The Impact of Trade Liberalisation on Exports, Imports, the Balance of Payments and Growth: the Case of Mexico

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Abstract

The aim of this paper is to disentangle the effects of trade liberalisation during the mid-1980s from the liberalisation involved in the North American Free Trade Agreement (NAFTA) on exports, imports and the balance of payments in Mexico. The main empirical results suggest that the trade reforms during the mid-1980s had a significant impact on trade, exports and imports; however, the effects of NAFTA are negligible. Since the mid-1980s, the propensity to import has exceeded the propensity to export and this has worsened the growth rate consistent with balanced trade, and this is a major explanation of the slowdown of Mexico's growth in recent years. NAFTA has not delivered the improved growth performance that was promised by Mexico's political leaders at the time.

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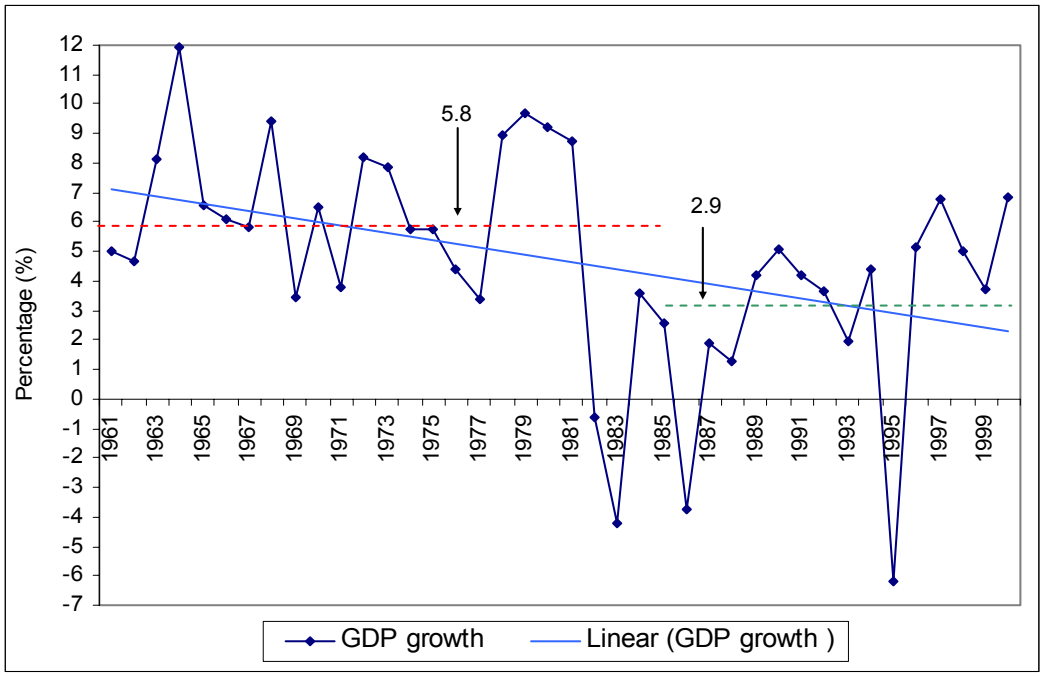
1. Introduction

In the mid-1980s, after more than three decades of pursuing import substitution policies, Mexico embarked on a serious programme of trade liberalisation which has led the country to become the thirteenth largest exporter and the tenth largest importer in the world (WTO, 2001). Tariffs were reduced substantially, import licenses were gradually rescinded, and export promotion policies were pursued, particularly through the *maquiladoras* sector. Mexico joined the GATT in 1986, and the North American Free Trade Agreement (NAFTA) came into effect on the 1st January 1994. The process of trade liberalisation continues, and Mexico is an active participant in the current discussion on the formation of a Free Trade Area of the Americas (FTAA).

The major purpose of the change in trade policy regime, in the wake of the debt crisis of the early 1980s, was to accelerate economic development and to 'grow out' of debt. This remained the purpose of further trade liberalisation programmes. Great expectations were raised with the signing of the NAFTA agreement that somehow Mexico would embark on a 'new golden age' of economic growth and prosperity (Lustig, 1994; Serra, 1991), but the rhetoric has not matched the reality. Graph 1 shows the Mexican growth experience for the years 1961 to 2000. Growth has fluctuated from period to period as the country has lurched from one crisis to another, but on average it can be clearly seen that the average growth of GDP has been lower post-1985 (when liberalisation took place in a significant way), than pre-1985. Average growth from 1961 to 1985 was 5.8 per cent, and from 1985 to 2000, it was 2.9 per cent. So, while the volume of trade has grown twenty-three fold, the growth of

the economy has slowed. On the surface this presents a paradox, but what we argue in this paper is that the potential gains from trade have been diluted because trade policies have not addressed fundamental weaknesses in the industrial and financial sectors. In particular, trade liberalisation has made imports much more sensitive to increases in domestic income, and worsened the balance of payments. This increase in the income elasticity of demand for imports has not been compensated by a sufficiently faster growth of exports and has therefore reduced the growth of domestic income consistent with a sustainable balance of payments position.

Graph 1
Mexico's GDP growth, 1961-2000



The analysis proceeds as follows. First, a brief overview of Mexico's trade liberalisation is presented. Then, we evaluate the impact of trade liberalisation in the mid-1980s, and of NAFTA, on export and import performance (see also Garces-Diaz, 2001; Ocegueda, 2000; Sotomayor, 1997). This is the first study to address this issue in a systematic and rigorous way. Next we look at the effect of trade liberalisation on the balance of trade and balance of payments, and use the findings to estimate the

effect of trade liberalisation on GDP growth within the framework of a balance of payments constrained growth model. Our results corroborate some previous findings of Moreno-Brid (1998, 1999, and 2001). Finally, we look to the future.

2. Overview of Trade Policy Reforms

During the import substitution phase of the late 1950s to the late 1970s three main forms of trade controls were applied: import tariffs, licensing restrictions, and official reference prices. The proportion of imported goods subject to licensing rose steadily, chiefly in response to balance-of-payments difficulties. A recurrent policy of the Mexican government, when it was experiencing the lack of foreign exchange, was to reintroduce import controls rather than reducing domestic expenditure (Balassa 1983; Ten Kate, 1992; Weiss, 1992). However, Mexico was far from being a closed economy, and the effect of the various trade controls was less protectionist than in a number of other economies that pursued import-substitution policies.

But pressures mounted, internally and externally, for the liberalisation of trade. Mainstream economic theory argues that free trade is necessary to maintain the competitiveness of domestic industry (Balassa, 1983). Internally, the official arguments for liberalisation were that Mexico's productive structures were inefficient (resulting from protectionist policies) and that the economy needed to open itself more to foreign investment. Externally, trade liberalisation was part of the structural adjustment programmes imposed by the World Bank and the IMF in the early 1980s. After the annual meeting of the Bretton Woods institution in Seoul in October 1985

(and the implementation of the Baker Plan), the Mexican government confirmed its commitment to trade liberalisation:[1]

> …policies should be adopted that attacked (sic) the real causes of poor economic performance, which implied (sic) trade liberalisation, privatisation of state companies and a more tolerant attitude toward private foreign investments…

Trade liberalisation was to become the engine of growth.

The programme of trade reforms introduced in Mexico in the period 1985-87 was one of the most far-reaching of any developing economy. In a relatively brief period, tariff rates on most products were quickly reduced, reference prices were progressively removed and non-tariff controls were drastically decreased or eliminated. The first stage of the import liberalisation programme was implemented in June 1985, when licenses were eliminated on almost 3,600 tariff lines, which left only 908 under control (Ten Kate, 1992). Table 1 shows the evolution of the proportion of domestic production value covered by import licensing, and it can be seen that it fell over 90 per cent from June 1985 to 25 per cent in 1987.

Table 1
Quantitative Indicators of the Mexican Import Regime during the 1980s (%)

	1985 June	1985 December	1986 December	1987 December	1988 December	1989 December
Domestic production value covered by import licensing	92.2	47.1	39.8	25.4	21.3	19.8
Production-weighted tariff averages	23.5	28.5	24.5	11.8	10.2	12.5
Domestic production value covered by official import prices	18.7	25.4	18.7	0.6	0.0	0.0

Source: Ten Kate, 1992.

Tariffs initially rose as compensation for license elimination, but by December 1987, the production-weighted average tariff had fallen to 11.8 per cent compared to 23.5

[1] Taken from Ten Kate (1992).

per cent in June 1985. At the same time domestic production value covered by official import prices was virtually reduced to zero by December 1987 to comply with Mexico's membership of GATT in July 1986.

Mexico's accession to GATT did not imply an intensification of the liberalisation process; rather it was considered as a signal by policy makers of their intention to carry on the liberalisation process. Less dramatic reductions in import licensing and tariff coverage of imports continued after 1987, so that in 1988 official prices were abolished entirely, and in 1989 only 19.8 per cent of imports were protected by the licensing system and 12.5 per cent by tariff coverage. The government focused on fine-tuning the trade liberalisation process. The emphasis was on reducing the dispersion in tariff rates with the objective of producing a broadly uniform system of effective protection.

At the same time, negotiations started on what was to become the North American Free Trade Agreement (NAFTA). In 1985, Mexico and the US had already signed a bilateral deal on subsidies and countervailing duties. In 1987 and 1989 further agreements were signed to establish principles and procedures for resolving controversies on trade and investment, and for facilitating both. Canada, Mexico and the United States started accelerated negotiations, which were officially initiated in 1991 and NAFTA came into effect on 1st January 1994. It was designed to remove most of Mexico's remaining barriers to trade and investment, either immediately or gradually over a fifteen year period to 2008.[2] Table 2 shows NAFTA's tariff elimination schedule. Goods categorised in group A were able to enter Mexico duty

[2] The full NAFTA text is available at <URL:http:// www.nafta-sec-alena.org/english/index.htm>.

free as soon as NAFTA took effect; goods classified in group B entered duty free after 1st January 1998; goods in category C1 have been duty free since 1st January 2003; goods classified in group C2 will be duty free from 1st January 2008; and, goods classified in group D were already duty free before NAFTA. Approximately 85 per cent of total goods fall within categories A, B and C1, so that now only 15 per cent of goods are protected in some way.

Table 2
NAFTA's Tariff Elimination Schedule

Group A	Duties on goods of this category shall be eliminated entirely and such goods shall be duty-free, effective 1st January 1994.
Group B	Duties on goods of this category shall be removed in 5 equal stages beginning on 1st January 1994, and such goods shall be duty-free, effective 1st January 1998.
Group C1	Duties on goods of this category shall be removed in 10 equal stages beginning on 1st January 1994, and such goods shall be duty-free, effective 1st January 2003.
Group C2	Duties on goods of this category shall be removed in 15 equal stages beginning on 1st January 1994, and such goods shall be duty-free, effective 1st January 2008.
Group D	Goods shall continue to receive duty-free treatment.

Source: North American Free Trade Agreement (NAFTA).

It is important to stress, however, that the most significant trade liberalisation had already taken place in the mid-1980s. The main function of NAFTA was to embody the newly-liberalised regime in a comprehensive international agreement in order to lock-in free market policies against a future change of government in Mexico, (Skott and Larudee, 1998; FitzGerald, 1999). Nonetheless, the proponents of NAFTA expected large benefits for Mexico in the form of increased foreign investment and exports. Very little was said, however, about the impact on imports and the balance of payments of Mexico from the general process of liberalisation. On one hand, previous studies of Mexico's trade performance have focused on exports, but even these do not disentangle properly the effect of the mid-1980s reforms from NAFTA (Graf, 1996; Katz, 1996; Sotomayor, 1997). On the other hand, work on imports has mainly

focused on the price and income elasticities and not on the effect of trade liberalisation (Alfaro and Salas, 1992; Clavijo and Faini, 1990; Galindo and Cardero, 1999; Dornbush and Werner, 1994, López and Guerrero, 1998; Salas 1988; and, Sotomayor, 1997), with the exception of Moreno-Brid (2002b). As far as the balance of payments effects of trade liberalisation are concerned there have been recent panel data studies (Parikh, 2000; Santos-Paulino and Thirlwall, 2004; UNCTAD, 1999), but no study for Mexico. We now attempt to make our own estimates of the impact of liberalisation on exports, imports, the balance of trade and the balance of payments.

3. The Impact of Trade Liberalisation on Export Growth

In this section we focus on the impact of trade liberalisation in the mid-1980s and NAFTA on non-oil export growth.[3] To do this, we specify a standard export growth function, in which exports are considered to be a function of price competitiveness, measured by the real exchange rate,[4] and international income.[5] Assuming constant price and income elasticities of demand for exports, the function can be expressed as (Thirlwall, 2003):

$$X = A\left(\frac{P_f E}{P_d}\right)^{\beta_1} YUS^{\beta_2} \qquad (1)$$

where A is a constant, P_d are domestic prices, P_f are US prices, YUS is world income, and E is the nominal exchange rate measured as the domestic price of foreign currency; β_1 and β_2 denote price and income elasticities, respectively. Taking logs of

[3] Oil is excluded first because oil exports are influenced by other factors from those that explain non-oil exports and secondly, doing this we isolate the evolution of exports from the fluctuations in the oil market. Hereafter we treat non-oil exports as exports.

[4] The real exchange rate is defined as $RER = (P_{US}/P_M)$, where E is the nominal exchange rate (quantity of pesos per one US dollar), P_{US} represents US's prices and P_M is Mexico's prices. An increase in the RER represents a depreciation.

[5] Since Mexico's main trade partner is the US, the GDP of US is taken as world income.

the variables, and differentiating with respect to time, the rate of growth of exports (including a constant which may pick up supply-side factors) is expressed as:

$$x = \alpha + \beta_1 (p_f + e - p_d) + \beta_2 yus \quad (2)$$

Both elasticities, β_1 and β_2, are expected to be positive. The model, however, assumes that exports adjust without a lag to changes in competitiveness and income, so there is no difference between short and long run elasticities. It is more realistic to assume lagged adjustment. Assuming that exports adjust partially to the difference between export demand in period *t* and the actual flow of exports in the previous period (*t-1*), the lag of exports becomes an explanatory variable, giving equation (3):

$$x_t = \alpha + \beta_1 p_t + \beta_2 yus_t + \beta_3 x_{t-1} + \mu_t \quad (3)$$

where p_t now stands for the rate of change of competitiveness, μ_t is an error term and *t* represents the time period. The short run elasticities are β_1 and β_2 and the long run price and income elasticities are given by (β_1/1-β_3) and (β_2/1-β_3), respectively.

To test for the impact of liberalisation in the mid-1980s and NAFTA, two shift dummies are used. Each dummy variable takes the value of zero prior to the liberalisation episode and one afterwards.[6] Tests were done for which of the years showed the most significant impact, and 1986 proved to be the most significant for the first period of trade liberalisation. For the second period of trade liberalisation we tested for 1994, 1995 and 1996, but none of them were significant. For the purposes of presenting the results of the model we chose 1994, the starting date of NAFTA. Thus, the extended export demand function to be estimated is:

$$x_t = \alpha + \beta_1 p_t + \beta_2 yus_t + \beta_3 x_{t-1} + \beta_4 lib86_t + \beta_5 lib94_t + \mu_t \quad (4)$$

[6] The argument for using a 'continuous' dummy variable is that although serious trade liberalisation started in the selected year, more reforms continued over the following years, so we are testing for a permanent effect.

where *lib86* and *lib94* are the shift dummy variables. The rest of the variables are as defined earlier.[7]

The equation is estimated using an Autoregressive Distributed Lag (ARDL) framework to provide long run estimates of the relationship between the variables. The ARDL estimation involves two steps. In the first stage the existence of a long run relationship is examined. The F-statistic is used to examine the significance of the lagged levels of the variables in the error correction form of the underlying ARDL model.[8] If the calculated F-statistic is higher than the upper bound critical value, it suggests rejection of the null hypothesis of no long run relationship. In the second stage, the long and short run parameters are estimated using the ARDL method.

To estimate equation (4), we use annual data from 1970 to 2000.[9] First we calculated the F-statistic, which has a value of 6.59. Comparing it with the interval of critical values (from 3.79 to 4.85) under the assumption of an intercept and no trend, we reject the null hypothesis of no long run relationship between the variables at the 5 per cent significance level. We then estimated the long run coefficients and the Error Correction Model (ECM). We start from one lag length,[10] and then the order of the ARDL model is determined by using the Schwarz Bayesian Criterion (SBC). The

[7] A shift dummy variable for 1991 was also included in order to capture a change in the way export data were compiled since this year. The dummy takes the value of one in 1991 and 0 otherwise.
[8]Pesaran *et al*. (1997) and Pesaran *et al*. (2001) provide the asymptotic critical value bounds for the F-statistic.
[9]The data source is the World Development Indicators, WB (2002) and the Government Finance Statistics Yearbook, IMF (several issues).
[10] We are constrained to use one lag due to the sample size considered.

long run coefficients, and the ECM derived from the ARDL (1,1,0) approach, are the following, respectively:[11]

$$LX = \underset{t\text{-statistic}}{\underset{(-0.26)}{-4.38} + \underset{(1.54)}{0.88}\ LYUS + \underset{(1.77)}{0.85}\ LP + \underset{(3.71)*}{0.69}\ lib86 + \underset{(1.42)}{0.28}\ lib94 + \underset{(3.00)*}{0.77}\ d91} \quad (5)$$

$$x = \underset{t\text{-statistic}}{\underset{(-0.26)}{-2.13} + \underset{(3.54)*}{4.39}\ yus + \underset{(2.41)*}{0.41}\ p + \underset{(2.82)*}{0.34}\ lib86 + \underset{(1.23)}{0.13}\ lib94 + \underset{(3.76)*}{0.37}\ d91 - \underset{(-3.96)*}{0.48}\ ecm_{-1}} \quad (6)$$

where the continuous variables in equation (5) are measured in logs (L) and the variables in equation (6) represent growth rates.

In equation (5) only the first trade liberalisation coefficient, *lib86*, of all the long run coefficients, is significant at the 5 per cent level. The value of the coefficient suggests that given changes in foreign income and relative prices, non-oil exports approximately doubled.[12] The ECM shows the short run coefficients of the variables (all of them are significant, except *lib94*), plus the error term. Export growth responds substantially to the growth of the US economy, but the price elasticity of Mexican exports is quite low. NAFTA has had no discernable effect on Mexican export performance. This finding corroborates the work of Garces-Diaz (2001) that trade liberalisation relating to NAFTA has had no significant impact on export growth. This is perhaps not surprising because most of the major trade reforms had already taken place in the mid-1980s, and the major function of NAFTA was to lock-in those reforms (see Skott and Larudee, 1998; and Ibarra, 1999). The coefficient on the error term tells us that about 48 per cent of the discrepancy between the actual and the equilibrium value of the rate of growth of exports is corrected within a year.

[11] Both models satisfy all diagnostic tests.
[12] This value is calculated from $e^{\beta}-1$, where β is the value of the coefficient.

4. The Impact of Trade Liberalisation on Imports

One of the most common effects of trade liberalisation, particularly in developing countries, is that it increases imports by more than exports (Santos-Paulino and Thirlwall, 2004). We want to examine whether this has been the case for Mexico, holding other variables constant. As in the case of exports, we consider a standard import growth function where imports are assumed to be a function of price competitiveness measured by the real exchange rate, and domestic income. Assuming that the price and income elasticities of demand for imports are constant, the function can be written as (Thirlwall, 2003):

$$M = L\left(\frac{P_f E}{P_d}\right)^{\delta_1} YM^{\delta_2} \tag{7}$$

where L is a constant, YM is Mexico's income, and the rest of the variables are as described before; δ_1 and δ_2 denote the price and income elasticities, respectively. Taking logs of the variables in equation (7) and differentiating with respect to time, the rate of growth of imports (including a constant) is:

$$m = \lambda + \delta_1 (p_f + e - p_d) + \delta_2 ym \tag{8}$$

It is expected that the price elasticity (δ_1) is negative and the income elasticity (δ_2) is positive. Considering the lagged adjustment in a disequilibrium model of import demand, it is assumed that imports adjust only partially to the difference between import demand in period t and the actual flow of imports in the previous period (t-1). The dynamic import function is then expressed as:

$$m_t = \lambda + \delta_1 p_t + \delta_2 ym_t + \delta_3 m_{t-1} + \varepsilon_t \tag{9}$$

where p_t is the rate of change of the real exchange rate, ε_t is the error term and t represents the time period. The short run price and income elasticities are given by δ_1 and δ_2, and the long run elasticities by (δ_1/1-δ_3) and (δ_2/1-δ_3), respectively.

To take account of trade liberalisation on import growth, equation (9) is extended to include the ratio of import duties to total imports, to capture trade distortions, and two shift dummy variables, one for each period of trade liberalisation. Tests showed that the most significant breaks occurred in 1985 and 1994. The extended import growth function is expressed as:

$$m_t = \lambda + \delta_1 p_t + \delta_2 ym_t + \delta_3 m_{t-1} + \delta_4 md_t + \delta_5 lib85_t + \delta_6 lib94_t + \varepsilon_t \quad (10)$$

where *md* is the import duties ratio, and *lib85* and *lib94* are the shift dummy variables.[13]

As with exports, we estimate the short and long run coefficients of the import growth equation using the ARDL procedure. Also, we present the results of the ECM. Following the ARDL procedure we found that the calculated F-statistic is 4.57. Comparing with the interval of critical values (from 3.21 to 4.37), under the assumption of an intercept and no trend, we reject the null hypothesis of no long run relationship between the variables at the 5 per cent significance level. We then estimated the long run coefficients and the ECM.[14] We consider one lag length, and then the order of the ARDL model is determined by using the SBC. The long run coefficients, and the ECM derived from the ARDL (1,1,1) approach, are the following, respectively:[15]

LM =	-1.60 +	1.04 *LYM* -	1.06 *LP* +	0.65 *lib85* +	0.61 *lib94* –	0.04 *d91*	(11)
t-statistic	(-0.22)	(3.80)*	(-2.72)*	(2.83)*	(4.14)*	(-0.15)	

m =	-0.49 +	2.60 *ym* -	0.70 *p* +	0.20 *lib85* +	0.19 *lib94* –	0.01 *d91* -	0.31 ecm_{-1}	(12)
t-statistic	(-0.22)	(3.89)*	(-3.71)*	(3.94)*	(2.73)*	(-0.15)	(-3.28)*	

[13] Also, a shift dummy variable for 1991 was included in order to capture a change in the way import data were compiled since this year. The dummy takes the value of one in 1991 and 0 otherwise.
[14] In the following equations we exclude the import duties ratio as an explanatory variable because it is not statistically significant, and the remaining coefficients show better results.
[15] Both models satisfy all diagnostic tests.

where the continuous variables in equation (11) are measured in logs (L), and the variables in equation (12) represent growth rates. The two long run trade liberalisation coefficients, *lib85* and *lib94*, in equation (11) are significant at the 5 per cent level, suggesting that given changes in domestic income and relative prices, imports increased by approximately 85 per cent in both years.[16] The ECM in equation (12) shows the short run coefficients of the variables and the error correction term. Except for the constant, all the parameters are statistically significant. The error correction coefficient is statistically significant, has the correct sign and suggests a moderate speed of convergence (31 per cent) to equilibrium. These results show that import growth responded before export growth, and NAFTA has increased import growth but not export growth.

The contrast between the performance of imports and exports suggests that trade liberalisation had significant effects on the balance of trade and balance of payments. In the next section we attempt to estimate these effects.

5. The Impact of Trade Liberalisation on the Balance of Trade and the Balance of Payments

A model of the trade balance and the balance of payments is estimated over the period 1980-2000. As the trade balance (and balance of payments) is measured in monetary terms, the terms of trade also become an important variable to consider. We specify the trade balance in two ways. Firstly, we define the trade balance as the ratio of the value of exports to imports.[17] Thus:

$$TB = X/M \qquad (13)$$

[16] This value is calculated from $e^{\beta-1}$, where β is the value of the coefficient.
[17] The trade balance excludes oil.

where X and M are the values of non-oil exports and imports, respectively. Taking logs of the variables and differentiating with respect to time, the rate of growth of the trade balance is defined as:

$$tb = (p_x + x) - (p_m + m) \quad (14)$$

where x and m are the rate of change of the volume of exports and imports, respectively. The difference between the rate of change of export prices and import prices ($p_x - p_m$) measures the rate of change in the terms of trade, *tot*. Based on equations (2) and (8), which define the rate of growth of exports and imports, respectively, we substitute and rearrange terms to obtain the following equation:

$$tb = \psi + \theta_1 yus_t + \theta_2 ym_t + \theta_3 p_t + \theta_4 tot_t + \tau_t \quad (15)^{18}$$

where ψ is a constant and τ_t is the error term. It is expected that θ_1 is positive, θ_2 is negative, θ_3 is positive, and θ_4 is positive. Equation (15) is then extended with the inclusion of export and import duties, and two shift dummy variables to compare the effects of liberalisation.[19] Tests showed the most significant structural breaks to be in 1985 and 1994. The estimated trade balance model becomes:

$$tb_t = \psi + \theta_1 yus_t + \theta_2 ym_t + \theta_3 p_t + \theta_4 tot_t + \theta_5 xd_t + \theta_6 md_t + \theta_7 lib85_t + \theta_8 lib94_t + \tau_t \quad (16)$$

where *xd* and *md* are export and import duties, respectively, and *lib85* and *lib94* are the shift dummy variables for each of the episodes of trade liberalisation. The sign of θ_5 is negative, θ_6 is expected to be positive, and θ_7 and θ_8 are undetermined.

Secondly, we take the ratio of the trade balance to GDP (TB/GDP). The function has the same explanatory variables as in equation (16), and can be written as follows:

$$\text{TB/GDP} = \alpha + \delta_1 yus_t + \delta_2 ym_t + \delta_3 p_t + \delta_4 tot_t + \delta_5 xd_t + \delta_6 md_t + \delta_7 lib85_t + \delta_8 lib94_t + \nu \quad (17)$$

[18] The explanatory variables of the trade balance equation encompass both the absorption and elasticity approaches to the balance of payments.

[19] As data on export duties are available for the period 1980-2000, they were included in the trade balance equations (although not previously in the export growth equation).

where α is the constant and ν the error term. The expected signs of the δs are the same as the coefficients of equation (16).

Since trade liberalisation not only affects merchandise trade but also services, we further test for the impact of liberalisation on the rate of change of the current account of the balance of payments (BP) and on the current account of the balance of payments as a share of GDP (BP/GDP). The BP and BP/GDP models are specified as follows:[20]

$$\frac{dBP}{BP} \text{ and } \frac{BP}{GDP} = \lambda + \chi_1 yus_t + \chi_2 ym_t + \chi_3 p_t + \chi_4 tot_t + \chi_5 xd_t + \chi_6 md_t + \chi_7 lib85_t + \chi_8 lib94_t + \upsilon_t \qquad (18)$$

where λ is the constant and υ the error term. The variables and the expected signs of the χs are the same as the variables and coefficients of equation (16).

We estimate the models using the ARDL and ECM frameworks. First, we test for the existence of a long run relationship between the variables in the trade balance model (equation 16) using the F-test (Pesaran and Pesaran, 1997). The calculated F-statistic is 11.6. Comparing it with the interval of the critical values of the F-test (2.85 to 4.04), we reject the null hypothesis of no long relationship between the variables. To estimate the long run coefficients and the ECM, we use one lag length, and the order of the ARDL model is (1,0,0,0). The long run coefficients, and the ECM derived from the ARDL approach, for the rate of change of trade balance are given in equations (19) and (20), respectively:[21]

$$LTB = -29.08 - 1.27\ LYM + 2.73\ LYUS + 1.23\ LP - 0.28\ lib85 - 0.11\ lib94 \qquad (19)$$

t-statistic	(-3.94)*	(1.21)	(3.12)*	(3.64)*	(-2.00)*	(-0.97)

[20]The current account of the balance of payments excludes oil.
[21]The terms of trade variable (TOT) and the export and import duties are omitted because their coefficients are insignificant, and the rest of the variables perform better without them.

$$tb = \underset{t\text{-statistic}}{\underset{(-2.11)^*}{-23.93} \; \underset{(-1.04)}{-1.04}\, ym + \underset{(2.38)^*}{2.25}\, yus + \underset{(4.79)^*}{1.05}\, p \; \underset{(-2.01)^*}{-0.23}\, lib85 \; \underset{(-0.94)}{-0.09}\, lib94 \; \underset{(-5.74)^*}{-0.82}\, ecm_{-1}} \qquad (20)$$

where the L preceding each variable in equation (19) stands for the log of the variable; and lower case letters in equation (20) represent growth rates for the first three variables.

Focusing on the long run coefficients, the trade liberalisation indicator related to the first period of trade reforms, *lib85*, is significantly negative. This means that the trade balance deteriorated as a result of trade liberalisation by approximately 23 per cent.[22] However, there is no significant impact of the second shift dummy variable, *lib94*, on the trade balance. The income and real exchange rate elasticities show the expected sign, and are statistically significant, but domestic income is surprisingly insignificant. The ECM shows the short run coefficients of the variables and the error correction term. The latter tells us that about 82 per cent of the discrepancy between the actual and the equilibrium value of the rate of growth of the trade balance is corrected within a year.

When we substitute TB/GDP for tb the results are as follows:

$$\underset{t\text{-statistic}}{\text{TB/GDP} = \underset{(-3.94)^*}{-2.31} \; \underset{(-1.33)}{-0.11}\, LYM + \underset{(3.22)^*}{0.23}\, LYUS + \underset{(3.48)^*}{0.09}\, LP \; \underset{(-1.94)\,**}{-0.02}\, lib85 \; \underset{(-0.94)}{-0.00}\, lib94} \qquad (21)$$

$$\underset{t\text{-statistic}}{\text{TB/GDP} = \underset{(-3.54)^*}{-1.95} \; \underset{(-1.20)}{-0.09}\, ym + \underset{(1.20)}{0.19}\, yus + \underset{(4.48)^*}{0.07}\, p \; \underset{(-1.97)^{**}}{-0.01}\, lib85 \; \underset{(-0.92)}{-0.00}\, lib94 \; \underset{(-5.70)^*}{-0.84}\, ecm_{-1}} \qquad (22)$$

In the long run model there is no change in the significance of the coefficients. The trade balance responds positively and significantly to the growth of the US economy and the exchange rate, and the negative sign on the *lib85* dummy also retains its

[22] This value is calculated from $e^{\beta-1}$, where β is the value of the coefficient.

significance. Domestic income growth and the *lib94* dummy, however, remain insignificant. In the ECM, the only difference is that the US growth variable is no longer significant. The results confirm that liberalisation in the mid-1980s affected the trade balance adversely, but apparently not NAFTA.

Turning to the current account of the balance of payments (equation 18), the results are as follows:[23]

$$\underset{t\text{-statistic}}{LBP} = \underset{(-5.66)^*}{-19.51} \underset{(-2.38)^*}{-1.38\,LYM} + \underset{(6.22)^*}{2.25\,LYUS} + \underset{(3.08)^*}{0.62\,LP} \underset{(-1.54)}{-0.12\,lib85} \underset{(-1.02)}{-0.06\,lib94} \quad (23)$$

$$\underset{t\text{-statistic}}{bp} = \underset{(-4.31)^*}{-17.86} \underset{(-1.97)^{**}}{-1.26\,ym} + \underset{(3.56)^*}{2.06\,yus} + \underset{(4.06)^*}{0.57\,p} \underset{(-1.57)}{-0.11\,lib85} \underset{(-1.00)}{-0.06\,lib94} \underset{(-6.46)^*}{-0.92\,ecm_{-1}} \quad (24)$$

In both the long and short run models, the income and price elasticities have the expected signs and are statistically significant, while the liberalisation dummies, controlling for the growth of income, are not significant. This contrasts with the trade balance model might be expected if balance of payments adjustment is required if trade deficits cannot be financed.[24]

6. Trade liberalisation and Growth

In this section we examine the interaction of the trade balance and economic growth by considering the balance-of-payments-constrained growth model, first formulated by Thirlwall (1979). We are interested in whether Thirlwall's model is a good predictor of Mexico's long run growth rate. Thirlwall's model says that the ultimate constraint on growth in an open economy is the balance of payments, and that a

[23] The terms of trade variable (TOT) and the exports and import duties are omitted because their coefficients are insignificant, and the rest of the variables perform better without them.
[24] Most of the coefficients for the current account of the balance of payments as a share of GDP are statistically insignificant, except for the real exchange rate. The results are not presented here but available on request.

country's growth rate can be approximated by the inverse of the income elasticity of demand for imports times the rate of growth of exports. The balance-of-payments-constrained growth model is derived from equations (1) and (7). By assuming long run equilibrium on the current account, and that the rate of change of relative prices is constant over time ($p_d - p_f - e = 0$),[25] the balance of payments equilibrium growth rate can be written as:

$$y_b^1 = (\varepsilon/\pi)\, z \quad [26] \tag{25}$$

or, combining equations (2) and (25), gives:

$$y_b^2 = (1/\pi)\, x \tag{26}$$

Equation (26) is a dynamic version of Harrod's static foreign trade multiplier result (Harrod, 1933) that output in an open economy is determined by exports relative to the propensity to import. In other words, the rate of growth of exports divided by the income elasticity for imports sets a rate of growth which cannot be exceeded in the long run without ever-increasing capital inflows.[27]

There has been a lot of interest in the performance of the relationship between Mexico's GDP growth and its trade sector during recent decades. In particular, several studies have focused on the analysis of the balance of payments constraint on Mexico's long run economic growth; most of them have considered Thirlwall's model. Warman (1994), Moreno-Brid (1998, 1999, 2001 and 2002a), López and Cruz (2000) and Ocegueda (2000), by using different econometric techniques, all confirm Thirlwall's 'Law' for the Mexican economy. Loría and Fuji (1997) arrive at a similar

[25] McCombie and Thirlwall (1994) argue that in the long term relative price fluctuations measured in a common currency are minimal. However, McCombie (1997) emphasises that "the approach does not argue that relative prices have no effect on trade flows, only that over the long run their impact is quantitatively small".

[26] It can also be shown that this result holds if the Marshall-Lerner condition is just satisfied (i.e. $\psi + \eta = 1$).

[27] For further extensions of Thirlwall's 'Law', see Thirlwall and Hussein (1982), McCombie and Thirlwall (1999), and Moreno-Brid (1999, 1998 and 2001).

conclusion that Mexico's economic growth is constrained by the balance of payments, although they follow a descriptive approach rather than an econometric one.

We now turn to our own estimates of the impact of trade reforms on Mexico's economic growth by analysing the effect of trade reforms on the income elasticity of demand for imports and the rate of growth of exports. If the former has increased over time this means a negative effect of trade liberalisation on economic growth, unless offset by a faster rate of growth of exports. To test for this we estimate the long run elasticity of demand for imports, using the ARDL technique, for fourteen sub-periods. We find that the long run income elasticity of demand for imports has increased (see Table 3).[28]

Table 3
Long Run Income Elasticities of Demand for Imports
(Selected sub-periods, 1973-1999)

Period	π	Period	π
1973-1987	1.21	1980-1994	2.47
1974-1988	1.50	1981-1995	3.34
1975-1989	1.85	1982-1996	4.56
1976-1990	2.09	1983-1997	4.43
1977-1991	2.31	1984-1998	3.12
1978-1992	2.20	1985-1999	3.15
1979-1993	2.04		

Source: Own estimations based on data from World Development Indicators (2002).

To estimate the balance-of-payments-constrained growth model (equation 21), we consider the whole time period and two different sub-periods taking the mid-1980s trade reforms as a break point (1985 and 1986), and using different income elasticities of import demand. Table 5 shows the results. In each period, the estimated dynamic

[28] In spite of considering different sub-periods, our results are consistent with the elasticities that Moreno-Brid (2001) estimated (see Table 4).

Table 4
Income Elasticities of Demand for Imports

Period	π	Period	π	Period	π
1968-1983	1.39	1974-1989	1.46	1980-1995	1.55
1969-1984	1.48	1975-1990	1.50	1981-1996	2.66
1970-1985	1.46	1976-1991	1.60	1982-1997	3.53
1971-1986	1.56	1977-1992	1.46	1983-1998	3.10
1972-1987	1.62	1978-1993	1.60	1984-1999	3.14
1973-1988	1.55	1979-1994	1.65		

Source: Moreno-Brid (2001), from Table 4.4.

Harrod foreign trade multiplier result is somewhat higher than the actual growth rate of GDP (y);[29] but the important point to note is the reduction in the balance of payments equilibrium growth rate post 1985/86. It falls by one half, and this is mirrored by a fall in the actual growth rate to 2.8 per cent post-1986. [30] This increase in the income elasticity of demand for imports has not been matched by a sufficient increase in the growth rate of exports.

Table 5
Impact of Trade Reforms on Mexico's GDP Growth
(Selected sub-periods)

Period	Harrod trade multiplier $y_b^2 = x/\pi$	Actual Growth Rate [a] (y)	Export Growth Rate (x) [a]	π	Terms of Trade [b] (1995=100)
1973-1999	4.4	3.6	9.8	2.2	-1.40
1973-1985	6.9	5.0	9.0	1.3	-0.55
1973-1986	5.8	4.3	8.7	1.5	-2.62
1986-1999	2.9	2.8	9.2	3.1	-2.19
1987-1999	3.2	2.8	10.5	3.2	-0.10

Notes: [a] Figures are in real terms at 1995 US dollars. [b] The terms of trade are calculated as the ratio of Mexico's export price index to its import price index, where all prices are expressed in US dollars.
Source: Own calculations based on data from World Development Indicators (2002) and Banco de México.

A formal test of whether the actual growth of a country can be predicted from its balance of payments equilibrium growth rate has been proposed by McCombie (1989). The test consists of estimating the hypothetical income elasticity of demand that equates the actual and the balance of payments equilibrium growth rates (i.e. $\pi' \equiv x/y$), and to compare π' with the estimated π. If π' does not differ significantly from π, nor will actual GDP growth differ significantly from y_b^2. Thus the hypothesis to be tested is whether or not $\pi = \pi'$. This was undertaken by estimating the

[29] The adverse effect of relative prices movements may be one explanation of the shortfall of the actual rate of growth below the dynamic Harrod trade multiplier result. For instance, the sub-periods which include 1986 (1973-1986 or 1986-1999) have on average a faster deterioration in the real terms of trade than the other two sub-periods (1973-1985 or 1987-1999) (see last column in Table 5). In 1986 the negative change in the terms of trade was approximately 29.4 per cent.
[30] The estimations of the balance of payments equilibrium growth rates differ from those reported by Moreno-Brid (2001) because the rates of growth of exports used here are higher than the ones he presents. The only explanation for this is that the figures which he shows are in real (1980) Mexican pesos, while ours are in real (1995) US dollars (the terms of trade varied during the 1980s).

t-statistic from the standard error of π for the null hypothesis that $\pi = \pi'$, and evaluating whether or not the null hypothesis is rejected at the 95 per cent confidence level. The results are reported in Table 6. The balance of payments equilibrium growth rate is not refuted for the full sample, or for the two post mid-1980s trade reform sub-periods. For the other two sub-periods, 1973-1985 and 1973-1986, there is a statistically significant difference between π and π', although the discrepancies are not very large.

Table 6
Testing for whether π and π' are significantly different (Selected sub-periods)

Period	Π	π'	Absolute value of the *t* statistic [a]
1973-1999	2.2	2.7	1.51
1973-1985	1.3	1.8	2.93*
1973-1986	1.5	2.0	2.57*
1986-1999	3.1	3.2	0.17
1987-1999	3.2	3.7	0.94

Notes: [a] The *t*-statistic is based on the null hypothesis that $\pi = \pi'$. The asterisk (*) denotes that π differs significantly from π' at the 5 per cent confidence level.
Source: Own calculations based on data from World Development Indicators (2002) and Banco de México.

We conclude that the slowdown of Mexico's economic growth since the mid-1980s can be linked to an increase in the long run elasticity of import demand associated with trade liberalisation, which has not been compensated by a sustained expansion of exports. Part of the explanation for the increase in the income elasticity of demand for imports is the increased dependence of the under-developed industrial sector on foreign inputs. Trade liberalisation has exacerbated and reinforced this dependence, promoting and facilitating access to a wide variety of imported goods.

7. Conclusions

This is the first study of its kind which has attempted to estimate the impact of trade liberalisation in the mid-1980s and NAFTA in a rigorous and systematic way.[31] The

[31] See Pacheco-López (2003) for alternative econometric techniques which support and complement the findings presented here.

analysis provided is of particular relevance for policy purposes given the accelerated process of trade integration between Mexico and the US, and also because of the country's position in Latin America.

Firstly, with regard to export and import performance we find that trade liberalisation in the mid-1980s positively affected the performance of export and import growth by a similar magnitude, but imports responded earlier than exports. NAFTA, however, shows no significant impact on exports, which is perhaps not surprising given the extent of trade liberalisation that had already taken place.

Secondly, with regard to the trade balance and the balance of payments, our results show that the mid-1980's trade liberalisation worsened the trade balance. Since the deterioration of the trade balance limits the foreign exchange availability and the sustainability of economic growth, we evaluated how trade liberalisation has interacted with the performance of Mexico's GDP growth through Thirlwall's balance of payments constrained growth model. The results of the model confirm the hypothesis that the slowdown in Mexico's economic growth since 1985/86 has resulted from an upward shift in the income elasticity of demand for imports and an insufficient increase in the rate of growth of exports. Thus, trade liberalisation has resulted in making the balance of payments constraint on Mexico's long run growth even more binding, which supports earlier findings of Moreno-Brid (2002a, 2001, 1999 and 1998).

Thirdly, our analysis of the effects of trade liberalisation in Mexico has several policy implications. Notwithstanding Mexico's rate of growth of exports, or its position in

the list of leading exporters, what really matters is the position of the balance of payments. In other words, the constraint on growth will continue unless the production structure and the pattern of trade in Mexico are changed to increase export expansion relative to imports.

Our results question the euphoric statements which claimed that once NAFTA was signed, Mexico was going to embark on a path of faster, sustainable economic growth, and it was going to be able, through trade liberalisation, to 'catch-up' with its trading partners.[32] *A posteriori*, we confirm Rodrik's (1992) warning that "claims on behalf of liberalization should be modest lest policy-makers become disillusioned once again" (p.103). Rodrik cautioned about the danger of over-selling trade liberalisation as a panacea for economic development, which at the time was considered as the answer to the 'lost decade': the 1980s. The point made by Rodrik is still valid today.

In this regard, Mexico's participation in two future major free trade agreements, the Free Trade Area of the Americas (FTAA), which will come into effect in 2005, and the Plan Puebla Panama (PPP) —financed by the Inter-American Development Bank— should be considered carefully. Both agreements require detailed analysis. Although officially each of them has different aims, they are based on the assumption that free trade and investment within the area will guarantee sustainable development for the participating countries.

[32] Carlos Salinas, who was Mexico's President during the period 1988-1994, and Jaime Serra, who was the Minister of Trade and Industrial Development of Mexico during Salinas' administration, constantly made such strong declarations: "…this is the way (trade liberalisation) that will achieve the sustainable recovery of Mexico's economic growth" and "..this change in the world (trade liberalisation) is the unique way to recover economic growth, create jobs and satisfy the necessities of new generations of Mexicans" —statements translated from the official announcement of trilateral negotiations towards NAFTA made by Salinas the 5th February 1991— (Martinez, 1991).

Reasonable economists would agree that free trade is neither sufficient to increase exports with backward-forward linkages to the domestic economy nor guarantees an improved balance of payments of any country. Trade liberalisation must be coupled with governmental policies that co-ordinate the industrial and trade policy for simultaneous internal and external equilibrium. In practice, economic policy-making has been contradictory, and now NAFTA precludes the policies that might be desirable (Blecker, 1996).

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