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Abstract: *The aim of this paper is to disentangle the effects of trade liberalization during the mid-1980s from the liberalization involved in the North American Free Trade Agreement (NAFTA) on exports, imports, and the balance of trade in Mexico. The main empirical results suggest that the trade reforms during the mid-1980s had a significant effect on trade, exports, and imports; however, the effects of NAFTA, at least on exports, 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, which 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.*

Key words: *balance of payments, exports, imports, Mexico, NAFTA, trade liberalization.*

In the mid-1980s, after more than three decades of pursuing import-substitution policies, Mexico embarked on a serious program of trade liberalization, 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 Tariffs were reduced substantially, import licenses were gradually rescinded, and export promotion policies were pursued, particularly through the *maquiladoras* sector.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 General Agreement on Tariffs and Trade (GATT) in 1986, and the North American Free Trade Agreement (NAFTA) came into effect on January 1, 1994. The process of trade liberalization continues, and Mexico is an active participant in

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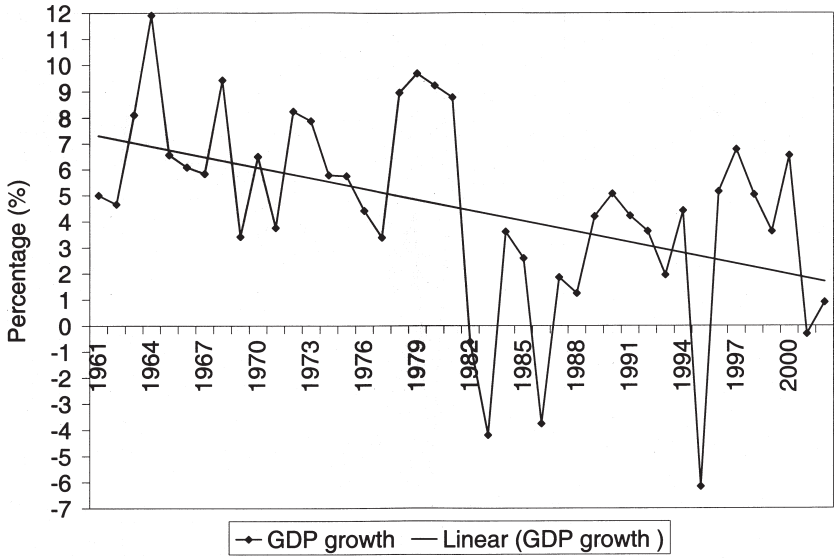
Figure 1 Mexico's GDP growth, 1961–2002



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 liberalization programs. Great expectations were raised with the signing of NAFTA that somehow Mexico would embark on a "new golden age" of economic growth and prosperity (Lustig, 1994; Serra, 1991), but the reality has not matched the rhetoric. Figure 1 shows the Mexican growth experience for the years 1961 to 2002. Growth has fluctuated from period to period as the country has lurched from one crisis to another, but on average, it can be seen that the growth of growth domestic product (GDP) has been lower post-1985 (when liberalization took place in a significant way) than pre-1985. Average growth from 1961 to 1985 was 5.8 percent per annum, and from 1985 to 2002, it was 2.6 percent per annum. Although 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 is argued 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. As one of the effects of trade liberalization, Mexico has increased its dependence

on imported inputs, especially of raw materials and parts for assembly. Moreover, trade liberalization 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.

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 a lack of foreign exchange, was to reintroduce import controls rather than reduce 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 liberalization of trade. Internally, the official arguments for liberalization were that Mexico's productive structures were inefficient (resulting from protectionist policies) and that the economy needed to open itself to more foreign investment. There was also a desperate need to increase foreign exchange earnings after the 1982 debt crisis. Externally, trade liberalization was part of the structural adjustment programs imposed by the World Bank and the International Monetary Fund (IMF) in the early 1980s. Trade liberalization was supposed to become the engine of growth.

The program of trade reforms introduced in Mexico during the 1985–87 period 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 nontariff controls were drastically decreased or eliminated. The first stage of the import liberalization program 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 from over 90 percent in June 1985 to less than 20 percent in 1989.

Table 1
Quantitative indicators of the Mexican import regime during the 1980s (in percent)

	June 1985	December 1985	December 1986	December 1987	December 1988	December 1989
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 1989, the production-weighted average tariff had fallen to 12.5 percent compared with 23.5 percent in June 1985. At the same time, the value of domestic production value covered by official import prices was virtually reduced to zero by December 1987 to comply with Mexico's membership in GATT in July 1986. Mexico's accession of GATT did not imply an intensification of the liberalization process; rather, it was considered as a signal by policy-makers of their intention to carry on the liberalization process. The government focused on fine-tuning the liberalization process. The emphasis was on reducing the dispersion in tariff rates with the objective of producing a broadly uniform system of effective protection.

In 1991, official negotiations started on what was to become NAFTA. In 1985, Mexico and the United States 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 January 1, 1994. It was designed to remove most of Mexico's remaining barriers to trade and investment with Canada and the United States, either immediately or gradually over a 15-year period to 2008.[1] The main function of NAFTA was to embody the newly liberalized regime in a comprehensive international agreement in order to lock-in free market policies against a future change of government in Mexico (FitzGerald, 1999; Skott and Larudee, 1998). 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 effect on imports and the balance of payments of Mexico from the general process of liberalization.[2]

[1] However, NAFTA did not include the abolition of administered protection, such as antidumping measures, countervailing measures, and safeguard duties.

[2] It is worth mentioning that apart from NAFTA, Mexico has signed several other free trade agreements (FTAs) with Colombia and Venezuela (1995); Costa Rica (1995); Bolivia (1995); Nicaragua (1998); Chile (1999); the European Union (2000); Israel (2000); El Salvador, Guatemala, and Honduras (2001); Iceland, Norway, Liechtenstein, and Switzerland (2001); and Uruguay (2004). In spite of this, Mexico's biggest trade partner remains the United States.

Theoretical models

In this section, we focus on the effect of trade liberalization in the mid-1980s, and of NAFTA, on nonoil export growth,[3] import growth, and the balance of trade. To do this, we first specify a standard export demand function, in which exports are considered to be a function of the real exchange rate and world income. Assuming constant price and income elasticities, the export demand function can be expressed as

$$X = A_0 e^{\alpha t} \left(\frac{P_f ER}{P_d} \right)^{\beta_1} Z^{\beta_2}, \tag{1}$$

where X is the volume of exports; $A_0 e^{\alpha t}$ represents a time trend; P_f is U.S. price;[4] ER is the nominal exchange rate measured as the domestic price of foreign currency; P_d is domestic price; Z is U.S. income; and β_1 and β_2 denote price and income elasticities, respectively. Taking logs of the variables, and differentiating with respect to time, the rate of growth of exports is expressed as

$$x = \alpha + \beta_1 \left(p_f + er - p_d \right) + \beta_2 z, \tag{2}$$

where lowercase letters represent instantaneous growth rates of the variables. Both elasticities, β_1 and β_2, are expected to be positive. To test for the effect of trade liberalization in the mid-1980s, and of NAFTA, two shift dummies are used. Each dummy variable takes the value of zero prior to liberalization and the value of one afterward.[5] Tests were done for the years that showed the most significant effect. For the first period,

[3] Oil exports are excluded because they are a large component of visible exports and are subject to many other influences (some noneconomic). By doing this, we isolate the evolution of exports from the fluctuations in the oil market.

[4] Mexico's main trade partner is the United States. For instance, the share of Mexico's exports going to the United States increased from 64 percent in 1980 to 89 percent in 2000; during the same period, the share of Mexican imports coming from the United States increased from 61 percent to 73 percent (IMF, *Direction of Trade Statistics,* various issues). Therefore, we considered the prices of the United States as foreign prices to estimate the real exchange rate and U.S. income to measure "world" income. The definition of the real exchange rate is given in the Appendix.

[5] The argument for using a "continuous" dummy variable is that although serious trade liberalization started in the selected year, more reforms continued over the following years, so when we use the dummies *lib85* or *lib86* and *lib94* in regressions estimated in growth rate form, they represent changes in the time trend.

1985, 1986, and 1987 were tested, and 1986 proved to be the most significant. For the second period, we tested for 1994, 1995, and 1996, but none of them were significant. For the purposes of presenting the results of the model, however, we include 1994, the starting date of NAFTA.[6] Thus, the extended export demand function to be estimated is:

$$x_t = \alpha + \beta_1 rer_t + \beta_2 z_t + \beta_3 lib86_t + \beta_4 lib94_t + \mu_t, \tag{3}$$

where $rer = (p_f + er - p_d)$ is the rate of change of the real exchange rate, and *lib86* and *lib94* are the shift dummy variables. The rest of the variables are as previously defined.

We turn now to imports. One of the most common effects of trade liberalization, 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 demand 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

$$M = \Lambda_0 e^{\lambda t} \left(\frac{P_f ER}{P_d} \right)^{\delta_1} YM^{\delta_2}, \tag{4}$$

where M is the volume of imports, $\Lambda_0 e^{\lambda t}$ represents a time trend, YM is Mexico's income, and the rest of the variables are as previously described. δ_1 and δ_2 denote the price and income elasticities, respectively. Taking logs of the variables in Equation (4) and differentiating with respect to time, the rate of growth of imports is

$$m = \lambda + \delta_1 \left(p_f + er - p_d \right) + \delta_2 ym. \tag{5}$$

It is expected that the price elasticity (δ_1) is negative and the income elasticity (δ_2) is positive. To test for the effect of trade liberalization on import growth, Equation (5) is extended to include the ratio of import duties to total imports, to capture trade distortions, and to include two

[6] Ideally, the model could be extended to include the export duty ratio as a measure of trade distortion, but the export duty ratio variable available does not distinguish between oil and nonoil exports.

shift dummy variables, one for each period of trade liberalization. Tests showed that the most significant breaks occurred in 1985 and 1994. The extended import growth function is expressed as

$$m_t = \lambda + \delta_1 rer_t + \delta_2 ym_t + \delta_3 md_t + \delta_4 lib85_t + \delta_5 lib94_t + \varepsilon_t, \quad (6)$$

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

Finally, we turn to the trade balance. We first define a standard trade balance model, which is then extended by adding trade liberalization indicators. Usually, attention is paid to the effects of trade liberalization on exports, but hardly any is paid to the overall effect on the trade balance.[7] We specify the trade balance in two ways. First, we define the trade balance as the ratio of the value of exports to imports. Thus,

$$TB = \frac{P_X X}{P_M M}, \quad (7)$$

where $P_X X$ and $P_M M$ are the values of nonoil exports and imports, respectively, and P_X and P_M are measured in U.S. dollars. Taking logs of the variables and differentiating with respect to time, the rate of growth of the trade balance is defined as

$$tb = \left(p_x + x\right) - \left(p_m + m\right), \quad (8)$$

where x and m are the rates of change of the volumes of exports and imports, respectively. The difference between the rates of change of export and import prices $(p_x - p_m)$ measures the rate of change in the terms of trade, *tot*. Based on Equations (2) and (5), which define the rate of growth of exports and imports, respectively, we substitute and rearrange terms to obtain the following equation:[8]

$$tb = \psi + \theta_1 z_t + \theta_2 ym_t + \theta_3 rer_t + \theta_4 tot_t + \tau_t, \quad (9)$$

where ψ is a constant representing a time trend, and τ_t is the error term. θ_1 is expected to be positive, θ_2 is expected to be negative, the sign of θ_3

[7] Galindo and Guerrero (1997) evaluate the factors that determine the trade balance of Mexico but are not concerned with the effects of trade liberalization.

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

depends on the sum of the price elasticities of demand for exports and imports, and θ_4 should be unity. Equation (9) is then extended with the inclusion of import duties and two shift dummy variables to estimate the effects of trade liberalization. Tests showed the most significant structural breaks to be in 1985 and 1994. The estimated trade balance model becomes

$$tb_t = \psi + \theta_1 z_t + \theta_2 ym_t + \theta_3 rer_t + \theta_4 tot_t + \theta_5 md_t + \theta_6 lib85_t + \theta_7 lib94_t + \tau_t. \tag{10}$$

The sign of θ_5 is expected to be positive; θ_6 and θ_7 are ambiguous.

Second, we measure the trade balance as a ratio of GDP [$(P_X X - P_M M)/YM$]. This is one of the ratios that international financial organizations consider when deciding on the creditworthiness of countries.[9] The function has the same explanatory variables as in Equation (10) and can be written as

$$\left(P_X X - P_M M\right)/YM = \chi + \gamma_1 z_t + \gamma_2 ym_t + \gamma_3 rer_t + \gamma_4 tot_t + \gamma_5 md_t + \gamma_6 lib85_t + \gamma_7 lib94_t + \nu_t, \tag{11}$$

where χ is the constant and ν the error term. The expected signs of the γs are the same as the coefficients of Equation (10).

To date, previous studies of Mexico's trade performance have focused on exports, but even these do not disentangle properly the effect of the mid-1980s trade reforms from NAFTA (Graf, 1996; Katz, 1996; Sotomayor, 1997). Work on imports has mainly focused on the price and income elasticities, and not on the effect of trade liberalization (e.g., Alfaro and Salas, 1992; Clavijo and Faini, 1990; Dornbusch and Werner, 1994; Galindo and Cardero, 1999; López and Guerrero, 1998; Salas 1988; Sotomayor, 1997), with the exception of Moreno-Brid (2002). As far as the balance-of-payments effects of trade liberalization are concerned, there have been recent panel data studies (Parikh, 2002; Santos-Paulino and Thirlwall, 2004; UNCTAD, 1999), but no study for Mexico. We now attempt to make our own estimates of the effect of trade liberalization on exports, imports, and the balance of trade.

[9] Notice that the trade balance is now redefined as the net difference between the value of exports and imports.

Econometric modeling

Equations (3), (6), (10), and (11) are estimated using an autoregressive distributed lag (ARDL) procedure to provide long-run estimates of the relationship between the independent and dependent variables.[10] The ARDL estimation involves two steps. In the first step, the existence of a long-run relationship between the variables under investigation is examined. The *F*-statistic is used to test the significance of the lagged levels of the variables in the error correction form of the underlying ARDL model.[11] 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 step, the long- and short-run parameters are estimated using the ARDL method. The estimation of those parameters starts by considering one lag length, and then the order of the ARDL model is determined by using the Schwarz–Bayesian criterion (SBC). The same methodology is applied for exports, imports, and the trade balance.[12]

Export function (equation (3))

The *F*-statistic calculated has a value of 6.59 (Equation (3)), which is above the interval of critical values (from 3.79 to 4.85), under the assumption of an intercept and no trend; therefore, we reject the null hypothesis of no long-run relationship between the variables at the 95 percent significance level. The error correction model (ECM) and the long-run coefficients derived from the ARDL (1, 1, 0) approach are presented in Equations (12) and (13), respectively, in Table 2.

The ECM in Equation (12) shows the short-run coefficients of the variables (all of them are significant, except *lib94*), plus the error correction term. Export growth responds substantially to the growth of the U.S. 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), who found

[10] According to Pesaran and Pesaran (1997), the main advantage of this testing and estimation approach lies in the fact that it can be applied irrespective of whether the regressors are *I*(0) or *I*(1), and this avoids the pretesting issues associated with standard cointegration analysis. However, stationarity tests were performed, and all the series are trend stationary in growth rates (the results are available on request). Descriptive statistics of the variables used are given in the Appendix.

[11] Pesaran and Pesaran (1997) and Pesaran et al. (2001) provide the asymptotic critical value bounds for the *F*-statistic.

[12] See the Appendix for definitions of the variables used, their descriptive statistics, and sources.

Table 2
Equations of the growth of exports, imports, and the balance of trade: 1970–2000

Exports[1]			Imports[1]			Rate of change of the trade balance[1]			$(P_X X - P_M M)/GDP$[1]		
Regressor	Equation (12)[2]	Equation (13)[3]	Regressor	Equation (14)[2]	Equation (15)[3]	Regressor	Equation (16)[2]	Equation (17)[3]	Regressor	Equation (18)[4]	Equation (19)[5]
Constant	–2.13	–4.38	*Constant*	–0.49	–1.60	*Constant*	–30.07	–51.08	*Constant*	–1.36	–7.78
	(–0.26)	(–0.26)		(–0.22)	(–0.22)		(–2.11)*	(–2.50)*		(–1.28)	(–0.83)
z	4.39	0.88	*ym*	2.60	1.04	*ym*	–6.74	–2.80	*ym*	–0.72	–0.46
	(3.54)*	(1.54)		(3.89)*	(3.80)*		(–6.15)*	(–3.88)*		(–6.32)*	(–1.10)
rer	0.41	0.85	*rer*	–0.70	–1.06	*z*	6.47	4.19	*z*	0.11	0.67
	(2.41)*	(1.77)		(–3.71)*	(–2.72)*		(4.17)*	(3.28)*		(1.73)	(0.98)
lib86	0.34	0.69	*lib85*	0.20	0.65	*rer*	0.30	0.52	*rer*	0.10	0.06
	(2.82)*	(3.71)*		(3.94)*	(2.83)*		(1.33)	(1.48)		(3.57)*	(0.06)
lib94	0.13	0.28	*lib94*	0.19	0.61	*lib85*	–0.08	–0.13	*lib85*	–0.03	–0.17
	(1.23)	(1.42)		(2.73)*	(4.14)*		(–0.53)	(–0.51)		(–2.44)*	(–0.80)
D91	0.37	0.77	*D91*	–0.01	–0.04	*lib94*	–0.00	–0.00	*lib94*	–0.00	–0.00
	(3.76)*	(3.00)*		(–0.15)	(–0.15)		(–0.00)	(–0.00)		(–0.05)	(–0.05)
ecm_{-1}	–0.48		ecm_{-1}	–0.31		*D91*	0.22	0.37	*D91*	0.01	0.07
	(–3.96)*			(–3.28)*			(1.55)	(1.40)		(1.06)	(0.60)
						ecm_{-1}	–0.58	(–3.85)*	ecm_{-1}	–0.17	(–0.92)*
R^2	0.55	0.98	R^2	0.88	0.99	R^2	0.88	0.95	R^2	0.94	0.95
Adjusted R^2	0.41	0.98	Adjusted R^2	0.84	0.98	Adjusted R^2	0.82	0.94	Adjusted R^2	0.91	0.93

(continues)

Table 2
(Continued)

Exports[1]		Imports[1]		Rate of change of the trade balance[1]		$(P_X X - P_M M)/GDP$[1]	
Diagnostic tests[6]							
Serial correlation	0.836	Serial correlation	0.317	Serial correlation	0.990	Serial correlation	0.625
Functional form	0.199	Functional form	0.292	Functional form	0.000	Functional form	0.989
Normality	0.564	Normality	0.888	Normality	0.550	Normality	0.891
Heteroscedasticity	0.396	Heteroscedasticity	0.435	Heteroscedasticity	0.217	Heteroscedasticity	0.052

Notes: *t*-statistics are shown in parentheses. * denotes significance of the coefficient at the 95 percent level. [1] A shift dummy variable for 1991 (*D91*) was also included in order to capture a change in the way export and import data were compiled after this year. There was not a distinction between *maquiladora* (in-bond production) and non-*maquiladora* exports and imports. The dummy takes the value of one in 1991 and zero otherwise. [2] The variables represent growth rates. [3] The variables are measured in log levels. [4] The independent variables are measured in growth rates. [5] The variables are measured in log levels. [6] The diagnostic tests show probabilities and they correspond to the ARDL models from which the ECM models and the long-run coefficients are derived.

that NAFTA has had no significant effect 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 Ibarra, 1999; Skott and Larudee, 1998). The coefficient on the error correction term tells us that about 48 percent of the discrepancy between the actual and the equilibrium value of the rate of growth of exports is corrected within a year. In Equation (13), of all the long-run coefficients, only the first trade liberalization coefficient, *lib86,* is significant at the 95 percent level (apart from *D91*). The value of the coefficient suggests that given changes in U.S. income and the real exchange rate, nonoil exports approximately doubled.[13] Although exports seem to have benefited from the liberalization process, it is interesting to note that *actual* export growth post-1986 hardly differs from pre-1986 export growth (see later). The benefits of liberalization seem to have been negated by other factors.

Import function (equation (6))

Following the ARDL procedure, we found that the calculated *F*-statistic is 4.57 (Equation (6)); comparing it 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 95 percent significance level. We then estimated the ECM and the long-run coefficients.[14] The ECM and the long-run coefficients derived from the ARDL (1, 1, 1) model are presented in Equations (14) and (15), respectively, in Table 2.

The ECM in Equation (14) shows the short-run coefficients of the variables and the error correction term. Both the price and income elasticities of demand for imports are significant. The error correction coefficient is also statistically significant, has the correct sign, and suggests a moderate speed of convergence (31 percent) to equilibrium. The two long-run trade liberalization coefficients, *lib85* and *lib94,* in Equation (15), are significant at the 95 percent level, suggesting that, given changes in domestic income and the real exchange rate, the rate of growth of imports was 92 percent higher after 1985 and 84 percent higher after 1994.[15]

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

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

Comparing the results from estimating the export and import demand functions and the effect of liberalization, it appears that import growth responded before export growth in the mid-1980s, and NAFTA has increased import growth but not export growth. These results support our argument that one of the effects of trade liberalization in Mexico has been the increasing dependence on imported inputs.

Balance of trade functions (equations (10) and (11))

We first test for the existence of a long-run relationship between the variables in the trade balance model (Equation (10)) using the *F*-test. 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-run relationship. The ECM and the long-run coefficients derived from the ARDL (1, 0, 0, 0) model are given in Equations (16) and (17), respectively, in Table 2.[16] The signs on the trade liberalization indicators, *lib85* and *lib94*, are negative, but are not statistically significant. The income elasticities show the expected signs and are statistically significant, but the price elasticity is insignificant, suggesting that the trade balance is unaffected by the real exchange rate. This will be the case if the sum of price elasticities of demand for exports and imports is not significantly different from unity. The error correction term tells us that about 58 percent of the discrepancy between the actual and the equilibrium value of the rate of change of the trade balance is corrected within a year.

When we measure the trade balance as a proportion of GDP, $(P_X X - P_M M)/YM$, the *F*-statistic is 33.27, which is higher than the interval of the critical values of the *F*-test (3.21 to 4.37). The order of the ARDL model is (1, 0, 1, 1). The ECM model and the long-run coefficients are given in Equations (18) and (19), respectively, in Table 2. In the ECM model, *lib85* has a significant negative effect on the trade balance ratio equal to 0.03 percent of GDP, but NAFTA has no effect. In the long-run model, all coefficients are insignificant.

[16] The terms of trade variable (*tot*) is omitted from the estimation of the equation, because it contains the price of oil exports and we are interested in the nonoil trade balance. The Bank of Mexico constructs a nonoil price export index, but it only starts in 1995. The effect of movements in the nonoil terms of trade will be picked up by the constant term. The estimated constant is very high because of large short-term fluctuations in the terms of trade. The import duty ratio is omitted because the coefficient is statistically insignificant and the rest of the variables perform better without it.

Trade liberalization and economic 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 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 (2) and (5). By assuming long-run equilibrium on the current account and that the sum of the price elasticities of demand for exports and imports is equal to unity, then the rate of growth of domestic income consistent with the balance-of-payments equilibrium on current account can be written as

$$y_b^1 = \left(\beta_2 / \delta_2\right) z, \tag{20}$$

where β_2 is the income elasticity of demand for exports, δ_2 is the income elasticity of demand for imports, and z is the growth rate of world income. Alternatively, suppose that the real exchange rate is constant over time, $p_f + er - p_d = 0$;[17] we then have $\beta_2 z = x$, which gives the following equation:

$$y_b^2 = x / \delta_2. \tag{21}$$

Equation (21) is the balance-of-payments equilibrium growth rate, or the 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 that cannot be exceeded in the long run without ever-increasing capital inflows.[18]

[17] McCombie and Thirlwall (1994) argue that in the long term, relative price fluctuations measured in a common currency are minimal. However, McCombie emphasizes 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" (1997, p. 346).

[18] For further extensions of Thirlwall's "law," see McCombie and Thirlwall (1999), Moreno-Brid (2001), and Thirlwall and Hussain (1982).

There has been a lot of interest in recent years in the relationship between Mexico's GDP growth and the performance of its trade sector. In particular, several studies have focused on the analysis of the balance-of-payments constraint on Mexico's long-run economic growth, mostly using Thirlwall's model. López and Cruz (2000), Moreno-Brid (1998; 1999; 2001), Ocegueda (2000), and Warman (1993) all confirm Thirlwall's "law" for the Mexican economy using different econometric techniques. Loría and Fuji (1997) arrive at a similar 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 effect of trade liberalization on Mexico's economic growth by analyzing 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 liberalization on economic growth, unless it is 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 14 subperiods. We find that the long-run income elasticity of demand for imports has increased (see Table 3).[19]

To estimate the balance-of-payments–constrained growth model (Equation (21)), we consider the whole time period and two different subperiods, taking the mid-1980s trade reforms as a break point (1985 and 1986) and using different income elasticities of import demand. Table 4 shows the results. In each period, the estimated balance-of-payments equilibrium growth rate is somewhat higher than the actual growth

[19] Despite considering different subperiods, our results are consistent with the elasticities that Moreno-Brid (2001) estimated:

Income Elasticities of Demand for Imports

Period	δ_2	Period	δ_2	Period	δ_2
1968–83	1.39	1974–89	1.46	1980–95	1.55
1969–84	1.48	1975–90	1.50	1981–96	2.66
1970–85	1.46	1976–91	1.60	1982–97	3.53
1971–86	1.56	1977–92	1.46	1983–98	3.10
1972–87	1.62	1978–93	1.60	1984–99	3.14
1973–88	1.55	1979–94	1.65		

Source: Moreno-Brid (2001, table 3.4).

Table 3
Long-run income elasticities of demand for imports (selected subperiods, 1973–1999)

Period	δ_2	Period	δ_2
1973–87	1.21	1980–94	2.47
1974–88	1.50	1981–95	3.34
1975–89	1.85	1982–96	4.56
1976–90	2.09	1983–97	4.43
1977–91	2.31	1984–98	3.12
1978–92	2.20	1985–99	3.15
1979–93	2.04		

Source: Author's results obtained by estimating an import demand function similar to Equation (5), which was extended by including import duties as a trade liberalization indicator. Data are from *World Development Indicators 2002* (World Bank, 2001).

Table 4
Effect of trade reforms on Mexico's GDP growth (selected subperiods)

Period	Balance-of-payments equilibrium growth rate $y_b^2 = x/\delta_2$	Actual growth rate[1]	Total export growth rate[1]	δ_2	Terms of trade[2] (1995 = 100)
1973–99	4.4	3.6	9.8	2.2	–1.40
1973–85	6.9	5.0	9.0	1.3	–0.55
1973–86	5.8	4.3	8.7	1.5	–2.62
1986–99	2.9	2.8	9.2	3.1	–2.19
1987–99	3.2	2.8	10.5	3.2	–0.10

Source: Author's calculations based on data from *World Development Indicators 2002* (World Bank, 2001) and Bank of Mexico Web page (www.banxico.org.mx/sie/cuadros/CP152.asp).

[1] Figures are in real terms at 1995 U.S. dollars. [2] 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 U.S. dollars.

rate of GDP;[20] but the important point to note is the reduction in the balance-of-payments equilibrium growth rate post-1985–86. It falls by a half, from approximately 6 percent to 3 percent, and this is mirrored

[20] The adverse effect of relative price movements may be one explanation of the shortfall of the actual rate of growth below the dynamic Harrod trade multiplier result. For instance, the subperiods that include 1986 (1973–86 or 1986–99) have, on average, a faster deterioration in the real terms of trade than the other two subperiods (1973–85 or 1987–99) (see last column in Table 4). In 1986, the negative change in the terms of trade was approximately 29.4 percent.

by a fall in the actual average growth rate to 2.8 percent post-1986.[21] This increase in the income elasticity of demand for imports has not been matched by any significant increase in the growth rate of exports, which was approximately 9 percent per annum pre-1985–86, and just over 9 percent afterward.

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., $\delta_2^* \equiv x/y$), and to compare δ_2^* with the estimated δ_2. If δ_2^* does not differ significantly from δ_2, then actual GDP growth will not differ significantly from y_b^2. Thus, the hypothesis to be tested is whether or not $\delta_2 = \delta_2^*$. This was undertaken by estimating the *t*-statistic from the standard error of δ_2 for the null hypothesis that $\delta_2 = \delta_2^*$, and evaluating whether or not the null hypothesis is rejected at the 95 percent confidence level. The results are reported in Table 5. The balance-of-payments equilibrium growth rate is not refuted for the full sample, nor for the two post-mid-1980s trade reform subperiods. For the other two subperiods, 1973–85 and 1973–86, there is a statistically significant difference between δ_2 and δ_2^*, although the discrepancies are not very large. These subperiods correspond to the years of major international borrowing, which would explain the discrepancies between δ_2 and δ_2^*.

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 liberalization, which has not been compensated for 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 underdeveloped industrial sector on foreign inputs. Trade liberalization has exacerbated and reinforced this dependence, promoting and facilitating access to a wide variety of imported goods.

Conclusions

This study has provided an analysis of the effects of trade liberalization on Mexico's exports, imports, the trade balance, and economic growth

[21] The estimations of the balance-of-payments equilibrium growth rates differ slightly from those reported by Moreno-Brid (2001) because the rates of growth of exports used here are higher than the ones he presents. The explanation for this may be that the figures Moreno-Brid shows are in real (1980) Mexican pesos, whereas ours are in real (1995) U.S. dollars (the terms of trade varied during the 1980s).

Table 5
Testing whether δ_2 and δ_2^* are significantly different (selected subperiods)

Period	δ_2	δ_2^*	Absolute value of the *t*-statistic[1]
1973–99	2.2	2.7	1.51
1973–85	1.3	1.8	2.93[2]
1973–86	1.5	2.0	2.57[2]
1986–99	3.1	3.2	0.17
1987–99	3.2	3.7	0.94

Source: Author's calculations based on data from *World Development Indicators 2002* (World Bank, 2001) and *Indicadores Económicos* (Bank of Mexico, various issues).
[1] The *t*-statistic is based on the null hypothesis that $\delta_2 = \delta_2^*$. [2] δ_2 differs significantly from δ_2^* at the 95 percent confidence level.

since the mid-1980s. The analysis presented is of particular relevance for policy purposes given the accelerated process of trade integration between Mexico and the United States, and also because of the country's position in Latin America.

First, with regard to export and import performance, we find that trade liberalization 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 effect on exports, which is, perhaps, not surprising, given the extent of trade liberalization that had already taken place. There was, however, a significant effect on import growth.

Second, with regard to the trade balance, our results show that the mid-1980s trade reforms worsened the trade balance ratio. Because a deterioration of the trade balance limits foreign exchange availability and the sustainability of economic growth, we evaluated how trade liberalization has interacted with the performance of Mexico's GDP growth through Thirlwall's balance-of-payments–constrained growth model. The results of the model are consistent with 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 liberalization 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 (1998; 1999; 2001).

Third, our analysis of the effects of trade liberalization in Mexico has several policy implications. Notwithstanding Mexico's export performance, and its position in the list of leading exporters, what really matters

is the *balance* between exports and imports and the position of the current account of the balance of payments, because this is what affects the creditworthiness of a country, its ability to borrow, and the sustainability of growth. In other words, the constraint on Mexico's 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 that 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 liberalization, to "catch up" with its trading partners.[22] *A posteriori,* we confirm Rodrik's warning that "claims on behalf of liberalization should be modest lest policy-makers become disillusioned once again" (1992, p. 103). Rodrik cautioned about the danger of overselling trade liberalization as a panacea for economic development, which, at the time, was considered to be 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 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 agreement has different aims, they are based on the assumption that free trade and investment within the area will guarantee sustainable development for all the participating countries.

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 liberalization must be coupled with governmental policies that coordinate the industrial and trade policy to achieve simultaneous internal and external equilibrium.

[22] Carlos Salinas de Gortari, who was Mexico's between 1988 and 1994, and Jaime Serra, who was the minister of trade and industrial development of Mexico during Salinas's administration, constantly made such strong declarations: "this is the way [i.e., trade liberalization] that will achieve the sustainable recovery of Mexico's economic growth" and "this change in the world [trade liberalization] 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 toward NAFTA made by Salinas on February 5, 1991; Martínez, 1991, p. 4A).

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Appendix

Data definitions, sources, and descriptive statistics

The source of the nominal exchange rate is from the Bank of Mexico (www.banxico.org.mx/eInfoFinanciera/FSinfoFinanciera.html), and the source for import duties is the IMF's *Government Finance Statistics Yearbook* (various issues). The source for the rest of the variables is the World Bank's *World Development Indicators 2002* (World Bank, 2001). The definitions are as follows:

Exports (X): Exports of goods and services without oil exports (constant 1995 US$).

Imports (M): Imports of goods and services (constant 1995 US$).

Total exports (TX): Total exports (constant 1995 US$).

Domestic income growth (YM): Mexico's GDP (constant 1995 US$).

World income growth (Z): GDP of the United States (constant 1995 US$).

Real exchange rate (RER): Defined as $ER * P_f/P_d$, where ER is the nominal exchange rate (quantity of pesos per $1), P_f represents the price index of the United States, and P_d is price index of Mexico. An increase in the RER represents a depreciation.

Import duties ratio (Md) (percent of imports): Import duties comprising all levies collected on goods at the point of entry into the country divided by the value of imports.

Nonoil trade balance (TB): the difference between the value of nonoil exports and the value of imports.

Ratio of the trade balance to domestic income $(P_X X - P_M M)/YM$.

Descriptive statistics

	x	*m*	*y*	*z*	*rer*	*tb*	$TB = \frac{P_X X - P_M M}{YM}$
Mean	0.100978	0.078345	0.038997	0.031677	–0.003721	0.022633	–0.084310
Median	0.112981	0.158183	0.042281	0.034926	–0.055207	–0.046581	–0.086403
Maximum	0.580771	0.316156	0.092562	0.070260	0.429669	0.993184	–0.005575
Minimum	–0.326998	–0.475660	–0.063653	–0.020875	–0.221947	–0.643154	–0.196683
Standard deviation	0.175751	0.191055	0.038017	0.021093	0.146447	0.302636	0.044582
Observations	30	30	30	30	30	30	30