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CANTER

DP 95-06

Department of Economics

UNIVERSITY OF CANTERBURY

CHRISTCHURCH, NEW ZEALAND

ISSN 1171-0705

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Discussion Paper

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Department of Economics, University of Canterbury
Christchurch, New Zealand

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Liliana Winkelmann and Rainer Winkelmann

Optimal Markup Responses to Trade Policy Reform in a Small, Open Economy: Evidence from New Zealand

by

Liliana Winkelmann and Rainer Winkelmann
Department of Economics
University of Canterbury
Private Bag 4800
Christchurch, New Zealand

Fax: 64 3 364 2635
Phone: 64 3 364 2825

Abstract

Recent developments in new trade theory have shown that trade liberalization in small open economies can affect terms of trade in imperfectly competitive markets. We use the natural experiment provided by the comprehensive New Zealand economic reforms in the mid 1980's to test this proposition. Using panel data on export unit values from Germany and the United States to several destinations including New Zealand, we find weak evidence for decreased export prices to New Zealand as a result of the reforms.

JEL code: F1, F14

Keywords: export unit values, panel data, tariffs, pass-through

1. Introduction

Harris (1984), Markusen and Venables (1988), and Hertel (1994) introduced general equilibrium frameworks for analyzing the effects of trade and industrial policy under imperfect competition in a small open economy. The motivation for these papers was the "new trade theory" insight that no country is "small" in that it cannot influence its terms of trade on one hand, and the conflicting variety of policy implications of these new models on the other. The unusually comprehensive and consistent program of economic liberalization that was undertaken in New Zealand in the mid-80s provides an unprecedented natural experiment setting for examining the impact of trade reform in a small, open economy.

Provided that the international marketplace is characterized by a segmentented market structure, the new view maintains that foreign suppliers will be setting export prices for each destination rather than charging a single price across the markets. Subject to both industry-specific and broad macroeconomic factors, a general trend of adjusting profit margins in response to changes in policy variables is predicted as a part of the exporters' profit maximizing behaviour. Neither the direction nor the size of these changes are, however, conclusive and both depend on the nature of strategic interactions among the parties involved.

In particular, a decrease in the tariff rate is suggested to impact the relative price of exports through at least two different channels. The first is associated with a structural change in the industry and leads to a reduction in the distortion itself. The common

argument is put forward in the IO literature and is as follows. Both the size of the market and the degree of foreign competition within it depend on the prevailing rate of protection. As this rate changes, the industry structure and the competition in product markets are affected, implying an adjustment in the markup of price over cost. This setup gives rise to so-called "procompetitive effects" of trade reform as defined by Vousden (1990) and predicts that markups are increasing in tariffs. An alternative channel is suggested in Feenstra (1989). The focus here is on the incompleteness of the pass-through of tariffs and the industry structure is assumed to be fixed. This analysis makes a case for a "terms of trade" argument for import protection by emphasising a possible negative relationship between tariff rates and optimal markups charged by firms.

The two channels can be conceived of as affecting the long run equilibrium relationship between protection rates and prices, and the short run markups on unit cost respectively. Which of the two effects prevails is then an empirical issue. The purpose of this paper is to provide evidence on the comparative size of the two effects for the case of a small open economy. New Zealand lends itself as a natural case study: The economic reforms commencing in the country between 1979 and 1984 brought the nominal tariff rate for the import-competing sector from 28 per cent in 1981/82 down to about 21 per cent in 1987/1988 (see Wong, 1989).

We utilize a partial equilibrium framework to assess the impact of dismantling the protection regime on the structure of the New Zealand product markets. Although the partial equilibrium approach has the drawback that it cannot account for the economy wide effects of import liberalization, it has the advantage that it can be applied to detailed product-level data on prices and quantities. Furthermore, most of the policy measures

undertaken in New Zealand were aimed at increasing the competition faced by the protected industries. Our study focuses on American and German exports to New Zealand and a control group of foreign markets between 1973 and 1992. The markup over cost on exports to New Zealand is expected to decrease relative to other export destinations during the period.

2. The Empirical Model

To estimate the effect of trade liberalization on export prices to New Zealand we use the following two-way fixed effects panel model

$$p_{ijt} = \theta_{tj} + \lambda_{ij} + \delta D_{ijt} + \beta_{ij} x_{ijt} + \epsilon_{ijt}$$

where j is a 7-digit industry index, i a destination index, t a period index, and

$$D_{ijt} = \begin{cases} 1 & \text{if } t > 1984 \text{ and } i = \text{New Zealand} \\ 0 & \text{otherwise} \end{cases}$$

p is the log of the unit value in sellers currency and x is the log of the exchange rate in units of buyers currency per units of sellers currency. The highly disaggregated data mitigate the concern of using unit value data for non-homogeneous product categories. For a given industry j, θ_t captures unobservable effects that vary over time but are constant across destinations, for instance changes in marginal costs of exporters and/or common changes in markups, whereas λ_i measures effects that are constant over time but vary across destinations. Example for the latter are geography, quality differences in

products, and, in particular, trade policy. The main benefit of the panel approach is that destination specific markup differences can be identified without actually observing marginal cost. This is the case since marginal costs for any exporter can be assumed identical for each export destination.

Knetter (1989, 1993) has introduced the above framework to study pricing-to-market of US and German exporters. In contrast to Knetter, our main interest is not in exchange rate effects but rather in the structural change effect δ. The interpretation of δ is as follows. It measures the percentage change in average markups for exports to New Zealand *relative* to other destinations after 1984. There are at least two reasons, other than trade liberalization, why export prices to New Zealand might have changed during the period. The first is associated with marginal cost movements common to all destinations. The second is associated with the large and persistent depreciation of the New Zealand dollar over the period that might have affected export prices. The above model controls for both factors through the inclusion of time dummies and exchange rates. Hence, the potential bias is avoided and the coefficient δ measures the specific New Zealand trade liberalization effect.

If δ is negative, that is the average markup to New Zealand relative to other destinations has decreased, we conclude that the increase in competitiveness due to reforms is the dominant factor. If δ is positive (and β_{NZ} negative) it means that the increased markups due to the incomplete pass-through of tariff reductions outweighs the competitiveness effect, and prices charged to New Zealand rose relative to other destinations.

3. Data and Estimation

We estimate export price functions for two source countries, Germany and the United States. Both countries are ranked among the 6 largest exporters to New Zealand.The US import share was 12 percent in 1993. Annual data of export values and quantities by destination for 7-digit industries are published by the US Department of Commerce and by the German Statistisches Bundesamt. The sample period is 1973-1992 for the US and 1975-1987 for Germany. For some industries the period differs due to missing observations. The main criterion for selecting specific industries was a continuous presence of New Zealand as an export destination. Since New Zealand is a small market, most industries failed this test. Moreover, it was not possible to find an industry that satisfied this criterion for both Germany and the US. The control destinations include the main trading partners of the two source countries, including the United Kingdom, Japan and Canada, as well as some smaller destinations like Sweden and Denmark.

Tables 1 and 2 display the regression results for six selected industries for each source market. The first two columns give the estimates for λ_i and β in the general model. Standard errors are in parentheses. The values for θ_t are not displayed. To avoid multicollinearity, New Zealand has been omitted as a destination. Therefore, the λ_i's measure the difference (in percent) between markups to other destinations and markups to New Zealand. To give one example, consider the US export of raisins. The estimates indicate that the export price of raisins in the pre-1985 period was between 20 and 60 percent higher for New Zealand than for control destinations. After the reforms took place, the premium decreased by 21 percentage points. This result is compatible with a "procompetitive" interpretation of New Zealand trade reforms.

As discussed above, such an interpretation is only valid after the potential effect of exchange rate movements is taken into account. The estimated coefficients for β_i are all negative and 5 out of 7 are significant. US exporters decrease their markup as their currency appreciates. This phenomenon is referred to as incomplete pass-through or local currency price stabilization (Knetter, 1989). In the last column, we re-estimates the model under the restriction that $\beta_i=\beta$ for all i. This restriction postulates that the pass-through relationship is industry specific rather than industry *and* destination specific. Such a restriction has been tested in Knetter (1993). It preserves degrees of freedom, and the New Zealand trade reform effect is estimated more precisely. Contrary to Knetter (1993), F-tests reject the restriction for the raisin regression, as well as for all other regressions. This universal rejection may be due to the fact that our sample includes destinations with a more diverse market structure.

The regression results for US exporters in table 1 indicate that the New Zealand markup relative to other destinations has decreased in the post-1984 period in all industries. While the point estimates of the decrease in the markup vary from 7 percentage points for car tires to 26 percentage points for airplanes, the effect is statistically insignificant in all but the raisin industry. The results for German exporters in table 2 provide a somewhat different picture. Three of the six industries display positive point estimates for δ. One of the positive coefficients (for electric switches) is statistically significant.

The reaction of German exporters to the trade reforms is thus less consistent with the pro-competitive argument than the reaction of US exporters. Part of this difference may be due to the industry selection. Further, the control group for the two source countries differ. The German export destinations include the US and more European countries.

There is evidence that these countries have experienced contemporaneous increases in competitiveness, for European countries due to the gradual integration process.

4. Conclusions

Did the New Zealand trade reforms in the mid-eighties affect the terms of trade? We assess this question using panel data on export unit values of German and US exports to various destinations. There is weak evidence that export prices to New Zealand relative to other destinations fell after the reforms took effect. This finding is compatible with the view that the increase in competitiveness due to trade liberalization did outweigh a potentially incomplete pass-through of tariff reductions.

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TABLE 1: EXPORT PRICE EQUATIONS FOR THE UNITED STATES (1973-1992)

Industry	Destination	λ_i		β_i		λ_i^1	
Raisins	Canada	-0.193*	(0.480)	-1.102*	(0.224)	-0.182*	(0.527)
T=20	Denmark	-0.380*	(0.479)	-0.277	(0.207)	-0.401*	(0.526)
	UK	-0.516*	(0.479)	-0.356*	(0.159)	-0.527*	(0.528)
	Germany	-0.505*	(0.479)	-0.364*	(0.199)	-0.521*	(0.526)
	Switzerland	-0.468*	(0.479)	-0.303	(0.196)	-0.487*	(0.526)
	Japan	-0.584*	(0.479)	-0.463*	(0.175)	-0.590*	(0.527)
	New Zealand			-0.385*	(0.193)		
	NZ >1984	-0.206*	(0.855)			-0.237*	(0.697)
	R-squared	0.945**				0.918	(β=-0.182)
Airplanes	Canada	0.022	(0.122)	0.007	(0.600)	-0.005	(0.118)
T=16	UK	0.179	(0.123)	-0.096	(0.437)	0.156	(0.119)
	Germany	0.478*	(0.122)	-0.139	(0.573)	0.455*	(0.118)
	Switzerland	0.332*	(0.122)	-0.321	(0.532)	0.317*	(0.118)
	Japan	0.401*	(0.122)	-0.150	(0.465)	0.381*	(0.118)
	Australia	0.020	(0.122)	0.014	(0.649)	-0.006	(0.118)
	New Zealand			0.315	(0.515)		
	NZ >1984	-0.264	(0.236)			-0.439*	(0.193)
	R-squared	0.821**				.815	(β=-0.080)
Used Cars	Canada	-0.506*	(0.098)	-1.135*	(0.462)	-0.513*	(0.105)
T=16	Denmark	-0.082	(0.098)	-0.061	(0.465)	-0.122	(0.105)
	UK	0.035	(0.098)	-0.590*	(0.338)	0.016	(0.105)
	Germany	0.130	(0.098)	-0.199	(0.446)	0.093	(0.105)
	Switzerland	0.344*	(0.098)	-0.702*	(0.413)	0.326*	(0.105)
	Japan	0.154	(0.098)	-0.224	(0.360)	0.114	(0.105)
	Australia	-0.282*	(0.098)	0.288	(0.500)	-0.329*	(0.105)
	New Zealand			0.158	(0.398)		
	NZ >1984	-0.171	(0.187)			-0.401*	(0.169)
	R-squared	0.843**				0.804	(β=-0.447)

Table 1 (cont.)

Bourbon	UK	-0.033	(0.075)	0.095	(0.265)	-0.060	(0.077)
T=20	Germany	-0.210*	(0.074)	-0.158	(0.329)	-0.217*	(0.076)
	Switzerland	-0.104	(0.074)	0.466	(0.325)	-0.144*	(0.076)
	Japan	-0.161*	(0.074)	0.083	(0.290)	-0.184*	(0.076)
	Australia	-0.011	(0.075)	0.767*	(0.382)	-0.052	(0.076)
	New Zealand			0.387	(0.325)		
	NZ >1984	-0.093	(0.134)			-0.195*	(0.102)
	R-squared	0.844**				0.828	(β=-0.160)
Cartires	Canada	-0.223*	(0.051)	-0.125	(0.217)	-0.252*	(0.051)
T=20	Denmark	0.012	(0.051)	-0.329*	(0.199)	-0.007	(0.051)
	UK	-0.014	(0.051)	-0.385*	(0.153)	-0.027	(0.052)
	Germany	-0.170*	(0.051)	-0.593*	(0.190)	-0.177*	(0.051)
	Switzerland	-0.001	(0.051)	-0.243	(0.188)	-0.026	(0.051)
	Japan	-0.149*	(0.051)	0.010	(0.168)	-0.191*	(0.052)
	Australia	-0.626	(0.051)	-0.307	(0.222)	-0.084	(0.051)
	New Zealand			-0.117	(0.193)		
	NZ >1984	-0.066	(0.090)			-0.147*	(0.068)
	R-squared	0.889**				0.861	(β=-0.244)
Cigarettes	Canada	0.022	(0.756)	0.512	(0.347)	-0.009	(0.754)
T=18	Denmark	0.117	(0.756)	0.333	(0.320)	0.091	(0.754)
	Germany	0.051	(0.756)	0.526*	(0.309)	0.015	(0.755)
	Switzerland	0.082	(0.756)	0.386	(0.307)	0.052	(0.755)
	Japan	0.121	(0.756)	-0.100	(0.277)	0.119	(0.757)
	Australia	0.072	(0.757)	0.489	(0.355)	0.041	(0.754)
	New Zealand			0.544*	(0.306)		
	NZ >1984	-0.174	(0.148)			-0.306*	(0.109)
	R-squared	0.901**				0.883	(β=0.090)

Notes:

Standard errors in parentheses.

[1] Restricted model with $\beta_i=\beta$.

* *t*-test: significantly different from zero at the 10 percent level.

***F*-test: restriction $\beta_i = \beta$ is rejected at the 10 percent significance level.

TABLE 2: EXPORT PRICE EQUATIONS FOR GERMANY (1975-1987)

Industry	Destination	λ_i		β_i		λ_i^1	
Sport Shoes	Netherlands	-0.297*	(0.044)	-0.299	(0.501)	-0.302*	(0.067)
T=10	UK	-0.113*	(0.044)	0.619*	(0.210)	-0.148*	(0.067)
	Sweden	0.005	(0.044)	-0.243	(0.404)	0.001	(0.067)
	US	-0.026	(0.044)	-0.418*	(0.212)	-0.024	(0.067)
	Canada	-0.017	(0.044)	-0.688*	(0.227)	-0.008	(0.067)
	Japan	0.213*	(0.044)	-0.714*	(0.262)	0.219*	(0.067)
	Australia	0.038	(0.044)	-0.569*	(0.240)	0.042	(0.067)
	New Zealand			-0.434*	(0.218)		
	NZ >1984	-0.113	(0.122)			-0.090	(0.165)
	R-squared	0.897**				0.731	(β=-0.198)
Staples	France	0.126	(0.109)	-0.643	(0.689)	0.146	(0.117)
T=12	Italy	-0.212*	(0.109)	0.510	(0.638)	-0.206*	(0.117)
	UK	-0.098	(0.109)	0.033	(0.420)	-0.080	(0.117)
	US	-0.401*	(0.109)	-0.069	(0.408)	-0.378*	(0.117)
	Canada	-0.325*	(0.109)	0.308	(0.450)	-0.316*	(0.117)
	Japan	-0.203*	(0.109)	1.295*	(0.460)	-0.222*	(0.117)
	Australia	-0.098	(0.109)	0.408	(0.486)	-0.091	(0.117)
	New Zealand			0.055	(0.461)		
	NZ >1984	-0.355*	(0.195)			-0.285	(0.187)
	R-squared	0.577**				0.453	(β=0.342)
Fluosilicic	France	0.028	(0.095)	0.020	(0.613)	0.083	(0.115)
Acid	Netherlands	-0.099	(0.096)	0.225	(0.791)	-0.041	(0.115)
T=13	UK	0.129	(0.094)	0.093	(0.369)	0.188	(0.115)
	US	0.196*	(0.094)	0.471	(0.351)	0.253*	(0.115)
	Canada	0.524*	(0.094)	0.945*	(0.384)	0.582*	(0.114)
	Japan	0.730*	(0.094)	0.822*	(0.407)	0.789*	(0.114)
	Australia	0.349*	(0.094)	-1.058*	(0.416)	0.401*	(0.114)
	New Zealand			0.754*	(0.392)		
	NZ >1984	-0.028	(0.169)			0.236	(0.190)
	R-squared	0.774**				0.626	(β=0.204)
White Wine	UK	-0.439*	(0.022)	0.138	(0.099)	-0.455*	(0.034)
T=13	US	-0.226*	(0.022)	-0.264*	(0.096)	-0.228*	(0.034)
	Canada	-0.184*	(0.022)	-0.124	(0.105)	-0.191*	(0.034)
	Japan	-0.131*	(0.022)	-0.603*	(0.108)	-0.124*	(0.034)
	Australia	-0.100*	(0.022)	-0.067	(0.114)	-0.108*	(0.034)
	New Zealand			-0.065	(0.107)		
	NZ >1984	0.020	(0.041)			-0.017	(0.058)
	R-squared	0.950**				0.869	(β=-0.133)

Table 2 (cont.)

Coated Fabric T=13	France	-0.075	(0.064)	-1.193*	(0.369)	-0.080	(0.090)
	Italy	-0.248*	(0.064)	-0.252	(0.335)	-0.264*	(0.090)
	UK	-0.322*	(0.064)	0.280	(0.221)	-0.356*	(0.090)
	Sweden	-0.003	(0.064)	-0.532	(0.485)	-0.017	(0.090)
	US	-0.378*	(0.064)	-0.292	(0.207)	-0.392*	(0.090)
	Australia	0.333*	(0.064)	-1.523*	(0.248)	0.347*	(0.090)
	New Zealand			0.263	(0.238)		
	NZ >1984	0.100	(0.116)			-0.041	(0.152)
	R-squared	0.901**				0.786	(β=-0.257)
Electric Switches T=12	France	0.416*	(0.119)	-0.221	(0.724)	0.446*	(0.135)
	UK	0.189	(0.119)	0.321	(0.443)	0.206	(0.135)
	Sweden	0.945*	(0.121)	0.244	(0.429)	0.965*	(0.135)
	US	0.621*	(0.119)	-0.618	(0.403)	0.670*	(0.135)
	Canada	0.973*	(0.119)	-0.619	(0.434)	1.019*	(0.135)
	Japan	-0.234*	(0.119)	1.023*	(0.496)	-0.232*	(0.135)
	Australia	1.084*	(0.119)	0.122	(0.475)	1.108*	(0.135)
	New Zealand			-1.222*	(0.477)		
	NZ >1984	0.379*	(0.205)			0.630*	(0.216)
	R-squared	0.857**				0.797	(β=-0.026)

Notes:

Standard errors in parentheses.

[1] Restricted model with $\beta_i=\beta$.

* *t*-test: significantly different from zero at the 10 percent level.

***F*-test: restriction $\beta_i = \beta$ is rejected at the 10 percent significance level.

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No. 9101 Bounds on the Effect of Heteroscedasticity on the Chow Test for Structural Change, by David Giles and Offer Lieberman.

No. 9102 The Optimal Size of a Preliminary Test for Linear Restrictions when Estimating the Regression Scale Parameter, by Judith A. Giles and Offer Lieberman.

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