# Tariffs, Quotas and Terms-of-Trade: The Case of New Zealand

Liliana Winkelmann*  Rainer Winkelmann

Department of Economics
University of Canterbury

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*Address for correspondence: University of Canterbury, PB 4800, Christchurch, New Zealand. Fax: (3) 3642 635. E-mail: L.Winkelmann@econ.canterbury.ac.nz.
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## 1 Introduction

Both tariffs and quotas result in resources being allocated in such a way as to reduce potential real world income and are, hence, considered detrimental for the welfare of the world as a whole. Insofar as the welfare of the country that imposes the protection is concerned, effects of the two measures depend on the impact they have on the country's terms-of-trade[1]. If a measure induces foreign exporters to lower prices on their shipments, it is expected to better the domestic welfare; otherwise, the measure will adversely affect the country that imposes it. While most economists believe that, in the latter sense, price based measures such as tariffs dominate direct controls over quantities such as quotas, the theoretical literature suggests that the effect of the two measures relative to one another is highly sensitive to the nature of competition in the market under consideration.

It is this theoretical ambiguity, to begin with, that calls for an empirical appraisal of the two measures' effects. More pertinent, however, is the fact that non-tariff barriers (NTBs) to trade, many of which are believed to have economic and welfare effects similar to those of quotas, have been burgeoning in tariffs stead throughout the industrial world during the last twenty years[2]. Despite their high incidence empirical studies of the effects of either restriction on the importing country's terms-of-trade are uncommonly rare. The reason for this resides with two major factors. First is a relatively small number of economies that have undergone trade policy reforms of a nature and magnitude required for those effects to be empirically identifiable. The alternative way of gauging the effects, calibrated simulation models, have produced

[1] For a detailed discussion of the channels through which trade policies affect welfare of the country that initiates them, see Feenstra (1995).

[2] NTBs such as quantitative restrictions (e.g. import quotas on agricultural products, voluntary export restraints on automobiles or the quantitative restrictions on yarn, textiles and apparel under the Multi-Fiber Arrangement) and antidumping measures are encountered by a significant proportion of goods entering industrial countries. Back in 1993 on average, fourteen percent of the goods imported by the European Union, Japan and the US were covered by these measures.

estimates that are highly sensitive to the model specifications used in their derivation and, thus, is an inadequate solution[3].

The second factor concerns difficulties involved in designing an appropriate numerical summary measure of quotas. While in ad valorem form, via stating by how much the price at home exceeds that in the rest of the world, tariffs are by themselves an indicator of the instrument’s price effect, the effects of quotas on prices are not readily quantifiable. In the literature so far, their impact has been gauged in two main ways: by indices such as *trade coverage ratio*/*frequency ratio* and by measures known as *tariff equivalents of quotas*[4]. While the aggregate nature of the former has precluded their usage in assessing quotas’ effects on prices of individual goods, the latter are still today an integral part of the standard template for case studies of the effects of protection and the computable general equilibrium models that dominate evaluation of protection in practice. To compute them, it is necessary to rule out the possibility that the nature of competition in product market under consideration can be subject to the kind of restriction imposed. This, however, might be a major pitfall since the theoretical literature on trade policy argues persuasively that, rather than an intellectual nuisance to be assumed away, market conduct is likely to be an important explanatory variable in gauging the price effects of various trade policies[5].

In this paper we investigate whether the nature of competition and, hence, the market power of firms operating in international goods markets depend on the kind of restriction imposed. Our analysis examines the pricing responses of foreign exporters to a liberalisation of tariffs and quotas that took place as a part of a comprehensive trade reforms program undertaken in New Zealand in the mid-80s. This “natural experiment” setting has two features that are particularly important for our purposes. Firstly, quantitative restrictions, i.e. quotas and non-automatic import licensing

[3] See, for example, Baldwin and Krugman (1988), Dixit (1988), Rodrik (1988) or Leamer (1990). Feenstra (1995) discusses advantages and disadvantages of using structural models in these estimations.
[4] Both, *trade coverage ratio* and *frequency ratio*, follow the so-called ‘inventory approach’. The first refers to the share of total imports (by value) subject to quotas while the second indicates the percentage of tariff-line-level products subject to quotas. For more details, see Laird and Yeats (1990).
[5] See, for instance, Krishna (1989, 1990).

regulations, were both the primary instrument of protection and almost exclusive NTBs used. Secondly, the quotas were *value* quotas, meaning that they restricted value rather than quantity of imports. This detail is important since it hedges our estimates against a bias arising from a change in the product mix of differentiated import good.

Our estimates of price effects of quotas and tariffs are derived using a panel 7-digit category product-level dataset on export prices and quantities over a period in which quotas were entirely eliminated and tariffs underwent significant changes. We estimate the impact of the quota on price by comparing the price in the quota-restrained market to that in the "same" market without a quota. The empirical specification controls for tariffs as well as for the costs and exchange rates, the changes in both of which are likely to have had an effect on the prices charged by foreign exporters during the period.

Related issues have been the topic of some relatively recent empirical work. In particular, our study is along the lines of those by Feenstra (1988, 1992, 1993), Goldberg (1992) and Berry, Levinsohn and Pakes (1994) who examined the VERs on automobiles and their effects on domestic prices, quality upgrading, profits and profit margins. We build on their work by extending the number of product categories considered and, thereby, providing evidence on importance of the interplay between the nature of competition and the kind of restriction imposed for product markets that differ considerably in the degree of market power the sellers are expected to have.

Since it takes place against the background of a massive trade reforms program assumed by a *developed* country, the study also complements those of Levinsohn (1993) and Harrison (1994), who examined effects of trade liberalisation in Turkey and Côte d'Ivoire respectively[6]. Unlike them, however, we are concerned with the effects of liberalisation on market power of *foreign exporters*, a subject that, despite

[6] Both authors' results are consistent with the hypothesis that trade liberalisation leads to a decline in the domestic firms' markups and, therefore, has beneficial welfare effects on the country that initiates it.

being theoretically more controversial relative to the effects of liberalisation on market power of domestic firms, has remained barely explored empirically[7].

The main finding of our analysis is that the restrictions that a destination country chooses to impose differently affect the market power of foreign exporters selling to their markets. In particular, while detrimental effects of quotas on the prices charged by foreign firms are ubiquitous and quantitatively important, tariffs are inversely, if any, related to those prices. The results further indicate that these findings are conclusive and not likely to differ significantly across industries.

The remainder of the paper is organised as follows. Section 2 reviews important features of New Zealand's protection structure and the trade liberalisation programme undertaken in the mid 80s. Section 3 discusses theoretical results on effects of protection on the pricing behaviour of firms selling in international goods markets. Section 4 describes the data and empirical model used to estimate price effects of tariffs and quotas. Results are reported and interpreted in Section 5. Section 6 concludes.

## 2 Import Protection in New Zealand

New Zealand has a long history of protectionism[8]. Tariffs, first introduced as a source of government revenues, assumed their role as an instrument for protecting domestic industries in the late nineteenth century. Fifty years thereafter, in 1938, the government made the tariff protective structure redundant by an introduction of an extensive import licensing scheme. Originally justified as a response to the country's deteriorating overseas currency reserves, the import licensing controls remained the dominant means of protection in New Zealand over the next fifty years to come. In 1984, an earlier initiated movement to sell import licenses in a competitive bidding process, was accelerated by the new government that used the licence prices to

[7] As Levinsohn (1993, p.9) points out, referring to domestic firms, "[W]ith so many possible theoretical permutations, it is striking that a tariff or a quota, will, in almost every case, increase price-marginal cost markups."

[8] Detailed discussions of protection in New Zealand can be found in Ministry of Commerce (1987, 1990, 1994).

convert the quota into an equivalent tariff. The process of converting all quotas into tariffs was concluded in 1992. The phased removal of import licensing, finally completed at the end of 1992, was followed by several years of tariff harmonisation and reduction. Since 1988 tariffs have been steadily reduced with the intention to reach an average level of seven per cent, which is the same as in other OECD countries[9].

Several distinctive features of New Zealand's protective structure are noteworthy. Table 1 relates to the first of them, namely the breadth of non-tariff barriers used. It shows the incidence of NTBs in New Zealand and selected OECD countries. Two different measures are reported: a *frequency ratio* (showing the percentage of tariff lines covered by NTBs), and a *trade coverage ratio* (showing a share of total imports subject to NTBs). The data for 1981 come twelve years after the government (at the 1969 National Development Conference), recognising the high costs of import licensing, announced it as its main objective to remove the policy as the principal instrument of protection. Over those twelve years, the proportion of imports subject to

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Table 1 about here

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licensing dropped steadily, from more than 75 percent in the late sixties to about 46 percent at the time when the above ratios were computed. Despite this partial trade liberalisation, however, New Zealand's NTB ratios in 1981 still ranked highest among developed market economies in terms of both indices. Note, for instance, that the next highest frequency ratio listed (for Norway) was by twenty five percentage points lower than that for New Zealand while the next highest trade coverage ratio (of Japan), was more than twenty percentage points lower than the corresponding ratios for New Zealand. Moreover, in terms of either index, the share of New Zealand's imports

[9] The seven per cent level is to be compared with, let's say, 1981 when the average tariff rate was about 28 per cent. Note also that the seven per cent average does not include so-called industry plan goods (e.g. motor vehicles) that are still pursuing their individual reduction programmes.

subject to NTBs by far exceeded the average of the OECD countries as a whole (where the frequency ratio and the trade coverage ratio were 12.2 and 15.1 respectively) as well as that of the OECD developing countries (where the frequency ratio and the trade coverage ratio were 18.7 and 18.8 respectively) [10].

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Table 2 about here

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Another distinctive feature of New Zealand's NTBs protection concerns the kind of products covered. In contrast to the NTBs coverage of the agricultural sector that has been characteristic for most OECD countries and the EC countries in particular, an emphasis on the protection of manufacturing is typical of the NTB coverage in New Zealand. These points are documented in Tables 2 and 3. Notice two additional details that emerge from the tables. First, although there is a considerable cross-country variation in protection afforded agriculture, the protection afforded manufacturing in the rest of the countries is not only of a lesser extent but also has a lesser cross-industry variation relative to New Zealand. Second, the NTBs in New Zealand covered virtually all import-competing goods produced. In particular, the most important import category (30.4 percent of all imports in June 1982), Machinery and Transport Equipment, was also the category with the smallest proportion of imports (49.2 percent) exempt from import licensing.

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Table 3 about here

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Aside from variations in these aggregate statistics, there existed major differences in individual OECD countries' orientation towards specific measures, as illustrated in

[10] Note, however, that to the extent that one's interest is in the severity of the restrictions, neither index conveys the correct information. In particular, rather than stating how much trade is prevented from taking place because of the restrictions, the indices show how much trade takes place under the restriction.

Table 4. As opposed to countries like Denmark, Germany or Japan which tended to use quite a diverse set of NTBs, the incidence of NTBs in New Zealand was restricted to only two types of measures: *non-automatic licensing regulations* (requirements for an approval which is not granted freely or automatically, as a prior condition to importation) and *quotas* (global or bilateral, other than VERs and MFA restraints)[11]. The two measures covered 18.1 (7.1) and 27.6 (21.6) percent of the country's 1986 imports from developed (developing) countries (Laird and Yeats (1990)).

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Table 4 about here

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Although a few licences were administered on a volume basis (leather goods, footwear, writing instruments, wallpaper, golf clubs and badminton rackets), most New Zealand import licensing restrictions were denominated in value terms. The licences were granted to New Zealand-based companies or individuals exclusively and, except in a very few cases, applicable to goods from any source country. Prior to 1983, most licences were adjusted annually in percentage terms and issued automatically to established traders on the basis of imports in the previous year. Permitting non-established traders to acquire licenses and, fairly gradually, increasing the annual rate at which licences were adjusted were the main mechanisms used to actualise the process of trade liberalisation at this early stage. Notable changes began to take place with the implementation of a global import licence tendering programme in November 1984[12].

[11] Alternative NTBs used by other OECD countries include measures such as tariff quotas, seasonal tariffs, variable import levies, anti-dumping and countervailing duties, minimum import price requirements, VERs and restrictions negotiated under the Multifibre Arrangement.

[12] The import licence tendering programme involved offering of fixed values of licence for tender at regular intervals. For the purposes of the tender, the total value was divided into a number (around ten) of discrete units and, with restrictions placed on the number of units (around twenty percent) to be acquired per tenderer, offered to be bid for. Each successful tenderer would pay the premium he has bid for a year long licence to import an item code that, in general, could cover a number of tariff items. The licences were allowed to be transferred from one company to another.

A decline in both the frequency ratio and the trade coverage ratio, that followed the introduction of the tendering programme can be seen back in Table 1. For the first couple of years the major changes actually involved a shift in the composition of restrictions: while the share of imports facing the non-automatic import licensing regulations fell by 8.8 percent, the share of imports facing quotas, in fact, rose by 1.6 percent between 1981 and 1986. In conjunction with Table 3, this illustrates how high the incidence of quotas on imports of most manufactured products in the 1986 still was, thus indicating that the main function of the tendering programme in this starting-up phase was to set criteria by which a majority of goods were to be exempt within a predictable time frame.

In particular, licences were to be removed when tender premiums reached a set level. Actual licence prices were used to convert quotas into tariffs which were to be liberalised subsequently. By July 1988 only about five percent of all imports, basically the goods covered by special industry development plans, were subject to import licensing restrictions (Ministry of Commerce (1994)). The phased removal of import licensing was followed by several years of tariff reforms and reduction. Between July 1988 and July 1992, non-industry plan tariffs were reduced using the formula that had the effect of reducing high tariff rates more than low ones, thus tending to level the average tariff rate out[13]. A post-1992 tariff programme, announced in March 1990, provided that most tariffs would reduce to a maximum level of ten percent until July 1996.

## 3 Protection and Market Power of Foreign Exporters

In this section, we review the theoretical results on the interaction between protection and market power of foreign exporters. Since our empirical framework uses export prices, we state testable hypotheses stemming from the work in terms of those prices. Throughout, a special attention is paid to the differential impact, if any, that tariffs and

[13] The formula was introduced by the Swiss and used to harmonise the tariff levels around the world following the final Tokyo Round Agreement (1979). It is: *tariff reduction = t/(t+0.14)*, where *t = the existing tariff rate*. Hence, a 70 percent existing tariff rate would be cut by about 83 percent, whereas a 10 percent existing tariff would be cut by 42 percent.

quotas are expected to have on export prices. We begin by briefly discussing how the export prices are related to retail and domestic prices that are more frequently encountered in the literature. In the subsequent section we then consider implications of different assumptions about the way the export prices are determined for the effect that protection might have on those prices. Our focus on tariffs and quotas is typical of the literature as a whole. Although limited, it is held to be illustrative of the protection in general since most NTBs are strongly believed to have effects similar to those of quotas.

### 3.1 Export Prices

*Export* prices are prices that an exporter from a particular source country charges for the goods shipped to destination countries. For our purposes, these prices are taken to be denominated in units of the source-country currency. Export prices are to be distinguished from the prices paid by the buyers at destination markets. The latter are customarily stated in units of the local currency and considered in terms of either retail or domestic prices. *Retail* prices are prices that goods command at the point of final sale. In addition to export prices, they are determined by factors such as transportation costs, distribution costs, tariffs, and retail/wholesale markups incurred in the destination markets. Much of previous empirical research makes use of retail prices.

The theoretical literature assumes, instead, that transportation and distribution costs as well as the retail markups are zero and, consequently, considers so-called *domestic prices,*

$$p_i^{dom} = p_i^{exp}\, e_i\, (1 + \tau_i),$$

where $p_i^{dom}$ is the domestic price at destination $i$ in units of the destination $i$'s currency, $p_i^{exp}$ is the export price in units of seller's currency, $e_i$ is the exchange rate expressed as units of the destination $i$'s currency per unit of the seller's, and $\tau_i$ stands for a destination-specific tariff and/or any other import barrier related markup that is incurred in the destination market.

The relationship embodies its more traditional version in which the so-called "international price" replaces $p_i^{exp}$ from above. The present form is more useful since it allows to model the effects of trade policies under imperfect competition[14]. Via posing that foreign firms, in addition to costs, might charge a destination-specific markup, i.e.

$$p_i^{exp} = c(w, q) + m_i$$

(where $c$ denotes production costs and $w$ and $q$ the input prices and quantity produced, respectively), it introduces the possibility that trade restrictions, *inter alia*, affect that markup and, thereby, the price that foreign exporters charge. The questions of why and how, if at all, the choice of restriction affects those prices are considered next.

### 3.2 Effects of Import Restrictions on Export Prices

*Competitive Foreign Supply*. Figure 1 depicts the above referred to "benchmark" model. The model has been widely used to discuss the economic and welfare effects of imposing barriers to trade in a "small" open economy[15]. For our purposes, it is important because it implies that economic outcome in general and the export prices charged by foreign exporters in particular are unaffected by the choice of restriction imposed.

The argument is based on the assumption that firms selling in international goods markets have no market power, i.e. all charge the same international price equal to a common currency equivalent of the (opportunity) cost of producing the good in the country that has a comparative advantage in its production. In the figure, the local-currency denominated international price is denoted by $p_{int}$ while $D_m$ stands for the country's import demand curve.

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[14] In particular, in the case that international goods markets are segmented. The concept of international price commonly incorporates that international goods markets are both integrated and perfectly competitive.

[15] This assumption implies that the country is small enough so that no change in the quantity of its imports can affect the world demand for and, hence, the international price of the good.

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Figure 1 about here

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Suppose that imports are restricted by a quota that limits them to $Q_q$, an amount below the free trade level of imports, $Q_{int}$. By restricting supply, the quota will drive up the domestic price of the good to $p_{q,}$ therefore generating windfall gain of the size $(p_q - p_{int})$ per unit to those who hold licenses to import. In the sense that exactly the same economic outcome (i.e. the same quantity of imports and the same domestic price as well as consumption and production) could be generated by imposing an *ad valorem* tariff rate $\tau = (p_q / p_{int} - 1)$ instead, the tariff and the quota are equivalent. The tariff rate $\tau$ is said to be the *tariff equivalent* of the quota $Q_q$. Removing the tariff and lifting the quota would have exactly the same market effects. In particular, the domestic price would fall to $p_{int}$, while the export prices charged by firms selling to this market would remain at their initial level, $p_{int}$[16].

Notice that the comparative welfare effect of two measures depends, in this context, on who appropriates the windfall profits, i.e. "quota rents". As long as the government sells the licenses to import in a competitive bidding process, there is no difference in the welfare effects of two measures[17]. It is only when (a part of) the quota rents goes to foreign firms and/or government, that a quota becomes welfare inferior to an equivalent tariff.

[16] It is noteworthy that the presence of domestic market power does not change this latter result (Bhagwati (1965)). As long as the foreign supply is infinitely elastic, the export price with or without a quota will be the same.

[17] The idea here is that competition among potential importers would drive the price of license up to ($p_q$ - $p_{int}$) per unit, which is the maximum value they are willing to pay for it (given that they can buy the good at the world market for $p_{int}$, and then sell it in the protected market for $p_q$). It is exactly this idea, in combination with the alleged low dead-weight losses associated with the quota (strictly speaking, with the equivalent tariff), that has spurred the recent interest in using quantitative restrictions to circumvent the rules and principles of GATT. The ability of the government to retrieve these rents, however, is strictly subject to the competitive nature in all three relevant markets, namely foreign supply, domestic supply and the market for licenses.

*Foreign Monopoly*. To see how the choice of restriction can be a crucial determinant of the export price consider instead the domestic market that takes the form of a monopoly in foreign supply (with domestic production, if any, being competitive)[18].Let

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Figure 2 about here

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$MC$, $D_m$ and $MR$ in Figure 2 denote the foreign monopolist's marginal cost, the domestic import demand schedule and the marginal revenue curve associated with it, respectively. Under free and unobstructed international trade, the foreign monopolist would ship the quantity $Q_f$ and charge price $p_f$, where $p_f$ is the domestic currency equivalent of the export price charged by the monopolist. Imposing a binding (i.e. less than $Q_f$) quota $Q_q$, would distort the demand curve so as to make it profit-maximising for the monopolist to decrease the amount shipped to $Q_q$, and charge (the domestic currency denominated) export price $p_q$. If, instead, a (specific) tariff of size $T$ were used to restrict imports to the level $Q_q$, the profit-maximising domestic price would, nonetheless, remain the same. In this case, however, the foreign supplier would get only ($p_q$ - $T$) per unit whereas the domestic government would collect the remaining $T$ per unit imported.

Hence, if this market structure were the most reasonable approximation of the industry under consideration, we would expect that the price charged to this destination falls (to $p_f$) following the quota's removal. Moreover, the export price would fall even further (to $p_t$-$t$) if the quota were replaced by the import-equivalent tariff $T$, leading to a rise in price if the tariff were liberalised thereafter[19]. In this sense, the import-

[18] The argument is stated here with a reference to a linear demand curve. It remains essentially the same as long as the marginal revenue curve is steeper than the demand curve.
[19] This case is of interest since New Zealand's government used the actual license prices to convert quotas into tariffs. The tariffs have then been phased out as explained earlier.

equivalent tariff and quota are not price-equivalent - the tariff dominates the quota in terms of its effect on the domestic country's terms-of-trade[20].

The preceding analysis pertains to the case of  segmented destination markets. Krishna (1990) has extended the analysis to the case where there is costless resale between the monopolist's export markets. Her analysis showed that quotas that are set slightly below the free trade level will yield essentially the same outcome as above. However, in the case of restrictive quotas, the demand conditions and the relative size of the destinations' markets can interact in a way which would make an imposition of quota beneficial for the domestic country's terms of trade. This effect turns out to be the strongest if the domestic country is small and the domestic (residual) demand curve inelastic.

*Foreign Oligopoly*. The high sensitivity of the results to the assumptions on quota's restrictiveness and market conduct, that are evident in Krishna's (1990) monopoly model, has proved to be even more of an issue in the oligopolistic settings[21]. At the heart of the results' inconclusiveness lies an interplay between tariffs and quotas on one side and the nature of competition in the industry under consideration on the other.

Harris (1985) indicated the direction of the debate. Extending Bhagwati's (1965) study to account for the market power in foreign supply, Harris showed that introducing a quantitative restriction (VER) at a free trade level of imports changes the nature of competition between the domestic and foreign firm (from Bertrand to Stackelberg leadership). A side result that quantitative restriction is inferior, in terms of the restrictions' terms of trade effects, to the import- equivalent tariff, has stimulated two main strains of responses.

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[20] The original argument here is that of Shibata (1968). The argument was stated in terms of a tariff revenue loss, $T \times Q_q$, associated with a quota being imposed in the tariff's stead.
[21] Much of, particularly, earlier research was motivated by a proliferation of VERs and, therefore, stated in those terms.

Mai and Hwang (1988) are illustrative of the work that focuses on implications of the Cournot competition among firms. They conclude that lifting a quota under that assumption would result in no change in the export price. Furthermore, in the case the free trade equilibrium were more collusive than Cournot, the quota could be shown to be even pro-competitive, indicating that its removal would lead to an increase in the export price. In Mai and Hwang (1989), the authors advance the analysis to establish that price effects of tariffs and quantitative restrictions crucially depend on the behavioural patterns of firms in these industries, thus implying that the way quotas affect the export price is basically undetermined. Essentially the same conclusion is reached by Fung (1989) who, however, goes further to argue that the Cournot result might be more relevant since its outcome can be viewed as being generated by, in the international markets fairly plausible, two stage game: in the first stage, firms commit themselves by choosing capacities; in the second, they compete in prices[22].

The research that concentrated on price competition instead draws on the asymmetry of the foreign supply response to a tariff as opposed to a quota. The fact that there is no supply response to a binding quota is, for instance, at the heart of Krishna's (1989) argument. The idea there is that, by assisting firms to pre-commit themselves to higher prices, quotas (in contrast to tariffs) facilitate collusion between them. Itoh and Ono (1982) reproduce the argument in the case of the Stackelberg leadership model and, in Itoh and Ono (1984), go on to demonstrate the restrictiveness of the requirements necessary for the equivalence result.

Rotemberg and Saloner (1989) pointed out another important source of a lack of the results' robustness. Whereas the latter work indicates that lifting quotas under price competition is likely to drive the export price down, their model illustrated that, once the actions of firms depend on the history of their industry, removing a quota would be anti-competitive and, thus, drive the price up

[22] The Cournot assumption has its cons as well. Specifically, it brings up a particular conceptual difficulty: which of the firms gets rationed, and how, if the combined planned sales of the firms exceed the quota?

The size of the quota is yet another parameter found to affect conclusions throughout the literature. As Nordström shows for the case of Rotemberg and Saloner's model and Krugman and Helpman (1989) illustrate in their extensive analysis of a Bertrand oligopoly, the costs of a quota are most likely not to be monotonic in the quota's restrictiveness. That is to say, as much as we can expect that restricting imports at a certain level may be detrimental for the terms of trade of the country that initiates the policy, it is possible that, once this level falls below a certain critical level, the competition between the exporters might induce them to lower their export prices thereby improving the country's terms of trade[23].

In summary, although it has established that a proper analysis of quotas and tariffs' effects on prices charged by foreign firms need to take into account the induced effect of the measures on market conduct, the theoretical work did not take it much further. Moreover, by showing how inconclusive and sensitive to assumptions the effects are, the work has indicated that the only way to make those insights policy relevant is to determine the effects empirically.

## 4 Data and the Empirical Model

Our data cover eight SITC classification categories over the period 1973 to 1994 and are obtained from publications of the *U.S. Department of Commerce.* The data include annual value and quantity exported from the United States to selected destination countries (Canada, Denmark, United Kingdom, Germany, Switzerland, Japan, Australia and New Zealand) of each of the eight 7-digit industry category (cars, cartires, airplanes, motorcycles, film, paper, bourbon, books) [24].

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[23] It is noteworthy that the domestic price in the latter case will still be above the domestic-currency denominated export price. Treating the difference between the two as beneficial for the domestic country's welfare is thus critically dependent on the (implicit) assumption that it is the domestic citizens who hold the licenses to import (as it was under New Zealand's licensing scheme).

[24] Not all the data are available throughout the period. In particular, data on paper, film and motorcycles are available until 1988 only.

The values are in units of the exporter's currency ($US) at the port of export (f.o.b. prices) and are, therefore, readily comparable across destinations. Furthermore, in contrast to local-currency prices at the point of final sale in the destination markets, f.o.b. prices are free of transportation and distribution costs as well as retail and tariff markups. Given the annual destination-specific export values and quantities, a panel dataset of unit values, equal to the quotient of the value and quantity of shipments in an industry category per country for a given year, is constructed. These unit values will be used as our dependent variable - the export price.

Potential problems involved in using unit values are well-known. Basically, they are related to shifting composition of goods within the aggregate category. Indeed, the multidestination data on export values and quantities are available at the 7-digit industry rather than the firm level. While this forces us to aggregate firms into groups and consider the products exported to different destinations as close substitutes, the trade policy debates' focus on industries (rather than firms) does, in a way, both justify and validate working at this level of aggregation. More importantly, we will be basing our analysis on comparison of relative prices solely. In that sense, our conclusions might be mistaken only insofar as there is a shock that affects the composition of shipments to two destinations differently. There, we rely on the facts that (i) all countries in the sample are closely interrelated industrial countries that are likely to be concurrently exposed to and similarly affected by the same shocks and (ii) a value quota does not affect the relative price and, therefore, the composition of imports within the restricted category relative to free trade.

To analyse the export price adjustment for a 7-digit industry in a given source country we estimate the following model:

$$p_{it} = \alpha + \theta_t + \lambda_i + \lambda_{NZ} d_t + \beta x_{it} + \gamma \tau_{NZ,t} + \varepsilon_{it}$$

where $i$ ($i$ = 1,2,...,N) and $t$ ($t$ = 1,2,..., T) index the destination market for exports and time, respectively, $p_{it}$ is the log of the destination-specific export price (as defined above), $x_{it}$ is the log of the destination specific exchange rate (expressed as units of the buyer's currency per US$, and deflated by the wholesale price index in the destination market), $\tau_{NZ,t}$ is the log of the tariff rate, and $\alpha$, $\theta_t, \lambda_i$, $\lambda_{NZ}$, $\beta$ and $\gamma$ are parameters to be estimated[25]. The variable $d_t$ is defined as[26]

$$d_t = \begin{cases} 0 \text{ if } t < 1987 \text{ or destination is New Zealand} \\ 1 \text{ if } t \geq 1987 \text{ and destination is New Zealand.} \end{cases}$$

The error terms are assumed to be independently and identically distributed, $\varepsilon \sim (0, \sigma_\varepsilon^2)$.

Model (1) extends Knetter's (1994) specification of an export price equation by introducing an additional control for tariff effects. It has the structure of a linear two-way fixed effects panel model with an intercept term that includes, apart from the standard constant, two additional set of factors, $\theta_t$ s and $\lambda_i$ s. The time effects ($\theta_t$) capture the unobservable effects that are constant across destinations but may vary over time and, thus, control for changes in costs of production through time. The destination specific effects ($\lambda_i$) account for the unobservable effects that are constant over time but assumed to vary across destinations and, hence, account for potential time-invariant differences in the composition of imports within category across destinations. The model thereby makes it feasible to, for a given average quality of destination-specific imports, disentangle the change in price due to a cost change from one that comes from a change in the destination specific markup.

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[25] To construct the exchange rate series, the annual average nominal exchange rates and the wholesale price indices published in various issues of the *International Financial Statistics* are used. Adjusting the series by taking the log of the series divided by its mean, imposes the condition that export prices are unaffected by the changes in the exchange rate that are linked to inflation in the destination country.

[26] The year "1987" stands in fact for 1986 (for paper, film and motorcycles) , 1989 ( for cars and tires) and 1987 (otherwise). It was chosen as to reflect as close as possible the import liberalisation programme in particular industries. In the industries where import licensing existed, the calendar year of the exemption date (having all goods exempt license) was chosen. Otherwise, the reforms were taken as gradually removing the NTBs, and the breaking point was chosen so as to strike a balance between two considerations namely that, (i) not all data are available for the entire period, leading to an imprecise measurement and high variability of, predominantly, the post-reform price differences, and (ii) one would expect that measurable effects will appear only towards the end of the 80s.

In estimation, one time- and one destination-specific effect must be dropped to avoid singularity. Here, the destination effect for New Zealand will be dropped and, consequently, the destination specific effect for each country will measure the average export price difference (in percentage terms) between destination *i* and New Zealand during the pre-1987 period. The time-specific effects are normalised as to sum up to zero. Given that the exchange rate series is normalised around its mean (before taking logs), the (log) of price charged to any destination *i* (except for New Zealand) at time *t* equals $(\alpha + \theta_t + \lambda_i)$ at the average value of the exchange rate series. In other words, we pose that export price to each destination (at the average value of the exchange rate) equals, in general, $(\alpha + \theta_t + \lambda_i)$, i.e. a sum of marginal cost and destination specific markup. The marginal cost is a function of input prices and quantity produced, both of which are likely to vary over time bringing about corresponding changes in price of exports to all destination markets. The marginal cost parameter $\theta_t$ is introduced to capture these effects.

As for $\lambda_i$ s, there might be country specific characteristics that cause the average prices to differ across destinations. In addition to cross-country differences in the average composition of imports discussed earlier, the most fruitful way to think of these characteristics is in terms of country-specific trade policies[27]. If the country-specific restrictive practices are economically significant and anti-competitive in the sense that they enable exporters to capture some of with them associated rent, export prices to that destination should be higher, *ceteris paribus*, than to those charged to the rest of the world; on the other hand, restrictive practices that act so as to reduce market power of foreign exporters should result in the destination-specific export prices that are lower relative to other destinations. This difference in relative prices is captured by $\lambda_i$ s whose estimates reveal the average percentage difference in prices between New Zealand and other destinations during the pre-liberalisation period, conditional on all other controls for destination-specific variation in those prices. The coefficient $\lambda_{NZ}$ is then introduced to measure the change in the average post-liberalisation markup

[27] As explained earlier, our model allows that goods shipped to different destinations are similar rather than identical. The prices that firms charge for those goods will be in different ratios to marginal cost since the firms selling to segmented international markets will price discriminate.

charged to New Zealand. If the quantitative restrictions were significant and the rents were not fully captured by New Zealand importers, the average level of markup over cost to New Zealand should have fallen following the liberalisation. We would, in that case, expect $\lambda_{NZ}<0$.

Although a higher $\lambda_i$, due to the nature of our data, might just reflect a persistently higher quality of goods within the specific export category, a *systematic* evidence that export prices to New Zealand were consistently higher relative to the rest of the world, is likely to be indicative of a country-specific idiosyncrasy, such as a presence of substantially more anti-competitive import restrictions. To see why, recall that the equilibrium prices in each market will eventually be determined by the exporters' perceptions of the elasticities of demand facing them in those markets and, therefore, be not necessarily the same. Given that there is no reason to believe that shapes of (residual) industry demand curves for a wide range of industries differ systematically across destinations, systematic country-specific relationships in relative prices in those industries are better interpreted as country- rather than industry-specific. Furthermore, even a persistent quality difference would not be a problem since inference is drawn off $\lambda_{NZ}$ rather than off $\lambda_i$s. As a final caveat, is it possible/likely that a reduction, let's say, in $\lambda_{NZ}$ reflects a liberalisation induced fall in quality purchased? A bulk of work (see e.g. Feenstra (1988)) has, in fact, suggested that price differential might indeed indicate a quota induced quality upgrade[28]. The fact that quotas in New Zealand were denominated in value, rather than volume, terms is, therefore, crucial. This is because the importers who are constrained by the *value* of goods they import maximise their returns with respect to each dollar of import entitlement. Consequently, their actions do not affect the relative price and, hence, the composition of imports within the restricted category relative to free trade[29].

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[28] The incidence of an increase in product characteristics due to a quota has not been unequivocally established (see, for instance, Rodrigez (1979), Das and Donnenfeld (1987, 1989)), Krishna (1987)).

[29] To see the latter, suppose that $p_i$ and $p_j$, and $p_i^{exp}$ and $p_j^{exp}$ stand for the domestic and export prices of a cheaper and a more expensive variety of the import category under consideration. If importers are facing a limit on the value of imports, they will find it profitable to import each variety up to the point where the return per dollar spent is the same for both varieties, i.e. until $(p_i - p_i^{exp})/ p_i^{exp} = (p_j - p_j^{exp})/ p_j^{exp}$. Thus, in equilibrium, the relative price at home does not differ from the relative export price, i.e. $p_i / p_j = p_i^{exp}/ p_j^{exp}$. The case is in contrast to

The motivation to control for exchange rate effects comes from the pricing to market literature (see e.g. Marston (1990), Knetter (1993)), where exchange rates were found to be significant determinants of the changes in the destination-specific markups. Taking into account that a heavy depreciation of the currency paralleled New Zealand's reform programme of the mid-80s, we include the exchange rate as an explanatory variable in order to isolate the effects of trade restrictions. Moreover, the estimates of $\beta$ are interesting since they will provide some evidence on which type of market namely, the perfectly competitive, the integrated imperfectly competitive or segmented imperfectly competitive, is most applicable for modelling international markets for manufactured goods. In particular, a competitive world market would imply $\theta_t = c = p$, $\lambda_i = \beta = 0$ while the imperfectly competitive integrated market would imply $\theta_t = c$, $\lambda_i = \lambda$, $\beta = 0$. Nonzero values of $\beta$ (in conjunction with systematic cross-industry differences in $\lambda_i$s), on the other hand, imply price discrimination triggered by exchange rate changes and, as such, are inconsistent with the integrated market hypothesis[30].

From a theoretical perspective, the tariff rate acts very much like the exchange rate[31]. That is to say, in contrast to traditional theory which implied that a country can experience a terms of trade gain from imposing a tariff only if it is large enough to, by doing so, decrease the world demand and, thereby, the world price of the good, we now know that once the traditional assumptions of perfect competition and constant returns to scale are relaxed, foreign exporters might respond to tariff rate changes by adjusting their prices depending on the properties of the residual demand schedule they are facing. To illustrate, recall that the domestic price of the good can be obtained by multiplying the domestic-currency denominated export price with the exchange rate $e_i$ and a tariff factor $(1+\tau_i)$, where $e_i$ and $\tau_i$ denote the NZ$/US$ exchange rate and tariff rate on the US imports of certain good, respectively. If export prices are

that of volume quotas, were importers are optimising at the point where premia for both varieties are equal.

[30] Assuming that βs are constant across destinations is consistent with the pricing to market studies which suggest that degree of pricing to market is industry specific (Knetter (1993)).

[31] For the symmetry of tariffs and exchange rates see Feenstra (1989).

unaffected by tariffs, the pass-through is said to be complete; if exporters lower their prices following a tariff increase, the “tariff-pass-through” is incomplete and local prices increase by less than tariffs. Hence, the coefficient $\gamma$ in equation (1) will be zero in the former, and negative in the latter case.

The tariff data for the study were collected from publications of the *Customs Tariff of New Zealand*. Costs of obtaining more detailed information on the tariff structure in other destination countries are considerable. The perceived benefits of including them, on the other hand, are not substantial. While it certainly would be interesting to compare the tariff coefficients across destination markets, the fact that New Zealand reforms of mid 80s were truly unilateral ought to ensure unbiasedness of all the relevant coefficients in the regression.

## 5 Estimation and Results

To analyse the price impact of tariffs and quotas, we begin by examining the behaviour of the export price charged to New Zealand relative to the export price charged to “rest of the world” throughout the sample period. We compute the latter price as an average of the unit values charged to all other destinations, namely Canada, Denmark, United Kingdom, Germany, Switzerland, Japan and Australia. The resulting time-series plots are depicted in Figures 3 and 4.

The first notable pattern is that the two prices move more or less in the same direction in most of the cases (in particular, only the prices for paper and motorcycles seem to, for an extended period of time, move in directions opposite to those in which the world prices for the respective goods move). This indicates that it is, indeed, the same factor - marginal cost - that is the main determinant of these prices. What about the relative price movements that ought to reflect the idiosyncratic trade policy changes that took place over the period? To begin with, notice that New Zealand prices tended to exceed those in the rest of the world throughout the first half or so of the period. Around the mid or late 80s, on the other hand, the prices fell below the average “world” price level and have stayed there till the end of the period. Basing our interpretation of the graphs on the idea that the policy changes, if any, in the destinations other than New Zealand cancel out, we conclude that the figures indicate a significant negative price effect from the mid 80s trade liberalisation.

The same results emerge if we calculate "differences in differences", i.e. changes in the percentage difference in export prices to New Zealand relative to the rest of the world. Table 5 reports the numbers. To compute the *Price to NZ relative to world price/Pre-reform*, the logarithmic average "world" price for each year in the pre-reform period is subtracted from logarithm of the price to New Zealand in that particular year. These differences measure the percentage difference in the price between New Zealand and the rest of the world in that year. The average of the differences over the pre-reform period is reported in the second column of Table 5. For instance, we see that the price charged on the car shipments to New Zealand was on average 9.91 percent lower than the average price charged on shipments to the rest of destinations during the period preceding the liberalisation.

The average percentage differences in prices to New Zealand relative to prices to the rest of world in the period following the liberalisation, *Post-reform*, are computed in a way analogous to the above and reported in the third column of Table 5. We see, for example, that the average difference in the car price increased to 45.36 percent. The difference between the two, -35.44 percent, indicates by how much, in percentage terms, the relative car price charged to New Zealand fell following the liberalisation. The associated *t*-statistics of 4.88 shows that the decline is statistically significant, i.e. we reject the hypothesis of no change between the two sub-periods. This economically substantial decline in export prices is supported by the rest of the data. The decrease in the relative price varies from 17.84 percent for bourbon to 159.53 for paper. It is interesting to notice that the average price of books (that had no restriction imposed) actually rose. Finally, the unchanged price of motorcycles is most likely due to the fact that the sample period ends in 1988, i.e. it is too short for the changes to be accounted for.

Although the falling prices to New Zealand depicted in Figures 3 and 4 could, in principle, be revealing of a potential downward trends in costs of production, the rising price differentials require additional exploration. As discussed earlier, the theory of international trade under imperfect competition points to two additional sources of those differentials. In particular, it indicates that exporters are likely to adjust their prices in response to changes in destination-specific exchange rates and trade policies. The changes in the latter are then argued to be subject to the choice of restriction imposed. Our specification, by controlling for both tariffs and exchange rates, decomposes the differentials to pin down the determinants of export prices[32]. The results from the regression are reported in Table 6.

Before considering the price effects more thoroughly, we take advantage of the model specification to address another related issues. Which, the integrated/perfectly competitive or the segmented market model, is more appropriate for modelling international markets for manufactured goods? To answer the question, recall that the integrated world market for a certain good would imply that exporters do not adjust their markups in response to destination-specific changes in the exchange rate and that, to begin with, those markups do not differ across destinations. Now, consider the estimates of the destination-specific markups ($\lambda_i$s) reported in Table 6: in each case, at least three of the coefficients are significantly different from zero, indicating that the markups do differ across destinations. In other words, the fact that the price of tires charged in Canada, for instance, is about 25 percent lower than the price charged on tires shipped to New Zealand testifies that the decisions on the size of markups to be charged on shipments to the two markets are made separately, i.e. that the exporter charges destination-specific, positive markups in the first place. International market for tires is, thus, to  be segmented. By the same token, international markets for all the products under consideration are likely to be segmented as well.

Estimates of $\beta$s tell much the same story as pricing to market studies do: as his currency *vis-à-vis* the currency of destination *i* appreciates (depreciates), the exporter

[32] $\lambda_{NZ}$s will then, for the reasons explained earlier, reflect changes in prices due to liberalisation of quotas.

lowers (raises) the markup charged to destination *i*. Although, similar to most pricing to market studies, the estimates differ considerably across industries (from one to about forty four percent) and are largely insignificant, all but one of the coefficients reflect the local currency price stabilising feature of export prices found elsewhere in the literature.

A most remarkable result is that the response of exporters to tariff rate changes matches extraordinarily well predictions put forward by the new trade theory. In particular, tariffs have negative price effects, causing the export prices to fall in response to imposition of tariff. The overall negative sign of the coefficients thus implies that, like in the case of the exchange rate shocks, foreign exporters are likely to respond to tariffs by stabilising the local-currency prices. The coefficients differ substantially in magnitude (a one percent increase in tariff rate leads to between a 0.16 and 0.99 percent decrease in price) over the products, but are, all except one, insignificant. The coefficients on motorcycles merit a special attention since they are comparable to those reported in Feenstra (1989); in particular, the exchange rate pass-through coefficient reported there is almost the same as the one found here. Furthermore, the pass-through elasticities display the same pattern found in Feenstra (1989) - t-tests uniformly fail to reject the hypothesis of symmetric pass-through of tariffs and exchange rates (test statistics range from 0.1 to 0.91).

Finally, we turn to the price impact of quotas. The relevant information is shown again in Table 6 where, in the *NZ Trade Reform* row, $\lambda_{NZ}$s for different industries are reported. As explained earlier, the estimates of these coefficients can be used to gauge the price impact of quotas, for they equal the percentage change in the relative price charged to New Zealand's quota-restrained market as compared to the relative price charged to the same market without quota, *ceteris paribus*[33]. The estimated price impacts are substantial, and all but two coefficients are significant at the five percent level. The size of the latter varies from about 22 percent for bourbon to about 77 and 88 percent for airplanes and cars, respectively. The most sizeable effect (147 percent)

[33] Such a measure of the impact of the quota on price resembles quite closely that suggested by Feenstra (1995). The measure improves on all measures used so far and discussed in Laird and Yeats (1990, pp28-30).

was found for paper, the industry that is distinguished by highly concentrated market power in domestic supply. We, therefore, argue that it testifies on the magnitude of the detrimental effect of quotas when both domestic and foreign market power are present. An insufficient time-span of the data on motorcycles is the most likely reason for the insignificant (positive) coefficient found there while the positive significant coefficient on books, although interesting, has no substantial bearing on the questions posed here (for no restriction has existed on imports of books throughout the period).

Since they are identified by pre-reform New Zealand prices and the prices to other countries over the entire sample, it is, in principle, possible that $\lambda_{NZ}$s might have picked up some of the simultaneous decrease in the prices over time[34]. Table 7 provides evidence that counters this argument. The displayed coefficients are based on regressions of the type

$$p_{it} = \alpha + \theta_t + \lambda_i + \lambda_j d_{jt} + \beta x_{it} + \gamma \tau_{NZ,t} + \varepsilon_{it}$$

where

$$d_t = \begin{cases} 1 \text{ if } t \geq 1987 \text{ and destination is } j \\ 0 \text{ otherwise} \end{cases}$$

and

$$j \in \{\text{Canada, Denmark, United Kingdom, Germany, Switzerland, Japan, Australia}\}.$$

In other words, we reran the original regression while consecutively replacing the New Zealand dummy by dummy variables for all the other countries in the sample. In the sense that coefficients for New Zealand are both largest and the sole systematically negative ones, i.e. that no other country exhibits a systematic pattern of lower export prices, the displayed coefficients substantiate our previous findings.

## 6 Conclusion

[34] It is unlikely since $\theta_t$s are supposed to capture those effects.

In this paper we have analysed effects of tariffs and quotas on the pricing behaviour of foreign exporters. To do so, we introduced a way to measure the price-impact of quotas that improves on the measures proposed in the literature so far. By making use of a panel dataset, we estimate the impact by comparing the price in a quota-restrained market to the price in the same market without quota.

Our analysis has addressed the following questions: (i) Which of the two basic models, with or without market power, is more appropriate for examining the effects of trade policies in international markets for manufactured goods? (ii) Is market power of foreign exporters, if any, subject to the type of protection imposed? (iii) As a general rule of thumb, is the elimination of quantitative restrictions more likely to be pro- or anti-competitive and, hence, beneficial or detrimental for the terms-of-trade of the country undertaking the liberalisation?

The findings are surprisingly strong and unambiguous. Market power is a widespread phenomenon in the international goods markets for manufactures. It has been detected in all products, ranging from almost homogenous categories such as film to categories that comprise a considerable variety of products such as cars or airplanes. Models that rely on the integrated goods market assumption yield, therefore, erroneous conclusions. In particular, by not allowing for the effects of trade liberalisation on market power of foreign exporters the models greatly underestimate (potential) benefits of trade liberalisation.

The principal message of the paper is twofold. Firstly, quotas and tariffs are by no means equivalent: while quotas perform as to increase export prices, the relationship between tariffs and export prices is much less certain. To the extent that there is any, tariffs are inversely related to the prices charged by foreign exporters. Secondly, quantitative restrictions are a particularly expensive form of protection. The deteriorating effects quotas have on the terms-of-trade of the country that imposes them are quantitatively important are ubiquitous.

In terms of immediate policy relevance, the results indicate that using actual license prices to convert quotas into tariffs is, in general, invalid. Accordingly, the estimates of the revenues to be raised from auctioning licenses to import by the importing country that are obtained using computable general equilibrium models by far exceed the actual revenue-raising potential of those auctions. As a general rule of thumb, liberalising NTBs, most of which are believed to have economic impact similar to that of quotas, is highly desirable since it is likely to improve the terms-of-trade of the country that initiates the policy.

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Figure 1

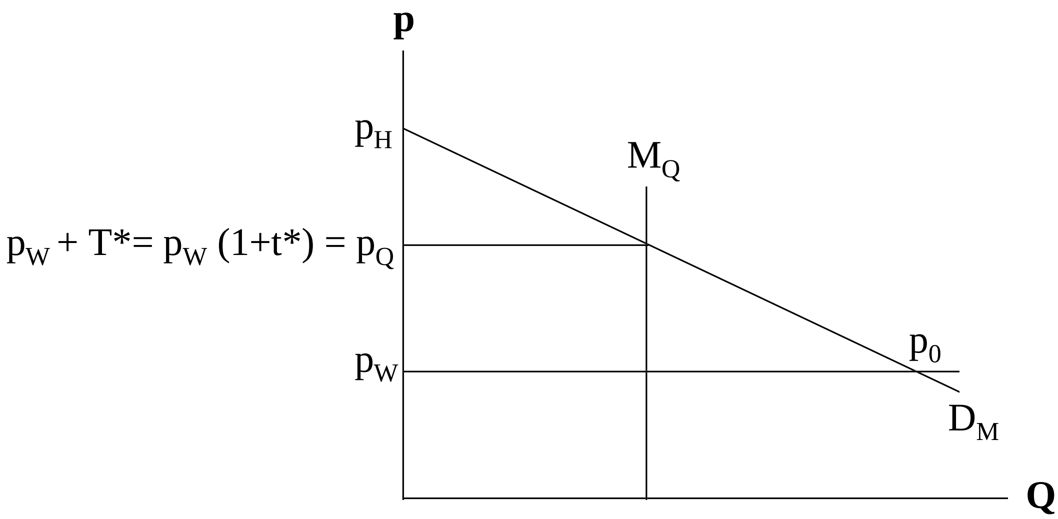

Figure 2.

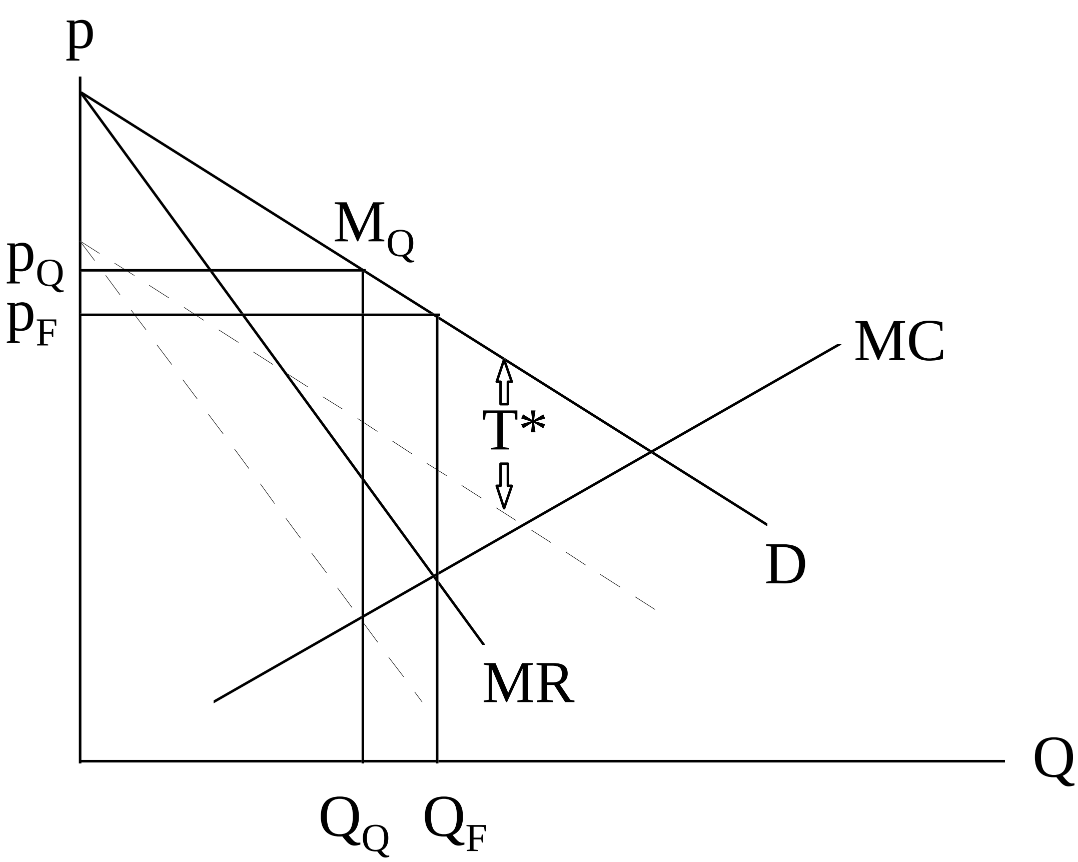

Figure 3: Export Prices to New Zealand and to World

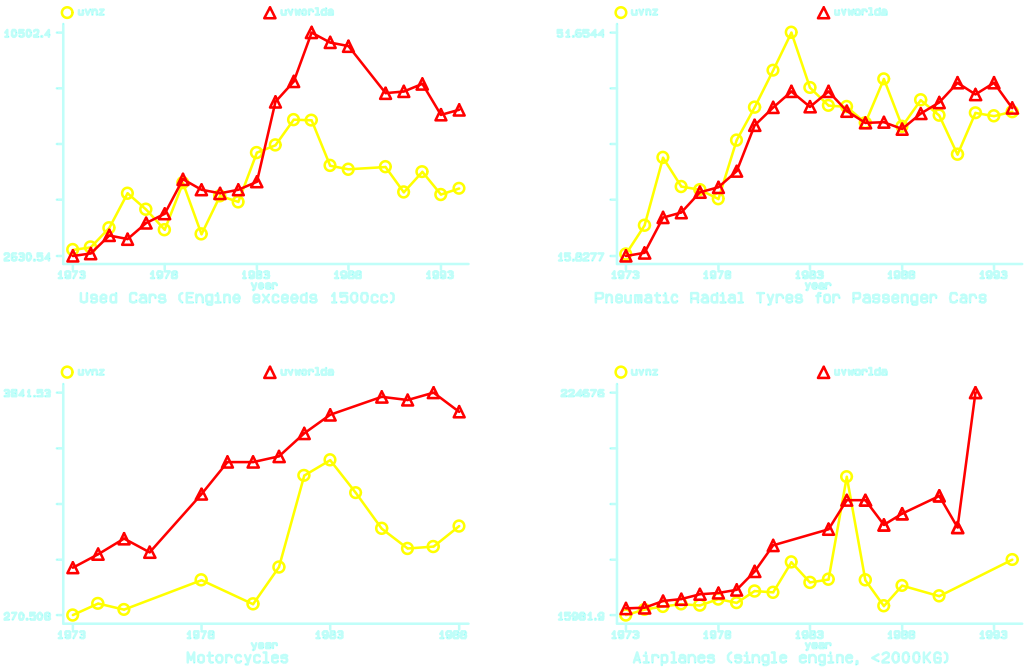

Figure 4: Export Prices to New Zealand and to World

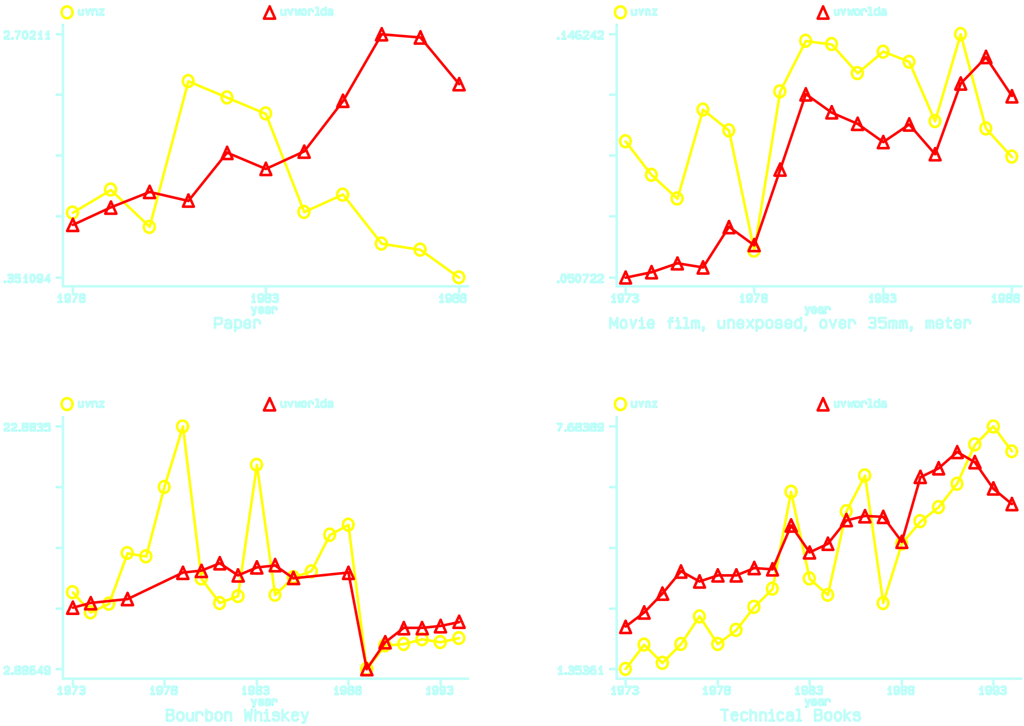

Table 5: Differences in Differences

| *Industry* | *Price to New Zealand relative to world price*[a] *(% difference)* | | *t-test for change in relative price*[b] |
|---|---|---|---|
| | *Pre-reform* | *Post-reform* | |
| Cars | -.0991 | -.4536 | 4.88 |
| | (0.067) | (0.028) | |
| Cartires | .0949 | -.0876 | 3.11 |
| | (0.029) | (0.051) | |
| Airplanes | -.3520 | -1.2161 | 5.10 |
| | (0.088) | (0.145) | |
| Motorcycles | -0.9932 | -0.9273 | -0.36 |
| | (0.154) | (0.098) | |
| Film | 0.3249 | -0.1016 | 3.09 |
| | (0.065) | (0.122) | |
| Paper | 0.0297 | -1.5656 | 7.51 |
| | (0.159) | (0.141) | |
| Bourbon | .0917 | -.0867 | 1.31 |
| | (0.113) | (0.075) | |
| Books | -.3100 | -.0660 | -2.02 |
| | (0.081) | (0.090) | |

*Notes:*
[a] The world price is the average price charged to Canada, Denmark, the United Kingdom, Germany, Switzerland, Japan and Australia.
[b] The null hypothesis is that the percentage difference between the New Zealand price and the world price is unchanged over the two periods.

TABLE 6. Price effects of quotas.

| | Cars | Tires | Airplane | Mcycles | Film | Paper | Bourbon | Books |
|---|---|---|---|---|---|---|---|---|
| Constant | 8.6263 | 3.5821 | 10.7869 | 6.8810 | 2.0973 | .3775 | 2.2739 | 1.2246 |
| | (.083) | (.052) | (.084) | (.106) | (.086) | (.173) | (.057) | (.076) |
| Canada | -.5062* | -.2506* | .0091 | 1.0105* | -.5392* | -1.0968* | -.2623* | |
| | (.101) | (.059) | (.113) | (.133) | (.111) | (.195) | (.070) | |
| Denmark | -.1126 | .0223 | .3886* | .6256* | -.4419* | .2886 | -.1301* | .0912 |
| | (.101) | (.059) | (.113) | (.166) | (.116) | (.196) | (.072) | (.093) |
| United Kingdom | .0426* | -.0029 | .0819 | .6874* | -.4963* | -.5595* | -.0268 | .2834* |
| | (.102) | (.059) | (.108) | (.133) | (.111) | (.193) | (.069) | (.093) |
| Germany | .0849 | -.1425* | .4645* | .9389* | -.2825* | .1981 | -.1997* | .2709* |
| | (.102) | (.059) | (.107) | (.133) | (.111) | (.196) | (.069) | (.093) |
| Switzerland | .3463* | -.0038 | .3109* | 1.0929* | -.0937 | .0945 | -.1373* | .2736* |
| | (.102) | (.059) | (.107) | (.134) | (.111) | (.193) | (.070) | (.093) |
| Japan | .1821 | -.1886* | .5846* | 1.0392* | -.5584* | .3408 | -.1555* | .5391* |
| | (.102) | (.059) | (.107) | (.133) | (.111) | (.192) | (.069) | (.093) |
| Australia | -.3502* | -.0739 | .0730 | .8948* | -.4222* | -.3226* | -.0502 | .0939 |
| | (.101) | (.059) | (.107) | (.133) | (.111) | (.196) | (.069) | (.093) |
| Exchange Rate | -.4340 | -.2176 | -.0071 | -.0056 | .2492 | -.4362 | -.0749 | -.0132 |
| | (.276) | (.141) | (.340) | (.412) | (.355) | (.627) | (.197) | (.316) |
| Tariff | -.9972* | -.0156 | .0659 | -.6683 | .2861 | .4637 | -.1551 | |
| | (.586) | (.339) | (.092) | (.706) | (.198) | (1.109) | (.184) | |
| NZ Trade Reform | -.8845* | -.1991 | -.7694* | .0864 | -.3825* | -1.4692* | -.2214* | .2122* |
| | (.349) | (.185) | (.217) | (.228) | (.199) | (.323) | (.091) | (.128) |
| Observations | 168 | 176 | 156 | 115 | 125 | 88 | 169 | 154 |
| R-squared | 0.565 | 0.3764 | 0.4855 | 0.5630 | 0.3477 | 0.6826 | 0.1922 | 0.2973 |

*Notes:*

Standard errors in parentheses. Coefficients marked with a * are significant at the 10% significance level.

The dependent variable is log of export unit value.

Each regression includes a set of period specific dummy variables.

TABLE 7. Price changes pre-and post New Zealand reform in New Zealand and in reference countries.

| | Cars | Tires | Airplane | Mcycles | Film | Paper | Bourbon | Books |
|---|---|---|---|---|---|---|---|---|
| Canada | .0292 | -.1302* | .0634 | .2922 | -.8187 | .4690 | .2954* | |
| | (.159) | (.074) | (.263) | (.223) | (.189) | (.338) | (.100) | |
| Denmark | .0060 | .0659 | -.0254 | -.6716* | .5554* | -.1244 | -.1038 | .2389* |
| | (.151) | (.072) | (.184) | (.251) | (.321) | (.336) | (.100) | (.128) |
| United Kingdom | .0484 | .0718 | -.2365 | -.0408 | .4206* | -.4504 | .1238 | -.0254 |
| | (.154) | (.073) | (.163) | (.222) | (.199) | (.332) | (.092) | (.132) |
| Germany | -.0992 | .1983* | -.0119 | -.0824 | .4475* | .8064* | .2725* | -.0274 |
| | (.151) | (.070) | (.161) | (.220) | (.197) | (.325) | (.088) | (.130) |
| Switzerland | .0494 | .1415* | .0767 | .1945 | .3886* | 1.0070* | -.1728* | -.3053* |
| | (.151) | (.071) | (.161) | (.221) | (.198) | (.316) | (.091) | (.127) |
| Japan | .2605* | -.2549* | .9196* | -.1587 | .0849 | .0164 | .0648 | -.1723 |
| | (.152) | (.070) | (.144) | (.231) | (.211) | (.355) | (.095) | (.133) |
| Australia | -.1296 | -.0812 | -.3866* | .2333 | -.4464 | -.5539 | -.2506* | .0840 |
| | (.154) | (.073) | (.173) | (.241) | (.215) | (.364) | (.095) | (.142) |
| New Zealand | -.8845* | -.1991 | -.7694* | .0864 | -.3825* | -1.4692* | -.2214* | .2122* |
| | (.349) | (.185) | (.217) | (.228) | (.199) | (.323) | (.091) | (.128) |

*Notes:*
Standard errors in parentheses. Coefficients marked with a * are significant at the 10% significance level.