. The model is then estimated on data from Morocco. The results suggest that quantity restrictions had a significant impact on both the level of imports and their sensitivity to income and price variations.

The paper is organized as follows: Section 2 presents a simple model of rationing. Section 3 provides a cursory overview of the evolution of trade flows and policy in Morocco. Econometric specification and results for consumption and investment imports are presented in section 4. The last section offers some conclusions and discusses a few implications of our findings for the trade liberalization process in Morocco.

THE IMPACT OF RATIONING

We assume that there are two categories of imports, i.e. those subject to licensing and those which can freely enter the country. It is also assumed that the relative border prices among these two commodities stay unchanged. While it would be desirable to dispense with this assumption, available data would not allow us to derive two separate price indices for rationed and non rationed commodities. Consider the following cost function

$$c(V, P_D, P_M, P_C)$$

where P_D, P_M and P_C denote respectively the price of a domestically produced commodity, of the freely importable foreign commodity and of the foreign good subject to import licensing respectively while V is the level of production (utility). We also have that

$$P_M = \Theta P_M^o \qquad P_C = \Theta P_C^o$$

where P_i^o is the price of good i in the base year. Total real import expenditure is equal to $\bar{q} = P_C^o q_C + P_M^o q_M$. We want to assess the impact of quotas on both total $(\bar{q})$ and free (q_M) imports as well as on the sensitivity of $\bar{q}$ and q_M w.r.t. V and P_M. Suppose that q_C is subject to a ration. The cost function under rationing is $c^* = c\ (V, P_D, P_M, \tilde{q}_C)$. From this we can derive a set of effective demand functions:

$$q_i^* = q_i^*\ (V, P_D, P_M, \tilde{q}_C) \qquad i = D,M$$

Following Neary and Roberts (1980) we define as the virtual prices the set P_D, P_M and $\tilde{P}_C$ which would induce the consumer to demand exactly the ration level. It follows that

$$(1) \qquad q_M^*\ (V, P_D, P_M, \tilde{q}_C) = q_M\ (V, P_D, P_M, \tilde{P}_C)$$

i.e. the rationed demand is equal to the unrationed one if the latter is evaluated at the virtual prices. The following equation defines $\tilde{P}_C$

$$(2) \qquad \tilde{q}_C = q_C\ (V, P_D, P_M, \tilde{P}_C)$$

Let us differentiate eq. (1) w.r.t. P_M. Using eq. 2 and Young's theorem, we have

$$(3) \qquad \frac{\delta q_M^*}{\delta P_M} = \frac{\delta q_M}{\delta P_M} - \frac{(\delta q_M/\delta P_C)^2}{\delta q_C/\delta P_C}$$

where all derivatives are evaluated at virtual prices. To compare notional and effective sensitivity of q_M w.r.t. its own price we must recall that in the unconstrained case P_M and P_C move together. We therefore look at:

$$(4) \qquad \frac{\delta q_M^*}{\delta P_M} - \left(\frac{\delta q_M}{\delta P_M} + \frac{\delta q_M}{\delta P_C}\right) = - \frac{\delta q_M}{\delta P_C} \frac{\delta q_C/\delta P_M + \delta q_C/\delta P_C}{\delta q_C/\delta P_C}$$

Interestingly enough, this expression will be negative if the two imported commodities are net substitutes $(\delta q_M/\delta p_C > 0)$ and own price dominate cross price effects $(\delta q_C/\delta p_C + \delta q_C/\delta p_M < 0)$. The implication is that constrained elasticities are <u>larger</u> than their unconstrained counterparts. This finding runs counter Le Chatellier kind of result by Neary and Roberts. The intuition is however fairly clear. In the unconstrained situation, when P_M increases, also P_C goes up dampening, if goods M and C are net substitutes, the negative effect on q_M. There is no such effect, of course, when the constraint is binding. As a result notional elasticities are lower than constrained ones. It is noteworthy that the Neary-Roberts result reappears if q_M and q_C are net complements. As far as total imports are concerned, it is easy to show that their sensitivity to P_M (i.e. to their common price Θ) is again greater in the constrained case under the same conditions as before.

Finally to find the impact of rationing on the sensitivity of q_M w.r.t. V (the output/utility level) we differentiate again eq. 1:

$$(5) \qquad \frac{\delta q_M^*}{\delta V} - \frac{\delta q_M}{\delta V} = - \frac{\delta q_M}{\delta P_C} \frac{\delta q_C/\delta V}{\delta q_C/\delta P_C}$$

Suppose that goods M and C are both normal. An increase of V leads to a higher demand for good M and, in the rationed case, amounts to a tightening of the constraint. If the two imported commodities are net substitutes, the virtual price $\tilde{P}_C$ will increase causing a further increase of the demand for good M. Therefore the effect of an increase of V on q_M will be more pronounced in the rationed case. Unsurprisingly the opposite result holds for total imports.

For completeness' sake we only have to determine the impact of price and income variations for Marshallian demands. As Neary and Roberts show constrained and notional Marshallian demands are equal if the latter are evaluated at virtual prices and at an expenditure level appropriately corrected for the income effect of the ration:

$$(6) \qquad d_M^* (P_D, P_M, y - P_C \cdot \bar{q}_C, \bar{q}_C) = d_M [P_D, P_M, P_C, y + (\tilde{P}_C - P_C) q_C]$$

where y denotes nominal income. The effects of an increase in y are easily traced. In the constrained case a higher y tightens the constraints and, if goods M and C are net substitutes, causes the demand for M to rise further than in the unconstrained case. A similar result holds for good D. We can infer that, given the adding up condition, total imports must instead be less responsive to variations of income in the constrained case. The results are less clear cut for uncompensated

price elasticities: gross substitutability/complementarity is relevant in this case, and income effects blur the nicety of the previous picture. An increase in the common price of free and constrained imports influences the demand for unconstrained imports through two channels: substitution away from good M towards the domestic good, although, as discussed above, the degree of substitutability is less than in the unconstrained regime; and, since purchasing the ration is more expensive, income effect tending to decrease the demand for goods D and M. The two move in opposite directions in altering the notional price derivative of the freely imported good. The implication is that no general result can be obtained when comparing uncompensated price responsiveness 1/ between the notional and the constrained cases.

EMPIRICAL ANALYSIS: THE CASE OF MOROCCO

a) The Evolution of Trade Policy and Flows

Since 1956, when the country gained independence, trade policy in Morocco has been geared to the objective of fostering industrialization. However only in the first half of the seventies, following the four-fold increase of phosphate price (the main foreign exchange earner for Morocco), did a fully comprehensive effort to promote the development of the industrial sector begin. The phosphate price boom proved however to be short-lived, but even afterward the

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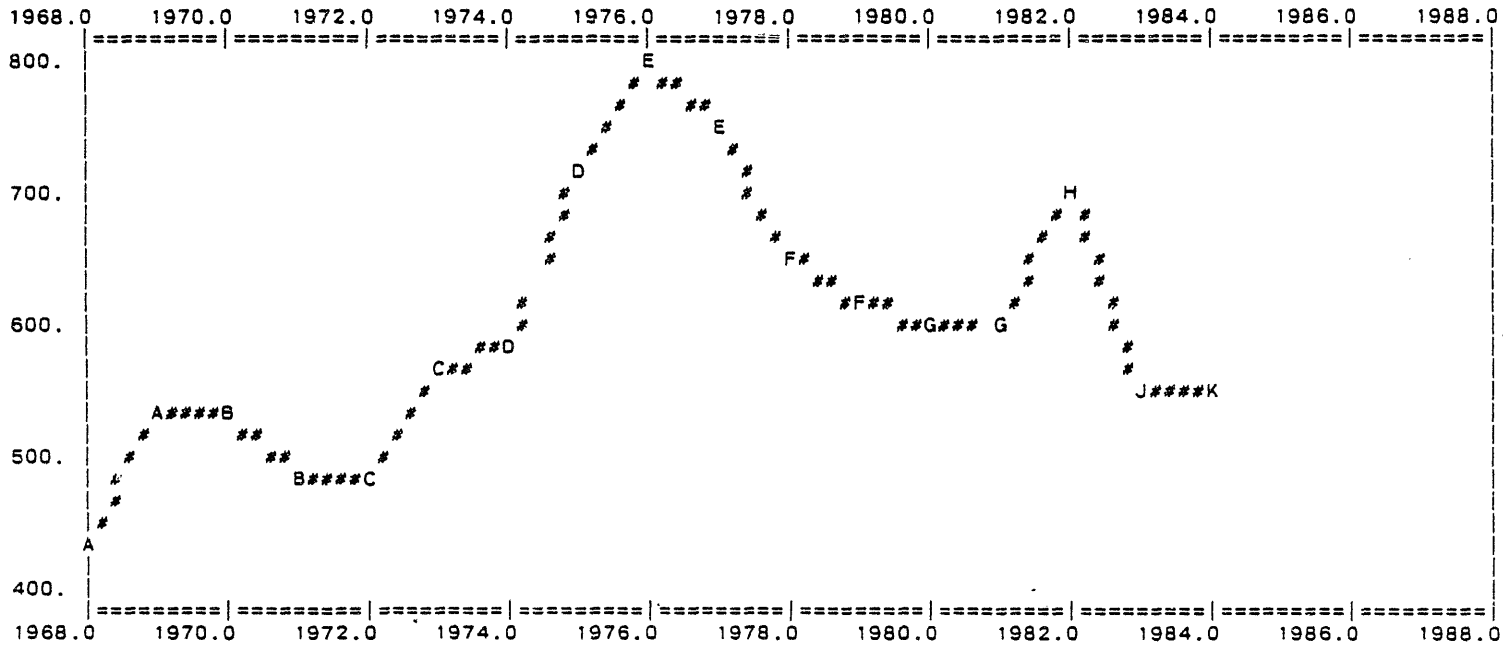
1/ It is worth noticing that the previous results for price and income responsiveness for constrained and notional demands cannot be simply translated into statements about elasticities, insofar as import quantities, which appear in the denominator for the expression of elasticities, are by definition lower in the constrained case. Only if effective derivatives are higher than notional ones can results for derivatives be safely carried over to elasticities.

Moroccan authorities did not renounce their effort to promote growth through higher public sector spending. The short run impact on growth was positive, but associated to high and unsustainable external deficits. The latter reached in 1977 16.5 percent of GDP forcing the government to take a set of measures aimed at reducing investment spending and restricting imports. Similarly, in 1983 when, due also to a set of adverse external shocks, the current account worsened considerably and a payment crisis erupted, Moroccan authorities had to take both emergency and structural adjustment measures. A trade liberalization program was implemented, based mainly on the reduction of import duties, the phasing out of import licensing, the pursuing of a more active exchange rate policy and the setting up of a more favourable administrative environment for exporters.

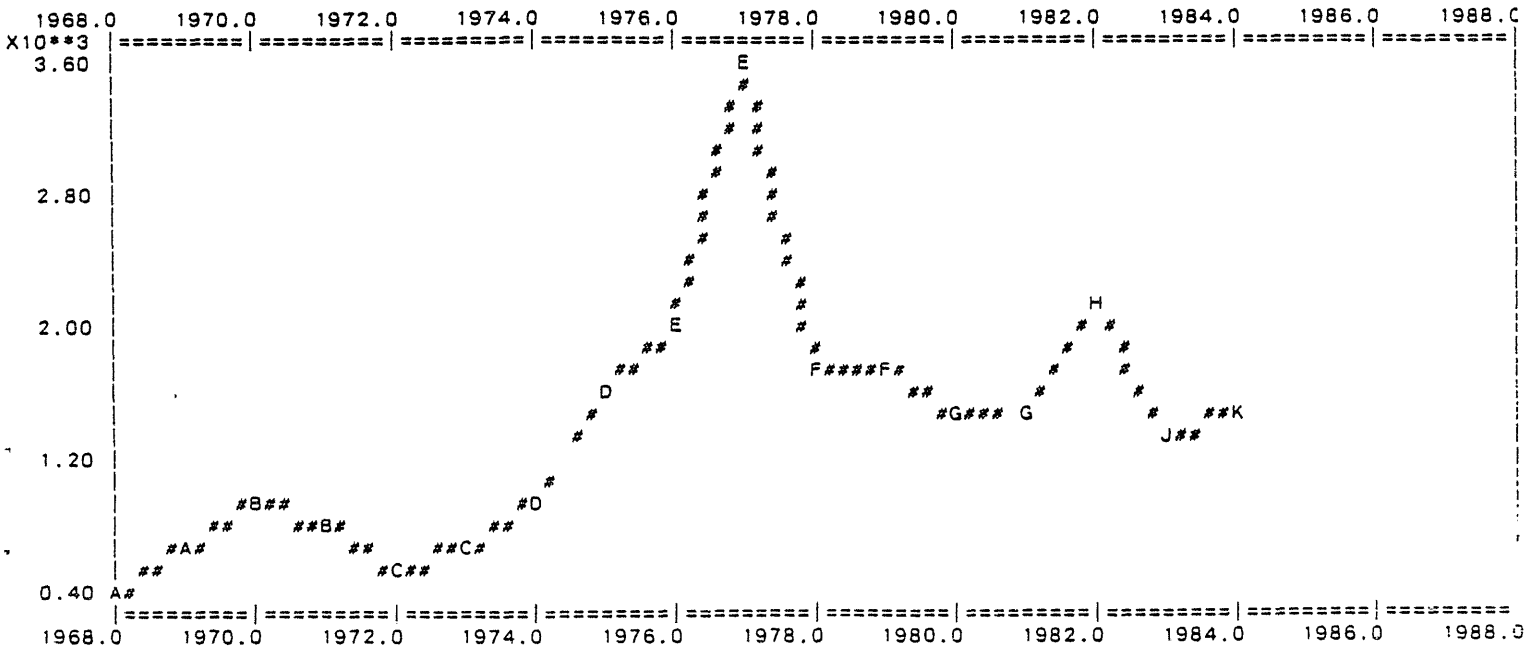
Figure 1 depicts the behavior of consumption and investment imports. The varying degree of the foreign exchange constraint can explain to a large extent the cyclical variations of aggregate imports. Superimposed to these effects are the long-run impact of industrialization policies. The latter were paramount in reducing imports of consumption goods to only 10 percent of total imports in 1985 from 17.8 percent in 1967, but also made the economy highly dependent on imported capital goods (their share in total imports went up from 22.6 percent in 1973 to 29.2 percent in 1980). Trade policy was used to translate both the short-run constraints and the long-term objectives into actual import flows. Unsurprisingly both tariff and non-tariff barriers were part of the tool-kit of trade policy. As far as non-tariff barriers are concerned, since 1967 all imports are classified in three groups. Commodities included in the first list (list A) can be

Figure 1: CONSUMPTION AND INVESTMENT IMPORTS

A) CONSUMPTION GOODS IMPORTS



B)INVESTMENT GOODS IMPORTS



freely imported, commodities included in list B are subject to import licensing and list C commodities cannot be imported except under special conditions. Table 1 reports the share of total imports in Lists B and C both at an aggregate level and for disaggregated functional categories. This is apparently an adequate indicator of the importance of non-tariff barriers. It steadily increases after 1972 following the government policy aimed at speeding up industrialization. It peaks twice in 1978-79 and in 1983 when the deteriorating current account balances forces Moroccan authorities to take emergency measures aimed at curtailing imports and decreases in 1984-85 following the policy shift toward trade liberalization.

Table 1: VALUE SHARE OF IMPORTS SUBJECT TO LICENSING

	Investment Goods	Consumption Goods	Total Imports
1970	22.4	22.3	30.4
1972	27.2	21.3	22.3
1978	39.7	57.6	59.0
1980	63.0	61.3	65.9
1982	23.7	60.0	57.7
1983	67.6	77.3	66.1
1984	24.7	60.0	17.8
1985	20.8	54.5	14.2

Tariff barriers follow a very similar pattern steadily increasing until 1983 and declining afterward. Data on custom duties are, unfortunately, very hard to come by and only snapshots at particular points of time are available. It is useful, however, to

recall that, in the context of the liberalization program, the maximum custom duty rate was set to 60 percent in 1984 and 45 percent in 1985. Information is also available on two across the board tariffs, the special tax and the stamp duty. Both exhibit a clear upper trend until 1983 (Table 2), with the special import tax declining afterward from 15 percent to 7.5 percent in 1985.

Table 2: TARIFF BARRIERS

	Special Import Tax	Stamp Duty
1970	2.5	1.0
1973	5.0	4.0
1978	12.0	4.0
1980	15.0	10.0
1982	15.0	10.0
1983	15.0	10.0
1984	10.0	10.0
1985	7.5	10.0

b) The Data

Econometric analysis has focussed on consumption and capital goods imports. Both have been strongly influenced, albeit in opposite way, by the trade policy orientation. Furthermore the recent surge of consumption goods imports, following the implementation of a set of trade liberalization measures, has to some extent reignited the controversy on the benefit of less inward oriented policies. Agricultural imports have been excluded from our analysis on the ground that they are fully controlled by Moroccan authorities.

Value data for imports have been deflated by unit value indices calculated by the Direction de la Statistique from a fairly disaggregated basis. These indices have been taken as representative of the CIF price of imports. To this we have added an indicator of the tariff rate inclusive of the effect of the stamp duty, the special import tax and indirect taxes. The omission of custom duties is not serious for investment goods imports, as far as they benefitted from the various investment codes exemptions but may somewhat false our results for consumption goods. GDP deflators have been used as proxies of the composite prices of consumption and investment goods. Finally domestic consumption and total investments have been used as activity variables in the two import equations. As far as the issue of determining an indicator of quotas is concerned, we have relied on the value share of imports subject to licensing. This is, recognisibly, a fairly imperfect indicator. A decrease in it may even indicate a tightening of the trade regime if it reflects the fact that licenses are less generously granted. However this indicator appears to fit the evolution of the restrictiveness of quantitative restrictions in Morocco quite well, as we noticed earlier, indicating therefore that changes in the trade regimes were mostly accomplished by shifting commodities across lists and not by varying the restrictiveness in granting import licenses.

THE RESULTS

a) Imports of Consumer Goods

We consider the problem of a representative household which, having solved the first-stage of its optimization problem, allocates

total consumption 1/ among domestic and imported goods. Relative prices are assumed to be constant within the two groups of goods. Some of the imported goods are subject to (binding) quantitative restrictions.

We seek an empirical specification that makes it possible to implement the theoretical results presented above using available data for Morocco. Severe restrictions on the functional form are needed. We selected the Linear Expenditure System as a compromise between functional form flexibility and data requirements. 2/

Neary and Roberts (1983) show that the L.E.S. demand function for an unconstrained good in the presence of binding constraints is

$$(7) \qquad m_j\, p_j = \gamma_j\, P_j + \frac{\beta_j}{1 - \sum \beta_c} * [E - \sum p_i\, \gamma_i - \sum p_c\, m_c]$$

where γ's are the subsistence levels of the goods among which total expenditure E is allocated; β's are marginal propensities to spend the super numeraire income; m's are levels of consumptions; indices i and j refer to unconstrained goods, index c to constrained goods.

1/ Of course, total consumption is jointly endogenous; single-equation estimation is carried out under the maintained assumption of independence between random disturbances in the first-stage and second-stage equations.

2/ We attempted to estimate a flexible functional form relating the log of total imports to the log of expenditure and relative price of imports, with coefficient assumed to vary linearly as a function of the quota indicator. The results were unsatisfactory, mainly because of high collinearity introduced by the presence of the interaction terms (quota x price) and (quota x expenditure), with quota, price and expenditure also entering the regression separately. The same remarks apply to the estimation of the investment import equation.

Under the assumption of constant (unitary by choice of units) relative prices among domestically produced goods and among imported goods, we can write the following expression for total real imports M:

$$(8) \quad P_M * M = P_M \left(\sum \gamma_f + \sum m_c\right) + \frac{\sum \beta_f}{1 - \sum \beta_c} * \left[E - P_D \sum \gamma_D - P_M \left(\sum \gamma_f + \sum m_c\right)\right]$$

where P_M is the aggregate price of imports, including tariffs; P_D the aggregate price of home goods; subscript f refers to freely importable foreign goods, c to constrained imports, and D to domestically produced consumption goods.

It is possible to check that the responsiveness of total imports both to total expenditure E and to their own price decreases as $\sum \beta_f$ becomes smaller and $\sum \beta_c$ becomes larger (more constraints are imposed). Recall that we found that uncompensated price derivatives may move either way between constrained and unconstrained regimes. In an LES goods are gross complements $\left(\frac{\delta m_i}{\delta p_j} < 0\right)$ and this tilts the balance towards a positive sign for the uncompensated price response. On the other hand, goods are net substitutes and own price dominate cross price effect, so compensated price derivatives are larger in absolute value in the constrained regime (in accordance with eq. 4).

We are interested in estimating required consumption and marginal propensity to spend for the aggregate "total imports". Given the assumed constancy of relative prices within the aggregate, estimation would be straightforward if it weren't for the presence of quotas. Lacking data on quota levels for individual goods, it is not possible to estimate eq. (8) as it stands: some very stringent assumptions are needed to make use in estimation of the available quota information. In the light of the general features of quantitative restriction policy in Morocco, we have tentatively assumed that:

$\sum\beta_c/\sum\beta_i$ (the ratio of marginal propensity to spend on currently constrained goods to total marginal propensity to spend on imports) is in every period closely approximated by the ratio of imports subject to quotas to total imports, q_t. This is not rigorously defendable; it should, however, be close enough to reality to constitute an improvement over neglecting quotas altogether.

$\sum\gamma_f + \sum m_c$ is approximately constant (either all import quotas are always set at or slightly above the required consumption level, or at least when fewer restrictions are imposed the allowed amount is increased, so that the above sum is close to constant).

With these assumptions, and allowing for partial adjustment (strongly suggested by the data) we get from (8).

$$(9)\ (P_M * M)_t = (1 - d)\ \{\text{alfa} * P_M + \frac{\text{beta}\ (1 - q_t)}{1 - \text{beta} * q_t} * [E - \text{gamma} * P_{Dt} - \text{alfa} * P_{Mt}]\} + d * (P_M * M)_{t-1}$$

where alfa = $\sum \gamma_t + \sum m_c$, beta = $\sum\beta_i$, gamma = $\sum \gamma_D$ and d is the partial adjustment coefficient.

Results of the estimation of eq. (9) by non-linear least squares are reported in Table 3.

The estimates are rather precise and not unreasonable. The dependent variables is imports of consumer goods, which are about 2.5 to 5 percent of total consumption expenditure E over the sample period. The marginal propensity to spend is (notionally) higher than that - about 9 percent. Estimated super-numerary income is positive over all the sample, and the point estimates do not depend on the

Table 3: IMPORTS OF CONSUMPTION GOODS (LINEAR EXPENDITURE SYSTEM)
(standard errors in parentheses)

alfa	333.1 (94.27)	13 degrees of freedom $R^2 = 0.997$
beta	0.0897 (.030)	DW = 1.58
gamma	9213.29 (1985.1)	st. error residuals = 79.95
d	0.643 (0.115)	out of sample forecasting error (for 1985) is 2917.4 - 3025 Test stat. 1.81 (X^2_1) LM test for auto-correlation 1.58 (X^2_1)

starting point of the iteration. Regressing squared residuals over squared estimates of the gradient (which is a test for misspecification if homoskedasticity is assumed, see White, 1981) gives $X^2(5) = 9.69$. While no formal Hausman test has been computed, non-linear two stage (NL2S) estimates do not differ appreciably from the non-linear least squares (NLS) ones (although this is probably due to the low number of observations).

We also tried to estimate a standard L.E.S. demand function, neglecting the presence of quantitative restrictions. The results are extremely poor (very imprecise, and with a negative point estimate for the marginal propensity to spend on imports), which is evidence that quotas do matter and that our attempt to take them into account is not meaningless, with all the arbitrariness of the assumptions discussed above.

The results of the L.E.S. estimation can be used to roughly figure out the impact on imports of an hypothetical lifting of all

quantitative restrictions in 1985. The L.E.S. predicts that nominal imports would then have been 3837.83 million of dirham (MDH) in the first year, and 6491.53 MDH in the long run. These very large effects can be contrasted to the relatively minor effect of a repeal of tariffs with status-quo quotas. The tariff on consumer goods in 1985 has been roughly estimated at about 10 percent for the purpose of this study; the L.E.S. suggests that a reduction of the price of imports by that amount (keeping quotas in place) would imply a nominal expenditure on imports equal to 2867.73 MDH in 1985 (about a 10 percent increase in real terms over the status-quo forecast) and 3777.91 MDH in the long run (43 percent increase in real terms).

All these simulations keep total consumption expenditure and prices of domestic goods unchanged, which of course is very much a simplification. Still, they do seem fairly realistic and provide insights as to the different effects of tariff and non-tariff barriers to trade.

b) Imports of Investment Goods

Morocco, as many developing countries, is heavily dependent on imported capital goods. Investment imports represented in 1984 31.7 percent of total investment, up from 25.8 percent in 1968. In modelling imports of investment goods we consider a representative firm which minimizes the cost of acquiring a given flow of new capital goods subject to a transformation function between foreign and domestically produced investment goods. A subset of foreign investment goods is subject to quantitative restrictions. Finally relative prices among foreign capital goods are assumed to be constant. Suppose that total

investment is equal to a Cobb-Douglas function of foreign and domestically produced investment goods:

$$(10) \qquad I = I_D^{\beta_D} \prod_{f \varepsilon F} I_f^{\beta_f} \prod_{c \varepsilon C} I_c^{\beta_c} \qquad \beta_D + \sum_f \beta_f + \sum_c \beta_c = 1$$

where I and I_D denote respectively total and domestic investment, while the index F (C) refer to those foreign investment goods which can (cannot) be freely imported. The firm is assumed to minimize the cost of acquiring I subject to eq. (10) and the quantitative restrictions. The price of all foreign investment goods is assumed to be the same. After substituting the first-order conditions into eq. (10) and solving for I_f, we find that:

$$(11) \qquad I_f = \left(\frac{I}{\prod_{c \varepsilon C} I_c^{\beta_c}}\right)^{\frac{1}{1-\Sigma\beta_c}} \left(\frac{P_M}{P_D}\right)^{\frac{-\beta_D}{1-\Sigma\beta_c}} \prod_{i \varepsilon F,D} \beta_i^{\frac{-\beta_i}{1-\Sigma\beta_c}} \beta_f \qquad f \varepsilon F$$

where P_M and P_D denote respectively the price of foreign and domestic capital goods. Then:

$$(12) \qquad \ln \sum_{f \varepsilon F} I_f = \ln \Sigma\beta_f + \frac{1}{1-\Sigma\beta_c} \left(\ln I - \Sigma\beta_c \ln I_c - (1 - \beta_M) \ln (P_M/P_D) - \beta_D \ln \beta_D - \Sigma \beta_f \ln \beta_f\right)$$

where $\beta_M = 1 - \beta_D = \Sigma \beta_i$ (with $i \varepsilon F,C$)

Let now assume that q, the value share of imports subject to licensing, is equal to $\Sigma\ \beta_c/\Sigma\ \beta_i$. 1/ Under the further assumption that all β_i's are equal and rations are set at identical levels, after a little algebra the estimating equation becomes:

$$(13) \qquad \ln \sum_{f\varepsilon F} I_f = \ln\left(\beta_M(1-q)\right) + \frac{1}{1-\beta_M\ q}\left\{\ln I - (1-\beta_M)\ln(P_M/P_D) - \beta_M\ q\ \ln(\Sigma I_c) - (1-\beta_M)\ln(1-\beta_M) - a - \beta_M\ q\ \ln\left((\beta_M\ q\right)\right\}$$

where a is a constant which depends on β_M and the number of imported goods.

It is noteworthy that, in line with eq. (4), both output and the compensated price elasticities increase with rationing, i.e., with a higher value of q. It can be easily checked than in this problems free and constrained imported goods are net substitutes and own-price dominate cross-price effects.

The results of estimating eq. 13, with the addition of a lagged dependent variable, by non-linear least squares are presented in Table 4. The measured price elasticity is .68 in the short run and quite well determined. Adjustment to long-run levels is fairly rapid. The statistical properties of the equation are satisfactory. The LM test does not indicate at the 10 percent significance level the presence of auto-correlation ($X_1^2 = 1.67$). Similarly a general test of mis-

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1/Again the assumption is not rigorously defendable. In the Cobb-Douglas, it amounts to assume that the constraint is just binding.

Table 4: IMPORTS OF INVESTMENT GOOD (COBB-DOUGLAS SPECIFICATION)
(standard error in parentheses)

β_M	.32 (.10)	14 Degrees of Freedom R^2 = .99
a	-1.25 (.52)	st. error of residuals = .010
Lagged Dependent Variable	.10 (.05)	Out of sample forecasting error (for 1985) is 7.123 - 7.1277 Test stat. .002 (X_1^2) LM test for auto-correlation: X_1^2 = 1.67

specification (White 1981) fails to detect, again at the 10 percent level, any significant problem (X_6^2 = 5.56). 1/, 2/. Finally the predictive power of the equation is more than satisfactory, with projected nominal investment imports in 1985 equal to 6975 MDH against an actual value of 7008 MDH. Unsurprisingly both the Chow and

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1/ Had we run the test using only square terms and not the cross products to save on the degrees of freedom, the results would not have changed much (X_3^2 = 4.57).

2/ However given the small sample size, the power of the previous tests may be fairly low. There are at least two possible sources of misspecifications. First total investment may be itself endogenous. Second serially correlated errors will result, given the presence of the lagged endogenous variable, in inconsistent estimates. To allow for those two effects the equation was reestimated by non-linear two stage least squares (NL2S). The results are however fairly close to NLS estimates. The equation again is well-behaved. The Anderson-Mizon test (a more appropriate test for simultaneous equation systems) does not provide any indication of structural instability (X_1^2 = .48). Also a regression of the residuals on their lagged values fails to detect the presence of serially correlated errors (t_{14} = .74).

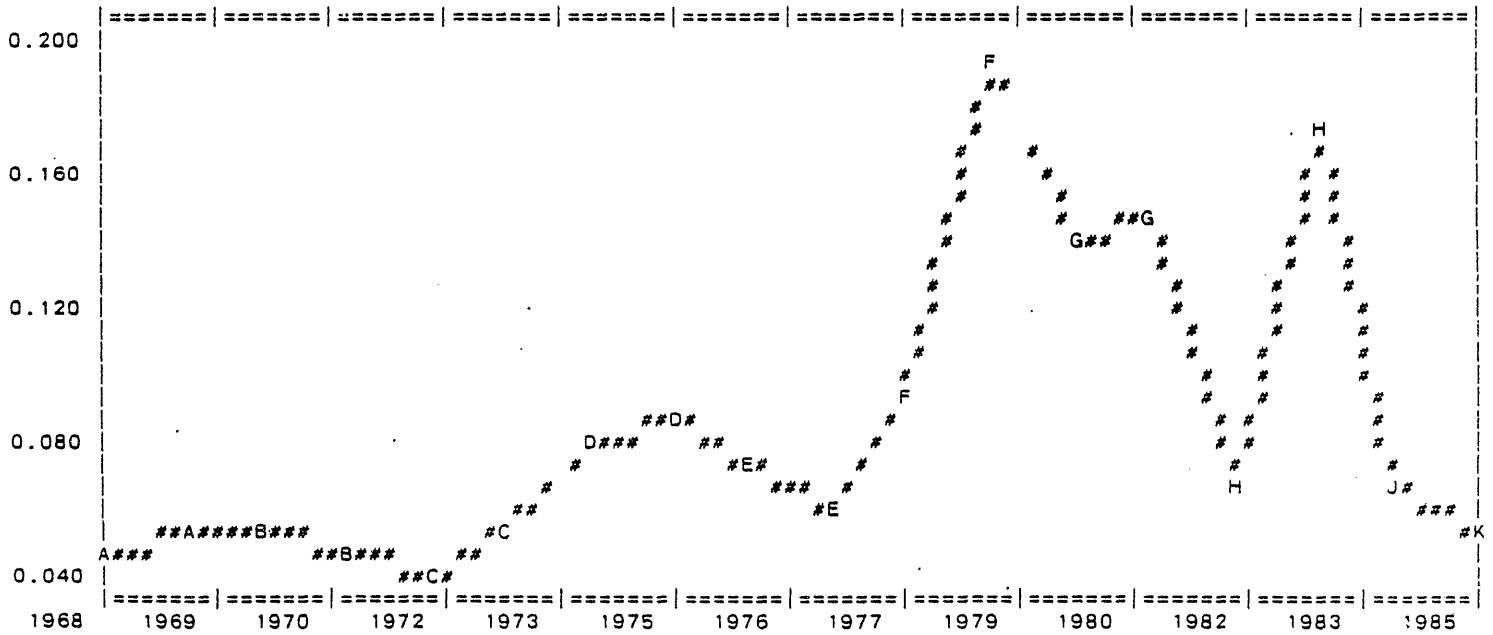
the Hendry tests take values which are not different from zero up to the third decimal point.

We can now examine the impact of liberalization policies. If the special import tax had been removed in 1985 the relative price of foreign investment goods would have decreased by approximately 7.6 percent with real investment imports going up by 5.6 percent to 1513 MDH from their actual value of 1433 MDH. The actual price elasticity (.74) is higher than its notional value (.68) because of the presence of quantity rationing. A similar exercise can be performed for non-tariff barriers. Figure 2 compares the fitted values of imports from eq. 13 with the levels which we would obtain if all quantitative restrictions were eliminated. The importance of rationing effects is clearly a function of our indicator q. The impact of removing quantitative controls is fairly limited (at most 9 percent) until 1979 when more than 80 percent of investment imports become subject to controls. A lifting of non-tariff restrictions in 1979 would have increased investment imports by a hefty 20 percent. A second peak in q occurs in 1983 when due to the sudden payment crisis Moroccan authorities took emergency measures to restrict imports. Almost 70 percent of imports were subject to licensing, the abolition of which would have increased investment imports by 17.5 percent.

CONCLUSIONS AND POLICY IMPLICATIONS

It may sound unsurprising to conclude by saying that trade policies have a very significant impact on import decisions. Still there is some use in it. We have seen how relative prices significantly affect import demand. A 10 percent real devaluation would have reduced

Figure 2: IMPACT OF LIFTING QUANTITATIVE RESTRICTIONS ON INVESTMENT GOODS IMPORTS (PERCENTAGE CHANGE)



in 1985 imports of consumption goods by the same amount in the short-run and by 42 percent in the steady state. Even investment goods imports, for which substitution possibilities appear from a priori ground more limited would have decreased by 7.4 percent. The quantitative importance of price effects means that tariff policy is not without consequence on the actual import flows. However, the fact remains that even a full abolition of the special import tax from say its 1985 level would have only a relatively small effect on the real exchange rate (with 30 percent custom duties, approximately 5.8 percent). The impact on consumption and investment imports, given existing quantitative

restrictions, 1/ would be equal respectively to 5.8 and 4.2 percent. The numbers are significantly larger when the attention of the liberalization process is devoted to non-tariff barriers. We have seen how both consumption and investment goods imports would heftly react to a lifting of quantitative barriers. The impact is particularly relevant for consumption goods, for which our estimates indicate that, following the repeal of quantitative controls, imports would almost double in the long-run. The impact of QRs is not limited to import levels, but extends also to price and activity elasticities. Our results suggest that had QRs for consumption goods been lifted in 1985, their income elasticity would have increased from .93 to 1.20. While the significance of these numbers should not be overestimated, a more reliable implication of our analysis is that estimated elasticities from models which do not take fully into account QRs (including therefore their effect on elasticities themselves) offer very little guidance to predict the effect of trade liberalization. Furthermore we show that, contrary to widespread beliefs, it cannot be stated blankly that the price responsiveness of imports will increase when the impetus of the liberalization process sweeps away the web of quantitative controls.

Our results can also be used to cast light on some relevant policy trade-offs. Trade liberalization in Morocco has relied mostly on tariff reductions. Our results show that the impact on the current account is likely to be limited. However, the importance of trade taxes as a source of fiscal revenue points to a possible clash between

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1/ Recall that changing the extent of QR's would also affect price elasticities.

the need to stabilize the budget and the imperatives of the liberalization process. As an alternative to tariff reduction, the lifting of QRs may at first blush seem more promising. It would not have a negative impact on the public budget. On the contrary, by increasing import flows, it would have a beneficial effect on government revenues. The other side of the coin is, of course, its impact on the current account, given the significant effect on import flows of quantitative controls. The policy maker must therefore strike a very delicate balance in selecting the pace and the tools of the liberalization process. The simple message is that different instruments have different and sometimes opposite and undesirable impacts on the various policy objectives. This paper can move some steps toward a better quantification of the involved magnitudes.

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