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THE EFFECTS OF TRADE LIBERALISATION ON IMPORTS IN SELECTED DEVELOPING COUNTRIES

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Abstract

This paper analyses the impact of the reduction of tariff and non-tariff barriers on the imports of selected developing countries, utilising dynamic panel data techniques. Domestic income and relative prices are found to be significant determinants of import growth. Additionally, the results indicate that import duties reduce import growth, but the effect varies according to the region and the type of trade policy regime existing in the country. The results also show that the elimination of trade policy distortions has a strong, positive impact on import growth. Lastly, it is found that income and price elasticities are higher as a result of trade policy reform.

JEL Classification: C21, C22, C23, F13, F14.

Keywords: trade liberalisation, import growth, dynamic panel data, time series/cross section, developing countries.

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THE EFFECTS OF TRADE LIBERALISATION ON IMPORTS IN SELECTED DEVELOPING COUNTRIES

1. Introduction

In the formulation of trade and/or exchange rate policies, one of the major concerns of policy makers is the responsiveness of trade flows to relative price changes and income variations. The effect of trade and exchange rate policies is highly dependent upon the size of import and export price, and income, elasticities.

As far as the analysis of import price and income elasticities is concerned, the empirical investigation of import demand functions has been one of the most researched areas in international economics[1]. International economists have dedicated a considerable amount of effort to the estimation of import demand functions, both at the aggregate and disaggregated levels. Estimated elasticities are of significant practical importance to policy makers, where the elasticities derived are a crucial link between economies, and the degree to which the external balance constraint affects a country's growth performance.

However, few studies have analysed the impact of trade liberalisation on import behaviour across developing countries (exceptions are Bertola and Faini, 1991, and Faini *et al* 1992). Knowledge of the major variables that affect import performance, and the prediction of import flows can help policy-makers to design and assess the overall sustainability of structural reforms. They are employed, for example, as inputs into the configuration and

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[1] See Khan (1974). Some of the earlier studies that estimate import demand functions are surveyed by Goldstein and Khan (1985). Other early studies on import and export demand elasticities for different countries are: Kreinin (1967, 1973); Houthakker and Magee (1969); Khan (1974, 1975); Goldstein and Khan (1976, 1978); Murray and Ginman (1976); Wilson and Takacs (1979); Warner and Kreinin (1983); Haynes and Stone (1983); Bahmani-Oskooee (1986); and Marquez (1990). The literature on import demand functions is discussed in more detail in Section 2.

implementation of structural adjustment programmes, for determining the appropriate speed of the trade liberalisation process, and for avoiding the possibility of unexpected foreign exchange constraints endangering the reform effort.

The prediction of import response following trade liberalisation measures is not an easy task, especially when extensive non-tariff barriers on imports are present. Quotas, for instance, affect the responsiveness of imports to real exchange rates, tariffs and activity levels (domestic output). But the combined effects of import barriers, both quantitative and non-quantitative, are hard to gauge because of the constraints on data availability.

This paper derives an import growth function and presents new and relatively comprehensive evidence regarding import growth in selected developing countries, focusing on the impact of import controls, i.e., tariff and non-tariff barriers. To this end, the research applies dynamic panel data models based on fixed effects and generalised methods of moments (GMM). Also, heterogeneous panels for the complete sample as well as for the different regions of the world are estimated using a time series/cross section technique. Additionally, the countries are classified according the degree of trade policy distortion based on the Heritage Foundation Index of Economic Freedom (O'Driscoll *et al*, 1999). The trade policy distortion score is based on a country's average tariff rate, non-tariff barriers, and corruption in the Customs Services.

The plan of the paper is as follows. Section 2 analyses the theoretical specification and empirical evidence on import demand functions. Section 3 presents descriptive evidence of trade policy in the countries considered. Section 4 specifies the import growth function to be studied and reports the empirical results. Finally, conclusions are summarised in Section 5.

2. Import Demand Functions: Theory and Empirical Evidence

Traditional import demand functions make imports a function of domestic income and domestic prices relative to the price of import substitutes. If the price and income elasticities of demand are assumed constant, the import function can be written as:

$$M = \left(\frac{P_f E}{P_d} \right)^{\Psi} Y^{\pi} \tag{1}$$

where Y represents domestic income; P_f is foreign prices; E is the nominal exchange rate; P_d is domestic prices; ψ is the price elasticity of demand for imports; and π is the income elasticity of demand for imports. The price elasticity of demand for imports is expected to be negative, while the income elasticity is positive.

Taking logs of equation (1) and differentiating with respect to time, the growth of imports can be expressed as:

$$m = \psi(p_f + e - p_d) + \pi(y) \tag{2}$$

The partial adjustment form of the traditional import demand equation in which import growth is assumed to adjust only partially to the difference between equilibrium import growth in period t and the actual growth of imports in the previous period is represented as:

$$m_t = \beta_0 + \beta_1 pm + \beta_2 y + \beta_3 m_{t-1} + \mu_t \tag{3}$$

where $\beta_1 = \psi$ and $\beta_2 = \pi$ (i.e. the short run price and income elasticities); pm is the growth in relative prices; and μ_t is the error term. The long run price and income elasticities are given by $\beta_1/(1-\beta_3)$ and $\beta_2/(1-\beta_3)$ respectively.

As stressed earlier, there are a large number of empirical studies which estimate import demand functions for both developed and developing countries. These studies have used

mainly OLS and instrumental variables techniques, assuming stationary data[2]. Examples of import demand studies for advanced economies are Kohli (1991), Urbain (1992), Wilkinson (1992), Deyak *et al* (1993), Clarida (1994), Mah (1994), Marquez (1994), Sedgley and Smith (1994), Carone (1996), and Masih and Masih (2000). Deyak *et al* (1989) and Pattichis (1999) estimate disaggregated import demand functions. Examples of import demand studies for developing countries are Marquez and McNeilly (1988), Mah (1992, 1993, 1997), Bahmani-Oskooee and Rhee (1997), Bahmani-Oskooee and Niroomand (1998), Senhadji (1998), and Reinhart (1995). The conclusion of these studies is that, in general, income and relative prices are significant determinants of import performance, but the price elasticities tend to be low, in most cases way below unity. Income elasticities, however, tend to be above unity. Reinhart (1995) provides a set of interesting results for developing countries, where the elasticities differ considerably across regions. The price elasticities for the regions are: Latin America: -0.36; Asia: -0.40; Africa: -1.36; All countries: -0.53. The income elasticities are: Latin America: 0.96; Asia: 1.39; Africa: 1.14; All countries: 1.22.

2.1 Import Demand and Trade Liberalisation

The influence of trade liberalisation on import performance, and also the behaviour of import demand elasticities during the process of reform, have been analysed in different ways. Melo and Vogt (1984) propose two interesting hypotheses in this regard, for which they found support by analysing the case of Venezuela. First, they suggest that as the degree of import liberalisation increases, the income elasticity of demand increases. That is, the relaxation of controls will tend to increase the income elasticity automatically. Second, as economic

[2] The unit root tests and cointegration technique provide a more appropriate method of estimating long run elasticities in a time series framework. Bahmani-Oskooee and Niroomand (1998) provides a discussion of the issue.

development proceeds, the price elasticity of import demand also rises as the ability to substitute domestic production for imports (import substitution) become easier.

However, the subsequent empirical evidence regarding the hypotheses has not been conclusive. For instance, Boylan and Cuddy (1987) examined the two hypotheses for the case of Ireland and did not find empirical support for them. Mah (1999) argues, however, that Boylan and Cuddy's findings are misleading because of methodological shortcomings. Mah (1999) examines the Melo-Vogt (1984) hypotheses during the process of economic development in Thailand using, according to the author, 'a more appropriate empirical technique'. The results support the hypothesis related to the income elasticity, showing that the income elasticity increased as a result of trade liberalisation. However, the price elasticity was not found to be responsive to trade liberalisation.

Bertola and Faini (1991) provide one of the earliest studies of the impact of trade liberalisation on import demand for a developing economy, accounting for the response of imports to the elimination of tariff and non-tariff barriers. Through the development of a theoretical model and empirical application to Morocco, the authors show that quantity restrictions (QRs) had a significant impact not only on the level of imports, but also on their sensitivity to income and price variations. For instance, the authors demonstrated that, had QRs for consumption goods been lifted in 1985 (the date used for the prediction test), their income elasticity would have increased from 0.93 to 1.20.

Faini *et al* (1992) study the impact of trade policy on import demand in developing countries. The authors focus on the impact of import controls, assuming two categories of imports, that is, those subject to quantitative restrictions, and those that can freely enter the country. They show that estimated income elasticities in developing countries are generally higher than unity, and that relative prices are significant with an elasticity less than unity. Another finding is that when the lack of foreign exchange or, more generally, a restrictive

trade regime effectively constrains import flows, the measured impact of price and income elasticities becomes less evident. Faini *et al* results suggest that the real effects of income and price changes (e.g. a devaluation) on import behaviour are more evident when the impact of import controls and/or liberalisation policies is also included in the analysis. Thus, import demand studies, which do not evaluate the effect of import policy changes, should be interpreted with caution, as far as the estimates of the income and price elasticities are concerned.

3. Descriptive Evidence on Trade Policy

One of the most important purposes of establishing the General Agreement on Tariffs and Trade (GATT) in 1947 was to achieve a substantial reduction of tariffs and non-tariff barriers to trade, and thus to secure freer access of countries to international markets. Since then, trade policy reforms in developing countries have been widely documented, mainly because trade reforms have become an integral part of structural adjustment programmes, required by international organisations, as a result of international indebtedness (see IMF, 1998; Dean *et al* 1994; UNTACD 1999, 2000). Furthermore, the change in intellectual thinking, and the empirical evidence provided by multi-country studies (using different indicators of trade distortions), which analyse the virtues of a more outward-oriented economy, and the failures of protectionist policies in some developing countries, were crucial factors behind trade policy reform. The obvious policy implication from this literature is that developing countries should abandon protectionist and restrictive trade strategies and open their foreign trade sectors[3].

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[3] See Edwards (1992, 1993); Krueger (1998); Rodríguez and Rodrik, 2000; Thirlwall (2000); Ben-David *et al* (1999).

In relation to tariffs, there have been important developments in terms of their application, and substantial reforms and reductions of tariffs have been achieved in the successive rounds of trade negotiations. However, it is difficult to contend that the same achievement has been reached regarding non-tariff barriers, which are considered as a significant impediment to trade, and which now attract most of the effort on trade negotiations and reforms.

Non-tariff barriers affecting imports can take various forms, amongst which can be mentioned are: import policy barriers (the prohibition or restriction of imports maintained through import licensing requirements); standard and administrative requirements, applied for ensuring quality of goods seeking access into domestic markets (which countries use as a protectionist measure); anti-dumping and Countervailing Measures, used (and permitted by the WTO under special circumstances) to protect domestic industry from serious injury arising from dumped or subsidised imports; government procurement; services barriers; lack of adequate protection of intellectual property rights; etc. The existence of such barriers is a reason of concern, but the WTO accepts the application of some of them as a form of protection of domestic markets, especially for health and/or sanitary reasons. Nevertheless, there is a moral hazard that countries might abuse the application of non-tariff barriers, and such norms can become a disguised way of protectionism.

Table A1 presents a summary of the main trade policy reform measures undertaken in the countries analysed in this study. Even though the countries reviewed undertook necessary reforms to reduce trade distortions (especially imports), the course of reform was diverse, and in many cases reforms are still outstanding. The simplification of import procedures, the reduction or elimination of quotas, and the rationalisation of tariff structures are the most widespread reforms. As far as trade policy indicators are concerned, import tariffs provide a

convenient indicator of the negative impact that trade taxes can have on import growth in quantitative terms.

Table 1 presents a summary of the behaviour of import taxes, as a percentage of total imports, before and after the identified date of the most significant trade reforms. In most of the cases, the reforms, specifically import liberalisation episodes, can be linked to reductions in import taxes. Countries like Colombia, Dominican Republic, Ecuador, India, Korea, Malaysia, Mexico, and Paraguay present notable reductions in import duties, coinciding with the periods of liberalisation. Other economies like Chile, Thailand, Morocco, Uruguay, Cameroon, Malawi and Tunisia also managed to reduce import duty receipts as a proportion of total imports. In most of the cases, import growth increased following the liberalisation policies. However, it would not be completely appropriate to try to establish a relationship between trade liberalisation and import growth, based on import tariff reductions alone, because some countries adopted different approaches to the reform process, and there are non-tariff barriers to trade that might have also affected import growth. Moreover, in some countries import tariffs increased due to the fact that such economies decided to eliminate non-tariff barriers, and to convert these non-quantitative restrictions into tariffs.

Regarding non-tariff barriers, it is very difficult to express in a single number or indicator their weight as a trade policy measure, mainly because they are very country specific, and because the information is not always readily published, especially for the case of developing countries. Some authors have used different criteria to try to measure non-tariff barriers, and one of them is the use of dummy variables to present structural breaks in policy reforms.

In connection to this, since 1995, the Heritage Foundation has developed an Index of Economic Freedom which provides an annual examination of the factors that contribute most directly to economic freedom and prosperity. The index includes the broadest array of

institutional factors, and one of the key elements in measuring economic freedom is trade policy. The five broad categories of countries, based on the trade policy grading scale, are *very low, low, moderate, high* and *very high*.

Table 2 shows the trade policy scores, which are based on a country's average tariff rate – the higher the rate, the worse (or higher) the score[4]. The other factors of trade policy are non-tariff barriers and corruption in the Customs Services. This index takes values of 1 to 5 and tries to measure the extent to which government policy acts as a disincentive to trade. As can be observed from Table 2, on average, most of the countries we take fall in the 'moderate' category, which coincide with the level of tariffs expressed in Table 1. Also, countries that were acknowledged as having 'very high' trade policy restrictions appear to apply very high tariff levels. However, given the mixed evidence regarding trade policy practices, it is suitable to rely on the empirical scrutiny which is undertaken in the following sections to analyse the relationship between trade liberalisation and import performance.

4. The Model and Results

Traditional import demand functions relating import flows to relative price and domestic incomes are estimated. Additionally, the functions include the effect of import duties on import growth, and the effect of trade liberalisation through the use of dummy variables. Also, we test if the income elasticity of import demand changes with trade liberalisation, and also if the price elasticity also changes as the ability to substitute domestic production for imports becomes easier. The assumption is that trade liberalisation (i.e. the

[4] If average tariff rates are not available, the average rate is determined by calculating the revenue generated from tariffs and duties as a percentage of total imports. Also, the information on the overall tariff structure, its various rates, and the items to which these rates apply to estimate an effective tariff rate are analysed.

reduction and/or elimination of trade policy distortions) has a significant impact not only on the growth of imports, but on their sensitivity to income and price variations as well.

Using the dynamic specification of the import growth function presented in equation (3), the augmented import growth function which also allows for the effects of import duties and trade liberalisation on export growth, can be expressed as:

$$m_{it} = \alpha_i + \beta_1 pm_{it} + \beta_2 y_{it} + \beta_3 m_{it-1} + \beta_4 d_{it} + \beta_5 lib_{it} + \varepsilon_{it} \tag{4}$$

where α_i are country-specific effects (when panel data are used), d_{it} is import duties, and lib_{it} is a shift dummy variable for the years following significant liberalisation. The rest of the variables are as defined earlier, and we expect $\beta_1 < 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 < 0$ and $\beta_5 > 0$.

Trade liberalisation can also affect the price and income elasticities themselves, as suggested by the Melo-Vogt (1984) hypotheses discussed earlier. Such interaction effects can be estimated by including two slope dummy variables, $y \times lib$ and $pm \times lib$, to capture the joint effects of the elimination of import distortion measures on income and price elasticities, respectively. Thus we also estimate:

$$m_{it} = \alpha_i + \beta_1 pm_{it} + \beta_2 y_{it} + \beta_3 m_{it-1} + \beta_4 d_{it} + \beta_5 lib_{it} + \beta_6 (pm \times lib)_{it} + \beta_7 (y \times lib)_{it} + \varepsilon_{it} \tag{5}$$

4.1 Panel Data

The import growth functions presented in equations (4) and (5) which allow for the effects of import policy distortions and trade liberalisation on import performance will be analysed by two types of cross sectional-panel data analysis. First, two forms of dynamic panel data model are estimated: the fixed-effects estimator, based on the inclusion of dummy variables to account for factors that are specific to each country but constant over time; and

dynamic panel data models based on generalised methods of moments (GMM) (Arellano, 1993, and Arellano and Bond, 1998)[5].

The results from both estimators are reported in Table 3. The fixed effects results in column (i) show that all the arguments of the import growth function have the expected sign. However, the relative price indicator is not statistically significant. The coefficient on the lagged dependent variable is so small that there is virtually no difference between short and long run income and price elasticities. The import tariff coefficient (-0.20) and the trade liberalisation dummy (3.20) are statistically significant, showing that both the reduction of imports duties, as well as the reform of the trade policy regime, had a marked impact on import performance.

In order to assess the direct impact of tariffs on import growth, import duty elasticities were calculated from the estimated regression coefficients (see Table 6). The estimated elasticity is -0.42, and the impact of trade liberalisation is calculated to have raised the growth of imports by 3.20 percentage points or 73 percent.

Column (ii) provides the estimates that test the Melo and Vogt (1984) hypotheses. The short run income and price elasticities are both statistically significant as are the import duty and trade liberalisation coefficients. The import duty coefficient is -0.20, and the shift dummy coefficient of 6.19 shows that there is a significant import response to trade liberalisation. With regard to the direct impact of tariffs on import growth, the estimated import duty

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[5] The GMM estimator is preferred by some authors to the fixed effects estimator to estimate dynamic panel data models since the dynamic fixed effects model produces estimates that are inconsistent if the number of ‘individuals’ tends to infinity while the number of time periods (T) is fixed (see Nerlove 1967; Nickell, 1981; and Harris and Mátyás, 1986). More specifically, the bias is of order ($1/T$). In the present case, the number of years is large (T=23) and thus the bias should be minimal. The GMM estimator is based on first differencing and controls for the endogeneity of the lagged dependent variable (and can also control for the potential endogeneity of other explanatory variables - see Arellano, 1993; Arellano and Bond, 1998).

elasticity is -0.43. Additionally, the calculated relative impact of liberalisation on import growth (1.41) implies that trade reform increased import growth by more than 100 percent (see Table 6).

Regarding the slope dummy variables, the Melo-Vogt (1984) hypotheses are confirmed, since both the coefficients are significantly different from zero, and they show the expected sign. Moreover, the two interaction variables are jointly significant, with an F-statistic of $F(2, 475) = 9.61$.

Turning now to the GMM estimates, the results presented in columns (iii) and (iv) endorse the findings of the fixed effects estimations. Income and price elasticities are strongly statistically significant and the magnitudes are similar to the fixed effect estimates. More interesting are the results concerning import duties and trade liberalisation measures. As can be seen from column (iii), import tariffs negatively affect imports: the estimated coefficient is -0.35, which implies an import duty elasticity of -0.67. The independent impact of trade liberalisation as shown by the trade liberalisation coefficient (1.99) is statistically significant. That is, the implementation of import liberalisation policies raised import growth by 38 percent, according to the calculations presented in Table 6.

Column (iv) shows the GMM results which consider the interaction effects involving trade liberalisation and income and price elasticities, proposed by the Melo-Vogt hypotheses. Looking at the import duty coefficient, it is statistically significant and the magnitude of the coefficient is higher than in the previous case (-0.43). Also, the estimated import duty elasticity (-0.82) verifies the strong negative impact that tariffs inflict on import growth. The trade liberalisation coefficient is 9.10, and the relative impact of liberalisation on import growth is calculated as 1.76, indicating that the lessening of trade policy barriers contributes

to an increase in import growth by more than 100 percent[6]. The Melo-Vogt hypotheses are again confirmed.

4.2 Time-Series/Cross-Section

In this section, a panel data model is implemented which is appropriate to analyse data observed for a relatively large number of periods and for a relatively small number of cross sectional units. The time-series/cross-section (TSCS) model allows for the error term of each cross section unit to be freely correlated across equations. The relevance of this type of model is that the error term need not have the same properties for each country[7]; thus, it is suitable to analyse region or group specific estimations.

The evaluation of trade policy reforms in the different regions, and the classification of countries according to the degree of restriction of the trade policy regime, suggest that the impact of trade liberalisation on import growth might differ across those regions or groups of countries. Also, the price and income elasticities can vary across such groups, as suggested by studies which deal with multi-country studies of import demand functions (see Senhadji, 1998; Bahmani-Oskooee and Rhee, 1997).

4.2.1 The Impact of Liberalisation According to Region

Table 4 presents the estimation of equation (5) for the different geographical regions that comprise this study. The countries in the sample were classified into four zones: Africa, East Asia, South Asia, and Latin America. The results for all the countries in column (i)

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[6] It follows that these results could have implications on the balance of trade and payments. There is evidence that trade liberalisation worsens the trade balance significantly (see UNCTAD, 1999).

[7] The estimator is a two-step generalised least squares estimator with maximum likelihood estimates (MLE) interaction. The model allows for groupwise heteroscedasticity, cross-group correlation, and within-group autocorrelation (see Greene 1997, Chapter 16).

validate the findings of the dynamic panel data estimates. The growth of real GDP proves to have a significant, positive impact on import growth, as shown by the short and long run income elasticity values (1.65 and 1.68, respectively). The import price elasticity has the expected sign, although is not statistically significant. The results also confirm the significant influence that import tariffs and trade liberalisation have on import growth. Additionally, there is evidence that trade liberalisation raises the sensitivity of imports to real income growth, and to relative price changes.

As expected, the region-specific results present more mixed outcomes. Regarding the income and price elasticities, the East Asia region presents the highest long run income elasticity (1.98), although Latin America and Africa also show relatively high income elasticities (1.79 and 1.33, respectively). Regarding the long run price elasticity, Latin America possesses the highest elasticity (-0.17), while Africa has the lowest elasticity, (-0.01), (which is very low and statistically insignificant)[8].

The trade policy related indicators also provide diverse results across the regions analysed. The estimated import duty coefficients are significantly different from zero in all cases, except Africa, and the magnitude of the coefficients is relatively high in the different regions. To be more specific, regarding the expected negative impact of tariffs on import growth, the calculated import duty elasticities are very similar in East Asia, South Asia and Latin America, where the elasticities are -0.65, -0.69, and -0.49, respectively (see Table 6). Although the import duty coefficient is not significantly different from zero in the African case, the calculated elasticity (-1.04) shows a higher negative impact of tariffs on imports than

[8] For Africa and Latin America, the negative coefficient on the lagged dependent variable indicates a non-equilibrium (i.e. divergent) path for import growth.

in the other regions. It can be attributed to the fact that most African countries in our sample possess a very high import duty ratio, both before and after liberalisation[9].

The results also show that trade policy reforms emerge as a more important determinant of import growth in all of the regions. According to the estimations, trade liberalisation has a stronger impact on import growth in Africa, that is 8.44 percentage points, which implies that liberalisation increased import growth by more than 1000 percent in this region (starting from a very low base). The impact of liberalisation in East Asia, South Asia and Latin America is also comparatively high - 4.12, 1.41, and 1.10 percentage points respectively. This means that trade liberalisation increased import growth by 61 percent in East Asia, 21 percent in South Asia, and 26 percent in Latin America (see Table 6). The results show that the elimination, and/or reduction, of restrictive measures affecting international trade has played a major role in affecting import growth.

4.2.2 The Impact of Liberalisation According to Degree of Protection

Another set of time-series/cross-section estimations are presented in Table 5, which portray the analysis of import growth in the sample of countries divided according to classification of the trade policy regimes based on the criteria discussed in Section 3 (see Table 2)[10]. As in the region-specific case, the results vary according to the characteristics of the particular categories, providing insight into the differential impact that a country's trade

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[9] As can be seen in Table 1, Cameroon, Malawi and Tunisia fall into the categories of countries with high import duties as a share of total imports, with duty ratios above 20 percent before and after liberalisation.

[10] The Heritage classification starts from 1995. Thus, in order to assess the impact of tariff and non-tariff barriers for the whole number of observations analysed in the present study, a new classification covering the complete period (1976-1998) was undertaken. This classification is based on the Heritage Foundation's criteria (see Table A2 annexed).

policy (i.e. tariff and non-tariff barriers) has on import growth, and on the arguments of the import growth function.

The estimated import duties coefficient is significantly different from zero in all the cases except in the “low-moderate” category, and the coefficient is larger, i.e. more negative, in the “high-very high” classification as expected. Also, the coefficient is relatively important for “all countries”. Regarding the calculated import duty elasticities (shown in Table 6), import tariffs have a stronger negative effect on imports in countries with “high-very high” restrictive trade regimes, and the elasticity is -0.74. In the “low-moderate” category, import tariffs have a smaller impact on import growth, -0.04.

The estimates for the trade regime liberalisation, which involve the reduction and/or elimination of major import barriers, appear to be a more crucial determinant of import growth. Moreover, the findings confirm the positive impact that trade reform has on import growth. According to the estimates, trade liberalisation has the strongest positive impact on import growth in those countries with “high-very high” restrictive trade regimes. The influence of trade liberalisation on import growth in this case is 4.93 percentage points, or in other words, liberalisation increased imports by 145 percent. The relative impact of liberalisation in countries with “low-moderate” trade policy distortions is smaller in comparison to the other classifications, which is to be expected given the initial conditions regarding trade policy and the use of instruments that directly affect import flows. In this case, trade liberalisation has a relatively small impact of only 19 percent (or 1.02 points). It is clear from this analysis that initial trade policy conditions are also of paramount importance for import growth in the liberalisation process.

5. Conclusions

This paper has examined, in a comprehensive and systematic fashion, import growth functions for a selection of developing countries. In addition to the detailed analysis of the major trade policies implemented in the 22 countries studied during the period 1976-1998; dynamic panel data, and time series/cross section techniques are implemented, which is another important contribution of the paper to the import growth and trade reform-liberalisation literature.

Over the period considered, the income and price elasticities of demand for imports fall within the boundaries of the elasticities found in the previous empirical literature. The long-run price and income elasticities have the expected sign and, in general, are statistically significant.

The main purpose of this paper, however, has been to examine the extent to which trade-related measures affect import growth in developing countries. One of the indicators used to assess the impact of trade policy distortions on import growth is the level of import duties. It is found that import duties reduce import growth, but the effect varies according to the region and the type of trade policy regime prevailing in the country. The calculated import duty elasticities vary considerably amongst regions. Africa seems to be the most affected by the level of import tariffs, but the negative effect is also appreciable in the other regions. Also, the impact of import duties differs significantly according to the degree of protectionism and/or distortions of trade policy in the countries. Import duties affect mostly countries classified as having high and very high levels of protectionism.

As described earlier, the countries analysed have all undertaken profound trade reforms, in which the reduction and simplification of import tariffs, as well as the elimination of non-quantitative restrictions, were fundamental elements of the liberalisation process. The results here provide empirical evidence supporting the premise that the elimination of trade policy

distortions has a strong, positive impact on import growth. Specifically, trade liberalisation has increased import growth by an average of more than 100 percent across all countries, but, as the regionally disaggregated estimations show, the import duty elasticities and the relative impact of trade liberalisation vary considerably across regions and types of trade policy regimes.

Finally, we also tested for the Melo-Vogt (1984) hypotheses. The Melo-Vogt hypothesis concerning the increase of income elasticities following import liberalisation is supported by the different exercises undertaken in this study. The higher income elasticities after liberalisation reflect an increase in the degree of openness to international trade of the countries analysed. The hypothesis of an increase in price elasticities as a result of import reform is also confirmed in most cases.

The response of import growth to trade liberalisation measures do not come as a surprise, in the light of trade policy practices in developing countries before undertaking the reforms. The policies include the use of development policies focused on restrictive trade policies such as import substitution strategy, which concentrate on enhancing the ability to substitute domestic production for imports.

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Table 1

Import Duties and Import Growth Before and After Trade Liberalisation

Country	Year of Liberalisation	Before liberalisation (from 1976) Import Duty	Before liberalisation (from 1976) Import Growth	After liberalisation (up to 1998) Import Duty	After liberalisation (up to 1998) Import Growth
		$0 \leq d < 5$ percent			
Indonesia	1986	4.82	7.55	5.11	8.59
		$5 \leq d < 10$ percent			
Costa Rica	1990	9.72	3.95	7.97	9.05
Korea	1990	8.68	12.53	5.55	9.35
Malaysia	1988	8.41	10.06	5.09	15.48
Mexico	1986	8.27	7.94	4.69	13.44
Paraguay	1989	8.59	11.02	4.88	22.88
		$10 \leq d < 15$ percent			
Chile	1976	13.93*	2.49	12.42	9.88
Philippines	1986	13.48	2.84	13.97	13.12
Sri Lanka	1990	13.38	7.93	13.41	8.77
Thailand	1986	12.81	6.12	9.66	11.66
Venezuela	1991	10.05	6.40	10.11	12.71
Zambia	1990	10.07	-4.23	16.67	2.34
		$15 \leq d < 20$ percent			
Colombia	1991	15.04	4.99	9.17	14.52
Dom. Rep.	1992	18.98	5.38	15.03	8.05
Ecuador	1991	15.81	1.78	8.89	6.69
Morocco	1984	19.11	3.31	16.65	6.49
Uruguay	1985	16.27	-1.53	10.65	11.39
		20 percent $\leq d$			
Cameroon	1991	21.65	6.77	20.98	3.40
India	1991	38.59	6.79	27.77	10.93
Malawi	1991	21.47	2.28	21.36	1.83
Pakistan	1991	26.82	3.63	21.33	4.84
Tunisia	1989	23.83	6.01	21.29	4.63

Sources: Dean *et al* (1994), UNDP/UNCTAD (1999), World Bank (1999), WTO Trade Policy Reviews (various issues).

Note: *d* denotes import duties. The values are period averages, and are the author's calculations**.** The data for Chile's import duties 'before liberalisation' corresponds to the year 1975.

Table 2

Classification of Countries According to the Heritage Foundation

Trade Policy Grading Scale: 1995-2000

Level of Protectionism	**Criteria**	**Countries**
Very low	ATR ≤ 4 percent and/or very low non-tariff barriers.	
Low	4 < ATR ≤ 9 percent and/or low non-tariff barriers.	Chile Paraguay Uruguay
Moderate	9 < ATR ≤ 14 percent and/or moderate non-tariff barriers.	Colombia Costa Rica Ecuador Korea Malaysia Mexico Philippines Thailand Sri Lanka Venezuela Zambia
High	14 < ATR ≤ 19 percent and/or high non-tariff barriers.	Dominican Republic Indonesia Morocco
Very high	19 percent ≤ ATR and/or very high non-tariff barriers that virtually close the market to imports	Cameroon India Malawi Pakistan Tunisia

Source: Heritage Foundation Index of Economic Freedom, various issues (see Johnson and Sheehy, 1995; Johnson *et al* 1998a, 1998b; Johnson and Holmes, 1998, O'Driscoll *et al*, 1999).

Note: ATR denotes average tariff rate. The validity of the Heritage's classification of the countries was confirmed by comparing with the IMF (1998) trade policy rating (for those countries for which the scores were available).

Table 3

Import Performance in Selected Developing Economies: 1976-97

	Dependent variable: import growth m_t			
	Fixed effects		**GMM**	
Explanatory variables:	**(i)**	**(ii)**	**(iii)**	**(iv)**
pm	-0.10	-0.15	-0.18	-0.16
	(1.28)	(2.89)**	(2.43)*	(2.66)**
y	1.65	1.91	1.31	2.60
	(10.03)**	(8.47)**	(5.48)**	(5.41)**
m_{t-1}	0.01	0.10	0.04	0.08
	(0.48)	(2.53)*	(0.43)	(0.20)
d	-0.20	-0.20	-0.35	-0.43
	(2.26)*	(2.34)*	(1.86)§	(3.60)**
lib	3.20	6.19	1.99	9.10
	(2.17)*	(3.03)**	(4.22)**	(2.12)*
$y \times lib$		0.59		0.93
		(1.81)§		(2.57)**
$pm \times lib$		-0.23		-0.40
		(2.12)*		(2.85)*
y_{LR}	1.67	2.12	1.36	2.82
pm_{LR}	-0.10	-0.17	-0.19	-0.17
	Diagnostic statistics			
R^2	0.48	0.59		
Omit $y \times lib$, $pm \times lib$		9.61**		15.92**
Heteroscedasticity test	1.93	24.5**		
Wald test			[0.000]	[0.000]
Sargan test			[0.452]	[0.482]
1st-order serial correlation			[0.000]	[0.008]
2nd-order serial correlation			[0.418]	[0.436]
Number of observations	504	504	386	386

Notes:

1. Figures in parentheses ( ) are absolute t-ratios; figures in brackets [ ] are p-values; §, *, ** indicates that a coefficient is significant at the 10 percent, 5 percent, 1 percent level respectively.
2. y_{LR} and pm_{LR} are the long run income and price elasticities respectively.
3. Omit $y \times lib$, $pm \times lib$ is the F-statistic for the omission of these two variables from the regression.
4. The Heteroscedasticity test is based on a regression of the residuals on the squared fitted values. The Wald test is for the joint significance of the regressors. The Sargan test is of over-identifying restrictions. The tests for 1st and 2nd order serial correlation are asymptotically distributed as standard normal variables (see Arellano and Bond, 1991). The p-values report the probability of rejecting the null hypothesis of serial correlation, where the first differencing will induce (MA1) serial correlation if the time-varying component of the error term in levels is a serially uncorrelated disturbance.
5. The GMM estimations were performed using the programme DPD98 for Gauss (Arellano and Bond, 1998).

Table 4

Two Step Generalised Least Squares and Maximum Likelihood Estimation

	Dependent variable: import growth m_t				
Explanatory variables:	**All countries (i)**	**Africa (ii)**	**East Asia (iii)**	**South Asia (iv)**	**Latin America (v)**
pm	-0.11	-0.01	-0.16	-0.09	-0.19
	(0.60)	(1.40)	(1.84)§	(1.15)	(4.21)**
y	1.65	1.44	1.92	0.80	2.01
	(11.05)**	(4.27)**	(8.05)**	(1.87)§	(8.37)**
m_{t-1}	0.02	-0.08	0.03	0.03	-0.12
	(2.49)*	(0.91)	(0.48)	(0.23)	(2.59)**
d	-0.20	-0.15	-0.72	-0.20	-0.35
	(2.39)*	(0.69)	(2.68)**	(2.03)*	(1.78)§
lib	6.73	8.44	4.12	1.41	1.10
	(3.37)**	(3.13)**	(1.99)*	(2.97)**	(1.93)§
$y \times lib$	0.22	1.53	0.41	3.76	0.42
	(1.96)*	(3.26)**	(1.79)§	(3.82)**	(1.70)§
$pm \times lib$	-0.24	-0.34	-0.29	-0.05	-0.21
	(3.52)**	(2.34)*	(2.36)*	(0.18)	(2.03)*
y_{LR}	1.68	1.33	1.98	0.82	1.79
pm_{LR}	-0.11	-0.01	-0.16	-0.09	-0.17
	Diagnostic statistics				
LRS	232.92	13.98	8.90	4.31	45.48
	[38.93]	[18.31]	[18.31]	[7.81]	[51.00]
Number of observations	462	105	105	63	189

Notes:

1. Figures in parentheses ( ) are absolute t-ratios; §, *, ** indicates that a coefficient is significant at the 10 percent, 5 percent, 1 percent level respectively.
2. y_{LR} and pm_{LR} are the long run income and price elasticities respectively.
3. Omit $y \times lib$, $pm \times lib$ is the F-statistic for the omission of these two variables from the regression.
4. Likelihood Ratio Statistic (LRS) is a test for serial correlation. The numbers in brackets [ ] are the critical values.

Table 5

Two Step Generalised Least Squares and Maximum Likelihood Estimation

	Dependent variable: import growth m_t		
Explanatory variables:	**All Countries (i)**	**Low-Moderate (ii)**	**High-Very high (iii)**
pm	-0.01 (0.42)	-0.11 (2.66)**	-0.01 (1.28)
y	1.66 (11.03)**	2.00 (11.45)**	1.03 (4.82)**
m_{t-1}	0.01 (0.32)	0.10 (2.66)**	-0.04 (0.62)
d	-0.25 (2.75)**	-0.03 (1.68)	-0.16 (2.65)**
lib	5.94 (2.76)**	1.02 (3.49)**	4.93 (1.85)§
$y \times lib$	0.36 (3.26)**	0.41 (9.02)**	0.60 (2.18)*
$pm \times lib$	-0.24 (3.33)**	-0.19 (2.34)*	-0.33 (1.34)
y_{LR}	1.68	2.22	0.99
pm_{LR}	-0.01	-0.12	-0.01
	Diagnostic statistic		
LRS	228.40 [36.19]	232.97 [26.22]	32.11 [32.67]
Number of observations	420	273	147

Notes:

1. Figures in parentheses ( ) are absolute t-ratios; §, *, ** indicates that a coefficient is significant at the 10 percent, 5 percent, 1 percent level respectively.
2. y_{LR} and pm_{LR} are the long run income and price elasticities respectively.
3. Likelihood Ratio Statistic (LRS) is a test for serial correlation. The numbers in brackets [ ] are the critical values.
4. In this set of estimations, Indonesia and Zambia are not included because they switched regimes during the period. Hence, the sample size is slightly smaller than in Table 3 and Table 4.

Table 6

Import Duty Elasticities and Relative Impact of Trade Liberalisation

Estimation method:	**Import duties** (μ_d)	**Liberalisation** (%*lib*)
Fixed Effects:		
Equation (4)	-0.42	0.73
Equation (5)	-0.43	1.41
GMM:		
Equation (4)	-0.67	0.38
Equation (5)	-0.82	1.76
Time Series/Cross Section (equation (5)):		
All Countries	-0.42	1.53
Africa	-1.04	11.11
East Asia	-0.65	0.61
South Asia	-0.69	0.21
Latin America	-0.49	0.26
All Countries	-0.50	1.27
Low-Moderate	-0.04	0.19
High-Very high	-0.74	1.45

Notes:

1. The import duty elasticity is calculated as $\mu_d = (\bar{d}/\bar{m})(\partial m/\partial d) = (\bar{d}/\bar{m})\beta_1$, where $\bar{d}$ and $\bar{m}$ are the means of import duties and import growth respectively.
2. The proportionate impact of trade liberalisation is calculated as $\%lib = \beta_5/\bar{m}_{lib=0}$, where β_5 is the coefficient of trade liberalisation and $\bar{m}_{lib=0}$ is the mean of import growth before liberalisation.

APPENDIX

Data Definitions and Sources

Import Growth (m): Imports of Goods and Services; annual percentage growth (constant 1995 US$). Source: World Bank, *World Development Indicators* (WDI), 1999.

Income Growth (*y*): GDP; annual percentage growth (constant 1995 US$). Source: World Bank, *World Development Indicators* (WDI), 1999.

Import Duties (*d*): Import duties (percent of imports). Import duties comprise all levies collected on goods at the point of entry into the country. They include levies for revenue purposes or import protection, whether on a specific or ad-valorem basis, providing they are restricted to imported products. Data are shown for central government only. Source: World Bank, *World Development Indicators* (WDI), 1999.

Real Effective Exchange Rate (*pm*): The relative price of imports, $\left(\frac{P_f E}{P_d}\right)$, where P_f is foreign prices; E is the nominal exchange rate; and P_d is domestic prices, is calculated as the inverse of the REER. Data for the REER for Colombia, Costa Rica, Ecuador, India, Indonesia, Malaysia, Mexico, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, and Tunisia are from Bahmani-Oskooee and Mirzai (2000). The REERs for the remaining countries are constructed from IMF's *IFS* (various issues).

Table A1

Imports and Exchange Liberalisation in Developing Countries

Region/Country	Reform: First	Reform: Most recent	Trade Reform measures
SOUTH ASIA			
India	1989	1991	Some tariff increases and net additions to the OGL. Significant liberalisation of tariffs and QRs in the 1991 reform programme. Unification of the exchange rate regime.
Pakistan	1989	1991	Replaced non-tariff barriers with tariff, reduction of maximum tariff rates and reduction of exemptions from tariff. Some restrictions in capital account transactions were removed in 1991, and new instruments are not subject to exchange controls.
Sri Lanka	1987	1990	Reduction of the range and number of goods requiring licensing. Exchange rate reform started in 1984. By 1994 most exchange controls were removed.
EAST ASIA			
Indonesia	1985	1990	Reduction in the coverage of non-tariff import barriers. Tariffs were reduced to around 10 percent by 1993.
Korea	1984	1990 1998	Removed non-agricultural QRs. Reduction of unweighted average tariff.
Malaysia	1986	1989	Tariffs reductions were made between 1988 and 1992, in items including food, household goods, clothing, electrical and electronic goods.
Philippines	1986	1989	Gradual replacement of QRs with tariffs. Reduction of tariff bands. Reform of customs procedures.
Thailand	1982	1990	Elimination of non-agricultural QRs. Tariffs reductions programme, but later reversed.
AFRICA			
Cameroon	1989	1991	Elimination of QRs on imports.
Malawi	1988	1991	Reduction of import duties. Limitation of foreign exchange allocation to a small negative list. Transfer QRs to surtaxes.
Morocco	1983	1989	Reduction in QRs on non-competitive goods. Sharp reduction of maximum tariff; new tariff surcharge.

Tunisia	1987	1990	Gradual replacement of QRs with surcharges. Tariff reduction; increases in surcharges.
Zambia	1990	1990	Gradual increase of OGL and exchange rate unification. Reduction of maximum tariff rate and range.
LATIN AMERICA			
Chile	1985	1988	By 1985 Chile had virtually no QRs (and prohibited by the Constitution). Reduction of uniform non-tariff rate.
Colombia	1985	1991	Significant reduction in both levels and dispersion of tariff rates and expanded the number of tariff positions on the free import list. Elimination of import licensing, reductions in the levels of tariffs, reduction of the number of tariffs from 14 in 1990 to 4 in 1993, and liberalisation of the exchange rate. Supplement of tariff reductions by a competitive exchange rate. In 1991 all foreign exchange operations were to be transacted at the market determined exchange rate, and foreign exchange controls were relaxed, and foreign licenses were abolished.
Costa Rica	1985	1990	Reduction in average tariff rates and a decrease in the dispersion of rates. In January 1992 the foreign exchange system was deregulated, floated the exchange rate, opened the capital account, and eliminated foreign exchange controls
Dominican Republic	1990	1992	Non tariff barriers were largely dismantled. Tariffs reform (both number and rates). Reduction of import surcharge, and further abolition in 1995. Customs modernisation. Simplification of the exchange rate system.
Ecuador	1985	1991	Segmented elimination of QRs. Tariff maxim reduced to 35 percent.
Mexico	1985	1988	Progressive removal of import restrictions and their replacement with tariffs. In 1986 import-licensing coverage was reduced, and in 1987 all minim prices were eliminated. The QRs have been almost eliminated from intermediate capital goods. In 1991 the foreign exchange markets were unified, and a band within the peso was allowed to fluctuate was established.

Paraguay	1989	1995	Simplification of the tariff structure and reduction of rates. Non-tariff barriers applied to few agricultural products were replaced by tariff. Exchange controls were abolished, establishing a free-floating exchange rate.
Uruguay	1983	1985	QRs and other barriers to trade were removed, trade regulations were simplified, and a gradual process of reducing import duties was established. Administrative controls have been reduced.
Venezuela	1989	1991	Virtual elimination of up from QRs, re-established by 1992. Reduction and rationalisation of maximum tariff. Unification of the four markets exchange rates. Foreign exchange controls were abolished.

Sources: Dean *et al* (1994); IMF (1998, 1999); Rodrik (1997); Musonda and Adam (1999); UNCTAD (1999); Winglee *et al* (1992); WTO *Trade Policy Reviews* (various issues).

Note: OGL denotes open general license; QRs denotes quantitative restrictions.

Table A2

Classification of Countries According to Trade Policy Regime

Classification/Countries	
Low-Moderate	
Chile	Paraguay
Colombia	Philippines
Costa Rica	Sri Lanka
Ecuador	Thailand
Korea	Uruguay
Malaysia	Venezuela
Mexico	
High-Very high	
Cameroon	Morocco
Dominican Republic	Pakistan
India	Tunisia
Malawi	

Note: The classification presented in this table is based on the Heritage Foundation criteria in terms of tariffs and non-tariffs barriers. The background information is taken from Table 1, Table 2, and Table A1.