

THE IMPACT OF TRADE LIBERALISATION ON EXPORTS, IMPORTS AND THE BALANCE OF PAYMENTS OF DEVELOPING COUNTRIES

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This paper uses panel data and times series/cross section analysis to estimate the effect of trade liberalisation on export growth, import growth, the balance of trade and the balance of payments for a sample of 22 developing countries that have adopted trade liberalisation policies since the mid-1970s. We find that liberalisation stimulated export growth but raised import growth by more, leading to a worsening of the balance of trade and payments. To the extent that this has constrained the growth of output and living standards, the findings have important implications for the sequencing and degree of liberalisation.

One of the major purposes of trade liberalisation is to promote economic growth by capturing the static and dynamic gains from trade through a more efficient allocation of resources; greater competition; an increase in the flow of knowledge and investment and, ultimately, a faster rate of capital accumulation and technical progress. Barriers to trade and anti-export bias will reduce export growth below potential. Import controls are likely to reduce efficiency, although, at the same time, they protect the balance of payments. The presumption is that trade liberalisation will raise the growth of exports and imports but the implications for the trade balance and the balance of payments are uncertain because this depends on the *relative* impact of liberalisation on export and import growth and on what happens to the prices of traded goods. Trade liberalisation may promote growth from the supply side but, if the balance of payments worsens, growth may be adversely affected from the demand side because the payments deficits resulting from liberalisation are unsustainable and not easily rectified by relative price (real exchange rate) changes (Khan and Zahler, 1985).

The purpose of this paper is to examine this issue in a systematic way taking 22 developing countries from different continents that have undergone extensive trade liberalisation since the mid-1970s. We are interested in answering four major questions. First, what has been the effect of trade liberalisation on export and import growth in the aggregate for all countries in the sample and, are there differences between the major regions of Africa, Latin America, East Asia, and South Asia? Second, has the impact of liberalisation been greater on export growth or import growth? Third, how has liberalisation affected the price and income elasticities of demand for exports and imports? Last, what has been the effect of liberalisation on the trade balance and the current account of the balance of payments of countries: has there been improvement or deterioration? Theoretically, the effect of liberalisation on the trade balance or balance of payments is ambiguous whatever framework of balance of payments adjustment theory is used, so the issue becomes an empirical one (see later). The results have policy implications relating to the ‘sequencing’ of export and import liberalisation. If foreign

exchange shortages are to be avoided, the goal must be to liberalise in such a way as to keep the current account of the balance of payments in equilibrium, or at least at a level sustainable through long-term capital inflows without the need for deflation. Achieving the right balance between import and export growth in the trade liberalisation process can be as important as getting the sequencing right between internal and external financial liberalisation. To our knowledge, this is the first study to look at this topic in a systematic way, using different estimation procedures, and different measures of liberalisation.¹

Two basic measures of liberalisation are used in this study. The first is a measure of duties applied to exports and imports, where the rate of export duty (d_x) is measured as the ratio of export duty revenue to the value of exports and the rate of import duty (or implicit tariff, d_m) is measured as revenue from imports as a ratio of import value. The second measure takes the form of a dummy variable (*lib*) applied to the year in which trade liberalisation is deemed to have taken place in a significant way (and continued), based on criteria compiled by the World Trade Organisation (WTO), World Bank and other bodies. This variable is used both as a shift dummy and as a slope dummy interacting with the price and income variables in the export and import growth functions. In the balance of trade/payments equations, the liberalisation dummy is also interacted with domestic income growth, so that the growth effects of liberalisation (positive or negative) on the balance of trade/payments can be separated from what we call the 'pure' liberalisation effect on these variables. In general, liberalisation refers to all measures taken to reduce anti-export bias and import controls, including non-tariff barriers and exchange rate distortions.²

The methodology used for estimating the effects of liberalisation is to specify standard equations for export growth, import growth, the trade balance and the balance of payments, and to add to the normal determinants of trade performance (i.e. domestic income, foreign income and price competitiveness) the two measures of trade liberalisation (also interacting the liberalisation dummy with the income and price variables). We test for the impact and significance of liberalisation using different estimation techniques including dynamic panel data analysis based on fixed effects and generalised method of moments (GMM) and time series/cross section analysis.

1. Countries and the Degree of 'Protection'

Tables 1 and 2 give the countries taken for analysis (grouped by the degree of 'protection') and the level of export and import duties before and after the major year of trade liberalisation. Also shown are the average annual growth rates of export and import volume before and after liberalisation.

As far as exports are concerned, liberalisation reduced duties to virtually nothing for most countries and the average growth of exports rose from 6.9% per

¹ UNCTAD (1999) has shown an interest in this subject but only looked at the impact of trade liberalisation on the trade balance for a limited number of countries.

² Details of the trade reforms undertaken in each of the 22 countries are available on request.

Table 1
Export Duties and Export Growth Before and After Trade Liberalisation

Country	Year of liberalisation	Before liberalisation (from 1972)		After liberalisation (up to 1997)	
		Export duty	Export growth	Export duty	Export growth
$0 \leq d < 1\%$					
Chile	1976	0.0	8.8	0.0	10.2
Indonesia	1986	0.6	4.6	0.5	9.4
Korea	1990	0.0	16.0	0.0	15.3
Malawi	1991	0.4	4.4	0.0	5.2
Paraguay	1989	0.7	11.6	0.0	9.5
Venezuela	1991	0.0	-0.7	0.0	6.4
$1 \leq d < 3\%$					
Ecuador	1991	1.6	12.0	0.3	8.6
India	1991	1.4	6.5	0.2	12.2
Mexico	1986	2.0	9.5	0.02	12.8
Morocco	1984	2.1	4.3	0.5	7.3
Philippines	1986	1.4	6.4	0.1	10.9
Thailand	1986	2.7	8.8	0.3	14.6
Uruguay	1985	1.1	6.9	0.4	7.6
Tunisia	1989	1.2	7.4	0.3	4.9
Zambia	1990	2.4	-1.1	0.0	4.9
$3 \leq d < 5\%$					
Cameroon	1991	4.2	9.1	1.8	-0.9
Colombia	1991	4.5	5.7	0.3	8.6
Pakistan	1991	4.0	6.0	0.0	6.3
$5 \leq d < 10\%$					
Costa Rica	1990	7.9	6.2	2.6	8.7
Dom. Rep.	1992	5.3	6.6	0.01	29.3
Malaysia	1988	6.9	8.9	1.7	14.1
$10\% \text{ or more}$					
Sri Lanka	1990	13.5	4.3	0.7	9.3

Sources: Dean *et al.* (1994), World Bank (1999), WTO *Trade Policy Review* (various issues).

Note: d denotes export duties. The values are period averages, and are the authors' calculations.

annum (p.a.) pre-liberalisation to 9.8% p.a. post-liberalisation (not controlling for other variables).

In the case of imports, liberalisation reduced the implicit tariff from an average of 15.4% to 12.8%, and the average growth of imports rose from 5.2% p.a. pre-liberalisation to 9.5% p.a. post-liberalisation. Tariff levels fell relatively little, and sometimes rose, in the liberalisation process because they replaced non-tariff barriers, such as quantitative restrictions and licences. This is why we measure liberalisation not only by tariff changes (a continuous variable) but also through the use of shift and slope dummies. On the surface, it looks as if liberalisation has had a greater impact on import growth than export growth but how much of these increases (or more?) were the result of liberalisation alone cannot be known, however, until other variables are controlled for.

Previous research in this field tends to give conflicting results. On the export side, some studies show that countries which embarked on liberalisation programmes have improved their export performance (Thomas *et al.*, 1991; Weiss, 1992; Joshi and Little, 1996; Helleiner, 1994; Bleaney, 1999; Ahmed, 2000). On the

Table 2
Import Duties and Import Growth Before and After Trade Liberalisation

Country	Year of liberalisation	Before liberalisation (from 1976)		After liberalisation (up to 1998)	
		Import duty	Import growth	Import duty	Import growth
$0 \leq d < 5\%$					
Indonesia	1986	4.82	7.55	5.11	8.59
$5 \leq d < 10\%$					
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
$10 \leq d < 15\%$					
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
$15 \leq d < 20\%$					
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% or more					
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), World Bank (1999), WTO *Trade Policy Review* (various issues).

Note: d denotes import duties. The values are period averages, and are the authors' calculations.

*The data for Chile's import duties 'before liberalisation' corresponds to the year 1975.

other hand, other studies have found little evidence of a relationship between trade liberalisation and export growth (UNCTAD, 1989; Agosin, 1991; Clarke and Kirkpatrick, 1992; Greenaway and Sapsford, 1994; Shafaedin, 1994; Jenkins, 1996). On the import side, most studies show a strong positive impact of trade liberalisation on import growth, although working through the sensitivity of imports to income and relative price changes (Melo and Vogt, 1984; Mah, 1999; Bertola and Faini, 1991). The relaxation of import restrictions will have a direct and continuing impact on import growth from the time of liberalisation, as well as increasing the sensitivity of imports to increases in domestic income in the future. In our model, we prefer to separate the two effects using both shift and slope dummies.

There are very few studies of the impact of trade liberalisation on the trade balance or balance of payments. Khan and Zahler (1985) examine the effect of trade and financial liberalisation on the economies of Argentina, Chile and Uruguay. They find that the volume of trade increased but the current account of the balance of payments went into severe deficit, and that capital flows generated by

interest rate differentials were not sufficient to finance the deficits without adjustment as well. Their results imply that the value of imports increased faster than the value of exports but they do not separate the effect of volume and price changes. Ostry and Rose (1992) take five different data sets and find no statistically significant relation between tariff changes and the real trade balance. They do not consider exports and imports separately or other aspects of liberalisation. UNCTAD (1999) has studied the effect of trade liberalisation on the trade balance for sixteen countries over the period 1970 to 1995 using panel data techniques, and found a significant negative relation.

2. The Impact of Liberalisation on Export Growth

The export performance of a country may be expected to depend primarily on competitiveness (measured as the price of a country's exports relative to the foreign price of related goods expressed in a common currency) and the level of 'world' demand³ which determines shifts in the demand curve for a country's goods. If the price and income elasticities of demand are assumed constant, the export function can be written as:

$$X_t = A(P_d/P_f)_t^\eta W_t^\varepsilon \quad (1)$$

where X_t is the level of exports at time t ; A is a constant; P_d/P_f is relative domestic and foreign prices measured in a common currency; W is the level of 'world' income; η (< 0) is the price elasticity of demand for exports, and ε (> 0) is the income elasticity of demand for exports. Taking logs and differentiating with respect to time gives:

$$x_t = \eta(p_d - p_f)_t + \varepsilon(w_t). \quad (2)$$

This traditional export growth function provides a useful framework in which to analyse the responsiveness of exports to price and income variations.

We make three major modifications to this basic model. First we assume that the adjustment of export demand to changes in prices and income is not instantaneous, so that we have a dynamic specification for estimation (including a constant) of the form:

$$x_t = a_0 + a_1(px)_t + a_2w_t + a_3x_{t-1} + \mu_t \quad (3)$$

where px is the rate of change of relative prices; w is world income growth; x_{t-1} is lagged export growth, and μ is a stochastic error term. This specification allows us to distinguish short and long run elasticities. The short run price and income elasticities are a_1 and a_2 respectively; and the long run elasticities are $a_1/(1 - a_3)$ and $a_2/(1 - a_3)$.

The second modification is the introduction of our measures of trade liberalisation: export duties (d_x) on the one hand and a dummy variable (lib) for the year

³ World demand is measured as World GDP minus the GDP of the own country (data taken from World Bank, *World Development Indicators*).

of significant trade liberalisation on the other. This gives an augmented estimating equation of the form:

$$x_{it} = a_i + a_1 px_{it} + a_2 w_{it} + a_3 x_{it-1} + a_4 d_{xit} + a_5 lib_{it} + \varepsilon_{it} \quad (4)$$

where a_i is the country-specific effect (where panel data estimation techniques are used). The expected signs on the liberalisation variables are $a_4 < 0$ and $a_5 > 0$.

Third, trade liberalisation can affect the price and income elasticities of demand for exports. For example, liberalisation could increase the sensitivity of exports to price and income changes by making it easier for producers to shift resources into the traded sector; by facilitating structural change, and by stimulating efficiency. Such interaction effects can be estimated by including two slope dummy variables, (*lib w*) and (*lib px*), to capture the joint effects of the elimination of trade distortion measures on income and price elasticities, respectively. Thus:

$$x_{it} = a_i + a_1 px_{it} + a_2 w_{it} + a_3 x_{it-1} + a_4 d_{xit} + a_5 lib_{it} + a_6 (lib \ px)_{it} + a_7 (lib \ w)_{it} + \varepsilon_{it}. \quad (5)$$

2.1. Dynamic Panel Data Estimation

To test for the effects of trade liberalisation on export growth, (4) and (5) are estimated using two forms of panel data model for the 22 countries over the period 1972–97. The first is the fixed effects estimator which includes dummy variables to account for individual country-specific effects. The second is the dynamic panel data model based on generalised methods of moments (GMM) (Arellano, 1993; Arellano and Bond, 1998). This estimation controls for the endogeneity of other explanatory variables. The instruments used are based on lagged values of the explanatory variables.⁴ The results from both estimators are given in Table 3. Focussing first on the fixed effects estimates, both (4) and (5) show significant price and income elasticities of demand for exports but the price elasticity is very low and there is hardly any difference between the short and long run price and income elasticities. Low price elasticities, which do not conform to the ‘small’ country assumption of trade theory, are frequently found also in time series estimates (Senhadji and Montenegro, 1999; Perraton, 2003). The liberalisation dummy has a significant positive effect on export growth of the order of 1 to 2 percentage points but export duties have an insignificant negative effect. Neither of the slope dummies are significant. The GMM results give similar, but stronger, results. The price and income elasticities are significant but again the price elasticity is very low and there is not much difference between the short and long run elasticities. The impact of liberalisation is positive and significant and the effect of the removal of export duties is now shown to be significant. Also, liberalisation positively affects the income elasticity, raising it by 1.41 percentage points, which is substantial.

⁴ For an up-to-date survey of the application of GMM to panel data see Wooldridge (2001). We do not undertake time series estimations for each country separately because of the limited degrees of freedom for some countries. Individual country differences are allowed for by the fixed effects estimator.

Table 3
Export Growth in Selected Developing Economies: 1972–97

	Dependent variable: export growth x_t			
	Fixed effects		GMM	
	Equation (5)	Equation (4)	Equation (5)	Equation (4)
Explanatory variables:				
Relative price change (px)	-0.11 (1.86) [§]	-0.10 (1.87) [§]	-0.14 (2.09) [*]	-0.16 (2.45) [*]
World income growth (w)	2.09 (3.26) ^{**}	1.53 (3.09) ^{**}	1.42 (2.60) ^{**}	1.54 (1.99) [*]
Lagged export growth (x_{t-1})	0.03 (2.25) [*]	0.03 (2.06) [*]	0.11 (4.78) ^{**}	0.15 (8.94) ^{**}
Export duties (d_x)	-0.05 (1.07)	-0.19 (1.01)	-0.16 (1.89) [§]	-0.19 (2.16) [*]
Shift dummy (lib)	0.85 (2.29) [*]	1.91 (2.45) [*]	1.56 (2.28) [*]	1.94 (2.49) [*]
Interaction dummy ($lib\ w$)	0.58 (1.40)		1.41 (3.58) ^{**}	
Interaction dummy ($lib\ px$)	-0.06 (0.62)		-0.07 (0.32)	
Long run income elasticity (w_{LR})	2.15	1.58	1.60	1.81
Long run price elasticity (px_{LR})	-0.11	-0.10	-0.16	-0.18
Diagnostic statistics				
R ²	0.53	0.51		
Omit $lib\ w$, $lib\ px$	0.34		78.51 ^{**}	
Hausman Test	24.03	25.63		
Wald test			[0.000]	[0.000]
Sargan test			[0.461]	[0.589]
1st-order serial correlation			[0.027]	[0.000]
2nd-order serial correlation			[0.793]	[0.356]
Number of observations	480	480	362	362

Notes:

Figures in parenthesis () are absolute t-ratios; figures in brackets [] are p-values.

^{**} indicates that a coefficient is significant at the 1% level; ^{*} significant at the 5% level, and [§] significant at the 10% level.

Omit $lib\ w$, $lib\ px$ is the F-statistic for the omission of these two variables from the regression.

w_{LR} and px_{LR} are the long run income and price elasticities, respectively.

Hausman's chi-square statistic favours the fixed effects estimator over the random effects model (i.e. there is within group variation in all variables for at least some groups). 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 (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.

The GMM estimations were performed using the programme DPD98 for Gauss (Arellano and Bond, 1998).

The effect of generalised liberalisation on export growth seems altogether stronger than the effect of simply cutting export duties. If we take the GMM estimates of (5), for example, the effect of liberalisation has been to raise the growth of exports by, on average, 1.56 percentage points, while the effect of a 1 percentage point reduction in duties has been to raise export growth by only 0.16 percentage points.

A 10 percentage point reduction in duties, therefore, would be required to achieve the same effect on export growth as liberalisation. The average fall in export duties across all countries was less than 3 percentage points. Since the growth of exports before liberalisation averaged 6.9% p.a., the effect of liberalisation, and the virtual elimination of export duties has raised the growth of exports by approximately 2 percentage points or by nearly 30% and accounts for nearly

70% of the increase in export growth observed in the post-liberalisation period. If one adds to this the effect of liberalisation on the income elasticity of demand for exports, virtually the whole of the increase in export growth post-liberalisation can be attributed to trade reforms.

2.2. *Disaggregated Analysis by Region*

The above analysis takes an aggregate of all countries in the sample. The evaluation of trade policy reforms in different regions of the world suggests that there is a diversity of experience regarding trade liberalisation. In addition, there is strong evidence that price and income elasticities of demand for exports differ significantly across regions (Senhadji and Montenegro, 1999). To examine differences between regions, the countries in the sample are divided into four zones: Africa, Latin America, South Asia and East Asia.

Since the number of countries in each region is small but the number of years is relatively large, we use for estimation a time series/cross section model (TSCS) which allows for group-wise heteroscedasticity, cross-group correlation and within group autocorrelation. The estimator is a two-step generalised least squares with maximum likelihood interaction. The relevance of this type of model is that the error term need not have the same properties for each country (Greene, 1997).

The results of fitting (5) to the data are shown in Table 4. The estimates for all countries broadly confirm the earlier results using dynamic panel data analysis. Both liberalisation variables are significant, with roughly the same magnitude as the previous estimates. But there are noticeable differences between regions (continents). The effect of export duty reduction in Latin America, East and South Asia is significant but not in Africa. On the other hand, the impact of liberalisation appears to have been the greatest in Africa with a coefficient on the liberalisation dummy variable of 3.58 compared with only 1.66 for Latin America. In three of the regions, liberalisation has raised the income elasticity of demand for exports significantly but not in Africa. The price and income elasticities are all significant, but differ between regions, and again the price elasticities are shown to be very low.

3. The Impact of Liberalisation on Import Growth

To model the effect of trade liberalisation on import growth, the same approach is used as for export growth, so there is no need for a detailed discussion of the estimating equations. The two import growth equations estimated are:

$$m_{it} = b_i + b_1 pm_{it} + b_2 y_{it} + b_3 m_{it-1} + b_4 d_{mit} + b_5 lib_{it} + e_{it} \quad (6)$$

and

$$m_{it} = b_i + b_1 pm_{it} + b_2 y_{it} + b_3 m_{it-1} + b_4 d_{mit} + b_5 lib_{it} + b_6 (lib \ pm)_{it} + b_7 (lib \ y) + e_{it} \quad (7)$$

where b_i is the country-specific effect (using panel data); pm is the rate of change of import prices relative to domestic substitutes; y is the growth of domestic income;

Table 4
Export Growth Disaggregated by Region: 1972–97

	Dependent variable: export growth x_t				
	All countries Equation (5)	Africa Equation (5)	East Asia Equation (5)	South Asia Equation (5)	Latin America Equation (5)
Explanatory variables (same as Table 3):					
<i>Constant</i>	-0.99 (0.66)	-6.54 (1.44)	0.30 (0.14)	3.73 (2.27)*	0.39 (0.35)
<i>px</i>	-0.18 (3.96)**	-0.35 (2.16)*	-0.23 (2.24)*	-0.21 (3.49)**	-0.21 (5.51)**
<i>w</i>	1.76 (3.82)**	1.39 (3.07)**	1.71 (2.63)*	0.32 (2.24)*	1.41 (4.99)**
x_{t-1}	0.10 (2.62)*	0.04 (1.04)	0.14 (1.77) [§]	0.23 (1.99)*	0.17 (3.02)**
d_x	-0.19 (2.02)*	-0.10 (0.13)	-0.55 (1.93) [§]	-0.31 (3.08)**	-0.81 (4.66)**
<i>lib</i>	1.99 (3.76)**	3.58 (2.42)*	2.42 (2.53)*	2.54 (3.53)**	1.66 (6.37)**
<i>lib w</i>	1.36 (1.98)*	1.25 (0.58)	1.16 (2.31)*	0.60 (0.64)	1.62 (3.51)**
<i>lib px</i>	-0.04 (0.66)	-0.38 (1.19)	-0.09 (0.69)	-0.12 (0.65)	-0.13 (2.44)*
w_{LR}	1.95	1.44	1.98	0.42	1.68
px_{LR}	-0.20	-0.36	-0.21	-0.27	-0.25
Diagnostic statistics					
Likelihood	167.72 [38.93]	8.33 [12.59]	18.54 [25.00]	10.17 [7.81]	67.90 [58.62]
Ratio Statistic (LRS)					
Number of observations	440	80	120	60	180

Notes:

Figures in parenthesis () are absolute t-ratios; figures in brackets [] are p-values.

** indicates that a coefficient is significant at the 1% level; * significant at the 5% level, and [§] significant at the 10% level.

w_{LR} and px_{LR} are the long run income and price elasticities, respectively.

Likelihood Ratio Statistic (LRS) is the test for serial correlation. The numbers in parenthesis are the critical values. The results provided are based on heteroscedastic and correlated regressions, with group specific autocorrelation. Such regressions are supported by the LRS.

m_{t-1} is lagged import growth; d_m is the measure of import duties; *lib* is a dummy variable for the year of liberalisation; (*lib pm*) and (*lib y*) are slope dummies on relative price and income growth, respectively, to capture the interaction between liberalisation and the sensitivity of imports to price and income changes, and e_t is an error term. The expected signs on the variables are: $b_1 < 0$; $b_2 > 0$; $b_3 > 0$; $b_4 < 0$; $b_5 > 0$; $b_6 < 0$; $b_7 > 0$.

To estimate (6) and (7) and the impact of liberalisation on import growth, two forms of dynamic panel model are again used: the fixed effects estimator and the GMM model. The results from both models are reported in Table 5. Focussing on the fixed effects model, it can be seen from (7) that both the price and income elasticities of demand are statistically significant and, like exports, there is not much difference between the short and long run elasticities. The price elasticity of demand for imports is very low which is consistent with other studies in this field (Senhadji, 1998; Perraton, 2003).

The impact of import duties on import growth is significantly negative and the effect of import liberalisation is strongly positive. Moreover, liberalisation affects both the price and income elasticities of demand in the expected direction. The impact of the liberalisation dummy is markedly stronger than the import duty variable.

Table 5
Import Growth in Selected Developing Economies: 1972–98

	Dependent variable: import growth m_t			
	Fixed effects		GMM	
	Equation (6)	Equation (7)	Equation (6)	Equation (7)
Explanatory variables:				
Relative price change (pm)	-0.10 (1.28)	-0.15 (2.89)**	-0.18 (2.43)*	-0.16 (2.66)*
Domestic income growth (y)	1.65 (10.03)**	1.91 (8.47)**	1.31 (5.48)**	2.60 (5.41)**
Lagged import growth (m_{t-1})	0.01 (0.48)	0.10 (2.53)*	0.04 (0.43)	0.08 (0.20)
Import duties (d_m)	-0.20 (2.26)*	-0.20 (2.34)*	-0.35 (1.86)§	-0.43 (3.60)**
Shift dummy (lib)	3.20 (2.17)*	6.19 (3.03)**	1.99 (4.22)**	9.10 (2.12)*
Interaction dummy ($lib\ y$)		0.59 (1.81)§		0.93 (2.57)**
Interaction dummy ($lib\ pm$)		-0.23 (2.12)*		-0.40 (2.85)**
Long run income elasticity (y_{LR})	1.67	2.12	1.36	2.82
Long run price elasticity (pm_{LR})	-0.10	-0.14	-0.19	-0.17
Diagnostic statistics				
R^2	0.48	0.59		
Omit $y \times lib$, $pm \times lib$		9.61**		15.92**
Hausman Test	21.93	24.52		
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:
Figures in parentheses () are absolute t-ratios; figures in brackets [] are p-values.
** indicates that a coefficient is significant at the 1% level; * significant at the 5% level, and §significant at the 10% level.
Omit $lib\ y$, $lib\ pm$ is the F-statistic for the omission of these two variables from the regression.
 y_{LR} and pm_{LR} are the long run income and price elasticities, respectively.
Hausman's chi-square statistic favours the fixed effects estimator over the random effects model (i.e. there is within group variation in all variables for at least some groups). 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 (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.
The GMM estimations were performed using the programme DPD98 for Gauss (Arellano and Bond, 1998).

If we take the estimates of (7), the effect of liberalisation has been to raise the growth of imports by 6.19 percentage points, while the effect of a one percentage point reduction in duties has been to raise import growth by only 0.2 percentage points. Since duties fell on average by only 2.8 percentage points, the total impact of duty reduction on import growth has been minimal. The effect of liberalisation in total more than accounts for the rise in the growth of imports from 5.2% p.a. pre-liberalisation to 9.5% p.a. post-liberalisation. The big increase in import growth cannot be attributed to the fact that liberalisation typically takes place when a country's growth performance is good because the import growth equations control for domestic output growth (and the endogeneity of output growth using GMM estimation).

The GMM model gives similar results. The price and income elasticities are both significant and liberalisation has made imports more sensitive to both price and

income changes. Duties have a significant negative effect on import growth and the impact of liberalisation itself is estimated to have raised import growth by 9 percentage points in (7).

3.1. *Disaggregated Analysis by Region*

In this Section, we analyse differences in the behaviour of import growth between the regions of Latin America, Africa, East Asia and South Asia, using the time series/cross section model employed in the case of exports. The results are shown in Table 6. The estimates for all countries in the sample validate the findings of the dynamic panel data model.

Trade liberalisation has a significant positive impact on import growth exceeding 6 percentage points. The impact differs considerably between regions, however. The effect appears to have been strongest in Africa and weakest in Latin America. In Africa, however, reductions in import duties do not have an independent significant effect. Liberalisation increased the income elasticity of demand for imports in all regions and also the price elasticity, except in South Asia. In general, in line with other studies, the price elasticities of demand for imports are very low and not significant, while the income elasticities are highly significant.

Table 6
Import Growth Disaggregated by Region: 1972–98

	Dependent variable: import growth m_t				
	All countries Equation (7)	Africa Equation (7)	East Asia Equation (7)	South Asia Equation (7)	Latin America Equation (7)
Explanatory variables (same as Table 5):					
pm	-0.11 (0.60)	-0.01 (1.40)	-0.16 (1.84) [§]	-0.09 (1.15)	-0.19 (4.21)**
y	1.65 (11.05)**	1.44 (4.27)**	1.92 (8.05)**	0.80 (1.87) [§]	2.01 (8.37)**
m_{t-1}	0.02 (2.49)*	-0.08 (0.91)	0.03 (0.48)	0.03 (0.23)	-0.12 (2.59)*
d_m	-0.20 (2.39)*	-0.15 (0.69)	-0.72 (2.68)**	-0.20 (2.03)*	-0.35 (1.78) [§]
lib	6.73 (3.37)**	8.44 (3.13)**	4.12 (1.99)*	1.41 (2.97)**	1.10 (1.93) [§]
$lib\ y$	0.22 (1.96)*	1.53 (3.26)**	0.41 (1.79) [§]	3.76 (3.82)**	0.42 (1.70) [§]
$lib\ pm$	-0.24 (3.52)**	-0.34 (2.34)*	0.29 (2.36)*	-0.05 (0.18)	-0.21 (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					
Likelihood	232.92 [38.93]	13.98 [18.31]	8.90 [18.31]	4.31 [7.81]	45.48 [51.00]
Ratio Statistic (LRS)					
Number of observations	462	105	105	63	189

Notes:

Figures in parenthesis () are absolute t-ratios; figures in brackets [] are p-values.

**indicates that a coefficient is significant at the 1% level; *significant at the 5% level, and [§]significant at the 10% level.

w_{LR} and px_{LR} are the long run income and price elasticities, respectively.

Likelihood Ratio Statistic (LRS) is the test for serial correlation. The numbers in parenthesis are the critical values. The results provided are based on heteroscedastic and correlated regressions, with group specific autocorrelation. Such regressions are supported by the LRS.

3.2. *The Effect of Liberalisation According to the Degree of Protection*

It is also interesting to examine the impact of liberalisation on import growth according to the degree of protection. Since 1995, the Heritage Foundation has constructed an Index of Economic Freedom which includes a broad array of institutional factors, one of which is trade policy. A trade policy score of 1 to 5 is given to countries based on a country's average tariff rate, non-tariff barriers and corruption in the customs service. The five broad categories of countries, based on this trade policy grading scale, are: very low; low; moderate; high, and very high (see Table 7). We have grouped our sample of countries into just two categories: those with relatively low levels of protection throughout the period and those with still relatively high levels of protection despite liberalisation.

Equation (7) is fitted to both samples of countries, using our time series/cross section estimator. The results are shown in Table 8. The estimates for all countries confirm the earlier results. When countries are distinguished according to their degree of protection, however, interesting differences emerge. First, the price and

Table 7
*Classification of Countries According to the Heritage Foundation Trade Policy
Grading Scale: 1995–2000*

Level of Protectionism	Criteria	Countries
Very low	$ATR \leq 4\%$ and/or very low non-tariff barriers.	
Low	$4 < ATR \leq 9\%$ and/or low non-tariff barriers.	Chile Paraguay Uruguay
Moderate	$9 < ATR \leq 14\%$ and/or moderate non-tariff barriers.	Colombia Costa Rica Ecuador Korea Malaysia Mexico Philippines Thailand Sri Lanka Venezuela Zambia
High	$14 < ATR \leq 19\%$ and/or high non-tariff barriers.	Dominican Republic Indonesia Morocco
Very high	$19\% \leq ATR$ 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 (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 8
Import Growth According to Degree of Protection: 1972–98

	Dependent variable: import growth m_t		
	All countries Equation (7)	Low-moderate protection Equation (7)	High-very high protection Equation (7)
Explanatory variables (Same as Table 5):			
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 (2.68)*	−0.04 (0.62)
d_m	−0.25 (2.75)**	−0.03 (1.68)	−0.16 (2.65)*
lib	5.94 (2.76)**	1.02 (3.49)**	4.93 (2.85)**
$lib\ y$	0.36 (3.26)**	0.41 (9.02)**	0.60 (2.18)*
$lib\ pm$	−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	−0.009
Diagnostic statistic			
Likelihood Ratio	228.40 [36.19]	232.97 [26.22]	32.11 [32.67]
Statistic (LRS)			
Number	420	273	147
of observations			

Notes:
Figures in parenthesis () are absolute t-ratios; figures in brackets [] are p-values.
** indicates that a coefficient is significant at the 1% level; * significant at the 5% level, and § significant at the 10% level.
 w_{LR} and px_{LR} are the long run income and price elasticities, respectively.
Likelihood Ratio Statistic (LRS) is the test for serial correlation. The numbers in parenthesis are the critical values. The results provided are based on heteroscedastic and correlated regressions, with group specific autocorrelation. Such regressions are supported by the LRS.
In this set of estimations Indonesia and Zambia are not included because they switched regimes during the period.

income elasticities of demand for imports are lower in the more highly protected countries, as might be expected. Second, liberalisation has increased the price and income elasticities of demand by more in these countries, as shown by differences in the slope dummy variables. Third, the effect of import duty changes and liberalisation on imports has been greater in the more highly protected category of countries. The liberalisation dummy is 4.93 compared to only 1.02 in the countries with a low-moderate degree of protection.

4. Comparing the Effect of Liberalisation on Export and Import Growth

We are now in a position to compare the impact of trade liberalisation on export and import growth as a prelude to examining directly the effect of liberalisation on the trade balance and the balance of payments. The comparison is shown in Table 9. The effect of duty reductions is slightly greater on import growth than export growth. The effect of overall trade liberalisation, however, is markedly greater on imports than exports (except in the GMM estimation without slope dummies). The effect of liberalisation on the estimated income elasticities of imports and exports does not differ very much but liberalisation has a bigger effect on the price elasticity of imports compared to exports (where the effect is not significant with either method of estimation). From the volume effects on trade,

Table 9
A Comparison of the Effects of Trade Liberalisation on Export and Import Growth

	Method of Estimation			
	Fixed effects model		GMM	
	Without slope dummy	With slope dummy	Without slope dummy	With slope dummy
Effect of duties on:				
Export growth	-0.19*	-0.05*	-0.19	-0.16
Import growth	-0.20	-0.20	-0.35	-0.43
Effect of liberalisation on:				
Export growth	1.91	0.85	1.94	1.56
Import growth	3.20	6.19	1.99	9.10
Effect of liberalisation on:				
Income elasticity of				
Exports	-	0.58*	-	1.41
Imports	-	0.59	-	0.93
Effect of liberalisation on:				
Price elasticity of				
Exports	-	-0.06*	-	-0.07*
Imports	-	-0.23	-	-0.40

Note: *denotes *not* significant.

therefore, the presumption must be that trade liberalisation has worsened the trade balance and the balance of payments. If the balance of trade effects are not sustainable through capital inflows, however, the impact on the current account will not be as great. This would be *prima facie* evidence that income adjustment has been necessary to keep the balance of payments at a sustainable level.

5. Trade Liberalisation, the Trade Balance and the Balance of Payments

The effect of trade liberalisation on the trade balance and current account of the balance of payments is theoretically ambiguous whatever framework of balance of payments analysis is used (Thirlwall and Gibson, 1992). In the partial equilibrium framework of the elasticity approach, the effect will depend on the extent to which import and export duties change and on the price elasticities of imports and exports. Measuring in foreign currency, export earnings will increase if the price elasticity of demand is greater than unity and import payments will increase if the price elasticity is greater than zero. Other aspects of trade liberalisation, which do not involve price changes, are not easily handled within the elasticities framework. In the general equilibrium framework of the absorption approach to the balance of payments, the effect of liberalisation will depend on how real income is affected relative to real absorption. A reduction in export duties should switch expenditure to domestic goods, thereby raising income, but a reduction in import duties will do the opposite. Even if real income increases, the balance of payments will not improve if the propensity to absorb is greater than unity. Then there are the direct effects on absorption to consider. If trade liberalisation reduces prices, this will increase real absorption through a real balance effect and money illusion but will

decrease absorption if there is a redistribution of income to the traded goods sector where the propensity to save is higher. In the monetary approach to the balance of payments, the outcome of liberalisation depends on how the real demand for money changes relative to the real supply. Given this theoretical ambiguity, the impact of liberalisation on the trade balance and the balance of payments becomes an empirical issue.

The impact of liberalisation on trade performance is measured here in monetary terms because it is the nominal gap between imports and exports which measures a country's shortage of foreign exchange and how much countries need to borrow to sustain growth if liberalisation worsens the payments position. We control for income and relative price changes and also include a separate terms of trade variable (*TOT*) because changes in the price of exports and imports automatically affect the monetary value of trade flows, independently of liberalisation. Doing this also separates the nominal and real (volume) effects of price changes on trade flows. The real exchange rate is, of course, an endogenous variable if it is partly determined by the state of the balance of payments, and this is taken account of by the GMM estimates.⁵ If liberalisation improves growth performance, some of the impact of liberalisation on the trade balance/current account will be captured by the growth variable. To allow for this we include in the equation an interaction dummy between liberalisation and growth (*lib y*) which takes the value *y* post-liberalisation and zero otherwise. If the sign of this variable is negative, it implies that liberalisation has raised the growth rate which in turn has raised import growth and worsened the trade balance/balance of payments. The coefficient on the shift dummy variable (*lib*) should thus be regarded as the 'pure' liberalisation effect on trade performance, independent of the effect of liberalisation working through its impact on growth performance.

Given the estimated impact of liberalisation on the volume of imports and exports summarised in the previous Section, and controlling for movements in the terms of trade, the *a priori* presumption is that liberalisation has worsened the trade balance and the balance of payments; but by exactly how much? To test directly the impact of duty reductions and liberalisation, we first normalise the trade balance and the current account to take account of differences in the size of countries by dividing by GDP. The dynamic equations to be estimated are therefore:

$$\frac{TB}{GDP} \text{ and } \frac{BP}{GDP} = c_1 + c_2(TB \text{ or } BP)_{t-1} + c_3(w) + c_4(y) + c_5(p) + c_6(d_x) + c_7(d_m) + c_8(TOT) + c_9(lib) + c_{10}(lib y) \quad (8)$$

where TB_{t-1} and BP_{t-1} are lagged dependent variables (+); *w* is the growth of world income (+); *y* is the growth of domestic income (-); *p* is the rate of change of relative prices (or real exchange rate) between countries and competitors;⁶ d_x is

⁵ It cannot be assumed, however, that if the exchange rate is endogenous that the balance of payments must automatically equilibrate because the exchange rate may also be determined by asset supply and demand; the exchange rate may be managed and there are time lags involved.

⁶ In equations without a separate terms of trade variable, the sign on '*p*' will depend on whether or not the Marshall-Lerner condition is satisfied. In equations with a separate terms of trade variable, the sign will be negative if there is substitution of foreign for domestic goods.

export duties (-); d_m is import duties (+); TOT is the nominal ('pure') terms of trade (+); lib is a liberalisation dummy with the sign to be determined and $lib\ y$ is the interaction of liberalisation and income growth (the bracketed terms after each variable are the expected signs of the coefficients).

Table 10 gives the results for the trade balance as a proportion of GDP using the least squares and GMM methods of estimation (excluding and including the TOT variable). Both methods of estimation give similar results but with the GMM results giving a stronger impact of liberalisation. We see that world income growth has a significant positive effect (as expected); domestic income growth has a significant negative effect (as expected); relative price changes worsen the trade balance (very slightly) and the pure terms of trade effect is positive (as expected); a 1% reduction of export duties has significantly improved the trade balance by roughly 0.2% of GDP, while a 1% reduction of import duties has worsened the trade balance by roughly 0.8% of GDP.

Table 10
Trade Liberalisation and the Trade Balance: (1976–98)

	Dependent variable: trade balance/GDP			
	Least squares		GMM	
	(i)	(ii)	(iii)	(iv)
Explanatory variables:				
Lagged trade balance (TB_{-1})	0.68 (2.13)*	0.67 (3.55)**	0.62 (3.96)**	0.61 (2.23)*
World income growth (w)	0.92 (2.01)*	0.89 (1.96)*	0.87 (2.92)*	0.73 (2.55)*
Domestic income growth (y)	-0.22 (3.80)**	-0.19 (3.37)**	-0.21 (2.31)*	-0.18 (2.68)*
Relative price change (p)	-0.07 (3.73)**	-0.07 (3.93)**	-0.05 (1.36)	-0.01 (1.25)
Export duties (d_e)	-0.21 (2.50)*	-0.23 (1.69) [§]	-0.28 (2.68)*	-0.29 (2.88)*
Import duties (d_m)	0.78 (3.50)**	0.81 (2.38)*	0.85 (2.36)*	0.83 (6.52)**
Shift dummy (lib)	-1.56 (2.42)*	-1.28 (4.48)**	-2.52 (2.22)*	-3.57 (9.75)*
Terms of trade (TOT)		0.29 (2.13)*		0.40 (1.45)
Interaction dummy ($lib\ y$)	-0.26 (3.31)**	-0.23 (2.57)*	-0.41 (4.39)**	-0.20 (6.77)**
Diagnostic statistics				
R^2	0.54	0.54		
Hausman Test	87.00	99.03		
Heteroscedasticity test	18.93	15.71		
Wald test			[0.000]	[0.000]
Sargan test			[0.419]	[0.835]
1st-order serial correlation			[0.000]	[0.000]
2nd-order serial correlation			[0.623]	[0.128]
Number of observations	506	506	498	498

Notes:

Figures in parentheses () are absolute t-ratios; figures in brackets [] are p-values.

** indicates that a coefficient is significant at the 1% level, * significant at the 5% level, and [§] significant at the 10% level.

Hausman's chi-square statistic favours the fixed effects estimator over the random effects model (i.e. there is within group variation in all variables for at least some groups). 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 (Arellano and Bond, 1991). The p-values report the probability of rejecting the null hypothesis of no 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. The GMM estimations were performed using the programme DPD98 for Gauss (Arellano and Bond, 1998).

The impact of the new liberalised regime, independent of duty changes, has been to worsen the trade balance by over 2% of GDP in the GMM estimates. The negative sign on (*lib y*) indicates that liberalisation has raised the growth of income which has worsened the trade balance by a further 0.4 percentage points in the GMM estimates. These results compare with a mean ratio of the trade balance to GDP, for the sample as a whole, of -2.72%.

Turning to the current account of the balance of payments, the effect of trade liberalisation is less than on the trade account (the results are available on request). This suggests that the deficits on the trade account have not been sustainable and adjustment (deflation) has been necessary so that current deficits can be financed.

5.1. *Disaggregated Analysis by Region*

We turn now to examine the impact of trade liberalisation on the trade balance and balance of payments in the four separate regions of Africa, East Asia, South Asia and Latin America, to see whether there are any significant 'regional' differences.

Focussing first on the trade balance (Table 11), world income growth, domestic income growth and relative price changes all have the expected sign and are generally significant in each of the regions. The 'pure' terms of trade impact is very small. Export duty reductions have the expected effect of improving the trade balance, most noticeably in East Asia where the effect of a one percentage point fall in duties has been to improve the trade balance by over 0.5% of GDP.

Likewise, the impact of tariff reductions on imports has been the greatest in East Asia worsening the trade balance by 0.7% of GDP for every one percentage point reduction in the tariff rate. In all regions, however, export duty reductions have improved the trade balance and import duty reductions have worsened the trade balance, with the latter effect marginally stronger than the former. The 'pure' liberalisation effect and the effect of liberalisation working through income growth have been to worsen the trade balance by over 2 percentage points in most regions.

Turning to the current account of the balance of payments, the conclusions are largely the same as for the trade balance (the results are available on request). World income growth improves the current account; domestic income growth worsens the current account and the impact of relative price changes is mixed. Sometimes the Marshall-Lerner condition is satisfied and sometimes not. The 'pure' terms of trade effect is very small. Export duty reductions have generally improved the current account, while import duty reductions have worsened it, particularly in Latin America.

The overall impact of the more liberalised trade regime in all the regions has been to worsen the current account but by less than 1% of GDP in most cases, which is less than the impact on the trade account, indicating the difficulty of financing large trade deficits.

Table 11
Impact on Trade Balance Disaggregated by Region

Dependent variable: trade balance/GDP											
All Countries			Africa			East Asia			South Asia		
(<i>ta</i>)	(<i>tb</i>)	(<i>ta</i>)	(<i>tb</i>)	(<i>ta</i>)	(<i>tb</i>)	(<i>ta</i>)	(<i>tb</i>)	(<i>ta</i>)	(<i>tb</i>)	(<i>ta</i>)	(<i>tb</i>)
Explanatory variables (same as Table 10):											
<i>TB</i> ₋₁	0.78 (2.77)*	0.69 (2.69)*	0.76 (2.77)*	0.67 (1.94)§	0.61 (2.17)*	0.43 (3.21)**	0.76 (3.85)**	0.74 (4.84)**	0.75 (3.58)**	0.72 (2.64)*	
<i>w</i>	0.92 (2.18)*	0.83 (3.72)**	0.62 (2.51)*	0.71 (2.15)*	0.98 (2.86)*	0.75 (2.90)*	0.73 (2.02)*	0.76 (2.41)*	0.88 (1.99)*	0.72 (2.96)**	
<i>y</i>	-0.27 (3.57)**	-0.31 (7.29)**	-0.16 (3.53)	-0.17 (1.76)§	-0.43 (9.55)**	-0.40 (5.79)**	-0.16 (2.40)*	-0.14 (2.28)*	-0.25 (4.88)**	-0.24 (8.51)**	
<i>p</i>	-0.01 (2.96)**	-0.02 (3.04)**	-0.02 (0.53)	-0.01 (2.68)*	-0.08 (4.10)**	-0.08 (3.65)**	-0.02 (1.27)	-0.01 (0.85)	-0.06 (3.35)**	-0.05 (6.03)**	
<i>d_x</i>	-0.28 (2.16)*	-0.31 (2.07)*	-0.28 (2.41)*	-0.29 (2.10)*	-0.54 (2.00)*	-0.54 (3.43)**	-0.26 (1.66)§	-0.29 (2.25)*	-0.25 (2.65)*	-0.28 (2.74)*	
<i>d_m</i>	0.37 (1.99)*	0.48 (4.76)**	0.67 (11.53)**	0.46 (2.09)*	0.77 (7.17)**	0.67 (8.89)**	0.56 (2.15)*	0.60 (4.16)**	0.34 (1.98)*	0.47 (3.80)**	
<i>lib</i>	-1.61 (4.35)**	-2.31 (3.83)*	-1.59 (2.68)*	-2.77 (2.42)*	-1.43 (2.56)*	-1.44 (2.44)*	-1.44 (2.68)*	-1.94 (2.35)*	-0.99 (2.14)*	-1.51 (2.87)*	
<i>lib y</i>	-0.29 (3.59)**	-0.19 (2.40)*	-0.19 (2.17)*	-0.18 (2.50)*	-0.35 (6.49)**	-0.36 (2.79)*	0.18 (2.71)*	-0.26 (2.83)*	-0.28 (2.39)*	-0.28 (2.27)*	
<i>TOT</i>	-0.07 (2.39)*		-0.03 (1.03)			-0.10 (1.75)§		-0.04 (0.71)		-0.19 (1.77)§	
Diagnostic statistic											
Likelihood Ratio	93.04 [38.93]	119.22 [38.93]	24.61 [13.28]	28.00 [13.28]	30.54 [23.21]	33.07 [23.21]	8.31 [7.31]	9.39 [7.31]	70.91 [20.09]	71.07 [20.09]	
Statistic (LRS)											
Number of observations	506	506	115	115	115	115	69	69	207	207	

Notes: Figures in parentheses () are absolute t-ratios. §, * ** indicate that a coefficient is significant at the 10%, 5% and 1% level respectively. Likelihood Ratio Statistic (LRS) is the test for serial correlation; the numbers in brackets [] are the critical values. The results provided are based on heteroscedastic and correlated regressions, with group autocorrelation. Such regressions are supported by the LRS.

5.2. *Disaggregation According to Degree of Protection*

Finally, we consider the impact of trade liberalisation on the trade balance and balance of payments according to the overall trade regime of the countries – whether highly protected or lowly protected. If imports are generally more sensitive to liberalisation than exports, we expect the ‘shock’ effect of liberalisation on the trade balance and the current account to be greater in the highly protected group of countries than in those with more moderate degrees of protection, and this is generally confirmed by the results.

Looking first at the trade balance (Table 12), the effect of changes in import duties is significantly higher in the highly protected countries than in the countries with low to moderate degrees of protection. Likewise, the overall (negative) impact on the trade balance of a more liberalised trade regime is much greater in countries that start highly protected than in those with low levels of protection. The effect of domestic income growth and relative price changes is roughly the same between the two sets of countries; so, too, is the impact of liberalisation working through the effect on growth. In the case of the current account of the balance of payments, the impact of duty changes on exports and imports does not differ significantly between the two sets of countries but the overall effect of the liberalisation process continues to be the strongest in those countries that start heavily protected (the results are available on request).

6. Conclusions

In research on trade liberalisation in developing countries, a lot of attention has been paid to its impact on export performance (with mixed conclusions), economic growth, employment, wage inequality and the income distribution but very little to its impact on imports, the balance of trade and the current account of the balance of payments. These are equally important areas of inquiry, because if trade liberalisation leads to a faster growth of imports than exports, this can have serious implications for the balance of payments of countries that may constrain growth below the growth of productive potential.⁷ In other words, while trade liberalisation may promote growth from the supply side through a more efficient allocation of resources, it may constrain growth from the demand side unless a balance between imports and exports can be maintained through currency depreciation or deficits can be financed through sustainable capital inflows. The results of the analysis undertaken are strong and robust to the different estimations techniques used, which means that the conclusions can be presented with some confidence.

First, reductions in export and import duties have significantly affected the growth of exports and imports, with the impact on import growth greater. For a one percentage point reduction in duties, exports have grown by just under 0.2%, while imports have grown by between 0.2 and 0.4%.

Second, the impact of a more liberalised trade regime, in all its manifestations, independently of duty reductions, has raised import growth by more than exports. Evidently, it has been easier for importers to import than for producers to reallocate

⁷ For a survey of the evidence see McCombie and Thirlwall (1997).

Table 12
Impact on Trade Balance According to Degree of Protection

	Dependent variable: trade balance/GDP					
	All countries		Low-moderate protection		High-very high protection	
	(i)	(ii)	(iii)	(iib)	(iia)	(iib)
Explanatory variables (same as Table 10):						
<i>TB</i> ₋₁	0.46 (2.06) [*]	0.78 (5.84) ^{**}	0.63 (4.73) ^{**}	0.67 (2.03) [*]	0.72 (4.71) ^{**}	0.49 (3.72) ^{**}
<i>w</i>	0.99 (2.58) [*]	0.89 (2.85) [*]	0.93 (7.55) ^{**}	0.80 (5.57) ^{**}	0.74 (2.91) [*]	0.73 (2.92) [*]
<i>y</i>	-0.14 (2.25) [*]	-0.23 (3.37) ^{**}	-0.19 (2.82) [*]	-0.22 (2.41) [*]	-0.10 (2.59) [*]	-0.16 (1.83) [§]
<i>p</i>	-0.01 (1.26)	-0.01 (2.85) [*]	-0.05 (7.07) ^{**}	-0.07 (4.36) ^{**}	-0.01 (0.43)	-0.01 (1.06)
<i>d_x</i>	-0.19 (3.41) ^{**}	-0.22 (2.45) [*]	-0.16 (9.39) ^{**}	-0.14 (11.05) ^{**}	-0.17 (1.69) [§]	-0.21 (2.17) [*]
<i>d_m</i>	0.22 (4.78) ^{**}	0.37 (4.18) ^{**}	0.29 (3.67) ^{**}	0.18 (12.39) ^{**}	0.69 (2.60) [*]	0.67 (6.12) ^{**}
<i>lib</i>	-1.20 (2.45) [*]	-1.11 (2.82) [*]	-0.68 (5.59) ^{**}	-0.49 (3.88) ^{**}	-1.74 (2.38) [*]	-1.77 (2.20) [*]
<i>liby</i>	-0.57 (3.57) ^{**}	-0.32 (6.10) ^{**}	-0.38 (2.82) [*]	-0.20 (4.39) ^{**}	-0.27 (2.61) [*]	-0.25 (2.85) [*]
<i>TOT</i>		-0.32 (2.85) [*]		-0.17 (1.78) [§]		-0.51 (5.02) ^{**}
Diagnostic statistic						
Likelihood Ratio Statistic (LRS)	202.94 [36.19]	194.97 [36.19]	91.40 [29.14]	110.65 [29.14]	76.61 [16.81]	75.30 [16.81]
Number of observations	460	460	299	299	161	161

Notes:
Figures in parentheses () are absolute t-ratios.
§, *, **, indicate that a coefficient is significant at the 10%, 5% and 1% level respectively.
Likelihood Ratio Statistic (LRS) is the test for serial correlation. The numbers in brackets [] are the critical values. The results provided are based on heteroscedastic and correlated regressions, with group autocorrelation. Such regressions are supported by the LRS.
In this set of estimations Indonesia and Zambia are not included because they switched regimes during the period.

resources to the traded-goods sector and to capture export markets. Compared to the pre-liberalisation regime, the process of liberalisation has raised export growth by approximately just under 2%, while import growth has increased by about 6%.

Third, liberalisation has increased the income elasticities of demand for imports and exports by roughly equal amounts but has increased the price elasticity of demand for imports by more than for exports.

Fourth, the 'pure' effect of trade liberalisation, independent of duty changes, has been to worsen the trade balance by over 2% of GDP but the impact on the current account of the balance of payments has been less – worsening it by approximately 0.8% of GDP on average. The effects of liberalisation on the trade balance and balance of payments have been similar across the regions of Africa, Latin America, East and South Asia, in the sense that all the regions have suffered deterioration.

Fifth, the impact of liberalisation differs according to whether countries start highly protected or whether they already have relatively low levels of protection. The positive effect of liberalisation on import growth and the negative effect on the trade balance and balance of payments are all greater in the more highly protected countries.

Sixth, it appears that liberalisation has had a net positive effect on income growth but the balance of trade consequences may have reduced growth below what might otherwise have been had a balance between exports and imports been maintained. One policy conclusion from our results would be, therefore, that countries (and international organisations that promote trade liberalisation in developing countries) need to take great care in the sequencing of the liberalisation of exports and imports to achieve a better balance between export and import performance if countries are to realise their potential growth performance. Free trade and flexible exchange rates are no guarantee that unemployed domestic resources are easily converted into scarce foreign exchange.

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Appendix: Data Definitions and Sources

Export Growth (x):

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

Export Duties (d_x):

Export duties (% of exports); includes all levies collected on goods at the point of export. Source: World Bank, *World Development Indicators* (WDI), 1999.

Import Duties (d_m):

Import duties (% 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.

Rate of Change of Relative Prices

Rate of Change of Relative Prices (p_x and p_m) used in the export and import demand functions is measured by the real exchange rate (RER) defined as (EP_d/P_f) , where E is the nominal exchange rate measured as the foreign price of domestic currency and (P_d/P_f) is the ratio of domestic to foreign prices. Data for the RER 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 RERs for the remaining countries are constructed from the IMF's *International Financial Statistics* (various issues).

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.

World Income Growth (w):

World GDP; annual percentage growth (constant 1995 US\$). Source: World Bank, *World Development Indicators* (WDI), 1999. The activity variable is defined as the difference between world GDP and country GDP, that is: $WY_i = \text{WorldGDP} - \text{GDP}_i$.

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