Trade Liberalisation in Mexico and its Impact on Exports, Imports and the Balance of Payments

by

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Abstract

The aim of this thesis is to disentangle the effects of trade liberalisation during the mid-1980s from the trade liberalisation involved in the North American Free Trade Agreement (NAFTA) on exports, imports and the balance of payments in Mexico, at the aggregate and disaggregated level. 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. In spite of the fast rate of manufacturing exports, the most dynamic sector, imports have increased even faster. Therefore, trade liberalisation has worsened the trade balance. In addition to this, the evidence presented in this thesis shows that more liberalised trade has not contributed to an improved economic performance in Mexico, as promised a decade ago, before NAFTA came into effect, by the leaders of Canada, Mexico and the US. However, NAFTA has locked-in Mexico's trade and foreign investment policy, easing the access of multinational firms to the country but with minimum forward and backward linkages to the domestic economy.

It is corroborated that Mexico's economic performance is constrained by the external sector and trade liberalisation has contributed to reinforcing the dependence of domestic industry on imports.

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Chapter 1

Introduction

1.1 Motivation of the Study

The liberalisation of trade is strongly advocated as the means through which economies can accelerate their economic development. As the World Bank wrote in its latest *Global Economic Prospects* "A reduction in world barriers to trade could accelerate growth, provide stimulus to new forms of productivity-enhancing specialization, and lead to a more rapid pace of job creation and poverty reduction around the world" (World Bank, 2002, p. xi). The prevailing opinion in trade-policy spheres is that expanded trade leads to prosperity. Thus, the impact of trade liberalisation on economic performance has been one of the topical issues of trade and development economics.

In fact, trade liberalisation —meaning any measure taken to reduce export restrictions and import controls, considering non-tariff barriers (e.g. quantitative restrictions, quotas, subsidies, local content requirements, etc.) and exchange rate distortions— in Mexico, as for many other developing economies, has been one of the cornerstones of economic policy over the last two decades. This period has seen a radical trade policy re-orientation for the country, from a highly protectionist trade policy, focused on its domestic market, to an intense deregulation of trade policy. The argument was that trade liberalised economies appear to fare better than non-trade liberalised countries.[1]

[1] Edwards (1997) explicitly declares that several research studies were carried out by the Wold Bank with a common message: "protectionism distorts relative prices, encourages corruption and slows growth" (p.44).

Trade liberalisation has represented the opposite development policy to the import substitution industrialisation (ISI) development strategy applied during the 1950s, 1960s and 1970s, which was originally proposed by Prebisch (1950) and Singer (1950). The ISI strategy was based on the idea that domestic investment and technological capabilities can be spurred by providing domestic producers with protection against imports. In fact, ISI policies seem to have stimulated growth by creating protected home markets for domestic entrepreneurs to invest in. But after Mexico experienced the debt crisis in 1982 —a crisis resulting from the combination of adverse domestic factors (e.g. monetary and fiscal policies incompatible with sustainable external balances) and international factors (e.g. high interest rates), the economic policy was re-orientated. The intervention of the government in the economy was significantly reduced; and the free-market model adopted included drastic trade reforms.

Given the emphasis that Mexican trade policy has given to free trade since the mid-1980s, the main motivation of this thesis is to disentangle the effects of trade liberalisation on exports, imports and the balance of payments, between two marked trade reform episodes: 1) the trade reforms launched during the mid-1980s; and, 2) the trade liberalisation that culminated in the North American Free Trade Agreement (NAFTA). We are particularly interested in examining whether NAFTA has had any marked impact on trade performance as the proponents have exhaustively promoted (Lustig, 1994 and 1997; Krueger, 2000; NAFTA 2002; Salinas, 2000;[2] Serra, 1991[3]). To our knowledge, this is the first study to do so in a systematic and rigorous way.

[2] Carlos Salinas was Mexico's President during the period 1988-1994.

[3] Jaime Serra was the Minister of Trade and Industrial Development of Mexico during Salinas' administration. He led NAFTA's negotiations from the Mexican side; and he still strongly promotes it (see Serra *et al.* 2003).

The thesis makes six important contributions, trying to answer the following questions. First, what has been the impact of trade liberalisation on export and import growth at the aggregate and disaggregated level? Second, how have the income and price elasticities of demand for exports and imports responded to trade liberalisation? Third, has Mexico's trade structure changed after trade reforms? Fourth, how has the trade balance and the current account of the balance of payments reacted to trade liberalisation? Have they improved or deteriorated? Fifth, how has trade liberalisation affected economic growth? Finally, what are the causal links between liberalised foreign direct investment inflows, exports and imports? We will try to answer these questions by applying several time series econometric techniques, such as the Ordinary Least Squares (OLS) method, Error Correction Models (ECM), Autoregressive Distributed Lag (ARDL) models, rolling regressions, out-side sample forecasts, the Johansen cointegration method and the Chow structural break point test.

Studies that have investigated the effect of trade liberalisation on Mexican exports and imports have considered 1982 as the break point in trade policy, because that was the date when economic policy was re-orientated, but it was not until mid-1985 that trade barriers were officially modified. In addition to this, most of the empirical studies so far disregard the post-NAFTA period, giving an incomplete picture of the recent trade performance of Mexico. The literature on the early effects of NAFTA on trade is rather scant, but the work done (based on simulations of Computable General Equilibrium models) seems to conclude that NAFTA would have large benefits on Mexico's trade. Also, it is relevant to mention that there are no rigorous studies focusing on the effects of trade liberalisation either on the trade balance or on the current account of the balance of payments.

1.2 Trade Liberalisation Theory

The foundations of modern trade theory are at least two centuries old. The benefits of trade were one of the major preoccupations of all the great classical economists. Adam Smith, in his major work *An Inquiry into the Nature and Causes of the Wealth of Nations* [1776 (1895)], claimed that the gains from trade could be obtained from specialisation by means of division of labour (i.e. one should never attempt to make at home anything that it will cost more to make than to buy from abroad). Smith stressed the importance of trade as a means of widening the market, and as an outlet for surplus commodities, which brings otherwise unemployed resources into employment. Implicitly, Smith also applied the doctrine of *laissez-faire* to international trade, when he claimed that all nations would benefit from free trade, by allowing individual countries to specialise in the goods they are best suited to produce because of their natural resources and acquired advantages. Thus, by trading, nations could improve welfare. The next step in the development of trade theory was the publication of *The Principles of Political Economy and Taxation* by David Ricardo [1817 (2002)]. He developed the concept of 'relative comparative advantage',[4] by considering that economies are endowed with different natural resources and man-made production assets. Thus, the opportunity cost of producing goods varies from country to country, and this is measured by the marginal rate of transformation between one commodity and another. He suggested that countries can obtain welfare gains by specialising in the production of those goods with the lowest opportunity cost and trading the surplus of production over domestic demand, provided that the international rate of exchange between goods lies between the two domestic price ratios. After Ricardo's contribution, the theoretical implications were developed by other economists. For instance, Mill [1856 (1986)] acknowledged the importance of the

[4] The concept of 'relative comparative advantage' remains to this day the central feature of orthodox trade theory.

relevance of the dynamic effects of trade. Marshall [1890 (1920)] recognised that the causes of economic growth are related to the study of international trade. During the 20th century, one of the most influential developments came with Ohlin's (1933) publication of *Interregional and International Trade.* Considering the pioneer work of Eli Heckscher, Ohlin further developed the proposition that a country exports those goods that use the country's most abundant factors of production most intensively in their production.

The following are some of the core questions that modern international trade theory has addressed: What determines the pattern of trade? How are the resources distributed among the trading partners? What are the implications of trade for the structure of production for each trading country? Although trade theory demonstrates that trade enables each country to obtain a higher level of production and consumption than can be obtained under autarky, and that free trade tends to result in maximum welfare for a country's population, the assumptions —about the nature of the production functions and consumer tastes, the stocks of capital and labour, forces guiding the maximizing behaviour of producers and consumers, and prices in the rest of the world— may not apply similarly for all countries. If those assumptions are not satisfied, there are circumstances under which free trade will not maximize welfare. Moreover, in practice, the well promoted effects may work in the opposite direction to those expected from the theory. Undoubtedly political, economic and institutional events have influenced international trade, which, at the same time, has often been conditioned by the demands of special interest groups.

In relation to trade policy, after the First World War, and the Great Depression of the 1930s, most nations moved sharply towards protectionism.[5] In most countries, tariffs switched demand from foreign to domestic products in the attempt to increase domestic employment; tariffs also were used to strengthen the country's position in dealing with other nations which practiced protectionism. However, after the Second World War, the claims in favour of free trade were re-invigorated. Following the impulse to promote trade, in 1947 The General Agreement on Tariffs and Trade (GATT) was established. Free trade was institutionalised as the 'new' way to restore economic development. The agreement was designed to provide an international forum that encouraged free trade between members by regulating and reducing tariffs on traded goods and by providing a common mechanism for resolving trade disputes.[6]

Since the war, many distinguished economists (e.g. Balassa, Bhagwati, Corden, Dixit, Edwards, Feenstra, Grossman, Haberler, Helpman, Johnson, Kemp, Krueger, Krugman, Little, Ramaswami, Sachs, Scitovsky, Scott, Srinivasan, Warner, among an extensive list) have entered the free trade versus protectionist debate, mainly on the side of free trade. Specifically, the theoretical literature has been orientated to determine the best methods of intervention and the amount of such intervention that could be applied by trade policies, and to justify the benefits of free trade.

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[5] Hicks (1959) describes how the unemployment of those days undermined the belief in the doctrine of free trade:

> "The main thing which caused so much liberal opinion in England to lose its faith in [f]ree [t]rade was the helplessness of the older liberalism in the face of massive unemployment, and the possibility of using import restriction as an element in an active programme fighting unemployment. One is, of course, obliged to associate this line of thought with the name of Keynes. It was this, almost alone, which led Keynes to abandon his early belief in [f]ree [t]rade" (p.48).

[6] The GATT is now encompassed by the establishment of the World Trade Organisation (WTO), as a result of the 1986-1994 Uruguay Round negotiations, signed at the Marrakesh ministerial meeting in April 1994.

The Gains from Trade in Traditional Trade Theory

The neo-classical theory has a well-established proposition that trade liberalisation leads to improved allocation of resources, and a more efficient allocation of resources will increase the level of output. This approach focuses on the increase in the value of output and real income from domestic resources permitted by trade. Specifically, the traditional trade theory makes a distinction between the static and dynamic gains from trade.

First, there is an initial shock effect of liberalisation on previously protected high cost domestic products. Induced by comparative advantage, the efficiency of the allocation of resources to activities where productivity is higher at world prices will increase. Through specialisation (i.e. division of labour), the maximum to be produced from a given amount of factor resources is reached. The static gain from trade is the increase in welfare as a result of saving the excess cost of import substitution. Graphically, improvements in this type of benefit from trade involve movements along a production possibility frontier with the consumption possibility curve higher than the production possibility curve.

Second, as export markets widen the total market for a country's producers, the dynamic effects of trade are associated with the exploitation of large-scale economies. As first stressed by Adam Smith, market size imposes a constraint on the division of labour, so that 'more open countries' are better able to exploit increasing returns to scale. On the one hand, the extension of the size of the market raises the rewards for successful innovators and foreign investment, and enlarges the scope for knowledge spillovers (Helpman and Krugman, 1985). On the other hand, the larger size of the firms makes them more

efficient (Krueger, 1998).[7] Then, in the long run the acceleration of technical progress and the trend of investment will rise by means of competition. It is argued that the forces of competition help to establish a link between international trade and productivity. Trade liberalisation fosters competition, through the arrival of imports, which may stimulate producers to achieve greater technical efficiency; and, as open trade regimes force greater reliance on the market, the scope for rent-seeking for import licenses and corruption diminish (Krueger, 1998). In other words, this pro-competitive effect of international trade is one reason why trade liberalisation may raise rates of productivity growth and increase incentives to innovate (Aghion and Howit, 1998). Technological progress promotes investment and more competitive exports.[8] Then, aggregate supply expands more rapidly. Graphically, these improvements are illustrated by an outward shift in the production possibility frontier by augmenting the availability of resources for production through increasing the productivity of resources and increasing their quantity.

1.3 Measures of Trade Liberalisation

Overall, countries are considered to be liberalised if their trade policies do not control, by any means, exports, imports or the exchange rate. By definition, a trade system with no government interference would be neutral. Some of the most common measures of trade liberalisation used are: the average import tariff; an average index of non-trade barriers; an index of effective protection; an index of relative price distortions or exchange

[7] Krugman (1987) stresses "[t]he view that free trade is the best of all possible policies is part of the general case for laissez-faire in a market economy, and rests on the position that markets are efficient" (p.134). However, he concludes his defence of free trade as follows: "This is not the old argument that free trade is optimal because markets are efficient. Instead, it is a sadder but wiser argument for free trade as a rule of thumb in a world whose politics are as imperfect as its markets" (p.143).

[8] Trade liberalisation makes exports more competitive mainly by reducing export duties and other trade distortions. The neo-classical supply-side model argues that export growth generates externalities and faster productivity growth, because the export sector is more productive than the non-export sector (see Bernard and Jensen, 1999).

rate misalignment; the share of trade subject to non-tariff barriers, export and import duties, and the average black market exchange rate premium.

Some researchers and organizations have elaborated their own measures of liberalisation with the intention of having a more accurate measure of trade openness and to overcome the drawbacks of preceding measures. We mention below some of the most frequently used trade liberalisation indicators.

The World Bank's 1987 *World Development Report* broadly defined trade policies as outward oriented and inward oriented. The former policy provides neutral incentives between production for the domestic market and the foreign market. Regarding the latter strategy, by contrast, incentives are biased in favour of domestic production and against foreign trade. According to these trade policy definitions, the World Bank classified a group of forty-one developing countries into four categories in the periods 1963-1973 and 1973-1985. The four categories are: 1) *strongly inward oriented countries*, where the incentive structures strongly favour production for the domestic market and discriminate strongly against imports; 2) *moderately inward oriented countries*, where the overall incentive structure favours production for the domestic market; 3) *moderately outward oriented countries*, where the overall incentive structure is biased towards production for domestic rather than foreign markets; and, 4) *strongly outward oriented countries*, where there are few trade or foreign exchange controls, there is little or no use of direct controls and the exchange rate is maintained so that the effective exchange rates for imports and exports are similar. The main conclusion of the World Bank study was that "the evidence suggests that economic performance of the outward-oriented economies has been broadly superior to that of inward-oriented economies in all aspects" (p.85).

Leamer's (1988) departing point to determine the degree of trade openness is the trade intensity ratio (exports plus imports over GNP). He constructs two sets of trade policy indicators. First, he uses two openness measures, which account for the effects of trade restrictions: 1) the ratio of actual to predicted trade, and 2) an adjusted trade intensity ratio, which is the actual trade intensity ratio minus the trade intensity ratio predicted, —Leamer argues that "the adjusted trade intensity ratio is analogous to a measure of welfare loss indicating the percentage of GNP lost as a result of trade barriers" (p.164). Thus, the adjusted trade intensity ratio is an indicator of the level of trade barriers. Second, he proposes trade intervention rates, which measures the extent to which trade is distorted by policy. Leamer also proposes openness measures using a factor-analytic model, but then he severely criticises the approach by saying that it is "fundamentally flawed". Alternatively, Leamer estimates a model to predict net exports for each product (using a 1982 three-digit SITC data) for each country (53 countries), which depends on factor endowments (land, labour, capital, coal, minerals and oil), distance and trade balance. The estimates based on the model indicate that if the actual trade of a country is less than what the model predicts, then it has a higher than average level of protection; on the contrary, a country that trades more has a lower than average protection of trade.

In 1991, Michaely *et al.* (1991) constructed an index of trade liberalisation. Researchers involved in such study assigned a value of one (indicating the highest possible degree of intervention) and a value of twenty (representing that trade policy was completely liberalised). The criteria used by the authors to determine the value of the index were based on quantitative data (e.g. nominal and effective rates of protection) or qualitative information (e.g. a declarative act such as the signing of an agreement with another country). The authors mention that the index of liberalisation shows strengthening or weakening of the movement to or from liberalisation.

Since 1995, the Heritage Foundation has constructed an Index of Economic Freedom (O' Driscoll *et al.*, 2003). This index uses institutional factors, including information on trade policy, to classify countries into five categories according to the degree to which trade is distorted. A trade policy score of 1 to 5 is given to countries based on their average tariff rate, the extent of non-tariff barriers, and the degree of corruption in the customs service. Based on this trade policy grading scale, five levels of protection are determined: very high, high, moderate, low, and very low.

Sachs and Warner (1995) classify countries as open or closed depending on five criteria: 1) an average tariff rate higher than 40 per cent; 2) non-tariff barriers covering more than 40 per cent of imports; 3) a socialist economic system; 4) a state monopoly of major exports; and, 5) a black market exchange rate that has depreciated on average by 20 per cent or more relative to the official exchange rate. A country is considered as closed if any one of the conditions is satisfied; on the contrary, if none of the conditions is satisfied the economy is regarded as open.

It is important to mention that most of the empirical studies that examine the effects of trade liberalisation focus on the construction of trade liberalisation indicators, but, as discussed by many other studies (see Harrison and Hanson, 1999; Rodríguez and Rodrik, 2000), those indicators are surprisingly fragile and questionable.

In order to avoid any inconsistency or inaccuracy in the elaboration of trade liberalisation indices, we are going to use the ratio of import and export duties to total imports and exports, respectively; and shift and slope dummies to encompass all the modifications in trade controls.

1.4 Empirical Work on Trade Liberalisation and Economic Performance

Over the last thirty years or so, there has been a substantial amount of research attempting to measure the costs of protection and the benefits of more liberalised trade regimes. There are two broad groups of studies. Within the first group, there are large multi-country studies that thoroughly examine the process of trade policy reform in individual countries (e.g. Little *et al.*, 1970; Balassa, 1971; Krueger, 1978; Bhagwati, 1978; Michaely *et al.*, 1991).

In the early 1970s, the Organization for Economic Co-operation and Development (OECD) sponsored a series of country studies on industrialisation and trade in seven developing countries (Argentina, Brazil, India, Mexico, Pakistan, the Philippines and Taiwan). This study[9] provides estimates of effective rates of protection[10] and showed the extent to which import substitution failed to achieve many of the objectives set for it. It argued that industry should be promoted rather than protected, and intervention should be made as close as possible to the point of a distortion, rather than by the general use of trade restrictions. Another study by the International Bank for Reconstruction and Development, coordinated by Balassa *et al.* (1971), involved comprehensive calculations of effective rates of protection in another group of countries (Brazil, Chile, Norway, Mexico, Pakistan, the Philippines and West Malaysia). A further study by the National Bureau of Economic Research (NBER) on exchange control, liberalisation, and economic development, organised by Bhagwati (1978) and Krueger (1978), included ten country studies (Brazil, Chile, Colombia, Egypt, Ghana, India, Israel, the Philippines, South Korea, and Turkey). Each country was analysed through five phases of trade and

[9] See Little *et al.* (1970).
[10] The effective rate of protection is the protection of value-added, see in detail in next section.

payments regimes, in order to trace one type of regime to another. The phases went from heavy reliance on quantitative restrictions to exclusive use of price interventions. The World Bank's Latin American and Caribbean Region project, directed by Michaely *et al.* (1991), also examined the liberalising trade experience in sixteen countries (Argentina, Brazil, Chile, Colombia, Indonesia, Israel, Korea, New Zealand, Pakistan, Peru, the Philippines, Singapore, Spain, Sri Lanka, Turkey, Uruguay, and Yugoslavia). The authors claimed that the attributes of trade liberalisation are export promoting policies and a depreciation of the real exchange rate.

Overall, these studies stressed the negative or weak effects of import substitution policies. Although the benefits from trade liberalisation vary across countries, the authors remark on the following: industry is provided with new export industries and wider markets; industries' efficiency increases; exports' structure changes; investment is more productive; etc.

Within the second group of studies, there are econometric studies using time series analysis, cross-section analysis, or panel data (using time and cross-country data) that look at the relationship between trade liberalisation and exports; and, between trade liberalisation and economic growth.

Empirical evidence on the relationship between trade liberalisation and export growth gives consistent results. For example, Bleaney (1999) shows improvement in export performance for ten Latin American countries after they embarked on liberalisation programmes; and, Ahmed (2002) shows it for Bangladesh. Santos-Paulino (2002a) applies panel data techniques to estimate an export growth equation for a sample of 22

developing countries over the period 1972-1997, and shows that trade liberalisation has increased export growth by between one and two percentage points.

Regarding the empirical evidence on the relationship between trade liberalisation and economic growth, Edwards (1992) tested the hypothesis that more open economies tend to grow faster, using a sample of thirty developing countries in the period 1970-1982. He estimated a conventional growth equation, where the independent variables are countries' investment ratio, initial level of per capita income (as a proxy for technological backwardness) and a measure of trade distortion —Leamer's (1988) trade openness indicators. Alternatively, he uses nine proxies for trade intervention and openness. All except one of the trade distortion indicators have a negative effect on growth performance. With these results, Edwards suggests that economies with more open and less distorted commercial policies have tended to grow faster than those with more restrictive trade policies.

Edwards (1998) also investigates the relationship between total factor productivity growth and trade liberalisation. He estimates total factor productivity growth separately on nine indicators of openness —1) the Sachs-Warner openness index; 2) the World Bank's 1987 trade classification; 3) Leamer's (1988) openness index; 4) the average black market exchange rate premium; 5) the average import tariff; 6) the average coverage of non-tariff barriers; 7) the Heritage Foundation index; 8) the ratio of total revenue from trade taxes to total trade; and 9) Wolf's (1993) regression-based index of import distortions in 1985— for 93 developed and developing countries over the period 1960-1990. In the vast majority of cases the estimated coefficient of the openness indicator has the expected sign and it is significant. Edwards concludes his study by arguing that "these results are quite

remarkable, suggesting with tremendous consistency that there is a significantly positive relationship between openness and productivity growth" (p. 391).

Dollar (1992) also deals with the issue of whether outward oriented countries grow more rapidly. He considers a sample of 95 developing economies over the period 1976-1985, and uses two real exchange rate indices, as measures of trade orientation: first an index of real exchange rate distortion and second an index of real exchange rate variability. The assumption is that misalignment of the real exchange rate is measured relative to the price level that corresponds to a country's particular resource endowment, which is indicative of the extent to which incentives are geared to the home or foreign market. His main finding is that the distortion in the real exchange rate is negatively related to the per capita GDP growth, after controlling for differences in the level of investment and exchange rate variability.

In another comprehensive study, Sachs and Warner (1995) investigate the relationship between trade orientation and growth for 75 countries over the period 1970-1989. Using the five criteria that they proposed, mentioned earlier, they give a zero value for closed economies and a value of one for open economies. They find a strong association between openness and growth in both groups of countries, developing and developed. Within the group of open economies, however, the developing countries grew on average by 2.2 percentage points faster than the developed countries.

These studies, however, are not without their critics. Rodríguez and Rodrik (2000) judiciously analyse the most relevant empirical studies, published during the 1990s, dealing with the relationship between trade liberalisation and GDP growth. The survey covered studies that use different trade liberalisation indicators but obtain not dissimilar

results (Dollar, 1992; Sachs and Warner, 1995; Edwards, 1998; Ben-David 1993; Frankel and Romer, 1999). Rodríguez and Rodrik are sceptical about the results derived from the studies they analyse, because either they arise from misspecification or from ambiguous trade liberalisation indicators. On the other hand, Rodríguez and Rodrik argue that there is "no credible evidence that suggests that trade restrictions are systematically associated with higher growth rates" (p. 317). They suspect rather that the relationship between trade liberalisation and growth depends on countries' characteristics and other external circumstances. Furthermore, the authors warn about the tendency to overstate the evidence in favour of trade liberalisation, where great expectations of the effect of trade openness on economic growth are unlikely to be met.

In order to overcome some of Rodríguez and Rodrik's criticisms, Wacziarg (2001) evaluates the channels through which openness may raise growth, and establishes the links between these channels and the degree of openness. Wacziarg proposes the following six channels: 1) a more efficient allocation of resources (measured by the black market exchange rate premium); 2) capital accumulation; 3) knowledge spillovers (measured by the ratio of manufactured exports to total merchandise exports); 4) foreign direct investment (as a proportion of GDP); 5) government policy (measured by an index that gives equal weight to public debt as a share of GDP, government deficit as a share of GDP, and growth of M2 in relation to total real output growth); and, 6) the size of government (measured by the share of public consumption to GDP). In a cross-country context, taking 57 countries with data averaged over four periods 1970-1974, 1975-1979, 1980-1984, and 1985-1989, the author estimated different specifications for the channel equations. The most important channel is capital accumulation, which accounts for approximately 63 per cent of the total effect of trade policy on economic growth.

There is further evidence that trade liberalisation impacts on growth favourably, but only with a lag. Greenaway *et al.* (2002) show that there is a "J curve" type effect, where growth initially deteriorates but subsequently recovers and then improves.

It is worth mentioning that some of the euphoria over promoting trade liberalisation as a catalyst to accelerate economic performance has been based on the experience of East Asian NICs (e.g. Krueger, 1998). However, other economists have analysed the circumstances under which these countries propelled their economic growth, and interestingly, the examination shows that the East Asian NICs did not always apply the extensive liberalisation policies recommended by the Bretton Wood institutions to developing countries (see Singh, 1990 and Thirlwall, 2003b).

Only a few studies have focused on the effects of trade liberalisation on imports and the balance of payments. A recent paper by Santos-Paulino (2002b) examines the impact of trade liberalisation on import growth for a selected group of 22 developing countries. Using panel data and time series/cross- section techniques, it is found that trade liberalisation has more than doubled import growth on average across all countries. Regarding the impact of trade liberalisation on the balance of payments, Michaely *et al.* (1991) argue that "[t]he *impact* effect of liberalization on the balance of payments appears commonly to be *favourable*" (p.140). However, recent and up-dated cross-section/panel studies in this field (e.g. UNCTAD, 1999; Parikh, 2002; and, Santos-Paulino and Thirlwall, 2002) find that trade liberalisation deteriorates the balance of trade and the balance of payments, controlling for other factors. In this respect, trade liberalisation can cause 'negative' effects, which adversely affect countries' economic development.

1.5 Structure of the Thesis

The thesis has seven chapters. Chapter 2 reviews the trade liberalisation process in Mexico, within the context of the macroeconomic reforms of the 1980s. It divides the macroeconomic context into four phases: 1) Oil Export Boom; 2) Macroeconomic Phase I: Diversifying Non-Oil Exports; 3) Macroeconomic Phase II: Modernising the Country; and, 4) Towards Free Trade Agreements.

Chapter 3 analyses the effects of trade liberalisation on export growth, at the aggregate and disaggregated level —considering three different classifications: classification 1 is related to Farming, Extractive and Manufacturing sectors; classification 2 refers to Consumer goods and Capital goods; and, classification 3 deals with the nine manufacturing sub-sectors: Food Products, Beverages and Tobacco; Textiles and Leather Products; Wood Products; Paper Products, Publishing and Printing; Chemicals, Rubber and Plastic Products; Non-Metallic Mineral Products; Basic Metals; Machinery and Equipment; and, Other Manufactures. For this purpose a standard export growth equation, in which price competitiveness and world income are assumed as the basic determinants, is extended with the inclusion of two shift dummies as trade liberalisation indicators: one for the mid-1980s reforms; the other for NAFTA. The examination of the performance of exports is supported with descriptive analysis and several econometric techniques.

Chapter 4 analyses first the structure of imports before and after trade reforms, and then investigates the impact of trade liberalisation on import growth at different levels of aggregation. The chapter follows a similar structure to chapter 3. In this case, besides including shift dummies, import duties are considered to account for changes in import controls. Other studies have investigated the effects of trade liberalisation on import growth, but they have neglected to analyse in detail the effects of NAFTA.

The aim of Chapter 5 is twofold. First, it examines the effects of trade liberalisation on the trade balance and the current account of the balance of payments. The main target is to evaluate whether these trade accounts have improved or deteriorated as a result of liberalisation. Traditionally, orthodox theory neglects the impact of trade liberalisation on the balance of payments and the negative effects this might have on growth if the trade balance deteriorates. This is the first study that investigates this issue for Mexico. Second, it investigates the relationship between trade liberalisation and economic growth through a balance-of-payments-constrained growth model.

Besides trade liberalisation, Mexico has experienced financial liberalisation. The law relating to foreign direct investment (FDI) has experienced marked changes. Chapter 6 examines the relationship between the liberalisation of FDI inflows, exports and imports. It explores causal links between FDI and exports, and FDI and imports. The former relationship has been investigated by others (Alguacil *et al.*, 2002), but there are no studies referring to the latter.

Finally, Chapter 7 recapitulates the results of previous chapters, and gives the general conclusions of the thesis.

Chapter 2

Mexico's Growth and Trade

2.1 Introduction

During the mid-1980s Mexico applied trade reforms as a central lever of the free-market strategy in combination with structural adjustment policies imposed by the International Monetary Fund, the World Bank and other multilateral institutions (Edwards, 1993; Skott and Larudee, 1998). As a consequence of the high internal and external debt in 1982 and the crisis in the international oil market, the country was largely excluded from international financial markets. It accepted almost any conditions from the international institutions in order to obtain financial assistance. The new development strategy involved diverse actions: the budget deficit was cut dramatically; price controls and subsidies were removed; the size of the public sector was greatly reduced through wide-ranging privatisation; foreign investment was encouraged by legislative reforms; and monetary conservatism was combined with prices and income policies to control inflation. In fact, during 1985 the main trade reforms started and trade liberalisation[1] was institutionalised.

The macroeconomic reforms orientated the country to depend heavily on the international market. Trade and financial liberalisation constituted the substantial reforms that accelerated the economic change in the country. The participation of the public sector in the economy changed drastically, public expenditure as a share of GDP fell and the participation of the state in the economy was reduced. Then, the participation of the

[1] *Cf.* Weiss (1992a), Krueger (1998) and Greenaway *et al.* (1998) for different concepts of trade liberalisation.

private sector gained prominence in the economy. Privatisation and deregulation were oriented towards increasing the role of competition in the economy.

In general, the Mexican trade structure has been modified since the 1980s. There has been a marked shift between oil and non-oil exports (see Székely, 1989). Specifically, after 1986 manufactures rather than oil became the main proportion of total exports. The bulk of exports is no longer oil. The proportion of oil in merchandise exports fell from 60 per cent in 1985 to 32 per cent in 1986; in 2000 the share of oil exports in merchandise exports was 10 per cent. However, oil imports have not significantly changed during this period (1980-2000) as a percentage of total merchandise imports (see Table 2.1).

Table 2.1
Oil Exports and Oil Imports
(% of merchandise exports or imports)

Year	Exports	Imports	Year	Exports	Imports
1980	67	2	1991	29	4
1981	72	2	1992	18	3
1982	77	3	1993	14	2
1983	64	2	1994	12	2
1984	62	3	1995	10	2
1985	60	4	1996	12	2
1986	32	3	1997	10	3
1987	42	4	1998	6	2
1988	32	3	1999	7	2
1989	34	4	2000	10	3
1990	38	4			

Source: World Development Indicators (2002).

Despite the changes in trade policy, which influenced changes in the trade structure and accelerated export growth led by the manufacturing sector, legitimate doubts remain concerning the overall impact of the liberalisation strategy on the trade sector. At the same time, GDP growth has been unstable, and has been lower on average since 1985. The average GDP growth rate during the 1970s was 6.4 per cent, for the 1980s it was 3.1 per cent and for the 1990s it registered 2.9 per cent. Since the trade reforms of the mid-

1980s took place, the economy's growth record has been relatively poor (see Table 2.2). The average GDP growth rate pre-1985 was 5.4 per cent and post-1985 it was 2.9 per cent.

Table 2.2
The Growth of GDP, Exports and Imports (%)

Year	GDP	Exports	Imports
1970	6.50	4.28	7.68
1971	3.76	2.85	-4.29
1972	8.23	13.94	15.44
1973	7.86	10.91	20.79
1974	5.78	-0.22	17.82
1975	5.74	2.27	-3.91
1976	4.42	7.28	-6.06
1977	3.39	18.22	-18.26
1978	8.96	22.76	22.01
1979	9.70	18.70	29.45
1980	9.23	22.20	37.18
1981	8.77	11.37	17.72
1982	-0.63	22.55	-37.85
1983	-4.20	14.23	-33.79
1984	3.61	5.75	17.81
1985	2.59	-4.46	10.98
1986	-3.75	4.49	-7.58
1987	1.86	9.49	5.15
1988	1.25	5.76	36.71
1989	4.20	5.66	17.97
1990	5.07	5.31	19.74
1991	4.22	5.07	15.18
1992	3.63	4.98	19.62
1993	1.95	8.09	1.86
1994	4.42	17.80	21.25
1995	-6.17	30.19	-15.04
1996	5.15	18.23	22.88
1997	6.77	10.72	22.75
1998	5.03	12.10	16.56
1999	3.75	12.42	13.80
2000	6.86	15.96	21.37

Source: World Development Indicators, (2002).

The purpose of this chapter is to present an overview of Mexico's growth and trade performance. A useful way to examine this is to distinguish four periods of analysis. Therefore, the remaining sections of this chapter are organised as follows. Section two describes the evolution of economic activity during the phase recognised as *oil export*

boom (1976-82). Section three deals with the analysis of the economy during the first part of the macroeconomic reforms (1983-87), when non-oil exports started to be promoted. The description of the 1985-86 trade reforms is presented in this section. Section four outlines the main characteristics of the economy when it experienced a second phase of macroeconomic reforms (1988-93). Section five examines the economic development for the six year period (1994-2000) in which Mexico signed several free trade agreements (FTAs) including NAFTA. Finally, section six draws conclusions from the earlier sections.

2.2 Oil Export Boom

Economic development in Mexico during the 1950s to 1970s is conventionally referred to as the import substitution phase (Balassa, 1983; Cárdenas, 1996; Lustig, 1992; Skott and Larudee, 1998), since the internal market provided the main demand for most sectors and various policy interventions restricted the access to imports. Three main forms of trade controls were applied: import tariffs, licensing restrictions, and official reference prices. From 1955 up to the 1970s, these operated with a fixed nominal exchange rate that was devalued twice during the period, once in 1976 by 25 per cent and again in 1977 by 47 per cent. 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 have been characterised as pursuing import-substitution policies (Weiss, 1992b).

Import licensing was extended in 1957 and the proportion of imported goods subject to licensing rose steadily, chiefly in response to balance-of-payments difficulties. During that year, 17.7 per cent of total imports were subject to licences; this rose to 53.8 per cent

in 1961, reaching 90.4 per cent in 1976 and 100 per cent at the time of the 1982 debt crisis (see Table 2.3).

Table 2.3
Imports as % of Total Imports Controlled by Licensing System

Year	%	Year	%	Year	%
1956	17.7	1967	65.2	1978	76.3
1957	35.1	1968	64.4	1979	70.0
1958	42.5	1969	65.1	1980	60.0
1959	43.2	1970	68.3	1981	85.5
1960	37.8	1971	67.7	1982	100.0
1961	53.8	1972	66.3	1983	100.0
1962	52.5	1973	69.6	1984	83.5
1963	63.5	1974	82.0	1985	37.5
1964	65.5	1975	68.4	1986	30.9
1965	60.0	1976	90.4	1987	27.5
1966	62.0	1977	90.0	1988	19.7

Source: Weiss (1992b).

Exports were also subject to some minor taxes, and during this period received relatively small subsidies through a system of preferential credit and some tax discounts on duties paid on imported inputs (Balassa, 1983).

In order to have a better understanding of the evolution of trade policy before the 1985 liberalisation let us consider at the same time the macroeconomic context that Mexico's economy was facing. Three main variables are highlighted through the analysis: the exchange rate, the trade balance and the growth rate.

In the mid-1970s output growth generated an unsustainable deficit on the trade balance. In 1975, the deficit on the trade balance as a proportion of GDP was 2.7 per cent. In 1976, the government announced a change in the exchange rate regime, ending 22 years of a fixed nominal regime. The Mexican peso was devalued by 25 per cent in nominal terms. This situation, plus the accumulation of huge central government deficit (20.2 per cent of GDP), led the government to reach an agreement with the IMF in order to adjust the

external sector. However, it proved to be unnecessary because Mexico became oil rich. Despite the outstanding increase in oil exports, the balance of payments position had been deteriorating; and, notwithstanding this deterioration, the international banking community did not stop lending Mexico ever increasing amounts to finance the deficits. Singh (1990) has highlighted that while the international bank loans to developing countries increased by 76 per cent from 1978 to 1981, they rose by 146 per cent to Mexico, already a large debtor in 1978.

At the end of 1979, President José López Portillo (1976-1982) considered the idea of joining the GATT. However, in March 1980 this idea was dismissed. This decision marked the beginning of a period of renewed import restrictions. In 1981, the import licensing system was applied to 85 per cent of imports (see Table 2.3).[2] President López Portillo was confident that as long as the oil continued to finance the government's spending, there was no need to pursue the trade liberalisation agenda. Additionally, oil reserves seemed endless and no one thought that oil prices would change so drastically. The discovery of substantial oil reserves, and the subsequent increase in petroleum exports, gave the country easy access to international private borrowing (Lustig, 1992; Cárdenas, 1996).[3] With the increase of petroleum exports, the ratio of the trade balance to GDP changed from a deficit of 2.7 per cent in 1975 to a surplus of 0.1 per cent in 1977. These improvements, and the potential for future increases in petroleum exports, allowed

[2] The trade policy used the import licensing system to control trade balance deficits, which worked like a valve to regulate foreign exchange reserves.

[3] Mexican Oil Exports (Thousands of barrels per day)

Year	Oil Exports	Year	Oil Exports	Year	Oil Exports	Year	Oil Exports
1976	94.4	1979	532.8	1982	1492.1	1985	1438.2
1977	202.0	1980	827.7	1983	1534.8	1986	1289.8
1978	365.0	1981	1098.0	1984	1525.6	1987	1345.4

Source: Székely (1989), from Table 1.

a partial relaxation of the trade controls (Balassa, 1983).[4] First, the proportion of imports subject to licenses was reduced, falling from 90 per cent in 1977 to 60 per cent in 1980 (see Table 2.3). Second, it became easier to obtain licenses (Weiss, 1992b). These factors were responsible for a significant growth in imports. For instance, in 1978 imports registered an increase of 22.1 per cent, and in 1980 they increased by 37.1 per cent.

The oil export boom ended in 1981 when a combination of rising international interest rates, declining international oil prices (which negatively affected the oil export revenues), diminishing access to international credit and an appreciated real exchange rate (that created new exchange rate difficulties), plunged the whole Mexican economy into a major recession. The financial fragility of the economy caused a major capital flight. Mexico could no longer service its debt commitments. In August 1982, it declared a moratorium on its external debt. This year the overall budget deficit, as a proportion of GDP, was five times higher than in 1978. From 1982 to 1987 real GDP decreased on average by 1.3 per cent per year.

These events were followed by the introduction of major devaluations of the nominal exchange rate combined with a crawling peg policy and strict exchange controls. The lack of foreign exchange was met chiefly by the reintroduction of import controls rather than by a reduction in domestic expenditure (Balassa 1983; Ten Kate, 1992; Weiss, 1992b). Because the government wanted to generate large trade surpluses quickly so that it could resume payments on its debt, restrictions on imports were tightened. In other words, it meant the reversal of liberalisation measures. Licences were extended to cover 100 per

[4] Balassa argues that these facts reflected the perception that import liberalisation was necessary in order to reduce the existing bias against exports and raise levels of efficiency by exposing Mexican industry to foreign competition.

cent of imports (see Table 2.3). As a consequence, in 1982 imports fell by 37.8 per cent. Meanwhile, exports rebounded by 22.5 per cent.[5] During 1982-84 nominal exchange rate depreciation was substantially below domestic inflation, so that the real exchange rate appreciated in 1984 (see Table 2.4). Thus, the dynamic behaviour of exports was gradually lost; and, to keep domestic and export production going, imports were allowed to grow again. To prevent further deterioration of the trade balance,[6] exchange rate devaluation was accelerated in 1985, and continued until 1987, registering a large devaluation of 32.1 per cent in real terms in 1986. The exchange rate was relied upon to raise the export growth rate back to previous levels. The importance of the exchange rate in this context is recognised.

Table 2.4
Mexican Nominal Exchange Rate and Real Exchange Rate Index, 1970-1998

Year	Price Index (1995 = 100)	Nominal Exchange Rate (pesos per US$)	% Var.	Real Exchange Rate Index* 1970=100	% Var.	Year	Price Index (1995 = 100)	Nominal Exchange Rate (pesos per US$)	% Var.	Real Exchange Rate Index* 1970=100	% Var.
1970	0.06	0.012		100.0		1985	3.16	0.25	49.7	180.6	-1.7
1971	0.06	0.012	0.0	106.4	6.4	1986	5.90	0.61	144.0	238.7	32.1
1972	0.07	0.012	0.0	109.6	3.0	1987	13.68	1.38	126.2	241.9	1.3
1973	0.07	0.012	0.0	116.1	5.9	1988	29.30	2.27	64.5	193.5	-20.0
1974	0.09	0.012	0.0	129.0	11.1	1989	35.16	2.46	8.4	180.6	-6.7
1975	0.11	0.012	0.0	141.9	10.0	1990	44.53	2.81	14.2	174.1	-3.6
1976	0.13	0.015	25.0	183.8	29.5	1991	54.62	3.02	7.5	158.0	-9.2
1977	0.16	0.022	46.7	141.9	-22.8	1992	63.09	3.09	2.3	145.1	-8.2
1978	0.19	0.022	0.0	154.8	9.1	1993	69.25	3.12	1.0	135.4	-6.7
1979	0.23	0.022	0.0	174.1	12.5	1994	74.07	3.38	8.3	141.9	4.8
1980	0.29	0.023	4.5	132.2	-24.1	1995	100.00	6.42	89.9	206.4	45.5
1981	0.37	0.024	4.3	116.1	-12.2	1996	134.37	7.60	18.4	187.0	-9.4
1982	0.60	0.056	133.3	190.3	63.9	1997	162.09	7.92	4.2	164.5	-12.0
1983	1.21	0.120	114.3	209.6	10.1	1998	187.91	9.14	15.4	167.7	1.9
1984	2.00	0.167	39.2	183.8	-12.3						

Note: * Exchange Rate in pesos per US dollar, increments imply depreciation in the exchange rate.
Source: Own calculations based on data from World Development Indicators (2002).

[5] Moreover, a relatively successful restructuring of foreign debt brought the balance of payments back under control. Randall (1995) considers that as foreign funds were unavailable, this required the postponement of the payment of interest and amortisation on the debt, so that there would be uncommitted foreign exchange available.

[6] In 1985, the export growth rate decreased 4.5 per cent, while the import growth rate increased 11 per cent.

The year 1982 marked the end of the economic model based on oil exports. The administration under President Miguel de la Madrid Hurtado (1982-1988) undertook drastic economic reforms. Besides the implementation of an *orthodox* stabilisation program, structural reforms were applied to orientate the economy from a state-led development and trade protectionist strategy to a private-led growth and trade openness policy.

2.3 Macroeconomic Phase I: Diversifying Non-oil Exports

After the debt crisis, once it was recognised that the economy should not be mainly dependent on one product oil- Mexico's economic growth model changed dramatically. The new development strategy included diverse macroeconomic reforms. Besides the austere management of monetary policy and the reduction in public expenditure, two new strategies were followed in order to stabilise the economy: privatisation and deregulation of public firms and the opening of the economy through trade and financial liberalisation. The main objective, among others, was to accelerate economic growth.[7] This section attempts to analyse the main factors that led the economy to embark upon trade liberalisation.

2.3.1 Macroeconomic Reforms

In 1983, the De la Madrid administration launched an ambitious economic programme *Programa Inmediato de Reorientacion Economica* (PIRE). The purpose was to stabilise the macroeconomic indicators in order to recover from the debt crisis. Primarily, the

[7] As Parik (2002) argues, a large number of developing countries, Mexico included, turned to economic liberalisation as a result of different factors: it was a response to economic crisis, it stopped import substitution strategy, and it was a response to the pressure from multilateral financial institutions to liberalise their economies.

intention was to amend public finances. Cutting public expenditure and increasing prices of public goods and services reduced the budget deficit. Although this economic programme was successful in turning the trade deficit into a surplus and, more modestly, in lowering inflation and raising GDP, it collapsed in late 1985: fiscal discipline began to falter, and the earthquake in Mexico City caused disruption and imposed significant cost. Furthermore, international oil prices started on a steep decline that was to continue into 1986 and 1987. All this worsened the Mexican economy.

Considering the macroeconomic context, the 1985-88 period was one of falling output and accelerating inflation. To face these circumstances, policy-makers followed traditional policy strategies (reduction in the government deficit, a tight monetary policy - private credit constrained substantially - to curb inflation and an undervalued currency to restore balance-of-payments stability) in order to reach macroeconomic stabilisation. In 1987, the monetary authorities devalued the domestic currency by 126 per cent in nominal terms. High inflation during the year caused a drastic decline in real interest rates and a flow of financial resources into secondary markets (e.g. the Mexican Stock Market). This rapid growth of investment in the stock market came to a sudden halt in October 1987 with the crash of the New York Stock Exchange. In this situation the application of the *orthodox* program was not sufficient to stabilise the main macroeconomic indicators. In December 1987, the government faced this situation through the implementation of an *heterodox* approach, driven by the *Pacto de Solidaridad Económica (PSE).*[8] This programme was a success in bringing down inflation in a short time. It was based on austere fiscal policy, implicit and explicit indexation of wages to the price level and the

[8] *PSE* was planned based on the experience of other stabilisation programmes for countries such as Brazil, Argentina and Israel. For a detailed analysis of *PSE*, see for example Aspe (1992).

use of a pre-announced rate of depreciation of the nominal exchange rate. Additionally, the privatisation of public firms was accelerated and the process of opening up Mexico to foreign trade and investment was initiated.

As regards the deregulation and privatisation of public firms, in Mexico as in many other developing countries, it was undertaken for a number of reasons including improving economic efficiency, reducing the drain on government resources, raising revenues for the government and to help pay off the foreign debt by raising foreign exchange through the sale of public assets to foreign firms (Singh, 1999). However, it is recognised that rather than efficiency reasons, the main motive for privatisation was to reduce budget deficits which the international institutions demanded to provide financial assistance. It should be mentioned that while in 1982 the State held 1,155 firms, by the mid-1990s that number was reduced to 213, due to consolidation, privatisation or closing (see Table 2.5).

Table 2.5
Evolution of the *Paraestatal*[a] Sector in Mexico, 1982- May 1993

Type of Firm	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Decentralised Organisms	102	97	95	96	94	94	89	88	82	78	82	82
Majority Government Participation	744	700	703	629	528	437	252	229	147	120	100	99
Public Trust	231	199	173	147	108	83	71	62	51	43	35	32
Minority Government Participation	78	78	78	69	7	3	0	0	0	0	0	0
TOTAL	1 155	1074	1049	941	737	617	412	379	280	241	217	213

Note: [a] The state owned industries are called *Industria Paraestatal.*
Source: Rogozinski (1997).

For instance, almost all the manufacturing enterprises owned by the government, the commercial banks, the airlines and the telephone service were sold to the private sector.

The immediate benefit of the privatisation programme was its effect in improving the public finances.

Meanwhile, trade liberalisation was re-initiated. During the second half of the 1980s, Mexico's commitments towards trade liberalisation were formalised.

2.3.2 Trade Liberalisation Process

Beyond other macroeconomic reforms, Mexico's trade liberalisation, according to mainstream economic theory, was necessary in order to increase the competitiveness of domestic industry (Balassa, 1983; Ten Kate, 1992). The official arguments to justify trade liberalisation were, among others, the poor growth performance, which was attributed to inefficient productive structures resulting from protectionist policies, counterproductive government participation and resistance to foreign investment. Following this underlying postulate, reiterated by the Baker Plan at the annual meeting of the IMF and the World Bank during October 1985 in Seoul, the Mexican government confirmed its promise to liberalise trade:[9]

> ...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...

It was expected that the effects of those reforms were going to make the trade sector the engine of growth.[10]

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[9] Taken from Ten Kate (1992).

[10] Trade reforms gave a stimulus to the manufacturing trade sector (see chapters 3 and 4), but GDP growth did not increase as expected.

The programme of trade reforms introduced in Mexico in the period 1985-87 was one of the most far-reaching of any developing economy.[11,12] 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.[13] 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). Thus, imports controlled by the licensing system fell from 83.5 per cent in 1984 to 37.5 per cent in 1985. Additionally, it was envisaged that external competition would contribute to controlling the rate of inflation. Therefore, the Mexican government decided that the trade liberalisation already in process should be significantly speeded up (Aspe, 1993).

At a first glance, it is surprising that after trade liberalisation the rate of growth of imports halted. However, there are explanations for this. Ten Kate and de Mateo (1989) explain that there are two types of protection: trade barriers and exchange rate protection (there could be a trade-off between them). They adjudge that the decrease in imports was due to the devaluation immediately after the trade reforms. In other words, the initial impact of these trade reforms on import-competing products was softened by a 32 per cent real devaluation of the peso between 1985 and 1986.[14] A complementary explanation is based

[11] Weiss (1992b) suggests that it appears that a weakening in the performance of non-oil exports was a key factor in convincing the administration of the need for trade liberalisation. However, the data show a slowdown of exports of goods and services, which may be explained by the post 1982-debt crisis. Contrary to Weiss's argument as already mentioned in this chapter, the impetus of trade liberalisation was part of the structural adjustment programmes recommended by the IMF and WB (Edwards, 1993; Pastor, 1994; Skott and Larudee, 1998).

[12] Edwards (1997) argues that in countries like Colombia, Chile and Mexico, the local authorities were more fervent believers in free trade than the World Bank staff.

[13] As we already mentioned, accelerated trade liberalisation was based on the assumption that competition from imports would put a ceiling on inflation for traded goods.

[14] Ros (1994) also agrees with them, arguing that the high real exchange rate greatly softened the initial shock of import liberalisation and contributed to policy sustainability in many ways.

on the direct growth pattern that exists between the growth of GDP and imports. During that period imports did not pick up, and even decreased, because there was still an economic recession resulting from the debt crisis.

In 1985, Mexico and the US signed a bilateral agreement on subsidies and countervailing duties. A reinforcing commitment of Mexico towards trade liberalisation was formalised with Mexico's entry to GATT. In November the country started negotiating for admission to GATT, and became a full member in July 1986. The country was committed to eliminating official prices for most goods by the end of 1987. In the same year Mexico and the US signed a framework agreement to set up principles and procedures for resolving controversies on trade and investment. However, most of the reforms required to enter GATT were already realised or even surpassed with the unilateral liberalisation programme during 1985. It is important to note that from June to December 1985 the coverage rate of import licensing fell from 92.2 per cent to 47.1 per cent, so that more than half of domestic production was no longer protected by import licenses (see Table 2.6).[15] Therefore, Mexico's accession to GATT did not imply an intensification of its liberalisation process, but rather it was considered a signal by policy makers of their intention to carry on the trade liberalisation policy (Ten Kate, 1992). An alternative explanation of this fact is that policy makers launched trade reforms in advance in order to have access to GATT without any restriction. Less dramatic reductions in import licensing and tariff coverage of imports continued in subsequent years, 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.

[15] During the same period the tariff average increased from 23.5 per cent to 28.5 per cent (this reflects the tariff compensation for license elimination), while the coverage of official prices increased from 18.7 per cent to 25.4 per cent.

Table 2.6
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.

2.4 Macroeconomic Phase II: "*Modernising the Country*"

The main target during the Carlos Salinas de Gortari administration (1988-1994) was to stabilise the macroeconomic performance and to control inflation. Once the country was subject to the competitive international market and the main economic indicators were not improving as expected, trade and investment reforms were reinforced.[16]

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. Commerce Ministry decrees, in January and March 1989, raised tariffs for those commodities subject to only 5 per cent tariff rates and gave positive rates to many goods previously exempt which were registering an import surge. The reduction of the rest of the import licensing and tariffs were negotiated in the North America Free Trade Agreement (NAFTA), an issue that is going to be considered in the next section. In October 1989, a new framework agreement between Mexico and the US was signed to start global conversations to facilitate trade and investment.

[16] According to FitzGerald (1999), NAFTA is about the promotion of inter-sectoral specialisation.

At this point, an important complement to the deregulation process was the implementation of trade facilitation programmes, specifically for export industries. The main instrument in this area is COMPEX (*Comisión Mixta para la Promoción de Exportaciones*), a mechanism designed to address particular problems that exporters face (e.g. bureaucratic inefficiencies) in attempting to sell their goods abroad.

In addition to the COMPEX mechanism there are two specific programmes for the promotion of exporting industries, known as ALTEX (*Empresas Altamente Exportadoras*) and PITEX (*Programa de Importación Temporal para producir artículos de Exportación*). The ALTEX programme recognises the contribution of firms with high levels of exports, and gives them special administrative, fiscal and financial treatment. The PITEX programme includes duty drawbacks for firms that have a high level of imported inputs embodied in exports.[17]

One major criticism of the export promotion programme, however, is that it has only supported part of the manufacturing sector, specifically the *maquiladora* sector.[18] This sector purchases material inputs in the world market (US), transforming them with domestic labour into intermediate or final products, and selling the output in the world market (US). Although the manufacturing sector trade imbalances have been smoothed by the surpluses on the *maquila* sector (see Table 2.7), it does not offer substantial net exports. During 1980-98, total exports grew at an average annual rate of 10.9 per cent, whereas *maquila* exports grew at an average annual rate of 18.4 per cent. Consequently,

[17] See Máttar (1998) and Ten Kate *et al.* (2000) for a detailed analysis of export promotion policies.
[18] The *maquiladora* programme consists of special tariff preferences; raw materials can be imported in-bond duty free, manufactured in the *maquiladora* base, and then re-exported while paying duty only on the value added in Mexico.

maquila exports as a percentage of total exports rose from 14 per cent in 1980 to 45 per cent in 1998. Also, *maquila* imports report an average annual growth rate of 19.4 per cent against a 9.8 per cent growth rate of total imports. The share of *maquila* imports in total imports grew from 8.3 per cent in 1980 to 34.5 per cent in 1998.[19]

Table 2.7
Mexico's *Maquila* Trade
(Thousands of US dollars)

Year	Maquila Exports	Maquila Exports /Total Exports	Growth of Maquila exports	Maquila Imports	Maquila Imports/Total Imports	Growth of Maquila Imports	Total trade balance	Maquila trade balance
1980	2,519,163	14.0		1,747,481	8.3		-3,058,321	771,682
1981	3,205,286	13.8	27.2	2,229,026	8.2	27.6	-3,876,890	976,260
1982	2,825,539	11.7	-11.8	1,974,253	11.6	-11.4	7,044,579	851,286
1983	3,641,094	14.0	28.9	2,822,712	23.8	43.0	14,104,857	818,382
1984	4,904,318	16.9	34.7	3,748,973	23.6	32.8	13,184,153	1,155,345
1985	5,093,498	19.0	3.9	3,826,028	20.8	2.1	8,398,196	1,267,470
1986	5,645,889	25.9	10.8	4,351,347	25.9	13.7	5,019,703	1,294,542
1987	7,105,028	25.7	25.8	5,506,971	29.3	26.6	8,787,089	1,598,057
1988	10,145,670	33.1	42.8	7,808,255	27.8	41.8	2,609,529	2,337,415
1989	12,328,926	35.1	21.5	9,328,090	26.8	19.5	405,054	3,000,836
1990	13,872,504	34.1	12.5	10,321,352	24.8	10.6	-882,324	3,551,152
1991	15,833,065	37.1	14.1	11,782,443	23.6	14.2	-7,279,040	4,050,622
1992	18,680,054	40.4	18.0	13,936,719	22.4	18.3	-15,933,727	4,743,335
1993	21,853,025	42.1	17.0	16,442,963	25.2	18.0	-13,480,576	5,410,062
1994	26,269,246	43.1	20.2	20,466,167	25.8	24.5	-18,463,683	5,803,079
1995	31,103,273	39.1	18.4	26,178,808	36.1	27.9	7,088,485	4,924,465
1996	36,920,320	38.5	18.7	30,504,710	34.1	16.5	6,530,967	6,415,610
1997	45,165,628	40.9	22.3	36,332,102	33.1	19.1	623,590	8,833,526
1998	52,863,648	45.0	17.0	42,556,671	34.5	17.1	-5,742,180	10,306,977

Source: Buitelaar and Padilla (2000) and Banco de México.

Another step towards free-market economic orientation was stimulated by the liberalisation of Mexico's capital market. Particularly, the need to attract foreign direct investment (FDI) forced Mexico to create an appropriate legislative context that would allow the entry of foreign capital. In 1989, the Mexican government announced changes

[19] *Maquiladora* firms benefited from the special tariffs treatment. However, as soon as NAFTA came into effect those benefits began to be eliminated. The only advantage that Mexico still has is the low labour cost, but there are other Latin American and Asian countries that compete in this area. Therefore, it is predictable that *maquiladora* firms in Mexico will reduce their output.

in the Law on Foreign Investment, which consisted of the gradual elimination of some of the restrictions on foreign investment particularly in the capital -and technological-intensive industries. Table 2.8 shows the performance of foreign direct investment from 1970 to 2000. On average, it is clear that FDI increased more during the 1990s than during the 1970s and 1980s. It seems that trade and financial liberalisation have attracted more foreign capital.[20]

Table 2.8
Foreign Direct Investment, net inflows (% of GDP)

Year	FDI	Year	FDI	Year	FDI
1970	0.91	1981	0.93	1992	1.21
1971	0.78	1982	0.84	1993	1.09
1972	0.67	1983	0.31	1994	2.59
1973	0.83	1984	0.22	1995	2.62
1974	0.94	1985	0.27	1996	2.60
1975	0.69	1986	1.18	1997	3.57
1976	0.71	1987	2.31	1998	2.60
1977	0.68	1988	1.42	1999	2.90
1978	0.80	1989	1.36	2000	3.10
1979	0.99	1990	1.00		
1980	0.96	1991	1.51		

Source: World Development Indicators (2002).

In the early 1990s, as negotiations with Chile took place to sign a Complementary Economic Agreement (CEA), Mexico was also initiating negotiations with Canada and the US on what would later be the NAFTA.

2.5 Towards Free Trade Agreements

NAFTA started on 1st January 1994. It removed most of Mexico's remaining barriers to trade and investment, either immediately upon its implementation or gradually thereafter over a fifteen year period.[21] Table 2.9 shows NAFTA's tariff elimination schedule. Goods

[20] Particularly, the relationships between foreign direct investment, exports and imports are going to be analysed in Chapter 6.
[21] The full NAFTA text is available at <URL:http:// www.nafta-sec-alena.org/english/index.htm>.

categorised in group A entered to Mexico duty free as soon as NAFTA took effect; goods classified in group B entered duty free after 1st January 1998; goods in category C1 are 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. Two main points should be highlighted. First, the tariff elimination was to be a progressive process, and around 85 per cent of total goods fall within categories A, B and C1.

Table 2.9
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).

The main function of NAFTA, among other objectives, 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). The argument of the trade sector as the engine of growth was well promoted in order to achieve NAFTA implementation.

NAFTA involved trade liberalisation on the part of Mexico that went beyond that achieved during the first phase of serious trade reforms in the mid-1980s. Remaining non-tariff barriers, mainly those in agriculture and transportation equipment, were to be

eliminated. Restrictions on foreign investment were to be eased further; most significantly, US and Canada providers of financial services in Mexico were to be accorded the same treatment as their Mexican counterparts (Kehoe, 1995). Dispute resolution mechanisms were established, and, as part of side agreements negotiated after NAFTA itself, tri-national commissions were established to deal with issues involving labour rights and protection of the environment.

At the end of the first year of the implementation of NAFTA, notwithstanding the improvement of some macroeconomic variables, economic activity was vulnerable to international shocks related to capital flows (which were rapidly depleting the foreign exchange reserves). Also, the trade balance registered a huge deficit of 4.8 per cent of GDP. When a new government assumed power in December 1994 (President Zedillo's administration, 1994-2000), an effort to undertake a 15 per cent devaluation triggered further capital flight from the Mexican peso into US dollars. The government withdrew from the foreign exchange market, and the peso depreciated substantially in real terms by 50 per cent (in nominal terms the depreciation reached 90 per cent). After several internal and external events —political shocks and increases in the US interest rate— there was a consequent massive decline in Mexican foreign-exchange reserves, which were insufficient to defend the value of the peso. All this contributed to the devaluation of the peso when the exchange rate was allowed to float freely on 22 December. In 1995, the GDP fell by 6.1 per cent. The Mexican crisis was internationally recognised as a financial crisis. [22]

[22] It was internationally recognised as the *Tequila* effect, due to the repercussions in the rest of the Latin American countries. For a detailed analysis about Mexico's 1994-95 crisis, see, for example, Kregel (1998), among others. Refer to FitzGerald (1999), Gould (1996), and Neely (1996) for an analysis of the links between NAFTA and the '1994-95 Mexican peso-crisis'.

In response to the severe exchange rate crisis, again an orthodox stabilisation package was introduced, with the focus on cutting domestic absorption. Zedillo's administration neither applied restrictive trade measures nor attempted renegotiations of NAFTA. The recovery from the 1995 crisis was fast, in part due to the stabilisation programme and the financial package engineered by the US Treasury, the IMF, and other multilateral financial institutions. Indeed, in 1996 the GDP showed a positive rate of growth of 5.1 per cent. However, these events did not contribute to modifying the structure of Mexico's growth and development. The trade balance was registering deficits while the domestic currency was appreciating instead of depreciating (as might have been expected). This fact leads us to think that not only was there an exchange rate problem, but also some structural weaknesses, which were probably accentuated with the opening of the economy.

It can be taken for granted that the real appreciation that took place prior to 1994 and the subsequent real depreciation affected incentives for both imports and exports.[23]

Mexico has been a WTO member since 1 January 1995. The binding trade and foreign investment rules are contained in more than sixty agreements and decisions, which were formulated as a result of the Uruguay Round 1986-1994 negotiations, signed in Marrakesh in April 1994 (see Table A1 in the Appendix).

Apart from NAFTA, Mexico has signed several other FTAs (see Figure 2.1). After NAFTA, in 1995 Mexico agreed the G-3 Free Trade Agreement (Colombia, Mexico and

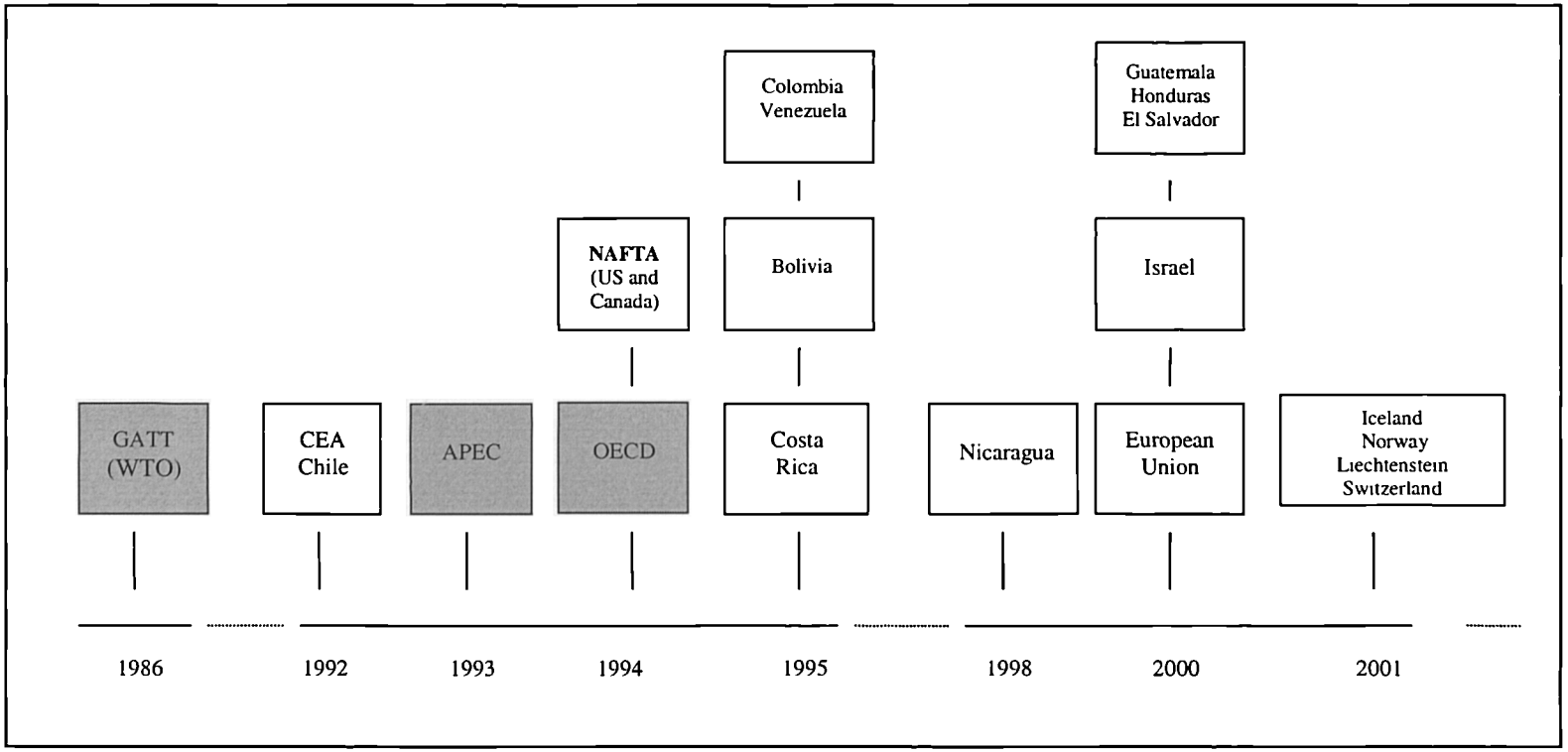
[23] The Mexican government imposed a surcharge on all imports entering into Mexico, except those entering under NAFTA. The tax was subsequently raised when the government encountered revenue losses from oil when the oil price dropped in 1998 and early 1999 (Krueger, 2000).

Venezuela), the FTA with Bolivia, and the FTA with Costa Rica. In 1998, Mexico signed the FTA with Nicaragua; and one year later, in 1999, the CEA with Chile became a FTA. During 2000, Mexico initiated Free Trade Agreements with Israel and the European Union; negotiations ended with the so-called North Triangle, which includes El Salvador, Guatemala and Honduras. The most recent agreement, which came into effect in 2001, was signed with the European Association of Free Trade, composed of Iceland, Liechtenstein, Norway and Switzerland.[24] Besides those FTAs, Mexico has signed other kinds of co-operation agreements relating to trade and investment with various countries (including South Korea, Australia, New Zealand), and it is currently in talks with Japan. Furthermore, it is a member of the Asia-Pacific Economic Co-operation (APEC), and Mexico has participated actively in the organisation of the Free Trade Area of the Americas (FTAA). All of Mexico's FTAs contain specific rules of origin. Non-preferential rules of origin apply to anti-dumping and countervailing duties to prevent circumvention of such duties. The procedures to apply these rules vary by product and country of origin.

In spite of these trade agreements with different countries, the reliance of Mexico on trade with the US became even more pronounced. Mexico's exports to the US have increased from 64.7 per cent in 1980 to 73.1 per cent in 1990 and to 88.7 per cent in 2000; meanwhile, imports have increased from 61.5 per cent in 1980 to 70.8 per cent in 1990 and to 73.1 per cent in 2000 (see Table 2.10).

[24] For detailed information about these FTA see <URL:http://www.economia-snci.gob.mx>

Figure 2.1
Time Profile of Mexico's Free Trade Agreements and Adhesions to International Organisations



Source: Secretaria de Economía.

Table 2.10
Participation of Industrial Countries on Mexico's Trade (%)

	EXPORTS								IMPORTS							
Year	US	Canada	Japan	France	Germany	Italy	Spain	UK	US	Canada	Japan	France	Germany	Italy	Spain	UK
1980	64.74	0.75	4.31	3.64	1.65	0.65	7.96	0.28	61.57	1.81	5.08	2.68	5.00	1.57	1.79	2.08
1981	55.29	3.41	5.97	4.64	1.09	0.58	9.91	1.25	63.82	1.85	4.99	2.44	4.93	1.79	1.96	1.78
1982	56.17	2.74	5.86	4.17	0.84	1.81	8.87	3.59	58.03	2.14	4.40	1.95	4.33	2.08	1.95	1.44
1983	55.91	2.00	6.49	3.57	1.16	0.64	6.94	3.93	60.46	2.51	3.90	3.99	4.04	1.85	1.85	1.89
1984	57.95	2.03	7.66	3.81	0.95	1.25	6.98	4.18	62.36	2.00	4.43	2.23	4.26	1.98	1.73	1.85
1985	60.35	1.78	7.73	3.69	1.33	1.36	7.69	3.07	66.62	1.75	5.38	2.05	3.99	1.56	1.59	2.11
1986	64.67	1.39	6.92	2.69	2.34	0.76	5.50	1.37	65.82	1.86	6.07	2.05	5.84	1.62	1.63	1.76
1987	64.63	1.52	6.56	2.83	1.56	0.42	6.00	1.52	64.68	2.94	6.56	2.77	6.73	1.36	1.43	1.76
1988	64.62	1.52	6.56	2.83	1.56	0.42	6.00	1.52	64.68	2.93	6.56	2.77	6.73	1.37	1.42	1.76
1989	70.04	1.18	5.71	2.09	1.56	0.60	4.93	0.78	70.43	1.63	3.70	2.15	4.16	1.59	1.49	1.29
1990	73.12	2.42	5.37	2.19	1.52	0.51	3.62	0.79	70.80	1.27	5.15	2.13	4.54	1.48	1.45	1.22
1991	79.54	2.67	2.91	1.41	1.24	0.40	2.69	0.51	73.93	1.40	3.58	1.94	4.67	1.25	1.15	1.00
1992	81.11	2.16	1.72	1.23	1.06	0.32	2.67	0.50	71.27	1.69	4.89	2.10	3.99	1.58	1.41	1.00
1993	83.30	2.98	1.35	0.83	0.82	0.15	1.69	0.42	71.20	1.78	5.15	1.65	4.33	1.25	1.76	0.90
1994	85.32	2.41	1.62	0.80	0.65	0.14	1.40	0.43	71.85	2.02	4.80	1.88	3.89	1.27	1.68	0.88
1995	83.57	2.49	1.17	0.61	0.65	0.25	0.98	0.63	74.53	1.90	4.98	1.36	3.71	1.06	0.96	0.73
1996	84.04	2.26	1.42	0.44	0.67	0.15	0.96	0.59	75.59	1.95	4.36	1.14	3.55	1.12	0.70	0.76
1997	85.60	1.95	1.05	0.39	0.65	0.25	0.85	0.63	74.84	1.79	3.95	1.08	3.55	1.21	0.89	0.83
1998	87.92	1.29	0.73	0.34	0.98	0.15	0.61	0.56	74.49	1.83	3.64	1.14	3.64	1.26	1.00	0.84
1999	88.27	1.75	0.57	0.21	1.53	0.12	0.60	0.55	74.14	2.08	3.58	0.98	3.54	1.16	0.93	0.80
2000	88.72	2.01	0.56	0.23	0.93	0.13	0.91	0.52	73.10	2.30	3.71	0.84	3.30	1.06	0.82	0.63

Source: International Monetary Fund, *Direction of Trade Statistics Yearbook*, several issues.

Since the negotiations of NAFTA, the trade volume of Mexico has risen markedly. For instance, in 1992 the exports/GDP share was 14.4 per cent, which doubled by 1998, reaching 29.3 per cent. At the same time, import penetration rose from 20.8 per cent to 32 per cent. In addition to the increase in trade volume, trade structure was changing, but the interpretation of the change was misunderstood by policy makers. The Salinas administration argued that the Mexican current account deficit was a natural condition for a developing country that required imports of capital goods to restructure its manufacturing sector. This was not the case for Mexico's trade at that moment. Although the largest component of merchandise imports from 1987 to 1994 was intermediate goods, which were necessary to support the export performance of the Mexican economy, the fastest growing component of imports throughout the period was consumer goods, which grew nearly at twice the rate of total imports (see Table 2.11).

Table 2.11
Structure of Merchandise Imports (% of Total)

	1987	1990	1992	1994	1996	1998	Growth rate 1987-98
Consumer goods	4.08	12.26	12.46	11.98	7.44	8.86	**32.33**
Intermediary goods	81.94	71.42	68.94	71.23	80.35	77.32	**18.20**
Capital goods	13.98	16.32	18.60	16.78	12.20	13.82	**19.58**

Source: Banco de México.

Table 2.12 shows the composition of Mexican exports. A continuous shift in the participation of agriculture and mining exports towards manufacturing exports is observed.

Table 2.12
Structure of Merchandise Exports (% of Total)

	1987	1990	1992	1994	1996	1998
Petroleum	31.27	24.82	17.98	12.15	12.13	6.07
Non-Petroleum	68.73	75.18	82.02	87.85	87.86	93.92
Agriculture	5.59	5.31	4.57	4.40	3.74	3.23
Mining	2.09	1.52	0.77	0.59	0.46	0.39
Manufacturing	61.05	68.35	76.68	82.89	83.65	90.29

Source: Banco de México.

Another two aspects are important to emphasise. First, GDP growth and exports show opposite growth patterns since the liberalisation of trade. Second, the growth of GDP and imports show the same growth pattern. When GDP growth has moved upwards then import growth has followed it, and vice versa. Then, the ratio of the trade balance to GDP shows opposite movements in relation to the output growth rate.

In sum, the trade volume has been increasing, but GDP growth has not shown a rising trend, because imports have expanded by more than exports (Ruiz-Nápoles, 2001; Sarmiento, 1999).

2.6 Conclusions

The Mexican economy has experienced significant changes over the last thirty years. The economic development up to the 1970s came to a halt when the oil price in the international market fell in 1982 and caused a debt crisis. Afterwards, the government firmly decided to change the orientation of its economic growth strategy, from inward to outward looking. It orientated the growth and development policies towards a free-market strategy. The degree of state involvement has continued to decline in recent years. Although Mexico embarked upon the process of economic liberalisation with its unilateral deregulation of its import licensing system and then strengthened with its accession to the GATT in 1986, the economy has not reached a higher stable long run rate of growth. The results of the structural adjustment policies were insufficient to modify the inefficient productive structure of the economy.

Great expectations and controversy surrounded the decision of the Mexican government to sign a FTA with Canada and US. The negotiations preceding NAFTA were long and

difficult, in part because of the uncertainty about the costs and benefits of such a far-reaching agreement. Although, nowadays, Mexico is pointed out as one of the countries with more FTAs signed, Mexico's trade policy has failed to eliminate trade deficits.

Appendix A

Table A1
The Uruguay Round Agreements

General Agreement on Tariffs and Trade 1994
Agreement on Agriculture
Agreement on Sanitary and Phytosanitary Measures
Decision on Measures Concerning the Possible Negative Effects on the Reform Programme on Least-Developed and Net Food-Importing Developing Countries
Agreement on Textiles and Clothing
Agreement on Technical Barriers to Trade
Agreement on Trade-Related Investment Measures
Agreement on Implementation of Article VI (Anti-dumping)
Agreement on Implementation of Article VII (Customs Valuation)
Agreement on Preshipment Inspection
Agreement on Rules of Origin
Agreement on Import Licensing Procedures
Agreement on Subsidies and Countervailing Measures
Agreement on Safeguards
General Agreement on Trade in Services
Agreement on Trade-Related Aspects of Intellectual Property Rights, Including Trade in Counterfeit Goods

Source: World Trade Organisation (WTO, 1994e).

Chapter 3

Impact of Trade Reforms on Exports

3.1. Introduction

During the last two decades Mexican exports have been growing relative to output. In constant prices, exports of goods and services rose from around 10 per cent of GDP in 1980 to 44 per cent in 2000 (see Table 3.1). This performance propelled Mexico to occupy the 13th position in the list of leading exporters in world merchandise trade in 2000 (WTO, 2001). Over this period, Mexico has also experienced changes in its trade structure. For instance, the major proportion of exports shifted from oil exports to non-oil exports.

Table 3.1
Exports of Goods and Services (% of GDP)

Year	Exports	Year	Exports
1980	10.1	1991	18.0
1981	10.3	1992	18.3
1982	12.7	1993	19.4
1983	15.2	1994	21.5
1984	15.5	1995	30.4
1985	14.4	1996	34.2
1986	15.7	1997	35.4
1987	16.9	1998	37.8
1988	17.6	1999	41.0
1989	17.9	2000	44.5
1990	17.9		

Source: World Development Indicators (2002).

Until 1985 the share of the value of oil exports in the total value of exports was not less than 50 per cent (see Table 3.2). From 1985 to 1986 the share of oil exports in total exports decreased by 29.2 percentage points because in 1986 the price of oil collapsed (from 1980 to

1986 the annual average oil price was $US 28 per barrel, in 1986 it dropped to $US 12), which contracted the value of Mexican oil exports.

Table 3.2
Value of Oil Exports
(% of Total Exports)

Year	Oil Exports	Year	Oil Exports
1980	67.3	1991	19.1
1981	72.5	1992	18.0
1982	77.6	1993	14.3
1983	71.8	1994	12.2
1984	68.6	1995	10.6
1985	68.2	1996	12.1
1986	39.0	1997	10.3
1987	41.1	1998	6.1
1988	32.7	1999	7.3
1989	34.5	2000	9.8
1990	37.6		

Source: Own calculations base on data from Instituto Nacional de Estadística, Geografía e Informática (INEGI).

Exports have always played a significant role in the economy, and particularly after the 1994 peso crisis. They counterbalanced the negative effects of decreasing domestic demand, and they have provided foreign exchange to finance imports. However, the export sector also indicates a major weakness of the Mexican economy, in the sense that it does not have strong backward linkages with domestic industry, which explains a high demand of imports that are required to produce exports. Also, exports are concentrated in a small group of firms and in one major market, the US. It is estimated that 70 per cent of Mexican exports are produced by less than 300 firms (Máttar, 1998), and around 3,130 firms (including *maquiladoras*[1] –in bond industries) produce 93.3 per cent of exports (Dussel, 2000b). In 2000, the US was the

[1] This industry purchases material inputs in the world market (US), transforming them with domestic labour into final products, and selling the output in the world market (US). The *maquiladora* programme has special tariff preferences; raw materials are imported duty free, manufactured in the *maquiladora* base, and then re-exported while paying duty only on the value added in Mexico.

market for over 85 per cent of Mexican exports (Direction of Trade Statistics Yearbook, 2001).

During the mid-1980s Mexico initiated a process of serious trade liberalisation.[2] In order to understand the role played by trade liberalisation on Mexico's trade it is our concern to answer the following questions: What effects have trade reforms had on exports? How much of the export growth is explained as a result of trade liberalisation?

Previous work has been done on Mexico's export performance (e.g. Graf, 1996; Katz, 1996; Ocegueda, 2000; Sotomayor, 1997). For instance, Graf (1996) analyses the manufacturing export performance, focusing on twenty manufacturing sub-sectors, during the 1970-1994 period and one sub-period 1983-1994, applying the OLS method. After specifying an export equation for each sub-sector —dependent on the real exchange rate, manufacturing production index, labour productivity, unit labour costs, US imports, a shift dummy which accounted for the effects of the debt crises, and two slope dummy variables to capture the joint effects of the change in Mexico's economic orientation after the debt crises on price and income elasticities—, Graf presents two sets of results. First, the real exchange was the only variable significant in six sub-sectors and the coefficient of the dummy variable was significant in five sub-sectors. Second, when the sub-period 1983-1994 was considered, Graf classifies the sub-sectors into five categories according to the significance of the coefficients of the variables. The main conclusion of the analysis is that the determinants of the rate of growth of exports for each sub-sector are not the same.

[2] See chapter 2, where an analysis of trade reforms is presented.

Ocegueda (2000) estimates a non-oil export equation over the period 1960-1997, applying the Engel and Granger method. He finds no long run relationship between the variables under investigation in the non-oil export model (i.e. between the level of exports and the real exchange and output of the US). Thus, he argues that this is evidence of a structural change in the performance of non-oil exports. In order to test this hypothesis, the sample is divided into sub-periods (1960-1982 and 1983-1997). Ocegueda considers 1982 as the turning point in economic policy making. He finds that the income elasticity of demand for exports increases from one period to the other (from 1.3 to 4.3). Sotomayor (1997) presents a table that summarises price and income elasticity estimations of six different studies, specifying the period of analysis and the econometric technique applied. These studies, however, do not consider the period beyond 1993, and do not highlight the impact on exports of trade reforms in the mid-1980s.

Regarding the analysis of the impact of NAFTA on Mexican exports, research has been carried out by means of computable general equilibrium (CGE) models (i.e. Kehoe and Kehoe, 1994) in order to assess the economic effects of NAFTA in Canada, Mexico and the US. Such studies mostly anticipated large benefits for Mexico and less significant for Canada and the US. They are focused on capturing changes in prices, output and welfare from NAFTA. None of the existing literature analyses the impact of trade liberalisation on export performance, which is what we are interested in doing in this chapter.

The precise aim of this chapter is twofold. First, we compare export composition by sector and by manufacturing sub-sector before and after trade reforms. Second, we analyse the

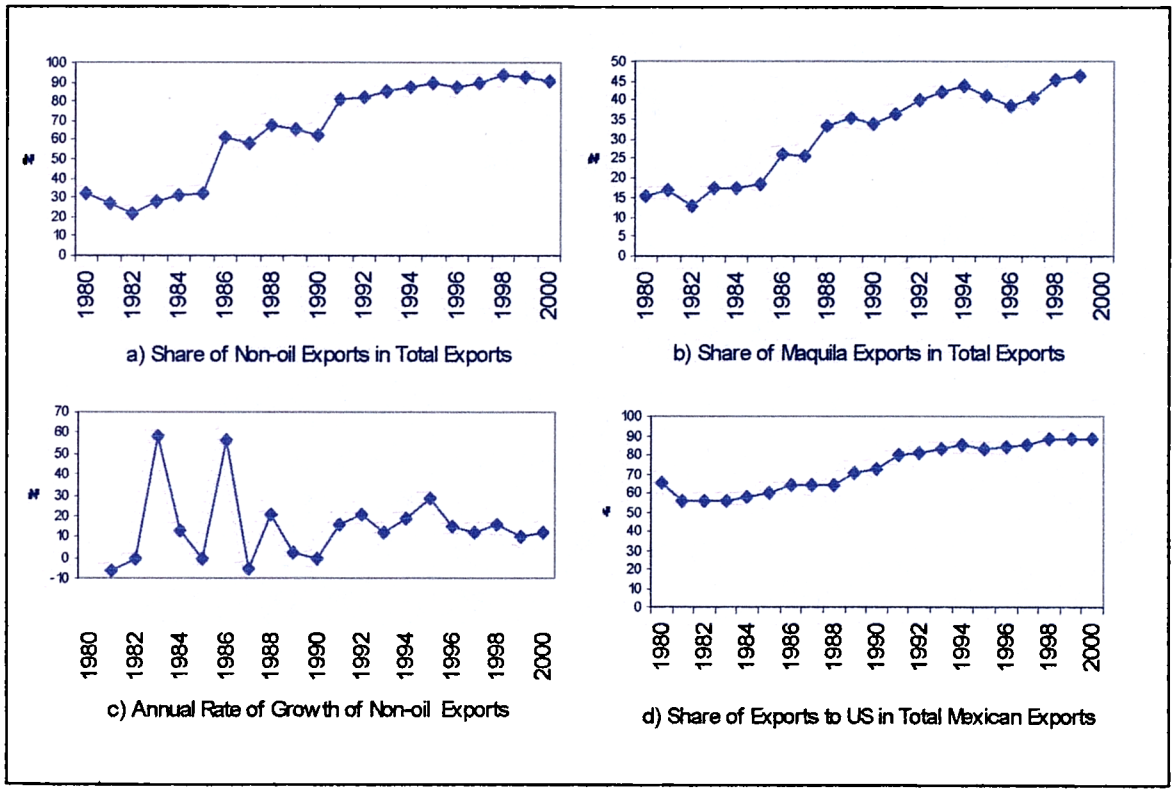
impact of trade reforms on export performance at the aggregate and a disaggregated level. The analysis is performed within the framework of the single equation, OLS methodology, and the analysis is supported by other econometric techniques, such as structural stability analysis, rolling regressions, outside-sample forecasts, autoregressive distributed lag method (ARDL) and error correction models (ECM). The remaining sections of the chapter are organised as follows. Section two describes the export composition during the last two decades. Section three presents the model and describes the methodology used for the statistical analysis. Section four carries out the study of the impact of trade reforms on exports at the aggregate level. Section five analyses the effect of trade reforms on exports at a disaggregated level. Finally, section six concludes.

3.2 Export Composition

Since 1980 there have been some important changes in Mexico's trade composition, and in the rate of growth and destination of Mexican exports, as is illustrated by Graph 3.1. Panel a) shows how non-oil exports have increased their participation in total exports from about 33 per cent in 1980 to 90 per cent in 2000. Panel b) shows a rise in *maquiladora* exports as a share of total exports, up from 15 per cent in the early 1980s to about 50 per cent in 2000. Panel c) illustrates how the dynamics of non-oil exports have performed since 1980. When the debt crisis occurred in 1982, oil exports reached their highest point and non-oil exports started to grow vigorously as a result of the devaluation of the Mexican peso. The dynamic growth of non-oil exports was lost during 1984 and 1985 because of the gradual appreciation of the real exchange rate during that period. Although in 1986 total merchandise exports decreased as a result of the collapse of the international oil market, non-oil exports increased,

presumably due to a combination of trade liberalisation and exchange rate changes from August 1985. Given these facts, it is relevant to highlight that growth rates of non-oil exports are high and volatile; therefore, large coefficients for the dummy variables that will measure the impact of trade reforms on exports may also be high. The final panel shows an upwards tendency of Mexican exports to concentrate on a single destination, the US, even before NAFTA was signed.

Graph 3.1
Changes in Mexican Exports

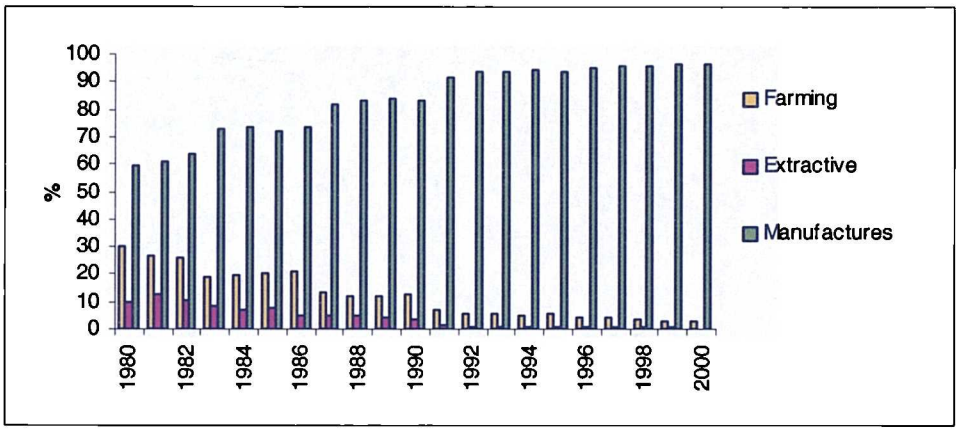


Source: Banco de México, Instituto Nacional de Estadística, Geografía e Informática (INEGI), Direction of Trade Statistics Yearbook (2001) and World Development Indicators (2002).
Note: All the variables represent volume of exports.

A more detailed analysis requires the decomposition of non-oil exports into their main components. Graph 3.2 shows the changes in the three main sectors: farming, extractive and

manufactures. During the last two decades it is observed that both farming and extractive sectors have decreased their participation in non-oil exports. In 1980, the farming sector represented 30 per cent of non-oil exports and in 2000 it was only 2.8 per cent. Likewise, the extractive sector diminished from 10 per cent to 0.35 per cent in twenty years. Meanwhile, the share of manufacturing exports rose from 60 per cent in 1980 to 97 per cent in 2000.

Graph 3.2
Share of Main Sectors in Non-Oil Exports, 1980-2000
(% of Total Exports)

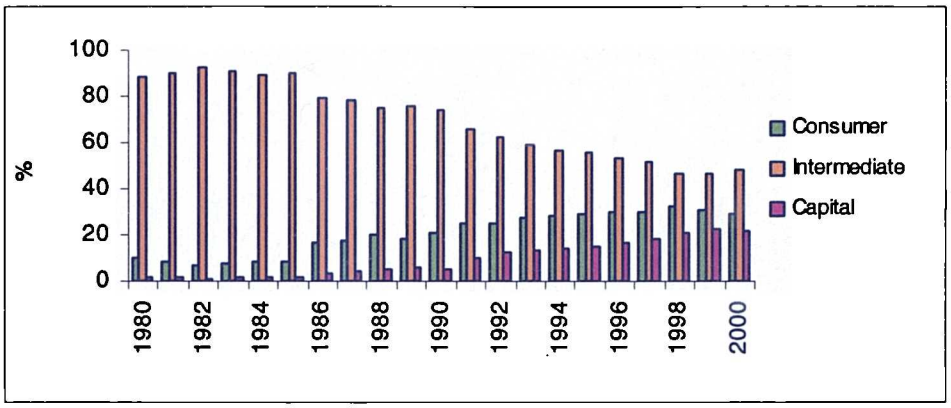


Source: Instituto Nacional de Estadística, Geografía e Informática (INEGI) and Banco de México.

Further examination of export composition is given in Graph 3.3. We observe that the share of consumer and capital goods in total exports have increased over the period, 1980-2000, while the share of intermediate goods decreased.[3]

[3] It is necessary to mention that intermediate goods include oil exports. Then, we are referring to the share of intermediate goods in *total* exports.

Graph 3.3
Goods Composition of Exports, 1980-2000
(% of Total Exports)



Source: Instituto Nacional de Estadística, Geografía e Informática (INEGI) and Banco de México.

We now focus on the structure of the manufacturing sector itself. It is composed of nine sub-sectors: Food Products, Beverages and Tobacco; Textiles and Leather Products; Wood Products; Paper Products, Publishing and Printing; Chemicals, Rubber and Plastic Products; Non-Metallic Mineral Products; Basic Metals; Machinery and Equipment; and, Other Manufactures. Table 3.3 illustrates the distribution of exports by the nine manufacturing sub-sectors from 1980 to 2000.

We analyse the distribution of manufacturing exports through the comparison of four years 1980, 1986, 1994 and 2000. The first and the last years are the beginning and end of our sample, respectively; and, we are taking 1985/1986 and 1994 as reference years of trade liberalisation.

Table 3.3
Distribution of Exports by Manufacturing Sub-Sectors, 1980-2000

Year	Food Products, Beverages and Tobacco	Textiles and Leather Products	Wood Products	Paper Products, Publishing and Printing	Chemicals, Rubber and Plastic Products	Non-Metallic Mineral Products	Basic Metals	Machinery and Equipment	Other Manufactures
1980	21.61	5.18	1.55	2.21	26.74	3.57	15.90	22.00	1.23
1981	16.58	4.42	1.45	1.99	29.86	3.04	19.66	21.81	1.22
1982	20.89	4.44	1.54	2.32	24.93	4.12	14.47	26.23	1.06
1983	13.30	3.51	1.51	1.38	28.38	3.86	16.17	30.53	1.38
1984	11.76	3.94	1.40	1.39	31.86	4.13	12.71	31.73	1.07
1985	11.68	3.03	1.12	1.35	33.80	4.87	9.97	33.12	1.06
1986	11.85	4.21	1.27	1.74	20.67	4.74	11.60	43.12	0.81
1987	12.60	5.43	1.29	2.13	18.78	4.28	12.08	42.75	0.66
1988	11.11	5.05	1.48	2.62	19.31	4.24	12.77	42.68	0.74
1989	9.69	4.76	1.51	2.06	17.57	4.33	14.51	44.76	0.83
1990	7.37	4.25	1.13	1.37	20.10	3.53	12.68	48.72	0.86
1991	4.40	6.23	1.37	1.92	11.51	2.59	6.46	63.34	2.17
1992	3.77	6.41	1.38	1.81	11.00	2.54	5.73	65.56	1.80
1993	3.74	6.52	1.35	1.56	10.08	2.65	5.70	66.71	1.70
1994	3.71	6.37	1.15	1.10	9.06	2.38	5.13	69.16	1.94
1995	3.75	7.27	0.92	1.29	9.17	2.08	7.25	66.31	1.94
1996	3.62	7.82	1.06	1.11	7.82	2.12	5.91	68.80	1.73
1997	3.48	9.22	1.10	1.11	7.40	2.12	5.61	68.19	1.77
1998	3.32	9.24	0.99	1.09	6.70	2.15	4.63	70.16	1.71
1999	3.09	9.13	0.91	1.09	6.54	2.11	3.54	72.25	1.35
2000	2.83	8.55	0.78	0.92	6.67	1.97	3.20	74.07	1.02

Source: Instituto Nacional de Estadística, Geografía e Informática (INEGI) and Banco de México.

In 1980, three sub-sectors (Food, Beverages and Tobacco; Chemicals, Rubber and Plastic Products; and, Machinery and Equipment) represented over 70 per cent of manufacturing exports. The Chemicals, Rubber and Plastic Products manufacturing sub-sector was the one with the highest contribution, about 27 per cent.

From 1980 to 1986, there were significant changes among the manufacturing sub-sectors, especially in the Food Products, Beverages and Tobacco, and the Machinery and Equipment sub-sectors. The former sub-sector's contribution fell from 22 to 12 per cent, while the latter sub-sector doubled its contribution during those six years.

From 1986 to 1994, six out of nine manufacturing sub-sectors (Food Products, Beverages and Tobacco; Wood Products; Paper Products, Publishing and Printing; Chemicals, Rubber and Plastic Products; Non-Metallic Mineral Products; and, Basic Metals) decreased their contribution. The Chemicals, Rubber and Plastic Products sub-sector decreased approximately two-fold during this period. By contrast, the most outstanding increase was registered by the Machinery and Equipment sub-sector. Its contribution rose from 43 per cent to 70 per cent.

Between 1986 and 2000, two sub-sectors (Textiles and Leather Products; and, Machinery and Equipment) continued increasing their participation in manufacturing exports. By contrast, Food Products, Beverages and Tobacco; Chemicals, Rubber and Plastic Products; Basic Metals; and, Other Manufactures decreased their participation in manufacturing exports. The

other sub-sectors (Wood Products; Paper Products, Publishing and Printing; and, Non-Metallic Mineral Products) remained constant.

A different approach to analyse the performance of manufacturing exports is to examine the proportion of output that is exported of each manufacturing sub-sector. Table 3.4 shows these figures.

With regard to trade liberalisation which started in a serious way in 1985, there is no marked increase in the share of output exported in 1985, but there is in 1986. In that year, almost every manufacturing sub-sector more than doubled the share of output exported, but mainly due to a negative GDP rate of growth (-3.75) in 1986. With regard to NAFTA there is no marked increase in export shares in 1994, but all sectors increased the share of output going to exports in 1995. Some sub-sectors nearly doubled their share of output exported, for instance Food Products, Beverages and Tobacco; Wood Products, Chemicals, Rubber and Plastic Products; Non- Metallic Mineral Products; and, Machinery and Equipment. The remaining sub-sectors, Textiles and Leather Products; Paper Products, Publishing and Printing; Basic Metals; and, Other Manufactures more than doubled their share. There are two plausible explanations for these increases. First, the extraordinary dynamism of manufacturing exports in 1995 may be related to NAFTA, but with some delay. Second, the increase of competitiveness linked to the large real devaluation, 45.5 per cent, of the Mexican peso against the US dollar may be responsible.

Table 3.4
Manufacturing Exports by Sectors (% of output of each sector), 1980-2000

Year	Food Products, Beverages and Tobacco	Textiles and Leather Products	Wood Products	Paper Products, Publishing and Printing	Chemicals, Rubber and Plastic Products	Non-Metallic Mineral Products	Basic Metals	Machinery and Equipment	Other Manufactures
1980	0.42	0.22	0.17	0.22	0.91	0.22	1.63	0.44	0.22
1981	0.31	0.18	0.16	0.19	0.93	0.19	1.93	0.40	0.19
1982	0.53	0.26	0.24	0.31	1.08	0.36	2.22	0.76	0.25
1983	0.65	0.42	0.48	0.39	2.33	0.69	4.96	2.09	0.75
1984	0.63	0.51	0.49	0.41	2.74	0.78	3.90	2.21	0.58
1985	0.58	0.37	0.37	0.35	2.69	0.83	2.93	1.99	0.51
1986	1.38	1.26	0.98	1.10	3.93	2.00	8.43	6.89	0.99
1987	1.72	2.01	1.13	1.57	4.02	1.94	9.15	7.70	0.98
1988	1.48	1.84	1.32	1.83	4.02	1.93	9.12	6.80	1.04
1989	1.12	1.54	1.25	1.22	3.11	1.75	9.43	5.99	0.99
1990	0.82	1.31	0.95	0.75	3.44	1.35	7.74	5.91	0.87
1991	1.02	4.04	2.47	2.21	4.21	2.07	8.96	15.34	4.81
1992	0.86	4.25	2.47	2.06	4.05	1.95	8.01	15.29	3.50
1993	0.95	5.11	2.85	2.08	4.34	2.28	8.87	18.66	3.90
1994	1.06	5.72	2.75	1.65	4.36	2.26	8.70	20.97	5.04
1995	1.94	12.60	4.33	3.80	8.07	4.06	21.38	40.54	10.18
1996	1.94	12.58	5.02	3.43	6.93	4.10	15.73	36.90	8.53
1997	1.90	14.13	5.11	3.23	6.46	4.08	14.14	32.34	8.31
1998	2.04	16.33	5.30	3.59	6.61	4.70	13.46	35.77	8.89
1999	1.86	15.95	4.92	3.46	6.42	4.61	10.42	35.09	6.77
2000	1.69	14.65	4.20	2.96	6.56	4.30	9.48	32.81	4.89

Note: The output of each sector (in constant 1993 prices) was transformed into $US using real exchange rate.
Source: Own calculations based on data from Instituto Nacional de Estadística Geografía e Informática (INEGI), International Monetary Fund (IMF) and Banco de México.

From the previous descriptive analysis a main hypothesis is derived. If trade reforms had any effect at all on exports, it is likely that it was delayed and may be hard to disentangle from exchange rate changes. However, it is expected that a formal export growth model can distinguish those effects and can discern break points caused by trade liberalisation.

The next section presents an export growth model, and a brief description of the econometric techniques that we are going to use in order to evaluate the impact of trade reforms on exports.

3.3 The Model and Econometric Techniques

Export performance can clearly be affected by trade liberalisation (see Chapter 1). Two events are identified as being important in this regard. The first one is when trade liberalisation started in a serious way in 1985-1986. The second event is related to facts involved in Mexico's accession to NAFTA in 1994. Our primary objective is to see whether any impact can be discerned from trade liberalisation on non-oil export growth.[4] How much have exports increased as a result of trade reforms independently of other determinants of export performance?

We try to answer this question by specifying a complete export growth function starting from its simple expression and then extending it to include the trade liberalisation indicators. First, we take a standard export growth function, in which exports are considered to be a function

[4] The decision to exclude oil is based on two main factors. First, oil exports are influenced by other factors from those that explain non-oil exports. Second, doing this we isolate the evolution of exports from the fluctuations in the oil market. Hereafter we treat non-oil exports as exports.

of price competitiveness measured by the real exchange rate;[5] and international income.[6] Assuming that the price and income elasticities of demand for exports are constant, the function can be expressed as (Thirlwall, 1999):

$$X = A\left(\frac{P_f E}{P_d}\right)^{\beta_1} YUS^{\beta_2} \tag{3.1}$$

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; β_1 and β_2 denote price and income elasticities, respectively. Taking logs of the variables in equation (3.1) 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:

$$x = \alpha + \beta_1 (p_f + e - p_d) + \beta_2 yus \tag{3.2}$$

It is expected that both elasticities, β_1 and β_2, are positive. This 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

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[5] The real exchange rate is defined as $RER = E\left(\frac{P_{US}}{P_M}\right)$, 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 depreciation.

[6] Since Mexico's main trade partner is the US (see Panel *d* in Graph 3.1), the GDP of US is taken as world income.

in period t and the actual flow of exports in the previous period (t-1), the lag of exports also becomes an explanatory variable, giving equation (3.3):

$$x_t = \alpha + \beta_1 p_t + \beta_2 yus_t + \beta_3 x_{t-1} + \mu_t \qquad (3.3)$$

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 $\left(\frac{\beta_1}{1-\beta_3}\right)$ and $\left(\frac{\beta_2}{1-\beta_3}\right)$, respectively.

Equation (3.3) can then be extended to include the two liberalisation indicators, defined as shift dummy variables, one for the first period of reforms and the other for the second period of reforms. Each dummy variable takes the value of zero prior to liberalisation and one afterwards.[7] Tests we 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 reforms. For the second period of trade reforms we tested for 1994, 1995 and 1996; however none of them were significant. For the purposes of presenting the results of the model we chose 1994, but the results of using 1995 and 1996 are shown in the Appendix. Thus, the extended export demand function to be estimated can be expressed as:

$$x_t = \alpha + \beta_1 p_t + \beta_2 yus_t + \beta_3 x_{t-1} + \beta_4 lib86_t + \beta_5 lib94_t + \mu_t \qquad (3.4)$$

[7] 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.[8]

We are going to use different approaches to estimate the export demand function. First, the Ordinary Least Square (OLS) method, as the most standard approach for time series analysis, is applied. In order to test for structural breaks in the export demand function coefficients we use different techniques, such as the Chow Test, Rolling Regressions and Outside Sample Forecasts. Secondly, Autoregressive Distributed Lag Models (ARDL) and Error Correction Models (ECM) are estimated in order to test for cointegration among the variables and speed of adjustment of exports after they are affected by an external shock, respectively.

3.4. Impact of Trade Reforms on Non-Oil Exports at the Aggregate Level

i) Ordinary Least Square Estimations

The first technique that we are going to use is the OLS methodology. The time series properties of the data are presented, followed by the estimations of the export growth function. We focus our analysis on the shift dummy variables, which represent the trade liberalisation indicators.

In order to estimate the export demand model, and to avoid the possibility of spurious results, it is necessary to include only stationary variables. The first step is to apply the Augmented Dickey Fuller (ADF) test to examine the stationarity properties of the time series considered in equations (3.3) and (3.4). We use annual data from 1970 to 2000. The data source is the

[8] A shift dummy variable for 1991 was 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.

World Development Indicators (2002) and the Government Finance Statistics Yearbook, IMF (several issues).

Unit root tests for stationarity are performed on the log levels of the variables and first differences. Table 3.5 (part A) below presents the results of the ADF test (one lag) under the assumption of a constant. All the variables are stationary in first differences at the 5 per cent level of significance. In other words, all the variables we use are integrated of order one, I(1).

Table 3.5
Unit Root Test for Stationarity

	PART A with Constant Only, sample period 1970-2000		PART B with Constant and Time Trend, sample period 1970-2000	
Variables	Log Level [1]	Differences[1]	Log Level [2]	Differences[2]
x	-0.81	-3.24*	-1.39	-3.77*
yus	0.74	-4.13*	-3.74	-4.09*
p	-2.83	-5.36*	-3.05	-5.24*

Notes: [1]The critical value for rejection of hypothesis of a unit root is -2.97. [2]The critical value for rejection of hypothesis of a unit root is -3.59. The asterisk (*) denotes significance at the 5 per cent level.

Table 3.5 (part B) also presents the results of the ADF test (one lag) with a constant and deterministic time trend for the variables in both log levels and first differences. It can be seen that all the variables in log levels are non-stationary. In the case of first differences, the null hypothesis of non-stationarity can be rejected at the 5 per cent level.

As an exercise, we present regressions using the OLS method, which are shown in Table 3.6. Different specifications were estimated in order to know how each variable behaves when more explanatory variables are included. We started estimating the simple static model and we ended with a complete dynamic one, as equation (3.4) defines. Only stationary variables

are included. Two main factors should be mentioned about the results obtained. First, the shift dummy variable for 1986 is positive and significant at the 5 per cent confidence level in equation *3.6.3* and *3.6.5*. The shift dummy for 1994, however, is not statistically significant. Second, concerning income elasticities it can be seen that they are significant at the 5 per cent confidence level through all equations. The price elasticity has the expected sign and also is statistically significant through all the estimations (*3.6.1* to *3.6.5*).

The export growth model has been able to separate the effect of liberalisation and the exchange rate for 1986. Based on the estimated equations, equation (*3.6.5*) may be the best estimation that represents export growth. The effect of liberalisation on exports is positive. The shift dummy variable for 1986 indicates that for given changes in foreign income and relative prices, export growth increased by 15 percentage points. This compares with the average growth of non-oil exports over the sample period of 12.4 per cent, and the rate of growth of non-oil exports in 1986 of 56 per cent. We do not obtain significant effects for the second trade liberalisation indicator, *lib94*. It seems that NAFTA by itself did not bring meaningful incentives to raise the growth of exports significantly. Both income and price elasticities have the expected sign and are statistically significant. The former is relatively high, suggesting that a one per cent increase in the US income increases exports by 5.04 per cent, while the latter is relatively low –a one per cent depreciation in the real exchange rate increases exports by 0.51 per cent.

Table 3.6
OLS Estimation for Export Growth: 1970-2000 [9]

Dependent variable: Export growth (x)					
Regressor	Equations				
	3.6.1	*3.6.2*	*3.6.3*	*3.6.4*	*3.6.5*
Constant	-0.05 (-1.03)	-0.05 (-0.94)	-0.10 (-1.90)	-0.05 (-1.01)	-0.11 (-1.96)
yus	4.69 (3.32)*	4.89 (3.16)*	5.02 (3.52)*	4.77 (3.02)*	5.19 (3.54)*
p	0.53 (2.75)*	0.52 (2.60)*	0.53 (2.90)*	0.51 (2.51)*	0.55 (2.93)*
x_{1}		-0.07 (-0.43)	-0.19 (-1.15)	-0.09 (-0.51)	-0.19 (-1.16)
lib86			0.12 (2.30)*		0.15 (2.26)*
lib94				0.04 (0.66)	-0.05 (-0.68)
D91	0.29 (1.80)	0.28 (1.72)	0.21 (1.38)	0.29 (1.73)	0.19 (1.22)
R^2	0.37	0.28	0.49	0.38	0.50
Durbin Watson	2.24	1.72	1.98	2.07	1.95
Diagnostic Tests					
Serial Correlation	*0.528*	*0.806*	*0.965*	*0.772*	*0.934*
Functional Form	*0.659*	*0.653*	*0.417*	*0.754*	*0.274*
Normality	*0.041*	*0.120*	*0.000*	*0.020*	*0.000*
Heteroscedasticity	*0.066*	*0.033*	*0.325*	*0.144*	*0.303*

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. The diagnostic tests show probabilities.

In conclusion we can say that although the trade reforms started in 1985, they took time to take effect, and became significant only in 1986. When 1985 is considered as the structural break for the first period of reforms the coefficient on the shift dummy is slightly smaller and less significant. Turning to the second period of reforms, no shift dummy variable shows meaningful effects, even considering one or two years after 1994 (see Table B1 and Table B2 in the Appendix). This is an important finding since most commentaries in Mexico assumes

[9] Income and price slope dummies (i.e. *yus*lib86, yus*lib94, p*lib86, p*lib94;* designed to capture the effects of the elimination of trade distortions on the income and price elasticities of demand) were included in the export equation, but the results showed that the variables were not statistically different from zero (not reported here). Also, it is important to mention that we did not include export duties as a trade liberalisation indicator due to the lack of figures for some years during the 1970s; however, export duties are considered in the extended trade balance equations during the period 1980-2000 (see equations 5.4 and 5.5 in Chapter 5).

that NAFTA has had a significant impact on growth performance (see Güémez, 1996; NAFTA, 2002; Serra, 2003; Authers and Silver, 2003).

ii) Structural Stability, Rolling Regressions and Forecasts

To supplement our previous analysis, we also use additional techniques for analysing whether or not a structural break in export growth can be identified in 1986 and 1994: structural stability, rolling regressions and outside-sample forecasts.

First, we apply the Chow breakpoint test to see if there is statistical evidence for structural stability of the parameters. Selecting 1986 as the breakpoint year, the test leads us to reject the null hypothesis of structural stability at the 25 per cent level of significance; the p-value of the test is 0.17. Although, it is a weak test this result confirms our previous findings.

Second, we use the technique of rolling regression to examine parameter variation over time. In Table 3.7 we present seventeen rolling regressions of the simplest export model (equation 3.2). The sample size is 14 years. As we can observe, the constant does not show drastic changes, but it shifted from a negative to a positive sign in the sample that includes 1994.

Table 3.7
Rolling Regressions for Exports
(window size 14)

Dependent variable: Export growth rate (x)									
Variable \ *Period*	1971-84	1972-85	1973-86	1974-87	1975-88	1976-89	1977-90	1978-91	1979-92
constant	-0.08 (-1.24)	-0.08 (-1.27)	-0.07 (-1.00)	-0.08 (-1.11)	-0.10 (-1.12)	-0.12 (-1.19)	-0.13 (-1.42)	-0.04 (-0.52)	-0.03 (-0.44)
yus	4.80 (2.59)*	4.75 (2.55)*	5.31 (2.36)*	5.42 (2.29)*	6.36 (2.38)*	6.84 (2.30)*	7.87 (2.74)*	6.27 (2.19)*	6.66 (2.18)*
p	0.46 (1.50)	0.46 (1.48)	0.74 (2.21)*	0.74 (2.17)*	0.66 (1.93)	0.71 (2.00)*	0.81 (2.38)*	0.76 (2.02)*	0.73 (1.94)

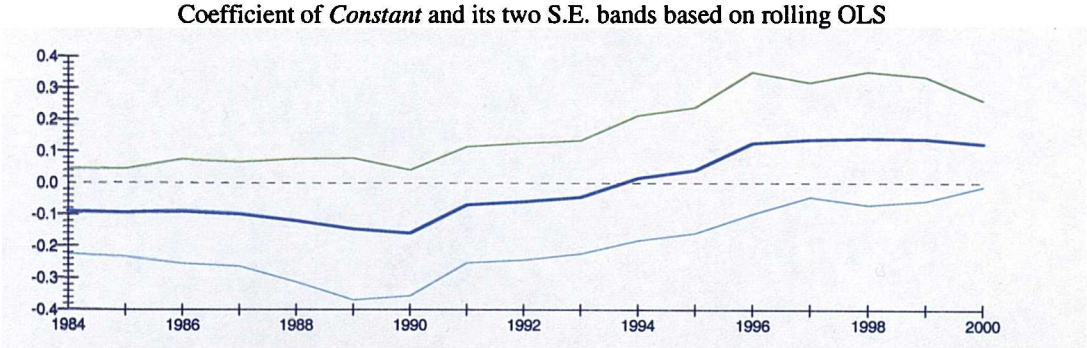
Variable \ *Period*	1980-93	1981-94	1982-95	1983-96	1984-97	1985-98	1986-99	1987-00
Constant	-0.02 (-0.30)	0.03 (0.33)	0.05 (0.60)	0.14 (1.32)	0.12 (1.56)	0.13 (1.49)	0.13 (1.32)	0.12 (1.78)
yus	6.70 (2.25)*	4.80 (1.54)	4.04 (1.37)	1.49 (0.46)	0.97 (0.40)	0.79 (0.29)	0.56 (0.18)	0.42 (0.21)
p	0.71 (1.92)	0.54 (1.48)	0.42 (1.37)	0.62 (1.98)	0.51 (2.05)*	0.52 (2.02)*	0.51 (2.01)*	0.19 (0.99)

Note: The asterisk (*) denotes significance at the 5 per cent.

The rolling coefficients *constant*, *yus* and *p*, with their standard errors, are shown in Graph 3.4, (a), (b) and (c), respectively. The estimate of the constant shows a clear upward tendency. The income elasticity is increasing up to 1990 and then falls. The price elasticity shows a roughly stable pattern.

Graph 3.4
Rolling Coefficients for Exports

Coefficient of *Constant* and its two S.E. bands based on rolling OLS

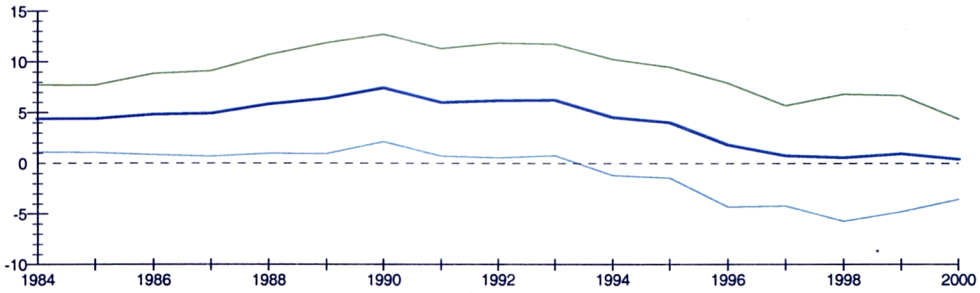


(a)

(*Graph 3.4 continues overleaf*)

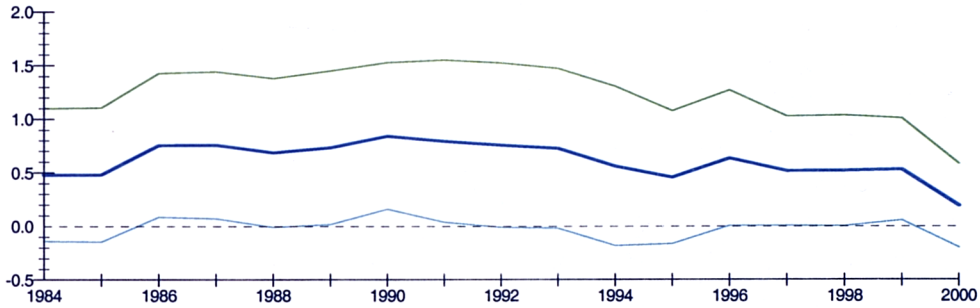
(Graph 3.4 continued)

Coefficient of *yus* and its two S.E. bands based on rolling OLS



(b)

Coefficient of *p* and its two S.E. bands based on rolling OLS

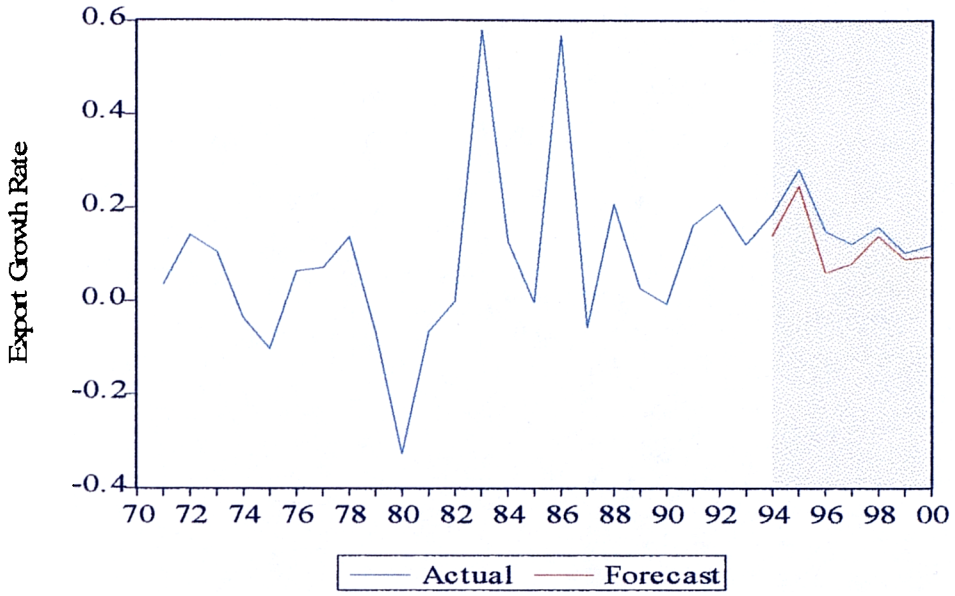


(c)

The third procedure to test for the effect of NAFTA on exports is to estimate the export model up to 1994 and then to make outside-sample forecasts. If actual export performance is greater than predicted, this is *prima facie* evidence of a positive structural break. The actual and the forecast exports are shown in Graph 3.5. In this case, the former slightly exceeds the latter in the beginning of 1994 and then in 1995-96. It means that, in some way and with some delay, NAFTA may have represented a structural break for exports, but not continuous and remarkable.[10]

[10] We estimated dynamic forecast for exports in order to compare it with the static forecast model. However, there is not a significant difference between them. This may be because the lagged dependent variable is not statistically significant, see Table 3.6.

Graph 3.5
Actual and Single Equation Static Forecast for Exports



We also calculated the root–mean-square (*rms*) forecast error[11] and the Theil inequality coefficient along with its components for this forecast. These statistics which are helpful in evaluating the forecast are as follows:

Export Forecast Evaluation	
Root-mean square error	0.044691
Theil inequality coefficient	0.146032
Bias proportion	0.734177
Variance proportion	0.001532
Covariance proportion	0.036486

Observe that the bias proportion of the Theil inequality coefficient is relatively high (about 73 per cent).[12] This means that a systematic bias is present, so the model is not likely to be reliable for forecasting.

[11] The smaller the error the better the forecasting ability of the model (Pindyck and Rubinfeld, 1998).
[12] The bias proportion tells us how far the mean of the forecast is from the mean of the actual series.

In the next sub-section we are going to test for the existence of a long run relationship among the variables that explain export performance. Also, we are interested in estimating the speed of adjustment of the model once it is disturbed by a shock.

iii) Autoregressive Distributed Lag and Error Correction Modelling

The estimation of long run relationships can be approached through the use of an autoregressive distributed lag model (ARDL). The ARDL method is investigated within a sufficiently dynamic specification, including the lagged dependent and independent variables. Pesaran and Shin (1995) consider the following general ARDL (p, q) model:

$$y_t = \alpha_0 + \alpha_1 t + \sum_{i=1}^{p} \varphi_i y_{t-i} + \beta' x_t + \sum_{i=0}^{q-1} \beta^{*\prime} \Delta x_{t-i} + u_t \tag{3.5}$$

$$\Delta x_t = P_1 \Delta x_{t-1} + P_2 \Delta x_{t-2} + \ldots + P_s \Delta x_{t-s} + \varepsilon_t \tag{3.6}$$

where x_t is a k-dimensional vector of $I(1)$ variables that are not cointegrated among themselves, u_t and ε_t are serially uncorrelated disturbances with zero mean and constant variance-covariances, and P_i are k x k coefficient matrices such that the vector autoregressive process in Δx_t is stable. It is also assumed that there exists a stable unique long-run relationship between y_t and x_t. If the disturbances are uncorrelated, then i) the OLS estimators of the short run parameters are $\sqrt{T}$ -consistent, ii) their covariance matrix is asymptotically singular, so that the estimators of the short-run coefficients on the I(1) variables are asymptotically perfectly collinear with the estimators of the coefficients on the lagged dependent variable, and iii) the ARDL-based estimators of the long-run coefficients are

'superconsistent'. In this case, the ARDL approach to cointegration does not require knowledge of whether the variables under consideration are I(1) or I(0).

In practice, the ARDL estimation involves two steps. In the first stage the existence of a long run relationship, as predicted by the theory between the variables under consideration, 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. Pesaran *et al.* (1997 and 2001) provide the asymptotic critical value bounds for the F-statistic. 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. Then, in the next stage the long and short run parameters are estimated using the ARDL method.

In this case, the calculated F statistic is 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, it is above the upper critical value, allowing us to reject the null hypothesis of no long run relationship between the variables at the 5 per cent significance level.

Having tested that the long run relationship between the variables is not spurious, we then estimated the long run coefficients and the ECM. We start from one lag length,[13] and then the order of the ARDL model is determined by using the Schwarz Bayesian Criterion (SBC).

[13] We are constrained to use one lag due to the small sample size considered.

The long run coefficients, and the ECM derived from the ARDL (1,1,0) approach, are the following, respectively:[14]

$$LX = \underset{(-0.26)}{-4.38} + \underset{(1.54)}{0.88}\, LYUS + \underset{(1.77)}{0.85}\, LP + \underset{(3.71)}{0.69}\, lib86 + \underset{(1.42)}{0.28}\, lib94 + \underset{(3.00)}{0.77}\, d91 \qquad (3.7)$$

$$x = \underset{(-0.26)}{-2.13} + \underset{(3.54)}{4.39}\, yus + \underset{(2.41)}{0.41}p + \underset{(2.82)}{0.34}\, lib86 + \underset{(1.23)}{0.13}\, lib94 + \underset{(3.76)}{0.37}\, d91 - \underset{(-3.96)}{0.48}\, ecm_{-1} \qquad (3.8)$$

where the *L* preceding the variables, in equation 3.7, stands for the logs of the variable; and, the dependent and the first two independent variables in equation 3.8, which are in lower cases, represent growth rates.

Only the first trade liberalisation coefficient, *lib86*, of all the long run coefficients (equation 3.7) is significant at the 5 per cent level, suggesting that given changes in foreign income and relative prices, non oil exports approximately doubled.[15] Meanwhile, the ECM shows the short run coefficients of the variables (all of them are significant, except *lib94*) and the error term. The latter 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.

In sum, there is evidence that the trade reforms in the mid-1980s improved export performance. The boost in non-oil exports can only be understood through the process of structural change that followed the trade liberalisation initiated in 1985. But the trade liberalisation relating to NAFTA did not have a significant impact on export growth. It could

[14] Both models satisfy all diagnostic tests.
[15] This value is calculated from e^{β}-1, where β is the value of the coefficient. This is consistent with the OLS estimation of a 15 percentage points rise compared with an average growth of 12.4 per cent.

mean that even without such agreement, exports would have had a similar outcome to the one observed; significant trade liberalisation had already taken place before NAFTA took effect (see section 2.5 in Chapter 2).

In addition to this, we have to consider the institutional factors that were behind Mexico's decision to join NAFTA. As Skott and Larudee (1998) and Ibarra (1999) argue, one of the main reasons for Mexico joining NAFTA was to overcome the lack of confidence in the permanence of trade policy reforms.

3.5 Impact of Trade Reforms on Non-Oil Exports at a Disaggregated Level

At the disaggregated level, the existing work that has been done on Mexico's export performance refers to selected products or sectors. For instance, Dussel (2000a) analyses trade changes in agriculture and electronics. Those sectors were chosen because the former includes maize which represents the main food in Mexicans' diet; and, the latter because it is an export oriented industry attracting multinational firms. His research is descriptive rather than analytical. He focuses on some trade changes and tendencies during the 1990s, comparing growth rates over time, the participation of Mexican exports in the US market, and contrasting Mexican export performance with other countries. Also, in other work Dussel (2000b) examines some of Mexico's manufacturing sectors. After ranking manufacturing sectors by the annual average export growth rate, considering nine years (1988-1996), he concludes that trade liberalisation has generated a strongly export-oriented group of products (automobiles, electronic equipment, other textile industries, household appliances, machinery

and electric equipment, and soft drinks and flavourings), but the rest of the manufacturing sector has not grown significantly.

Garces-Diaz (2000) examines exports at a disaggregated level. He divided exports into *maquila*, oil related, and the rest. Basically, he looks for the existence of long run relationships among the variables included in an export demand function. The main features of his study is that he works with monthly figures and considers the index of value of US industrial production as the foreign income. The data sample used goes from 1980 to 2000, and is split into two, from 1980 to 1989 and from 1991 to 2000. For all types of exports, he found a stable cointegration vector for the 1991-2000 period which leads him to conclude that a structural change in Mexican exports during the 1990s did not take place and NAFTA should not be credited with the performance shown by the trade sector.

However, these studies do not measure how the first period of trade reforms (1985-86) and NAFTA affected exports. This is the aim of this section, by considering three different classifications of exports. Classification 1 is related to Farming, Extractive and Manufacturing sectors. Classification 2 refers to Consumer goods and Capital goods.[16] Classification 3 deals with the nine sub-sectors that comprise the manufacturing sector: Food Products, Beverages and Tobacco; Textiles and Leather Products; Wood Products; Paper Products, Publishing and Printing; Chemicals, Rubber and Plastic Products; Non-Metallic Mineral Products; Basic Metals; Machinery and Equipment; and, Other Manufactures.

[16] As our analysis is focused on non-oil exports. We do not consider any more Intermediate goods because they contain oil.

i) Ordinary Least Square Estimations

In order to estimate the export model at the disaggregated level, and to avoid the possibility of spurious results, the ADF test was applied to the different classifications of exports. We use annual data from 1980 to 2000. The data source is the Instituto Nacional de Estadística Geografía e Informática (INEGI), the Banco de México, and the World Development Indicators (2002).

Unit root tests for stationarity are performed on the log levels of the variables and first differences. Table 3.8 presents the results of the ADF test (one lag) under the assumption of a constant (part A) and with constant and deterministic time trend (part B). All the variables are I(1).

Table 3.8
Unit Root Test for Stationarity

	PART A with Constant Only, sample period 1980-2000		PART B with Constant and Time Trend, sample period 1980-2000	
Variables	Log Level [1]	Differences[1]	Log Level [2]	Differences[2]
yus	-0.04	-3.78*	-2.23	-3.80*
p	-2.00	-5.74*	-2.60	-5.84*
Farming Exports	-2.45	-15.51*	-4.63*	-15.56*
Extractive Exports	-1.54	-6.54*	-2.66	-6.52*
Manufacturing Exports	0.02	-5.46*	-4.00*	-5.47*
Consumer Goods Exports	0.32	-8.72*	-2.94	-8.84*
Capital Goods	-0.16	-7.50*	-2.88	-7.49*
Food Products, Beverages and Tobacco	-0.74	-16.31*	-3.16	-16.97*
Textiles and Leather Products	-0.40	-5.00*	-3.08	-5.01*
Wood Products	-0.72	-6.06*	-3.20	-6.01*
Paper Products, Publishing and Printing	-0.72	-5.95*	-3.40	-5.92*
Chemicals, Rubber and Plastic Products	-0.72	-5.41*	-3.15	-5.38*
Non-Metallic Mineral Products	-0.51	-6.26*	-2.99	-6.21*
Basic Metals	-1.00	-5.05*	-3.75*	-5.03*
Machinery and Equipment	-0.27	-5.70*	-3.24	-5.67*
Other Manufactures	-0.64	-5.37*	-2.13	-5.33*

Notes: [1]The critical value for rejection of hypothesis of a unit root is -2.89. [2]The critical value for rejection of hypothesis of a unit root is -3.46. The asterisk (*) denotes significance at the 5 per cent level.

We present regressions using the OLS method for the three different classifications of exports. Table 3.9 shows the results for exports included in classification 1. Different specifications were estimated in order to know how each variable behaves when more explanatory variables are included. We started estimating the simple static model and we ended with a complete dynamic one.[17] Three main points should be mentioned about the results obtained. First, the shift dummy variable for 1986 is positive and significant at the 5 per cent confidence level for farming and manufacturing exports (equations *3.9.5* and *3.9.15*). Second, concerning income elasticities it can be seen that they are significant at the 5 per cent confidence level in most of the equations but implausibly large. But clearly Mexico's trade is highly dependent on US demand. In the case of price elasticities, they have the expected sign and are significant at the 5 per cent confidence level through almost all equations. Third, the coefficients related to the shift dummy variable for 1991, are always significant, except for equations *3.9.1* and *3.9.6*.

Table 3.9
OLS Estimation for Disaggregated Exports Growth: 1980-2000

Dependent variable : x^i										
Variable / x^i	*Eq.*	*Constant*	*yus*	*p*	x^i_{-1}	*lib 86*	*lib94*	*d91*		R^2
Farming	*3.9.1*	-0.16 (-1.23)	6.85 (1.77)	0.84 (2.27)*				0.48 (1.69)		0.26
	3.9.2	-0.15 (-1.36)	7.74 (2.32)*	0.91 (2.91)*	-0.56 (-3.25)*			0.57 (2.38)*		0.57
	3.9.3	-0.25 (-1.82)	7.72 (2.35)*	0.99 (3.14)*	-0.59 (-3.42)*	0.12 (1.19)		0.56 (2.34)*		0.61
	3.9.4	-0.18 (-1.64)	10.20 (2.79)*	1.05 (3.30)*	-0.56 (-3.33)*		-0.13 (-1.41)	0.64 (2.69)*		0.62
	3.9.5	-0.40 (-3.23)*	12.27 (3.92)*	1.33 (4.68)*	-0.60 (-4.30)*	0.24 (2.63)*	-0.24 (-2.77)*	0.66 (3.35)*		0.76

(Table 3.9 continues overleaf)

[17] Note again that a shift dummy variable related to 1991, *d91*, is included in order to capture the change in the methodology used by INEGI related to non-oil export series. Since 1991 *maquiladora* exports are included in the time series, before this year they were presented as a different variable.

(Table 3.9 continued)

Variable / x^i	Eq.	Constant	yus	p	x^i_t	lib 86	lib94	d91		R^2
Extractive	3.9.6	-0.20 (-1.79)	6.86 (2.05)*	0.71 (2.23)*				0.30 (1.21)		0.26
	3.9.7	-0.31 (-2.99)*	9.79 (3.20)*	1.00 (3.42)*	-0.18 (-0.97)			0.46 (2.10)*		0.49
	3.9.8	-0.37 (-2.85)*	9.76 (3.14)*	1.05 (3.45)*	-0.18 (-0.95)	0.07 (0.74)		0.45 (2.00)*		0.51
	3.9.9	-0.32 (-2.87)*	10.07 (2.79)*	1.02 (3.20)*	-0.18 (-0.93)		-0.01 (-0.16)	0.47 (2.01)*		0.49
	3.9.10	-0.41 (-2.76)*	10.92 (2.92)*	1.13 (3.31)*	-0.18 (-0.91)	0.10 (0.92)	-0.06 (-0.59)	0.47 (2.03)*		0.52
Manufacturing	3.9.11	-0.03 (-0.32)	6.32 (2.17)*	0.63 (2.29)*				1.05 (4.89)*		0.61
	3.9.12	-0.00 (-0.57)	6.39 (1.96)	0.58 (1.82)	-0.12 (-0.70)			1.03 (4.28)*		0.62
	3.9.13	-0.05 (-0.36)	6.37 (1.90)	0.62 (1.86)	-0.12 (-0.68)	0.06 (0.59)		1.02 (4.12)*		0.63
	3.9.14	-0.02 (-0.24)	9.52 (2.79)*	0.72 (2.39)*	-0.19 (-1.15)		-0.16 (-1.19)	1.09 (4.91)*		0.70
	3.9.15	-0.19 (-1.51)	11.19 (3.57)*	0.93 (3.23)*	-0.22 (-1.53)	0.19 (2.09)*	-0.26 (-2.91)*	1.10 (5.53)*		0.78

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. See diagnostic test in Table A3 in the Appendix.

Based on the estimated equations, the effect of 1986 trade reforms on farming and manufacturing exports is positive. The shift dummy variable for 1986 indicates that for given changes in foreign income and relative prices, farming and manufacturing export growth increased by 24 and 19 percentage points, respectively. However, the second trade liberalisation indicator, *lib94*, does not show significant positive results for farming and manufacturing exports. We do not obtain any impact of 1986 and 1994 trade reforms on extractive exports.

Even considering other years related to the first period of trade reforms, 1985 and 1987, we do not obtain more significant results for extractive and manufacturing exports. The results for farming exports are similar as those for 1986. Regarding the second period of trade

liberalisation we tested for 1995 and 1996, but none of these years show positive and significant coefficients (see Table B6 and Table B7 in the Appendix).

The results using OLS for the second classification of exports are presented in Table 3.10. Three aspects should be mentioned. First, the shift dummy variable for 1986 is positive and significant at the 5 per cent confidence level for Consumer goods and Capital goods (equations *3.10.5* and *3.10.10*). Second, income elasticities for consumer and capital goods, although they are not always significant, are extremely high. This again suggests Mexico's strong dependence on the US market. Third, the coefficients related to the shift dummy variable for 1991 are always significant.

Neither 1985 nor 1987 exhibit significant results for the first period of trade reforms. Also, when we considered 1995 and 1996 as alternative years for the second period of trade reforms they do not show positive and significant coefficients (see Table B8 and B9 in the Appendix).

Table 3.10
OLS Estimation for Disaggregated Exports Growth: 1980-2000

Dependent variable : x^i										
Variable / x^i	*Eq.*	*Constant*	*yus*	*p*	x^i_{-1}	*lib 86*	*lib94*	*d91*		R^2
Consumer Goods	*3.10.1*	-0.01 (-0.13)	5.55 (1.58)	0.57 (1.73)				0.85 (3.35)*		0.44
	3.10.2	0.02 (0.19)	5.43 (1.54)	0.47 (1.36)	-0.19 (-0.95)			0.83 (3.29)*		0.48
	3.10.3	-0.09 (-0.65)	5.34 (1.60)	0.55 (1.67)	-0.23 (-1.20)	0.16 (1.59)		0.80 (3.32)*		0.56
	3.10.4	0.00 (0.00)	7.73 (1.97)	0.59 (1.67)	-0.20 (-1.03)		-0.12 (-1.23)	0.89 (3.52)*		0.53
	3.10.5	-0.24 (-2.02)*	10.21 (3.34)*	0.89 (3.15)*	-0.29 (-1.91)	0.30 (3.28)*	-0.26 (-3.05)*	0.91 (4.73)*		0.75

(Table 3.10 continues overleaf)

(Table 3.10 continued)

Variable / x^i	*Eq.*	*Constant*	*yus*	*p*	x^i_1	*lib86*	*lib94*	*d91*		R^2
Capital Goods	*3.10.6*	-0.07 (-0.50)	8.82 (2.03)*	0.49 (1.22)				1.39 (4.44)*		0.59
	3.10.7	0.03 (0.21)	7.41 (1.69)	0.32 (0.75)	-0.22 (-1.31)			1.24 (3.82)*		0.63
	3.10.8	-0.07 (-0.39)	7.28 (1.69)	0.40 (0.96)	-0.23 (-1.38)	0.15 (1.18)		1.21 (3.76)*		0.67
	3.10 9	0.01 (0.07)	10.11 (2.10)*	0.46 (1.07)	-0.24 (-1.42)		-0.14 (-1.23)	1.31 (4.04)*		0.67
	3.10 10	-0.23 (-1.33)	12.40 (2.94)*	0.77 (1.99)	-0.27 (-1.89)	0.30 (2.41)*	-0.28 (-2.44)*	1.31 (4.72)*		0.78

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. See diagnostic test in Table B4 in the Appendix.

The results from OLS estimations for the third classification of exports are reported in Table 3.11. The shift dummy variable for 1986 is positive and significant at the 5 per cent confidence level for the Textiles and Leather Products, and for the Basic Metals sub-sectors, equations *3.11.5* and *3.11.35*. Meanwhile, none of the coefficients related to the shift dummy variable for 1994 is positive and significant. Regarding income and price elasticities, they show the expected signs. The former exhibits high magnitudes particularly when one or both of the trade liberalisation indicators are included. It is exceptional that for some manufacturing sectors (Wood Products; Chemicals, rubber and Plastic Products; and, Other Manufactures) none of the price elasticities are statistically significant.

For those sectors where *lib86* has a positive effect on manufacturing export growth, it varies from 34 to 40 percentage points.

Table 3.11
OLS Estimation for Disaggregated Exports Growth: 1980-2000

Dependent variable : x^i

	Variable / x^i	Eq.	Constant	yus	p	x^i_1	lib86	lib94	d91		R^2
Food Products, Beverages and Tobacco		3.11.1	-0.12 (-1.51)	6.53 (2.65)*	0.87 (3.72)*				0.61 (3.39)*		0.52
		3.11.2	-0.09 (-1.05)	5.37 (1.92)	0.83 (3.24)*	0.13 (0.61)			0.60 (2.99)*		0.49
		3.11.3	-0.15 (-1.34)	5.44 (1.92)	0.87 (3.31)*	0.10 (0.46)	0.07 (0.85)		0.58 (2.85)*		0.51
		3.11.4	-0.11 (-1.13)	6.41 (1.98)	0.89 (3.23)*	0.12 (0.56)		-0.05 (-0.67)	0.63 (3.01)*		0.50
		3.11.5	-0.22 (-1.83)	7.76 (2.38)*	1.03 (3.65)*	0.06 (0.27)	0.13 (1.42)	-0.11 (1.32)	0.62 (3.10)*		0.57
Textiles and Leather Products		3.11.6	-0.16 (-1.10)	10.65 (2.45)*	0.94 (2.29)*				1.60 (5.10)		0.64
		3.11.7	-0.17 (-1.04)	10.73 (2.37)*	0.97 (2.08)*	0.02 (0.14)			1.61 (4.77)*		0.64
		3.11.8	-0.31 (-1.63)	10.59 (2.41)*	1.06 (2.33)*	0.00 (0.03)	0.18 (1.37)		1.57 (4.77)*		0.69
		3.11.9	-0.20 (-1.21)	13.48 (2.66)*	1.11 (2.34)*	0.01 (0.08)		-0.14 (-1.15)	1.68 (4.96)*		0.68
		3.11.10	-0.48 (-2.80)*	16.20 (3.77)*	1.44 (3.52)*	-0.03 (-0.23)	0.34 (2.67)*	-0.30 (-2.53)*	1.68 (5.99)*		0.80
Wood Products		3.11.11	-0.08 (-0.51)	6.26 (1.35)	0.43 (0.99)				1.24 (3.70)*		0.51
		3.11.12	-0.05 (-0.31)	6.01 (1.25)	0.35 (0.72)	-0.09 (-0.42)			1.18 (3.19)*		0.52
		3.11.13	-0.07 (-0.35)	6.01 (1.21)	0.37 (0.71)	-0.08 (-0.39)	0.02 (0.18)		1.18 (3.07)*		0.52
		3.11.14	-0.07 (-0.47)	10.19 (2.02)*	0.51 (1.10)	-0.19 (-0.90)		-0.23 (-1.78)	1.24 (3.57)*		0.61
		3.11.15	-0.24 (-1.15)	11.75 (2.31)*	0.71 (1.47)	-0.20 (-1.00)	0.19 (1.24)	-0.32 (-2.19)*	1.24 (3.65)*		0.66
Paper Products, Publishing and Printing		3.11.16	-0.18 (-1.09)	8.88 (1.79)	0.99 (2.13)*				1.57 (4.39)*		0.59
		3.11.17	-0.26 (-1.39)	9.97 (1.96)	1.20 (2.33)*	0.18 (0.95)			1.74 (4.35)*		0.61
		3.11.18	-0.32 (-1.45)	9.87 (1.89)	1.25 (2.33)*	0.17 (0.88)	0.08 (0.56)		1.71 (4.16)*		0.62
		3.11.19	-0.28 (-1.52)	13.03 (2.33)*	1.33 (2.57)*	0.14 (0.72)		-0.17 (-1.23)	1.79 (4.53)*		0.65
		3.11.20	-0.48 (-2.17)*	14.89 (2.72)*	1.55 (3.01)*	0.07 (0.41)	0.25 (1.50)	-0.29 (-1.88)	1.75 (4.64)*		0.71
Chemicals, Rubber and Plastic Products		3.11.21	-0.08 (-0.69)	6.22 (1.77)	0.14 (0.44)				0.46 (1.83)		0.25
		3.11.22	-0.05 (-0.51)	7.14 (2.24)*	0.09 (0.32)	-0.44 (-2.11)*			0.52 (2.28)*		0.43
		3.11.23	0.34 (2.38)*	3.51 (1.05)	-0.02 (-0.10)	-0.56 (-3.25)*	-0.31 (-3.95)*		0.41 (2.12)*		0.67
		3.11.24	-0.15 (-1.13)	13.48 (2.90)*	0.27 (1.02)	-0.63 (-2.93)*		-0.22 (-2.74)*	0.74 (2.96)*		0.54
		3.11.25	0.08 (0.79)	10.31 (3.92)*	0.08 (0.35)	-0.69 (-4.35)*	-0.20 (-2.45)*	-0.13 (-1.86)	0.66 (4.02)*		0.76

(Table 3.11continues overleaf)

(Table 3.11 continued)

x^i \ Variable	Eq.	Constant	yus	p	x^i_t	lib86	lib94	d91		R^2
Non-Metallic Mineral Products	3.11.26	0.00 (0.01)	4.78 (1.59)	0.54 (1.90)				0.64 (2.97)*		0.39
	3.11.27	-0.00 (-0.00)	4.69 (1.46)	0.54 (1.83)	0.03 (0.12)			0.65 (2.82)*		0.39
	3.11.28	0.12 (0.94)	5.06 (1.65)	0.43 (1.48)	-0.06 (-0.27)	-0.14 (-1.58)		0.65 (2.99)*		0.49
	3.11.29	-0.02 (-0.25)	9.93 (3.00)*	0.73 (2.84)*	-0.26 (-1.14)		-0.22 (-2.68)*	0.70 (3.62)*		0.61
	3.11.30	0.03 (0.28)	9.42 (2.73)*	0.65 (2.32)*	-0.27 (-1.14)	-0.06 (-0.71)	-0.19 (-2.07)*	0.69 (3.53)*		0.62
Basic Metals	3.11.31	-0.26 (-1.48)	11.23 (2.17)*	1.05 (2.16)*				0.66 (1.77)		0.27
	3.11.32	-0.18 (-1.00)	10.07 (1.99)	0.86 (1.76)	-0.32 (-1.45)			0.52 (1.41)		0.37
	3.11.33	-0.32 (-1.48)	10.06 (2.01)*	0.98 (1.98)	-0.30 (-1.38)	0.17 (1.14)		0.50 (1.36)		0.43
	3.11.34	-0.23 (-1.39)	14.85 (2.85)*	1.12 (2.41)*	-0.34 (-1.69)		-0.25 (-1.96)	0.64 (1.87)		0.51
	3.11.35	-0.59 (-3.59)*	18.21 (4.53)*	1.58 (4.24)*	-0.31 (-2.10)*	0.40 (3.36)*	-0.44 (-3.93)*	0.68 (2.63)*		0.75
Machinery and Equipment	3.11.36	0.02 (0.20)	5.83 (1.53)	0.68 (1.89)				1.21 (4.42)*		0.60
	3.11.37	0.05 (0.39)	5.85 (1.50)	0.62 (1.66)	-0.10 (-0.61)			1.20 (4.23)*		0.61
	3.11.38	0.09 (0.50)	5.87 (1.46)	0.59 (1.49)	-0.11 (-0.63)	-0.04 (-0.33)		1.20 (4.11)*		0.62
	3.11.39	0.03 (0.29)	10.62 (2.78)*	0.83 (2.50)*	-0.23 (-1.49)		-0.25 (-2.50)*	1.30 (5.32)*		0.74
	3.11.30	-0.05 (-0.34)	11.51 (2.89)*	0.94 (2.64)*	-0.24 (-1.53)	0.10 (0.89)	-0.30 (-2.60)*	1.31 (5.30)*		0.75
Other Products	3.11.41	-0.09 (-0.57)	6.05 (1.32)	0.43 (0.99)				1.98 (5.97)*		0.76
	3.11.42	-0.04 (-0.29)	5.87 (1.31)	0.33 (0.78)	-0.17 (-1.38)			1.94 (6.00)*		0.79
	3.11.43	-0.02 (-0.13)	5.89 (1.27)	0.31 (0.70)	-0.17 (-1.32)	-0.02 (-0.18)		1.95 (5.79)*		0.79
	3.11.44	-0.08 (-0.53)	9.45 (1.95)	0.51 (1.22)	-0.20 (-1.70)		-0.19 (-1.54)	2.03 (6.47)*		0.82
	3.11.45	-0.16 (-0.81)	10.29 (2.00)*	0.62 (1.34)	-0.21 (-1.73)	0.09 (0.64)	-0.23 (-1.62)	2.04 (6.33)*		0.83

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. See diagnostic test in Table A5 in the Appendix.

Similarly as we did for the other two classifications of exports, we consider two alternative years for each trade liberalisation indicator, 1985 and 1987 for the first period of trade reforms and 1995 and 1996 for the second one. However, the results are not significant enough specifically to claim that NAFTA generated a significant increase in Mexican exports

(see Table B10 and B11 in the Appendix). These results might be regarded as controversial, particularly by those who claim that Mexico has derived large benefits from the NAFTA trade agreement. These claims, however, have not been backed by rigorous statistical evidence.

ii) Structural Stability and Forecasts

We also use two additional techniques for examining whether or not a structural break in the growth of each type of exports can be identified in 1986 and 1994: structural stability and outside-sample forecasts. First, we apply the Chow break point test in order to examine the statistical evidence for structural stability of the parameters. This test leads us to reject the null hypothesis of structural stability at the 5 per cent level of significance for exports of the Manufacturing sector, the Consumer Goods sector, and three manufacturing sub-sectors (Textiles and Leather Products; Non-Metallic Mineral Products; and, Machinery and Equipment). We reject the null hypothesis at the 10 per cent for the following manufacturing sub-sectors: Food Products, Beverages and Tobacco; Wood Products; Chemicals, Rubber and Plastic Products; and, Other Manufactures. Also, we reject the null hypothesis at the 25 per cent level for exports of the Farming sector, the Capital Goods sector, and for the Paper Products, Publishing and Printing manufacturing sub-sector. By contrast, we accept the null hypothesis of no structural change for exports of the Extractive sector and for the Basic Metals sub-sector (see Table 3.12).

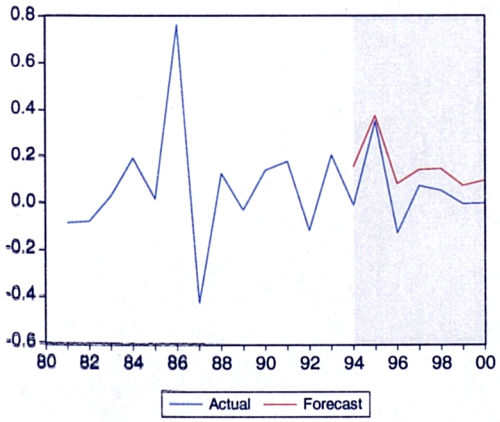
Table 3.12
Chow Test for Structural Stability of the Parameters

Exports Equation	*Calculated F-statistic*		*Exports Equation*	*Calculated F-statistic*
Farming	2.48***		Food Products, Beverages and Tobacco	3.07**
Extractive	0.59		Textiles and Leather Products	4.26*
Manufacturing	4.87*		Wood Products	2.96**
			Paper Products, Publishing and Printing	1.87***
			Chemicals, Rubber and Plastic Products	3.12**
Consumer Goods	7.41*		Non-Metallic Mineral Products	6.01*
Capital Goods	1.61***		Basic Metals	0.97
			Machinery and Equipment	6.51*
			Other Manufactures	2.76**

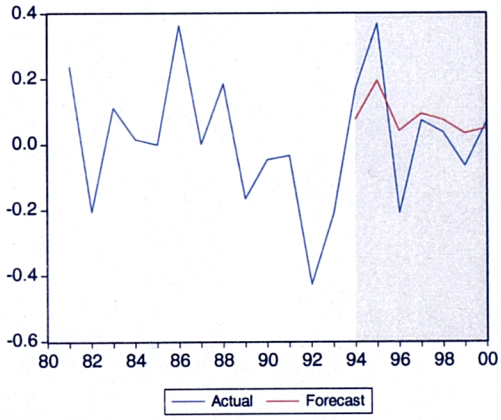
Notes: The asterisk (*), the double asterisk (**), and the triple asterisk (***) denote rejection of the null hypothesis of no structural change in the parameters at the 5 per cent, 10 per cent and 25 per cent, respectively.

The second procedure tests for the effect of NAFTA for each type of exports. Export models are estimated up to 1994 and then outside sample forecasts are made. The actual and the forecast exports are shown in Graph 3.6.

Graph 3.6
Actual, and Single Equation Static Forecast for Exports
Classification 1



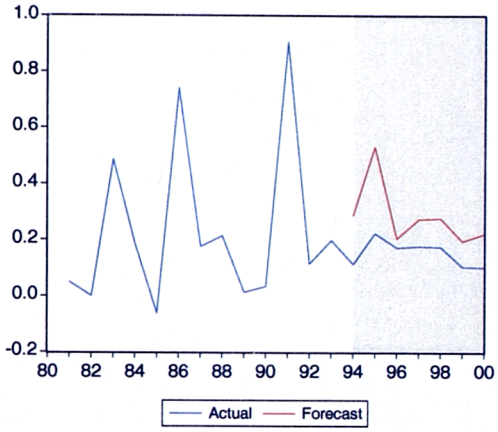
a) Farming Exports



b) Extractive Exports

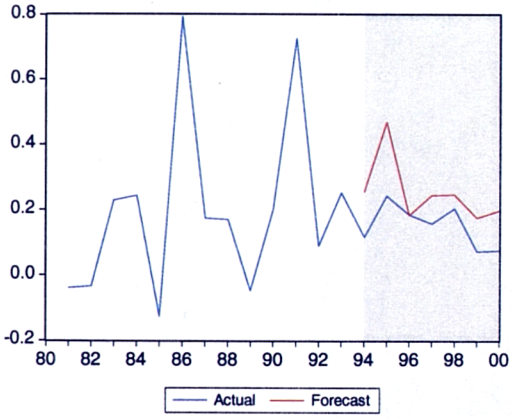
(Graph 3.6 continues overleaf)

(Graph 3.6 continued)

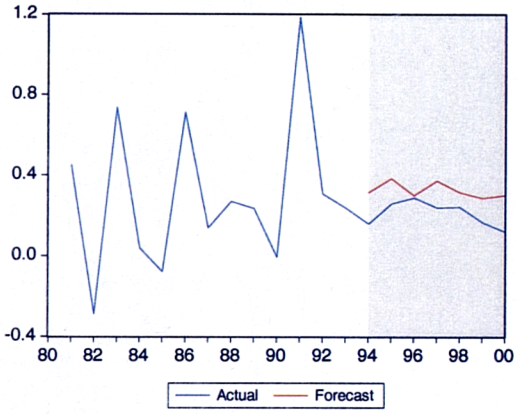


c) Manufacturing Exports

Classification 2

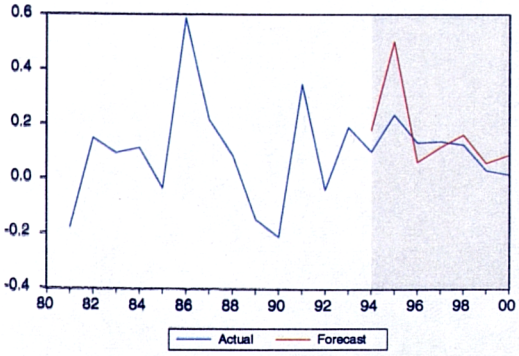


d) Consumer goods

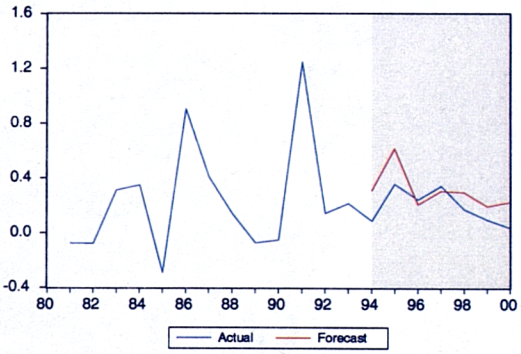


e) Capital goods

Classification 3



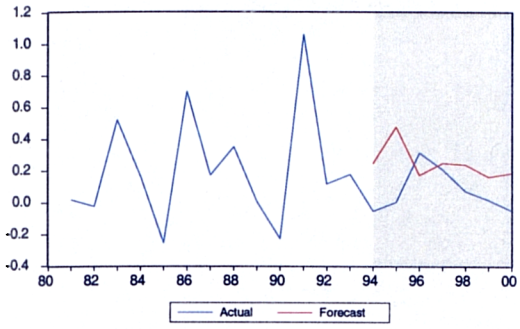
f) Food Products, Beverages and Tobacco



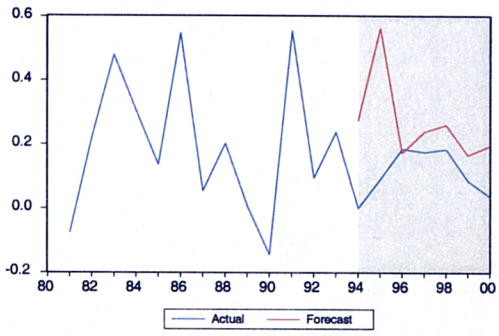
g) Textiles and Leather Products

(Graph 3.6 continues overleaf)

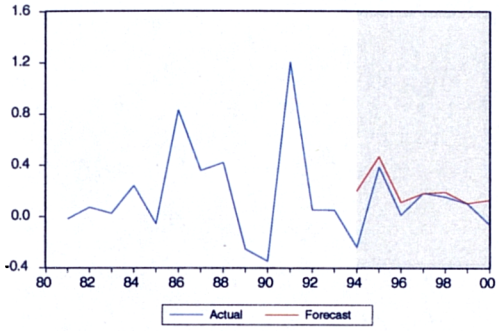
(Graph 3.6 continued)



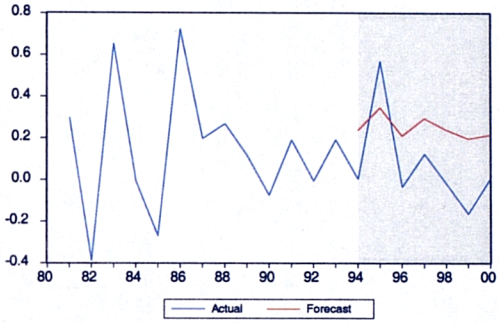
h) Wood Products



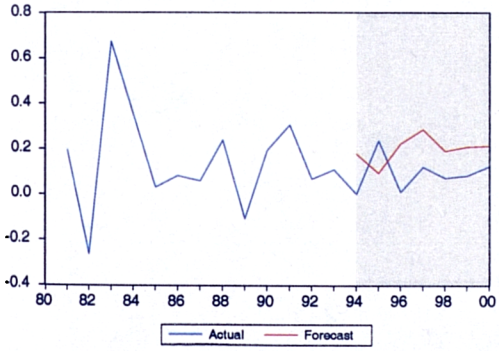
k) Non-Metallic Mineral Products



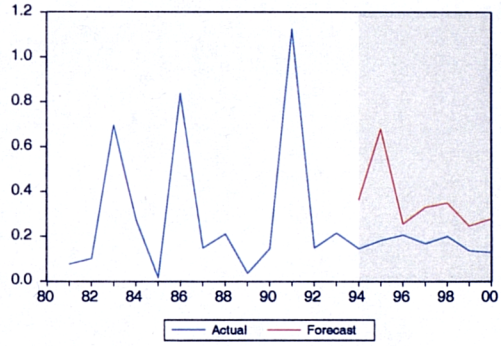
i) Paper Products, Publishing and Printing



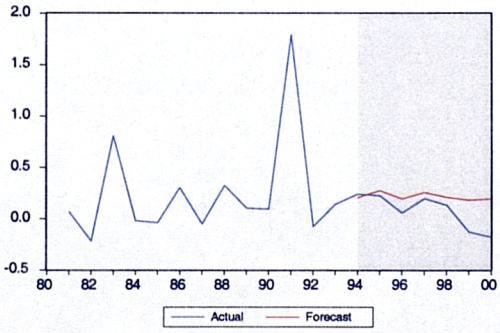
l) Basic Metals



j) Chemicals, Rubber and Plastic Products



m) Machinery and Equipment



n) Other Manufactures

An important feature when examining graphical plots is the prediction of turning points. Forecasts that can accurately predict turning points are of great importance. In most cases, forecasts follow the turning points of actual exports. If actual export performance is greater than predicted, then there is *prima facie* evidence of a favourable structural break. From the above set of graphs, only the Extractive sector exhibits evidence that NAFTA represented a favourable structural break for 1994; however, five manufacturing sub-sectors (Food, Beverages and Tobacco; Textiles and Leather Products; Wood Products; Chemicals, Rubber and Plastic Products; and, Basic Metals) show a structural break with some delay after NAFTA took place.

We also calculated the root-mean-square (*rms*) forecast error, which is expected to be close to zero, and the Theil inequality coefficient along with its components for these forecasts. These statistics which are helpful in evaluating the forecast are as follows:

Exports Forecast Evaluation					
	Root-mean square error	Theil inequality coefficient	Bias proportion	Variance proportion	Covariance proportion
a	0.120784	0.370642	0.769474	0.121252	0.109274
b	0.127975	0.466250	0.518649	0.338616	0.142735
c	0.156162	0.338096	0.726768	0.167760	0.105472
d	0.123516	0.286113	0.705011	0.069306	0.225683
e	0.126866	0.233084	0.832145	0.029646	0.138209
f	0.113489	0.325406	0.247953	0.444029	0.308018
g	0.161484	0.289591	0.544770	0.009725	0.445506
h	0.252206	0.610163	0.488401	0.013192	0.498406
i	0.190434	0.444147	0.421171	0.128493	0.450336
j	0.153850	0.475049	0.499113	0.016378	0.484509
k	0.220573	0.520138	0.521369	0.068672	0.409959
l	0.250530	0.519140	0.521442	0.458345	0.020213
m	0.234194	0.425504	0.673056	0.218274	0.108670
n	0.197965	0.497675	0.516667	0.400078	0.083250

iii) ARDL and Error Correction Modelling

We supplement our previous results with two other econometric techniques, ARDL and ECM. First, we test for the existence of a long run relationship between the variables under investigation, for each type of exports. The figures are shown in Table 3.13. All equations were estimated considering *lib86* and *lib94* trade liberalisation indicators and the shift dummy variable for 1991, *d91*. Since the calculated F-statistic for most types of exports, except for extractive exports, exceeds the upper bound of the critical value band, we reject the null hypothesis of no long run relationship between, x^i, *p*, *yus*, *lib86*, *lib94* and *d91*.[18]

Table 3.13
Testing for Long Run Relationship using F-statistic

Exports Equation	*Calculated F-statistic*		*Exports Equation*	*Calculated F-statistic*
Farming	21.06*		Food Products, Beverages and Tobacco	8.25*
Extractive	3.80		Textiles and Leather Products	28.33*
Manufacturing	58.33*		Wood Products	33.37*
			Paper Products, Publishing and Printing	20.51*
			Chemicals, Rubber and Plastic Products	6.82*
Consumer Goods	26.57*		Non-Metallic Mineral Products	12.45*
Capital Goods	25.91*		Basic Metals	5.76*
			Machinery and Equipment	28.83*
			Other Manufactures	23.34*

Notes: As the underlying regression contains an intercept but no trend, the bounds for the F critical value at the 5 per cent level are given by 3.79 and 4.85. The asterisk (*) denotes rejection of the null hypothesis of no long run relationship.

As it is only appropriate to embark on the second stage of the ARDL procedure if the long run relationship between the variables considered is not spurious, we continue with it for all the export equations except for the Extractive sector. Therefore, the estimation of the long run coefficients and the associated ECM are achieved using ARDL. The order of the ARDL

[18] Where ^{i} denotes the different type of exports.

model is determined by using the Schwarz Bayesian Criterion (SBC), Akaike Information Criteria (AIC) or determined by ourselves. The estimates of the long run coefficients and the ECM associated with these long run estimates are presented in Part A and Part B in Table 3.14, respectively.[19]

Table 3.14
Part A: Long Run Coefficients

Variable / X[1]	*Constant*	*yus*	*p*	*lib86*	*lib94*	*d91*
Farming ARDL (1,0,0)[1]	-13.89 (-3.47)*	1.17 (4.60)*	0.16 (1.55)	0.39 (6.30)*	0.14 (2.17)*	0.21 (3.79)*
Manufacturing ARDL (1,1,1)[3]	-56.95 (-10.65)*	3.99 (11.54)*	0.52 (3.07)*	0.54 (7.21)*	-0.21 (-0.23)	1.14 (13.88)*
Consumer Goods ARDL (1,0,0)[3]	-55.25 (-9.17)*	3.85 (9.99)*	0.24 (1.39)	0.55 (5.76)*	0.12 (1.21)	0.94 (9.90)*
Capital Goods ARDL (1,0,0)[3]	-83.37 (-8.33)*	5.59 (8.76)*	0.13 (0.53)	0.36 (2.38)*	0.11 (0.68)	1.43 (9.42)*
Food Products, Beverages and Tobacco ARDL (1,0,0)[1]	-33.14 (-3.38)*	2.30 (3.61)*	0.82 (2.15)*	0.35 (2.45)*	0.11 (0.76)	0.34 (1.81)
Textiles and Leather Products ARDL (1,0,1)[2]	-64.07 (-5.71)*	4.23 (5.80)*	0.77 (2.25)*	0.56 (3.62)*	0.19 (1.11)	1.44 (7.80)*
Wood Products ARDL (1,1,0)[3]	-41.17 (-4.34)*	2.72 (4.48)*	0.26 (1.02)	0.61 (4.37)*	-0.22 (-1.48)	1.19 (7.75)*
Paper Products, Publishing and Printing ARDL (1,0,0)[3]	-44.89 (-3.65)*	2.96 (3.76)*	0.47 (1.21)	0.79 (4.15)*	-0.30 (-1.42)	1.05 (4.99)*
Chemicals, Rubber and Plastic Products ARDL (1,1,0)[3]	-43.54 (-4.44)*	3.06 (4.89)*	0.40 (1.61)	0.13 (0.88)	-0.34 (-2.14)*	0.62 (4.29)*
Non-Metallic Mineral Products ARDL (1,1,0)[1]	-63.12 (-6.96)*	4.13 (7.14)*	1.04 (3.12)*	0.34 (2.34)*	-0.46 (-2.79)*	0.88 (4.82)*
Basic Metals ARDL (1,1,0)[2]	-7.72 (-0.36)	0.71 (0.52)	0.25 (0.56)	0.92 (2.96)*	0.24 (0.87)	0.49 (1.93)
Machinery and Equipment ARDL (1,1,1)[3]	-72.34 (-7.91)*	4.87 (8.27)*	0.85 (2.85)*	0.66 (5.11)*	-0.23 (-1.46)	1.57 (11.09)*
Other Manufactures ARDL (1,1,0)[3]	-37.75 (-3.41)*	2.49 (3.52)*	0.28 (1.00)	0.28 (1.76)	0.08 (0.50)	1.99 (11.91)*

(Table 3.14 continues overleaf)

[19] Almost all export equations pass all diagnostic tests, except for the Chemicals, Rubber and Plastic Products, and the Machinery and Equipment export equations. They fail to pass the functional form test.

(Table 3.14 continued)

Part B: Error Correction Model

Variable / X[1]	*Constant*	*yus*	*p*	*lib 86*	*lib94*	*d91*	*ECM*
Farming	-20.62 (3.62)*	1.73 (4 07)*	0.25 (1.58)	0.58 (5.55)*	0.21 (2.11)*	0.32 (3.67)*	-1.48 (-9.83)*
Manufacturing	-53.31 (-6.93)*	6.02 (3.82)*	0.31 (2.19)*	0.51 (6.44)*	-0.02 (-0.23)	1.07 (12.55)*	-0.93 (-11.20)*
Consumer Goods	-49.90 (-5.56)*	3.48 (5.72)*	0.22 (1.49)	0.50 (5.59)*	0.11 (1.16)	0.85 (8.65)*	-0.90 (-8.20)*
Capital Goods	-78.90 (-4.96)*	5.29 (5.06)*	0.13 (0.53)	0.34 (2.44)*	0.10 (0.67)	1.35 (7.72)*	-0.94 (-7.50)*
Food Products, Beverages and Tobacco	-23.36 (-2.12)*	1.62 (2.16)*	0.58 (3.26)*	0.24 (2.26)*	0.08 (0.74)	0.24 (2.51)*	-0.70 (-3.71)*
Textiles and Leather Products	-54.85 (-3.94)*	3.62 (3.94)*	0.19 (0.70)	0.48 (3.66)*	0.16 (1.07)	1.23 (9.00)*	-0.85 (7.45)*
Wood Products	-38.90 (-3.40)*	8.34 (3.89)*	0.25 (1.08)	0.57 (4.07)*	-0.21 (-1.54)	1.12 (8.06)*	-0.94 (-7.40)*
Paper Products, Publishing and Printing	-39.18 (-3.00)*	2.58 (3.03)*	0.41 (1.34)	0.69 (3.60)*	-0.26 (-1.49)	0.92 (5.92)*	-0.87 (-6.39)*
Chemicals, Rubber and Plastic Products	-38.76 (-3 06)*	9.22 (4 33)*	0.36 (1.62)	0.11 (0.83)	-0.30 (-2.19)*	-0.55 (3.84)*	-0.89 (-4.43)*
Non-Metallic Mineral Products	-46 93 (-3.82)*	7.50 (3.69)*	0.77 (4.53)*	0.25 (1.81)	-0.34 (-3.25)*	0.66 (6.33)*	-0.74 (-4.55)*
Basic Metals	-5.72 (-0.34)	5.70 (2.06)*	0.19 (0.58)	0.68 (3.39)*	0.18 (0.89)	0.36 (1.97)	-0.74 (-3.84)*
Machinery and Equipment	-64.76 (-5.14)*	8.28 (2.95)*	0.59 (2.50)*	0.59 (4.26)*	-0.20 (-1.47)	1.41 (9.06)*	-0.89 (-7.90)*
Other Manufactures	-42.68 (-2.96)*	9.15 (2.96)*	0.31 (1.02)	0.32 (1.76)	0.09 (0.49)	2.25 (8.80)*	-1.13 (-8.19)*

Notes: [1] Denotes ARDL selected based on SBC. [2] Denotes ARDL selected based on AIC. [3] Denotes that the ARDL was arbitrarily chosen. The asterisk (*) denotes significance of the coefficient at the 5 per cent level.

The long run coefficients for the first trade liberalisation indicator, *lib86*, are almost always significant at the 5 per cent level of significance, except for the Chemicals, Rubber and Plastic Products, and Other Manufactures sub-sectors; and, as expected, they show a positive sign. The Non-Metallic Mineral Products manufacturing sub-sector shows the lowest coefficient (0.34); while, the Basic Metals sub-sector has the highest coefficient (0.92). These coefficients may be interpreted as that the volume of the Non-Metallic Mineral Products and

the Basic Metals sub-sectors increased by 40 and 150 per cent,[20] respectively, due to trade liberalisation in 1986. Comparing these figures with their export growth rates in 1986 we observe differences between them. The export growth rate of the Non-Metallic Mineral Products sub-sector in 1986 was about 73 per cent and for the Basic Metals was about 106 per cent. Although these export growth rates are high, we have to consider that export prices fell by 30.6 percentage points from 1985 to 1986, and this affected the export volume.

The second trade liberalisation indicator, *lib94,* is not generally significant and does not show the expected sign. It is positive and statistically significant at the 5 per cent level only for farming exports. Regarding the sign and magnitude of income and price elasticities, they are as expected. These results support our previous findings.

From the ECM it is relevant to highlight that all the error correction terms are highly significant and have the correct sign (see Part B in Table 3.14). This suggests that every export equation has an accelerated speed of convergence to equilibrium, once they are shocked.

In sum, through different econometric techniques we show evidence which indicates that the trade reforms launched during the mid-1980s had a positive impact on most of the types of exports here analysed, but regarding NAFTA the results are contrary to those expected.

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

3.5 Conclusions

This chapter has analysed the effects of trade reforms on Mexico's exports at the aggregate and disaggregated level. Both levels of analysis, through the application of different econometric techniques (i.e. OLS method, ECM, ARDL, etc.), suggest that there was a positive impact of the mid-1980s trade reforms on export performance. However, no positive effect of NAFTA on export performance is discernable.

The specification of an export growth model that included two trade liberalisation indicators, one for the mid-1980s period and other for NAFTA, was able to discern the effects of the first period of trade reforms from exchange rate changes that occurred simultaneously. Regarding our attempt to disentangle the effects of NAFTA on exports from the exchange rate devaluation in 1994, no impact of NAFTA on exports was distinguishable.

In addition the results confirm the high dependence of Mexico's trade on growth of the US economy and on the exchange rate. The income and price elasticities in most of the export equations are statistically significant.

Appendix B

Table B1
OLS Estimation for Export Growth: 1970-2000

Dependent variable: Export growth (x)							
Regressor	*lib94*		*lib95*		*lib96*		
	B1.1	B1.2	B1.3	B1.4	B1.5	B1.6
Constant	-0.08 (-1.49)	-0.09 (-1.55)	-0.05 (-0.91)	-0.09 (-1.54)	-0.05 (-0.91)	-0.09 (-1.51)
yus	5.36 (3.20)*	5.61 (3.20)*	5.44 (3.02)*	5.57 (3.20)*	5.44 (3.02)*	5.52 (3.17)*
p	0.52 (2.60)*	0.54 (2.62)*	0.52 (2.45)*	0.54 (2.62)*	0.53 (2.48)*	0.51 (2.46)*
x_1	-0.18 (-0.98)	-0.18 (-0.98)	-0.09 (-0.53)	-0.17 (-0.96)	-0.09 (-0.53)	-0.18 (-0.98)
lib85	0.09 (1.53)	0.11 (1.61)		0.11 (1.61)		0.10 (1.56)
lib94, lib95, lib96		-0.05 (-0.59)	0.00 (0.06)	-0.05 (-0.57)	0.00 (0.07)	-0.04 (-0.45)
D91	0.25 (1.48)	0.24 (1.40)	0.31 (1.78)	0.25 (1.42)	0.31 (1.79)	0.25 (1.41)
R^2	0.45	0.46	0.39	0.46	0.39	0.46
Durbin Watson	2.12	2.16	2.05	2.17	2.05	2.15
Diagnostic Tests						
Serial Correlation	*0.621*	*0.557*	*0.827*	*0.529*	*0.822*	*0.580*
Functional Form	*0.871*	*0.649*	*0.479*	*0.672*	*0.485*	*0.825*
Normality	*0.000*	*0.001*	*0.028*	*0.000*	*0.030*	*0.000*
Heteroscedasticity	*0.440*	*0.324*	*0.132*	*0.343*	*0.124*	*0.416*

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. The diagnostic tests show probabilities.

Table B2
OLS Estimation for Export Growth: 1970-2000

Dependent variable: Export growth (x)					
Regressor	*lib94*		*lib95*		*lib96*
	B2.1	B2.2	B2.3		B2.4
Constant	-0.07 (-1.22)	-0.08 (-1.28)	-0.08 (-1.27)		-0.07 (-1.23)
yus	5.49 (3.18)*	5.76 (3.13)*	5.71 (3.14)*		5.62 (3.11)*
p	0.55 (2.65)*	0.58 (2.63)*	0.58 (2.64)*		0.54 (2.56)*
x_{-1}	-0.15 (-0.83)	-0.16 (-0.86)	-0.16 (-0.84)		-0.16 (-0.83)
lib87	0.06 (0.96)	0.09 (1.05)	0.08 (1.06)		0.07 (0.99)
lib94, lib95, lib96		-0.05 (-0.49)	-0.05 (-0.48)		-0.03 (-0.32)
D91	0.27 (1.55)	0.26 (1.44)	0.27 (1.47)		0.27 (1.48)
R^2	0.42	0.42	0.42		0.42
Durbin Watson	2.09	2.13	2.13		2.11
Diagnostic Tests					
Serial Correlation	*0.715*	*0.640*	*0.619*		*0.677*
Functional Form	*0.615*	*0.762*	*0.746*		*0.631*
Normality	*0.001*	*0.002*	*0.002*		*0.001*
Heteroscedasticity	*0.305*	*0.161*	*0.186*		*0.285*

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. The diagnostic tests show probabilities.

Table B3
Diagnostic Tests

Dependent variable : x^i					
x^i \ Test	*Eq.*	*Serial correlation*	*Functional Form*	*Normality*	*Heteroscedasticity*
Farming Exports	*B3.1*	*0.010*	*0.034*	*0.316*	*0.459*
	B3.2	*0.634*	*0.839*	*0.001*	*0.358*
	B3.3	*0.343*	*0.901*	*0.016*	*0.191*
	B3.4	*0.856*	*0.549*	*0.086*	*0.030*
	B3.5	*0.860*	*0.217*	*0.596*	*0.007*
Extractive Exports	*B3.6*	*0.391*	*0.026*	*0.907*	*0.680*
	B3.7	*0.360*	*0.051*	*0.416*	*0.466*
	B3.8	*0.446*	*0.072*	*0.344*	*0.817*
	B3.9	*0.419*	*0.062*	*0.469*	*0.507*
	B3.10	*0.787*	*0.106*	*0.325*	*0.853*
Manufacturing Exports	*B3.11*	*0.246*	*0.509*	*0.040*	*0.933*
	B3.12	*0.520*	*0.150*	*0.179*	*0.913*
	B3.13	*0.742*	*0.393*	*0.183*	*0.968*
	B3.14	*0.469*	*0.005*	*0.735*	*0.862*
	B3.15	*0.648*	*0.100*	*0.658*	*0.994*

Note: The diagnostic tests show probabilities.

Table B4
Diagnostic Tests

Dependent variable : x^i					
x^i \ Test	*Eq.*	*Serial correlation*	*Functional Form*	*Normality*	*Heteroscedasticity*
Consumer Goods	*B4.1*	*0.137*	*0.133*	*0.010*	*0.930*
	B4.2	*0.436*	*0.002*	*0.076*	*0.997*
	B4.3	*0.932*	*0.093*	*0.362*	*0.663*
	B4.4	*0.441*	*0.001*	*0.598*	*0.757*
	B4.5	*0.348*	*0.144*	*0.001*	*0.655*
Capital Goods	*B4.6*	*0.132*	*0.073*	*0.525*	*0.637*
	B4.7	*0.361*	*0.068*	*0.638*	*0.588*
	B4.8	*0.558*	*0.695*	*0.085*	*0.597*
	B4.9	*0.519*	*0.243*	*0.825*	*0.804*
	B4.10	*0.671*	*0.599*	*0.049*	*0.566*

Note: The diagnostic tests show probabilities.

Table B5
Diagnostic Tests

Dependent variable : x^j					
x^j \ Test	*Eq.*	*Serial correlation*	*Functional Form*	*Normality*	*Heteroscedasticity*
Food Products, Beverages and Tobacco	*B5.1*	*0.813*	*0.848*	*0.404*	*0.308*
	B5.2	*0.623*	*0.896*	*0.282*	*0.377*
	B5.3	*0.847*	*0.608*	*0.679*	*0.145*
	B5.4	*0.621*	*0.844*	*0.688*	*0.325*
	B5.5	*0.801*	*0.978*	*0.658*	*0.262*
Textile and Leather Products	*B5.6*	*0.643*	*0.423*	*0.527*	*0.700*
	B5.7	*0.519*	*0.513*	*0.460*	*0.709*
	B5.8	*0.860*	*0.792*	*0.848*	*0.760*
	B5.9	*0.614*	*0.244*	*0.176*	*0.806*
	B5.10	*0.799*	*0.267*	*0.153*	*0.731*
Wood products	*B5.11*	*0.613*	*0.571*	*0.657*	*0.524*
	B5.12	*0.818*	*0.580*	*0.760*	*0.511*
	B5.13	*0.883*	*0.745*	*0.720*	*0.503*
	B5.14	*0.932*	*0.207*	*0.595*	*0.691*
	B5.15	*0.822*	*0.121*	*0.703*	*0.413*
Paper Products, Publishing and Printing	*B5.16*	*0.632*	*0.391*	*0.479*	*0.576*
	B5.17	*0.581*	*0.358*	*0.366*	*0.599*
	B5.18	*0.733*	*0.395*	*0.538*	*0.615*
	B5.19	*0.679*	*0.238*	*0.872*	*0.569*
	B5.20	*0.832*	*0.125*	*0.797*	*0.542*
Chemicals, Rubber and Plastic Products	*B5.21*	*0.423*	*0.696*	*0.000*	*0.636*
	B5.22	*0.106*	*0.689*	*0.125*	*0.187*
	B5.23	*0.132*	*0.439*	*0.809*	*0.947*
	B5.24	*0.737*	*0.100*	*0.811*	*0.095*
	B5.25	*0.423*	*0.584*	*0.789*	*0.576*
Non-Metallic Mineral Products	*B5.26*	*0.779*	*0.409*	*0.809*	*0.783*
	B5.27	*0.852*	*0.481*	*0.785*	*0.815*
	B5.28	*0.474*	*0.965*	*0.508*	*0.810*
	B5.29	*0.541*	*0.316*	*0.474*	*1.00*
	B5.30	*0.803*	*0.371*	*0.499*	*0.918*
Basic Metals	*B5.31*	*0.562*	*0.099*	*0.644*	*0.893*
	B5.32	*0.213*	*0.000*	*0.650*	*0.647*
	B5.33	*0.147*	*0.139*	*0.663*	*0.878*
	B5.34	*0.209*	*0.156*	*0.271*	*0.821*
	B5.35	*0.764*	*0.604*	*0.331*	*0.934*
Machinery and Equipment	*B5.36*	*0.307*	*0.766*	*0.031*	*0.910*
	B5.37	*0.504*	*0.484*	*0.066*	*0.930*
	B5.38	*0.363*	*0.172*	*0.074*	*0.917*
	B5.39	*0.215*	*0.001*	*0.952*	*0.859*
	B5.40	*0.358*	*0.014*	*0.930*	*0.941*
Other Manufactures	*B5.41*	*0.261*	*0.955*	*0.006*	*0.649*
	B5.42	*0.586*	*0.127*	*0.063*	*0.652*
	B5.43	*0.553*	*0.094*	*0.165*	*0.638*
	B5.44	*0.548*	*0.097*	*0.670*	*0.604*
	B5.45	*0.605*	*0.389*	*0.112*	*0.644*

Note: The diagnostic tests show probabilities.

Table B6
OLS Estimation for Disaggregated Exports Growth: 1980-2000

Dependent variable : x^i										
Variable	*Eq*	*Constant*	*yus*	*p*	x^i_1	*lib85*	*lib94, lib95, lib96*	*d91*		R^2
Farming Exports							*lib94*			
	B6.2[1]	-0.29 (-2.08)*	7.72 (2.43)*	1.03 (3.33)*	0.62 (3.65)*	0.17 (1.53)		0.56 (2.44)*		0.63
	B6.3	-0.44 (-3.46)*	11.95 (3.98)*	1.34 (4.87)*	-0.64 (-4.68)*	0.28 (2.85)*	-0.22 (-2.77)*	0.66 (3.49)*		0.77
							lib95			
	B6.4	-0.18 (-1.57)	9.69 (2.67)*	1.01 (3.18)*	-0.57 (-3.37)*		-0.11 (-1.23)	0.63 (2.61)*		0.61
	A6.5	-0.40 (-3.02)*	10.94 (3.49)*	1.25 (4.35)*	-0.66 (-4.44)*	0.25 (2.44)*	-0.19 (-2.23)*	0.64 (3.14)*		0.74
							lib96			
	B6.6	-0.15 (-1.39)	8.77 (2.54)	0.89 (2.83)	-0.56 (-3.26)		-0.10 (-1.06)	0.58 (2.44)		0.60
	B6.7[1]	-0.33 (-2.39)*	9.10 (2.88)*	1.02 (3.46)*	-0.63 (-3.90)*	0.20 (1.89)*	-0.14 (-1.53)	0.57 (2.61)*		0.69
Extractive Exports							*lib94*			
	B6.8	-0.39 (-2.81)*	9.74 (3.15)*	1.06 (3.48)*	-0.18 (-0.96)	0.08 (0.83)		0.45 (2.02)*		0.52
	B6.9	-0.42 (-2.72)*	10.75 (2.92)*	1.13 (3.33)*	-0.18 (-0.91)	0.11 (0.96)	-0.05 (-0.54)	0.47 (2.03)*		0.53
							lib95			
	B6.10	-0.32 (-2.92)*	10.33 (2.95)*	1.03 (3.31)*	-0.17 (-0.86)		-0.03 (-0.36)	0.48 (2.06)*		0.49
	B6.11	-0.42 (-2.82)*	10.84 (3.06)*	1.13 (3.46)*	-0.15 (-0.78)	0.11 (1.00)	-0.06 (-0.69)	0.48 (2.07)*		0.53
							lib96			
	B6.12	-0.31 (-2.93)*	10.33 (3.17)*	0.98 (3.26)*	-0.16 (-0.84)		-0.05 (-0.60)	0.47 (2.07)*		0.50
	B6.13	-0.40 (-2.86)*	10.46 (3.20)*	1.05 (3.38)*	-0.15 (-0.80)	0.10 (0.96)	-0.07 (-0.79)	0.45 (2.01)*		0.54
Manufacturing Exports							*lib94*			
	B6.14	0.01 (0.11)	6.41 (1.89)	0.56 (1.65)	-0.12 (-0.68)	-0.02 (-0.25)		1.03 (4.14)*		0.62
	B6.15	-0.08 (-0.53)	9.89 (2.77)*	0.78 (2.37)*	-0.19 (-1.15)	0.06 (0.53)	-0.19 (-1.92)	1.10 (4.78)*		0.71
							lib95			
	B6.16	-0.02 (-0.17)	8.61 (2.47)*	0.67 (2.14)*	-0.17 (-1.02)		-0.13 (-1.46)	1.07 (4.60)*		0.67
	B6.17	-0.04 (-0.28)	8.72 (2.39)*	0.70 (2.03)*	-0.17 (-0.99)	0.02 (0.23)	-0.14 (-1.40)	1.07 (4.43)*		0.67
							lib96			
	B6.18	0.00 (0.01)	7.28 (2.13)*	0.53 (1.64)	-0.17 (-0.92)		-0.09 (-0.93)	1.02 (4.24)*		0.64
	B6.19	0.00 (0.05)	7.27 (2.04)*	0.53 (1.53)	-0.16 (-0.88)	-0.00 (-0.06)	-0.09 (-0.86)	1.03 (4.07)*		0.64

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. [1] The estimation fails normality test. [2] The estimation fails Functional Form test. [3] The estimation fails Heteroscedasticity test.

Table B7
OLS Estimation for Disaggregated Exports Growth: 1980-2000

Dependent variable : x^i										
Variable / x^i	*Eq.*	*Constant*	*yus*	*p*	x^i_1	*lib 87*	*lib94, lib95, lib96*	*d91*		R^2
Farming Exports							*lib94*			
	B7.1[1]	-0.12 (-0.80)	7.55 (2.18)	0.85 (2.39)	-0.55 (-3.05)	-0.04 (-0.39)		0.57 (2.29)		0.57
	B7.2[3]	-0.28 (-1.59)	11.87 (2.71)	1.26 (2.90)	-0.58 (-3.35)	0.10 (0.73)	-0.19 (-1.51)	0.68 (2.74)		0.64
							lib95			
	B7.3[1]	-0.22 (-1.31)	10.37 (2.49)	1.11 (2.69)	-0.59 (-3.26)	0.04 (0.37)	-0.14 (-1.18)	0.64 (2.55)		0.62
							lib96			
	B7.4[1]	-0.15 (-0.99)	8.73 (2.36)	0.88 (2.45)	-0.56 (-3.08)	-0.00 (-0.04)	-0.10 (-0.94)	0.58 (2.33)		0.60
Extractive Exports							*lib94*			
	B7.5	-0.33 (-2.44)	9.90 (3.10)	1.04 (3.12)	-0.18 (-0.95)	0.02 (0.26)		0.46 (2.03)		0.49
	B7.6	-0.39 (-2.16)	11.19 (2.58)	1.16 (2.68)	-0.18 (-0.93)	0.06 (0.50)	-0.05 (-0.46)	0.49 (2.02)		0.50
							lib95			
	B7.7	-0.39 (-2.36)	11.26 (2.85)	1.16 (2.96)	-0.16 (-0.80)	0.06 (0.56)	-0.07 (-0.61)	0.50 (2.07)		0.51
							lib96			
	B7.7	-0.36 (-2.50)	10.71 (3.11)	1.05 (3.09)	-0.16 (-0.82)	0.05 (0.48)	-0.07 (-0.71)	0.47 (2.02)		0.51
Manufacturing Exports							*lib94*			
	B7.8[2]	0.05 (0.38)	6.08 (1.82)	0.48 (1.37)	-0.11 (-0.61)	-0.77 (-0.76)		1.03 (4.21)		0.63
	B7.9[2]	-0.12 (-0.71)	11.24 (2.71)	0.92 (2.30)	-0.23 (-1.32)	0.10 (0.75)	-0.23 (-1.85)	1.12 (4.89)		0.71
							lib95			
	B7.10[2]	-0.02 (-0.17)	8.61 (2.47)	0.67 (2.14)	-0.17 (-1.02)		-0.13 (-1.46)	1.07 (4.60)		0.67
							lib96			
	B7.11[2]	0.04 (0.26)	6.91 (1.90)	0.48 (1.34)	-0.15 (-0.78)	-0.04 (-0.43)	-0.07 (-0.66)	1.03 (4.11)		0.64

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. [1] The estimation fails normality test. [2] The estimation fails Functional Form test. [3] The estimation fails Heteroscedasticity test.

Table B8
OLS Estimation for Disaggregated Exports Growth: 1980-2000

Dependent variable : x^i										
Variable / x^i	*Eq.*	*Constant*	*yus*	*p*	x^i_1	*lib 85*	*lib94, lib95, lib96*	*d91*		R^2
Consumer Goods							*lib94*			
	B8.1[1]	-0.03 (-0.24)	5.37 (1.50)	0.51 (1.43)	-0.21 (-1.04)	0.08 (0.66)		0.82 (3.17)*		0.50
	B8.2[1]	-0.14 (-0.90)	8.76 (2.26)*	0.74 (2.06)*	-0.26 (-1.34)	0.17 (1.37)	-0.18 (-1.73)	0.90 (3.66)*		0.60
							lib95			
	B8.3[1]	0.00 (0.06)	7.11 (1.82)	0.55 (1.54)	-0.21 (-1.05)		-0.10 (-0.99)	0.88 (3.41)*		0.51
	B8.4[1]	-0.11 (-0.67)	7.75 (1.99)	0.65 (1.80)	-0.26 (-1.29)	0.14 (1.13)	-0.14 (-1.35)	0.88 (3.44)*		0.56
							lib96			
	B8.5[1]	0.02 (0.21)	6.20 (1.67)	0.44 (1.23)	-0.21 (-1.05)		-0.08 (-0.74)	0.84 (3.26)*		0.50
	B8.61	-0.05 (-0.34)	6.34 (1.69)	0.48 (1.33)	-0.26 (-1.21)	0.11 (0.86)	-0.10 (-0.92)	0.82 (3.16)*		0.53
Capital Goods							*lib94*			
	B8.7	0.00 (0.01)	7.40 (1.63)	0.34 (0.77)	-0.22 (-1.24)	0.03 (0.25)		1.24 (3.68)*		0.63
	B8.8	-0.10 (-0.48)	10.90 (2.19)*	0.60 (1.28)	-0.23 (-1.35)	0.13 (0.82)	-0.19 (-1.44)	1.32 (4.02)*		0.69
							lib95			
	B8.9	0.01 (0.11)	9.28 (1.93)	0.41 (0.95)	-0.23 (-1.36)		-0.11 (-0.95)	1.29 (3.91)*		0.65
	B8.10	-0.06 (-0.30)	9.72 (1.95)	0.50 (1.07)	-0.23 (-1.29)	0.09 (0.60)	-0.14 (-1.07)	1.29 (3.82)*		0.66
							lib96			
	B8.11	0.04 (0.25)	8.28 (1.81)	0.28 (0.65)	-0.24 (-1.38)		-0.10 (-0.78)	1.24 (3.77)*		0.65
	B8.12	-0.01 (-0.05)	8.38 (1.77)	0.32 (0.70)	-0.24 (-1.31)	0.06 (0.40)	-0.11 (-0.82)	1.24 (3.63)*		0.65

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. [1]The estimation fails Functional Form test.

Table B9
OLS Estimation for Disaggregated Exports Growth: 1980-2000

Dependent variable : x^i										
Variable / x^i	*Eq.*	*Constant*	*yus*	*p*	x^i_1	*lib 87*	*lib94, lib95, lib96*	*d91*		R^2
Consumer Goods							*lib94*			
	B9.1	0.02 (0.14)	5.44 (1.48)	0.47 (1.24)	-0.19 (-0.90)	0.00 (0.02)		0.83 (3.17)*		0.48
	B9.2	-0.18 (-0.98)	11.00 (2.43)*	0.96 (2.18)*	-0.31 (-1.50)	0.20 (1.33)	-0.25 (-1.84)	0.96 (3.82)*		0.59
							lib95			
	B9.3[1]	-0.09 (-0.51)	8.68 (1.97)	0.73 (1.72)	-0.28 (-1.27)	0.11 (0.81)	-0.17 (-1.27)	0.91 (3.45)*		0.54
							lib96			
	B9.4[1]	-0.00 (-0.02)	6.53 (1.64)	0.48 (1.24)	-0.24 (-1.07)	0.04 (0.33)	-0.09 (-0.79)	0.84 (3.15)*		0.50
Capital Goods							*lib94*			
	B9.5	0.01 (0.07)	7.49 (1.64)	0.35 (0.75)	-0.23 (-1.28)	0.02 (0.20)		1.24 (3.68)*		0.63
	B9.6	-0.23 (-1.04)	14.16 (2.72)*	0.97 (1.88)	-0.31 (-1.87)	0.27 (1.60)	-0.32 (-2.05)*	1.37 (4.44)*		0.73
							lib95			
	B9.7	-0.11 (0.52)	11.17 (2.15)*	0.68 (1.31)	-0.27 (-1.54)	0.15 (0.96)	-0.20 (-1.33)	1.31 (3.95)*		0.68
							lib96			
	B9.8	-0.01 (-0.06)	8.75 (1.83)	0.36 (0.77)	-0.26 (-1.42)	0.07 (0.52)	-0.13 (-0.90)	1.24 (3.64)*		0.66

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. [1]The estimation fails Functional Form test.

Table B10
OLS Estimation for Disaggregated Exports Growth: 1980-2000

Dependent variable : x^i										
Variable / x^i	*Eq.*	*Constant*	*yus*	*p*	x^i_1	*lib85*	*lib94, lib95, lib96*	*d91*		R^2
Food Products, Beverages, and Tobacco							*lib94*			
	B10 1	-0.12 (-1.00)	5.39 (1.86)	0.85 (3.14)*	0.12 (0.53)	0.03 (0.34)		0.59 (2.85)*		0.49
	B10.2	-0.17 (-1.27)	6.97 (2.04)*	0.96 (3.21)*	0.09 (0.40)	0.07 (0.68)	-0.08 (-0.89)	0.62 (2.89)*		0.52
							lib95			
	B10.3	-0.10 (-1.08)	6.04 (1.88)	0.87 (3.17)*	0.12 (0.54)		-0.03 (-0.47)	0.62 (2.95)*		0.49
	B10 4	-0.15 (-1.14)	6.40 (1.90)	0.91 (3.10)*	0.09 (0.40)	0.05 (0.54)	-0.05 (-0.62)	0.61 (2.84)*		0.51
							lib96			
	B10 5	-0.09 (-1.01)	5.29 (1.73)	0.84 (3.11)*	0.13 (0.60)		0.00 (0.08)	0.60 (2.89)*		0.49
	B10 6	-0.12 (-0.95)	5.39 (1.69)	0.85 (3.01)*	0.12 (0.50)	0.03 (0.32)	0.00 (2.74)*	0.59 (2.74)*		0.49
Textile and Leather Products							*lib94*			
	B10 7	-0.19 (-0.89)	10.69 (2.28)*	0.98 (2.01)*	0.02 (0.12)	0.02 (0.13)		1.61 (4.56)*		0.64
	B10 8[3]	-0.30 (-1.34)	14.10 (2.68)*	1.20 (2.39)*	-0.00 (-0.03)	0.11 (0.67)	-1.18 (-1.30)	1.68 (4.83)*		0.69
							lib95			
	B10 9	-0.19 (-1.11)	12.30 (2.42)*	1.04 (2.16)*	0.01 (0.10)		-0.09 (-0.72)	1.65 (4.75)*		0.66
	B10 10	-0.25 (-1.09)	12.58 (2.37)*	1.09 (2.13)*	0.00 (0.02)	0.07 (0.41)	-0.11 (-0.80)	1.65 (4.57)*		0.66
							lib96			
	B10 11	-0.17 (-0.99)	11.25 (2.33)*	0.94 (1.95)	0.01 (0.07)		-0.05 (-0.41)	1.61 (4.62)*		0.65
	B10 12	-0.20 (-0.91)	11.29 (2.25)*	0.95 (1.89)	0.00 (0.03)	0.04 (0.23)	-0.06 (-0.44)	1.60 (4.41)*		0.65
Wood Products							*lib94*			
	B10 13	0.06 (0.26)	6.05 (1.25)	0.24 (0.48)	-0.11 (-0.50)	-0.13 (-0.80)		1.18 (3.16)*		0.54
	B10 14	-0.04 (-0.21)	10.02 (1.88)	0.47 (0.93)	-0.19 (-0.87)	-0.03 (-0.18)	-0.22 (-1.50)	1.23 (3.44)*		0.61
							lib95			
	B10 15	-0.06 (-0.38)	8.63 (1.66)	0.42 (0.88)	-0.16 (-0.74)		-0.16 (-1.19)	1.21 (3.31)*		0.57
	B10.16	0.00 (0.01)	8.30 (1.53)	0.35 (0.67)	-0.16 (-0.72)	-0.07 (-0.44)	-0.14 (-0.94)	1.21 (3.21)*		0.57
							lib96			
	B10.17	-0.04 (-0.24)	6.82 (1.34)	0.28 (0.56)	-0.13 (-0.58)		-0.09 (-0.61)	1.16 (3.06)*		0.53
	B10.18	0.05 (0.24)	6.68 (1.29)	0.20 (0.38)	-0.14 (-0.60)	-0.12 (-0.68)	-0.07 (-0.46)	1.17 (3.01)*		0.55

(Table B10 continues overleaf)

(Table B10 continued)

Variable / x^i	Eq.	Constant	yus	p	x^i_1	lib85	lib94, lib95, lib96	d91		R^2
Paper Products, Publishing and Printing							lib94			
	B10.19	-0.29 (-1.21)	9.93 (1.88)	1.22 (2.25)*	0.18 (0.89)	0.03 (0.20)		1.73 (4.16)*		0.62
	B10 20	-0.41 (-1.69)	13.84 (2.42)*	1.46 (2.68)*	0.10 (0.51)	0.16 (0.83)	-0.23 (-1.46)	1.76 (4.41)*		0.67
							lib95			
	B10.21	-0.26 (-1.37)	10.77 (1.87)	1.23 (2.28)*	0.17 (0.86)		-0.05 (-0.34)	1.75 (4.23)*		0.62
	B10.22	-0.32 (-1.25)	11.00 (1.84)	1.28 (2.22)*	0.16 (0.75)	0.06 (0.34)	-0.07 (-0.43)	1.74 (4.04)*		0.62
							lib96			
	B10.23	-0.25 (-1.33)	10.34 (1.90)	1.18 (2.19)*	0.17 (0.88)		-0.04 (-0.26)	1.74 (4.20)*		0.62
	B10 24	-0.29 (-1.19)	10.35 (1.83)	1.20 (2.13)*	0.17 (0.79)	0.05 (0.26)	-0.05 (-0.31)	1.72 (3.99)*		0.62
Chemicals, Rubber and Plastic Products							lib94			
	B10 25	0.20 (1.92)	7.62 (3.30)*	-0.11 (-0.52)	-0.59 (-3.80)*	-0.30 (-3.71)*		0.58 (3.50)*		0.72
	B10 26	0.12 (1.25)	10.35 (4.36)*	0.06 (0.30)	-0.64 (-4.64)*	-0.24 (-3.14)*	-0.14 (-2.20)*	0.65 (4.36)*		0.80
							lib95			
	B10 27[1]	-0.08 (-0.82)	10.05 (3.04)*	0.22 (0.80)	-0.53 (-2.69)*		-0.16 (-1.89)	0.61 (2.83)*		0.55
	B10.28	0.15 (1.47)	9.29 (3.69)*	-0.01 (-0.05)	-0.63 (-4.13)*	-0.27 (-3.25)*	-0.09 (-1.42)	0.63 (3.83)*		0.76
							lib96			
	B10 29	-0.05 (-0.58)	9.16 (3.11)*	0.04 (0.15)	-0.52 (-2.79)*		-0.19 (-2.24)*	0.55 (2.74)*		0.59
	B10 30	0.17 (2.02)*	9.20 (4.57)*	-0.14 (-0.75)	-0.64 (-4.91)*	-0.27 (-3.95)*	-0.15 (-2.60)*	0.60 (4.33)*		0.82
Non-Metallic Mineral Products							lib94			
	B10 31	0.16 (1.27)	5.03 (1.71)	0.40 (1.44)	-0.05 (-0.22)	-0.19 (-1.96)		0.66 (3.12)*		0.53
	B10 32	0.08 (0.70)	9.17 (2.79)	0.60 (2.26)*	-0.26 (-1.15)	-0.12 (-1.28)	-0.18 (-2.08)*	0.69 (3.68)*		0.65
							lib95			
	B10 33	-0.01 (-0.11)	8.02 (2.17)*	0.64 (2.22)*	-0.18 (-0.70)	-0.15 (-1.60)		-0.67 (3.06)*		0.49
	B10 34	0.13 (0.97)	7.36 (2.08)*	0.49 (1.72)	-0.19 (-0.75)	-0.16 (-1.56)	-0.11 (-1.15)	0.67 (3.22)*		0.57
							lib96			
	B10 35	0.00 (0.03)	5.41 (1.51)	0.52 (1.68)	-0.03 (-0.11)		-0.05 (-0.52)	0.64 (2.70)*		0.40
	B10.36	0.16 (1.22)	5.43 (1.64)	0.39 (1.34)	-0.08 (-0.32)	-0.19 (-1.83)	-0.03 (-0.30)	0.65 (2.98)*		0.53

(Table B10 continues overleaf)

(Table B10 continued)

Variable / x^j	Eq.	Constant	yus	p	x^i_t	lib85	lib94, lib95, lib96	d91		R^2
Basic Metals							lib94			
	B10 36[2]	-0.21 (-0 86)	10.08 (1.92)	0.89 (1.69)	-0.31 (-1.35)	0.03 (0.19)		0.52 (1.35)		0.37
	B10.37[1]	-0.41 (-1.78)	16.08 (3.05)*	1.33 (2.67)*	-0.30 (-1.52)	0.19 (1.11)	-0.32 (-2.26)*	0.67 (1.95)		0.56
							lib95			
	B10 38	-0.21 (-1.24)	13.54 (2.55)*	1.03 (2.15)*	-0.35 (-1.67)		-0.21 (-1.56)	0.61 (1.69)		0.47
	B10 39	-0.34 (-1.41)	14.18 (2.60)*	1.16 (2.25)*	-0.33 (-1.52)	0.13 (0.76)	-0.25 (-1.70)	0.62 (1.69)		0.49
							lib96			
	B10 41[2]	-0.17 (-1.07)	12.62 (2.68)*	0.76 (1.72)	-0.37 (-1.88)		-0.28 (-2.08)*	0.53 (1.58)		0.53
	B10 42	-0.26 (-1.18)	12.79 (2.65)*	0.83 (1.78)	-0.36 (-1.73)	0.10 (0.60)	-0.30 (-2.10)*	0.52 (1.53)		0.54
Machinery and Equipment							lib94			
	B10 43[2,3]	0.18 (0.99)	5.93 (1.53)	0.52 (1.34)	-0.13 (-0.75)	-0.14 (-1.07)		1.21 (4.30)*		0.65
	B10 44[2]	0.07 (0.41)	10.39 (2.57)*	0.79 (2.15)*	-0.23 (-1.44)	-0.03 (-0.30)	-0.23 (-2.10)*	1.30 (5.12)*		0.74
							lib95			
	B10 45[2]	0 04 (0.31)	9.34 (2.34)*	0.76 (2.16)*	-0.20 (-1.23)		-0.21 (-1.94)	1.27 (4.87)*		0.70
	B10 46[2]	0.10 (0.60)	9.03 (2.19)*	0.69 (1.81)	-0.20 (-1.22)	-0.07 (-0.56)	-0.18 (-1.61)	1.27 (4.74)*		0.71
							lib96			
	B10 47	0.07 (0.50)	7.16 (1.77)	0.56 (1.48)	-0.17 (-0.95)	-0.13 (-1.08)		1.20 (4.27)*		0.65
	B10 48[2]	0.17 (0.95)	7.04 (1.72)	0.48 (1.22)	-0.18 (-1.00)	-0.12 (-0.89)	-0.11 (-0.91)	1.21 (4.27)*		0.67
Other Manufactures							lib94			
	B10 49	0.05 (0.25)	5.87 (1.30)	0.25 (0.57)	-0.17 (-1.39)	-0.11 (-0.74)		1.95 (5.94)*		0.80
	B10.50	-0.05 (-0.23)	9.19 (1.79)	0.48 (1.03)	-0.20 (-1.62)	-0.03 (-0.18)	-0.18 (-1.28)	2.03 (6.22)*		0.82
							lib95			
	B10 51	-0.08 (-0.54)	9.42 (2.06)*	0.50 (1.24)	-0.20 (-1.76)		-0.22 (-1.81)	2.03 (6.69)*		0.83
	B10 52	-0.05 (-0.24)	9.28 (1.93)	0.47 (1.07)	-0.20 (-1.69)	-0.03 (-0.20)	-0 21 (-1.57)	2.03 (6.44)*		0.83
							lib96			
	B10 53	-0.03 (-0.25)	8.20 (1.95)	0.24 (0.62)	-0.23 (-1.96)		-0.25 (-2.02)*	1.95 (6.68)*		0.84
	B10 54	0.01 (0.08)	8.13 (1.87)	0.20 (0.49)	-0.23 (-1.90)	-0.06 (-0.43)	-0.24 (-1.83)	1.96 (6.48)*		0.84

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. [1] The estimation fails Heteroscedasticity test. [2] The estimation fails Functional Form test. [3] The estimation fails normality test.

Table B11
OLS Estimation for Disaggregated Exports Growth: 1980-2000

Dependent variable : x^i										
Variable / x^i	*Eq.*	*Constant*	*yus*	*p*	x^i_1	*lib87*	*lib94, lib95, lib96*	*d91*		R^2
Food Products, Beverages, and Tobacco							*lib94*			
	B11.1	-0.06 (-0.52)	5.12 (1.74)	0.78 (2.72)*	0.16 (0.69)	-0.03 (-0.45)		0.61 (2.92)*		0.49
	B11.2	-0.11 (-0.70)	6.52 (1.56)	0.90 (2.35)*	0.12 (0.48)	0.00 (0.04)	-0.05 (-0.48)	0.63 (2.87)*		0.50
							lib95			
	B11.3	-0.08 (-0.55)	5.68 (1.47)	0.83 (2.35)*	0.14 (0.56)	-0.02 (-0.18)	-0.02 (-0.23)	0.61 (2.82)*		0.50
							lib96			
	B11.4	-0.05 (-0.41)	4.76 (1.43)	0.78 (2.59)*	0.17 (0.71)	-0.05 (-0.50)	0.02 (0.27)	0.61 (2.82)*		0.50
Textile and Leather Products							*lib94*			
	B11.5	-0.17 (-0.85)	10.73 (2.27)*	0.97 (1.91)	0.02 (0.13)	0.00 (0.02)		1.61 (4.59)*		0.64
	B11.6	-0.41 (-1.73)	17.12 (2.94)*	1.52 (2.64)*	-0.06 (-0.32)	0.23 (1.21)	-0.30 (-1.69)	1.73 (5.15)*		0.71
							lib95			
	B11.7	-0.28 (-1.18)	13.61 (2.38)*	1.20 (2.11)*	-0.01 (-0.07)	0.10 (0.56)	-0.15 (-0.90)	1.67 (4.65)*		0.67
							lib96			
	B11.8	-0.19 (-0.89)	11.47 (2.23)*	0.97 (1.85)	0.00 (0.01)	0.03 (0.19)	-0.07 (-0.44)	1.61 (4.44)*		0.65
Wood Products							*lib94*			
	B11.9	0.05 (0.26)	5.50 (1.13)	0.17 (0.32)	-0.08 (-0.38)	-0.13 (-0.90)		1.18 (3.17)*		0.55
	B11.10[2]	*-0.15 (-0.62)*	*11.60 (1.88)*	*0.66 (1.10)*	*-0.22 (-0.97)*	*0.08 (0.42)*	*-0.29 (-1.50)*	*1.25 (3.49)**		0.62
							lib95			
	B11.11	-0.02 (-0.11)	8.05 (1.35)	0.35 (0.60)	-0.15 (-0.63)	-0.04 (-0.23)	-0.14 (-0.76)	1.20 (3.17)*		0.57
							lib96			
	B11.12	0.04 (0.21)	5.99 (1.13)	0.16 (0.29)	-0.10 (-0.44)	-0.11 (-0.70)	-0.04 (-0.29)	1.17 (3.02)*		0.55
Paper Products, Publishing and Printing							*lib94*			
	B11.13	-0.19 (-0.82)	9.68 (1.84)	1.09 (1.93)	0.19 (0.97)	-0.08 (-0.53)		1.74 (4.25)*		0.62
	B11.14	-0.37 (-1.33)	14.52 (2.17)*	1.51 (2.27)*	0.11 (0.53)	0.09 (0.44)	-0.24 (-1.15)	1.80 (4.41)*		0.66
							lib95			
	B11.15	-0.19 (-0.71)	9.78 (1.51)	1.10 (1.69)	0.19 (0.90)	-0.08 (-0.39)	-0.00 (-0.02)	1.75 (4.07)*		0.62
							lib96			
	B11.16	-0.19 (-0.79)	9.82 (1.71)	1.09 (1.86)	0.19 (0.90)	-0.07 (-0.45)	-0.01 (-0.08)	1.74 (4.08)*		0.62

(Table B11 continues overleaf)

(Table B11 continued)

Variable / x^i	Eq	Constant	yus	p	x^i_1	lib 85	lib94, lib95, lib96	d91		R^2
Chemicals, Rubber and Plastic Products							lib94			
	B11 17	0.15 (1.22)	6.56 (2.43)*	-0.23 (-0.83)	-0.61 (-3.26)*	-0.22 (-2.58)*		0.54 (2.78)*		0.62
	B11 18	0.03 (0.22)	9.62 (2.81)*	0.04 (0.14)	-0.61 (-3.40)*	-0.12 (-1.12)	-0.13 (-1.37)	0.61 (3.15)*		0.67
							lib95			
	B11 19	0.09 (0.68)	8.00 (2.42)*	-0.11 (-0.33)	-0.61 (-3.24)*	-0.18 (-1.71)	-0.07 (-0.77)	0.57 (2.85)*		0.64
							lib96			
	B11 20	0.10 (0.94)	8.17 (3.08)*	-0.21 (-0.80)	-0.63 (-3.66)*	-0.18 (-2.13)*	-0.14 (-1.78)	0.56 (3.11)*		0.70
Non-Metallic Mineral Products							lib94			
	B11 21	0.22 (2.06)*	4.16 (1.67)	0.17 (0.67)	-0.12 (-0.65)	-0.24 (-3.21)*		0.60 (3.37)*		0.66
	B11 22	0.15 (1.16)	6.75 (1.89)	0.36 (1.14)	-0.22 (-1.02)	-0.17 (-1.75)	-0.10 (-1.01)	0.64 (3.51)*		0.68
							lib95			
	B11 23	0.21 (1.68)	4.73 (1.39)	0.20 (0.69)	-0.15 (-0.67)	-0.23 (-2.46)*	-0.02 (-0.25)	0.61 (3.25)*		0.66
							lib96			
	B11 24	0.23 (1.98)	3.97 (1.39)	0.17 (0.65)	-0.11 (-0.52)	-0.25 (-3.02)*	0.01 (0.16)	0.61 (3.25)*		0.66
Basic Metals							lib94			
	B11 25[2]	-0.24 (-1.04)	10.34 (1.97)	0.95 (1.74)	-0.32 (-1.43)	0.06 (0.43)		0.52 (1.37)		0.38
	B11 26	-0.71 (-3.82)*	22.56 (5.07)*	2.09 (4.70)*	-0.41 (-2.74)*	0.49 (3.44)*	-0.57 (-4.29)*	0.79 (3.08)*		0.75
							lib95			
	B11 27	-0.51 (-2.29)*	17.52 (3.31)*	1.58 (3.00)*	-0.40 (-2.08)*	0.31 (1.88)	-0.39 (-2.48)*	0.67 (2.04)*		0.59
							lib96			
	B11 28	-0.33 (-1.71)	13.99 (3.00)*	1.00 (2.16)*	-0.40 (-2.09)*	0.19 (1.37)	-0.35 (-2.49)*	0.53 (1.64)		0.59
Machinery and Equipment							lib94			
	B11 29[2]	0.23 (1.39)	5.04 (1.38)	0.34 (0.90)	-0.12 (-0.74)	-0.19 (-1.75)		1.19 (4.50)*		0.69
	B11.30[2]	0.06 (0.34)	10.06 (2.12)*	0.76 (1.68)	-0.22 (-1.34)	-0.03 (-0.21)	-0.22 (-1.55)	1.29 (4.98)*		0.74
							lib95			
	B11.31[2]	0.14 (0.77)	7.84 (1.75)	0.56 (1.30)	-0.18 (-1.07)	-0.10 (-0.78)	-0.14 (-1.07)	1.24 (4.65)*		0.71
							lib96			
	B11.32[2]	0.21 (1.26)	5.84 (1.45)	0.34 (0.87)	-0.15 (-0.87)	-0.17 (-1.40)	-0.07 (-0.56)	1.19 (4.39)*		0.70
Other Manufactures							lib94			
	B11.33	0.00 (0.01)	5.59 (1.21)	0.25 (0.54)	-0.17 (-1.30)	-0.05 (-0.39)		1.94 (5.82)*		0.79
	B11.34	-0.24 (-1.03)	12.19 (2.12)*	0.85 (1.51)	-0.23 (-1.85)	0.17 (0.91)	-0.30 (-1.73)	2.09 (6.49)*		0.83
							lib95			
	B11.35[1]	-0.20 (-0.94)	11.13 (2.17)*	0.73 (1.46)	-0.22 (-1.85)	0.12 (0.79)	-0.29 (-1.90)	2.06 (6.64)*		0.84
							lib96			
	B11.36[2]	-0.07 (-0.38)	8.52 (1.90)	0.29 (0.67)	-0.23 (-1.91)	0.04 (0.30)	-0.26 (-1.92)	1.95 (6.45)*		0.84

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. [1] The estimation fails normality test. [2] The estimation fails Functional Form test.

Chapter 4

Impact of Trade Reforms on Imports

4.1 Introduction

In the previous chapter we examined the effects of trade reforms on Mexican exports at the aggregate and at a disaggregated level. Unexpected results came out, particularly those related to the effects of NAFTA on exports. By adopting the same structure and methodology, the present chapter complements chapter 3 by analysing the effects of trade reforms on Mexican imports.

One of the most common criticisms of trade liberalisation, particularly in developing countries, is that it increases import penetration. Indeed, Mexico has experienced a large increase of imports relative to output, particularly during the 1990s. In constant prices, imports of goods and services as a proportion of output doubled in twenty years. Import penetration increased from about 21 per cent of GDP in 1980 to 51 per cent in 2000 (see Table 4.1). The dynamics of Mexican imports led the country to be ranked 10th in the list of leading importers in world merchandise trade (WTO, 2001), which is three places above its ranking position for exports.

Table 4.1
Imports of Goods and Services (% of GDP)

Year	Ratio	Year	Ratio
1980	20.85	1991	22.89
1981	22.56	1992	26.42
1982	14.11	1993	26.40
1983	9.75	1994	30.65
1984	11.09	1995	27.75
1985	11.99	1996	32.43
1986	11.52	1997	37.29
1987	11.89	1998	41.38
1988	16.05	1999	45.39
1989	18.17	2000	51.55
1990	20.71		

Source: World Development Indicators (2002).

In order to elucidate the role played by trade liberalisation on Mexico's imports, a number of questions are addressed in this chapter: how has the composition of imports changed following trade liberalisation? What effects have trade reforms had on the volume of imports? How much of the import growth can be explained exclusively by trade liberalisation? Did imports react earlier than exports to trade reforms?

Concerning previous studies of Mexico's imports, Alfaro and Salas (1992), Clavijo and Faini (1990), Galindo and Cardero (1999), Dornbusch and Werner (1994), Ize (1989), López and Guerrero (1998), Moreno-Brid (2002b), Salas (1982 and 1988), and Sotomayor (1997) have all analysed the effects of trade restrictions on Mexico's demand for imports, either including dummy variables or other measures that capture the effect of tariff and non-tariff restrictions on imports. However, most of these studies focus on the analysis of income and price elasticities, except Moreno-Brid (2002b). In other words, although they controlled for the effects of trade liberalisation, they neglected to interpret the results obtained from the trade

liberalisation indicators. Also, these studies do not differentiate the impact of NAFTA on import performance from the trade reforms launched during the mid-1980s.

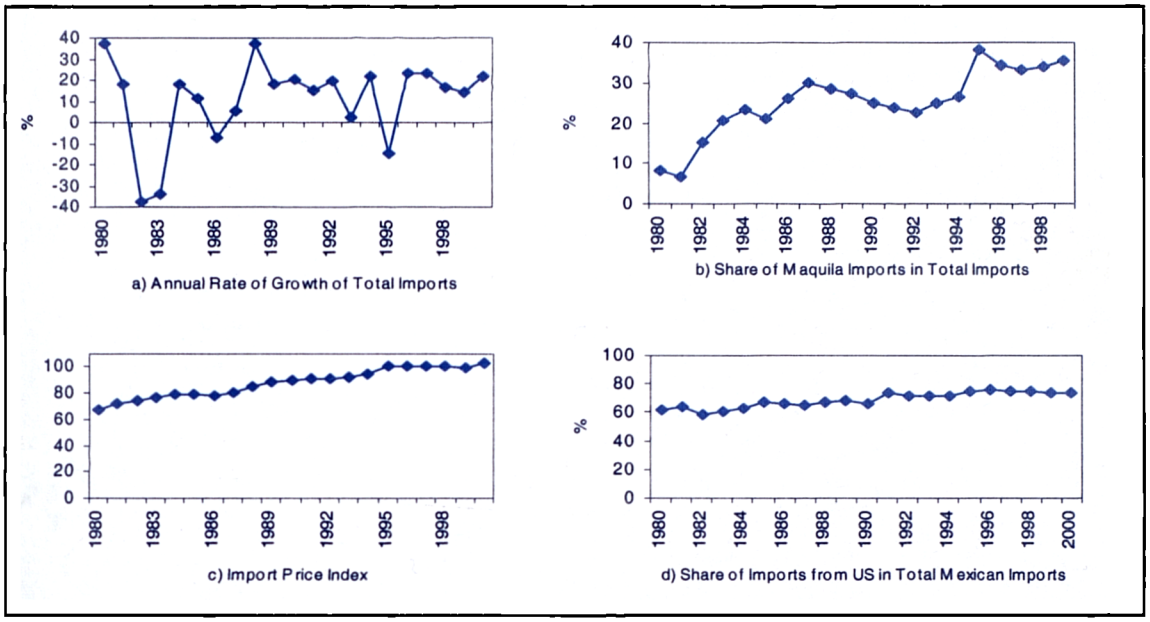
The aim of this chapter is twofold. First, we compare import composition by sector and manufacturing sub-sector before and after trade reforms. Second, we quantify the impact of trade reforms on imports at the aggregate and disaggregated level. The analysis is performed within the framework of the single equation, OLS methodology, and the analysis is supported by other econometric techniques, such as structural stability analysis, rolling regressions, outside sample forecasts, autoregressive distributed lag method (ARDL), and error correction models (ECM).

The remaining sections of the chapter are organised as follows. Section two describes the import composition over the past twenty years. Section three presents the import model and the econometric techniques used for the statistical analysis. Section four carries out the study of the impact of trade reforms on imports at the aggregate level. Section five analyses the effect of trade reforms on imports at a disaggregated level. Finally, section six concludes.

4.2 Import Composition

In order to have a better understanding of the performance of Mexican imports during the last twenty years, we look at some important characteristics of Mexico's imports, which are shown in Graph 4.1.

Graph 4.1
Changes in Mexican Imports



Note: All the variables are measured in constant prices (1995=100) or 1995 is used as a base year.
Source: Banco de México, Instituto Nacional de Estadística, Geografía e Informática (INEGI), Direction of Trade Statistics Yearbook (2001) and World Development Indicators (2002).

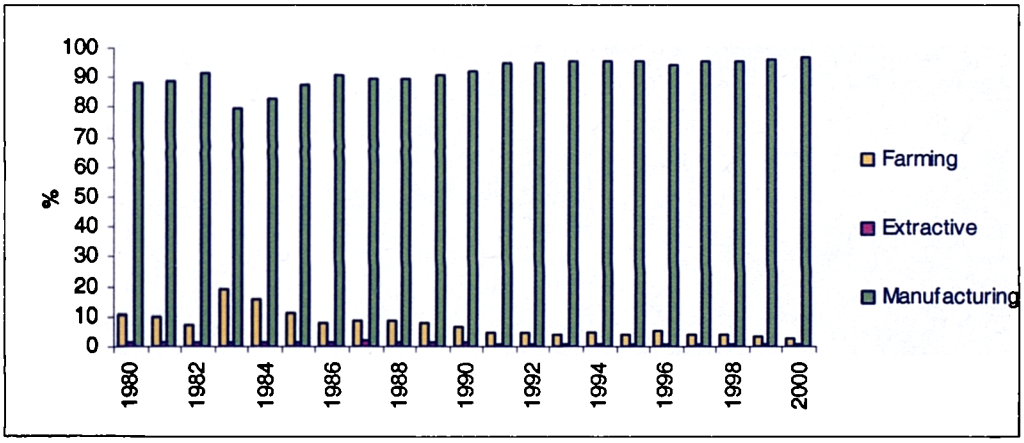
Panel a) shows the annual rate of growth of total imports. Major real exchange rate devaluations have always had a strong impact on imports. The large drop in 1982-83 corresponds to the debt crisis which left the country with a very low level of foreign currency. The next negative rate of growth is linked to the 32 per cent real exchange devaluation which occurred in 1986. Again, imports registered a negative growth rate of 15 per cent in 1995, when the GDP fell by 6 per cent and the Mexican peso was devalued against the US dollar by 45 per cent in real terms.

Panel b) shows the rise in *maquiladora* imports as a share in total Mexican imports. Panel c) gives the import price index (1995=100), which shows an upwards tendency. In panel d) we

observe that the US represents the major import source for Mexico, which has increased gradually through time.

Now, we turn to analyse import composition and import growth rates in more detail. Graph 4.2 shows the changes in the three main sectors: farming, extractive industries and manufacturing. In general, the shares of the three sectors have not changed significantly. There is no noticeable change in import composition either after the mid-1980s trade reforms or after 1994, when NAFTA was signed. Meanwhile, the share of farming imports has gradually declined. Throughout the period 1980 to 2000 manufactures represent the biggest share in total imports, and extractive imports the smallest share.

Graph 4.2
Share of Main Sectors in Imports, 1980-2000
(% of Total Imports)

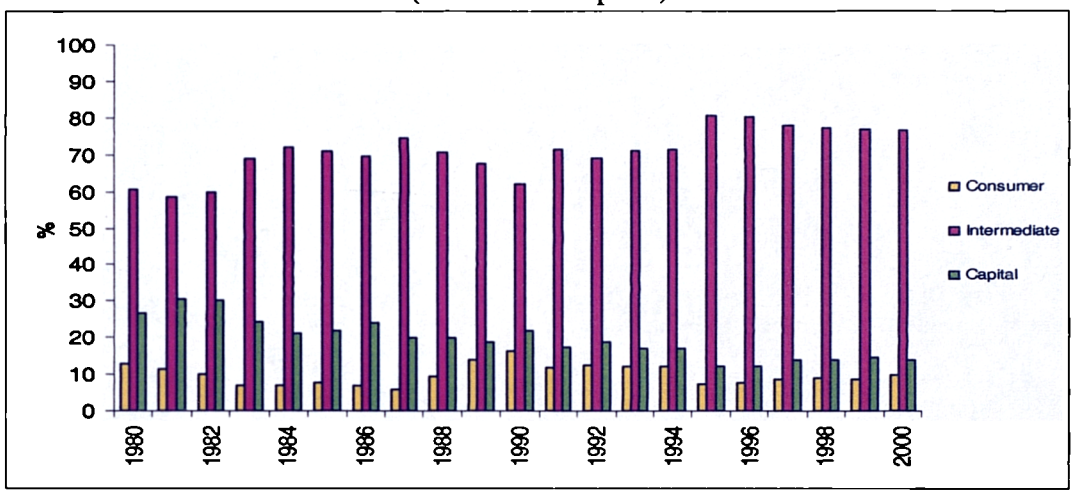


Source: Banco de México and Instituto Nacional de Estadística, Geografía e Informática (INEGI).

A different categorisation of imports is given in Graph 4.3, by decomposing total imports into consumer goods, intermediate goods and capital goods. In 1980, their shares in total imports were 13 per cent, 60 per cent and 27 per cent, respectively. During twenty years, the

composition changed very little, with intermediate goods continuing to account for the major share in total imports. Hardly any change seems to be associated with the trade reforms in the mid-1980s or NAFTA.

Graph 4.3
Goods Composition of Imports, 1980-2000
(% of Total Imports)



Source: Instituto Nacional de Estadística, Geografía e Informática (INEGI) and Banco de México.

Further examination of Mexico's imports is related to the analysis of the structure of the manufacturing sector itself. It is composed of nine sub-sectors: Food Products, Beverages and Tobacco; Textiles and Leather Products; Wood Products; Paper Products, Publishing and Printing; Chemicals, Rubber and Plastic Products; Non-Metallic Mineral Products; Basic Metals; Machinery and Equipment; and, Other Products. Table 4.2 illustrates the distribution of imports by the nine manufacturing sub-sectors from 1980 to 1999.

Table 4.2
Distribution of Imports by Manufacturing Sub-Sectors, 1980-1999

Year	Food Products, Beverages and Tobacco	Textiles and Leather Products	Wood Products	Paper Products, Publishing and Printing	Chemicals, Rubber and Plastic Products	Non-Metallic Mineral Products	Basic Metals	Machinery and Equipment	Other Products
1980	6.94	1.59	0.49	3.79	16.07	12.10	2.67	55.73	0.61
1981	4.89	1.83	0.40	3.20	14.20	10.99	2.74	61.14	0.62
1982	5.09	1.99	0.38	3.47	17.16	8.76	2.09	60.49	0.56
1983	7.41	0.66	0.32	4.10	22.44	6.63	1.54	56.62	0.27
1984	4.99	0.98	0.37	3.76	22.82	8.26	2.48	55.96	0.38
1985	4.04	1.14	0.39	3.30	23.35	6.71	3.00	57.56	0.52
1986	4.38	1.21	0.43	3.85	21.43	6.43	1.74	60.09	0.45
1987	3.88	1.45	0.36	5.13	22.51	6.22	1.96	57.97	0.51
1988	6.80	2.50	0.44	4.40	19.41	6.90	2.26	56.56	0.73
1989	8.82	3.56	0.49	4.09	19.49	6.75	2.03	53.66	1.11
1990	9.39	3.67	0.61	3.72	17.33	6.80	1.56	55.78	1.14
1991	5.61	4.76	0.91	3.86	17.12	7.58	1.69	57.28	1.18
1992	5.83	3.53	0.96	3.82	16.66	7.30	1.83	58.93	1.12
1993	5.45	5.73	0.93	3.84	16.61	6.71	1.57	57.94	1.22
1994	5.36	5.60	0.93	4.08	15.89	6.64	1.60	58.43	1.46
1995	3.88	5.36	0.52	4.29	17.54	6.82	1.78	58.83	0.98
1996	3.84	5.67	0.48	3.56	18.15	7.16	1.73	58.50	0.91
1997	3.53	6.06	0.45	3.23	18.15	6.83	1.79	58.82	1.13
1998	3.38	6.39	0.47	3.04	16.95	6.68	1.96	59.85	1.29
1999	3.13	6.55	0.50	2.94	16.64	6.02	1.85	61.16	1.21

Source: Own calculations based on data from Banco de México and Instituto Nacional de Estadística, Geografía e Informática (INEGI).

Comparing the distribution of manufacturing imports, from 1980 to 1999, we observe that it has not changed significantly. On average, two sub-sectors, Chemicals, Rubber and Plastic Products, and Machinery and Equipment, account for 75 per cent of manufacturing imports. The import share of the latter sub-sector, however, is by far the largest. The bulk of manufacturing imports have been concentrated in this particular sector, even before the mid-1980s trade liberalisation was launched. By contrast, on average, the Wood Products sub-sector had the lowest share of manufacturing imports.

A different approach to analyse the performance of manufacturing imports is to study the proportion of output that is imported of each manufacturing sector. Table 4.3 shows these figures. We focus our attention on two particular periods, 1984-1986 and 1993-1995, because trade reforms were launched and accentuated during those periods.

From 1984 to 1986, seven out of nine manufacturing sub-sectors (Food Products, Beverages and Tobacco; Textiles and Leather Products; Wood Products; Paper Products, Publishing and Printing; Non-Metallic Mineral Products; Basic Metals; and, Other Products) increased their share of output imported by less than one percentage point. Only, the Chemicals, Rubber and Plastic Products, and the Machinery and Equipment sub-sectors increased their share of output imported by more than one percentage point, 1.34 and 4.62, respectively.

Regarding the variations in the proportion of output imported from 1994 to 1995, seven out of nine manufacturing sub-sectors (Textiles and Leather Products; Paper Products, Publishing and Printing; Chemicals, Rubber and Plastic Products; Non-Metallic Mineral Products; and Machinery and Equipment) increased their share of output imported by more than one percentage point. The Machinery and Equipment sub-sector had the highest increase, 17.61 percentage points. These figures may be explained by two factors. First, the proportion of manufacturing imports relative to output increased because output of each sector decreased in 1995. Second, the increase in the share of output imported by manufacturing sub-sectors may be linked to the trade liberalisation that NAFTA represented.

Table 4.3
Manufacturing Imports by Sub-Sectors, 1980-1999
(% of output of each sub-sector)

Year	Food Products, Beverages and Tobacco	Textiles and Leather Products	Wood Products	Paper Products, Publishing and Printing	Chemicals, Rubber and Plastic Products	Non-Metallic Mineral Products	Basic Metals	Machinery and Equipment	Other Products
1980	0.97	0.49	0.39	2.77	3.96	5.47	1.98	7.95	0.79
1981	0.79	0.64	0.38	2.66	3.83	5.80	2.32	9.62	0.85
1982	0.74	0.69	0.35	2.72	4.29	4.49	1.86	10.18	0.76
1983	0.64	0.14	0.18	2.03	3.25	2.10	0.84	6.86	0.25
1984	0.52	0.25	0.25	2.20	3.87	3.08	1.50	7.67	0.41
1985	0.51	0.36	0.32	2.22	4.73	2.92	2.25	8.80	0.64
1986	0.65	0.46	0.42	3.11	5.21	3.47	1.62	12.29	0.70
1987	0.61	0.62	0.37	4.39	5.60	3.27	1.73	12.11	0.88
1988	1.30	1.30	0.57	4.41	5.80	4.51	2.32	12.94	1.48
1989	1.87	2.11	0.74	4.45	6.35	5.01	2.43	13.18	2.44
1990	2.26	2.45	1.11	4.45	6.42	5.64	2.06	14.64	2.50
1991	1.96	4.65	2.47	6.67	9.44	9.12	3.52	20.88	3.93
1992	2.18	3.85	2.83	7.13	10.06	9.20	4.19	22.54	3.60
1993	2.01	6.51	2.84	7.42	10.36	8.36	3.54	23.48	4.06
1994	2.41	7.91	3.52	9.63	12.04	9.94	4.28	27.88	5.98
1995	2.28	10.61	2.79	14.39	17.63	15.18	6.00	41.09	5.87
1996	2.39	10.59	2.64	12.84	18.65	16.07	5.36	36.42	5.20
1997	2.35	11.32	2.58	11.44	19.32	16.01	5.49	34.02	6.46
1998	2.45	13.33	2.95	11.77	19.71	17.25	6.72	36.00	7.92
1999	2.29	13.90	3.32	11.39	19.84	16.05	6.64	36.11	7.35

Note: The output of each sub-sector (in constant 1993 prices) was transformed into $US using real exchange rate.
Source: Own calculations based on data from Banco de México, Instituto Nacional de Estadística Geografía e Informática (INEGI) and International Financial Statistics.

The above descriptive analysis shows the difficulty that we are going to face in order to distinguish and evaluate the effects of trade reforms on imports from those effects related to the real exchange and income variations. Imports were often affected by recurrent devaluations and restrictive trade policy in order to control balance of payments problems (refer to Chapter 2). In the modelling to follow, we attempt to isolate these effects from the impact of liberalisation in which we are interested.

4.3 The Model and Econometric Techniques

This section presents the import growth model and describes different econometric approaches that we are going to use in order to evaluate the impact of trade reforms on imports (see Chapter 1 for the theoretical arguments of trade liberalisation) in two episodes of trade reforms, those related to the mid-1980s and to NAFTA.

As in the case of exports (see section 3.2 in Chapter 3), the estimation of a standard import function requires the inclusion of two shift dummy variables, and in addition we use an import duty ratio as an indicator of trade distortion. The complete function is built up step by step.

Initially, we consider a standard import function, where imports are assumed to be a function of price competitiveness measured by the real exchange rate;[1] and, domestic income (*YM*). Assuming that the price and income elasticities of demand for imports are constant, the function can be written as (Thirlwall, 1999):

$$M = L\left(\frac{P_f E}{P_d}\right)^{\delta_1} YM^{\delta_2} \tag{4.1}$$

[1] The real exchange rate is defined as $RER = E\left(\frac{P_f}{P_d}\right)$, where E is the nominal exchange rate (quantity of pesos per one US dollar), P_f represents US's prices and P_d is Mexico's prices. An increase in the RER represents depreciation.

where L is a constant, P_d are domestic prices, P_f are US prices, E is the nominal exchange rate, and YM is Mexico's income; δ_1 and δ_2 denote the price and income elasticities, respectively. Taking logs of the variables in equation (4.1) and differentiating with respect to time, the rate of growth of imports (including a constant) is:

$$m = \lambda + \delta_1 (p_f + e - p_d) + \delta_2 ym \tag{4.2}$$

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 expressed as:

$$m_t = \lambda + \delta_1 p_t + \delta_2 ym_t + \delta_3 m_{t-1} + \varepsilon_t \tag{4.3}$$

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 $\left(\frac{\delta_1}{1-\delta_3}\right)$ and $\left(\frac{\delta_2}{1-\delta_3}\right)$, respectively.

For the purposes of this section the import demand model, represented by equation (4.3), is extended with the inclusion of the ratio of import duties to total imports, which captures trade distortions. Additionally, two shift dummy variables are considered, one for the first period of trade reforms and the other for the second period of trade reforms. Each dummy variable

takes the value of zero prior to liberalisation and one afterwards.[2] Tests showed that the most significant breaks, related to trade reforms, in the case of imports occurred in 1985 and 1994. Thus, the extended import demand function can be expressed as:

$$m_t = \lambda + \delta_1 p_t + \delta_2 ym_t + \delta_3 m_{t-1} + \delta_4 md_t + \delta_5 lib85_t + \delta_6 lib94_t + \varepsilon_t \qquad (4.4)$$

where *md* is the import duties ratio, which measures how the degree of distortions on trade may discourage imports; and, *lib85* and *lib94* are the shift dummy variables.

We are going to use different approaches to estimate the import growth function. Ordinary Least Square (OLS) methodology, as the most standard approach for time series analysis, is applied. In order to test for structural breaks in the import demand function coefficients we use different techniques, such as the Chow Test, Rolling Regressions and Outside Sample Forecasts. Finally, Autoregressive Distributed Lag Models (ARDL) and Error Correction Models (ECM) are estimated in order to test for cointegration among the variables and speed of adjustment of imports after they are affected by an external shock, respectively.

4.4 Impact of Trade Reforms on Imports at the Aggregate Level

This section examines the effects of trade liberalisation on Mexican import performance at the aggregate level through the application of different econometric techniques. We will try to see whether any impact can be discerned from trade liberalisation on import growth. In

[2] 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, and the impact was continuous.

other words, we are looking for an answer for the following question: How much have imports increased as a result of trade reforms independently of other determinants of import performance?

i) Ordinary Least Square Estimations

The first method that we use to investigate the relationship between imports and trade reforms is the OLS method. The time series properties of the data are shown, followed by the estimations of the import growth function. We focus our analysis on the shift dummy variables, as they represent trade liberalisation indicators.

In order to avoid the possibility of spurious results it is relevant to test whether or not the variables in equation (4.4) are stationary. To test for unit roots of each variable in log levels and first differences, a standard Augmented Dickey Fuller (ADF) test, one lag, is performed. Table 4.4 (part A) presents the results. When the ADF test is applied under the assumption of a constant, all the variables in first differences are stationary.

Table 4.4
Unit Root Test for Stationarity

	PART A With Constant Only, sample period 1970-2000		PART B with Constant and Time Trend, sample period 1970-2000	
Variables	Log Level [1]	Differences[1]	Log Level [2]	Differences[2]
m	-0.34	-4.20*	-2.14	-4.35*
ym	-1.62	-3.05*	-2.56	-3.03
p	-2.90	-5.37*	-2.89	-5.29*
md	-0.94	-3.92*	-2.50	-3.90*

Notes: [1]The critical value for rejection of hypothesis of a unit root is -2.96. [2]The critical value for rejection of hypothesis of a unit root is -3.57. The asterisk (*) denotes significance at the 5 per cent level.

Table 4.4 (part B) also presents the results of the ADF test (one lag) with a constant and deterministic time trend for the variables in log levels and first differences. It can be seen that all the variables in log levels are non-stationary. In the case of first differences, the null hypothesis of non-stationarity can be rejected at the 5 per cent level for all the variables.

We estimated equation (4.3) using the OLS method, which includes the basic determinants of an import demand model. After that, we estimated the extended model that includes the shift dummy variables, and we then end up with a complete import demand model. Table 4.5 shows the results.

The evidence presented in Table 4.5 shows that the trade reforms launched during 1985 influenced positively the growth of imports. Effectively, *lib85*, as an indicator of trade liberalisation, is statistically significant in all equations at the 5 per cent level. The effect of *lib85* is to raise import growth by 13 percentage points. The econometric results tell us that none of the coefficients given by the second indicator of trade liberalisation, *lib94,* are statistically significant. [3]

The import duty ratio coefficients have the correct sign but are not significant in any equation. This variable seems to have had no independent effect on Mexican imports. The import demand estimations are characterised by the strong significance of the real exchange

[3] We explore an alternative way of measuring the impact of trade liberalisation related to NAFTA, defining in a different way *lib85*. It takes the value of one from 1985 to 1993, and zero otherwise. *lib94* takes the value of zero prior to NAFTA and one from 1994 to 2000. Treating in this way the trade liberalisation indicators, both coefficients are significant and positive. They show the same magnitude, suggesting that in 1985 and in 1994 imports growth increased by 13 percentage points. This means that NAFTA added nothing.

rate variable. All the price elasticity estimates fall within the range from –0.61 to –0.91. As regards the income elasticity, it is not always statistically significant, but it is modestly high when it is significant. The lagged dependent variable is just significant in two equations (*4.5.2*) and (*4.5.3*), giving long run elasticities slightly higher than the short run elasticities.

Table 4.5
OLS Estimation for Import Growth: 1970-2000 [4]

Dependent variable: Import growth (*m*)						
Regressor	Equations					
	4.5.1	*4.5.2*	*4.5.3*	*4.5.4*	*4.5.5*	*4.5.6*
Constant	0.02 (0.62)	0.02 (0.81)	0.01 (0.42)	-0.11 (-2.06)	0.00 (0.04)	-0.11 (-1.84)
ym	1.40 (2.01)*	0.96 (1.43)	1.03 (1.31)	2.63 (3.02)*	1.05 (1.37)	2.63 (2.66)*
p	-0.82 (-4.57)*	-0.89 (-5.23)*	-0.91 (-4.98)*	-0.61 (-3.30)*	-0.90 (-5.12)*	-0.61 (-3.00)*
m_{-1}		0.21 (2.13)*	0.24 (2.14)*	0.07 (0.70)	0.21 (1.98)	0.07 (0.67)
md			-0.05 (-0.66)	-0.07 (-1.10)	-0.02 (-0.31)	-0.07 (-1.00)
lib85				0.13 (2.90)*		0.13 (2.25)*
lib94					0.07 (1.57)	0.00 (0.00)
R^2	0.71	0.75	0.76	0.83	0.78	0.83
Durbin Watson	1.26	1.53	1.54	1.86	1.54	1.86
Diagnostic Tests						
Serial Correlation	*0.074*	*0.180*	*0.207*	*0.773*	*0.258*	*0.776*
Functional Form	*0.077*	*0.601*	*0.463*	*0.471*	*0.231*	*0.456*
Normality	*0.137*	*0.546*	*0.600*	*0.619*	*0.581*	*0.619*
Heteroscedasticity	*0.243*	*0.160*	*0.326*	*0.104*	*0.142*	*0.103*

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. The diagnostic tests show probabilities.

Equation (*4.5.6*) may be the best estimation that represents import growth. The explanatory variables account for 83 per cent of the variance of imports, and it passes the diagnostic tests.

[4] Income and price slope dummies (i.e. *ym*lib85*, *ym*lib94*, *p*lib85*, *p*lib94;* designed to capture the effects of the elimination of trade distortions on the income and price elasticities of demand) were included in the import equation, but the results showed that the variables were not statistically different from zero (results not reported here).

This equation shows that the shift dummy variable for 1985 behaves as expected indicating that the trade liberalisation launched in 1985 increased import growth by 13 percentage points. This compares with an average growth of imports over the period of 10 per cent. By contrast, the shift dummy variable for 1994 does not show significant effect of NAFTA on imports. Income and price elasticities are within the range of the value of other results (Moreno-Brid, 2002b; Sotomayor, 1997). The income elasticity shows that a one per cent increase in national income increases imports by 2.6 per cent; while a one per cent depreciation of the currency reduces imports by 0.61 per cent.

It is important to point out that we tried other dates for the dummy variables, as we did for the export function. We considered 1986 (*lib86*) and 1987 (*lib87*) instead of 1985 (*lib85*) as the first trade liberalisation indicator (see Table C1 and C2 in the Appendix). The *lib86* coefficient is significant through almost all equations, except equation (C1.2). The effect of *lib86* on imports is similar to *lib85*, which varies from 11 percentage points to 15 percentage points.

As regards the second trade liberalisation indicator, *lib94*, we considered the two subsequent years after NAFTA was launched. We substitute 1995 (*lib95*) and 1996 (*lib96*) for 1994 (*lib94*). However, none of them is significant (examine Table C1 and C2 in the Appendix).

ii) Structural Stability, Rolling Regressions and Forecasts

To supplement our previous analysis, we also use additional techniques for analysing whether or not a structural break in import growth can be identified in 1985 and 1994: structural stability, rolling regressions and outside-sample forecasts.

First, we apply the Chow breakpoint test to see if there is statistical evidence for structural stability of the parameters. In this case, we consider 1985 as a breakpoint. The Chow breakpoint test leads us to reject the null hypothesis of structural stability in the model of imports at the 5 per cent level of significance. The calculated value of the F-statistic, 16.01, is greater than the critical value, 3.01. This result supports the finding that in 1985 there was a structural change in Mexican import growth.

The second procedure is to use the technique of rolling regression to examine parameter variation over time. In Table 4.6 we present seventeen rolling regressions of the simplest import model (equation 4.2). The sample size is 14 years. In general, the constant has been shifting upwards, from negative to positive values. The income elasticity estimate has been erratic. The elasticity was falling smoothly for the first eight rolling regressions, and then it recovers for the next three regressions, and once more decreases for the regression 1982-95. This elasticity recovered once again for the period 1983-96, but it fell for the next two regressions, and then, it recovered for the last two regressions. From these results it could be argued that after the trade liberalisation of 1985 imports became less sensitive to domestic income, but there is an unclear pattern of what happened once NAFTA was announced.

Table 4.6
Rolling Regressions for Imports
(window size 14)

Dependent variable: Import growth rate (m)									
Period	1971-84	1972-85	1973-86	1974-87	1975-88	1976-89	1977-90	1978-91	1979-92
constant	-0.16	-0.12	-0.05	-0.04	-0.01	0.001	0.004	0.003	0.004
	(-4.78)*	(-3.04)*	(-0.89)	(-0.76)	(-0.23)	(0.04)	(0.10)	(0.07)	(0.10)
ym	3.81	3.40	2.36	2.20	1.69	1.79	1.83	1.99	2.12
	(6.77)*	(4.90)*	(2.17)*	(2.02)*	(1.72)	(1.99)	(2.01)*	(2.19)*	(2.23)*
p	-0.74	-0.82	-0.76	-0.79	-0.95	-0.99	-0.98	-0.91	-0.90
	(-5.19)*	(-4.56)*	(-2.59)*	(-2.71)*	(-3.83)*	(-4.39)*	(-4.25)*	(-3.82)*	(-3.86)*

Period	1980-93	1981-94	1982-95	1983-96	1984-97	1985-98	1986-99	1985-00
constant	-0.00	0.00	0.02	0.01	0.09	0.09	0.08	0.08
	(-0.07)	(0.01)	(0.63)	(0.43)	(3.98)*	(4.02)*	(3.43)*	(3.43)*
ym	2.19	2.32	1.92	3.63	0.84	0.82	0.95	1.00
	(2.02)*	(1.85)	(1.24)	(2.55)*	(1.06)	(1.10)	(1.23)	(1.37)
p	-0.88	-0.84	-0.71	-0.14	-0.55	-0.57	-0.53	-0.54
	(-3.65)*	(-3.34)*	(-2.45)*	(-0.43)	(-3.12)*	(-3.31)*	(-3.04)*	(-3.10)*

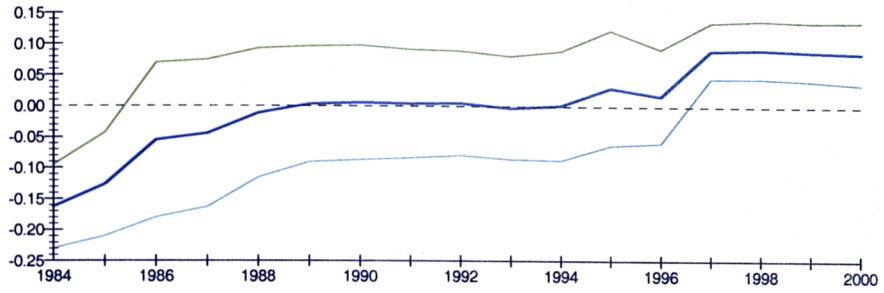
Note: The asterisk (*) denotes significance at the 5 per cent.

The price elasticity has always been significant and more or less stable. There is no big difference in the parameters if we compare their values for the samples before and after trade liberalisation took place (i.e. for 1985, compare the periods 1971-84 and 1973-86; for 1994, contrast 1980-93 and 1982-95).

The rolling coefficients presented in Table 4.6 are plotted in Graph 4.4. We observe *constant*, *ym* and *p* coefficients in panels (a), (b) and (c), respectively. All the rolling coefficients are within their standard error band. The changes in the parameters are clearer in the plots than in the table.

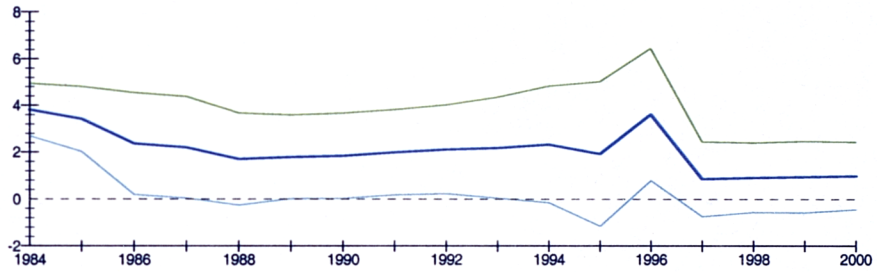
Graph 4.4
Rolling Coefficients for Imports

Coefficient of *Constant* and its two*S.E. bands based on rolling OLS



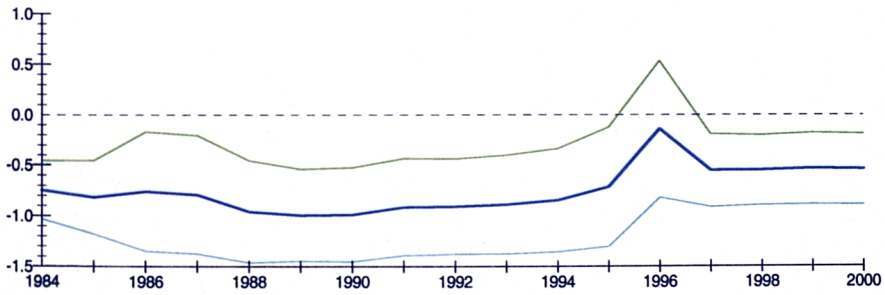
(a)

Coefficient of *ym* and its two*S.E. bands based on rolling OLS



(b)

Coefficient of *p* and its two*S.E. bands based on rolling OLS

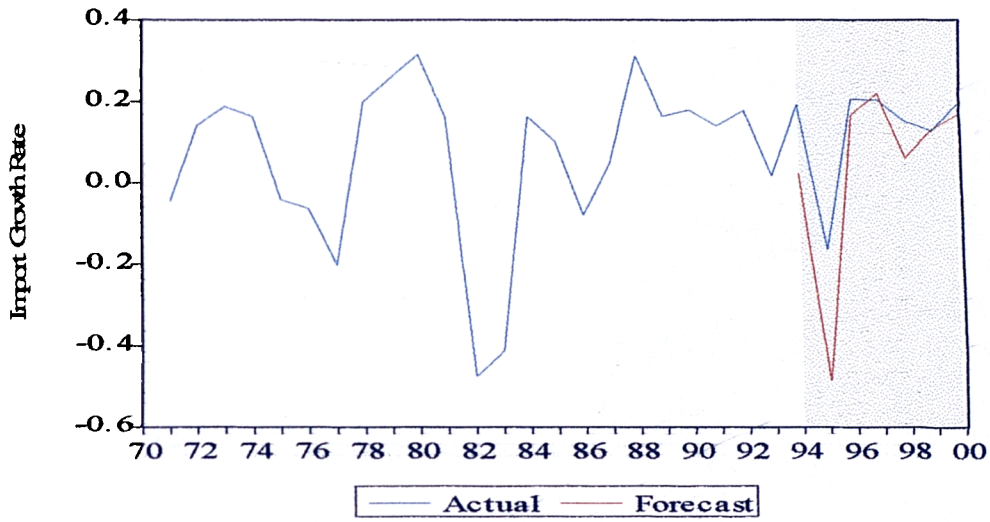


(c)

Our third procedure to test for the effect of NAFTA on imports is to estimate the import model up to 1994 and then to make outside sample forecasts. If there is some evidence of a

structural break related to NAFTA, we expect actual import growth to be greater than predicted. The actual and the forecast imports are shown in Graph 4.5. As we can observe, the actual import performance exceeds the forecast from 1994 to 1996. The forecast model under-predicts actual imports, markedly in 1995 and in 1998. Then, NAFTA represented a structural break for imports.

Graph 4.5
Actual, and Single Equation Static Forecast for Imports



From the import forecast evaluation, we observe that the *rms* forecast error is small, but the bias proportion is modestly large, which implies that a bias is present.

Imports Forecast Evaluation	
Root-mean square error (*rms*)	0.137411
Theil inequality coefficient	0.337362
Bias proportion	0.361163
Variance proportion	0.524776
Covariance proportion	0.114061

In the next sub-section we are going to test for the existence of a long run relationship among the variables that explain the import growth model. Also, we are interested in estimating the speed of adjustment of the model once it is disturbed by a shock.

iii) Autoregressive Distributed Lag and Error Correction Modelling

In this section we estimate the short and long run coefficients of the import demand model using the ARDL procedure. Also, we present the error correction model.

The ARDL process implies two steps. First, the existence of a long run relationship among the variables under consideration is examined. The F-statistic is used for this purpose. 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. Then, after testing for the existence of such a long run relationship, the long and short run parameters are estimated by using the ARDL method.

In this case, 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, it is above the upper critical value, allowing us to reject the null hypothesis of no long run relationship between the variables at the 5 per cent significance level.

Having tested that the long run relationship between the variables is not spurious, we then estimated the long run coefficients and the ECM.[5] We consider one lag length,[6] and then the

[5] In the following equations we do not include the import duties ratio as an explanatory variable. In any case it is not statistically significant, and the remaining coefficients show better results if we do not consider it.
[6] We are constrained to use one lag due to the small sample size considered.

order of the ARDL model is determined by using the Schwartz Bayesian Criterion (SBC). The long run coefficients and the ECM derived from the ARDL (1,1,1) approach are the following, respectively:[7]

$$LM = \underset{(-0.22)}{-1.58} + \underset{(3.92)}{1.04}\, LYM - \underset{(-2.79)}{1.06}\, LP + \underset{(2.99)}{0.64}\, lib85 + \underset{(4.41)}{0.62}\, lib94 \qquad (4.5)$$

$$m = \underset{(-0.22)}{-0.49} + \underset{(3.98)}{2.60}\, ym - \underset{(-3.79)}{0.70}p + \underset{(4.05)}{0.20}\, lib85 + \underset{(2.96)}{0.19}\, lib94 - \underset{(-3.43)}{0.31}\, ecm_{-1} \qquad (4.6)$$

where the *L* preceding the variables, in equation (4.5), stands for the log of the variable; and, the dependent and the first two independent variables in equation 4.6, which are in lower cases, represent growth rates.

The two long run trade liberalisation coefficients, *lib85* and *lib94*, in equation (4.5) 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.[8]

The ECM, in equation (4.6), shows the short run coefficients of the variables and the error correction term. Except for the constant coefficient, 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.

[7] Both models satisfy all diagnostic tests.
[8] This value is calculated from e^{β} [1], where β is the value of the coefficient.

In sum, at the aggregate level there is evidence that the trade reforms during the mid-1980s increased the growth of imports into the Mexican economy. Also, we found some evidence for structural break related to NAFTA using the outside sample forecasting method and when estimating the long run relationship using ARDL models.

The following section analyses the impact of trade reforms by sector. We are interested in identifying the sectors where trade reforms had the greatest impact on imports. The results presented in the next section should be taken cautiously due to the relatively small sample size used.

4.5 Impact of Trade Reforms on Imports at a Disaggregated Level

The aim of this section is to differentiate the effects of two periods of trade reforms on Mexican imports at a disaggregated level. For this purpose we consider three different classifications of imports. Classification 1 is related to Farming, Extractive and Manufacturing sectors; classification 2 refers to Consumer and Capital goods. Classification 3 deals with nine sub-sectors that comprise the manufacturing sector: Food Products, Beverages and Tobacco; Textiles and Leather Products; Wood Products; Paper Products, Publishing and Printing; Chemicals, Rubber and Plastic Products; Non-Metallic Mineral Products; Basic Metals; Machinery and Equipment; and, Other Products.

We are going to use the econometric techniques applied for the aggregate analysis: the OLS methodology, structural stability analysis, outside sample forecasts, ARDL and ECM.

i) Ordinary Least Square Estimations

In order to estimate the import model at a disaggregated level, using the OLS, and to avoid the possibility of spurious results, the ADF test was applied to the different sectors and sub-sectors under consideration. We use annual data from 1980 to 2000 for the first two classifications, and data from 1980 to 1999 for the third classification. The data source is the Instituto Nacional de Estadística Geografía e Informática (INEGI), the Banco de México, and the World Development Indicators (2002).

Unit root tests for stationarity are performed on the log levels of the variables and first differences. Table 4.7 (part A) presents the results of the ADF test (one lag) and the Phillips-Perron unit root test under the assumption of a constant. All the variables are integrated of order one, I(1), at the 5 per cent or 10 per cent level of significance.

Table 4.7
Unit Root Test for Stationarity

	PART A with Constant Only		PART B with Constant and Time Trend	
Variables	Log Level [1]	Differences[1]	Log Level [2]	Differences[2]
Farming Imports	-0.91	-4.68*	-3.75*	-4.45*
Extractive Imports	-0.45	-3.17*	-3.50**	-3.38**
Manufacturing Imports	-0.08	-3.91*	-5.17*	-3.98*
Consumer Goods	-0.78	-3.25*	-3.75*	-3.21
Intermediate Goods	0.19	-4.26*	-5.15*	-4.30*
Capital Goods	-0.67	-3.24*	-4.55*	-3.39**
Food Products, Beverages and Tobacco[3]	-0.84	-2.98**	-2.32	-2.98
Textiles and Leather Products	-0.26	-3.14*	-3.58**	-3.20
Wood Products	-0.75	-2.76**	-2.96	-2.61
Paper Products, Publishing and Printing	-0.40	-3.09*	-4.26*	-2.81
Chemicals, Rubber and Plastic Products	0.12	-4.02*	-4.45*	-4.22*
Non-Metallic Mineral Products	-0.78	-3.46*	-4.76*	-3.43**
Basic Metals	-0.73	-5.87*	-5.36*	-6.64*
Machinery and Equipment	-0.17	-3.90*	-5.14*	-4.01*
Other Products	-0.55	-3.70*	-3.84*	-3.63**

Notes: [1]The critical value for rejection of hypothesis of a unit root is -3.02. [2]The critical value for rejection of hypothesis of a unit root is -3.67. [3]The Phillips-Perron unit root test was applied for this manufacturing sub-sector. The asterisk (*) denotes significance at the 5 per cent level. The double asterisk (**) denotes significance at the 10 per cent level.

Table 4.7 (part B) also presents the results of the ADF (one lag) and the Phillips-Perron unit root test with a constant and deterministic time trend for the variables both in levels and first differences. It can be seen that almost all variables, except imports for the Food, Beverages and Tobacco sub-sector, and the Wood Products sub-sector, in log levels are stationary. In the case of first differences, the null hypothesis of non-stationarity can be rejected at the 5 per cent or 10 per cent level for the imports of five sectors (Farming; Extractive; Manufacturing; Intermediate Goods; Capital Goods); and, five manufacturing sub-sectors (Chemicals, Rubber and Plastic Products; Non-Metallic Mineral Products; Basic Metals; Machinery and Equipment; and, Other Products).

We present regressions using the OLS for the three different classifications of imports. Table 4.8 shows the results for the first classification. Different specifications were estimated in order to know how each variable behaves when more explanatory variables are included. We started estimating the simple static model and we ended with a complete dynamic one. Four factors should be mentioned. First, the shift dummy variable for 1985 is positive and significant at the 5 per cent confidence level for manufacturing imports (equation *3.8.13*). It suggests, *ceteris paribus*, that the mid-1980s trade reforms increased manufacturing import growth by 30 percentage points. Second, the shift dummy variable for 1994 is not significant at all. Third, price elasticities show the expected sign. They are statistically significant for farming and manufacturing equations, where the magnitude of the coefficients is relatively high. Regarding income elasticities they are not significant for any equation. Fourth, the shift dummy variable for 1991, which was included to capture the change in the way the data were compiled since that year, is not significant.

Table 4.8
OLS Estimation for Disaggregated Import Growth: 1980-2000

Dependent variable : m^i										
Variable / m^i	*Eq.*	*Constant*	*ym*	*p*	m^i_1	*lib 85*	*lib94*	*d91*		R^2
Farming Imports	*4 8.1*	0.10 (1.48)	-2.78 (-1.44)	-1.82 (-4.19)*				-0.13 (-0.58)		0.58
	4 8 2	0.08 (1.46)	-1.51 (-0.89)	-1.78 (-5.12)*	-0.46 (-3.50)*			-0.15 (-0.84)		0.77
	4 8.3	0.06 (0.54)	-1.57 (-0.88)	-1.77 (-4.89)*	-0.46 (-3.38)*	0.02 (0.22)		-0.15 (-0.83)		0.78
	4 8.4	0.05 (0.94)	-2.65 (-1.54)	-1.93 (-5.73)*	-0.45 (-3.66)*		0.14 (1.71)	-0.09 (-0.52)		0.82
	4 8 5	0 08 (0.78)	-2.65 (-1.48)	-1.96 (-5.48)*	-0.45 (-3.48)*	-0.04 (-0.33)	0.15 (1.67)	-0.08 (-0.45)		0.82
Extractive Imports	*4 8 6*	0.01 (0.24)	1.73 (0.95)	-0.14 (-0.37)				-0.19 (-0.96)		0.20
	4 8 7	0.01 (0.21)	1.55 (0.83)	-0.17 (-0.43)	0.17 (0.71)			-0.18 (-0.89)		0.22
	4 8 8	-0.16 (-1.10)	1.31 (0.72)	-0.05 (-0.13)	-0.09 (-0.31)	0.22 (1.32)				0.32
	4 8 9	-0.01 (-0.17)	0.67 (0.34)	-0.29 (-0.73)	0.10 (0.43)		0.12 (1.20)	-0.13 (-0.65)		0.30
	4 8 10	-0.15 (-1.01)	0.67 (0.34)	-0.17 (-0.40)	-0.10 (-0 32)	0.18 (1.04)	0.09 (0.91)	-0.17 (-0.83)		0.36
Manufacturing Imports	*4 8 11*	0.01 (0 26)	2.83 (1.55)	-0.73 (-1.96)				0.29 (1.53)		0.66
	4 8 12	0.02 (0.36)	1.79 (0.95)	-0.93 (-2.45)*	0.24 (1.50)			0.26 (1.42)		0.71
	4 8 13	-0.22 (-1.61)	2.46 (1.40)	-0.56 (-1.42)	-0.06 (-0.31)	0.30 (1.90)**		0.27 (1.62)		0.78
	4 8 14	0.00 (0.13)	1.38 (0.67)	-1.00 (-2.47)*	0.25 (1.51)		0.06 (0.62)	0.28 (1.48)		0.72
	4 8 15	-0.26 (-1.61)	2.93 (1.41)	-0.44 (-0.92)	-0.13 (-0.49)	0.36 (1.77)	-0.05 (-0.47)	0.25 (1.44)		0.78

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level, and the double asterisk (**) denotes significance of the coefficient at the 10 per cent level. See diagnostic test in Table C3 in the Appendix.

Even considering other years related to the first period of trade reforms, 1986 and 1987, we do not obtain more significant results. Regarding the second period of trade liberalisation we tested for 1995 and 1996, but none of these years show positive and significant coefficients (see Table C6 and Table C7 in the Appendix).

The results using OLS for the second classification of imports are presented in Table 4.9. Four main aspects should be mentioned. First, the shift dummy variable for 1985 is positive

and significant at the 5 per cent level for capital goods (equations *4.9.13* and *4.9.15*) and significant at the 10 per cent for intermediate goods (equation *4.9.8*); while, none of the coefficients relating to the second period of trade reforms is significant. Second, income elasticities are significant for capital goods, showing a relatively high magnitude. Third, the price elasticity shows the expected sign and is significant for almost all equations. This evidence may suggest that Mexican imports are mainly determined by price. Finally, the coefficients relating to the shift dummy variable for 1991 are significant for all intermediate goods equations.

Table 4.9
OLS Estimation for Disaggregated Import Growth: 1980-2000

Dependent variable : m^i										
Variable / m^i	*Eq.*	*Constant*	*ym*	*p*	m^i_1	*lib85*	*lib94*	*d91*		R^2
Consumer Goods	*4.9.1*	-0.00 (-0.06)	4.60 (1.73)	-1.33 (-2.45)*				-0.17 (-0.63)		0.69
	4.9.2	0.02 (0.27)	2.82 (1.10)	-1.67 (-3.24)*	0.29 (2.03)*			-0.26 (-1.04)		0.76
	4.9.3	-0.11 (-0.57)	3.04 (1.16)	-1.51 (-2.64)*	0.19 (1.02)	0.16 (0.75)		-0.25 (-0.97)		0.78
	4.9.4	0.03 (0.36)	3.16 (1.12)	-1.62 (-2.92)*	0.28 (1.90)		-0.04 (-0.35)	-0.28 (-1.05)		0.77
	4.9.5	-0.19 (-0.89)	4.26 (1.44)	-1.21 (-1.84)	0.10 (0.46)	0.29 (1.13)	-0.14 (-0.91)	-0.29 (-1.09)		0.79
Intermediate Goods	*4.9.6*	0.06 (1.29)	0.97 (0.68)	-0.84 (-2.91)*				0.42 (2.84)*		0.73
	4.9.7	0.05 (1.27)	0.29 (0.19)	-0.94 (-3.19)*	0.17 (1.23)			0.42 (2.90)*		0.76
	4.9.8	-0.11 (-1.11)	0.68 (0.49)	-0.74 (-2.54)*	-0.05 (-0.27)	0.22 (1.86)**		0.40 (2.99)*		0.81
	4.9.9	0.03 (0.77)	-0.37 (-0.24)	-1.04 (-3.55)*	0.18 (1.33)		0.10 (1.39)	0.46 (3.22)*		0.79
	4.9.10	-0.09 (-0.82)	0.28 (0.17)	-0.82 (-2.49)*	-0.00 (-0.00)	0.17 (1.27)	0.05 (0.61)	0.42 (2.96)*		0.82
Capital Goods	*4.9.11*	-0.05 (-0.84)	4.72 (2.49)*	-0.68 (-1.78)				0.02 (0.12)		0.71
	4.9.12	-0.03 (-0.50)	3.53 (1.78)	-0.98 (-2.34)*	0.23 (1.49)			-0.05 (-0.27)		0.75
	4.9.13	-0.31 (-2.32)*	4.22 (2.41)*	-0.52 (-1.27)	-0.03 (-0.21)	0.32 (2.28)*		0.00 (0.04)		0.82
	4.9.14	-0.03 (-0.58)	3.27 (1.50)	-1.02 (-2.29)*	0.24 (1.47)		0.03 (0.38)	-0.04 (-0.19)		0.75
	4.9.15	-0.36 (-2.44)*	4.96 (2.50)*	-0.33 (-0.69)	-0.11 (-0.54)	0.39 (2.36)*	-0.08 (-0.83)	-0.00 (-0.03)		0.83

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level, and the double asterisk (**) denotes significance of the coefficient at the 10 per cent level. See diagnostic test in Table C4 in the Appendix.

Trying different years, 1986 and 1987, for the first period of trade reforms, we do not find significant effects. Neither 1995 nor 1996 exhibit significant results for the second period of trade reforms related to NAFTA (see Table C8 and C9 in the Appendix). The price elasticity is the only variable that remains significant for almost all equations.

The results from OLS estimations for the third classification of imports are reported in Table 4.10. Two main aspects should be highlighted. First, the shift dummy variable for 1985 is positive and significant at the 5 per cent confidence level for the Machinery and Equipment sub-sector (equation *4.10.38*), suggesting that imports of this manufacturing sub-sector increased by 35 percentage points as a consequence of the mid-1980s trade reforms.[9] Precisely, in this manufacturing sub-sector, the most dynamic, is where the automobile industry and auto parts industry is classified. Multinational enterprises like General Motors, Toyota, Ford, VolksWagen increased their activities after the mid-1980s.

None of the coefficients for the second period of trade reforms, *lib94*, is significant.

Second, the price variable is significant at the 5 per cent confidence level, for at least one equation, in the following manufacturing sub-sectors: Food Products, Beverages and Tobacco; Wood Products; Chemicals, Rubber and Plastic Products; and, Machinery and Equipment.

[9] Although the Textiles and Leather Products manufacturing sub-sector show positive and significant coefficients for *lib85* (equations *4.10.8* and *4.10.10*), we do not rely on these results because when *lib85* is included the sign for the price elasticity changes to positive, and this is not compatible with the theory.

Table 4.10
OLS Estimation for Disaggregated Import Growth: 1980-1999

Dependent variable : m^i										
Variable / m^i	Eq.	*Constant*	*ym*	*p*	m^i_t	*lib85*	*lib94*	*d91*		R^2
Food Products, Beverages and Tobacco	*4 10.1*	-0.03 (0.56)	3.06 (1.70)	-0.56 (-1.45)				-0.16 (-0.96)		0.80
	4 10.2	-0.02 (-0.42)	2.04 (1.34)	-0.67 (-2.09)*	0.28 (2.68)*			-0.22 (-1.56)		0.87
	4.10.3	-0 13 (-1.43)	1.92 (1.31)	-0.62 (-2.00)*	0.20 (1.77)	0.13 (1.41)		-0.22 (-1.62)		0.89
	4 10 4	-0.01 (-0.34)	2.12 (1.27)	-0.66 (-1.94)	0.27 (2.52)*		-0.01 (-0.15)	-0.22 (-1.50)		0.87
	4 10.5	-0.15 (-1.62)	2.38 (1.53)	-0.54 (-1.65)	0.15 (1.27)	0.19 (1.69)**	-0.07 (-0.95)	-0.24 (-1.77)		0.90
Textiles and Leather Products	*4 10.6*	0.02 (0 17)	6.24 (1.22)	-0.77 (-0.74)				0.39 (0.74)		0.37
	4 10 7	0.02 (0.16)	6.14 (1.10)	-0.79 (-0.69)	0.01 (0.05)			0.39 (0.71)		0.37
	4 10 8	-0.68 (-1.81)	7.19 (1.44)	0.16 (0.14)	-0.38 (-1.36)	0.90 (2.08)*		0.35 (0.70)		0.54
	4 10 9	0.04 (0.24)	6.71 (1.10)	-0.70 (-0.58)	0.00 (0.03)		-0.08 (-0.28)	0.36 (0.62)		0.38
	4 10 10	-0.90 (-2.45)*	10.87 (2.15)*	1.09 (0.94)	-0.59 (-2.07)*	1.32 (2.83)*	-0.48 (-1.76)	0.14 (0.30)		0.64
Wood Products	*4 10 11*	-0.00 (-0.00)	4.45 (1.82)	-1.04 (-2.10)*				0.62 (2.41)*		0.73
	4 10 12	0.00 (0.00)	3.83 (1.55)	-1.17 (-2.32)*	0.16 (1.14)			0.55 (2.15)*		0.75
	4 10 13	-0.07 (-0.40)	3.82 (1.49)	-1.10 (-2.02)*	0.11 (0.60)	0.09 (0.45)		0.56 (2.11)*		0.76
	4 10 14	0.02 (0.30)	4.70 (1.75)	-1.03 (-1.95)	0.13 (0.89)		-0.11 (-0.88)	0.52 (1.98)		0.77
	4 10 15	-0.06 (-0.41)	5.16 (1.83)	-0.86 (-1.44)	0.05 (0.31)	0.14 (0.70)	-0.18 (-1.11)	0.50 (1.85)		0.78
Paper Products, Publishing and Printing	*4.10.16*	0.05 (0.92)	1.30 (0.73)	-0.55 (-1.53)				0.37 (2.00)*		0.53
	4.10.17	0.03 (0.65)	0.96 (0.55)	-0.61 (-1.74)	0.26 (1.46)			0.36 (2.04)*		0.59
	4 10 18	-0.15 (-1.22)	0.76 (0.47)	-0.46 (-1.36)	-0.03 (-0.12)	0.26 (1.69)**		0.35 (2.08)*		0.67
	4.10.19	0.03 (0.53)	0.86 (0.45)	-0.62 (-1.66)	0.26 (1.41)		0.01 (0.14)	0.37 (1.95)		0.59
	4.10.20	-0.08 (-0.83)	1.32 (0.71)	-0.42 (-1.08)	0.05 (0.23)	0.20 (1.43)	-0.07 (-0.66)	0.31 (1.66)		0.66

(Table 4.10 continues overleaf)

(Table 4.10 continued)

Variable / m^i	Eq.	*Constant*	*ym*	*p*	m^i_t	*lib85*	*lib94*	*d91*		R^2
Chemicals, Rubber and Plastic Products	*4.10 21*	0.06 (1.38)	1.84 (1.38)	-0.57 (-2.10)*				0.29 (2.10)*		0.68
	4.10.22	0.05 (1.24)	1.58 (1.09)	-0.61 (-2.12)*	0.08 (0.54)			0.29 (2.06)*		0.69
	4 10.23	-0.04 (-0.43)	1.75 (1.21)	-0.49 (-1.59)	-0.06 (-0.31)	0.13 (1.12)		0.28 (1.97)		0.72
	4.10.24	0.04 (0.94)	1.29 (0.81)	-0.66 (-2.14)*	0.09 (0.57)		0.04 (0.56)	0.31 (2.08)*		0.70
	4.10.25	-0.04 (-0.38)	1.73 (1.04)	-0.49 (-1.37)	-0.06 (-0.26)	0.13 (0.91)	0.00 (0.02)	0.28 (1.82)		0.72
Non-Metallic Mineral Products	*4 10 26*	0.00 (0.07)	2.45 (0.87)	-1.06 (-1.86)				0.40 (1.36)		0.56
	4.10 27	0.01 (0.13)	1.88 (0.60)	-1.15 (-1.86)	0.09 (0.46)			0.38 (1.28)		0.56
	4 10 28	-0.38 (-1.61)	2.98 (1.01)	-0.65 (-1.02)	-0.25 (-0.95)	0.46 (1.80)**		0.39 (1.40)		0.66
	4 10 29	-0.00 (-0.05)	1.26 (0.37)	-1.24 (-1.90)	0.09 (0.48)		0.09 (0.57)	0.42 (1.33)		0.57
	4 10 30	-0.42 (-1.58)	3.61 (1.04)	-0.50 (-0.67)	-0.30 (-0.99)	0.53 (1.67)	-0.06 (-0.39)	0.36 (1.23)		0.66
Basic Metals	*4 10 31*	0.01 (0.11)	3.01 (0.87)	-1.28 (-1.82)				0.32 (0.88)		0.52
	4 10 32	0.01 (0.12)	2.85 (0.76)	-1.32 (-1.73)	0.03 (0.16)			0.32 (0.86)		0.52
	4 10 33	-0.18 (-0.63)	2.96 (0.78)	-1.10 (-1.34)	-0.09 (-0.35)	0.24 (0.76)		0.28 (0.73)		0.54
	4 10 34	-0.01 (-0.10)	1.99 (0.49)	-1.44 (-1.80)	0.03 (0.18)		0.13 (0.66)	0.37 (0.95)		0.54
	4.10 35	-0.14 (-0.49)	2.42 (0.56)	-1.23 (-1.32)	-0.05 (-0.20)	0.18 (0.49)	0.08 (0.34)	0.32 (0.77)		0.55
Machinery and Equipment	*4.10.36*	0.02 (0.44)	2.98 (1.46)	-0.68 (-1.65)				0.30 (1.44)		0.61
	4.10 37	0.03 (0.48)	1.87 (0.86)	-0.93 (-2.07)*	0.22 (1.27)			0.26 (1.27)		0.65
	4.10 38	-0.25 (-1.67)	2.72 (1.37)	-0.44 (-0.95)	-0.10 (-0.46)	0.35 (2.05)*		0.29 (1.55)		0.74
	4.10 39	0.01 (0.24)	1.39 (0.59)	-1.01 (-2.11)*	0.24 (1.29)		0.06 (0.61)	0.29 (1.33)		0.66
	4.10.40	-0.29 (-1.71)	3.37 (1.43)	-0.27 (-0.48)	-0.18 (-0.66)	0.42 (1.95)**	-0.06 (-0.56)	0.27 (1.39)		0.75
Other Products	*4.10.41*	-0.01 (-0.12)	7.52 (1.99)	-0.92 (-1.20)				0.15 (0.39)		0.58
	4.10.42	-0.01 (-0.14)	6.59 (1.69)	-1.16 (-1.44)	0.17 (0.96)			0.13 (0.32)		0.61
	4.10.43	-0.28 (-0.89)	6.77 (1.72)	-0.81 (-0.89)	0.00 (0.01)	0.33 (0.91)		0.12 (0.30)		0.63
	4.10.44	0.00 (0.02)	7.23 (1.69)	-1.06 (-1.23)	0.16 (0.88)		-0.09 (-0.45)	0.09 (0.22)		0.62
	4.10.45	-0.45 (-1.34)	8.95 (2.11)*	-0.17 (-0.17)	-0.17 (-0.59)	0.64 (1.46)	-0.30 (-1.22)	0.00 (0.00)		0.68

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. See diagnostic test in Table C5 in the Appendix.

Notice that in four manufacturing sub-sectors (Wood Products; Paper Products, Publishing and Printing; and, Chemicals, Rubber and Plastic Products) the shift dummy variable for 1991 is significant; which suggest that the change in the way how the data were compiled mainly affected those sub-sectors.

Similarly as we did for the other two classifications of imports, we consider two alternative years for each trade liberalisation indicator, 1986 and 1987 for the first period of trade reforms; and, 1995 and 1996 for the second period (see Table C10 and C11 in the Appendix). The results, however, do not show significant coefficients related to the alternative years considered for any of the trade liberalisation indicators.

ii) Structural Stability and Forecasts

Additional to the use of shift dummy variables, as indicators of trade liberalisation, we apply, alternatively, two techniques for examining whether or not a structural break in the growth of each type of imports can be identified in 1985 and 1994: structural stability and outside-sample forecasts.

First, we apply the Chow break point test in order to examine the statistical evidence for structural stability of the parameters for the effect of the mid-1980s trade reforms. The Chow test leads us to accept the null hypothesis of structural stability for the Farming sector and the Wood Products manufacturing sub-sector. Imports of the other sectors and sub-sectors reject the null hypothesis, as can be seen in Table 4.11. In other words, almost all types of imports

analysed show evidence of a structural break in 1985, most likely as a result of trade liberalisation.

Table 4.11
Chow Test for structural stability of the parameters

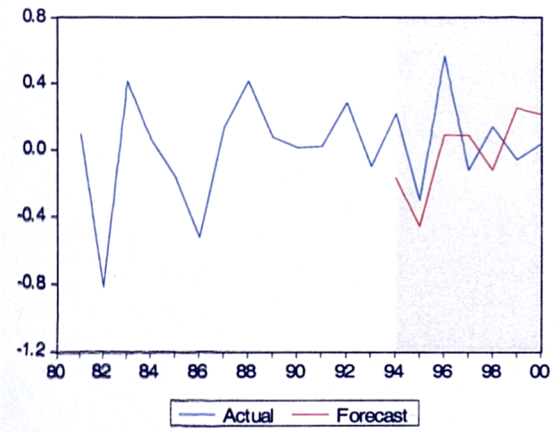
Imports Equation	*Calculated F-statistic*		*Imports Equation*	*Calculated F-statistic*
Farming	0.75		Food Products, Beverages and Tobacco	2.98**
Extractive	2.69**		Textiles and Leather Products	6.06*
Manufacturing	7.44*		Wood Products	1.24
			Paper Products, Publishing and Printing	4.18*
			Chemicals, Rubber and Plastic Products	1.94***
Consumer Goods	3.55*		Non-Metallic Mineral Products	4.41*
Intermediate Goods	3.64*		Basic Metals	1.98***
Capital Goods	6.47*		Machinery and Equipment	8.15*
			Other Products	3.06**

Notes: The asterisk (*), the double asterisk (**), and the triple asterisk (***) denote rejection of the null hypothesis of no structural change in the parameters at the 5 per cent, 10 per cent and 25 per cent, respectively.

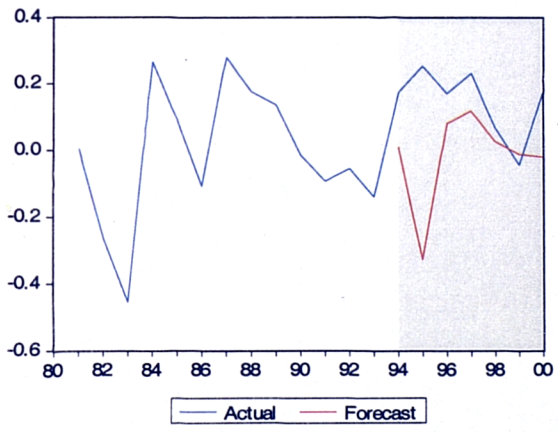
The second procedure is related to test for the effect of NAFTA for each type of imports. Import models are estimated up to 1994 and then outside-sample forecasts are made. The actual and the forecast import models are shown in Graph 4.6.

Graph 4.6
Actual, and Single Equation Static Forecast for Imports

Classification 1



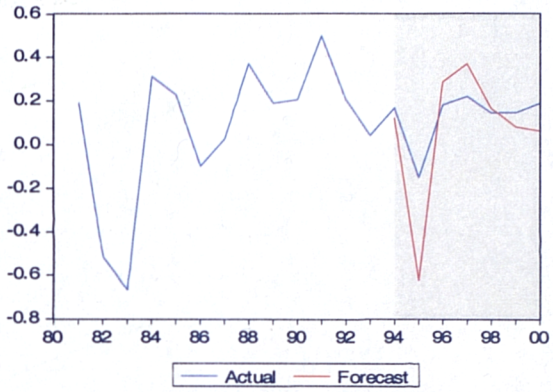
a) Farming Imports



b) Extractive Imports

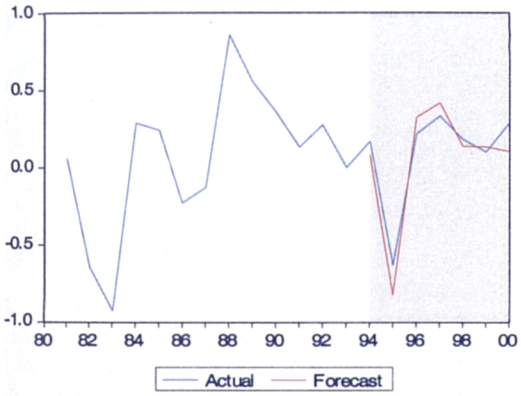
(Graph 4.6 continues overleaf)

(Graph 4.6 continued)

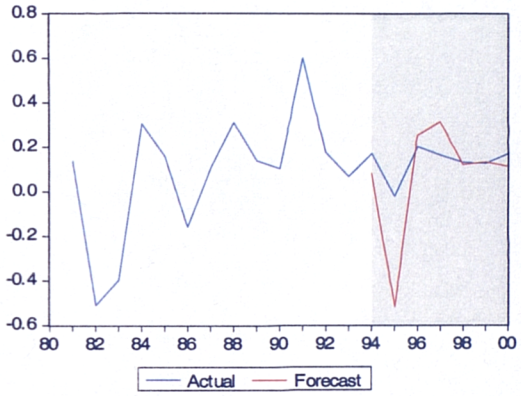


c) Manufacturing Imports

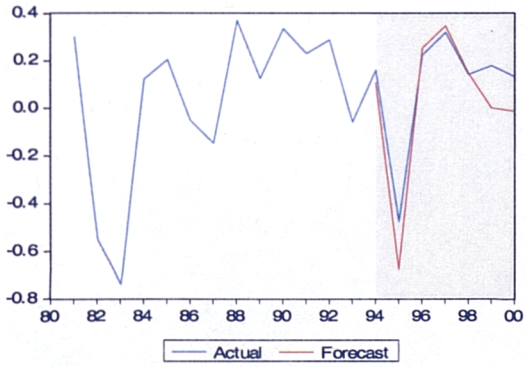
Classification 2



d) Consumer goods



e) Intermediate goods

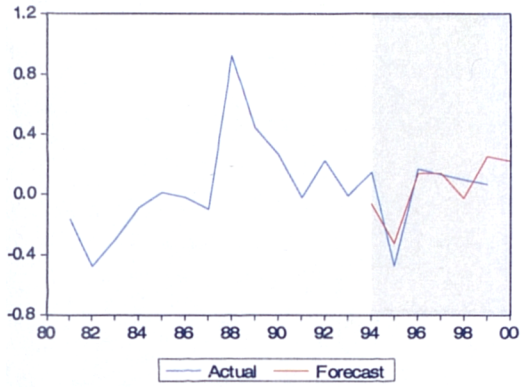


f) Capital goods

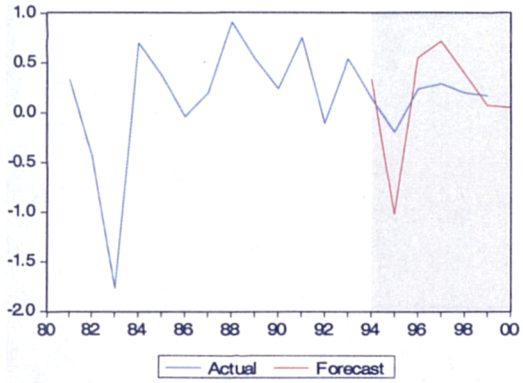
(Graph 4.6 continues overleaf)

(Graph 4.6 continued)

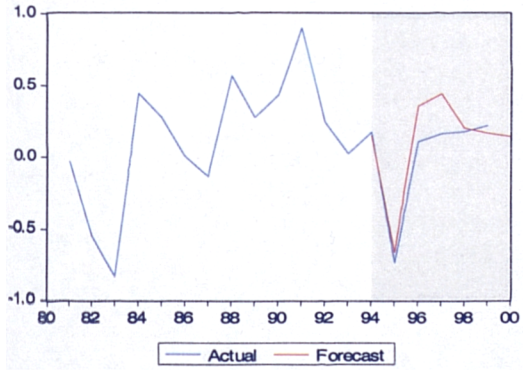
Classification 3



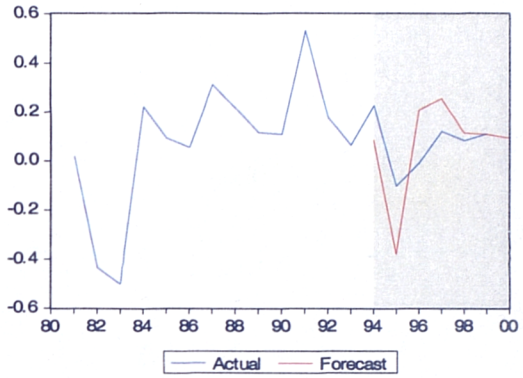
g) Food Products, Beverages and Tobacco



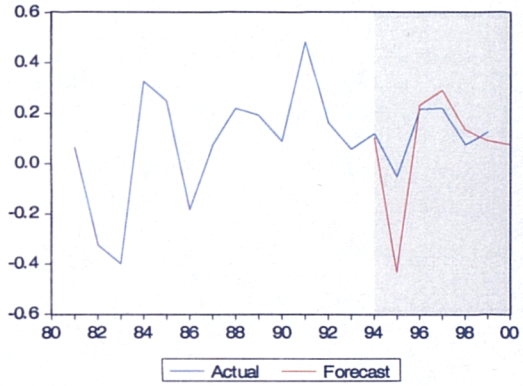
h) Textiles and Leather Products



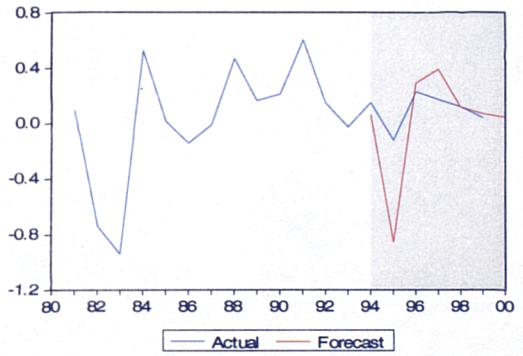
i) Wood Products



j) Paper Products, Publishing and Printing



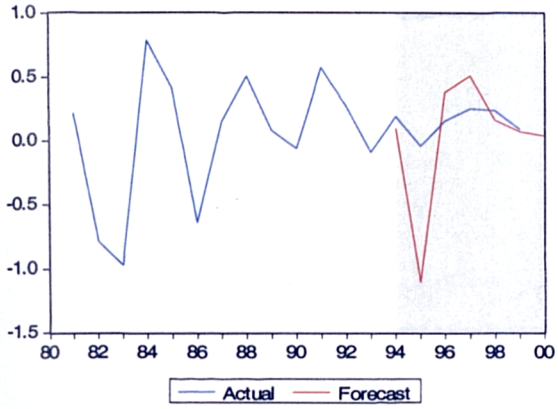
k) Chemicals, Rubber and Plastic Products



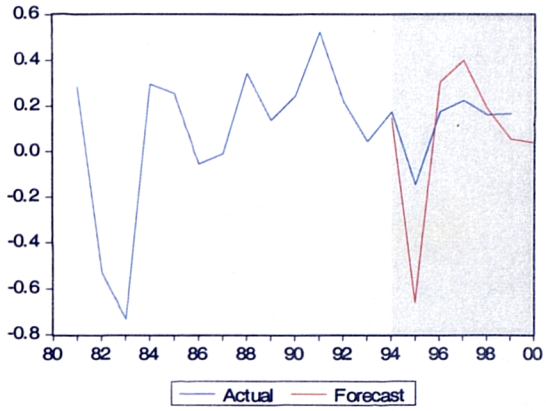
l) Non Metallic Mineral Products

(Graph 4.6 continues overleaf)

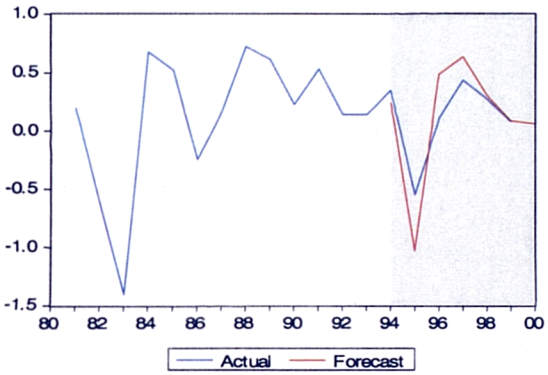
(Graph 4.6 continued)



m) Basic Metals



n) Machinery and Equipment



o) Other Manufactures

If actual import performance is greater than forecast, then there is *prima facie* evidence of a positive structural break. From the set of fifteen graphs, grouped in Graph 4.6, we observe that almost all import sectors and manufacturing sub-sectors, except for the Wood Products manufacturing sub-sector, show evidence that NAFTA represented a positive structural break.[11]

[11] Considering dynamic outside sample forecasts, the results are similar to those presented in Graph 4.6.

We also calculated the root-mean-square (*rms*) forecast error and the Theil inequality coefficient along with its components for these forecasts. These statistics which are helpful in evaluating the forecasts are as follows:

Forecasts Evaluation					
Graph	Root-mean square error (*rms*)	Theil inequality coefficient	Bias proportion	Variance proportion	Covariance proportion
a) Farming Imports	0.300877	0.604256	0.073364	0.006845	0.919791
b) Extractive Imports	0.245457	0.790667	0.445171	0.027129	0.527700
c) Manufacturing Imports	0.198555	0.4152885	0.090248	0.850437	0.059315
d) Consumer goods	0.119480	0.170755	0.105725	0.372622	0.521653
e) Intermediate goods	0.200585	0.481831	0.096493	0.849572	0.053935
f) Capital goods	0.116684	0.203604	0.376330	0.337757	0.285913
g) Food Products, Beverages and Tobacco	0.139611	0.336156	0.000083	0.077922	0.921995
h) Textiles and Leather Products	0.419418	0.520076	0.008500	0.974283	0.017217
i) Wood Products	0.159861	0.223113	0.349865	0.020220	0.629915
j) Paper Products, Publishing and Printing	0.164707	0.478993	0.001124	0.402019	0.596857
k) Chemicals, Rubber and Plastic Products	0.160355	0.407179	0.084139	0.801863	0.113998
l) Non Metallic Products	0.315012	0.564214	0.070428	0.866452	0.068630
m) Basic Metals	0.456469	0 651005	0.076202	0.866452	0.057346
n) Machinery and Equipment	0.232887	0 440340	0.048187	0.915811	0.036002
o)Other Manufactures	0 265762	0.295594	0.001033	0.687911	0.311056

From the import forecasts evaluation, we observe that the *rms* forecasts error is relatively high for the Textile and Leather Products, the Non-Metallic Products, and the Basic Metals sub-sectors, but the bias proportion is high for the Extractive sector, the Capital goods and the Wood Products. Therefore, we rely on the forecasts for import categories except for those which have a relatively high bias.

iii) ARDL and Error Correction Modelling

We supplement our previous results with two other econometric techniques, ARDL and ECM. We are looking for the existence of a long run relationship between the variables under consideration, for each type of imports, and for the speed of response of imports to an external shock.

First, the calculated F-statistics, which test for the existence of a long run relationship between the variables included for each import category, are shown in Table 4.12. All import models were estimated considering *lib85* and *lib94* trade liberalisation indicators and the shift dummy variable for 1991, *d91*.[12] The calculated F-statistic exceeds the upper bound of the critical value band in five import categories (Farming; Intermediate Goods; Wood Products; Chemicals, Rubber and Plastic Products; and, Basic Metals). Then, according to this test, the null hypothesis of no long run relationship between, m^i, *p*, *ym*, *lib85*, *lib94* and *d91* is rejected for those models.[13]

Table 4.12
Testing for Long Run Relationships using F-statistic

Imports Equation	*Calculated F-statistic*		*Imports Equation*	*Calculated F-statistic*
Farming	9.69*		1. Food Products, Beverages and Tobacco	0.25
Extractive	3.10		2. Textiles and Leather Products	1.77
Manufacturing	3.75		3. Wood Products	4.28**
			4. Paper Products, Publishing and Printing	3.01
			5. Chemicals, Rubber and Plastic Products	6.08*
Consumer Goods	0.97		6. Non-Metallic Mineral Products	3.61
Intermediate Goods	5.03*		7. Basic Metals	4.38**
Capital Goods	2.75		8. Machinery and Equipment	3.50
			9. Other Products	3.15

Notes: As the underlying regression contains an intercept but no trend, the bounds for the F- critical value at the 5 per cent and 10 per cent level are given by 3.79 and 4.85, and 3.18 and 4.12, respectively. The asterisk (*) denotes rejection of the null hypothesis of no long run relationship at the 5 per cent level and the double asterisk (**) shows rejection of the null hypothesis at the10 per cent.

As it is only appropriate to embark on the second stage of the ARDL procedure if the long run relationship between the variables considered is not spurious, we continue with it for the five import categories that pass this condition: Farming; Intermediate Goods; Wood Products; Chemicals, Rubber and Plastic Products; and, Basic Metals.

[12] For this test, the shift dummy variable for 1991 takes the value of one since 1991.
[13] Where ^{i} denotes the different types of imports.

The estimation of the long run coefficients and the associated ECM are achieved using ARDL. The order of the ARDL model is determined by using the Schwartz Bayesian Criterion (SBC) or is determined by ourselves. The estimates of the long run coefficients and the ECM associated with these long run estimates are presented in Part A and Part B in Table 4.13, respectively.

Table 4.13
Part A: Long Run Coefficients

Variable / m	*Constant*	*ym*	*p*	*lib85*	*lib94*	*d91*
Farming ARDL (1,1,0) [2]	-9 57 (0 95)	1.28 (1 60)	-0 63 (-2 00)*	-0.18 (-1.84)	0.31 (2.36)*	-0.01 (-0.07)
Intermediate Goods ARDL (1,1,0) [1]	-12.18 (0 66)	1 60 (1 09)	-0 55 (-1 07)	0.39 (1.93)	0.36 (1.65)	0.73 (2.50)*
Wood Products ARDL (1,0,0) [1]	-24.67 (-1 10)	2 43 (1 38)	-2 40 (-3 81)*	0.87 (3.23)*	-0.18 (-0.55)	0.81 (2.64)*
Chemicals, Rubber and PlasticProducts ARDL (1,1,0) [1]	-21 76 (-1 75)	2 23 (2 24)*	-0 24 (-0 66)	0 34 (2 52)*	0.21 (1.39)	0.52 (2.60)*
Basic Metals ARDL (1,0,0) [2]	-20 37 (0 91)	2 16 (1 23)	-1.84 (-2 83)*	0.37 (1 48)	0.51 (1.64)	0.05 (0.17)

Part B: Error Correction Model

Variable / m	*Constant*	*ym*	*p*	*lib85*	*lib94*	*d91*	*ECM*
Farming	-12 72 (-0 91)	3 35 (2 03)*	-0 84 (-1 89)	-0 24 (-1 72)	0.42 (2.36)*	-0.01 (-0.07)	-1.32 (-6.75)*
Intermediate Goods	-7 30 (-0 60)	3 53 (2.87)*	-0 33 (-1 01)	0 23 (2 37)*	0.21 (1.54)	0.43 (3.03)*	-0.59 (-3.85)*
Wood Products	-17 15 (-1 12)	1 69 (1 41)	-1.67 (-3 97)*	0 60 (3 81)*	-0.12 (-0.57)	0.56 (2.17)*	-0.69 (-5.73)*
Chemicals, Rubber and Plastic Products	-14 27 (-1 43)	3 86 (4 05)*	-0.16 (0 63)	0 22 (2 93)*	0.14 (1.32)	0.34 (3.07)*	-0.65 (-4.41)*
Basic Metals	-18 04 (-0 87)	1.91 (1.16)	-1.63 (-3.17)*	0 33 (1 61)	0.45 (1.64)	0.04 (0.17)	-0.88 (-5.40)*

Notes: [1] Denotes ARDL selected based on SBC. [2] Denotes ARDL was arbitrarily chosen. The asterisk (*) denotes significance of the coefficient at the 5 per cent level.

The long run coefficients for the first trade liberalisation indicator, *lib85*, are significant at the 5 per cent level for the Wood Products and the Chemicals, Rubber and Plastic Products manufacturing sub-sectors; as expected they show a positive sign. Imports of the former sub-sector increased by 138 percentage points; and, imports of the latter sub-sector rose by 40 percentage points, as a result of trade liberalisation in 1985.

Political debate is now going on concerning the negative effects that NAFTA, so far, has had on the Mexican farming sector. This sector has contracted since the 1980s, but especially since 1994. According to NAFTA's tariff elimination schedule, on 1st January 2003 the remaining import tariffs for most of the agricultural products are going to be eliminated (NAFTA Annex 302.2), but maize[14] is not going to be duty free imported until 2008. Mexican farmers argue that they are not able to compete against very low import prices from the US because US farmers benefit from large subsidies given by their government. The Mexican government, however, does not offer such subsidies to Mexican farmers because it is against NAFTA. Given these facts, a re-negotiation of NAFTA is urged in order to alleviate the trade balance deficit in the farming sector.[15]

Regarding the results for the long run income elasticities, the Chemicals, Rubber and Plastic Products sub-sector is the only one that shows a statistically significant coefficient at the 5 per cent level. The price elasticity coefficients, as expected, show a negative sign and are statistically significant at the 5 per cent level for imports of the Farming sector, the Wood Products and the Basic Metals sub-sectors.

From the ECM models (see part B in Table 4.13) it is relevant to remark that all the error correction terms are highly significant and have the correct negative sign; suggesting that those import categories converge to equilibrium, once they are shocked.

In sum, through the use of different econometric techniques we show evidence which suggest that the trade reforms launched during the mid-1980s increased the rate of growth of imports.

[14] Maize is the main grain that Mexican farmers produce and Mexican population consume.
[15] Refer to diverse articles in Mexican newspapers, (i.e. *La Jornada* and *Reforma*).

Independently of other factors (i.e. management of exchange rate), imports reacted earlier than exports to those trade reforms (see chapter 3). The results for the analysis of the impact of NAFTA on imports, however, vary by import sectors and manufacturing sub-sectors.

4.6 Conclusions

This chapter has analysed the effects of the two periods of trade reforms, the mid-1980s trade reforms and those related to NAFTA, on Mexico's imports at the aggregate and at a disaggregated level. The application of different econometric techniques (i.e. OLS method, outside forecast, ECM, ARDL, etc.), suggest that there was a positive impact of the mid-1980s trade reforms on imports. Regarding, the effects of NAFTA on imports, we found evidence of a very short structural break for most main sectors and manufacturing sub-sectors. These findings lead us to draw some further conclusions on Mexico's import performance.

In particular, at the disaggregated level we observe that the performance of imports during the last two decades has been very unstable, showing volatile growth rates. In spite of this peculiar performance, there is no substantial evidence of change in the composition of the manufacturing sub-sectors as a consequence of trade reforms. Even more, trade reforms have accentuated the demand of imports from those manufacturing sub-sectors that already had a major share in total imports.

Finally, this country case study provides more empirical evidence for the proposition that imports react sooner and faster than exports to trade liberalisation, specifically referring to

the mid-1980s trade reforms (Santos-Paulino and Thirlwall, 2002). From the previous chapter we have seen that exports responded to trade reforms not until 1986, while imports responded in 1985.

Appendix C

Table C1
OLS Estimation for Import Growth: 1970-2000

Dependent variable: Import growth (m)							
	lib94			*lib95*		*lib96*	
Regressor	C1.1	C1.2		C1.3	C1.4	C1.5	C1.6
Constant	-0.07 (-1.54)	-0.07 (-1.32)		0.00 (0.16)	-0.08 (-1.51)	0.00 (0.01)	-0.09 (-1.73)
ym	2.25 (2.58)*	2.16 (2.22)*		1.10 (1.38)	2.28 (2.50)	1.17 (1.44)	2.48 (2.75)*
p	-0.68 (-3.59)*	-0.70 (-3.39)*		-0.89 (-4.88)*	-0.67 (-3.41)*	-0.87 (-4.61)*	-0.65 (-3.40)*
m_{t}	0.11 (1.05)	0.12 (1.06)		0.22 (1.94)	0.11 (1.02)	0.21 (1.83)	0.11 (1.00)
md	-0.06 (-0.84)	-0.05 (-0.70)		-0.04 (-0.50)	-0.06 (-0.83)	-0.04 (-0.54)	-0.07 (-1.04)
lib86	0.11 (2.43)*	0.10 (1.72)			0.11 (2.16)*		0.15 (2.47)*
lib94, lib95, lib96		0.01 (0.25)		0.04 (0.90)	-0.00 (-0.16)	0.03 (0.79)	-0.05 (-0.99)
R^2	0.81	0.81		0.77	0.81	0.76	0.82
Durbin Watson	1.55	1.54		1.57	1.55	1.55	1.58
Diagnostic Tests							
Serial Correlation	*0.266*	*0.274*		*0.266*	*0.275*	*0.241*	*0.309*
Functional Form	*0.305*	*0.259*		*0.294*	*0.343*	*0.427*	*0.418*
Normality	*0.566*	*0.560*		*0.690*	*0.584*	*0.583*	*0.578*
Heteroscedasticity	*0.207*	*0.179*		*0.356*	*0.207*	*0.192*	*0.307*

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. The diagnostic tests show probabilities.

Table C2
OLS Estimation for Import Growth: 1970-2000

Dependent variable: Import growth (m)					
Regressor	*lib94*			*lib95*	*lib96*
	C2.1	C2.2		C2.3	C2.4
Constant	-0.03 (-0.66)	-0.01 (-0.36)		-0.03 (-0.60)	-0.03 (-0.69)
ym	1.62 (1.85)	1.34 (1.43)		1.58 (1.74)	1.67 (1.83)
p	-0.76 (-3.66)*	-0.83 (-3.70)*		-0.77 (-3.55)*	-0.74 (-3.45)*
m_{-1}	0.17 (1.43)	0.18 (1.54)		0.17 (1.41)	0.17 (1.39)
md	-0.04 (-0.58)	-0.03 (-0.36)		-0.04 (-0.52)	-0.04 (-0.60)
lib87	0.06 (1.42)	0.03 (0.55)		0.06 (1.07)	0.08 (1.16)
lib94, lib95, lib96		0.05 (0.85)		0.01 (0.24)	-0.01 (-0.27)
R^2	0.78	0.79		0.78	0.78
Durbin Watson	1.60	1.56		1.60	1.61
Diagnostic Tests					
Serial Correlation	*0.313*	*0.299*		*0.324*	*0.334*
Functional Form	*0.722*	*0.369*		*0.609*	*0.804*
Normality	*0.866*	*0.779*		*0.856*	*0.891*
Heteroscedasticity	*0.056*	*0.066*		*0.066*	*0.061*

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. The diagnostic tests show probabilities.

Table C3
Diagnostic Tests

Dependent variable : m^i					
m^i \ Test	*Eq.*	*Serial correlation*	*Functional Form*	*Normality*	*Heteroscedasticity*
Farming	*C3 1*	*0.117*	*0.280*	*0.561*	*0.473*
	C3 2	*0.139*	*0.454*	*0.670*	*0.427*
	C3 3	*0.168*	*0.454*	*0.728*	*0.610*
	C3.4	*0.345*	*0.679*	*0.706*	*0.509*
	C3 5	*0.357*	*0.763*	*0.761*	*0.541*
Extractive	*C3 6*	*0.469*	*0.089*	*0.950*	*0.723*
	C3 7	*0.613*	*0.827*	*0.884*	*0.409*
	C3 8	*0.901*	*0.031*	*0.767*	*0.595*
	C3.9	*0.732*	*0.073*	*0.950*	*0.185*
	C3 10	*0.964*	*0.023*	*0.885*	*0.315*
Manufacturing	*C3 11*	*0.551*	*0.144*	*0.005*	*0.842*
	C3 12	*0.888*	*0.619*	*0.372*	*0.781*
	C3.13	*0.271*	*0.125*	*0.448*	*0.723*
	C3 14	*0.969*	*0.217*	*0.355*	*0.898*
	C3 15	*0.187*	*0.159*	*0.547*	*0.798*

Note: The diagnostic tests show probabilities.

Table C4
Diagnostic Tests

Dependent variable : m^i					
m^i \ Test	*Eq*	*Serial correlation*	*Functional Form*	*Normality*	*Heteroscedasticity*
Consumer Goods	*C4 1*	*0.732*	*0.250*	*0.588*	*0.946*
	C4 2	*0.380*	*0.659*	*0.780*	*0.936*
	C4 3	*0.293*	*0.681*	*0.941*	*0.841*
	C4 4	*0.393*	*0.560*	*0.740*	*0.914*
	C4.5	*0.176*	*0.584*	*0.953*	*0.875*
Intermediate Goods	*C4 6*	*0.376*	*0.394*	*0.142*	*0.910*
	C4 7	*0.499*	*0.467*	*0.953*	*0.774*
	C4 8	*0.562*	*0.329*	*0.142*	*0.436*
	C4.9	*0.797*	*0.120*	*0.931*	*0.435*
	C4.10	*0.584*	*0.234*	*0.190*	*0.405*
Capital Goods	*C4 11*	*0.949*	*0.289*	*0.682*	*0.347*
	C4.12	*0.588*	*0.917*	*0.934*	*0.296*
	C4.13	*0.075*	*0.355*	*0.896*	*0.796*
	C4 14	*0.599*	*0.614*	*0.986*	*0.313*
	C4.15	*0.016*	*0.389*	*0.737*	*0.647*

Note: The diagnostic tests show probabilities.

Table C5
Diagnostic Tests

Dependent variable : m^i					
m^i \ Test	*Eq.*	*Serial correlation*	*Functional Form*	*Normality*	*Heteroscedasticity*
Food Products, Beverages and Tobacco	*C5 1*	*0.774*	*0.871*	*0.338*	*0.608*
	C5 2	*0.064*	*0.782*	*0.534*	*0.514*
	C5 3	*0.034*	*0.722*	*0.747*	*0.448*
	C5 4	*0.074*	*0.782*	*0.543*	*0.494*
	C5 5	*0.006*	*0.799*	*0.768*	*0.353*
Textiles and Leather Products	*C5 6*	*0.747*	*0.635*	*0.001*	*0.682*
	C5.7	*0.560*	*0.670*	*0.001*	*0.688*
	C5 8	*0.455*	*0.018*	*0.961*	*0.184*
	C5 9	*0.617*	*0.316*	*0.000*	*0.849*
	C5 10	*0.223*	*0.010*	*0.920*	*0.168*
Wood Products	*C5.11*	*0.955*	*0.813*	*0.830*	*0.659*
	C5 12	*0.379*	*0.707*	*0.987*	*0.566*
	C5 13	*0.385*	*0.523*	*0.895*	*0.489*
	C5.14	*0.290*	*0.806*	*0.935*	*0.556*
	C5 15	*0.378*	*0.815*	*0.895*	*0.372*
Paper Products, Publishing and Printing	*C5 16*	*0.272*	*0.766*	*0.266*	*0.419*
	C5 17	*0.684*	*0.040*	*0.975*	*0.272*
	C5 18	*0.588*	*0.032*	*0.798*	*0.384*
	C5 19	*0.694*	*0.042*	*0.968*	*0.271*
	C5 20	*0.651*	*0.023*	*0.890*	*0.284*
Chemicals, Rubber and Plastic Products	*C5 21*	*0.869*	*0.072*	*0.465*	*0.659*
	C5 22	*0.936*	*0.239*	*0.726*	*0.607*
	C5 23	*0.636*	*0.924*	*0.631*	*0.292*
	C5 24	*0.947*	*0.920*	*0.864*	*0.357*
	C5 25	*0.649*	*0.903*	*0.637*	*0.288*
Non-Metallic Mineral Products	*C5 26*	*0.873*	*0.061*	*0.043*	*0.682*
	C5 27	*0.572*	*0.269*	*0.212*	*0.758*
	C5 28	*0.097*	*0.600*	*0.540*	*0.793*
	C5 29	*0.469*	*0.966*	*0.188*	*0.872*
	C5 30	*0.102*	*0.730*	*0.583*	*0.928*
Basic Metals	*C5 31*	*0.670*	*0.135*	*0.893*	*0.314*
	C5 32	*0.529*	*0.197*	*0.890*	*0.329*
	C5 33	*0.316*	*0.884*	*0.732*	*0.933*
	C5.34	*0.385*	*0.925*	*0.957*	*0.814*
	C5 35	*0.311*	*0.808*	*0.797*	*0.671*
Machinery and Equipment	*C5 36*	*0.635*	*0.133*	*0.007*	*0.954*
	C5 37	*0.928*	*0.891*	*0.297*	*0.958*
	C5.38	*0.204*	*0.082*	*0.625*	*0.675*
	C5.39	*0.988*	*0.244*	*0.310*	*0.743*
	C5 40	*0.134*	*0.112*	*0.736*	*0.763*
Other Manufactures	*C5.41*	*0.755*	*0.775*	*0.100*	*0.949*
	C5 42	*0.848*	*0.656*	*0.355*	*0.900*
	C5.43	*0.672*	*0.063*	*0.942*	*0.867*
	C5.44	*0.846*	*0.850*	*0.279*	*0.605*
	C5.45	*0.349*	*0.180*	*0.975*	*0.340*

Note: The diagnostic tests show probabilities.

Table C6
OLS Estimation for Disaggregated Imports Growth: 1980-2000

Dependent variable : m^i										
Variable / m^i	Eq.	Constant	ym	p	m^i_{-1}	lib 86	lib94, lib95, lib96	d91		R^2
Farming							lib94			
	C6.1	0.02 (0.26)	-1.66 (-0.96)	-1.75 (-4.94)*	-0.46 (-3.48)*	0.07 (0.75)		-0.16 (-0.89)		0.78
	C6 2	0.04 (0.49)	-2.64 (-1.47)	-1.92 (-5.34)*	-0.45 (-3.51)*	0.01 (0.09)	0.14 (1.45)	-0.09 (-0.51)		0.82
							lib95			
	C6 3	0.06 (1.09)	-1.94 (-1.09)	-1.83 (-5.17)*	-0.46 (-3.51)*		0.08 (0.91)	-0.12 (-0.66)		0.79
	C6.4	0.03 (0.31)	-1.95 (-1.07)	-1.80 (-4.86)*	-0.47 (-3.41)*	0.05 (0.45)	0.06 (0.66)	-0.13 (-0.70)		0.79
							lib96			
	C6 5	0.08 (1.38)	-1.58 (-0.78)	-1.78 (-4.90)*	-0.46 (-3.31)*		0.00 (0.06)	-0.15 (-0.77)		0.77
	C6 6	0.06 (0.52)	-1.60 (-0.76)	-1.77 (-4.64)*	-0.46 (-3.19)*	0.02 (0.21)	0.00 (0.03)	-0.15 (-0.76)		0.78
Extractive							lib94			
	C6 7	-0.07 (-0 67)	1.40 (0.74)	-0.11 (-0.27)	0.06 (0.24)		0.12 (0.96)	-0.20 (-1.00)		0.28
	C6 8[1]	-0.06 (-0.56)	0.74 (0.36)	-0.23 (-0.54)	0.05 (0.18)	0.07 (0.57)	0.10 (0.88)	-0.15 (-0.73)		0.32
							lib95			
	C6 10[1]	-0.00 (-0.07)	1.12 (0.57)	-0.22 (-0.55)	0.09 (0.35)		0.09 (0.87)	-0.15 (-0.72)		0.27
	C6 11	-0.07 (-0.64)	1.09 (0.49)	-0.16 (-0.38)	0.02 (0.12)	0.10 (0.75)	0.07 (0.83)	-0.18 (-0.83)		0.26
							lib96			
	C6 12	0.01 (0.23)	1.74 (0.80)	-0.16 (-0.39)	0.18 (0.71)		-0.02 (-0.19)	-0.19 (-0.88)		0.23
	C6 13	-0.07 (-0.65)	1.72 (0.78)	-0.09 (-0.22)	0.08 (0.30)	0.13 (0.96)	-0.04 (-0.31)	-0.22 (-1.01)		0.28
Manufacturing							lib94			
	C6 14	-0.05 (-0.52)	1.75 (1.00)	-0.85 (-2.19)*	0.16 (0.86)	0.10 (0.85)		0.26 (1.46)		0.73
	C6 15	-0.05 (-0.42)	1.62 (0.78)	-0.87 (-1.92)	0.17 (0.81)	0.09 (0.61)	0.01 (0.13)	0.27 (1.39)		0.73
							lib95			
	C6 16	0.01 (0.27)	1.49 (0.80)	-0.97 (-2.55)*	0.24 (1.52)		0.02 (0.26)	0.27 (1.47)		0.71
	C6.17	-0.05 (-0.50)	1.81 (0.94)	-0.83 (-1.97)	0.15 (0.77)	0.10 (0.78)	-0.01 (-0.09)	0.25 (1.35)		0.73
							lib96			
	C6.18	0.02 (0.47)	2.15 (1.07)	-0.92 (-2.45)*	0.23 (1.48)		-0.06 (-0.55)	0.24 (1.30)		0.72
	C6.19	-0.07 (-0.68)	2.70 (1.32)	-0.75 (-1.87)	0.11 (0.59)	0.14 (1.10)	-0.10 (-0.89)	0.22 (1.19)		0.74

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. [1] The estimation fails Functional Form test.

Table C7
OLS Estimation for Disaggregated Imports Growth: 1980-2000

Dependent variable : m^i										
Variable / m^i	*Eq.*	*Constant*	*ym*	*p*	m^i_1	*lib 87*	*lib94, lib95, lib96*	*d91*		R^2
Farming							*lib94*			
	C7.1	-0.03 (-0.38)	-2.18 (-1.35)	-1.68 (-5.17)*	-0.47 (-3.89)*	0.17 (1.83)		-0.18 (-1.07)		0.82
	C7.2	-0.01 (-0.95)	-2.70 (-1.58)	-1.81 (-5.14)*	-0.46 (-3.79)*	0.12 (1.12)	0.09 (0.95)	-0.13 (-0.75)		0.83
							lib95			
	C7.3	-0.02 (-0.33)	-2.25 (-1.32)	-1.70 (-4.88)*	-0.47 (-3.75)*	0.16 (1.50)	0.02 (0.23)	-0.17 (-0.95)		0.82
							lib96			
	C7 4	-0.03 (-0.38)	-1.91 (-1.01)	-1.66 (-4.86)*	-0.48 (-3.75)*	0.18 (1.79)	-0.03 (-0.31)	-0.19 (-1.08)		0.82
Extractive							*lib94*			
	C7 5	-0.07 (-0.70)	1.10 (0.58)	-0.08 (-0.20)	0.06 (0.27)	0.13 (1.07)		-0.21 (-1.02)		0.29
	C7 6[1]	-0.06 (-0.56)	0.62 (0.30)	-0.20 (-0.47)	0.05 (0.22)	0.08 (0.59)	0.09 (0.78)	-0.16 (-0.75)		0.32
							lib95			
	C7 7[1]	-0.06 (-0.65)	0.90 (0.45)	-0.13 (-0.31)	0.03 (0.12)	0.11 (0.80)	0.06 (0.54)	-0.18 (-0.85)		0.30
							lib96			
	C7 8[1]	-0.07 (-0.67)	1.40 (0.63)	-0.06 (-0.16)	0.09 (0.32)	0.14 (1.06)	-0.04 (-0.30)	-0.22 (-1.02)		0.29
Manufacturing							*lib94*			
	C7 9	0.00 (0.01)	1.58 (0.88)	-0.92 (-2.31)*	0.22 (1.24)	0.03 (0.26)		0.26 (1.43)		0.71
	C7 10	0.01 (0.16)	1.17 (0.57)	-1.03 (-2.19)*	0.26 (1.30)	-0.01 (-0.08)	0.05 (0.49)	0.29 (1.47)		0.72
							lib95			
	C7 11	0.00 (0.04)	1.50 (0.78)	-0.94 (-2.15)*	0.23 (1.20)	0.02 (0.14)	0.01 (0.15)	0.27 (1.38)		0.71
							lib96			
	C7.12	-0.00 (-0 05)	2.20 (1.06)	-0.86 (-2.05)*	0.20 (1.06)	0.05 (0.41)	-0.07 (-0.62)	0.23 (1.21)		0.72

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. [1] The estimation fails Functional Form test.

Table C8
OLS Estimation for Disaggregated Imports Growth: 1980-2000

Dependent variable : m^i

	Variable / m^i	Eq.	Constant	ym	p	m^i_1	lib86	lib94, lib95, lib96	d91		R^2
Consumer Goods								lib94			
		C8.1	-0.02 (-0.15)	2.65 (1.09)	-1.65 (-3.11)*	0.26 (1.62)	0.05 (0.35)		-0.26 (-1.03)		0.77
		C8 2	-0.06 (-0.39)	3.67 (1.30)	-1.43 (-2.33)*	0.20 (1.12)	0.14 (0.70)	-0.11 (-0.73)	-0.30 (-1.14)		0.78
								lib95			
		C8 3	0.03 (0.46)	3.06 (1.23)	-1.64 (-3.20)*	0.28 (2.02)*		-0.07 (-0.62)	-0.29 (-1.13)		0.77
		C8 4	-0.05 (-0 35)	3.42 (1.32)	-1.48 (-2.62)*	0.22 (1.26)	0.13 (0.71)	-0.12 (-0.87)	-0.30 (-1.16)		0.78
								lib96			
		C8 5	0.03 (0 45)	3.99 (1.48)	-1.61 (-3.23)*	0.27 (1.93)		-0.15 (-1.03)	-0.31 (-1.25)		0.78
		C8 6	-0.06 (-0.44)	4.51 (1.61)	-1.46 (-2.69)*	0.19 (1.15)	0.13 (0.80)	-0.20 (-1.24)	-0.33 (-1.29)		0.80
Intermediate Goods								lib94			
		C8 7	-0.01 (-0.17)	0.39 (0.29)	-0.86 (-3.01)*	0.09 (0.62)	0.09 (1.09)		0.41 (2.92)*		0.78
		C8 8	0.00 (0.08)	-0.26 (-0.17)	-0.99 (-3.13)*	0.14 (0.90)	0.04 (0.45)	0.07 (0.96)	0.45 (3.07)*		0.79
								lib95			
		C8 9	0 04 (0 95)	-0.01 (-0 00)	-0.98 (-3.43)*	0.17 (1.26)		0.06 (0.88)	0.44 (3.11)*		0.77
		C8 10	-0 00 (-0 08)	0.17 (0.12)	-0.90 (-2.94)*	0 11 (0.69)	0.07 (0.77)	0.03 (0.48)	0.42 (2.87)*		0.78
								lib96			
		C8 11	0.05 (1.26)	0.42 (0.26)	-0.93 (-3.18)*	0.17 (1.20)		-0.01 (-0.12)	0.42 (2.80)*		0.76
		C8 12	-0 02 (-0 25)	0.82 (0.50)	-0.82 (-2.72)*	0.07 (0.44)	0.11 (1.17)	-0.04 (-0.51)	0.38 (2.59)*		0.78
Capital Goods								lib94			
		C8 13	-0.13 (-1.40)	3.27 (1.72)	-0.85 (-1.92)	0.12 (0.68)	0.13 (1.04)		-0.02 (-0.11)		0.75
		C8 14	-0.15 (-1.18)	3.77 (1.67)	-0.74 (-1.40)	0.09 (0.43)	0.17 (1.08)	-0.05 (-0.43)	-0.03 (-0.18)		0.76
								lib95			
		C8 15	-0.02 (-0.39)	3.08 (1.52)	-1.02 (-2.37)*	0.23 (1.43)		-0.01 (-0.12)	-0.04 (-0.20)		0.73
		C8 16	-0.15 (-1 20)	3.67 (1.78)	-0.77 (-1.60)	0.10 (0.52)	0.16 (1.17)	-0.06 (-0.60)	-0.04 (-0.21)		0.76
								lib96			
		C8 17	-0.02 (-0.38)	3.46 (1.59)	-1.01 (-2.35)*	0.23 (1.42)		-0.05 (-0.45)	-0.05 (-0.28)		0.74
		C8.18	-0.15 (-1.25)	4.15 (1.88)	-0.76 (-1.65)	0.09 (0.51)	0.16 (1.22)	0.09 (-0.80)	-0.05 (-0.27)		0.77

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level.

Table C9
OLS Estimation for Disaggregated Imports Growth: 1980-2000

Dependent variable : m^i										
Variable / m^i	*Eq.*	*Constant*	*ym*	*p*	m^i_1	*lib87*	*lib94, lib95, lib96*	*d91*		R^2
Consumer Goods							*lib94*			
	C9.1	0.05 (0.38)	2.68 (1.10)	-1.74 (-3.27)*	0.31 (1.98)	-0.04 (-0.26)		-0.26 (-1.02)		0.77
	C9.2	0.03 (0.24)	3.04 (1.09)	-1.64 (-2.56)*	0.29 (1.61)	-0.00 (-0.02)	-0.05 (-0.30)	-0.28 (-1.03)		0.77
							lib95			
	C9.3	0.03 (0.23)	3.07 (1.18)	-1.63 (-2.78)*	0.28 (1.68)	0.00 (0.04)	-0.08 (-0.54)	-0.29 (-1.08)		0.77
							lib96			
	C9.4	0.03 (0.23)	3.99 (1.43)	-1.60 (-2.90)*	0.27 (1.64)	0.00 (0.02)	-0.15 (-0.96)	-0.31 (-1.20)		0.78
Intermediate Goods							*lib94*			
	C9.5	0.00 (0.04)	0.17 (0.12)	-0.86 (-2.97)*	0.12 (0.79)	0.08 (0.97)		0.41 (2.91)*		0.77
	C9.6	0.02 (0.30)	-0.40 (-0.27)	-1.01 (-3.10)*	0.17 (1.07)	0.02 (0.25)	0.08 (0.99)	0.45 (3.08)*		0.79
							lib95			
	C9.7	0.00 (0.12)	0.00 (0.00)	-0.91 (-2.89)*	0.13 (0.85)	0.06 (0.62)	0.04 (0.48)	0.43 (2.86)*		0.78
							lib96			
	C9.8	0.00 (0.00)	0.47 (0.29)	-0.83 (-2.70)*	0.10 (0.66)	0.09 (1.01)	-0.03 (-0.39)	0.39 (2.61)*		0.78
Capital Goods							*lib94*			
	C9.9	-0.01 (-0.11)	3.03 (1.55)	-1.06 (-2.30)*	0.24 (1.35)	-0.02 (-0.18)		-0.04 (-0.19)		0.73
	C9.10	0.00 (0.02)	2.68 (1.19)	-1.17 (-2.08)*	0.27 (1.34)	-0.05 (-0.35)	0.04 (0.35)	-0.02 (-0.12)		0.74
							lib95			
	C9.11	-0.01 (-0.11)	3.06 (1.45)	-1.05 (-2.07)*	0.24 (1.26)	-0.02 (-0.13)	-0.00 (-0.04)	-0.04 (-0.19)		0.74
							lib96			
	C9.12	-0.01 (-0.15)	3.44 (1.52)	-1.02 (-2.09)*	0.23 (1.23)	-0.01 (-0.07)	-0.05 (-0.40)	-0.05 (-0.27)		0.74

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level.

Table C10
OLS Estimation for Disaggregated Imports Growth: 1980-1999

Dependent variable : m^i										
Variable / m^i	Eq.	Constant	ym	p	m^i_1	lib 86	lib94, lib95, lib96	d91		R^2
Food Products, Beverages and Tobacco							lib94			
	C10 1	-0.02 (-0.14)	-1.15 (-0.51)	-1.43 (-3.14)*	0.17 (0.88)	0.16 (1.09)		-0.29 (-1.27)		0.67
	C10.2	-0.07 (-0.50)	0.00 (0.00)	-1.20 (-2.42)*	0.07 (0.32)	0.27 (1.51)	-0.15 (-1.07)	-0.35 (-1.49)		0.70
							lib95			
	C10.3	0.12 (1.54)	-0.91 (-0.38)	-1.49 (-3.20)*	0.26 (1.50)		-0.07 (-0.64)	-0.31 (-1.30)		0.65
	C10 4	-0.06 (-0.45)	-0.34 (-0.15)	-1.27 (-2.78)*	0.08 (0.42)	0.26 (1.63)	-0.17 (-1.35)	-0.34 (-1.53)		0.72
							lib96			
	C10 5	0.11 (1.44)	-0.76 (-0.29)	-1.51 (-3.22)*	0.26 (1.40)		-0.06 (-0.39)	-0.30 (-1.25)		0.64
	C10 6	-0.05 (-0.40)	0.12 (0.04)	-1.32 (-2.82)*	0.08 (0.38)	0.22 (1.39)	-0.15 (-0.95)	-0.34 (-1.44)		0.69
Textiles and Leather Products							lib94			
	C10 7[1]	-0.30 (-0 96)	6.69 (1.23)	-0.39 (-0.34)	-0.12 (-0.50)	0.41 (1.16)		0.36 (0.66)		0.45
	C10 8	-0.38 (-1.18)	8.99 (1.53)	0.11 (0.09)	-0.21 (-0.78)	0.61 (1.51)	-0.32 (-1.00)	0.21 (0.37)		0.49
							lib95			
	C10 9[2]	0.01 (0.08)	6.57 (1.12)	-0.74 (-0.63)	0.01 (0.04)		-0.04 (-0.16)	0.39 (0.68)		0.39
	C10 10	-0.35 (-1.08)	7.87 (1.38)	-0.10 (-0.08)	-0.19 (-0.71)	0.55 (1.37)	-0.25 (-0.78)	0.26 (0.46)		0.48
							lib96			
	C10 11	0.03 (0.18)	8.45 (1.38)	-0.66 (-0.57)	-0.00 (-0.04)		-0.28 (-0.80)	0.31 (0.54)		0.42
	C10 12[1]	-0.37 (-1.20)	10.24 (1.74)	-0.06 (-0.05)	-0.22 (-0.85)	0.56 (1.57)	-0.46 (-1.32)	0.17 (0.32)		0.32
Wood Products							lib94			
	C10.13	-0.03 (-0.20)	4.10 (1.59)	-1.13 (-2.10)*	0.15 (0.94)	0.01 (0.07)		0.57 (2.12)*		0.76
	C10.14	-0.08 (-0.53)	5.37 (1.91)	0.84 (-1.42)	0.06 (0.32)	0.13 (0.67)	-0.18 (-1.07)	0.52 (1.89)		0.78
							lib95			
	C10.15	0.00 (0.08)	4.70 (1.84)	-1.05 (-2.05)*	0.13 (0.93)		-0.13 (-0.99)	0.54 (2.06)*		0.78
	C10.16	-0.06 (-0.45)	4.87 (1.85)	-0.94 (-1.70)	0.07 (0.44)	0.11 (0.62)	-0.18 (-1.14)	0.53 (1.95)		0.78
							lib96			
	C10 17	-0.00 (-0.04)	5.44 (1.97)	-1.06 (-2.09)*	0.11 (0.80)		-0.17 (-1.06)	0.53 (2.01)*		0.78
	C10.18	-0.07 (-0.46)	5.70 (1.97)	-0.98 (-1.80)	0.06 (0.39)	0.09 (0.52)	-0.21 (-1.15)	0.52 (1.90)		0.78

(Table C10 continues overleaf)

(Table C10 continued)

Variable / m^i	Eq.	Constant	ym	p	m^i_1	lib 86	lib94, lib95, lib96	d91		R^2
Paper Products, Publishing and Printing							lib94			
	C10 19^i	-0.08 (-0.86)	1.15 (0.71)	-0.49 (-1.46)	0.14 (0.70)	0.14 (1.23)		0.36 (2.11)		0.67
	C10.20^i	-0.10 (-0.96)	1.51 (0.84)	-0.41 (-1.10)	0.09 (0.40)	0.19 (1.30)	-0.06 (-0.55)	0.33 (1.81)		0.68
							lib95			
	C10 21^i	0.02 (0.37)	1.36 (0.78)	-0.55 (-1.56)	0.28 (1.61)		-0.02 (-0.31)	0.37 (2.03)*		0.63
	C10 22^i	-0.10 (-1.05)	1.49 (0.90)	-0.40 (-1.18)	0.07 (0.34)	0.20 (1.56)	-0.10 (-1.01)	0.32 (1.83)		0.70
							lib96			
	C10 23^i	0.02 (0.46)	1.89 (1.02)	-0.53 (-1.56)	0.25 (1.48)		-0.09 (-0.81)	0.34 (1.93)		0.65
	C10 24^i	-0.11 (1.25)	2.34 (1.37)	-0.39 (-1.22)	0.01 (0.06)	0.22 (1.83)	-0.17 (-1.56)	0.29 (1.73)		0.73
Chemicals, Rubber and Plastic Products							lib94			
	C10 25	0.02 (0.28)	1.79 (1.28)	-0.58 (-2.02)*	0.09 (0.55)	0.01 (0.17)		0.30 (2.18)*		0.73
	C10 26	0.03 (0.42)	1.40 (0.90)	-0.66 (-2.07)*	0.13 (0.70)	-0.01 (-0.16)	0.05 (0.65)	0.33 (2.22)*		0.74
							lib95			
	C10 27	0.02 (0.54)	1.62 (1.16)	-0.61 (-2.21)*	0.11 (0.71)		0.04 (0.58)	0.32 (2.30)*		0.73
	C10 28	0.02 (0.34)	1.62 (1.10)	-0.62 (-2.03)*	0.11 (0.62)	-0.00 (-0.04)	0.04 (0.53)	0.32 (2.18)*		0.73
							lib96			
	C10 29	0.03 (0.84)	2.05 (1.35)	-0.58 (-2.08)*	0.10 (0.69)	-0.03 (-0.44)		0.29 (2.07)*		0.73
	C10 30	0.01 (0.21)	2.13 (1.33)	-0.55 (-1.84)	0.08 (0.43)	0.02 (0.30)	-0.04 (-0.49)	0.28 (1.91)		0.73
Non-Metallic Mineral Products							lib94			
	C10 31	-0.21 (-1.26)	2.48 (0.85)	-0.89 (-1.50)	-0.03 (-0.18)	0.26 (1.43)		0.37 (1.33)		0.64
	C10 32	-0.21 (-1.18)	2.54 (0.76)	-0.88 (-1.30)	-0.04 (-0.18)	0.26 (1.21)	-0.00 (-0.04)	0.37 (1.22)		0.64
							lib95			
	C10 32	-0.02 (-0.22)	1.89 (0.59)	-1.15 (-1.85)	0.09 (0.48)		0.06 (0.40)	0.42 (1.35)		0.59
	C10.33	-0.21 (-1.21)	2.55 (0.82)	-0.87 (-1.37)	-0.04 (-0.19)	0.27 (1.31)	-0.01 (-0.11)	0.37 (1.22)		0.64
							lib96			
	C10.34	-0.00 (-0.00)	2.73 (0.80)	-1.09 (-1.76)	0.09 (0.47)		-0.08 (-0.45)	0.37 (1.18)		0.59
	C10.35	-0.24 (-1.39)	3.84 (1.18)	-0.78 (-1.28)	-0.08 (-0.38)	0.31 (1.64)	-0.17 (-0.95)	0.31 (1.06)		0.67

(Table C10 continues overleaf)

(Table C10 continued)

Variable / m'	Eq.	Constant	ym	p	m'_1	lib 86	lib94, lib95, lib96	d91		R^2
Basic Metals							lib94			
	C10.36	-0.01 (0.04)	3.07 (0.81)	-1.29 (-1.65)	0.04 (0.22)	0.00 (0.00)		0.34 (0.88)		0.54
	C10 37	0.02 (0.10)	1.97 (0.48)	-1.53 (-1.79)	0.08 (0.36)	-0.09 (-0.34)	0.17 (0.76)	0.42 (1.04)		0.57
							lib95			
	C10 38	-0.03 (-0.25)	2.71 (0.71)	-1.34 (-1.76)	0.04 (0.20)		0.10 (0.54)	0.37 (0.97)		0.55
	C10 39	0.00 (0.00)	2.66 (0.67)	-1.38 (-1.68)	0.05 (0.25)	-0.05 (-0.19)	0.12 (0.55)	0.39 (0.95)		0.55
							lib96			
	C10 40	0.00 (0 01)	3.84 (0.94)	-1.26 (-1.66)	0.04 (0 24)		-0.11 (-0.48)	0.30 (0.77)		0.55
	C10 41	-0 01 (-0 08)	3.88 (0.91)	-1.24 (-1.52)	0.04 (0.18)	0.02 (0.11)	-0.12 (-0.47)	0.29 (0.71)		0.55
Machinery and Equipment							lib94			
	C10 42	-0.08 (-0 68)	2.35 (1.11)	-0.75 (-1.60)	0.14 (0.68)	0.12 (0.91)		0.27 (1.33)		0.69
	C10 43	-0 07 (-0 56)	2.14 (0.86)	-0.80 (-1.46)	0.16 (0.68)	0.11 (0.63)	0.02 (0.19)	0.28 (1.28)		0.69
							lib95			
	C10 44	0 00 (0.03)	1.94 (0.88)	-0.92 (-2.05)*	0.24 (1.36)		0.04 (0.40)	0.29 (1.35)		0.68
	C10 45	-0.08 (-0 64)	2.33 (1.01)	-0.75 (-1.48)	0.14 (0.64)	0.12 (0.78)	0.00 (0.03)	0.27 (1.26)		0.69
							lib96			
	C10 46	0 01 (0 25)	2.46 (1.04)	-0 88 (-1.97)	0.24 (1.34)		-0.05 (-0.38)	0.26 (1.19)		0.68
	C10 47	-0.10 (-0.78)	3.10 (1.28)	-0.67 (-1.38)	0.10 (0.50)	0.16 (1.07)	-0.09 (-0.69)	0.24 (1.11)		0.71
Other Manufactures							lib94			
	C10 48	-0.07 (-0.30)	6.92 (1.72)	-1.10 (-1.26)	0.15 (0.74)	0.04 (0.16)		0.13 (0.32)		0.62
	C10 49	-0.11 (-0 45)	7.98 (1.77)	-0.85 (-0.86)	0.10 (0 46)	0.14 (0.45)	-0.15 (-0.60)	0.06 (0.15)		0.63
							lib95			
	C10.50	-0.01 (-0.09)	7.41 (1.83)	-1.07 (-1.28)	0.17 (0.93)		-0.12 (-0.60)	0.10 (0.24)		0.63
	C10.51	-0.10 (-0.43)	7.64 (1.81)	-0.91 (-0.99)	0.11 (0.50)	0.14 (0.46)	-0.17 (-0.72)	0.07 (0.16)		0.64
							lib96			
	C10 52	-0.00 (-0.07)	9.16 (2.20)*	-1.02 (-1.29)	0.15 (0.86)		-0.31 (-1.29)	0.03 (0.08)		0.67
	C10 53	-0.12 (-0.55)	9.58 (2.21)*	-0.85 (-0.99)	0.08 (0.38)	0.16 (0.61)	-0.36 (-1.38)	-0.00 (-0.00)		0.68

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. [1] The estimation fails Functional Form test. [2] The estimation fails normality test.

Table C11
OLS Estimation for Disaggregated Imports Growth: 1980-1999

Dependent variable : m^i										
Variable / m^i	Eq.	Constant	ym	p	m^i_1	lib 87	lib94, lib95, lib96	d91		R^2
Food Products, Beverages and Tobacco							lib94			
	C11.1	0.06 (0.53)	-1.34 (-0.56)	-1.49 (-3.11)	0.24 (1.23)	0.05 (0.35)		-0.29 (-1.21)		0.64
	C11 2	0.03 (0.25)	-0.76 (-0.29)	-1.33 (-2.37)	0.18 (0.76)	0.13 (0.65)	-0.09 (-0.60)	-0.32 (-1.29)		0.65
	C11.3	0.03 (0.26)	-0.90 (-0.37)	-1.34 (-2.64)	0.17 (0.80)	0.14 (0.81)	-0.14 (-0.96)	-0.33 (-1.36)		0.67
	C11 4	0.05 (0.39)	-0.66 (-0.24)	-1.43 (-2.81)	0.19 (0.88)	0.08 (0.52)	-0.09 (-0.54)	-0.32 (-1.26)		0.65
Textiles and Leather Products							lib94			
	C11 5[2]	-0.13 (-0.47)	6.00 (1.06)	-0.55 (-0.45)	-0.05 (-0.20)	0.22 (0.61)		0.38 (0.67)		0.40
	C11.6[2]	-0.20 (-0.65)	7.46 (1.23)	-0.09 (-0.06)	-0.11 (-0.42)	0.40 (0.92)	-0.26 (-0.74)	0.25 (0.43)		0.43
	C11 7[2]	-0.17 (-0.56)	6.63 (1.12)	-0.30 (-0.23)	-0.10 (-0.36)	0.34 (0.79)	-0.19 (-0.54)	0.30 (0.51)		0.42
	C11 8[2]	-0.16 (-0 57)	8.58 (1.39)	-0.29 (-0.23)	-0.11 (-0.43)	0.32 (0.87)	-0.37 (-1.01)	0.24 (0.41)		0.46
Wood Products							lib94			
	C11 9	0.08 (0.68)	4.55 (1.82)	-1.27 (-2.46)	0.21 (1.43)	-0.16 (-1.07)		0.58 (2.24)		0.78
	C11 10	0 07 (0 53)	4.79 (1.74)	-1.19 (-1.94)	0.19 (1.08)	-0.13 (-0.65)	-0.04 (-0.25)	0.56 (2.05)		0.78
	C11 11	0 07 (0.53)	4.78 (1.82)	-1.18 (-2.09)	0.18 (1.09)	-0.11 (-0.61)	-0.08 (-0.49)	0.56 (2.06)		0.78
	C11 12	0.07 (0.56)	5.45 (1.93)	-1.18 (-2.18)	0.16 (-0.75)	-0.12 (-0.75)	-0.13 (-0.74)	0.54 (2.02)		0.79
Paper Products, Publishing and Printing							lib94			
	C11 13[1]	-0.00 (-0.05)	1.15 (0 65)	-0.54 (-1.51)	0.25 (1.19)	0.03 (0 28)		0.37 (2.08)		0.63
	C11 14[1]	-0.00 (-0.04)	1.15 (0.60)	-0 54 (-1.29)	0.25 (1 02)	0.03 (0.21)	0.00 (0.00)	0.37 (1.89)		0.63
							lib95			
	C11.15[1]	-0.01 (-0 18)	1.26 (0.69)	-0.47 (-1 24)	0 20 (0 88)	0.08 (0 52)	-0.06 (-0.53)	0.35 (1.82)		0.64
							lib96			
	C11.16[1]	-0.01 (-0.20)	1.85 (0 97)	-0.47 (-1.29)	0 17 (0.77)	0 08 (0 61)	-0.11 (-0 96)	0.32 (1.75)		0.66

(Table C11 continues overleaf)

(Table C11 continued)

Variable / m^i	Eq.	Constant	ym	p	m^i_1	lib86	lib94, lib95, lib96	d91		R^2
Chemicals, Rubber and Plastic Products							lib94			
	C11.17	0.01 (0.28)	1.73 (1.23)	-0.57 (-2.00)*	0.09 (0.59)	0.02 (0.27)		0.30 (2.18)*		0.73
	C11.18	0.02 (0.40)	1.45 (0.96)	-0.65 (-2.03)*	0.12 (0.71)	-0.01 (-0.10)	0.05 (0.61)	0.33 (2.21)*		0.74
							lib95			
	C11.19	0.02 (0.33)	1.63 (1.11)	-0.61 (-2.00)*	0.10 (0.63)	0.00 (0.01)	0.04 (0.49)	0.32 (2.16)*		0.73
	C11.20[1]	-0.01 (-0.20)	1.85 (0.97)	-0.47 (-1.29)	0.17 (0.77)	0.08 (0.61)	-0.11 (-0.96)	0.32 (1.75)		0.66
Non-Metallic Mineral Products							lib94			
	C11.21	-0.11 (-0.68)	1.97 (0.64)	-0.97 (-1.52)	0.02 (0.12)	0.15 (0.77)		0.38 (1.29)		0.60
	C11.22	-0.10 (-0.56)	1.72 (0.50)	-1.04 (-1.40)	0.04 (0.18)	0.12 (0.49)	0.04 (0.21)	0.40 (1.25)		0.60
							lib95			
	C11.23	-0.11 (-0.63)	1.94 (0.59)	-0.98 (-1.42)	0.02 (0.12)	0.14 (0.63)	0.01 (0.06)	0.39 (1.22)		0.60
							lib96			
	C11.24	-0.12 (-0.73)	2.90 (0.84)	-0.89 (-1.34)	-0.00 (-0.00)	0.18 (0.90)	-0.13 (-0.66)	0.34 (1.07)		0.62
Basic Metals							lib94			
	C11.25	-0.05 (-0.30)	2.86 (0.75)	-1.24 (-1.58)	0.03 (0.15)	0.07 (0.33)		0.32 (0.85)		0.55
	C11.26	-0.03 (-0.17)	2.18 (0.53)	-1.44 (-1.65)	0.05 (0.24)	-0.00 (-0.03)	0.14 (0.60)	0.39 (0.96)		0.56
							lib95			
	C11.27	-0.04 (-0.24)	2.66 (0.67)	-1.32 (-1.58)	0.03 (0.16)	0.02 (0.11)	0.09 (0.42)	0.36 (0.89)		0.55
							lib96			
	C11.28	-0.06 (-0.31)	3.69 (0.87)	-1.18 (-1.45)	0.02 (0.13)	0.10 (0.42)	-0.13 (-0.54)	0.27 (0.67)		0.56
Machinery and Equipment							lib94			
	C11.29	-0.00 (-0.06)	2.07 (0.95)	-0.86 (-1.80)	0.22 (1.11)	0.03 (0.21)		0.27 (1.29)		0.67
	C11.30	0.01 (0.13)	1.53 (0.64)	-1.04 (-1.84)	0.27 (1.24)	-0.03 (-0.19)	0.08 (0.62)	0.31 (1.37)		0.68
							lib95			
	C11.31	-0.00 (-0.00)	1.94 (0.84)	-0.92 (-1.75)	0.24 (1.12)	0.00 (0.02)	0.04 (0.32)	0.29 (1.28)		0.68
							lib96			
	C11.32	-0.01 (-0.10)	2.50 (1.02)	-0.82 (-1.63)	0.21 (0.99)	0.04 (0.31)	-0.06 (-0.43)	0.25 (1.12)		0.68
Other Manufactures							lib94			
	C11.33	0.00 (0.03)	7.07 (1.74)	-1.21 (-1.39)	0.19 (0.98)	-0.07 (-0.28)		0.14 (0.35)		0.62
	C11.34	-0.01 (-0.06)	7.53 (1.70)	-1.06 (-1.04)	0.17 (0.77)	-0.01 (-0.03)	-0.08 (-0.33)	0.10 (0.24)		0.63
							lib95			
	C11.35	-0.01 (-0.06)	7.41 (1.75)	-1.07 (-1.13)	0.17 (0.79)	0.00 (0.00)	-0.12 (-0.50)	0.09 (0.22)		0.63
							lib96			
	C11.36	-0.01 (-0.07)	9.16 (2.11)*	-1.01 (-1.16)	0.14 (0.04)	0.01 (0.04)	-0.31 (-1.20)	0.03 (0.07)		0.67

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. [1] The estimation fails Functional Form test. [2] The estimation fails normality test.

Chapter 5

Impact of Trade Reforms on the Trade Balance, the Balance of Payments and Economic Growth

5.1 Introduction

This chapter focuses on the impact of trade liberalisation on the balance of trade and the balance of payments of Mexico. To date, there has been very little published research on this topic, and none for Mexico. There have been a lot of studies of the effects of liberalisation on export performance and economic growth, but the monetary consequences of trade reforms have been ignored. This is an important topic because if liberalisation affects the balance of payments adversely, it has implications for the credit-worthiness of the country, its ability to borrow, and the sustainability of growth. This chapter also examines, therefore, whether the changing trade performance of Mexico has affected its long run economic growth rate consistent with balance of payments equilibrium.

Theoretically, the effects of trade reforms (by means of tariff and non-tariff changes) on the trade balance and the current account of the balance of payments are *a priori* undetermined; therefore, it is entirely an empirical issue (Ostry and Rose, 1992).[1] Recent cross-section/panel studies in this field include UNCTAD (1999), Parikh (2000), and Santos-Paulino and

[1] Also, the effect of tariff changes on the level of output is ambiguous. The authors claim that the effect depends on the timing and expected duration of the tariff change, on the performance of real wages and exchange rates, on the values of several elasticities, as well as on institutional factors such as the degree of capital mobility. In other words, it depends on the characteristics of a specific economy.

Thirlwall (2002). All these studies find that trade liberalisation deteriorates the balance of trade and the balance of payments controlling for other factors. For instance, referring to the most recent and complete study, Santos-Paulino and Thirlwall (2002), considering a group of twenty-two developing countries for the period 1972-1997, found that trade liberalisation has worsened the trade balance by over one per cent of GDP and it has deteriorated the current account of the balance of payments by approximately 0.5 per cent of GDP on average. They found that the effects of liberalisation on the trade balance and current account of the balance of payments have been roughly the same across the regions of Africa, Latin America, East Asia and South Asia. There have been individual case studies for some Latin American countries (e.g. Khan and Zahler, 1985), but not for Mexico.

In Mexico, as in many other Latin American countries, the drastic reductions in trade restrictions went much further, in terms of speed and intensity, than the World Bank ever envisaged (Edwards, 1997). After 1985, when trade liberalisation was initiated in Mexico, the country experienced two balance of payments crises, one in 1986 and the other in 1994-95. Although each one had its particular causes, both crises originated in inappropriate macroeconomic policies —excessive government deficits and lax monetary policies— which resulted in vulnerable positions of the current and capital accounts[2] on the balance of payments; and both were preceded by trade reforms.

[2] On the capital account liberalisation issue, see for example Singh (2002a).

This chapter is organised as follows. Section 2 gives a descriptive analysis, comparing the performance of the trade balance and the current account of the balance of payments before and after trade reforms. A distinction is made between the total trade balance and the non-oil trade balance, as well as the total current account and the non-oil current account of the balance of payments. Moreover, a succinct description of the trade balance by sectors and manufacturing sub-sectors is also presented. Section 3 outlines the model and describes the econometric techniques to be used in the following section. Section 4 measures the impact of trade reforms on the trade balance and current account of the balance of payments. Section 5 spells out the relation between the current account of the balance of payments and economic growth using a balance-of-payments-constrained growth model. In this section, we compare our results with those given by previous studies (Moreno-Brid; 1998, 2001), and the validity of the model is tested by assessing how close the estimated growth rate approximates the actual growth rate. Section 6 concludes.

5.2 Descriptive Analysis

5.2.1 Aggregate Analysis

During the 1960s and early 1970s the agricultural sector was the main provider of foreign exchange. This sector financed imports required for industrialisation of the country (Fuji, 2000). When the trade surplus of the agricultural sector was insufficient to compensate for the trade deficit of the manufacturing sector, the government became more dependent on foreign investment. For a short time, the oil boom alleviated the constraint of the balance of payments. However, the foreign exchange obtained from oil exports was insufficient to sustain trade

balance equilibrium. In this sense, the Mexican economy has been subject to the effects of frequent balance of payments crises. Before trade reforms were launched during the mid-1980s, import tariffs and non-tariff barriers were used in order to ameliorate the deficits on the trade balance. In fact, the performance of the trade balance relative to GDP (TB/GDP) has been very volatile. Table 5.1 shows the TB/GDP ratio from 1979 to 2000.

Table 5.1
Total Trade Balance, Non-Oil Trade Balance, Trade in Services, Total Current Account and Non-Oil Current Account Relative to GDP (%)

Year	TB/GDP	Non-Oil TB/GDP	Trade in Services/GDP	Current Account/GDP[a]	Non-Oil Current Account/ GDP
1979	-1.59	-5.34	-	-	-
1980	-1.37	-6.04	-3.67	-4.67	-9.71
1981	-1.27	-6.02	-4.37	-5.30	-10.39
1982	3.59	-4.81	-7.13	-3.01	-11.95
1983	9.47	-1.28	-6.33	3.94	-7.61
1984	7.51	-1.95	-5.90	2.38	-7.85
1985	3.24	-2.64	-3.79	0.34	-6.43
1986	3.88	-0.99	-6.16	-1.06	-7.15
1987	6.26	0.11	-4.61	3.02	-4.50
1988	1.42	-2.24	-3.95	-1.30	-6.19
1989	0.18	-3.35	-3.93	-2.61	-7.28
1990	-0.34	-4.18	-4.01	-2.84	-8.20
1991	-2.01	-3.96	-2.72	-4.66	-6.68
1992	-4.38	-6.67	-3.27	-6.72	-9.94
1993	-3.34	-5.18	-3.36	-5.80	-8.55
1994	-4.39	-6.16	-3.56	-7.05	-9.72
1995	2.48	-0.47	-4.41	-0.55	-4.88
1996	1.97	-1.54	-4.08	-0.75	-5.62
1997	0.16	-2.67	-3.37	-1.91	-6.04
1998	-1.90	-3.61	-3.40	-3.86	-7.02
1999	-1.16	-3.24	-3.07	-2.92	-6.31
2000	-1.39	-4.24	-2.99	-3.16	-7.23

Note: [a] Includes transfers, where remittances from workers are accounted for.
Source: Own calculations based on data from World Development Indicators (2002) and Banco de México.

During the late 1970s and early 1980s, the country had to import most of the equipment required for the oil industry; thus the trade deficit was driven by this type of imports. From 1982 to 1989 there was a trade surplus. During the 1990s, the deficit on the trade balance

averaged 1.3 per cent of GDP. Before NAFTA was set up, the trade deficit relative to output increased rapidly from 0.18 per cent in 1989 to 3.3 per cent in 1993; and, in 1994, when NAFTA was implemented, the trade deficit relative to GDP was 4.3 per cent. This fact, among others, caused a severe contraction of GDP in 1995. During 1995, the ratio of the trade balance relative to output registered a surplus, but it did not last for long. After 1998, the deficit on the trade balance relative to GDP increased again.

Table 5.1 also shows the non-oil trade balance relative to GDP. From 1979 to 2000, each year registers a trade deficit, except in 1987. During this period, the trade deficit averaged 3.4 per cent of GDP. The trade deficits were very high during the first three years of the 1980s: in 1985; from 1989 to 1994, and from 1998 to 2000. It is important to differentiate the total trade balance from the non-oil trade balance because oil exports are not affected by trade reforms —but rather by different domestic and international regulations. Thus, in section 5.4, for the econometric estimations, we only consider the non-oil trade balance.

As with the non-oil trade balance relative to GDP, there is also a deficit on the trade in services as a share of GDP through all the period (Table 5.1). Although after 1995 it has a tendency to decrease, partly as a result of Mexico's GDP slowdown, it is still relatively high compared to the non-oil trade balance. Undoubtedly, deficits on trade in services constrain even more the current account of the balance of payments.

In order to have a better understanding of trade in services it is necessary to mention that officially the liberalisation of trade in services in Mexico started when NAFTA was set up in 1994. The terms of trade in services are established in *Chapter 12: Cross-Border Trade in Services* (refer to NAFTA's text). Beyond NAFTA, the creation of the General Agreement on Trade in Services (GATS) was one of the agreements of the 1986–94 Uruguay Round negotiations, signed at the Marrakesh ministerial meeting in April 1994, whose results came into force in January 1995 (WTO). Mainly, trade liberalisation in services is based on regulatory reforms and its aim is to secure a more transparent and predictable regulatory environment for services across countries. According to Hoekman and Messerlin (1999) services are much more regulation-intensive than goods. Table 5.2 shows the classification of services considered by GATS.

Table 5.2
Liberalisation of Trade in Services by GATS

Business Services and Professional Services	**Education Services**
Accountancy services	**Energy Services**
Advertising services	**Environmental Services**
Architectural and engineering services	**Financial Services**
Computer and related services	**Health and Social Services**
Legal services	**Tourism Services**
Communication Services	**Transport Services**
Audiovisual services	Air transport services
Postal and courier, express mail services	Maritime transport services
Telecommunications	Services auxiliary to all modes of transport
Construction and Related Services	**Movement of Persons**
Distribution Services	

Source: WTO (1994a). Available at <URL: http://www.wto.org/english/tratop_e/serv_e/top#top> [Accessed 11 February 2003].

Besides NAFTA, other free trade agreements include liberalisation of trade in services, for instance the EU-Mexico Free Trade Agreement came into force in July 2000.[3]

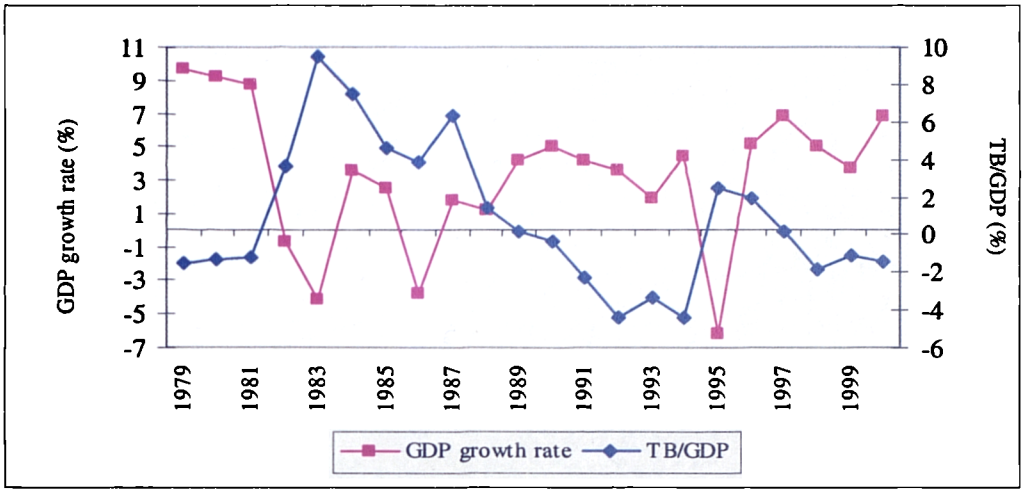
The last two columns of table 5.1 show the total current account and the non-oil current account of the balance of payments relative to GDP. From 1979 to 2000, on average the deficit for the former was 2.3 per cent of GDP and 7.5 per cent for the latter. We focus our attention on two comparisons between these two different variables at the time of liberalisation. First, the position of the current account changed from a surplus of 0.34 per cent of GDP in 1985 to a deficit of 1.06 per cent of GDP in 1986, and then moved again to a surplus of 3.02 per cent in 1987; while, the non-oil current account increased its deficit from 1985 to 1986, and then it diminished from 1986 to 1987. Second, from 1993 to 1994 both accounts increased their deficits.

Turning to other relevant aspects, Mexico has achieved relatively high rates of growth, but in combination with trade disequilibria and phases of sharp decline. Thus, the trade balance relative to GDP shows opposite movements in relation to the output growth rate, and this inverse relationship has hardly changed for the last two decades. Every time that GDP growth increases, the trade balance relative to GDP decreases, and *vice versa*. Panel a) in Graph 5.1 shows these variables from 1979 to 2000. This conflicting relationship applies as well for the non-oil trade balance relative to GDP and output growth rate, see panel b) in Graph 5.1.

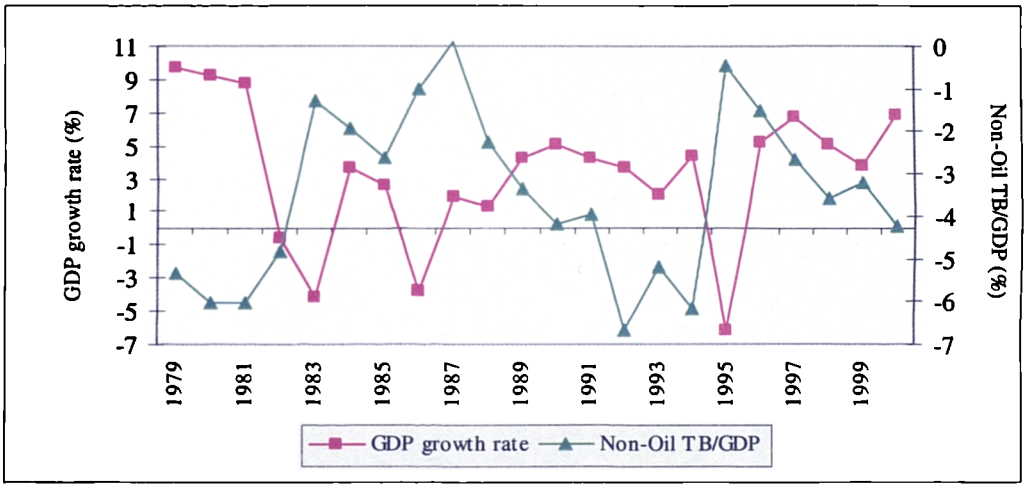
[3] See Ferreira (2001) for the analysis of liberalisation of trade in services in the EU-Mexico Free Trade Agreement. The text of this trade agreement is available at <URL :http://europa.eu.int/comm/trade/bilateral/mexico/fta.htm>.

Graph 5.1

a) GDP Growth and Trade Balance/GDP, 1979-2000



b) GDP Growth and Non-Oil Trade Balance/GDP, 1979-2000



The first negative GDP growth rate was in 1982, and it was accentuated in 1983. A combination of domestic factors (i.e. accelerated domestic demand, high indebtedness of the country, high inflation, high fiscal deficit —17 per cent of GDP— and trade deficits financed by the inflow of short term capital at high interest rates) with international circumstances

(i.e. fall in the price of oil, dramatic increases in real interest rates, and scarce availability of credit) caused the so-called debt crisis.[4]

The second negative growth rate occurred in 1986, when Mexico faced the second crisis of the 1980s. After 1982, the fiscal and monetary policies were adjusted to overcome the debt crisis. The privatisation of public firms was accelerated in order to alleviate the fiscal deficit (Aspe, 1994). However, the public finances were fragile because the public expenditure was relying excessively on oil. In fact, the economy was adversely affected when the price of oil fell from an average of US$25.5 a barrel in 1985 to US$12 in 1986. This, combined with other adverse external conditions, including high real interest rates and lack of international financial credit, resulted in large net resource transfers to the rest of the world. For instance, the high interest rates increased Mexico's debt payments; while the lack of external credit meant that little foreign capital was coming in. This led to devaluation of the real exchange rate in 1986. Despite the devaluation, imports continued to grow faster than exports, and caused a deficit on the non-oil current account of the balance of payments relative to GDP of approximately 7 per cent. The devaluation and higher public sector prices caused other prices in the economy to rise.

The third negative GDP growth rate occurred in 1995 when the GDP fell 6.5 per cent. The strong fall in economic growth was preceded by a high deficit on the current account of the balance of payments relative to GDP because consumption was stimulated by the expansion of

[4] See Aspe (1992), Brailovsky (1992), Lustig (1992), and Villareal (2000).

domestic credit. In 1994, the deficit on the current account was 7 per cent of GDP (see Table 5.1). The 1994-95 balance of payments crisis, popularly known as the *Tequila* or *Peso* crisis, could be briefly explained by the private demand expansion, weak banking system, an overvalued exchange rate, and by the vulnerability generated by the massive portfolio capital inflows, especially from 1990 to 1993. Ros and Lustig (2000) argue that the critical problems resulted from the fact that the liberalisation of trade and the opening of the domestic bond and stock markets took place in the midst of a persistent real overvaluation of the peso and a high volatility of capital flows. Also, as the rate of inflation was forced to adjust to similar levels of Mexico's trade partners (Canada and US) in a very short period of time, the exchange rate was pegged. Moreover, the country experienced political turmoil and violence throughout 1994: the armed uprising by the *Zapatistas* in January (the same day that NAFTA came into effect), the assassinations of the presidential candidate in March and of the Secretary of the ruling party in September, and the resignation in November of the Assistant Attorney who was in charge of investigating the assassination of his brother (Secretary of the *Partido Revolucionario Institucional*). In order to maintain the Mexican peso-US dollar rate unchanged, the Mexican monetary authorities increased domestic credit and encouraged investors who feared a devaluation to switch from Mexican peso-denominated short term government debt to debt indexed to the dollar, called *Tesobonos* (Lustig, 2001). These decisions were clearly wrong.

It is interesting to note that except for the 1986 balance of payments crisis, the other two crises coincided with presidential elections. The economic environment was surrounded by

institutional frictions between the public and private sector in relation to determining the scope of action of each sector in the economy. These political frictions influenced adversely the management of economic policy.

5.2.2 Disaggregated Analysis

A disaggregated analysis of the trade balance gives a more comprehensive understanding of Mexico's trade structure and about the tight links between GDP growth and trade. Table 5.3 shows the performance of the non-oil trade balance by main sectors, from 1980 to 2000. The agricultural sector has registered a very unstable trade balance pattern, shifting from trade deficit to surplus, but in most years there has been a deficit. The extractive sector has shown a more stable performance than the agricultural sector. During the 1980s, it had trade surpluses. However, after 1993 it experienced trade deficits, except in 1995. The manufacturing sector has registered systematic trade deficits. Notice that trade deficits during the 1990s were higher than during the 1980s.

Table 5.3
Trade Balance by Main Sectors, 1980-2000
(Millions of US$)

Year	Agriculture	Extractive	Manufacturing	Year	Agriculture	Extractive	Manufacturing
1980	-41.5	21.3	-1,151.8	1991	20.2	15.9	-1,221.7
1981	-78.3	33.9	-1,557.0	1992	-62.2	1.4	-1,838.9
1982	11.2	23.4	-879.4	1993	-10.8	-1.8	-1,589.0
1983	-42.7	31.7	-211.3	1994	-57.7	-0.7	-1,945.8
1984	-34.9	28.8	-370.0	1995	114.4	4.2	-9.8
1985	-16.5	24.8	-633.7	1996	-89.9	-11.7	-10.3
1986	96.7	26.8	-330.0	1997	-28.7	-22.5	-501.9
1987	36.2	26.6	-175.7	1998	-81.4	-27.5	-820.5
1988	-8.6	28.0	-551.3	1999	-46.1	-25.2	-863.6
1989	-20.7	18.1	-852.0	2000	-48.5	-33.7	-1,553.2
1990	7.6	19.0	-1,138.5				

Source: Own calculations based on data from Instituto Nacional de Estadística, Geografía e Informática (INEGI).

The performance of the trade balance by type of products is given in Table 5.4. Consumer goods have shown trade surpluses after the debt crisis and since 1991 the surpluses have increased noticeably because in 1991 there was a change in the compilation of the data. Since then, in-bond, *maquiladora*, products have been included in this classification. Intermediate goods show trade surpluses from 1980 to 1990, particularly from 1982. The most likely explanation for this is that oil exports are included in this category, which hides the evolution of other intermediary goods. After 1991 intermediate goods show continuous trade deficits. This shift cannot be explained by the performance of the trade balance in *maquiladoras* because it has registered surpluses. The most likely explanation is the decrease of intermediate good exports due to the economic slowdown in the US economy during the early 1990s in combination with an increasing demand for intermediate goods imports by Mexico. Capital goods exhibit trade deficits before 1994 and surpluses after 1995. This shift may be the result of the increase in automobile and auto-parts exports, some of the products favoured by NAFTA and by deregulation of foreign direct investment (Loría and Fuji 1997; Máttar *et al.*, 2002; Dussel, 2002b).[5]

[5] A consequence of NAFTA is that a large part of the trade is within firms (FitzGerald, 1999; Cimoli and Correa, 2002).

Table 5.4
Trade Balance by Type of Products, 1980-1999
(Millions of US$)

Year	Consumer Goods	Intermediate Goods	Capital Goods	Year	Consumer Goods	Intermediate Goods	Capital Goods
1980	-72.3	183.8	-413.4	1991[a]	388.9	-588.8	-363.9
1981	-100.4	315.3	-601.8	1992	310.8	-1,095.9	-484.8
1982	-10.4	894.0	-355.5	1993	533.8	-1,248.2	-336.8
1983	85.2	1,171.9	-144.7	1994	647.3	-1,716.0	-371.3
1984	105.7	1,075.5	-174.0	1995	1,493.2	-1,035.2	283.9
1985	56.9	776.6	-228.4	1996	1,813.0	-1,469.1	456.2
1986	154.7	360.6	-196.2	1997	1,965.7	-2,096.3	457.5
1987	238.8	521.9	-154.4	1998	2,237.6	-3,229.0	613.1
1988	181.9	100.4	-254.8	1999	2,511.5	-3,488.9	808.6
1989	61.1	27.6	-287.0	2000	2,696.5	-4,406.8	1,043.4
1990	36.9	66.3	-448.6				

Note: [a] After 1991 *maquiladora* products were added to the rest of the series.
Source: Own calculations based on data from Instituto Nacional de Estadística, Geografía e Informática (INEGI).

It is also interesting to examine which manufacturing sub-sectors have worsened or improved after trade reforms. Table 5.5 gives the trade balance for the nine manufacturing sub-sectors for the period 1980-1999. Three sub-sectors out of nine (Paper Products, Publishing and Printing; Chemicals, Rubber and Plastic Products; and, Non-Metallic Mineral Products) have trade deficits throughout the period. The Machinery and Equipment sub-sector had trade deficits before 1994; and, from 1995 to 1999 it had surpluses. Three sub-sectors (Textiles and Leather Products; Wood Products; and, Other Products) have shifted from deficits to surpluses, but after 1995 have had surpluses. The Basic Metals sub-sector is the only one that has experienced trade surpluses throughout the period.

Table 5.5
Trade Balance by Manufacturing Sub-Sectors, 1980-1999
(Millions of US$)

Year	Food Products, Beverages and Tobacco	Textiles and Leather Products	Wood Products	Paper Products, Publishing and Printing	Chemicals, Rubber and Plastic Products	Non-Metallic Mineral Products	Basic Metals	Machinery and Equipment	Other Products
1980	-33.2	-6.9	-2.3	-46.7	-146.1	-159.2	9.8	-717.2	-4.9
1981	-33.2	-18.6	-2.3	-52.0	-158.8	-191.4	16.9	-1,048.8	-7.2
1982	1.4	-10.0	0.0	-32.7	-123.8	-87.4	17.2	-610.1	-3.3
1983	16.4	12.0	4.9	-18.1	-4.3	-21.8	64.3	-197.3	4.7
1984	26.8	14.7	5.1	-23.4	-5.3	-45.0	53.3	-283.3	3.0
1985	20.2	4.2	1.9	-27.4	-63.7	-44.2	21.9	-426.1	0.2
1986	37.2	16.4	4.4	-24.4	-63.8	-28.8	60.2	-276.9	1.1
1987	71.1	32.9	7.6	-32.1	-59.2	-24.2	85.6	-201.2	0.7
1988	10.8	13.9	8.4	-39.7	-95.7	-60.8	96.5	-417.7	-3.5
1989	-62.2	-15.8	7.2	-55.4	-179.2	-81.1	119.6	-532.6	-12.2
1990	-132.0	-34.6	-0.5	-71.5	-163.1	-117.9	120.0	-722.4	-16.4
1991	-101.2	-18.6	1.3	-99.2	-360.4	-227.1	108.0	-536.7	12.2
1992	-164.2	24.5	-4.3	-127.8	-463.1	-271.6	85.5	-835.0	0.5
1993	-147.2	-62.9	0.3	-142.0	-495.5	-250.6	121.3	-610.0	-2.4
1994	-174.4	-76.0	-9.0	-206.5	-599.7	-310.5	118.8	-680.4	-8.1
1995	-7.3	106.8	22.5	-168.9	-471.5	-266.6	307.1	414.3	53.9
1996	-15.4	144.7	39.2	-166.0	-699.0	-340.7	281.9	689.5	55.6
1997	-21.8	222.1	48.8	-184.7	-946.5	-408.8	295.4	454.8	45.6
1998	-32.4	200.2	42.7	-197.7	-1,049.0	-457.0	221.5	424.4	26.7
1999	-31.3	207.4	36.9	-215.2	-1,177.7	-453.3	156.2	604.0	4.4

Source: Own calculations based on data from Banco de México and Instituto Nacional de Estadística, Geografía e Informática (INEGI).

It does not appear from the previous descriptive statistics that either the mid-1980s trade reforms or NAFTA have led to a positive and permanent improvement in the trade balance, but it is necessary to test, controlling for other variables.

5.3 The Model and Econometric Techniques

In order to evaluate the impact of trade reforms on the trade balance we estimate a model of the trade balance over the period 1980-2000. As in the case of exports (Chapter 3) and imports (Chapter 4) special attention is paid to 1985 and 1986, when trade distortions were modified in a significant way, and to 1994 when Mexico joined NAFTA. Given the earlier estimates of the

impact of trade liberalisation on the volume of exports and imports, the *a priori* expectation of the effects of trade reforms on the trade balance is uncertain. Also, the trade balance (and balance of payments) is measured in monetary terms, so the terms of trade also become important.

The trade balance (TB) is defined as:[6]

$$TB = \frac{X}{M} \tag{5.1}$$

where X and M are the value 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:

$$tb = (p_x + x) - (p_m + m) \tag{5.2}$$

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 (3.2) and (4.2), which define the rate of growth of exports and imports, respectively, we substitute and rearrange terms to obtain the following equation:

$$tb = \psi + \theta_1\, yus + \theta_2\, ym + \theta_3\, p + \theta_4\, tot + \tau_t \qquad (5.3)^7$$

[6] The trade balance excludes oil.

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

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. Our model (equation 5.3) is modified with the introduction of different trade liberalisation indicators. It is extended with the inclusion of export and import duties, and two shift dummy variables.[8] For the latter, tests showed the most significant structural breaks to be in 1985 and 1994. Thus, the estimated trade balance model is:

$$tb_t = \psi + \theta_1\, yus_t + \theta_2\, ym_t + \theta_3\, p_t + \theta_4\, tot_t + \theta_5 xd_t + \theta_6 md_t + \theta_7\, lib85_t + \theta_8 lib94_t + \tau_t \qquad (5.4)$$

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, respectively. The sign of θ_5 is negative, θ_6 is positive, and θ_7 and θ_8 are undetermined.

As an alternative specification we test the impact of trade liberalisation on the ratio of the trade balance to GDP. This is the more normal measure of balance of payments fragility. The complete equation to be estimated is as follows:

$$\frac{TB}{GDP} = \rho + \eta_1\, yus_t + \eta_2\, ym_t + \eta_3\, p_t + \eta_4\, tot_t + \eta_5\, xd_t + \eta_6\, md_t + \eta_7\, lib85_t + \eta_8\, lib94_t + \sigma_t \qquad (5.5)$$

where ρ is the constant term and σ_t the error term. The explanatory variables of equation (5.5), and the expected signs of the parameters, are the same as those described for equation (5.4).

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

Additionally, as trade liberalisation not only affects merchandise trade but also services, we 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.[9] The BP model is specified as follows:[10]

$$\frac{dBP}{BP} \text{ and } \frac{BP}{GDP} = \lambda + \chi_1\, yus_t + \chi_2\, ym_t + \chi_3\, p_t + \chi_4\, tot_t + \chi_5\, lib94_t + \upsilon_t \qquad (5.6)$$

where λ is the constant and υ the error term. The variables and the expected signs of the χs are similar to the variables and coefficients of equation (5.5).

Different econometric techniques to evaluate the impact of trade reforms on the trade balance and current account of the balance of payments are used. We estimate equations (5.5) and (5.6) using ordinary least squares. A structural stability test is applied to evaluate if the first period of trade reforms caused a structural change in the dependent variables. Outside sample forecasts are needed to test for structural stability relating to NAFTA. Rolling regressions show the evolution of the constant, and 'income and price elasticities', through different overlapping periods. Finally, ARDL and ECM models are used to test for long-run relationships among the variables that explain the trade balance, and to evaluate the speed of adjustment of the trade balance model after a shock.

[9]Differently from goods, tariffs and quotas generally are not restraints on trade in services. This makes it difficult to assess the extent of Mexico's openness to trade in services. However, considering that NAFTA was implemented in 1994, the shift dummy variable refers to this year.
[10] The current account of the balance of payments excludes oil.

5.4 Impact of Trade Reforms on the Trade Balance and Balance of Payments

The only major study to have looked at the determinants of Mexico's trade balance is Galindo and Guerrero (1997), but they pay no attention to the effects of trade reforms on the trade balance. Using the Johansen cointegration method and quarterly data from 1980 to 1995, they found that there is a long run relationship between the rate of growth of the trade balance, the rate of growth of domestic income, the rate of growth of US income and the rate of growth of the real exchange rate. The estimated domestic income elasticity is -0.75, the US income elasticity is 0.46 and the real exchange rate elasticity is 1.83.[11] Additionally, the authors argue that in the long run the nominal exchange rate tends to adjust to the inflation and interest rate gap between Mexico and US. This being so, the real exchange rate is not the best variable to offset a deterioration in the trade balance. They claim, however, that the Marshall-Lerner condition is satisfied.

i) Ordinary Least Square Estimations

Before starting to estimate the trade balance and current account of the balance of payments models using OLS, we first consider the stationarity of the variables. In previous chapters (chapters 3 and 4) we tested for stationarity of the majority of the series. Here, we only test for stationarity of the rate of change of the trade balance, the ratio of the trade balance to GDP, the rate of change of the current account of the balance of payments, the ratio of the current account of the balance of payments to GDP, and the terms of trade. Unit root tests for

[11] Galindo and Guerrero (1997) used US income in nominal terms to estimate the foreign income elasticity. They do not give any argument for doing so; and, they do not make clear if the domestic income variable is in real or nominal terms.

stationarity are performed on the levels of the variables. Table 5.6 (Part A) presents the results of the ADF test (one lag) under the assumption of a constant. The rate of change of the trade balance, the rate of change of the current account of the balance of payments, the ratio of the trade balance to GDP, and the terms of trade are I(0). The ratio of the current account of the balance of payments to GDP is not stationary. Table 5.6 (Part B) also shows the results of the ADF test (one lag) with a constant plus a deterministic time trend. Only the rate of change of the trade balance and the rate of change of the current account are I(0). These results imply that we are not able to use the OLS method for the ratio of the current account of the balance of payments to GDP, otherwise the results will be spurious.

Table 5.6
ADF Test for Stationarity

PART A with Constant Only, sample period 1970-2000		**PART B** with Constant and Time Trend, sample period 1970-2000
Variables	Log Level [1]	Log Level [2]
xd	-4.98*	-4.91*
tb	-4.09*	-4.53*
bp	-3.69*	-4.17*
TB/GDP	-2.72**	-2.66
BP/GDP	-2.30	-2.28
tot	-3.25*	-1.41

Notes: [1]The ADF critical value -3.04. [2]The ADF critical value is -3.67. The asterisk (*) and double asterisk (**) imply significance at the 5 per cent and 10 per cent level, respectively.

We first estimated a set of regressions using the OLS method considering the rate of growth of the non-oil trade balance as the dependent variable. The results are shown in Table 5.7.

Table 5.7
OLS Estimation for the Trade Balance: 1980-2000

Dependent variable: Trade Balance Rate of Growth (*tb*)				
Regressor	Equations			
	5.7.1	*5.7.2*	*5.7.3*	*5.7.4*
Constant	0.11 (1.26)	0.27 (2.60)*	0.11 (1.22)	0.29 (2.71)*
ym	-3.20 (-2.58)*	-4.42 (-3.64)*	-3.36 (-2.47)*	-4.30 (-3.48)*
yus	0.53 (0.28)	-1.56 (-1.81)	0.27 (0.12)	-1.21 (-0.61)
p	0.46 (1.55)	0.03 (0.11)	0.41 (1.19)	0.07 (0.23)
tot	0.03 (0.08)	-0.10 (-0.32)	-0.02 (-0.05)	-0.02 (0.08)
lib85		-0.14 (-2.33)*		-0.18 (-2.42)*
lib94			0.02 (0.38)	-0.06 (-0.86)
R^2	0 72	0.79	0.72	0.81
Durbin Watson	1.90	2.94	1.90	2.47
Diagnostic Tests				
Serial Correlation	*0.915*	*0.366*	*0.932*	*0.321*
Functional Form	*0.800*	*0.965*	*0.989*	*0.835*
Normality	*0.058*	*0.960*	*0.038*	*0.961*
Heteroscedasticity	*0.388*	*0.031*	*0.337*	*0.061*

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. The diagnostic tests show probabilities. Export and import duties were included in the estimations, both of them show expected signs but none of them is significant. As the sample is not very large, we decided to exclude them to have more degrees of freedom.

Three points should be highlighted. First, the shift dummy variable for 1985, *lib85*, has a negative sign and is significant at the 5 per cent confidence level (equations 5.7.2 and 5.7.4). It influenced negatively the *tb* by between 14 and 18 percentage points. Second, the shift dummy variable for 1994, *lib94*, is not statistically significant. Third, the coefficient of *ym* has the expected sign and is significant in all the equations. However, *yus* is not statistically significant and shifts from a positive to negative sign when both shift dummy

variables are included.[12] Although *p* is positive, it is not significant. The terms of trade variable *(tot)* is not statistically significant in any of the equations.

According to the estimated results, each period of trade liberalisation (*lib85* and *lib94*) had different effects on the trade balance. Trade reforms related to 1985 worsened the rate of change of the trade balance, but there is not a significant effect from NAFTA. The negative effect of the mid-1980s trade liberalisation on the trade balance is consistent with our earlier findings: imports reacted faster than exports to trade liberalisation. The significant impact of trade liberalisation on import growth was in 1985 (see chapter 4), while export growth increased in 1986 (see chapter 3). However, it is largely domestic income growth that drives the performance of the trade balance.[13]

Considering the ratio of the trade balance to GDP (TB/GDP) as the dependent variable, no significant coefficients that represent the trade liberalisation indicators were obtained. None of the coefficients of *lib85* and *lib94* are significant. Table 5.8 shows the results. In this case, the coefficients of *ym* and *yus* have the expected sign. For instance, considering equation *5.8.2*, if *ym* increases by one per cent, it leads to a deterioration of 0.32 in the ratio of the trade balance to GDP; which is a strong effect. When both income coefficients are significant (equations *5.8.1* and *5.8.2*), *yus* is always higher than *ym*. The coefficient of *p* is negative and

[12] As this is an unexpected result, because US is the main trade partner of Mexico, we tried different specifications of our model. We find that when the constant is excluded from the *tb* equation, both income elasticities, *ym* and *yus*, are statistically significant either at the 5 or 10 percent level; however, no dummy variable is significant. These results are in Table C1 in the Appendix.

[13] Tables C2 and C3 in the Appendix show different estimations of the trade balance equation, which consider alternative years for each period of trade reforms (*lib86* and *lib87*; *lib95* and *lib96*).

is not significant; while *tot* is positive but not significant. In general, if we consider the R^2, which is lower than 50 per cent, these results are rather weak.

Table 5.8
OLS Estimation for the Trade Balance /GDP: 1980-2000

Dependent variable: Trade Balance/GDP				
Regressor	Equations			
	5.8.1	*5.8.2*	*5.8.3*	*5.8.4*
Constant	-0.03 (-3.35)*	-0.04 (-3.21)*	-0.03 (-3.53)*	-0.03 (-2.29)*
ym	-0.34 (-2.24)*	-0.32 (-2.19)*	-0.36 (-2.25)*	-0.36 (-1.95)**
yus	0.40 (1.71)**	0.42 (1.82)**	0.35 (1.35)	0.37 (1.25)
p	-0.01 (-0.38)	-0.01 (-0.38)	-0.02 (-0.51)	-0.01 (-0.21)
tot	0.01 (0.29)	0.01 (0.22)	0.00 (0.15)	0.01 (0.24)
lib85		0.00 (0.42)		0.00 (0.17)
lib94			0.00 (0.52)	0.00 (0.26)
R^2	0.47	0.47	0.48	0.48
Durbin Watson	1.23	1.27	1.24	1.19
Diagnostic Tests				
Serial Correlation	*0.076*	*0.108*	*0.096*	*0.078*
Functional Form	*0.929*	*0.726*	*0.993*	*0.896*
Normality	*0.781*	*0.687*	*0.680*	*0.671*
Heteroscedasticity	*0.764*	*0.783*	*0.806*	*0.685*

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level and the double asterisk (**) denotes significance of the coefficient at the 10 per cent level. The diagnostic tests show probabilities.

The effects of liberalisation on the non-oil current account of the balance of payments are not picked up by the OLS estimations, according to the results given in Table 5.9. The shift dummy variable, *lib94*, considers liberalisation in trade of goods and services. The *lib94* coefficient is not statistically significant. The domestic income elasticity is the only coefficient that is statistically significant through all the equations. However, we should consider that many of the flows within the current account (i.e. interest payments) have more to do with

financial liberalisation than with trade liberalisation in goods and services. From the descriptive analysis (section 5.2) we know that the invisible account of the balance of payments has not compensated trade deficits. Additionally, transfers included in the current account (i.e. workers' remittances) are not directly linked with any trade reforms.

Table 5.9
OLS Estimation for the Balance of Payments: 1980-2000

Dependent variable: Current Account Growth		
Regressor	Equations	
	5.9.1	*5.9.2*
Constant	0.07 (1.50)	0.08 (1.47)
ym	-3.11 (-4.18)*	-3.18 (-3.90)*
yus	1.44 (1.28)	1.29 (0.99)
p	0.21 (1.19)	0.18 (0.90)
tot	0.22 (1.07)	0.20 (0.90)
lib94		0.01 (0.26)
R^2	0.79	0.79
Durbin Watson	2.13	2.14
	Diagnostic Tests	
Serial Correlation	*0.751*	*0.747*
Functional Form	*0.677*	*0.798*
Normality	*0.117*	*0.084*
Heteroscedasticity	*0.104*	*0.092*

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. The diagnostic tests show probabilities.

We now supplement the above analysis with additional econometric techniques to test for the effect of trade reforms on the trade balance and current account of the balance of payments.

ii) Structural Stability, Rolling Regressions and Forecasts

As we did for the export and import analysis, we apply structural stability, rolling regressions and outside-sample forecasts. First, to find out if there is evidence for structural stability of the rate of growth of the trade balance we applied the Chow breakpoint test. The Chow breakpoint test rejects the null hypothesis of structural stability in the trade balance for 1985 at the 10 per cent level of significance (the F-calculated, 2.48, is higher than the F-statistic, 2.43). This is further support of a structural break in the trade balance model, related to the mid-1980s trade reforms.

Second, we estimated rolling regressions to look for parameter variation in the basic trade balance model (equation 5.3), but focusing our attention on the change in the constant. The results, using a sample size of fourteen years, are shown in Table 5.10. The positive constant has decreased over the seven time periods. This predominant downward tendency suggests a worsening of the trade balance linked to the trade liberalisation reforms. After the period *1984-1997*, the domestic income elasticity decreases and is not significant any more. We have to consider that the rate of growth of GDP improved from one year to the other, it changed from -4.2 per cent in 1983 to 3.6 per cent in 1984; while the non-oil trade deficit worsened from 1983 (1,912 millions of US$) to 1984 (3,417 millions of US$). The foreign income coefficient is negative in four rolling regressions and is never significant. Also, the price coefficient does not follow a stable tendency, it increases through time and is only significant in the last four regressions. The terms of trade coefficient moves erratically and is not statistically significant in any of the equations.

Table 5.10
Rolling Regressions for tb
(window size 14)

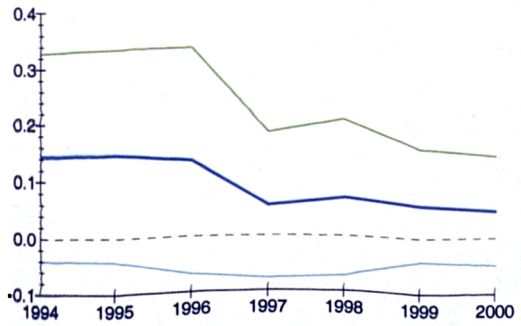
Dependent variable: *tb*							
Regressor	1981-94	1982-95	1983-96	1984-97	1985-98	1986-99	1987-00
Constant	0.14 (1.75)	0.15 (1.41)	0.14 (1.26)	0.03 (0.51)	0.05 (0.69)	0.04 (1.13)	0.05 (0.94)
ym	-5.27 (-2.93)*	-5.09 (-2.56)*	-5.11 (-2.39)*	-1.16 (-1.07)	-1.23 (-0.89)	-1.16 (-1.22)	-1.26 (-1.38)
yus	-0.20 (-0.09)	-0.61 (-0.25)	-0.08 (-0.03)	0.07 (0.04)	-0.45 (-0.21)	0.53 (0.37)	0.28 (0.20)
p	0.49 (1.40)	0.25 (0.65)	0.18 (0.40)	0.72 (2.28)*	0.71 (2.41)*	0.72 (3.55)*	0.63 (2.77)*
tot	0.43 (0.91)	0.13 (0.30)	0.16 (0.35)	-0.10 (-0.35)	0.09 (-0.32)	-0.10 (-0.54)	0.17 (0.45)

Note: The asterisk (*) denotes significance at the 5 per cent.

The "rolling" coefficients -*constant*, *ym*, *yus*, *p* and *tot*- with their standard errors are plotted on Graph 5.2 (a), (b), (c), (d) and (e) respectively. Through the analysis of these figures we observe that the *constant* exhibits a downward tendency after 1996; *ym* and *p* coefficients show an upward tendency from 1996 to 1997. Meanwhile, *yus* is relatively stable.

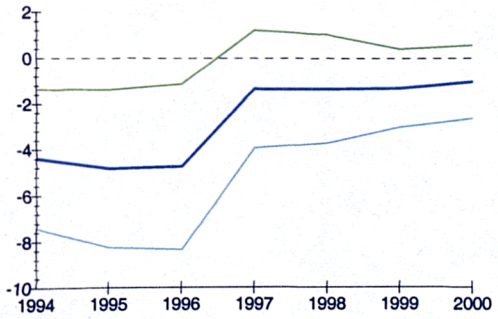
Graph 5.2
Rolling Coefficients for Trade Balance

Coefficient of *Constant* and its two S.E. bands based on rolling OLS



(a)

Coefficient of *ym* and its two S.E. bands based on rolling OLS

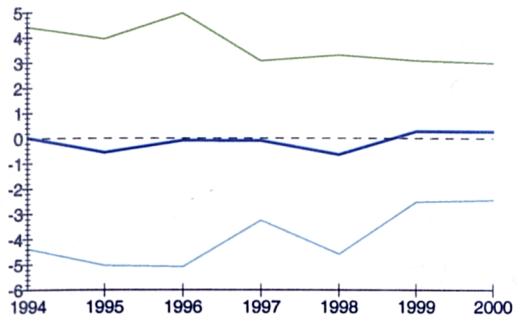


(b)

(*Graph 5.2 continues overleaf*)

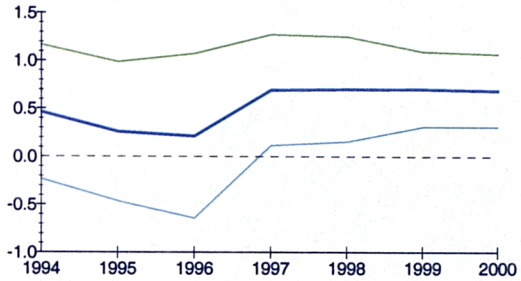
(*Graph 5.2 Continued*)

Coefficient of *yus* and its two S.E. bands based on rolling OLS



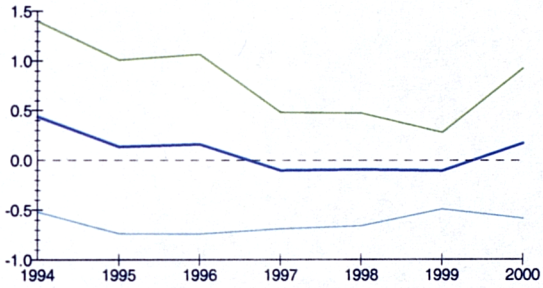
(c)

Coefficient of *p* and its two S.E. bands based on rolling OLS



(d)

Coefficient of *tot* and its two S.E. bands based on rolling OLS

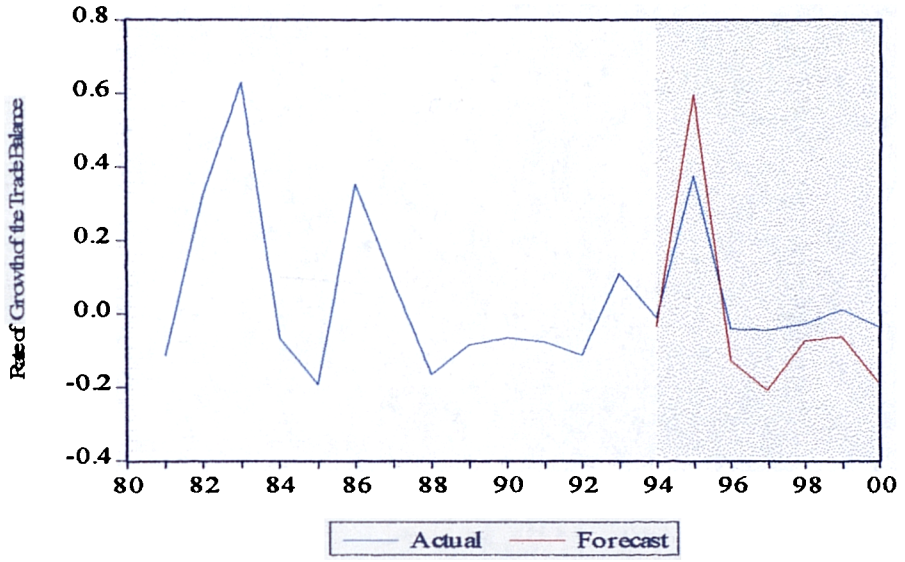


(e)

Third, to check our previous findings, concerning the effect of NAFTA on the trade balance, we estimate Mexico's trade balance up to 1993, then we make outside-sample forecasts, and compare the actual rate of change of the non-oil trade balance and the forecast model. If the actual trade balance performance is worse than predicted, this is *prima facie* evidence of an unfavourable structural break. The actual and the forecast trade balance models are shown

in Graph 5.3. In this case, the latter over-predicts the former, which suggests that NAFTA deteriorated the trade balance performance. On the other hand, from 1996, the actual trade balance performance is better than forecast.

Graph 5.3
Actual, and Single Equation Static Forecast for the Trade Balance



Regarding the statistics for the forecast evaluation, although the *rsm* is relatively moderate (0.12), the bias proportion of the Theil inequality coefficient is about 12 per cent. This implies that there is a small bias (as is observed in Graph 5.3).

Trade Balance Forecast Evaluation	
Root-mean square error	0.128203
Theil inequality coefficient	0.318550
Bias proportion	0.129320
Variance proportion	0.814432
Covariance proportion	0.056248

The results for the current account of the balance of payments are very similar to the ones obtained for the non-oil trade balance. The positive constant, estimated from the rolling regressions, decreased over the seven time periods, which can be interpreted as a worsening of

the current account related to trade reforms (see Table D2 and Graph D1 in the Appendix). The non-oil current account outside-sample forecast shows that NAFTA represents a deterioration on the current account (Graph D2 in the Appendix).

iii) ARDL and ECM models

Using two econometric techniques, ARDL and ECM models, we will try to corroborate the existence of a long run relationship among the variables that explain the rate of growth of the trade balance performance. Furthermore, we will investigate the speed of adjustment of the trade balance after it is affected by a shock.

First, we test for the existence of a long run relationship between the variables under investigation in the trade balance model using the F-test (Pesaran and Pesaran, 1997). In this case, 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), it is above the upper critical value, allowing us to reject the null hypothesis of no long relationship between the variables.

We then estimated 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 trade balance are:[14]

$$LTB = -29.08 - 1.27LYM + 2.73\,LYUS + 1.23\,LP - 0.28\,lib85 - 0.11\,lib94 \qquad (5.7)$$

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

$$tb = -23.93 - 1.04\,ym + 2.25\,yus + 1.05\,p - 0.23\,lib85 - 0.09\,lib94 - 0.82\,ecm_{-1} \qquad (5.8)$$

t-statistic (-2.11)* (-1.04) (2.38)* (4.79)* (-2.01)* (-0.94) (-5.74)*

[14] The terms of trade variable (TOT) is not included because it does not show a significant coefficient, and the rest of the variables perform better without it.

where the L preceding each variable in equation (5.7) stands for the log of the variable; and lower case letters in equation (5.8) represent growth rates for the first three variables.[15]

From the equation that represents 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.[16] 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, except for the domestic income. 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. [17]

From the previous empirical analysis, it is possible to say that the mid-1980s trade reforms worsened the trade balance. Regarding the second episode of trade reforms, related to NAFTA, the results cannot be considered as conclusive but they are certainly suggestive of a negative structural change in the trade balance from 1994 to 1995, but after 1996 there is evidence of a positive structural change. Although there is no definitive conclusion concerning

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[15] When we substitute the rate of growth of the trade balance (*tb*) for the ratio of the trade balance to GDP (*TBY*), all the coefficients are lower than the coefficients using *tb* as the dependent variable. Moreover, the real exchange rate and *lib85* coefficients are statistically significant at the 5 and 10 per cent level, respectively.

$TBY = -2.31 - 0.11 LYM + 0.23\ LYUS + 0.09\ LP - 0.02\ lib85 - 0.00\ lib94$ Long Run Model (5.7')

t-statistic (-3 94) (-1 33) (3.22) (3.48)* (-1 94) ** (-0 94)

$TBY = -1.95 - 0.09\ ym + 0.19\ yus + 0.07\ p - 0.01\ lib85 - 0.00\ lib94 - 0.84\ ecm_{-1}$ ECM (5.8')

t-statistic (-3 54) (-1 20) (1.20) (4 48)* (-1 97)** (-0 92) (-5 70)*

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

[17] There is a long run relationship between the variables under investigation in the current account of the balance of payments model. The calculated F statistic is 13.24, which is higher compared with the interval values of the F-test. The ARDL and ECM models for the current account do not show a significant coefficient related to *lib94*, but income and price elasticities have the expected sign and are statistically significant. The results are presented in Table C5 in the Appendix.

the effect of trade liberalisation on the current account of the balance of payments, as well as for the trade balance, there is evidence for an unfavourable structural break during 1994 and 1995, afterwards the results are indicative of a positive effect.

5.5 Interaction between the Balance of Payments and Economic Growth

5.5.1 Theoretical Framework

The purpose of this section is to examine the interaction of the trade balance and economic growth by considering the balance-of-payments-constrained growth model, first formulated by Thirlwall (1979). Particularly, we are interested in whether Thirlwall's model is a good predictor of Mexico's long run growth rate, given that trade liberalisation is likely to affect the income elasticity of demand for imports.

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 two main equations:

$$X = (P_d/P_f E)^{\eta} Z^{\varepsilon} \tag{5.9}$$

$$M = (P_d/P_f E)^{\psi} Y^{\pi} \tag{5.10}$$

where variables X, M, Z and Y are exports, imports, world income and domestic income, respectively; (P_d/P_f) is the ratio of domestic prices to foreign prices, and E is the nominal exchange rate measured as the domestic price of foreign currency. The parameters $\eta(<0)$ and ε (>0) are the price and income elasticity of exports, respectively; ψ (>0) and π (>0) are the

price and income elasticity of imports, respectively. Taking logs of (5.9) and (5.10) and differentiating with respect to time gives:

$$x = \eta\ (p_d - p_f - e) + \varepsilon z \tag{5.11}$$

$$m = \psi\ (p_d - e - p_f) + \pi y \tag{5.12}$$

where the lower case letters are the growth of the variables. Assuming long run equilibrium on the current account and that the rate of change of relative prices is constant over time ($p_d - p_f - e = 0$),[18] the balance of payments equilibrium growth rate can be written as:

$$y_b^1 = (\varepsilon/\pi)\ z \tag{5.13}$$ [19]

or, combining equation (5.11) and (5.13), gives another definition:

$$y_b^2 = (1/\pi)\ x \tag{5.14}$$

Equation (5.14) 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.

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. To allow for capital flows, Thirlwall and Hussain (1982) extended the original model as follows:

[18] McCombie and Thirlwall (1994) suggest that empirical evidence supports 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".

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

$$y_b^3 = \frac{\theta x - (1-\theta)(f - p_d)}{\pi} \tag{5.15}$$

where θ and (1-θ) represent the shares of exports and capital flows as a proportion of total receipts, respectively; and f is the rate of growth of nominal capital inflows. $\theta = P_d X/R$ and $(1-\theta) = F/R$, where F is the value of nominal capital flows measured in domestic currency and R is total overseas receipts. Assuming no initial disequilibrium and no capital flows (i.e. $\theta = 1$), equation 5.15 yields equation 5.14. In case that there is initial disequilibrium but $f = 0$, the balance-of-payments constrained growth rate is reduced to:

$$y_b^4 = \frac{\theta x - (1-\theta)(p_d)}{\pi} \tag{5.16}$$

y_b^4 is less than y_b^3, assuming that p_d is positive. Subtracting equation (5.16) from (5.14) we see the absolute reduction in the level of the growth rate:

$$y_b^2 - y_b^4 = \frac{(1-\theta)(p_d + x)}{\pi} \tag{5.17}$$

If, initially, capital inflows finance the current account deficit and the growth rate is not lower than without initial disequilibrium, there must be a positive rate of growth of capital inflows to compensate. This rate is defined by setting equation (5.15) equal to (5.14) and solving for f:

$$f = p_d + x \tag{5.18}$$

As there is a limit to the ratio of the current account deficit to GDP and the ratio of international debt to GDP, McCombie and Thirlwall (1999) and Moreno-Brid (1998) reformulate the model to allow for the influence of external debt accumulation. Assuming a given long term ratio of the external debt to GDP and constant terms of trade, McCombie and

Thirlwall derive the following expression (which coincides with the one derived by Moreno-Brid):

$$y_b^5 = \frac{\xi x}{\pi - (1 - \xi)} \tag{5.19}$$

where ξ is the export/import ratio at nominal prices. If the current account is zero (X/M =1), then equation (5.19) reduces to equation (5.14).

The implication of the extended model is that capital flows cannot permit an individual country to increase its growth rate above y_b^1 or y_b^2 by very much or for very long (McCombie and Thirlwall, 1999).

5.5.2. Overview of the Balance-of-Payments-Constrained Growth Model Applied to Mexico

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

Warman (1994) estimates the basic (equations 5.13 and 5.14) and extended (equation 5.15) balance-of-payments-constrained growth models over the period 1961-1990. She estimates

price and income elasticities of the import and export demand functions using OLS. Her estimations, either considering the static or dynamic specification of the import and export equations, show that the price elasticities of exports and imports do not satisfy the Marshall-Lerner condition. The specification used to estimate the income elasticity of demand for imports, however, does not include any variable which captures the impact of the mid-1980s trade reforms on imports. Considering the original model, she finds that the average predicted growth rates for the period 1961-1990, ranging from 4.9 to 5.7 per cent, are very close to the average actual growth rate of 5.1 per cent. When the sample was divided into two sub-periods, before and after the debt crisis (1961-1981 and 1982-1990), she finds that the extended model —which includes capital flows— approximates better to the actual growth rate. The results highlight the importance of export capacity and the income elasticity of demand for imports as determinants of long run economic growth. Moreover, the results imply that in the long run prices measured in a common currency stay fairly stable.

Loría and Fuji (1997) descriptively analyse the balance of payment constraint on Mexico's economic growth. They claim that the insufficient generation of foreign currency in relation to the growing demand from the manufacturing sector is the main constraint on Mexico's economic growth; this restriction has been intensified as a result of the macroeconomic reforms undertaken during the 1980s (i.e. adjustment and stabilisation programs implemented after the debt crisis; deregulation of the economy –trade and financial opening and privatisation of public firms). The authors describe the tendencies in the trade balance of the agricultural, mining and manufacturing sectors for the period 1980-1994; and they also analyse the shifts from trade surplus to deficit, and vice versa, for about 26 selected agricultural and manufacturing sub-sectors. In spite of the change in the composition of

exports in favour of manufactured goods, the authors conclude that the country's trade composition constrains its economic growth.

López and Cruz (2000), using the Johansen cointegration method, test Thirlwall's Law for four Latin American countries (Argentina, Brazil, Colombia and Mexico) for the period 1965-1996.[20] They focus on three issues. First, they validate Thirlwall's Law through the existence of cointegration vectors between domestic output and exports for each country. The Granger causality relationship between domestic output and exports was tested; their findings suggest that causality runs from exports to output for all countries, except for Mexico.[21] They also report the "equilibrium" (defined as "the inverse of the [long run] elasticity of exports with respect to output") and the estimated long run income elasticities of demand for imports (estimated by the cointegrating vector in the VAR for output and imports). The latter elasticity is higher than the former for all the economies, except for Brazil. The difference is wider for Mexico, and according to their results, López and Cruz claim that a growth rate of exports of 1 per cent was associated with a GDP growth rate of 2.2 per cent. In order to maintain foreign trade equilibrium, π should be 0.45 instead of 1.3. Second, after showing graphically that the real exchange rate has changed in Latin America economies, they argue that such variations affect domestic output in the long run. They support this argument because they found for each country a stable long run relationship between domestic output and the real exchange rate. However, as initially pointed out by Holland *et al.* (2002), López and Cruz are assuming a straightforward relationship between the real exchange rate and domestic output, but it is not

[20] For Colombia, the period is 1968-1996. For most of the estimations, the authors use different time periods, even for the same country.

[21] For the case of Mexico, this is a contradictory result compared with those obtained by Thornton (1996), Abdulsanner and Manuchehr (2000) and Alguacil *et al.* (2002). In general, they found that exports stimulated Mexico's economic growth. See in more detail in Chapter 6.

so. Beyond the fulfilment of the Marshall-Lerner condition, changes in the domestic currency —appreciation or depreciation— affect the domestic output through private investment, consumption and debt position in foreign currency.[22] Hence, their criticism of Thirlwall's assumption about the stability of the terms of trade or the real exchange rate in the long run is rather weak. Finally, they tested whether the Marshall-Lerner condition holds for the group of countries in their study by estimating a VAR which includes the trade balance, domestic and foreign income, and the real exchange rate. Their findings suggest that a higher exchange rate worsens the trade balance for the Brazilian and Mexican economies. The authors disregard, however, the effects of trade liberalisation in these Latin American countries.

Ocegueda (2000) also estimates the original balance-of-payments-constrained growth model over the period 1960-1997, applying the Engel and Granger method. He *confirms the* predictive power of the simple specification of Thirlwall's Law for the Mexican case. Ocegueda considers 1982 as the turning point for economic policy making arguing that after the debt crises all the macroeconomic variables were affected by the structural adjustment policies including trade liberalisation. After comparing estimates of GDP growth between two periods (1960-1982 and 1983-1997) he concludes that the balance of payments equilibrium growth rate worsened after 1982. He derives the conclusion by arguing that the income elasticity for imports (π) increased from 1.05 for the period 1960-1982 to 4.91 for the 1983-1997 period (the π for the second period is very high, about 2 percentage points higher than the one estimated by Moreno-Brid for a similar period). The import equation for the second

[22] In their conclusions, López and Cruz (2000) recognise that even when the Marshall-Lerner condition holds, a higher real exchange rate is associated with a lower level of domestic output, e.g. this is the case for Argentina's economy. They explain this inverse relation by saying that "...this negative association is probably the result of a harmful impact of a higher real exchange rate on domestic demand." Therefore, implicitly the authors take into account the indirect relationship between domestic output and the real exchange rate.

sub-sample includes the ratio of licensed imports to total imports as a variable to account for trade liberalisation.

Moreno-Brid in various papers (1998, 1999, 2001 and 2002a) has also thoroughly examined the balance of payments equilibrium growth rate for the Mexican economy. Two main conclusions emerge. First, the results support the extended version of Thirlwall's model (based on an alternative concept of long run equilibrium defined as a constant ratio of the current account deficit to domestic income; see Moreno-Brid, 2001) as a better predictor of Mexico's long run economic growth rather than the original model. Second, the *income elasticity of* demand for imports has increased as a result of trade liberalisation, which can explain Mexico's economic growth slowdown since the mid-1980s.

Moreno-Brid (2001), in his most complete work, estimates the original and extended balance-of-payments-constrained growth model from 1967 to 1999. The predicted growth rate of the extended model is 4.4 per cent, which is very close to the actual growth rate of 3.8 per cent. He applies the Johansen cointegration method to estimate the import equation.

The estimated income elasticity of demand for imports for that period is 1.7.[23] He includes the index of the production-weighted coverage of import licences —which takes into account the effects of trade liberalisation— in the import demand specification used to estimate π. The

[23] In earlier studies, Moreno-Brid (1998 and 1999) estimates implicitly the income elasticity of demand for imports. In other words, he divides the average annual growth rate of imports by the annual GDP growth rate. Doing this, he shows, for different periods, the following income elasticities for imports, π:

Table 1 in Moreno-Brid (1998)	1950-1975 $\pi = 0.95$	1976-1981 $\pi = 2.03$	1982-1987 $\pi = 77.15$ (sic)	1988-1994 $\pi = 6.34$	1988-1997 $\pi = 5.59$	
Table 1 in Moreno-Brid (1999)	1950-1994 $\pi = 1.29$	1950-1996 $\pi = 1.27$	1950-1981 $\pi = 1.16$	1982-1996 $\pi = 2.59$	1950-1975 $\pi = 0.95$	1976-1996 $\pi = 2.17$

value of the variable lies between zero and one (it equals zero when all licence requirements on imports have been eliminated, and it equals one when they are compulsory on every importable good or service). When the sample is divided into sub-periods (1968-1983 and 1982-1997; or, 1969-1984 and 1983-1998; or, 1970-1985 and 1984-1999) he finds that as the income elasticity of demand for imports increases, the actual growth rate decreases from one period to the other. For instance, for the first two sub-periods (1968-1983 and 1982-1997) π increases from 1.57 to 3.54, and the actual growth rate slows from 5.5 per cent to 1.6 per cent. In any case, one of his main conclusions is that π has constrained Mexico's economic growth. Table 5.11 summarises Moreno-Brid's *(2001) results.*

Table 5.11
Balance of Payments Constrained Economic Growth

Period	y_b^2	y_b^4	GDP growth rate (%)	Exports growth rate (%)	π
1967-1999	4.78	4.40	3.87	8.47	1.77
1968-1983	5.85	5.46	5.52	9.17	1.57
1969-1984	5.54	5.29	5.34	8.47	1.53
1970-1985	5.62	5.17	5.05	8.66	1.54
1982-1997	2.19	2.86	1.65	7.74	3.54
1983-1998	2.76	3.26	2.63	8.59	3.11
1984-1999	2.91	3.70	2.79	9.14	3.14

Source: Moreno-Brid (2001), from Table 4.7.

5.5.3 Effect of Trade Liberalisation on Mexico's Economic Growth

We turn now to our own estimates of the impact of trade reforms on Mexico's economic growth using Thirlwall's model. The effect of trade reforms on Mexico's GDP is measured by changes in the income elasticity of demand for imports and the rate of growth of exports. As the former has increased over time, according to previous studies, this means a negative effect of trade liberalisation on economic growth, unless offset by a faster rate of growth of exports. Thus, we estimate the long run elasticity of demand for imports using the ARDL technique,

for fourteen sub-periods.[24] We find an increase in the long run income elasticity of demand for imports. The results are presented in Table 5.12. In spite of considering different sub-periods, our results are consistent with the elasticities that Moreno-Brid (2001) estimated (see Table C4 in the Appendix).

Table 5.12
Long Run Income Elasticities of Demand for Imports
(Selected sub-periods, 1973-1999)

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

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

Notice that there is a remarkable jump in π from the period 1981-1995 to the period 1982-1996, which must be due to the increase in the rate of growth of imports in 1996 (the annual rate of growth of imports in 1995 was -15 per cent, but in 1996 was 23 per cent).

We consider the full sample and two different sub-periods to estimate the balance-of-payments-constrained growth model (equation 5.14), taking the mid-1980s trade reforms as a break point, and using different income elasticities of import demand. Table 5.13 shows the results. In each period, the estimated Harrod foreign trade multiplier is higher than the actual

[24] The specification of the import equation is very similar to equation (4.2) in Chapter 4; where imports depend on domestic income and the real exchange rate. In this case, import duties are included as a trade liberalisation indicator.

growth rate of GDP (y); for the first sub-period (1973-1985 or 1973-1986), the difference is higher than for the second sub-period (1986-1999 or 1987-1999).[25]

Table 5.13
Impact of Trade Reforms on Mexico's GDP (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.

Another point to notice is that in spite of having an increasing rate of growth of exports, π has increased as well, in part as a result of trade liberalisation (Moreno-Brid, 2001; Ocegueda, 2000), which has led to a reduction in the actual rate of growth of GDP.

The adverse effect of relative prices movements may be one explanation of the shortfall of the actual rate of growth. For instance, the sub-periods which include 1986 (1973-1986 or 1986-1999) have on average a faster deterioration than the other two sub-periods (1973-1985 or 1987-1999), see last column in Table 5.13. This is because in 1986 the negative change in the terms of trade was approximately 29.4 per cent. Also, the significant price elasticity of demand for imports (see Chapter 4), may have an adverse effect on the actual rate of growth.

[25] The estimations of the balance of payments equilibrium growth rates differ from those reported by Moreno-Brid (2001), because our rates of growth of exports are higher than the ones he presented. 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).

A formal test of whether the actual growth of a country can be predicted from its balance of payments equilibrium growth rate was 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 and y_b^2 differ significantly. Thus the hypothesis to be tested is whether or not $\pi = \pi'$. This was undertaken by estimating the *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 5.14. 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 5.14
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.

The analysis concludes with several findings. Even without considering the influence of capital flows on the balance of payments —which certainly would yield better approximations between the actual and estimated growth rates— it is shown that after the mid-1980s trade reforms the equilibrium long run rate of economic growth (y_b^2) has declined considerably,

from 6.9 per cent to 2.9 per cent (considering 1973-1985 and 1986-1999) or, alternatively, from 5.8 per cent to 3.2 per cent (1973-1986 and 1987-1999). The slowdown of Mexico's economic growth can be linked to an increase in the long run elasticity of import demand, which has not been compensated by a sustained expansion of exports. Also, the causes of the slowdown in the economy reflect the high dependence of the under-developed industrial sector on foreign trade. Trade liberalisation has reinforced such performance, promoting and facilitating access to a wide variety of imported goods. It is necessary to remember, however, that trade liberalisation was preceded by many other macroeconomic reforms (i.e. transformations in the scope and scale of the State's intervention in economic affairs), which altered Mexico's growth performance.

5.6 Conclusions

The chapter has analysed the impact of trade liberalisation on Mexico's trade balance and current account of the balance of payments, and has used a balance-of-payments-constrained growth model to evaluate Mexico's long term growth especially after the mid-1980s trade reforms. This is an area not previously researched for Mexico, but it is an important issue because trade liberalisation in goods and services may hamper Mexico's long run economic growth if imports grow faster than exports. We tried to disentangle the effects of the first episode of trade reforms, which officially was initiated in 1985, from the second period of trade liberalisation, related to NAFTA, when trade liberalisation in services was formally included.

The trade reforms launched during the mid-1980s worsened the position of the trade balance by between 14 and 18 percentage points in 1985. Although the effect is fairly small, it is

negative, showing that trade liberalisation, among other factors, contributed to a deterioration in the position of Mexico's trade sector. Regarding the effects of trade liberalisation related to NAFTA on the rate of growth of the trade balance, a negative impact is shown during the two years immediately after NAFTA was instituted. The effects of liberalisation on the current account of the balance of payments are not significant. Harrison and Hanson (1999) have argued that the fact of not seeing considerable trade liberalisation effects is because trade reforms were initiated in conjunction with real exchange depreciation, and also because Mexican firms maintained output by cutting profit margins and wages. However, the analysis here controls for changes in the real exchange rate.

Finally, our analysis was extended to compare the performance of Mexico's long run economic growth before and after trade reforms; and, we also compare our results with previous studies (Moreno-Brid, 2001). The findings corroborate that the long run income elasticity of demand for imports has increased over time; the change is most likely linked to trade reforms. The increase in the income elasticity of demand for imports, which has not been compensated by a higher rate of growth of exports, has contributed to the slowdown of Mexico's long run equilibrium growth rate.

Appendix D

Table D1
OLS Estimation for the Trade Balance: 1980-2000

Dependent variable: the Trade Balance Rate of Growth (*tb*)				
Regressor	Equations			
	D1.1	*D1.2*	*D1.3*	*D1.4*
ym	-2.14 (-2.30)*	-2.07 (-2.17)*	-2.24 (-2.20)*	-2.01 (-1.85)**
yus	2.55 (2.53)*	2.79 (2.59)*	2.43 (1.91)**	2.88 (1.91)**
p	0.70 (3.03)*	0.68 (2.89)*	0.67 (4.48)**	0.69 (2.48)*
tot	-0.13 (-0.40)	-0.23 (-0.62)	-0.16 (-0.45)	-0.22 (-0.56)
lib85		-0.03 (-0.65)		-0.03 (-0.60)
lib94			0.01 (0.21)	0.00 (0.09)
R^2	*0.69*	*0.70*	*0.69*	*0.70*
Durbin Watson	*1.95*	*2.01*	*1.92*	*2.02*
Diagnostic Tests				
Serial Correlation	*0.970*	*0.955*	*0.931*	*0.940*
Functional Form	*0.662*	*0.469*	*0.766*	*0.401*
Normality	*0.015*	*0.055*	*0.011*	*0.070*
Heteroscedasticity	*0.611*	*0.578*	*0.602*	*0.580*

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level and the double asterisk (**) denotes significance of the coefficient at the 10 per cent level. The diagnostic tests show probabilities.

Table D2
OLS Estimation for the Trade Balance: 1980-2000

Dependent variable: Trade Balance Rate of Growth (*tb*)							
	lib94		*lib95*		*lib96*		
Regressor	D1.1	D1.2	D1.3	D1.4	D1.5	D1.6
Constant	0.19 (1.57)	0.19 (1.49)	0.10 (1.21)	0.19 (1.45)	0.12 (1.43)	0.18 (1.43)
ym	-3.87 (-2.74)*	-3.86 (-2.61)*	-3.33 (-2.53)*	-3.87 (-2.64)*	-3.85 (-2.82)*	-4.14 (-3.05)*
yus	-0.60 (-0.27)	-0.60 (-0.25)	0.31 (0.15)	-0.62 (-0.26)	-0.15 (-0.07)	-0.79 (-0.34)
p	0.23 (0.63)	0.23 (0.60)	0.42 (1.31)	0.23 (0.60)	0.38 (1.26)	0.24 (0.65)
tot	-0.02 (-0.07)	-0.02 (-0.06)	-0.01 (-0.03)	-0.03 (-0.08)	0.02 (0.07)	0.10 (-0.28)
lib86	-0.07 (-1.01)	-0.07 (-0.89)		-0.07 (-0.86)		-0.05 (-0.61)
lib94, lib95, lib96		-0.00 (-0.17)	0.03 (0.45)	-0.00 (-0.03)	0.08 (1.13)	0.04 (0.77)
R^2	0.74	0.74	0.72	0.74	0.74	0.75
Durbin Watson	2.18	2.18	1.93	2.18	1.94	2.13
Diagnostic Tests						
Serial Correlation	0.648	0.641	0.969	0.635	0.983	0.676
Functional Form	0.778	0.776	0.875	0.835	0.840	0.817
Normality	0.288	0.287	0.030	0.284	0.034	0.248
Heteroscedasticity	0.264	0.266	0.317	0.251	0.268	0.212

Notes: Values in parenthesis correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. The diagnostic tests show probabilities.

Table D3
OLS Estimation for the Trade Balance: 1980-2000

Dependent variable: Trade Balance Rate of Growth (*tb*)					
	lib94		*lib95*		*lib96*
Regressor	D2.1	D2.2	D2.3		D2.4
Constant	0.25 (1.69)	0.26 (1.61)	0.22 (1.51)		0.27 (1.97)
ym	-4.30 (-2.80)*	-4.31 (-2.71)*	-3.90 (-2.71)*		-4.74 (-3.20)*
yus	-1.61 (-0.61)	-1.61 (-0.59)	-0.86 (-0.36)		-1.56 (-0.71)
p	0.08 (0.18)	0.07 (0.17)	0.21 (0.57)		0.16 (0.47)
tot	0.16 (0.44)	0.20 (0.47)	0.21 (0.47)		0.36 (0.86)
lib87	-0.11 (-1.20)	-0.12 (-1.12)	-0.09 (-0.98)		-0.12 (-1.35)
lib94, lib95, lib96		-0.01 (-0.22)	-0.01 (-0.20)		0.02 (0.27)
R^2	0.74	0.74	0.74		0.77
Durbin Watson	2.14	2.15	2.14		2.22
Diagnostic Tests					
Serial Correlation	0.734	0.719	0.748		0.609
Functional Form	0.829	0.707	0.908		0.286
Normality	0.268	0.228	0.173		0.204
Heteroscedasticity	0.247	0.282	0.266		0.366

Notes: Values in parentheses correspond to "t"-statistics. The asterisk (*) for the "t" statistics denotes significance of the coefficient at the 5 per cent level. The diagnostic tests show probabilities.

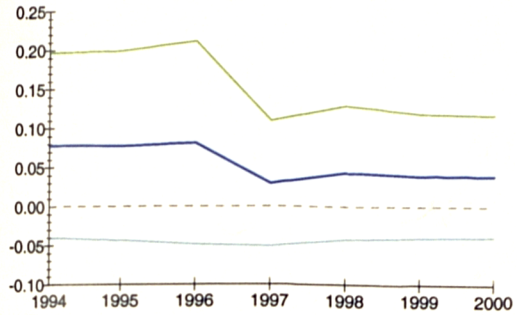
Table D4
Rolling Regressions for Current Account of the Balance of Payments
(window size 14)

Dependent variable: *ca*							
Regressor	1981-94	1982-95	1983-96	1984-97	1985-98	1986-99	1987-00
Constant	0.14 (2.31)*	0.11 (1.66)	0.10 (1.56)	0.08 (1.24)	0.05 (1.18)	0.05 (1.18)	0.05 (1.36)
ym	-4.59 (-4.58)*	-4.17 (-3.47)*	-4.00 (-3.10)*	-1.48 (-1 64)	-1.52 (-1.87)	-1.50 (-2.01)*	-1.61 (-2.24)*
yus	0.82 (0.65)	0.65 (0.44)	0.72 (0.45)	0.86 (0 86)	0.40 (0.32)	0.71 (0.63)	0.51 (0.45)
p	0.21 (1.09)	0.08 (0.36)	0.09 (0.35)	0.44 (2.36)*	0.44 (2.54)*	0.44 (2.77)*	0.37 (2.09)*
tot	0.53 (1.99)	0.30 (1.14)	0.29 (1.09)	0.12 (0 73)	0.13 (0 81)	0.13 (0.87)	0.33 (1.11)

Note: The asterisk (*) denotes significance at the 5 per cent.

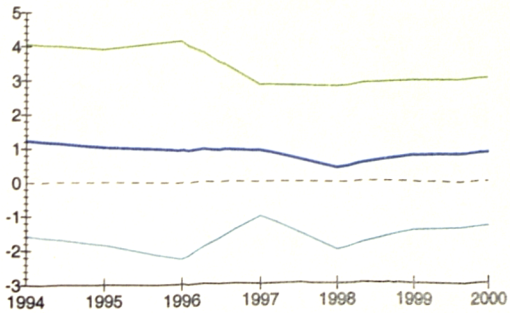
Graph D1
Rolling Coefficients for Current Account of the Balance of Payments

Coefficient of *Constant* and its two S.E. bands based on rolling OLS



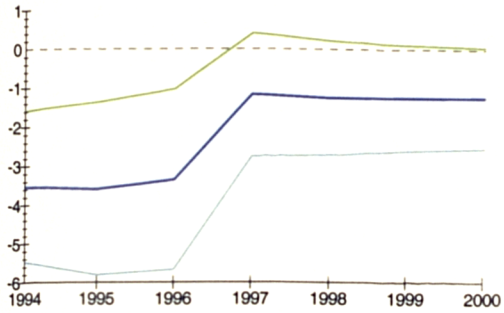
(a)

Coefficient of *yus* and its two S.E. bands based on rolling OLS



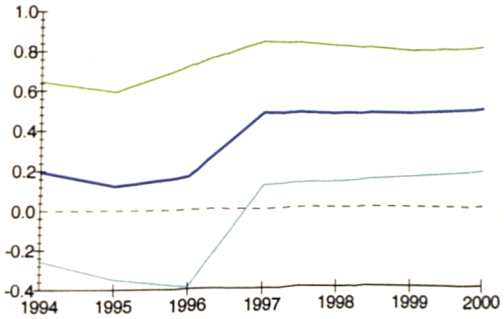
(c)

Coefficient of *ym* and its two S.E. bands based on rolling OLS



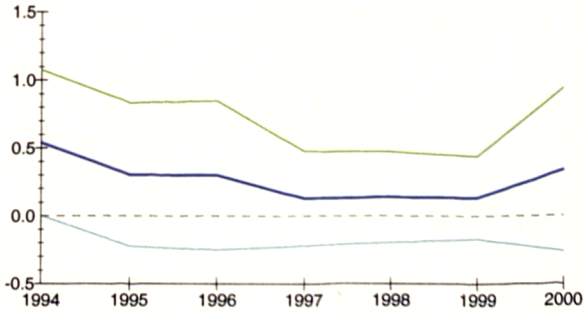
(b)

Coefficient of *p* and its two S.E. bands based on rolling OLS



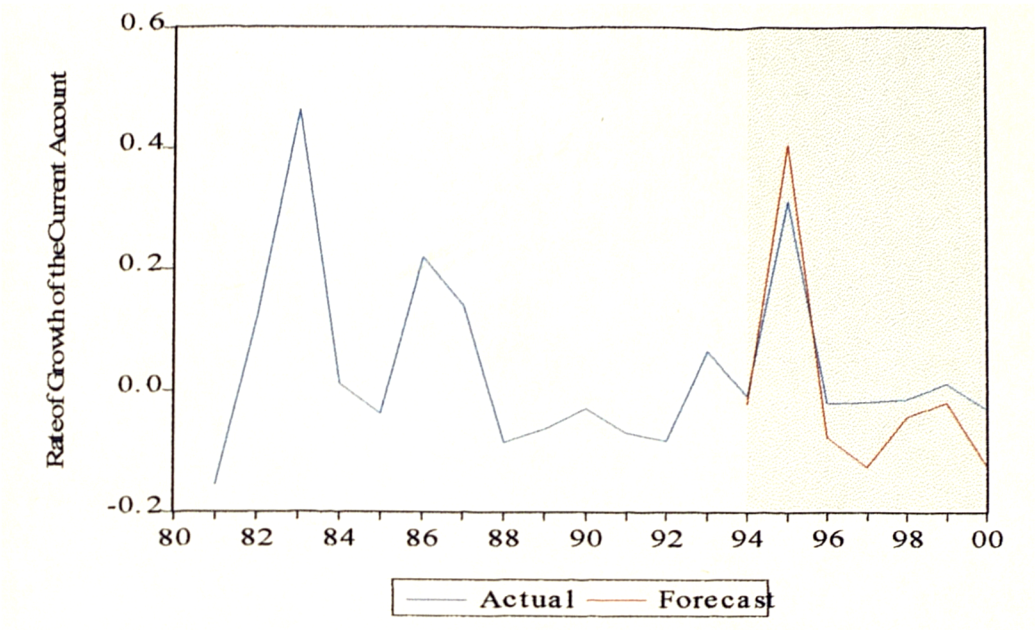
(d)

Coefficient of *p* and its two S.E. bands based on rolling OLS



(e)

Graph D2
Actual and Single Equation Static Forecast for the Current Account of the Balance of Payments



Forecast Evaluation	
Root-mean square error	0.069603
Theil inequality coefficient	0.239169
Bias proportion	0.235997
Variance proportion	0.648081
Covariance proportion	0.115952

Table D5
ARDL (1,0,0,0) Long Run Coefficients and Error Correction Model for the Current Account of the Balance of Payments

$LBP = -19.51 - 1.38LYM + 2.25\ LYUS + 0.62\ LP - 0.03\ lib94$	Long Run Model	(5.7'')
t-statistic (-5.66)* (-2.38)* (6.22)* (3.08)* (-0.44)		
$bp = -17.86 - 1.26\ ym + 2.06\ yus + 0.57\ p - 0.02\ lib94 - 0.91\ ecm_{-1}$	ECM	(5.8'')
t-statistic (-4.31)* (-1.97) (3.56)* (4.06)* (-0.44) (-6.09)*		

Table D6
Income Elasticities of Demand for Imports

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

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

Chapter 6

Impact of Foreign Direct Investment on Exports and Imports

6.1 Introduction

In order to have a better understanding of the relationship between liberalisation and trade structure, it should be taken into account not only the impact of trade liberalisation on exports, imports and the trade balance but also the role played by foreign direct investment (FDI) deregulation and the existence of linkages between FDI, exports and imports. FDI inflows have increased dramatically over the past decade throughout the world. Most of this increase has occurred in the industrial countries, while in the developing countries, it has been heavily concentrated among a small number of countries. Among continents, Latin America and the Caribbean has been the second largest recipient of FDI, surpassed only by Southeast Asian countries. In 2001, Latin America and the Caribbean countries received approximately 41.6 per cent of total FDI inflows to developing countries (UNCTAD, 2002a). Although most of the countries in this region have attracted FDI, it has mainly been concentrated in four countries: Argentina, Brazil, Chile and Mexico. From 1995 to 2001, these countries received approximately 80 per cent of FDI inflows to the region (ECLAC, 2002).

In particular, Mexico has been successful in attracting FDI inflows, simultaneously as its trade has increased. In 2001, it was the largest FDI recipient in Latin America (UNCTAD, 2002a); and, at the same time, it became the second largest trading developing country in the world (WTO, 2001), where nearly two thirds of the country's exports were from

foreign multinational corporations (MNCs)[1] (UNCTAD, 2002a). Thus, FDI and trade appear to be not merely complementary, but increasingly inseparable as two sides of the coin of the process of economic integration (Ruggiero, 1996).

The rapid increase in FDI has occurred in the context of reductions in barriers to foreign investment. In fact, since the late 1980s, in the expectation that FDI will promote economic development by raising exports and employment, and through knowledge spillovers —because MNCs are associated with more competitive technology, better management techniques and better skills in the international market— the Mexican government has been lowering entry barriers to attract investments from MNCs.[2] As shall become apparent from our analysis, the increment of FDI in the 1990s has facilitated the enlargement and empowerment of MNCs, and also the integration of a few selected industries into the North American market.

Specifically, MNCs looked for four principal benefits in Latin America during the 1990s: increased access to natural resources, greater access to markets for manufactures, new access to markets for services, and improved efficiency of their international systems of integrated production (Mortimore, 2000).[3] Particularly in Mexico, the aim was to

[1] As considered by Markusen (1995), MNCs are firms engaged in FDI —defined as investment in which the firm acquires a substantial controlling interest in a foreign firm or sets up a subsidiary in a foreign country.
[2] Blomström and Kokko (2003) argue that investment incentives aiming to increase the potential for spillovers may be inefficient unless they are complemented with measures to improve the local learning capability and to maintain a competitive local business environment.
[3] There is a vast literature which discusses the determinants of FDI into developing countries. For instance, UNCTAD (1996) highlights that the most important factors determining the surge of FDI into developing countries have been privatization, the globalisation of production, and increased economic and financial integration. De Mello (1997) suggests that country-specific institutional determinants of FDI, trade and policy regimes, combined with the existing factor endowments of the host country, determine FDI flows. Besides these factors, Chankraborty and Basu (2002) argue that the degree of political stability, the nature of government policy, investment regimes, the openness of the host country and the size of the market are possible determinants of FDI flows. Blomström (2002) points out that there are strong economic fundamentals to attract FDI, such as the various incentives offered by the government, market characteristics, relative production costs and resource availability. Gleason *et al.* (1999) claim that privatisation has been a primary force in spurring significant FDI in Latin America and the Caribbean. See Ramírez, (2002) for the particular case of Mexico.

restructure the existing MNCs' operations and to convert them into an export platform, as has been the case in the automobile industry. In other words, it is recognised that the main motivation for foreign investors to locate operations in Mexico is to take advantage of Mexico's location in order to serve the whole North American market rather than to serve the domestic market by itself (Agosin and Prieto, 1993; Twomey, 1996; FitzGerald, 1999; Graham and Wada, 2000; Sargent and Matthews, 2001). Additionally, the cheap labour in Mexico is another determinant that attracts US FDI flows to the country (Love and Lage-Hidalgo, 2000).[4] These factors explain why Mexico is among the world's largest recipients of FDI inflows and that, on average, more than 60 per cent of Mexico's FDI inflows come from the US.

The effects of FDI can be far reaching, with evidence suggesting that FDI impacts significantly on efficiency, employment, factor prices and trade.[5] For the particular case of Mexico, diverse studies have focused on the impact of FDI on labour productivity (Blomström and Persson, 1983; Blomström, 1988), wages (Feenstra and Hanson, 1997), and growth (Ramírez, 2000; Griffiths and Sapsford, 2003). However, and despite the important growth experienced by both FDI and trade, the effects of FDI on exports and imports have not been extensively explored. Although the question of causality linkage between FDI and exports has been investigated very recently (Alguacil *et al*, 2002), the causality linkage between FDI and imports, considering the post-NAFTA period, has not been studied at all.

[4] Cimoli and Correa (2002), argue that Mexico and the Central American countries have greatly globalised their manufacturing and assembly activities based on cheap labour.

[5] See Markusen (1995) for a survey of the literature. Additionally, he presents six macro facts from studies that use aggregated data and six micro facts used from studies that use industry and firm-level data to support the tied relationships between the theory and empirical evidence.

The aim of this chapter is to examine the process of liberalisation of FDI, as well as the relationship between FDI inflows, exports and imports in Mexico; specifically, the direction of causality between FDI and exports on the one hand and FDI and imports on the other. We will try to investigate how the deregulation of FDI and trade has facilitated intra-firm trade, which presumably allows greater freedom to MNCs to locate in the country, which subsequently may have an impact on the volume of trade —exports and imports.

The remainder of this chapter is structured as follows. Section two examines the liberalisation process of FDI as a result of the modifications in the legislation that regulates FDI in Mexico, which will allow us to have a better understanding of the FDI figures registered during the 1990s; it also presents a descriptive analysis of the performance of FDI in Mexico during the last three decades, focusing on the post-1994 figures at a disaggregated level. Section three reviews some theoretical arguments concerning the relationship between FDI and trade. Section four reviews the empirical literature related to the analysis of FDI and trade. As China has recently experienced a rapid increase in FDI inflows and trade, it is not surprising that many of the empirical studies refer to this country. Section five describes the methodology and the data used for the Granger causality analysis between FDI and exports, and between FDI and imports. The results are discussed in section six. Finally, the concluding section contains a critical evaluation of the results from the perspective of the interests of Mexico's trade and development.

6.2 Performance of FDI in Mexico

i. FDI liberalisation

Mexico has for some time been a large recipient of FDI inflows, which became possible through the liberalisation of foreign investment and other market-oriented reforms which the country adopted in the mid-1980s.[6] The deregulation of the *Foreign Investment Law* (FIL) has gradually reduced the range of activities reserved for the State or Mexican citizens. In particular, the reforms of 1989 and 1993 attempted to make the FIL compatible with NAFTA.[7] Additionally, amendments to the FIL in 1995, 1996, 1998, 1999 and 2000 have led to a major participation of FDI in Mexican economic activity.

From the evolution of the FIL the most relevant issues must be pointed out. Mexico's first formal statute to regulate, systematise and codify the rules and legal principles on investment was the *Law to Promote Mexican Investment and to Regulate Foreign Investment* of 1973. In this *Law*, foreign investors were required to seek authorisation from officials; FDI was prohibited in services; financial restrictions included limits on the repatriation of capital; and, foreign firms did not have access to the national financial market. In 1989, the *Law* had a major relaxation, which was part of a set of market-orientated reforms designed to open the economy to greater foreign participation, specifically from the US.[8] Additionally, "In October 1989, a new framework agreement was signed to start global conversations to facilitate trade and investment" (Aspe, 1993).[9]

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[6] Refer to Trevino *et al.* (2002a) and Trevino *et al.* (2002b). In these studies the authors analyse the effects of market-oriented reforms on FDI inflows into Latin American countries.

[7] Graham and Wada (2000) argue that the reforms to the FIL in 1989 were not related to NAFTA. We disagree with them, because, as we will show later, the reforms in 1989 and 1993 were orientated to achieve a far-reaching trade and investment agreement, such as NAFTA.

[8] It is useful to remember that in mid-1989, Mexico signed the so-called Brady Plan, to reduce its medium and long term debt. Also, in 1989, the IMF signed an Extended Fund Facility, and the World Bank and the Inter-American Development Bank increased their lending substantially (Lustig, 2001).

[9] Aspe was the Minister of Finance from 1988 to 1994. He mentions that in 1987 Mexico and the US signed a framework agreement to set up principles and procedures for resolving controversies on trade and investment. Later on, 11 June 1990, President Salinas (1988-1994) decided to instruct his Ministers to start working on a free trade agreement with the US.

Particularly, in the case of the car industry, under the pressure of MNCs, the domestic content rules were relaxed in 1989 by means of two decrees (*Decreto para el Fomento del Sector Auntomotriz* and *Decreto para el Fomento y Modernizacion de la Industria Manufacturera de Vehiculos de Autotransporte*).[10]

A new FIL was enacted in December 1993, which derogated the *Law to Promote Mexican Investment and to Regulate Foreign Investment* of 1989. The FIL of 1993 further reduced the number of activities in which foreign participation was forbidden or restricted. It divided restrictions on foreign investment into four categories: (i) activities that are reserved for the Mexican State and in which neither foreign nor Mexican private investment may participate (i.e. minting coins, printing of bank notes, electricity, oil); (ii) activities that are reserved exclusively for Mexican nationals and Mexican companies that exclude foreigners; (iii) activities in which foreign investment may participate up to a prescribed percentage (10 per cent, 25 per cent, 30 per cent or 49 per cent, depending on the activity); and (iv) activities in which foreign participation may exceed 49 per cent with prior approval from the Mexican Foreign Investment Commission —the official institution in charge of promoting foreign investment. Investment in any activity which does not fall within the above categories is not restricted (FIL: *Ley de Inversión Extranjera*, 1993).

The FIL of 1993 included the necessary adjustments to make it compatible with the NAFTA. NAFTA's investment provisions are meant to contribute to a less discriminatory investment environment among its members, but they also reflect the protectionist demands of several powerful industries.[11] NAFTA includes in Chapter 11 the investment

[10] See Moreno-Brid (1994) for a detailed analysis of the automobile industry in Mexico.
[11] See Gestrin and Rugman (1994) for a detailed analysis of NAFTA's investment provisions.

provisions which are aimed at creating greater investment opportunities between Canada, Mexico and the US. This chapter outlines the basic rules for the treatment of FDI and the resolution of disputes between investors and States. Chapter 14 includes investment issues related to financial services. In essence, NAFTA guarantees favourable conditions for investors within the region "each Party shall accord to investors of another Party treatment no less favourable than that it accords ... to its own investors..." (Article 1102).[12] Even more, FDI from Canada and the US has preferential treatment (Article 1103), which means that higher FDI amounts are allowed for NAFTA member countries than for any others. On the other side, however, NAFTA provides preferences for FDI in automobiles (Annex 300 A: Trade and Investment in the Automotive Sector)[13] and apparel (Annex 300 B: Textile and Apparel Goods).

Let us consider the auto industry to show how the Mexican authorities have modified the regulations in order to facilitate US MNCs entry. The *maquila* program in combination with the Mexican national automobile policy —had the main aim to adapt the automobile industry to a new strategy based on the liberalisation of the domestic market (Moreno-Brid, 1994)— reduced costs in the assembly of labour-intensive auto parts, which facilitated the implementation of export-oriented plants.[14] Later, the Mexican government facilitated, by means of NAFTA, the establishment of new corporate strategies of US auto MNCs in Mexico. The Mexican authorities permitted the assembly of "export models" that incorporated higher levels of imported components —70 per cent as compared to 40 per cent for models sold in the national market— (Mortimore, 2000). Hence, behind the

[12] See Eden (1996) for an analysis of the effects of the norm of national treatment.
[13] According to Mortimore (2000) the links between FDI and trade of auto MNCs operating in Mexico became one of Mexico's principal means of integration into the international economy.
[14] For instance, in 1998 automobile exports relative to the production of the 4 biggest auto MNCs was 68 per cent (see Table E1 in the Appendix).

huge increase of FDI in the Mexican automobile industry, there were the legal terms which hindered integration of this industry with the local sectors.

As Arestis and Paliginis (1996) analyse, the creation of NAFTA has effectively removed the ability of the Mexican State to intervene and protect the indigenous industry. In the end, as these authors argue, whether a country will benefit from the operation of MNCs depends on the national control exercised over them, the value-added in MNCs products and the linkages of MNCs with the domestic investment. All these three conditions have been absent from the operation of MNCs in Mexico. Additionally, Mexico's trade-investment policies are relatively constrained by the Agreement on Trade-Related Investment Measures (TRIMs), which is one of the agreements of the 1986–94 Uruguay Round negotiations, signed at the Marrakesh ministerial meeting in April 1994, whose results came into force in January 1995 (WTO, 1994d). This agreement is based on the assumption that certain investment measures restrict and distort trade. Therefore, it prohibits countries from using trade-related investment measures (e.g. local content requirements, trade balancing requirements, etc.), which are considered inconsistent with the provisions of GATT 1994 on national treatment (Article III) and those forbidding the use of quantitative restrictions (Article XI).[15] The phasing-out period for developed countries was two years from 1 January 1995; developing countries had a transition period of 5 years; and, least developed countries had seven years.[16]

Continuing with the liberalisation process of the FIL, it is relevant to mention that one of the most extensive amendments to the FIL was realised in January 1999, when the majority of financial services were liberalised. The government allowed 100 per cent of

[15] Refer to GATT 1994 (WTO, 1994b).
[16] In 2001, Mexico requested and obtained an extension for the elimination of its WTO- inconsistent TRIMs in the automotive sector.

FDI in the financial sector, particularly in banks; as well, railroad services and gas distribution were entirely deregulated.[17]

In addition to the changes in the FIL, it is important to highlight that in 1994 the Mexican government changed the definition of FDI data, with the intention of equalising it with that of the IMF and OECD. Before 1994, FDI included notified and authorised FDI to the National Foreign Investment Registry Office, which did not necessarily coincide with actual or realised investment (i.e. firms could have asked for authorisation of FDI without actually investing). Since 1994, FDI refers to realised new investment which includes: 1) amounts reported to the National Foreign Investment Registry Office; 2) provision of capital for new companies; 3) foreign investor trust-funds; 4) transfers of stock from nationals to foreigners, 5) imports of capital assets (fixed assets) by *maquiladora* firms; 6) ploughing back of profits by FDI firms; and, 7) the amounts involved in accounts between companies (debts and loans between parent companies). Prior to 1994, FDI data were only available for the first three categories (INEGI and Secretaria de Economía).

The modifications and amendments to the legal investment framework in Mexico were orientated towards trade and investment integration mainly between the US and Mexico (Blomström and Kokko, 1997). Therefore, the arguments which pretend to isolate the institutional changes after the mid-1980s from those made to achieve NAFTA are short-sighted. As we mentioned before, the argument of Graham and Wada (2000) that the reforms of the FIL were not related to NAFTA is groundless.

[17] For instance, activities like transport for passengers and management of coach stations were ruled by the following schedule: after 18th December 1995 FDI was restricted to participate below 49 per cent; after 1st January 2001 total FDI could reach 51 per cent of the total investment; and, from 1st January 2004 FDI can be 100 per cent of total investment without approval of the National Commission on Foreign Investment.

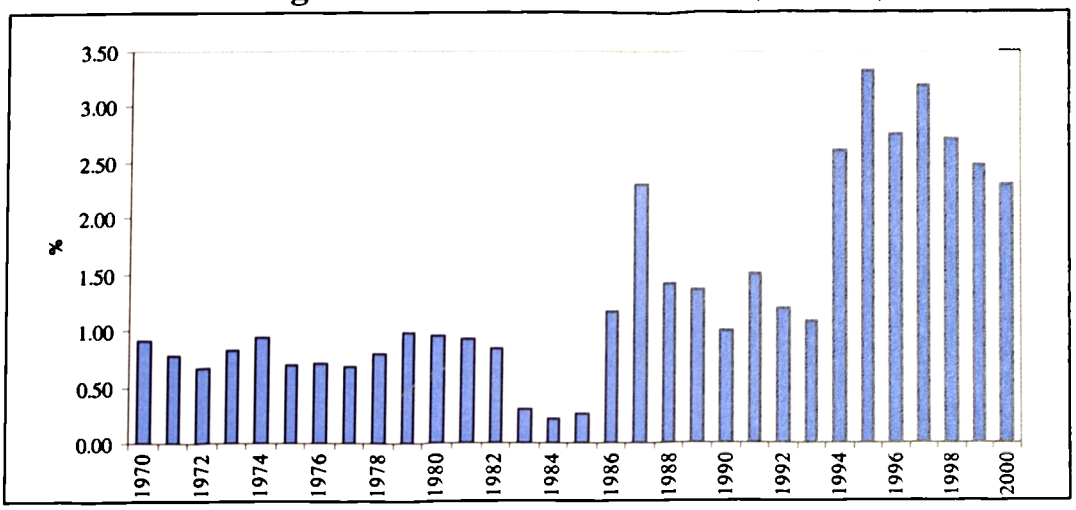
Beyond the amendments to the FIL, and the preferences for the North American investment given by the NAFTA agreement, it is necessary to mention that in order to promote foreign investment and to diversify the origin of FDI, the Mexican government has subscribed to several bilateral foreign investment agreements, mainly with European or Latin American countries. Mexico has bilateral investment treaties with Spain (1997), Switzerland (1998), Argentina (1998), the Netherlands (2000), Denmark (2000), France (2001), Finland (2001), and Portugal (2001); and has unfinished agreements with: Austria, Belgium and Luxemburg, Cuba, Germany, Greece, Italy, South Korea, Sweden, and Uruguay (Secretaría de Economía).

ii. FDI performance

The above analysis of FDI liberalisation gives a better understanding of the FDI figures, especially those from the 1990s. Over recent decades, the performance of FDI in Mexico has changed noticeably. During the 1970s, FDI relative to GDP was more or less stable, averaging 0.80 per cent of GDP, but it has increased over time, especially during the 1990s. FDI inflows as a percentage of GDP rose from 0.94 per cent in 1980 to 1.1 per cent in 1993; and, from 1994 to 2000 it rose, on average, 2.7 percentage points (see Graph 6.1), although the high post-1994 figures cannot all be attributed to NAFTA because of the change in the definition of FDI in 1994.[18] This significant detail has not been identified by previous studies which have analysed FDI in Mexico and presented econometric results (e.g. Cuadros *et al.*, 2001; Alguacil *et al.*, 2002; Griffiths and Sapsford, 2003).

[18] We compared FDI inflows to Mexico from five different data sources: two local (Secretaria de Economía and INEGI) and three international (UNCTAD, World Bank and IMF). The Mexican sources mention that due to the modification in the components included in FDI definition, no comparison before and after 1994 is accurate. As international data sources regularly collect published and unpublished national official FDI data directly from central banks, statistical offices or national authorities, the remarkable increment of FDI inflows since 1994 shows the change in the definition.

Graph 6.1
Foreign Direct Investment Inflows (% of GDP)

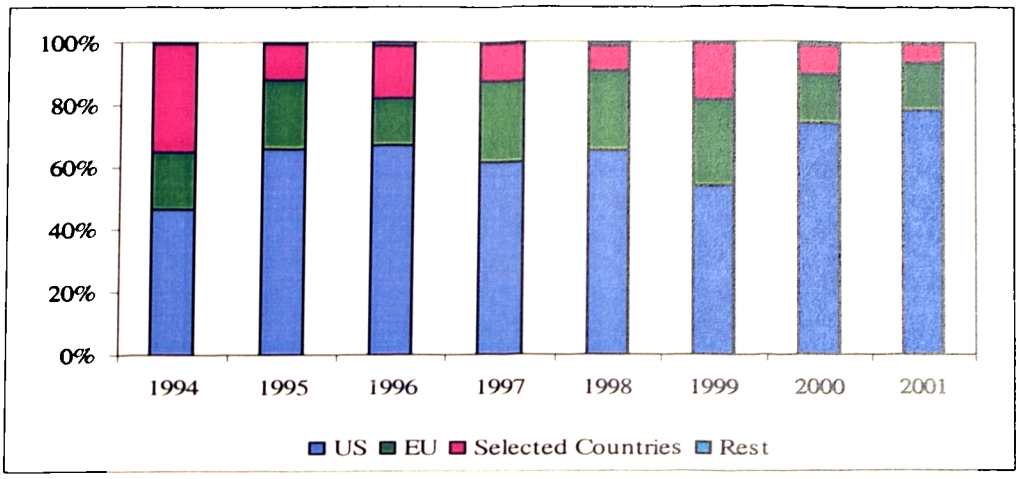


Note: There are three components in FDI: equity capital, reinvested earnings and intra-company loans.
Source: World Development Indicators (2002).

Referring to the sources of FDI, trends have been relatively stable. The US is the main source of FDI in Mexico, followed by countries of the European Union (EU). Two main changes have taken place since NAFTA was initiated. First, the US share has increased from 46 per cent in 1994 to 78 per cent in 2001. Second, the share of some EU countries, such as the United Kingdom and Germany, has fallen; while the share in others, like Spain and Holland, has increased during this period. The FDI participation of other countries (i.e. Japan, South Korea, Switzerland, etc.) has drastically decreased (see Graph 6.2). These tendencies show the interest of US firms in investing in Mexico, given the context provided by NAFTA, the geographical situation, low labour costs and less strict environmental regulations.[19]

[19] In 1994, the average hourly wage in manufacturing in Mexico was $2.1 and in US $12; such wage differential remains after seven years. In 2001, the average wage in manufacturing in Mexico was $2.5 and in US $14.8.

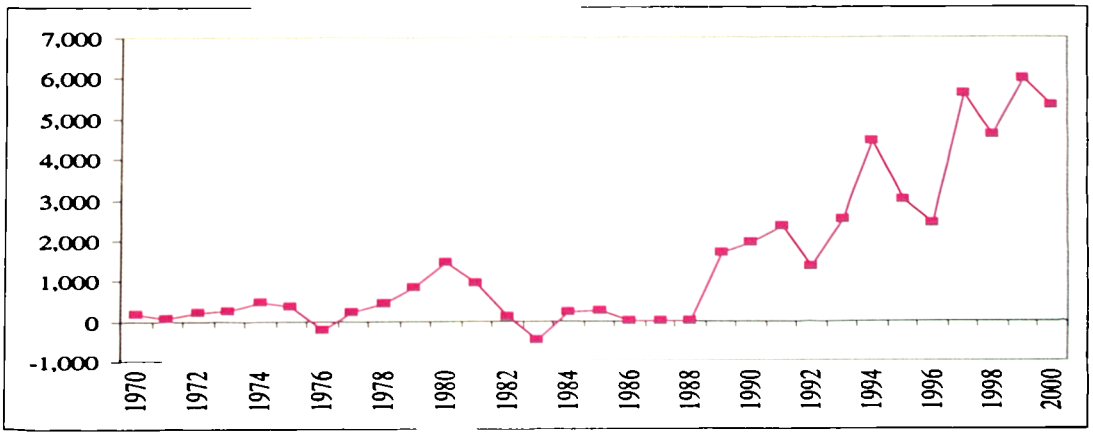
Graph 6.2
Foreign Direct Investment by Country of Origin, 1994-2000



Source: Secretaría de Economía.

Graph 6.3 shows in particular the performance of US investment in Mexico from 1970 to 2000. Notice that US FDI in Mexico during the 1970s and 1980s shows a steady performance, although with a few peaks; however, there is a clear rising trend post-1988, when presumably US investors responded quite strongly to the first round of reforms. Thus, the timing and changes in the US investment position suggest that the important stimulus of the upswing in the US investment in Mexico must have been the comprehensive trade and financial liberalisation that commenced in the mid-1980s, continued in the late-1980s and eventually peaked with the NAFTA.

Graph 6.3[a]
US Direct Investment Flows to Mexico, 1970-2000, (US$ millions)



Note: [a] Capital flows to Mexico are defined as equities, inter-company debt, and reinvested earnings. FDI with a negative sign suggests that at least on of the three components is negative and it is not compensated by the positive components.
Source: US Department of Commerce.

However, the US Department of Commerce has changed the methodology and presentation for US direct investment abroad in 1977, 1982 and 1994. These changes may or may not apply to direct investment in Mexico. For instance, Graham and Wada (2000) claim that the drop in the US FDI to Mexico in 1982 is due to a recalibration of the data and not an actual withdrawal of foreign investors. In general, given the changes in either the way to compile or present FDI data by local and international sources it would be necessary to take any econometric results with extreme caution, independently of the data source selected.

Mortimore (2000) suggests a very persuasive hypothesis related to the increase of US FDI in Latin America (mainly allocated in the apparel industry), including Mexico (where the majority of FDI is allocated in the automobile industry), during the 1990s. He claims that US investors were trying to win back North American market shares from Asian MNCs. Beyond this aim of US MNCs, he also mentions that a particular characteristic of the FDI orientated to those sectors "tends to result in export platforms which possess little contact with the host economy, thereby truncating or limiting the national industrialization process" (Mortimore, 2000). In fact, MNCs in Latin America attempt to gain efficiency by setting up new operations or restructuring their existing operations; but they do not invest to develop new technologies, which is an activity more common in developed countries.[20]

By focusing on the sectoral destination of FDI flows into Mexico, it can be discerned that they have been primarily channelled to the manufacturing sector (see Table 6.1).

[20] Since 2000, MNCs have closed subsidiaries in Mexico, especially *maquiladora* firms (Authers and Silver, 2003; Zuñiga and Valdez, 2002; Zuñiga and Amador, 2002) because they find greater comparative advantages in other countries (e.g. China). In Mortimore's words "...if local exchange rate appreciated, or wage and social security costs increased substantially, or transportation or infrastructure problems arose in any particular site, the headquarter corporation could adapt by closing local assembly line and adding another one in a more convenient location."

Table 6.1
Foreign Direct Investment by Sectors, 1994-2000, (Millions of US$)

Sectors	1994	1995	1996	1997	1998	1999	2000	2001	1994-2001	
									Value	Share (%)
Total	10,640	8,325	7,702	12,112	7,986	12,767	15,318	25,221	74,850	100.0
Agriculture	11	11	32	10	29	81	88	5	266	0.4
Extractive	98	79	84	130	42	127	181	33	775	1.0
Manufacturing	6,187	4,849	4,706	7,281	5,022	8,732	8,824	4,791	50,392	67.3
Electricity and Water	15	2	1	5	27	140	117	248	554	0.7
Construction	259	26	26	110	83	129	168	72	874	1.2
Commerce	1,251	1,008	725	1,899	937	1,156	2,165	1,533	10,675	14.3
Transport and Communication	719	876	428	686	374	256	2,458	2,864	3,745	5.0
Financial Services	941	1,066	1,214	1,087	708	714	4,586	13,571	23,889	31.9
Other Services	1,158	407	486	903	763	1,432	1,647	2,104	8,901	11.9

Source: Secretaría de Economía.

From 1994 to 2001 this sector accounted for 67.3 per cent of total FDI inflows. Recently, the deregulation of services in transport and telecommunications has attracted huge FDI inflows.[21] For instance, in 1999 this sector received only 256 millions of US$, and the following year it registered 2,458 millions of US$. The financial services sector has also expanded significantly; the average share during 1994-2001 was 32 per cent of total FDI. In 2001, particularly as a result of the liberalisation of the financial sector by the changes in the FIL in 1999, Mexico received the largest foreign investment ever made. The acquisition of *Banco Nacional de México* (BANAMEX was the biggest commercial bank in Mexico) by Citicorp, the US financial group, represented more than 50 per cent of the FDI in 2001 (UNCTAD, 2002a).[22] The other sectors have a relatively low proportion of FDI. For instance, the agriculture sector has the lowest share of FDI, only 0.4 per cent.

Table 6.2 shows the participation of FDI, on average from 1994 to 2001, in the manufacturing sub-sectors. The Machinery and Equipment sub-sector has received the highest share of FDI, 48 per cent (automobiles and auto-parts are included in this sub-

[21] Also, the increase of FDI includes major privatisations, such as TELMEX (*Teléfonos de México*).
[22] Since 1994, the amendments to the FIL have attracted investments by a large number of financial groups including Citicorp (Citibank) of the US; Bank Bilbao-Vizcaya and Bank Santander of Spain; and, Bank of Montreal of Canada. In spite of new investments and their consequent benefits (i.e. modernisation of the banking sector), the availability of credit is still very limited due to the restricted monetary policy, which is focused on controlling the inflation to make it comparable to the other two NAFTA members.

sector); followed by the Food Products, Beverages and Tobacco sub-sector with 19 per cent.[23] The Wood Products sub-sector has the lowest FDI share, 0.4 per cent.

Table 6.2
Participation of FDI in the Manufacturing Sub-Sectors, 1994-2001

Sector	FDI[a] (%)	Firms with FDI	
		Number	%
Food Products, Beverages and Tobacco	18.9	577	8.0
Textiles and Leather Products	3.8	1,034	14.4
Wood Products	0.4	214	3.0
Paper Products, Printing and Publishing	2.0	393	5.5
Chemical Substances	12.9	1,169	16.3
Non Metallic Products	1.3	192	2.7
Basic Metals	5.1	157	2.2
Machinery and Equipment	47.9	2,818	39.3
Other Manufactures	7.8	625	8.7

Note Original data in US$
Source Own calculations based on data from Secretaría de Economía.

Table 6.2 also shows the number of firms in the manufacturing sub-sectors which receive FDI and the percentage that it represents. The majority of the firms with FDI are in three sub-sectors: the Machinery and Equipment (2,818 firms), the Chemical Substances (1,169 firms), and the Textiles and Leather Products (1,034 firms).[24] In spite of the relatively large number of firms in the Textile and Leather Products sub-sector, 14.4 per cent of all the firms with FDI in the Manufacturing sector, it only accounts for 3.8 per cent of FDI inflows.[25]

Finally, it is relevant to mention the contribution that FDI makes to Mexican exports. For instance, in 2000 the top 35 MNCs, most of them from the US, exported 30 per cent of total Mexican exports (see Table E2 in the Appendix). Further, and perhaps a more relevant result derived from FDI inflows, from 1995 to 2000, Mexico occupied top

[23] Máttar *et al.* (2002) mention that FDI has a strong presence in the Food, Beverages and Tobacco sub-sector, as a result of purchases of national enterprises and from added investment by MNCs already established in Mexico (i e PepsiCo., Nestlé and Coca-Cola).
[24] In fact, this is the main reason that explains why most of the studies that refer to FDI in Mexico focus on the particular development of two industries: automobiles (Dussel, 2000a; Mortimore, 2000; Máttar *et al.*, 2002) and electronics (Dussel, 2000b).
[25] The apparel industry, included in this manufacturing sub sector, also shows the dilemmas and opportunities represented by the economic integration of Mexico with the US, which has been accelerated by NAFTA (Gereffi, 2000)

ranking positions in the 'top 20 export winners list', according to technology category (UNCTAD, 2002a). It ranked second in medium-technology manufactures; third in low-technology manufactures; and, sixth in high-technology manufactures. Also, we should not ignore the intra-industry trade figures, which have been at high levels since the 1980s. Intra-industry trade rose from 62.5 per cent of total manufacturing trade during the period 1988-1991 to over 73.4 per cent in 1996-2000 (OECD, 2002).

However, the story of FDI in Mexico is not quite as rosy as these figures suggest. At least there is one caveat, but rather important. It is well recognised that MNCs allocated in the manufacturing sector are weakly linked with domestic industry; the local input content in assembling is very low (Arestis and Paliginis, 1996; Dussel, 2000b; Ruiz-Napoles, 2000; Mattár *et al.* 2002; UNCTAD, 2002). In fact, it is relevant to notice that a significant proportion of FDI in Mexico, 15.4 per cent of total FDI in the period 1994-2000, was allocated to in-bond foreign assembly plants (*maquiladora*)[26] where MNCs affiliates are relatively 'footloose' (Buitelaar and Padilla, 2000). Some other characteristics of these firms are selective employment policies, unskilled labour, relatively low salaries, and non-union orientation; but most important, dependence on US economic activity for their operation has increased Mexico's dependence on the US (Arestis and Palangitis, 1996).[27]

[26] Griffiths and Sapsford (2003) report from Gerber (2001) that "maquila investment has accounted on average for 27 per cent of US FDI into Mexico for the period 1994 to 2000".

[27] A second FDI caveat has been left out because it is related to the effects of FDI in the capital account of the balance of payments (by no means less important). Notwithstanding that FDI is less volatile than other flows, FDI investment could easily produce a liquidity crisis. The risk increases when unfettered FDI yields time-inconsistent foreign exchange outflows and inflows (Singh 2001 and 2002a). In this regard, Singh suggests that in order to avoid financial fragility embodied in FDI, the government would need to regulate the amount and timing of FDI; by doing this economic development will be promoted.

6.3 Theory of FDI linkages with Exports and Imports

Before analysing two main linkages between FDI and trade, we should mention three different ways of how FDI may work in the economy. First, FDI inflows lead to an increase in capital supply available for investment in the host country, which increases productive capacity. Second, FDI inflows constitute a good source of current account financing and balance of payments relief, particularly if it is export-oriented and saving-enhancing. Third, as FDI involves the transfer of technologies and entrepreneurial skills, it affects both the quality and quantity of factors, resulting in changes in factor productivity and cost comparative advantage between products —the MNCs facilitate transfer of technologies and quicker flows of information, improving the productivity of the resources and diminishing their production costs— (Dunning, 1993; Sun, 2001). A "dynamic change in comparative advantage", as referred by Kojima (1973, 1975, and 1982), will certainly modify the structure of international trade.

Regarding the relationships between FDI inflows and trade, there are two possible linkages. One refers to whether FDI could be considered as a substitute for, or a complement to, international trade (Kojima, 1975). The presumption is that FDI and trade (more specifically exports) are alternative means of penetrating foreign markets. That is, a decision faced by any MNC is servicing foreign markets either by exporting goods or by exporting capital (FDI), and then producing locally. According to theory, whether FDI promotes or substitutes for trade depends on the type of FDI stimulated: 'vertical' or 'horizontal'. If FDI is 'vertical', where MNCs geographically split stages of production, this is likely to stimulate trade. Whereas, if FDI is 'horizontal', where MNCs produce final goods in multiple locations, this is likely to substitute for trade (Markusen, 1997). Additionally, Markusen shows theoretically that trade and investment liberalisation are in a sense complements, because FDI provides the recipient country with inputs without

which the country cannot exploit its abundant factors in certain industries. However, as mentioned before, FDI will not foster the economy —productivity, employment, trade— unless it is complemented with measures to improve the local business environment (Blosmtröm and Kokko, 2003).

Kojima (1973, 1975 and 1982) refers to the transfer of "superior" production functions which replace "inferior" ones in the host country, through transferring training of labour and management and marketing know-how. By doing this, FDI is seen to be a "tutor" in developing countries. In addition, Kojima (1975) proposes that FDI into industries in which the host country has a comparative advantage, tends to improve the productivity of the host economy and therefore stimulates more exports. He is assuming that the smaller is the technological difference between the headquarter and the host country industry, the easier it is to transfer and improve the technology in the latter. This means that labour-intensive technology is easier to transfer (e.g. textile industry).

The second relationship is related to the causal linkages between FDI and trade. The causality between FDI and exports could run in either direction. Initially, firms trade in the foreign market, and after learning more about the economic, social, political, ruling conditions of their trading partners they may establish a subsidiary in the host country (Liu *et al*, 2001) or they may embark on joint ventures with local enterprises. This implies FDI inflows, and, after some period, MNCs may start to export (UNCTAD, 1996; Rob and Vettas, 2003). The role of MNCs in expanding exports in host countries derives from the additional capital, new technology and better management and marketing strategies

that they can bring with them (UNCTAD, 2002a).[28] Thus, there may be a bi-directional causal link: exports stimulate FDI and FDI promotes exports.[29] Likewise with FDI and exports there are two possible bi-directional links between FDI and imports. First, if imports are evidence that a market exists for a commodity, the host country might attract FDI to produce that product locally. In other words, a rise in imports in the host country justifies investment and production by MNCs; thus, imports stimulate FDI inflows. Second, as soon as MNCs establish in the host country, they import certain types of supplies (basic components and intermediate goods produced by the headquarters) to satisfy the quality standards required by the international market; therefore, FDI inflows increase the demand for imports.

6.4 Empirical Literature on the Relationship between FDI, Exports and Imports

Most of the empirical studies focus on the Granger causality between FDI and exports (and, exports and economic growth), trying to support the export-led growth model launched in most developing countries during the 1980s, and the positive effects of FDI on exports. As a result of the outstanding performance of China's trade and FDI inflows during recent decades, this country has attracted a lot of attention (Liu *et al.*, 2002; Liu *et al.*, 2001; Sun, 2001; Zhang and Song, 2000; among others).

For instance, Liu *et al.* (2002) investigate the causal links between trade, FDI and economic growth in China, from 1981.1 to 1997.4. The study, conducted using the VARECM framework, shows bi-directional causal links between FDI, exports and

[28] Sharma (2000) argues that the role of FDI in exports depends on the motive behind such investment. If it is to by-pass trade barriers in the host country, then it is unlikely that such FDI would result in more exports. However, if FDI is motivated by the country's comparative advantage, then it may contribute to export growth.

[29] This is consistent with Vernon's (1966) product cycle hypothesis.

economic growth, and a uni-directional causal link from these three variables to imports. Liu *et al.* (2001) examine the causal linkages between trade (exports and imports) and FDI in China. The study is based on a panel of bilateral data for China and 19 home/country regions over the period 1984-1998. They found three main results: there is a uni-directional causal link from the growth of China's imports to the growth of the inward FDI stock; there exists a uni-directional causal link from the growth in the inward FDI stock in China to the growth of China's exports; and, there is a uni-directional causal link from the growth of China's exports to imports. The causation from inward FDI to China's export growth reflects China's FDI policy, which encourages MNCs to export their products. Similarly, Sun (2001) presents empirical evidence of the positive and significant relationship between FDI and exports across provinces and regions of China for the period 1984-1997, applying the TSCS method. The empirical analysis provides statistical evidence for a positive and significant relationship between FDI inflows and exports; however, the impact of FDI on exports from China varies across regions according to regional economic conditions, the degree of economic openness, and the different market orientations of FDI. Zhang and Song (2000) find evidence of a link between FDI and exports in China, using panel data at the provincial level for the period 1986-1997. Their results support the view that increased levels of FDI positively affect provincial manufacturing export performance. Specifically, they found that a 1 per cent change in the level of FDI in the previous year is associated with 0.29 per cent increase in exports in the following year.

Apart from the studies that refer to China, a few other analyses focus on the relationship between FDI inflows and trade (Alguacil and Orts, 2001; Bhalla, 1998; Cuadros *et al.*, 2001; de Mello and Fukasaku, 2000; Sharma, 2000; Weresa, 2001). The empirical evidence shows mixed results related to the existence of a direct relationship between FDI

inflows and exports. Bhalla (1998) explores and compares the contributions of exports and FDI to growth, and the trade and FDI linkages in China and India. The study reviews trade and investment policies and the economic liberalisation process in each country. From the statistical analysis, the author concludes that there is no positive correlation between FDI and exports in India, whereas this correlation exists in China. Sharma (2000) found similar results for the case of India; FDI appears to have had no statistically significant impact on exports during the period 1970-1998.[30] This result was obtained by estimating the determinants of export performance in India in a simultaneous equation framework. Cuadros *et al.* (2001) examined the relationship between FDI inflows and exports in three Latin American countries —Argentina, Brazil and Mexico— using a vector autoregressive model and quarterly data, during the period 1975-1997. The findings support evidence of a long run uni-directional causal link from FDI to exports in Mexico and Argentina, and short run uni-directional causal link from FDI to exports in Mexico and Brazil.[31]

A more comprehensive study for the Latin American countries is presented by de Mello and Fukasaku (2000). They examined Granger causality between FDI inflows and foreign trade (exports, imports and the trade balance) in a selected group of Latin American countries (Argentina, Bolivia, Brazil, Chile Colombia, Ecuador, Mexico, Peru, Uruguay and Venezuela) and Southeast Asian countries (Indonesia, South Korea, Malaysia, Philippines, Singapore and Thailand), using bivariate vector error correction models and annual data during the period 1970-1994. Among many other results, the authors report very interesting relationships. Regarding the findings for the Latin America countries,

[30] Lall (1999) gives an explanation for this result, arguing that FDI inflows in India have gone into domestic market oriented ventures or into infrastructure rather than to export-oriented activities.
[31] It is important to mention that they do not distinguish between oil and non-oil exports; a distinction required for the case of Mexico.

exports seem to Granger cause FDI inflows in Argentina; there is a bi-directional link between FDI inflows and exports for Chile; imports precede FDI in Argentina, Ecuador and Peru; and, there is a bi-directional link between FDI inflows and the trade balance in Chile. [32] In the case of the Southeast Asian countries, FDI inflows Granger cause exports in Malaysia; exports are found to Granger cause FDI in Indonesia; a bi-directional causality between exports and FDI was obtained for Singapore and Thailand; imports Granger cause FDI in Singapore and Thailand; and, there is a bi-directional causation between FDI and imports in Indonesia. Overall, the authors claim that the empirical analysis suggests a stronger association between FDI inflows and foreign trade in Southeast Asia than in Latin America.

As Spain has increasingly received FDI inflows since its entry into the European Union, Alguacil and Orts (2001) specifically investigate the linkage between FDI inflows and imports for this country. The authors adopted an aggregated time series model, using quarterly data for the period 1970-1992. The results support a uni-directional Granger causality relationship going from FDI inflows to imports. In a different country study, Weresa (2001) found that Poland's foreign trade with the European Union in the 1990s was driven by FDI inflows, mainly by its contribution to export creation. Although she does not test for Granger causality between trade and FDI inflows, from the statistical figures she concludes that FDI inflows have increased Polish exports and imports.

For the case of Mexico, studies have considered different approaches to analyse the effects of FDI inflows on Mexico's trade. Máttar *et al.* (2002) analyse the performance of FDI in Mexico within the context of the macroeconomic reforms in the 1980s. Through

[32] De Mello and Fukasaku (2000) found that exports seem to cause FDI, and a bi-directional Granger causality between imports and FDI in Mexico, but only for a shorter period (1970-1984).

all the analysis a comparison is made between Mexico and a selected group of other Latin American countries. Their statistical findings suggest that although the market-orientated reforms have encouraged FDI in selected sectors, they have not led to a rise in fixed capital formation in the economy as a whole. This has caused a strong segmentation between large export-orientated companies with strong links to foreign capital and smaller indigenous firms focusing on domestic demand.[33] They claim that the high import content in Mexican exports shows disrupted domestic chains of production, derived from the displacement and elimination of firms that previously produced for the domestic market but were unable to compete with the MNCs entry.[34]

Alguacil *et al.* (2002), in a very concise paper, analyse the existence of Granger causality between exports, FDI and domestic performance for the exclusive case of Mexico during the period 1980.1-1999.4 using a five-variable VAR model (non-oil exports, industrial production index, foreign direct investment, foreign income and the real exchange rate). They do not consider, however, the relationship between FDI and imports. Their results confirm the export-led growth hypothesis for Mexico. This evidence is consistent with the findings of Abdulsanner and Manuchehr (2000) and Thornton (1996), even though in both studies total exports are used instead of non-oil exports. Additionally, Alguacil *et al.* show evidence of a Granger causal relationship from FDI to exports, and from FDI to GDP growth. They claim that these results provide insight into the role played by FDI in the

[33] It is worth mentioning that the industrial structure of Mexico is very peculiar, more than 98 per cent of manufacturing industries are classified as "micro" and "small" size, from 1 to 10 employees and from 16 to 100 employees, respectively (INEGI, 1999).

[34] Regarding some of the effects of trade and financial liberalisation on the Mexican production system, Cimoli and Correa (2002) describe very well what has been happening, although not limited to Mexico but to other Latin American countries as well, by saying that "[m]any production activities have been seriously disrupted by trade liberalisation and by the massive inflow of imports, ..., which have rapidly proceeded toward the de-verticalisation of their production organisation technologies, substituting domestically-produced intermediate inputs by cheaper (and sometimes better), imported ones, reorganising themselves more as assembly-type operations based on a much higher unit import content. ...The share of large firms —either local subsidiaries of [MNCs] or domestically-owned conglomerates—in GDP has significantly increased during the adjustment process, while countless [small and medium enterprises] have been forced to exit the market altogether." (p.13).

effectiveness of the export policy followed by Mexico. However, they neither mention nor take into account the change in the definition of FDI in 1994.

The study presented in this chapter differs from Alguacil *et al.* in two main respects. First, the period of analysis is longer, 1970-2000, including eleven more years; using annual, rather than quarterly data. Second, we examine the Granger causality between FDI and imports, an issue not yet studied for the case of Mexico.

6.5 Methodology

As stated before, we are going to analyse the relationship between 1) FDI inflows and exports,[35] and 2) FDI inflows and imports, using the Granger causality test. In a bivariate framework, the variable x is said to cause the variable y in the Granger sense if the forecast for y improves when lagged variables for x are taken into account in the equation, *ceteris paribus* (Charemza and Deadman, 1997). In other words, the standard Granger causality procedure is based on past changes in one variable explaining actual change in another variable.

Testing causality, in the Granger sense, involves using an F-test (or Wald test). The appropriate formulation of a Granger-type test of causality (which must be applied to stationary series) is:

$$X_t = \beta_0 + \beta_1 X_{t-1} + \ldots + \beta_j X_{t-j} + \theta_1 FDI_{t-1} + \ldots + \theta_j FDI_{t-j} + \mu_t \quad (6.1)$$

$$FDI_t = \delta_0 + \delta_1 FDI_{t-1} + \ldots + \delta_j FDI_{t-j} + \gamma_1 X_{t-1} + \ldots + \gamma_j X_{t-j} + \nu_t \quad (6.2)$$

$$M_t = \varphi_0 + \varphi_1 M_{t-1} + \ldots + \varphi_j M_{t-j} + \alpha_1 FDI_{t-1} + \ldots + \alpha_j FDI_{t-j} + \sigma_t \quad (6.3)$$

$$FDI_t = \psi_0 + \psi_1 FDI_{t-1} + \ldots + \psi_j FDI_{t-j} + \xi_1 M_{t-1} + \ldots + \xi_j M_{t-j} + \tau_t \quad (6.4)$$

$j = 1, 2, \ldots, N$

[35] We consider non-oil exports in our analysis.

where X is exports, FDI is foreign direct investment inflows, M is imports; μ_t, v_t, σ_t, and τ_t are error terms with zero mean. In equation 6.1, the null hypothesis '*FDI* does not Granger cause *X*' ($\theta_1 = ... = \theta_j = 0$) is tested using a standard F-test (Wald test). It is rejected if the θs are jointly significantly different from zero. Similarly, in equation (6.2) the null hypothesis 'X does not Granger cause FDI' ($\gamma_1 =...= \gamma_j =0$) is rejected if the γs are jointly significantly different from zero. The same procedure applies for equations 6.3 and 6.4.

Considering an ARDL model developed by Pesaran and Shin (1997), an error correction model for each of the four equations is derived:

$$\Delta y_t = \lambda_0 + \sum_{i=1}^{r} \beta_{yi} \Delta y_{t-i} + \sum_{i=0}^{s} \beta_{xi} \Delta x_{t-i} + \pi \rho_{t-1} + \varepsilon_t \qquad (6.5)$$

where ρ_{t-1} is the lagged error correction term obtained from the residuals in each equation (equations 6.1 to 6.4) and ε_t is the random disturbance term. From equation (6.5) the null hypothesis that '*x* does not Granger cause *y*' would be rejected if the lagged coefficients of the β_{xi}'s are jointly significantly different from zero, using a standard F-test (Wald test). In case of cointegration between *x* and *y*, changes in one variable towards its long run equilibrium value may be a result of variations in the other variable. As well, the causality between *x* and *y* could be identified if the error term (ρ_{t-1}) is statistically significant. Notice that the Granger test results only indicate that the changes in *x* must come before the changes in *y* (Murkherjee *et al*, 1998). A statistically significant coefficient of ρ_{t-1} (π) shows how the short run coefficients of the endogenous variable adjust towards the long run equilibrium in reaction to changes in the exogenous variables. Empirical studies test causality through the error term and it is used as a test for *weak exogeneity*

(i.e. Kwan *et al.*, 1996).[36] A variable is *strongly exogenous* if it is *weakly exogenous* through the error correction term and if the lagged values are jointly significant. Granger causality is neither necessary nor sufficient to establish weak exogeneity.

In order to obtain consistent results derived from the Granger causality procedure three steps are followed. The first step is to test the order of integration of the variables. The second step is to test for cointegration using the Johansen maximum likelihood approach. Finally, the third step is to carry out the Granger causality tests.

6.6 Empirical Analysis

The tests are carried out on annual data from 1970 to 2000. The data source is the World Development Indicators (2002). All variables are in real terms and are expressed in US dollars. Before we apply the Granger causality tests outlined in the previous section, it is necessary to determine the order of integration of the variables. The ADF test is used for this purpose. Table 6.3 (part A) reports the ADF (one lag) test for the log levels of the variables and first differences under the assumption of a constant and (part B) under the assumption of a constant and deterministic time trend. The ADF test results for unit roots confirm that all variables are integrated of order one in levels but integrated of order zero in first differences at the 5 per cent level of significance.

[36] According to Charemza and Deadman, (1997), a variable z is said to be weakly exogenous for the parameters of interest (Φ) if knowledge of Φ is not required for inference on the changes of z; z is *strongly* exogenous if it is *weakly exogenous* for Φ and z should not be Granger caused by w.

Table 6.3
Unit Root Test for Stationarity

PART A with Constant Only, sample period 1970-2000			PART B with Constant and Time Trend, sample period 1970-2000	
Variables	Log Level [1]	Differences[1]	Log Level [2]	Differences[2]
X	-1.71	-6.94*	-3.27	-6.94*
M	-0.34	-4.20*	-2.14	-4.35*
FDI	-1.65	-4.08*	-3.32	-4.00*

Notes: [1]The critical value for rejection of hypothesis of a unit root is -2.96. [2]The critical value for rejection of hypothesis of a unit root is -3 57 for M and FDI, and 3.59 for X. The asterisk (*) denotes significance at the 5 per cent level.

Subsequently, on the basis of the above unit-root tests, a cointegration test is performed. The Johansen Full Information Maximum Likelihood (ML) method is a powerful cointegration test to check for the number of cointegrating vectors, particularly when a bivariate model is considered.[37] Table 6.4 shows the Johansen's cointegration test results.

Table 6.4
Johansen's Cointegration Test Statistics

a) Variables in Cointegrating Vector: LFDI -LX

		Trace Test			Maximum eigenvalue test		
Null Hypothesis	Alternative Hypothesis	Statistic	Critical Value 95%	90%	Statistic	Critical Value 95%	90%
		Maximum lag in VAR =4					
$r=0$	$r\geq 1$	28.16	20.18	17.88	20.53	15.87	13.81
$r\leq 1$	$r\geq 2$	7.63	9.16	7.53	7.63	9.16	7.53
		Maximum lag in VAR =3					
$r=0$	$r\geq 1$	25.15	20.18	17.88	18.93	15.87	13.81
$r\leq 1$	$r\geq 2$	6.21	9.16	7.53	6.21	9.16	7.53
		Maximum lag in VAR =2					
$r=0$	$r\geq 1$	28.50	20.18	17.88	15.24	15.87	13.81
$r\leq 1$	$r\geq 2$	13.25	9.16	7.53	13.25	9.16	7.53
		Maximum lag in VAR =1					
$r=0$	$r\geq 1$	14.26	20.18	17.88	12.30	15.87	13.81
$r\leq 1$	$r\geq 2$	1.95	9.16	7.53	1.95	9.16	7.53

b) Variables in Cointegrating Vector: LFDI-LM

		Trace Test			Maximum eigenvalue test		
Null Hypothesis	Alternative Hypothesis	Statistic	Critical Value 95%	90%	Statistic	Critical Value 95%	90%
		Maximum lag in VAR =4					
$r=0$	$r\geq 1$	23.28	20.18	17.88	18.44	15.87	13.81
$r\leq 1$	$r\geq 2$	4.83	9.16	7.53	4.83	9.16	7.53
		Maximum lag in VAR =3					
$r=0$	$r\geq 1$	25.20	20.18	17.88	21.68	15.87	13.81
$r<1$	$r\geq 2$	3.52	9.16	7.53	3.52	9.16	7.53
		Maximum lag in VAR =2					
$r=0$	$r\geq 1$	23.18	20.18	17.88	20.60	15.87	13.81
$r\leq 1$	$r\geq 2$	2.58	9.16	7.53	2.58	9.16	7.53
		Maximum lag in VAR =1					
$r=0$	$r\geq 1$	13.20	20.18	17.88	8.82	15.87	13.81
$r<1$	$r\geq 2$	4.37	9.16	7.53	4.37	9.16	7.53

[37] Alternatively, using Engel and Granger (1987) cointegrating test procedure the variables show to be cointegrated. These results are not shown.

In panel a), it is observed that when three and four lags are used in the procedure, the null hypothesis that LFDI and LX are not cointegrated (r = 0) is rejected using either the maximum eigenvalue test or the trace test at the 5 per cent level of significance. In other words, it indicates that there exists a unique cointegration vector among the variables involved. Similarly, for panel b) there is cointegration between LFDI and LM, when four, three and two lags are considered. Granger (1988) shows that if two variables are cointegrated, there should be a causal relationship between them in at least one direction.

Since the existence of cointegration between the variables is confirmed, the next step is to test for the causal relationships between FDI inflows, exports and imports. The literature offers different statistical methods to determine the optimal lags in Granger causality tests. The Schwarz Bayesian Criterion (SBC) and the Akaike Information Criterion (AIC) were used to determine the optimal lag-lengths in the ARDL and error correction models. Table 6.5 shows the results, which point to some patterns for the Granger causal links between FDI inflows, exports and imports in Mexico.

Table 6.5
Granger Causality Tests for FDI, Exports and Imports based on Error Correction Models, 1970-2000

Regression	Long Run Elasticities	Order of lags in ECM	Wald test	Error Term	Joint significance β_{yt} and β_{xt}	Causality
1) ΔLFDI on ΔLX[a]	0.74* [6.78]	(3,3)	25.26*	-1.14*	72.74*	LX →LFDI
ΔLX on ΔLFDI	0.83* [2.86]	(1,0)	2.61	0.12	-	
2) ΔLFDI on ΔLM[a]	0.98* [8.36]	(3, 0)	34.00*	-1.18	-	LM↔LFDI
ΔLM on ΔLFDI	0.85* [4.21]	(4,2)	17.24*	-0.30**	41.09*	

Notes: [a] A shift dummy, *d94* (which takes the value of 0 prior to 1994, and 1 afterwards), was included in the ARDL model. The asterisk (*) and double asterisk (**) denote significance at the 5 and 10 per cent level, respectively. The numbers in brackets are the *t*-statistics.

From the first set of regressions there is evidence of uni-directional Granger causality from LX to LFDI at the 5 per cent level of significance, either considering the Wald test or the error term. This is an interesting result, because it suggests that the performance of

exports stimulate more FDI inflows to the country. Also note that in addition to a significant error correction term, the joint significance of the lagged variables indicates that LX is *strongly exogenous*.

The second set of results shows bi-directional causality between LM and LFDI at the 5 per cent of significance using the Wald test. The joint significance of the lagged variables in combination with the significant error correction term indicates that LFDI is *strongly exogenous*. The results clearly support the link between FDI and imports, where most of the inputs required by MNCs are imported.

6.7 Conclusions

This chapter has examined the performance of FDI inflows in Mexico during the last three decades, and its relationship with exports and imports. The modifications in the legal framework that regulated FDI in Mexico started in 1989, which were orientated towards the facilitation of FDI inflows into the country. It is widely recognised that NAFTA's investment provisions led to modification of the *Foreign Investment Law* to reconcile it with the agreement. The analysis of the investment provisions by NAFTA and other allowances from the Mexican authorities to foreign investors showed that MNCs have been greatly benefited, as they have obtained bigger proportions of the international and domestic market by displacing indigenous firms.

The Mexican experience shows that investment liberalisation has combined with trade liberalisation to stimulate FDI and trade at the same time. The results from the Granger causality tests indicate that there is uni-directional causality from exports to FDI, and there is bi-directional causality between FDI inflows and Mexican imports. The development of exports, within a liberalised trade and financial context, encourages FDI

inflows to the country; and, at the same time FDI demands more imports. Therefore, the inter-relationships among these variables have generated the expansion on Mexico's trade and inward FDI.

As discussed in the literature, the Mexican government has followed the export-led growth model as a development strategy (Thornton, 1996; Abdulnasser and Manuchehr, 2000; Balassa, 1983; Alguacil *et al.*, 2002), where exports are highly promoted (see Chapter 2), and simultaneously imports are demanded mainly to provide inputs for domestic and export products, and to incorporate technology to foster economic development. Although there has been an upgrading of the type of Mexican exports, by means of MNCs' entry, it has not been enough to raise Mexico's sustainable growth rate. During the early 1970s, the country exported commodities; it became a uni-product exporter (oil) at the end of the 1970s-beginning of the 1980s; after the mid-1980s Mexico has been exporting manufactures; however, the domestic input content is very low. The shift from primary products to "a first generation" of manufactures does not represent more sophisticated activities (UNCTAD, 2002a). Therefore, the FDI-export-led growth model has widened the gap between the export and non-export orientated sectors, and stimulated exports and imports. This has led to an acute limitation of the national industrialisation process, ending in fragile balance of payments positions (see Chapter 5). Thus, the orientation and allocation of FDI plays a major role in the position of Mexico's trade balance. If Mexico is really committed to embarking on a process of sustainable long run economic growth it is imperative that the Mexican government works towards the integration of the domestic industry. By doing this, some of the dilemmas presented by FDI inflows would be counterbalanced.

Appendix E

Table E1
Structure and Export Propensities of the Mexican Automobile Industry, 1998 (Thousands of units and percentage)

Vehicle Assembler	Production	%	Exports	%	Exports/ Production (%)
Chrysler	360.6	25.3	301.1	31.0	83.5
Ford	213.7	15.0	174 8	18.0	81.8
General Motors	314.2	22.0	198.8	20.5	63.3
Volkswagen and Nissan	539.5	37.8	297 3	30.6	55.1
Total	1,427.6	100	972 0	100	68.1

Source: Mortimore (2000).

Table E2
Mexican Exports by the 35 leading Foreign Affiliates, 2000
(Million of dollars and percentage)

Rank	Name of Affiliates	Name of Parent Firm	Home Country	Industry	Value	% of Total Exports
1	IBM Mexico	IBM	United States	Electronics	9 630	5.3
2	Daimler Chrysler Mexico	Daimler Chrysler	Germany	Automotive	6 941	3.8
3	General Motors de Mexico	General Motors	United States	Automotive	6 732	3.7
4	Volkswagen Mexico	Volkswagen	Germany	Automotive	5 182	2.9
5	Ford Mexico	Ford Motor	United States	Automotive	3 471	1.9
6	Nissan Mexico	Nissan Motor	Japan	Automotive	2 720	1.5
7	Lear Corporation Mexico	Lear	United States	Automotive	1 878	1.0
8	Visteon Mexico	Visteon	United States	Automotive	1 676	0.9
9	Panamerican Beverage Inc	Coca-Cola	United States	Beverages	1 624	0.9
10	Sony Mexico	Sony	Japan	Electronics	1 621	0.9
11	General Electric Mexico	General Electric	United States	Electrical Apparatus	1 157	0.6
12	Alcoa	Alcoa	United States	Metals	1 070	0.6
13	Thomson	Thomson Industries	United States	Electronics	1 037	0.6
14	LG Electronics Mexico	LG Electronics	Rep Korea	Electronics	1 037	0.6
15	Sanyo Manufacturing Mexico	Sanyo Electric	Japan	Electronics	837	0.5
16	Grupo Kodak Mexico	Eastman Kodak	United States	Photographic	739	0.4
17	Grupo Modelo	Anheuser-Busch	United States	Beverages	694	0.4
18	Kemet de Mexico	Kemet	United States	Electronics	692	0.4
19	Favesa	Lear	United States	Automotive	684	0.4
20	Samsung Mexico	Samsung Electronics	Rep. Korea	Electronics	678	0.4
21	United Technologies Mexico	United Technologies	United States	Automotive	655	0.4
22	SIA Electrónica de Baja California	Sanyo Electric	Japan	Electronics	622	0.3
23	Industria John Deere	John Deere	Australia	Machinery	449	0.2
24	Mabe	General Electric	United States	Machinery	431	0.2
25	Siemens	Siemens	Genrmany	Electrical Machines	403	0.2
26	Carplastic	Visteon	United States	Automotive	381	0.2
27	Black & Decker Mexico	Black & Decker	United States	Tools	351	0.2
28	Xerox	Xerox	United States	Office machines	295	0.2
29	BASF Mexico	BASF	Germany	Chemicals	270	0.1
30	DUPont Mexico	Dupont, E.I. De Nemorus	United States	Chemicals	251	0.1
31	Electronica Clarion	Clarion	Japan	Electronics	236	0.1
32	Hewlett-Packard Mexico	Hewlett-Packard	United States	Electronics	228	0.1
33	Meximox	Meximox United States	United States	Metals	208	0.1
34	Procter & Gamble	Procter & Gamble	United States	Chemical	152	0.1
35	Nestlé Mexico	Nestlé	Switzerland	Food	122	0.1
	Total				**55 154**	**30.6**
	Total Exports of Mexico				**180 392**	**100.0**

Source: Table VI.15 from UNCTAD (2002a).

Chapter 7

Conclusions

7.1 Summary of the Results

In this thesis we have examined the impact of trade liberalisation on Mexico's exports, imports and the balance of payments by applying different time series econometric techniques. Special attention has been paid to disentangling the effects between two periods of trade reforms, those related to the mid-1980s and those linked to NAFTA. This study is the first of its kind to approach this issue in a rigorous and systematic way. The analysis provided is of particular relevance for policy purposes given the accelerated process of trade integration between Mexico and the US. The major conclusions from the research are set out below.

Firstly, with regard to export performance we find that at both the aggregate and disaggregated level, trade reforms of the mid-1980s had a positive impact on export growth. Export growth increased between 12 and 15 percentage points in 1986. However, no positive effect of NAFTA is discernable. Exports react positively to real exchange rate depreciation, through a significant price elasticity. Regarding the foreign demand, it was found that the income elasticity is always statistically significant at the aggregate level, but not for all the manufacturing sub-sectors. The outstanding export performance of the 1990s was mainly due to the impressive performance of the US economy and not due to the liberalisation involved in NAFTA. The chapter also examines the changes in the structure of exports. It is remarkable that from 1980 to 2000 the share of manufacturing exports rose from 60 per cent to 90 per cent of total exports. Within the manufacturing sector, the Machinery and Equipment sub-sector has the highest export participation,

rising from a share of 22 per cent in 1980 to 74 per cent in 2000. We argue that trade liberalisation has promoted the specialisation of a few industries by easing intra-firm trade.

Secondly, with regard to imports, the findings show a positive impact on the rate of growth of imports as a result of the mid-1980s trade reforms; import growth increased 12 percentage points in 1985. However, the econometric analysis gives mixed results relating to the effects of NAFTA on imports. The results obtained from using OLS show no significant coefficients related to the trade liberalisation indicators, neither import duties nor shift dummies. On the other hand, the outside-sample forecasts show some evidence of a structural break in 1994. The different estimations also show that imports react negatively to real exchange depreciation; the price elasticities of demand for imports are relatively high and, in general, are statistically significant. Also, the income elasticities are relatively high, but they are not always significant.

Comparing the results for exports and imports we find that the reductions in trade barriers have positively affected the performance of export and import growth by a similar magnitude. However, imports responded earlier than exports to trade liberalisation. While the effects of the mid-1980s trade reforms impacted import growth in 1985, export growth reacted in 1986. However, NAFTA does not show any significant impact on either exports or imports. The probable reason for this is that the major trade liberalisation took place during the mid-1980s, and NAFTA merely represented Mexico's free trade and financial commitment with the international market.

Thirdly, with regard to the trade balance and the balance of payments, our results show that the effects of the mid-1980s trade liberalisation episode worsened the trade balance.

Since the deterioration of the trade balance limits the foreign exchange availability and the sustainability of economic growth, we evaluate how trade liberalisation has interacted with the performance of Mexico's GDP growth through Thirlwall's balance of payments constrained growth model. The estimation of Thirlwall's model requires estimates of the income elasticity of import demand, which capture the influence of trade reforms. The results of the model, using McCombie's test (1989), confirmed the hypothesis that the slowdown in Mexico's economic growth since 1985 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. The sustainable growth rate pre-1985 and post-1985 was 5.8 per cent and 3.2 per cent, respectively. Thus, trade reforms have resulted in making the balance of payments constraint on Mexico's long run growth even more binding, which supports the findings of Moreno-Brid (2001, 1999 and 1998).

Fourthly, with regard to foreign direct investment (FDI), we were particularly interested in whether there are causal links between FDI, exports and imports. The results show a uni-directional link from exports to FDI. A likely explanation for this result is that FDI has been located in the financial services sector; and privatisation of either governmental firms or business owned by Mexican entrepreneurs (e.g. Teléfonos de México, TELMEX; Banco Nacional de México, BANAMEX) has absorbed a significant proportion of FDI inflows. These FDI inflows do not necessarily optimise export performance, at least in a direct way. The second result refers to a bi-directional link between FDI and imports, which is a plausible result according to the characteristics of Mexico's trade where intra-firm trade by MNCs accounts for over 50 per cent of Mexico's trade volume. In other words, the Mexican productive structure is increasingly dominated by foreign investors.

Overall, the unilateral liberalisation of trade during the mid-1980s was so far-reaching that the deregulation included in NAFTA represented just the multilateral negotiations that locked-in Mexico's trade and foreign investment policy. There is no evidence that NAFTA has improved the performance of exports. The euphoric statements about NAFTA, related to the crucial benefits that free trade was going to work as a lever for growth, seem to be extremely exaggerated. NAFTA, however, has been successful in allowing an easy access to MNCs, most of them from the US, to the country; where their production has a high import content, and minimum backward and forward linkages to the domestic economy. But, it is the performance of the US economy that mainly determines the volume of Mexican exports. Even more, our study confirms that the economic activity of Mexico is highly dependent on imports because the liberalisation of trade, coupled with FDI liberalisation, has contributed to a contraction of domestic industry (Cimoli and Correa, 2002; Máttar *et al.*, 2002).

7.2 Policy Implications

Our analysis of the effects of trade liberalisation in Mexico has several policy implications. From the figures analysed, export growth and import growth have a very similar performance. The export performance has not been enough to provide the foreign exchange requirements of the country to afford the imports demanded for economic development, when on average the sustainable growth rate post-1985 has fallen to 3.2 per cent. Even more, considering the private and public foreign debt —which in 2002 represented approximately 23.3 per cent of GDP— the country needs a more dynamic non-oil export performance which should be linked to the domestic economy, and its import content needs to be reduced. Currently, 30 per cent of Mexico's export earnings go to repay foreign debt.

More attention should be paid to the monetary effects of trade and financial liberalisation on the balance of payments. We claim that the deterioration of the trade balance as a result of trade liberalisation has adverse consequences for the economy. Notwithstanding the magnitude of the rate of growth of exports or the leadership of Mexico's position in the list of leading exporters, what really matters is the position of the balance of payments. A greater deficit on the balance of payments undermines the sustainability of growth, the credit-worthiness of the country and its ability to borrow.

Trade policy-makers still have room for manoeuvre. Trade policies must be orientated towards the promotion of the production of exports that contain high value-added, and preferably to those exports with high income and price elasticities of demand. Simultaneously, industrial policies should be orientated towards the production of the import content required for exports. 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.

The results of this study question those euphoric statements by various administrations 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 reach comparable macroeconomic indicators to its trading partners. With the analysis presented in this thesis, *a posteriori* we confirm Rodrik's (1992) warning "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 problems, 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),[1] which will come into effect in 2005, and the Plan Puebla Panama (PPP)[2] —financed by the Inter-American Development Bank— should be analysed carefully. Both agreements represent the most challenging international treaties to analyse. Although officially each of them involves different aims, they are based on the assumption that free trade and investment within the area will guarantee sustainable development.

Reasonable economists would agree that free trade is neither sufficient to increase exports with backward-forward linkages to the domestic economy nor guarantees a better position of the balance of payments of any country. Trade liberalisation must be coupled with governmental policies that co-ordinate the industrial and trade policy.

Finally, the results presented in this thesis show evidence which is against orthodox doctrine, suggesting that there are solid arguments for government intervention to oversee the process of liberalisation and industrial policy if the principal aim is to promote the country's economic development. This endorses the view in the quotation below:

> The Cambridge development economist Ajit Singh tells the story of when he first went to Cambridge as a student of Kaldor that Kaldor taught him three things: first, developing countries must industrialise; second, they can industrialise only by protection, and third, anyone who says otherwise is being dishonest! (Thirlwall, 2003a, p. 124).

[1] The participating countries in the FTAA are: Antigua, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, United States, Uruguay, and Venezuela.

[2] The participating countries in the PPP are: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama.

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