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**NEW ZEALAND TRADE  
LIBERALISATION,  
UNEMPLOYMENT  
AND REAL WAGES**

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## ***Abstract***

New Zealand embarked on major unilateral trade policy changes as part of the economic reform packages from 1984. Since that time there has been some evidence that unskilled wages have fallen relative to skilled workers wages. Popular criticism links the two causally by arguing that increased trade liberalisation has lead to this widening margin and affected the distribution of income. This study examines this hypothesis from two perspectives: the contribution that trade liberalisation after 1984 had on the appreciation of the real exchange rate reducing tradable sector profitability and employment and secondly, the effect trade liberalisation had on real wages of various skill groups given the factor intensities that prevail in the New Zealand economy. The results do not support the hypothesis. Trade liberalisation appears to have caused a depreciation of the real exchange rate as theory predicts, increasing employment in the tradeable sector. Furthermore, given that the exportable sector is more intensive in its use of unskilled labour, trade liberalisation appears to have increased the real wages of unskilled workers relative to skilled workers in New Zealand.

**Key Words:** New Zealand, trade and wages, wage distribution, Maori, women

**JEL Classification:** F14, J31

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# 1. Introduction

There has been a good deal of controversy, world wide, over the last thirty years regarding trade liberalisation and its possible links to the distribution of income, Deardorff (1999). The world market environment has become increasingly globalised since the end of the Second World War and the lower trade barriers, which form part of this opening up, are suspected to have increased wage disparities in developed countries. From 1945 to around 1968, world economic growth was rapid in a non-inflationary environment with little concern with the distributional effects of growth (perhaps because growth was so rapid, generally). However, after about 1968, inflation became a major issue, which escalated after the first oil shock in 1974 and associated government efforts to recycle petrodollars and generally buffer the impact of higher energy prices. Then from 1979, major countries began to fight inflation using tight monetary policies driving up real interest rates, at least temporally, in the process. There was a noticeable decrease in the relative wages of unskilled workers in the U.S. and elsewhere. New Zealand did not adopt tight monetary policies until after 1984 but once the general economic reforms got underway here, the real wage debate commenced in this country as well.

Researchers have focused on technology expansion, high real interest rates, discrimination against various ethnic groups and women as possible reasons for the disparate wage trends. International trade has also been raised as a possible culprit on the grounds that globalisation has resulted from lower trade barriers since the advent of the GATT (now WTO) in 1947, and the increased volumes of imports from lower wage to higher wage countries like New Zealand have tended to disadvantage unskilled workers. Of particular concern has been the increasing competitiveness of low wage countries in Asia in a wider range of manufactured products. This is the so-called “trade and wages” debate. Easton (1996) reviewed possible causes of the changing distribution of income from 1984 including changes to social welfare, monetary policy and tax policy in New Zealand but he did not explicitly examine the possibility that trade liberalisation was a source of the problem.

This paper looks directly at trade liberalisation in New Zealand, given the particular structure of our economy. This is important because no two economies are identical in terms of their compositions of production, employment of factors and their patterns of comparative advantage. All these factors can be expected to influence the way in which trade liberalisation, which promotes exports and imports, will affect real wages to different groups

of employees. Accordingly, this is not an area where one can easily extrapolate research results from one country to another. An analysis of these effects forms the second part of this paper.

The first part of the paper examines the effects of New Zealand's unilateral trade liberalisation on the real exchange rate. The particular timing and sequencing of the economic reforms from 1984 led to a real exchange rate appreciation from 1985 to 1989. This is hypothesised to have contributed to relative reductions in tradable output and employment. So the question is, how much effect did trade liberalisation reduce employment in the tradable sector with possible distributional consequences. This is the subject of the first part of the paper.

The second part of the paper uses a factor content study to examine the likely impacts of freer trade on different classes of labour and other factors of production. These effects are calibrated in terms of changes in real factor returns due to freer trade.

## **2. Theoretical Framework**

Dornbusch's (1974) small-open economy model is employed to analyse the effects of trade and macroeconomic policies on the structure of domestic incentives. In this three sector model, the country both consumes and produces exportables, importables and nontradables. The real exchange rate (RER) is the relative price of non-tradables to either exportables or importables. As in Edwards' (1989) empirical version of this model, the performance of the economy depends on the degree of misalignment of RER relative to its long run equilibrium value (ERER) via any exogenous or policy induced changes in the fundamentals affecting the RER. Edwards (1989) postulates that the RER is determined by real and monetary variables. These include technological progress, productivity changes, resource endowments and production subsidies on the supply side and monetary and fiscal policy settings including income and expenditure policies and capital market regulations on the demand side.

A subset of the empirical model from Cagatay (1999) based on Edwards (1989) is given below as equations 1-3. We concentrate on the importables section of the full model here but exportables show the same patterns so there is no need to include both in the interests of brevity. The importables subset includes an explanatory equation for the RER for



importables (rm), the importables output equation and an equation explaining employment in the importables sector.

Prior to estimation, some pre-testing work was carried out. The classical regression techniques can embody problems of spurious correlation (Thomas, 1997) when applied to non-stationary variables. Accordingly, all the variables were checked for non-stationarity with the appropriate test procedures, (DF-ADF test results are presented in Appendix, Table A1). All variables are integrated of order 1,  $I(1)$ . A second concern is whether there is a long-term relationship between the variables as proposed by the relevant theories. Cointegration tests were carried on the static versions of the equations and some evidence<sup>1</sup> of a long-term relationship was found between the variables in each equation, (results of CIDW and DF-ADF tests are presented in Appendix, Table A2). Cointegrated non-stationary variables imply that there is an adjustment process that prevents errors becoming larger in the long run, (Charemza et al., 1992). Accordingly, an error correction model (ECM) was applied to each equation following the two-step process in Engle and Granger (1987). The ECM embodies two main characteristics, which makes it a common approach in applied work. Firstly, while the spurious regression problem is overcome by this method, the model incorporates theory in terms of the long run relationship based on the statistical evidence. Secondly, the model provides the significance of short run disequilibrium behaviour (or departure from long run equilibrium) with the speed of adjustment to long run equilibrium.

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<sup>1</sup> In each equation the null hypothesis of non-cointegration was not rejected by ADF test, however it was rejected at 0.01 level by CIDW test. Also, the adjustment variables in short run estimations were found to be significant. Depending on these it was decided to carry on the analysis based on the results of CIDW tests.

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*Model:*

Long-run estimation results for importables

$$rm_t = 0.46 + 0.54rm_{t-1} + 0.29m3_t - 0.25m3_{t-1} + 0.14gcon_t + 0.16tot_t + 0.03nprot_t + e1_t \quad (1)$$

(3.10)\*    (1.75)\*\*    (-1.49)\*\*\*    (1.89)\*\*    (1.99)\*\*    (1.75)\*\*

$$sm_t = 15.39 - 0.71rm_t - 0.79rm_{t-1} + e2_t \quad (2)$$

(-1.21)^`    (-1.33)\*\*\*

$$em_t = -2.70 + 0.57sm_t + 0.28sm_{t-1} + e3_t \quad (3)$$

(4.93)\*    (2.41)\*\*

figures in parenthesis are t-test values.

\*: significant at 0.01 level

\*\*: significant at 0.05 level

\*\*\*: significant at 0.10 level

`: not significant at 0.10 level.

*Variables:*

rm: real exchange rate for importables

m3: real money supply

gcon: real final government consumption expenditure

tot: international terms of trade

nprot: net protection coefficient

sm: real output of importables

em: employment in importables

---

Each equation was estimated by ordinary least squares (OLS) method in double-log form with the annual data of 1978-96 for output and employment and of 1965-96 in case of real exchange rate. In equation (3) the coefficients were estimated by the Cochrane-Orcutt procedure as the residuals obtained from OLS estimation were highly correlated. The goodness of fit measures and diagnostic test results of both long and short run equations are presented in Appendix Table A4.

As the main interest of the paper is in the long run behaviour of the variables, the interpretation of the short run dynamics is not given and the related equations and test statistics are presented in Appendix Table A3 and A4.

The highly significant long run adjustment coefficients particularly in the RER and output equations (and moderately significant in the case of the employment function) provide strong support for an error correction model and a long run equilibrium relationship between the variables. The RER appears to be effected in the long run by real final government consumption expenditure, the real money supply, a net import protection coefficient and external terms of trade. All the variables had the expected signs after estimation and one year

lagged real money supply was found to be significant although with a negative sign. The long run elasticities given in Table 1 show that the relative contribution of fiscal policy and the terms of trade on the RER are much larger than the effects of monetary and trade liberalisation policies. Furthermore the trade liberalisation effect, net protection, is positive as the theory suggests. That is, trade liberalisation can be expected to cause a depreciation of the RER in the longrun. That is, trade liberalisation increases the demand for foreign exchange and, provided the exchange rate is free to adjust, causes a real depreciation in the exchange rate and an increase in resource flows into the exportable and importable sectors of the economy.

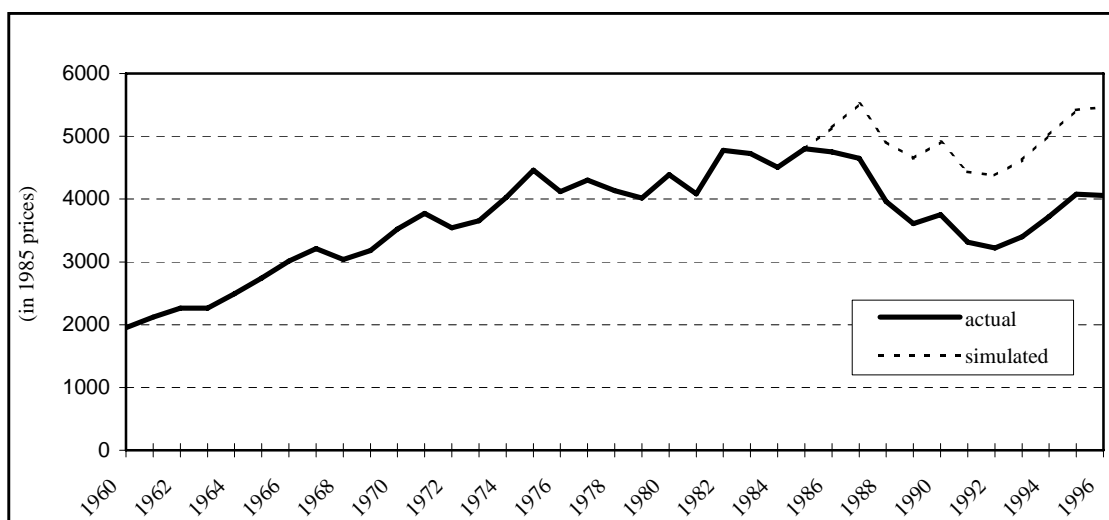
Importable output is explained by the current and one year lagged values of RER. Both variables had the expected signs and output level was highly elastic in terms of changes in relative prices. The same lag structure was also valid for employment equation, which was explained by the output level of importables sector. In this equation the variables also had the expected signs and a high elasticity in terms output was observed.

**Table 1**  
**Long Run Elasticities**

Importables			
Exogenous variables	Endogenous variables		
	$rm_t$	$sm_t$	$em_t$
$m3_t$	0.09		
$gcon_t$	0.30		
$tot_t$	0.35		
$nprot_t$	0.07		
$rm_t$		-1.50	
$sm_t$			1.29

### 3. Counterfactual Simulation

A simple alternative policy scenario to economic reform policies that were applied from 1984 consists of a policy mix that prevented the strong appreciation of RER after 1985. A dynamic deterministic simulation was carried out on the basis that the RER was held at its 1985 level. This could have been achieved by reducing government consumption and/or decreasing net protection (that is, increasing trade liberalisation), for example. The results of these simulations and the goodness of fit measures are presented in Figures 1 and 2.

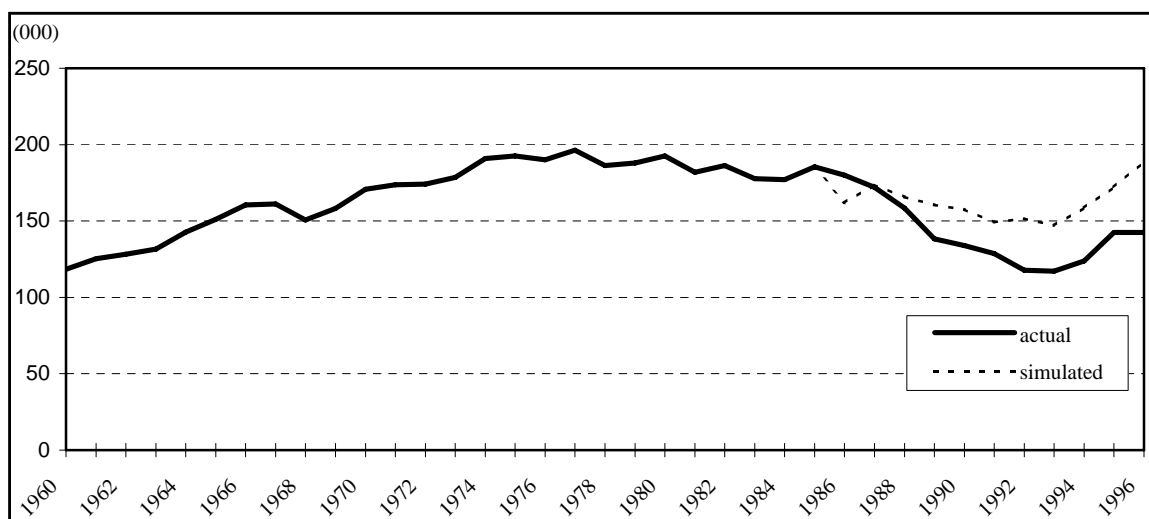


root mean square simulation error: 0.26

Theil's inequality coefficient: 0.02

**Figure 1**  
**Actual and Simulated Real Output of Importables Sector (million \$)**

At a constant RER for importables, output would not have exhibited the large trough that actually occurred and employment in the importable sector would have been 30,000 higher actual in 1992.



root mean square simulation error: 0.18  
 Theil's inequality coefficient: 0.02

**Figure 2**  
**Actual and Simulated Employment in Importables Sector (000)**

The counterfactual simulations show that at a constant RER for importables, importable output would have been higher by around a billion 1985 dollars which is between a third and a quarter of its actual value. Employment in the tradable sector would have declined after 1984 with a constant real exchange rate but up to 30,000 fewer jobs would have been lost in the sector, Figure 2. This provides evidence that the appreciating real exchange rate, partly influence from continued import protectionism in New Zealand after 1984, caused increased unemployment in the importable sector. Furthermore, the simulation shows that other factors, including monetary and fiscal policy and the terms of trade, were the main catalyst causing tradable sector output and employment reductions from 1984 to 1992.

## 4. Trade Liberalisation and Factor Rewards

Having examined aggregate output and employment effects of trade liberalisation after 1984, we now turn to trade liberalisation effects on the distribution of factor returns.

The standard Heckscher-Ohlin theory of comparative advantage postulates that a country can be expected to export products which are relatively intensive in the most abundant factors of production and to import products which are extensive in their use of these same factors. Furthermore, if the country in question has little influence on world market conditions, trade policy liberalisation at home and abroad will result in an expansion of the exportable sector and a contraction of the importable sector. Trade liberalisation at home involves reduced import tariffs and other barriers to trade and trade liberalisation abroad involves freer access for exports of the country in question to foreign markets.

New Zealand has been experiencing both influences: lower tariffs at home as part of the economic reforms and some improved market access abroad as a result of CER and the Uruguay GATT Round completed in 1994 (the first GATT agreement to address agricultural protectionism). These trade policy changes can be expected to have favoured the exportable sector in New Zealand over the importable sector. The Uruguay GATT agreement 1994 has reduced trade barriers facing New Zealand to some degree and New Zealand has unilaterally reduced the rate of import protection (production weighted) from around 30 percent in 1984 to the OECD average of about 5 or 6 percent today, Dalziel et al (1999).

But what of these effects on factor prices in New Zealand, particularly wages and salaries. The Heckscher-Ohlin framework has a direct linkage from world prices (and trade barriers affecting them) and factor prices. For example, the Stolper-Samuelson theorem tells us that an increase in the price of an internationally traded good will raise the real wage (or rental value of land or capital) of that factor which is used intensively in the production of the good in question. If the price of exportables relative to importables rose, for example, then those factors (labour etc) used intensively in exportable production would rise and those factors used intensively in importable production (import competing industries in New Zealand) would fall. If the owners of factors used intensively in exportable production are relatively rich, trade liberalisation could be expected to worsen the income distribution. But if these owners are poorer, the income distribution could be expected to improve as a result of trade liberalisation.

The factor content framework used here to examine this income distribution question is based on the Heckscher-Ohlin model. It is elaborated in Deardorff and Lattimore (1999) and hence the mathematical framework is not repeated here. Suffice to say that empirically, the calculations involve the use of three data sets. First, 1996 (1986) population census data from Statistics New Zealand has been used to discover which of 50 (62) industries workers of varying qualification levels, of both sexes and ethnic origin, work in. These workers are classified according to whether they are part or full-time workers, Statistics New Zealand (1999). Qualifications are used as a proxy for skill levels because they are one of the very few indicators of employee skills that are available. A summary of these data is given in the appendix, Table A.7. Total labour effort is calculated by equating 3 part-time jobs with a full-time job and expressing the resultant as full-time job equivalents.

The second data set is the table of exports, imports and net trade of 50 goods and services in New Zealand in 1996, corresponding to the 50 industries in the first data set, Table A.8. This data classifies industries according to their international trade status, exportable or importable. Some sectors hardly trade internationally at all and are essentially non-traded goods producers. The government sector is an example of this category.

The final data is the input-output table. This table is used to account for the linkages between industries in the economy. Factors of production can be employed indirectly in exportables or importables by virtue of employment in industries upstream or downstream from the tradable producer. The 1995 Statistics NZ (50 sector) input-output table (and the 1987 sixty-two sector input-output table for the earlier period) enables us to account for these indirect effects.

## **5. Factor Content of Trade**

The data are used in the Deardorff et al (1999, equation 9) model to calculate the net factor content of New Zealand trade. The net factor content is the embodiment of production factors in net trade of goods and services. Selected estimates of the net factor content of New Zealand trade are given in Table 2 with the full results given in Table A.9. The net factor content of trade will be positive (negative) when that factor of production is more heavily employed in exportable (importable) production rather than importable (exportable) production.

As seen in Table 2, the net factor contents of trade in land and capital are both positive indicating that New Zealand exports (imports) of goods and services tend to be land and capital intensive (extensive). The model estimates that there are 8.298 million hectares *more* land embodied in New Zealand exports than are embodied in New Zealand imports. Land is embodied in imports of food and other products to New Zealand. This high value for the factor content of trade in land is not surprising given the primary resource nature of New Zealand exports as shown by the net trade position of agriculture, food, forestry, fishing and textiles, Table A.8.

The labour resource categories are of special interest. The net factor contents of labour with low or no formal qualifications (Maori, non-Maori, male and female) tend to be positive indicating that owners of these factors tend to benefit from trade liberalisation. In the no qualification category for Maori males (females), New Zealand exports embody the labour services of 4452 (1231) more workers than is embodied in imports. Trade is positively affecting the employment of these classes of labour. At the other end of the qualification scale, the opposite is true. New Zealand exports embody 153 *fewer* male Maori workers whose highest qualification is a bachelor's degree than do imports - trade disadvantages this category of labour. In the skill vocational area, trade is basically neutral in its effect on Maori workers: the net factor contents are quite small though the positive for males may be significant. This pattern of negative values at higher qualification level also appears in the detailed Table A.9.



**Table 2**  
**Net Factor Content of Trade, 1996**

<b>Factor of Production</b>	<b>Ethnicity</b>	<b>Sex</b>	<b>Factor Content</b>
Labour by Qualification (full time equiv. jobs)			
Bachelors degree	Maori	male	-153
		female	-70
	Non-Maori	male	-4213
		female	-1534
Skill vocational	Maori	male	72
		female	-2
	Non-Maori	male	-1260
		female	16
No Qualificatione	Maori	male	4452
		female	1231
	Non-Maori	male	16989
		female	5162
Land ('000 hectares)			8298
Capital Equipment (1982/83 \$ millions)			4395

Source: Author calculations

The Table 2 results suggest that New Zealand tends to have a comparative advantage in products which embody low or unqualified labour, land and capital but a comparative disadvantage in products embodying labour with higher qualifications. It is worth noting that the net factor contents are measured in levels and therefore tend to be smaller for Maori categories than non-Maori categories because the absolute numbers of people involved differs significantly. The next computation corrects for this effect.

Equation 7 of Deardorff et al (1999) enables us to estimate the effects of the size and sign of the net factor content of trade on real factor rewards. The logical link in the analysis is that the Hechscher-Ohlin trade model has a direct correspondence between prices, market size, output, factors employed and factor returns. Exportable sectors have expanded market opportunities as trade possibilities increase which increases the factor rewards (e.g. real wage) of factors used intensively in exportable production. The opposite is true for factors used intensively in importable production. The effects of trade on real factor rewards are given in Table 2 for the same selected factors as Table 1 with the complete listing of changes in factor returns given in Table A.10.

A correction is made in the factor return calculations for the current account balance. New Zealand had a current account deficit in 1995 (as is typically the case). A current account deficit decreases the scarcity value of resources used intensively in exportable production.

**Table 3**  
**Changes in Real Resource Returns due to Trade, 1996**

<b>Factor of Production</b>	<b>Ethnicity</b>	<b>Sex</b>	<b>Factor Returns (%)</b>
Labour (full time equiv. jobs)			
Bachelor degree	Maori	male	-5
		female	-2
	Non-Maori	male	-6
		female	-3
Skill vocational	Maori	male	+2
		female	+1
	Non-Maori	male	0
		female	+1
No qualification	Maori	male	+16
		female	+7
	Non-Maori	male	+11
		female	+6
Land ('000 hectares)			+77
Capital Equipment (1982/83 \$ millions)			+3

Source: authors calculations

The Table 3 values are scaled according to the numbers of people (quantity of resource) and hence do not correspond exactly to relativities in Table 2. However, the Table 3 value will usually be positive when the Table 2 value is positive. The results suggest that real wages of unqualified Maori and Non-Maori workers of both sexes are increased significantly as a result of increased international trade, as is the return to land and capital. For example, non-Maori female wages without qualifications are estimated to be 6 percent higher with trade than without. This is true whether the increased trade is the result of New Zealand trade liberalisation policy or improved international market conditions for our exports. Female Maori employees with degrees also benefit from trade, as do male Maori employees with trade certificates. Maori and Non-Maori male employees with degrees lose as a result of increased trade by 1-2 percent points as do Non-Maori employees with trade certificates.

If we can assume that labour returns are associated positively with qualification level, then increased trade will tend to improve the distribution of wages for Maori and non-Maori workers alike. Trade liberalisation will tend to raise the real wages of low qualified workers and lower the real wage of highly qualified workers. To repeat, the source of the increased

trade does not effect this result. Increased trade has resulted from lower import protection in New Zealand, from improved foreign market access resulting from lower protection abroad or by increased market demand for New Zealand exports.

The analysis was also carried out with data for 1986/87 using the 1986 Census and the 1986/87 Input/Output table of Statistics New Zealand. This analysis involved a 62 industry disaggregation and some differences in the classification of intermediate qualification levels. Nevertheless the results are comparable with the 1996 analysis. The summary results of factor returns are provided in the Annex, Table A.11. They are very similar to those obtained for 1996. In 1986, New Zealand also had a comparative advantage in products embodying lower qualified labour. Accordingly, trade liberalisation in 1986 tended to benefit the same groups; land and capital owners and Maori and non-Maori labour without formal qualifications, and to a lesser extent Maori labour with skill qualifications.

Finally, it is important to note that this analysis examines the distribution of wage income as it is affected by trade liberalisation. It is not a complete picture of the distribution of income due to trade because income is the combination of labour, capital and land returns. However, if capital and land ownership is correlated positively with the qualification level of labour services available (i.e. highly qualified labour owners also own the most land and capital), the distribution effects of wages noted above will apply to the distribution of income as a whole. If the correlation is negative, there is no direct correspondence between the two.

## **6. Conclusions**

This paper reports on two empirical studies which examine the impact of trade liberalisation in New Zealand from different perspectives. In a traded-nontraded goods model of the Australian type, popularised by Dornbusch, trade liberalisation is shown to have tended to depreciate the real exchange rate after 1984. This appears to have had the effect of raising employment in the importable sector, not reducing it. Secondly, the New Zealand economy is shown to have a comparative advantage in products embodying unqualified labour services which provides evidence that unilateral freer trade policies in New Zealand and bilateral and multilateral freer trade policies since the 1980's have tended to benefit workers without qualifications and hurt workers with higher qualifications. These effects are expected to have made the distribution of income less skewed towards the wealthy.

## *References*

- Cagatay, Selim (1999) A Counter Factual to New Zealand's Economic Reforms. Ph.D thesis, in preparation, Lincoln University, Canterbury.
- Charemza, W.W and D.F. Deadman (1992) *New Directions in Econometric Practice*, Edward Elgar.
- Dalziel, Paul and Ralph Lattimore (1999) *The New Zealand Macroeconomy: A Briefing on the Reforms*. Melbourne: Oxford University Press.
- Deardorff, Alan (1999) Policy Implications of the Trade and wages Debate. DP 440, School of Public Policy, The University of Michigan.  
<http://www.spp.umich.edu/rsie/workingpapers/wp.html>
- Deardorff, Alan, and Ralph Lattimore (1999) Trade and Factor-Market effects of New Zealand's Reforms. *N.Z. Economic Papers*, 33 (1) 71-91.
- Dornbusch, Rudiger (1974) Tariffs and Non-traded Goods, *Journal of International Economics*, 4, 177-85.
- Easton, Brian (1996) Income Distribution, chapter 4 of Brian Silverstone, Alan Bollard and Ralph Lattimore editors, *A Study of Economic Reform: The Case of New Zealand*. Amsterdam: North-Holland.
- Edwards, S. (1989) *Real Exchange Rates, Devaluation, and Adjustment*, The MIT Press.
- Engle, R.F and C.W.J. Granger (1987) Co-integration and Error Correction: Representation, Estimation and Testing, *Econometrica*, 55, 251-276.
- Gujarati, D.N. (1995) *Basic Econometrics*, McGraw-Hill.
- Pesaran, M.H. and B. Pesaran (1997) *Working with Microfit 4.0*, Oxford University Press.
- Pindyck, R.S. and D.L. Rubinfeld (1991) *Econometric Models and Economic Forecasts*, McGraw-Hill.
- Statistics New Zealand (1999) Census of Population and Dwellings, special tabulations, reference C4240TM and C4257TM. Christchurch.
- Thomas, R.L. (1997) *Modern Econometrics*, Addison-Wesley.

## APPENDIX

**Table A1 - Unit Root Tests<sup>1</sup>**

	ADF <sup>2</sup> (0)	ADF(1)	ADF(2)		ADF(0)	ADF(1)
rm <sub>t</sub>		-1.59		d <sup>4</sup> rm <sub>t</sub>		-5.33
m3 <sub>t</sub>	0.59			dm3 <sub>t</sub>		-4.90
gcon <sub>t</sub>			-2.2	dgcon <sub>t</sub>		-5.76
tot <sub>t</sub>		-2.29		dtot <sub>t</sub>		-4.83
nprot <sup>3</sup> <sub>t</sub>	-3.52			dnprot <sub>t</sub>		-6.75
sm <sub>t</sub>	-2.32			dsm <sub>t</sub>		-5.40
em <sub>t</sub>		1.46		dem <sub>t</sub>	-3.97	

<sup>1</sup>: DF and ADF 95% critical values were obtained from Pesaran et al., (1997).

<sup>2</sup>: DF and ADF 95% critical value is -2.95.

<sup>3</sup>: DF and ADF 95% critical value with a time trend is -3.55.

<sup>4</sup>: "d" is used for showing first difference.

**Table A2 - Cointegration Test Results for Static Equations**

	Eqn. 1	Eqn. 2	Eqn. 3
	Dependent variable		
	rm <sub>t</sub>	sm <sub>t</sub>	em <sub>t</sub>
Calculated CIDW <sup>1</sup>	1.039	0.929	0.555
Critical values <sup>2</sup>			
0.01	0.511	0.511	0.511
0.05	0.386	0.386	0.386
0.10	0.322	0.322	0.322
Calculated DF-ADF			
ADF(0)	-3.493	-2.577	-1.944
Critical values <sup>3</sup>	lower-upper	lower-upper	lower-upper
0.01	4.54 - 4.84	4.54 - 4.20	3.71 - 3.29
0.05	4.26 - 3.59	3.71 - 3.50	2.87 - 2.65
0.10	3.61 - 3.47	3.33 - 3.16	2.84 - 2.08

<sup>1</sup>: For detailed information about cointegration Durbin-Watson (CIDW) test see Charemza et al., (1992) and Gujarati, (1995).

<sup>2</sup>: Critical values for CIDW test were obtained from Gujarati, (1995).

<sup>3</sup>: Limits for critical values of the ADF test were obtained from Charemza et al.,

**Table A3 - Short Run Estimation Results and Adjustment Coefficients**

$$\Delta rm_t = 0.17\Delta m3_t - 0.24\Delta m3_{t-1} + 0.37\Delta gcon_t + 0.26\Delta tot_t + 0.01\Delta nprot_t - 0.53ecmrm_{t-1} + e4_t \quad (4)$$

(1.62)\*\*    (-2.55)\*    (3.66)\*    (4.02)\*    (0.16)`    (-3.08)\*

$$\Delta sm_t = -0.58\Delta rm_t - 0.50ecmsm_{t-1} + e5_t \quad (5)$$

(-1.29)`    (-2.36)\*\*

$$\Delta em_t = 0.60\Delta sm_t + 0.30\Delta sm_{t-1} - 0.16ecmem_{t-1} + e6_t \quad (6)$$

(5.06)\*    (2.55)\*\*    (-1.30)`

**Table A4 - Goodness of Fit and Diagnostics**

Long-Run								
Importables	Adj. R <sup>2</sup>	S.E.	F-stat	F	F`	F`	Chi <sup>2</sup> 2`	Chi <sup>2</sup> 2`
rm <sub>t</sub>	0.83	0.038 (6,25)	25.81	(1,24) 1.53	(1,24) 0.08			4.38
sm <sub>t</sub>	0.93	0.057 (4,28)	115.21	(1,27) 0.14	(1,27) 0.78			2.72
em <sub>t</sub>	0.89	0.058 (3,12)	40.40	(1,11) 0.90	(1,11) 0.01			0.95
Short-Run								
Importables	Adj*. R <sup>2</sup>	S.E.	F-stat	F	F`	F`	Chi <sup>2</sup> 2`	Chi <sup>2</sup> 2`
rm <sub>t</sub>	0.59	0.025 (5,19)	7.84	(1,18) 0.63	(1,18) 1.69			0.24
sm <sub>t</sub>	0.19	0.067 (2,29)	4.58	(1,28) 7.77	(1,28) 0.31			0.03
em <sub>t</sub>	0.49	0.072 (2,10)	6.75	(1, 9) 3.33	(1, 9) 0.01			0.36

`: Lagrange multiplier test of residual serial correlation.

`: Ramsey's RESET test using the square of the fitted values.

`: Based on a test of skewness and kurtosis of residuals.

\*: Adj. R<sup>2</sup> must be interpreted carefully as short run equations do not cover an intercept

**Table A5-Short Run Elasticities**

Importables			
Exogenous variables	Endogenous variables		
	rm <sub>t</sub>	sm <sub>t</sub>	em <sub>t</sub>
m3 <sub>t</sub>	-0.07		
gcon <sub>t</sub>	0.37		
tot <sub>t</sub>	0.25		
nprot <sub>t</sub>	0.002		
rm <sub>t</sub>		-0.58	
sm <sub>t</sub>			0.90

**Table A6-Data Set**

	$rm_t$	$gcon_t$	$m3_t$	$tot_t$	$nprot_t$	$sm_t$	$em_t$
1960	86	2250	14379	132	54.8		
1961	87	2471	15718	121	54.8		
1962	88	2295	15904	116	54.8		
1963	89	2521	16737	124	54.7		
1964	88	2467	17074	138	46.0		
1965	94	2704	18081	141	46.0		
1966	94	3212	18312	137	46.0		
1967	97	3760	19501	134	45.0		
1968	93	3484	19593	116	41.0		
1969	94	3575	20005	113	43.0		
1970	94	3717	21072	114	43.0		
1971	110	4140	21079	107	43.0		
1972	113	4386	21415	115	44.0		
1973	113	4142	21589	135	39.0		
1974	117	4471	23410	155	40.0		
1975	114	5681	24906	108	41.0		
1976	105	5551	23730	91	41.1		
1977	105	5018	22175	99	41.1		
1978	106	5534	22713	100	41.1	4134	186
1979	109	5967	24598	106	37.6	4019	188
1980	104	5734	23778	110	37.6	4391	193
1981	108	6189	23501	98	37.6	4082	182
1982	114	6437	23650	99	24.4	4776	186
1983	111	6634	24431	96	9.0	4725	178
1984	105	6718	26263	96	3.0	4507	177
1985	100	6334	26274	95	25.3	4803	186
1986	111	6720	29630	92	20.0	4750	180
1987	113	7423	32039	96	18.0	4650	172
1988	118	7956	34434	106	16.0	3962	158
1989	119	8058	33119	112	14.0	3609	138
1990	120	8069	31610	117	12.0	3753	134
1991	123	8447	35634	111	10.5	3316	129
1992	123	8324	39166	108	8.8	3222	118
1993	123	8332	40281	111	9.0	3402	117
1994	122	8104	42095	113	7.0	3724	124
1995	120	7912	44214	112	6.0	4077	142
1996	124	8186	48994	110	5.0	4057	142

$rm_t$ : price of nontradables over importables (wage rate index over producer price index for importables), 1985=100.

$gcon_t$ ,  $m3_t$ ,  $sm_t$ : in 1985 prices.

$nprot_t$  : import tariffs-export subsidies (%).

$tot_t$  : export price index over import price index.

$em_t$  : in (000).



**Table A7- Industrial Land, Capital Use and Full-time Equivalent Employment With Respect to Sex, Qualifications and Ethnicity**

**1996**

Factors of Production	Industries		Sheep, Beef, Mixed Livestock	Dairy	Horticulture	Services to Agriculture	Other Farming	Fishing and Hunting	Forestry and Logging	Oil and Gas Exploration and Extraction	Other Mining and Quarrying
Labour (full-time equivalent employment)	Ethnicity	Sex									
Higher Degree	Non-Maori Ethnic Gr.	Male	249	112	259	149	112	43	125	30	100
		Female	129	63	121	42	45	16	32	3	16
	Maori Ethnic Gr.	Male	6	4	7	6	3	3	3	0	3
		Female	1	0	3	3	1	0	3	0	0
Bachelor Degree	Non-Maori Ethnic Gr.	Male	891	566	660	444	294	75	329	48	108
		Female	374	223	338	136	123	24	72	16	19
	Maori Ethnic Gr.	Male	22	15	16	19	10	6	12	0	3
		Female	11	8	13	8	4	3	4	0	0
Advanced Vocational Qualification	Non-Maori Ethnic Gr.	Male	1871	1054	968	700	441	66	308	34	76
		Female	1491	945	818	236	403	34	75	12	10
	Maori Ethnic Gr.	Male	63	36	29	34	16	9	44	0	7
		Female	32	41	40	25	11	4	6	0	0
Intermediate Vocational Qualification	Non-Maori Ethnic Gr.	Male	253	375	201	125	105	51	71	51	85
		Female	35	68	45	23	15	3	13	3	3
	Maori Ethnic Gr.	Male	9	18	15	12	0	7	12	3	7
		Female	0	3	3	4	0	0	1	0	0
Skilled Vocational Qualification	Non-Maori Ethnic Gr.	Male	1529	2187	933	795	596	472	397	102	333
		Female	446	408	329	130	129	26	44	4	7
	Maori Ethnic Gr.	Male	107	106	56	58	44	79	84	3	45
		Female	11	21	18	21	4	3	7	0	3

**Table A7- Continued**

<b>Factors of Production</b>	<b>Industries</b>		Sheep, Beef, Mixed Livestock	Dairy	Horticulture	Services to Agriculture	Other Farming	Fishing and Hunting	Forestry and Logging	Oil and Gas Exploration and Extraction	Other Mining and Quarrying
Basic Vocational Qualification	Non-Maori Ethnic Gr.	Male	1490	1560	1365	943	620	332	728	49	275
		Female	795	622	838	288	320	67	91	10	24
	Maori Ethnic Gr.	Male	184	146	180	198	83	95	445	3	51
		Female	55	46	136	125	59	18	36	0	0
School Qualification	Non-Maori Ethnic Gr.	Male	8087	5523	4061	2826	2320	579	1373	64	502
		Female	3212	3131	3023	1144	1153	226	296	27	99
	Maori Ethnic Gr.	Male	460	394	405	375	182	128	480	9	73
		Female	176	162	378	213	88	40	74	4	18
No Qualification	Non-Maori Ethnic Gr.	Male	10498	8342	4618	3821	3548	1027	2068	79	1204
		Female	2815	2631	3138	955	1090	230	222	14	68
	Maori Ethnic Gr.	Male	1158	695	876	973	441	331	1379	22	317
		Female	238	215	727	511	165	59	123	0	25
Land, '000 hectares			11,727	1,582	189	0	2,209	0	1,909	67	35
Capital Equipment, 1982/83 \$ millions			7107	5029	2833	1334	1598	1216	838	2535	1069

Source: Derived from 1996 Population Census, Statistics NZ and Deardorff and Lattimore (1999)

Meat and Meat Products Manufacturing	Dairy Product Manufacturing	Other Food Manufacturing	Beverage and Malt Manufacturing (incl. Tobacco & Alcohol)	Textile and Apparel Manufacturing	Wood and Wood Product Manufacturing	Paper and Paper Product Manufacturing	Printing and Publishing	Rubber, Plastic & Other Chemical Product Manufacturing	Petroleum, Coal and Basic Chemical Manufacturing	Non-Metallic Mineral Product Manufacturing	Basic Metal Product Manufacturing	Fabricated Metal Product Manufacturing	Machinery and Equipment Manufacturing	Transport Equipment Manufacturing
61	96	172	88	83	92	99	186	228	113	44	79	130	374	64
16	46	82	34	69	26	12	119	82	13	18	15	24	61	8
6	6	9	3	0	3	0	0	6	0	0	3	3	6	3
0	0	3	0	0	0	0	3	0	0	0	0	0	3	0
258	249	614	238	356	377	248	393	627	293	180	247	516	1148	233
75	126	326	90	311	97	82	348	241	67	53	52	72	243	63
16	4	27	10	18	12	6	15	12	6	6	12	13	25	3
7	3	13	4	6	6	7	13	9	3	3	0	0	3	3
349	433	395	126	369	419	200	426	547	286	211	256	623	1381	574
105	129	304	82	508	147	45	386	232	69	105	24	128	247	76
38	43	30	4	15	37	21	18	19	9	9	18	34	51	15
6	13	35	6	34	15	9	23	6	6	6	3	10	9	6
169	121	212	75	125	663	231	448	276	184	107	238	658	1546	453
21	12	39	6	46	18	12	47	28	9	10	0	21	33	16
12	9	15	6	12	30	30	16	12	9	6	18	34	73	12
3	0	7	3	0	0	0	3	0	3	0	0	3	1	0
1329	392	1044	199	785	3091	780	2061	779	430	413	688	2432	4222	1677
73	43	203	46	292	111	32	313	96	30	36	19	91	162	50
178	48	98	13	46	214	133	108	57	31	31	51	190	287	106
27	6	23	3	26	13	13	26	7	3	0	0	4	10	3
971	322	1191	212	935	1920	482	1265	799	326	402	439	2009	2582	1053
223	105	663	84	1099	285	106	637	367	67	102	42	250	457	129

Meat and Meat Products Manufacturing	Dairy Product Manufacturing	Other Food Manufacturing	Beverage and Malt Manufacturing (incl. Tobacco & Alcohol)	Textile and Apparel Manufacturing	Wood and Wood Product Manufacturing	Paper and Paper Product Manufacturing	Printing and Publishing	Rubber, Plastic & Other Chemical Product Manufacturing	Petroleum, Coal and Basic Chemical Manufacturing	Non-Metallic Mineral Product Manufacturing	Basic Metal Product Manufacturing	Fabricated Metal Product Manufacturing	Machinery and Equipment Manufacturing	Transport Equipment Manufacturing
312	58	208	27	110	350	143	73	93	43	68	64	258	230	97
97	17	186	12	113	49	23	51	48	10	10	9	34	58	21
2845	996	2721	548	2305	4263	935	2645	2222	767	1002	913	3534	4251	1856
854	541	2506	355	3389	1153	392	2344	1187	303	388	242	1078	1860	519
807	214	482	65	237	767	291	188	219	96	156	154	440	424	214
225	79	508	35	392	134	83	195	124	28	34	22	114	232	75
6249	1389	3893	549	3509	6242	1550	2259	2757	1083	1853	1553	5331	4806	2299
1242	421	3247	252	6955	1026	413	1576	1372	243	312	139	988	1773	550
2490	364	1005	102	497	1673	610	180	493	193	447	375	891	609	393
632	111	1201	77	1123	239	141	189	301	47	36	32	211	347	150
10	6	7	2	3	12	3	3	3	3	6	3	3	4	3
1492	3562	2215	914	1539	1605	2679	1614	1706	3873	1112	3018	1251	1874	853

Other Manu- facturing	Electricity Supply	Gas Supply	Water Supply	Construction	Wholesale and Retail Trade	Accommodation, Cafes and Restaurants	Road Transport	Services to Transport	Water Transport (incl. Rail)	Air Transport	Com- munication Services	Finance	Insurance	Services to Finance and Insurance
29	177	15	36	342	1858	774	88	176	63	83	342	769	177	336
18	35	0	9	70	925	489	23	108	13	35	156	324	101	91
0	6	0	3	18	42	25	7	6	3	3	9	28	6	6
0	0	0	0	4	24	19	0	3	0	1	6	11	3	3
95	446	37	100	1241	6743	1131	279	545	158	297	929	2237	553	967
39	91	7	28	210	3648	1236	91	494	57	192	538	1107	353	356
7	12	3	3	54	178	52	15	21	12	4	31	82	27	37
0	9	0	3	7	135	65	3	15	3	10	20	37	12	16
127	485	45	84	2885	6269	1037	378	640	192	1350	634	901	423	463
78	67	7	24	488	5024	1705	243	708	47	316	296	734	268	275
12	15	3	6	153	275	91	32	34	13	41	46	37	15	12
4	0	0	3	27	270	121	19	39	9	22	22	33	13	16
86	453	30	43	3444	4268	280	308	214	231	168	1281	192	103	77
10	19	3	3	76	821	154	17	101	9	28	72	153	55	53
3	25	0	3	194	215	21	19	3	13	6	91	18	6	3
0	6	0	0	7	47	19	3	10	0	3	9	10	3	4
393	1096	76	94	18177	15295	1618	1587	691	894	687	927	496	361	272
40	60	6	15	353	2662	1122	129	466	39	168	237	591	227	204
19	134	3	6	1466	962	151	175	57	79	30	100	37	15	12
1	3	0	6	37	195	138	10	36	4	10	33	50	16	20
307	425	39	56	8386	11103	3813	1389	849	611	585	893	753	392	411
127	90	12	28	696	7884	3675	303	1306	86	358	670	1364	536	444
42	103	6	3	1327	1053	503	306	117	117	32	113	48	18	21
10	13	0	3	89	766	654	56	109	22	28	113	121	35	43

Other Manu- facturing	Electricity Supply	Gas Supply	Water Supply	Construction	Wholesale and Retail Trade	Accommodation Cafes and Restaurants	Road Transport	Services to Transport	Water Transport (incl. Rail)	Air Transport	Com- munication Services	Finance	Insurance	Services to Finance and Insurance
789	598	84	127	14370	39762	7396	4475	2945	1004	1574	3466	5248	1716	1704
449	486	71	90	3000	34679	11259	1385	2948	307	1038	3112	9496	2103	1834
60	97	12	22	1974	3465	914	671	297	168	100	417	318	120	77
49	37	1	15	279	3365	1713	175	279	47	80	551	744	157	135
838	714	107	194	20333	30873	6164	8978	2170	1889	862	2483	931	450	501
497	219	23	41	1964	26167	9685	1167	984	139	295	2015	2482	651	542
101	184	24	67	4594	3869	775	2241	500	517	80	401	125	32	24
89	30	3	12	246	2947	1990	286	173	37	28	537	284	40	48
3	28	0	103	9	5	21	200	5	1	6	2	1	0	0
192	17503	1486	686	2670	14279	2928	3939	3510	1611	2543	6801	7431	659	1052

Real Estate	Business Services	Ownership of Owner Occupied Dwellings	Education Services	Health and Community Services	Cultural and Recreation Services	Personal and Other Services	Central Government Services	Local Government Services	Private Non-Profit Services to Households	Domestic Services of Households	Total
581	5075	0	8328	4910	713	406	2593	635	482	0	32,076
207	2076	0	6371	3228	638	268	1916	315	249	10	18,767
7	122	0	282	102	35	16	128	9	16	0	962
4	70	0	254	112	28	8	120	10	16	0	716
1654	15731	1	6802	2212	1368	1204	3315	1099	930	7	59,473
648	6544	0	10932	3615	1419	767	2965	578	452	33	39,971
50	509	0	492	93	81	44	225	40	52	0	2,412
22	268	0	772	160	67	38	230	29	46	0	2,098
1489	5568	0	5613	2250	1087	705	2523	1070	569	7	48,907
1120	3760	0	17819	19921	1141	963	3156	336	735	136	65,978
46	249	0	645	167	112	35	282	43	49	3	3,015
54	188	0	1764	1175	102	58	436	19	83	13	4,836
323	1216	0	705	298	374	867	946	245	133	0	23,108
86	481	0	235	542	95	135	198	52	27	6	3,957
9	65	0	51	13	26	49	118	18	6	0	1,352
9	43	0	22	37	6	8	28	6	8	1	323
1871	2915	0	1135	979	1125	4027	2183	674	296	13	85,548
710	2286	0	1600	4012	696	2397	1309	291	178	104	23,022
94	180	0	105	84	109	285	312	55	33	0	6,676
42	160	0	176	399	70	187	235	33	40	12	2,165
1462	3815	0	1532	1295	1360	2961	2677	635	395	11	68,425
1475	4357	0	3306	5814	1334	3213	2145	406	468	149	47,917
102	337	0	283	186	188	339	495	77	74	5	9,414
106	370	0	660	869	218	370	460	55	137	21	6,541

Real Estate	Business Services	Ownership of Owner Occupied Dwellings	Education Services	Health and Community Services	Cultural and Recreation Services	Personal and Other Services	Central Government Services	Local Government Services	Private Non-Profit Services to Households	Domestic Services of Households	Total
3411	11381	1	2474	1675	4522	4667	10609	1247	658	53	183,094
3718	15826	1	6803	10177	4064	5374	8180	1517	1020	372	158,731
251	909	3	438	216	563	525	1998	152	122	6	21,155
305	1440	0	1241	1168	539	634	1802	169	253	34	18,645
2794	4945	0	2268	1905	2592	6331	3208	1651	451	55	184,214
2260	5843	0	4132	10306	1758	5576	3175	697	685	346	113,321
268	884	0	757	434	431	1038	991	385	200	16	35,452
217	703	0	1507	2005	379	1095	825	114	230	56	20,781
0	1	557	0	3	169	1	96	12	82	0	19,094
11354	6011	59172	148	1272	1824	1638	29649	6711	0	0	237,932



**Table A8- Net Trade**

	million \$	1995		Net Trade
		Exports	Imports	
<b>Industries</b>				
Sheep, Beef, Mixed Livestock		384	1	383
Dairy		95	0	95
Horticulture		861	155	706
Services to Agriculture		4	8	-4
Other Farming		149	158	-9
Fishing and Hunting		199	2	197
Forestry and Logging		626	7	619
Oil and Gas Exploration and Extraction		193	811	-618
Other Mining and Quarrying		137	151	-14
Meat and Meat Products Manufacturing		3359	112	3248
Dairy Product Manufacturing		3171	39	3132
Other Food Manufacturing		1473	982	492
Beverage and Malt Manufacturing(1)		90	199	-109
Textile and Apparel Manufacturing		1775	1509	266
Wood and Wood Product Manufacturing		941	172	769
Paper and Paper Product Manufacturing		721	552	170
Printing and Publishing		90	382	-292
Rubber, Plastic & Other Chemical Product Manufacturing		535	1706	-1171
Petroleum, Coal and Basic Chemical Manufacturing		593	2394	-1801
Non-metallic Mineral Product Manufacturing		84	309	-226
Basic Metal Product Manufacturing		650	884	-235
Fabricated Metal Product Manufacturing		372	637	-265
Machinery and Equipment Manufacturing		1190	5760	-4570
Transport Equipment Manufacturing		295	2926	-2631
Other Manufacturing		235	460	-225
Electricity Supply		7	3	4
Gas Supply		1	1	0
Water Supply		0	1	-1
Construction		37	4	33
Wholesale and Retail Trade		3002	263	2739
Accommodation, Cafes and Restaurants		1247	1042	204
Road Transport		214	2	212
Services to Transport		232	27	205
Water Transport(2)		617	332	286
Air Transport		2015	1954	61
Communication Services		299	240	58
Finance		38	0	38
Insurance		39	48	-10
Services to Finance and Insurance		11	4821	-4810
Real Estate		41	52	-12
Business Services		324	522	-198
Ownership of Owner Occupied Dwellings		0	0	0
Education Services		14	20	-6
Health and Community Services		2	1	1
Cultural and Recreation Services		221	23	198

**Table A8- Net Trade Continued**

Personal and Other Services	44	44	-1
Central Government Services	99	0	99
Local Government Services	2	0	2
Private Non-Profit Services to Households	29	0	29
Domestic Services of Households	0	0	0
			-2962

Source: 1995 Input-Output Table and Balance of Payments Statistics, Statistics NZ.

Note: Imports of travel services have been allocated 50:50 to air transport and accommodation. Net imports of capital services (from the BOP statistics) were allocated to the banking sector.

**Table A9- Net Factor Content of Trade, 1996**

	<b>Ethnic Group</b>	<b>Sex</b>	<b>Factor Content of Trade</b>
Labour (full-time equivalents)	Non-Maori	Male	-1815
		Female	-524
Higher Degree	Maori	Male	-25
		Female	-22
Bachelor Degree	Non-Maori	Male	-4213
		Female	-1534
	Maori	Male	-153
		Female	-70
Advanced Vocational Qualification	Non-Maori	Male	-928
		Female	283
	Maori	Male	39
		Female	-30
Intermediate Vocational Qualification	Non-Maori	Male	-1505
		Female	-90
	Maori	Male	-44
		Female	-6
Skilled Vocational Qualification	Non-Maori	Male	-1260
		Female	16
	Maori	Male	72
		Female	-2
Basic Vocational Qualification	Non-Maori	Male	-159
		Female	15
	Maori	Male	630
		Female	157
School Qualification	Non-Maori	Male	5415
		Female	-536
	Maori	Male	1381
		Female	215
No Qualification	Non-Maori	Male	16989
		Female	5162
	Maori	Male	4452
		Female	1231
Land, '000 hectares			8298
Capital Equipment, 1982/83 \$ millions			4395

Source: Author calculations

**Table A10- Effect of Trade Liberalisation on Real Resource Returns, 1996**  
 (% change due to trade)

Highest Qualification	Ethnic Group	Sex	Real Returns %
Higher Degree	Non-Maori	Male	-4.38
		Female	-1.71
	Maori	Male	-1.57
		Female	-1.98
Bachelor Degree	Non-Maori	Male	-5.65
		Female	-2.7
	Maori	Male	-5
		Female	-2.24
Advanced Vocational Qualification	Non-Maori	Male	-0.85
		Female	1.47
	Maori	Male	2.36
		Female	0.41
Intermediate Vocational Qualification	Non-Maori	Male	-5.15
		Female	-1.22
	Maori	Male	-2.14
		Female	-0.79
Skilled Vocational Qualification	Non-Maori	Male	-0.44
		Female	1.1
	Maori	Male	2.14
		Female	0.96
Basic Vocational Qualification	Non-Maori	Male	0.8
		Female	1.06
	Maori	Male	8.27
		Female	3.51
School Qualification	Non-Maori	Male	4.11
		Female	0.69
	Maori	Male	8.08
		Female	2.21
No Qualification	Non-Maori	Male	11.29
		Female	5.85
	Maori	Male	15.54
		Female	7.39
Land	000 ha		78.68
Real Gross Capital Stock	82/83 \$ million		2.93

Source: Author calculations

**Table A11- Changes in Real Resource Returns Due to Trade, 1986**

<b>Factor of Production</b>	<b>Ethnicity</b>	<b>Sex</b>	<b>Factor Returns (%)</b>
Labour ( full time equiv. jobs)			
Bachelor degree	Maori	male	-1
		female	+2
	Non-Maori	male	-2
		female	0
Skill vocational	Maori	male	+2
		female	+1
	Non-Maori	male	-1
		female	-2
No Qualification	Maori	male	+13
		female	+4
	Non-Maori	male	+11
		female	+4
Land ('000 hectares)			+99
Capital Equipment (1982/83 \$ millions)			+4

Source: Authors calculations