

# **The WTO Agricultural Negotiations: Reform Options and Outcomes for New Zealand**

Anna Strutt  
University of Waikato  
[astrutt@waikato.ac.nz](mailto:astrutt@waikato.ac.nz)

and

Allan N. Rae  
Massey University  
[A.N.Rae@massey.ac.nz](mailto:A.N.Rae@massey.ac.nz)

## **ABSTRACT<sup>1</sup>**

The Uruguay Round was the first multilateral trade round in which a major effort was made to reform agricultural trade. A new WTO Round of agricultural trade negotiations began in March 2000, with the aim of building on the modest progress made during the Uruguay Round. However agricultural trade reform is likely to continue to be very contentious. In this paper we use the Global Trade Analysis Project (GTAP) model to examine options for further reforms and their impacts, particularly on New Zealand.

With its strong comparative advantage in agricultural production, New Zealand has much to gain from reform of heavily protected international agricultural markets. In particular, trade in products that can be produced on grasslands is seriously disrupted by current agricultural policies, with protection of ruminant meats and dairy products amongst the highest of all foods.

In this paper, we project the impact of complete trade liberalization, showing how this would enable New Zealand to more fully exploit its comparative advantage in agricultural production (particularly dairy and meat products). We also model two possible WTO reform scenarios that reduce tariffs across all sectors by either 36 percent or by a cocktail approach which cuts the largest tariffs more significantly. Preliminary modelling results indicate that substantive gains are possible from a multi-sector approach to reform that includes the heavily protected agricultural sectors. Across all countries, such reform will lead to improved allocative efficiency and increases in real GDP.

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<sup>1</sup> Preliminary draft of a paper prepared for the conference on *Sustainable Development and the General Equilibrium Approach*, Taipei, June 5-7, 2002. Financial support from the C Alma Baker Trust is gratefully acknowledged.

# 1. Introduction

New Zealand has historically had a very strong comparative advantage in agricultural products. Agricultural products continue to remain among the most important exports and New Zealand has a clear interest in the new World Trade Organisation (WTO) agricultural negotiations.

The Uruguay Round was the first WTO Round in which significant progress was made with agricultural trade reform. Prior to the Uruguay Round, many countries erected significant barriers to agricultural imports, taking advantage of the lack of international rules for trade in agriculture. To build on the modest progress made, WTO member countries agreed to resume negotiations on agricultural reform within 5 years from completion of the Uruguay Round negotiations. The agricultural negotiations were launched in 2000. In the first phase, concluded March 2001, forty-seven proposals and submissions were put forward; it is not yet clear what progress these contentious negotiations will manage to make.

Protection of agriculture has a long history. The Uruguay Round made some progress in establishing disciplines on the agriculture sector, with the share of the most distorting forms of support (“amber box”) falling significantly (OECD 2001). However the impact on levels of protection has been minimal, with OECD average tariff rates remaining at around 60 per cent for agricultural commodities, compared with around a 4 percent average tariff rate for manufactures (Gibson *et al.*, 2001). The level of support in OECD economies, as measured by the Producer Support Estimate (PSE), dropped by more than 20% between 1991 and 1997. But since 1997, the level of support has increased: the average price received by OECD farmers in 1997 was 29% above the world price; by 1999 it was 44% above the world price (OECD 2001, p. 186).<sup>2</sup> In the year 2000, total support to the agricultural sector in OECD countries amounted to more than US\$325 billion; this is equivalent to well over one per cent of GDP (OECD 2001).<sup>3</sup>

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<sup>2</sup> Driven largely by the fall in commodity prices on world markets.

<sup>3</sup> Between 1998 and 2000, approximately 55 per cent of total support cost has been borne by consumers; the rest by public budgets.

Dairy products have among the highest tariffs of any agricultural product, and a number of major markets appear to have increased average tariff rates for dairy products between 1995 and 2000. As shown in Table 1, the EU has increased average tariffs imposed on in-quota butter, cheese and skim milk powder. Japan has increased average tariff rates on out-of-quota butter, skim milk powder and whole milk powder. The United States has increased average tariffs on both in- and out-of-quota butter, cheese, skim milk powder and whole milk powder.

Table 1: Average dairy product tariff rates, selected countries and commodities

	1995	2000	Change (%)
<b>European Union</b>			
Butter_in <sup>a</sup>	54.0	66.0	22.1
Butter_out <sup>b</sup>	173.6	144.3	-16.9
Cheese_in	41.6	42.2	1.6
Cheese_out	139.5	96.5	-30.8
Skim milk powder_in	29.0	35.1	21.0
Skim milk powder_out	87.6	87.7	0.2
Whole milk powder_non <sup>c</sup>	139.6	106.9	-23.4
<b>Japan</b>			
Butter_in	35.0	35.0	0.0
Butter_out	595.9	679.2	14.0
Cheese_non	45.0	31.2	-30.8
Skim milk powder_in	19.3	15.8	-18.0
Skim milk powder_out	244.8	275.1	12.4
Whole milk powder_in	24	24	0.0
Whole milk powder_out	358.1	376.5	5.1
<b>United States</b>			
Butter_in	7.7	9.1	17.5
Butter_out	91.7	117.4	28.0
Cheese_in	12.3	12.3	0.0
Cheese_out	74.7	83.6	11.9
Skim milk powder_in	1.5	2.3	48.3
Skim milk powder_out	46.3	59.8	29.3
Whole milk powder_in	7.2	8.2	14.7
Whole milk powder_out	66.7	78.7	17.9

<sup>a)</sup> Average in-quota tariff rate. <sup>b)</sup> Average out-of-quota tariff rate.

<sup>c)</sup> Average non-quota tariff rate.

Source: OECD 2002 Table I.9

New Zealand's stated ultimate aim is for trade in agricultural goods to be on the same basis as trade in other goods (MFAT 2002). This will require substantial lowering of tariffs, increased market access and removal of domestic and export subsidies. Access to New Zealand's market for most commodities, including agriculture and food, is relatively unrestricted. This is in marked contrast to many other countries. Globally agriculture is one of the most heavily protected and subsidised sectors. In particular, trade in products that can be produced on grasslands (ie dairy products and ruminant meats) is seriously disrupted. Protection of ruminant meats and dairy products remain amongst the highest of all foods. Since these products are the most significant exports for New Zealand, we find that exporters across all sectors on average face trade-weighted tariffs in excess of 18 percent.

New Zealand is not alone with its interest in reform of agricultural trade. Agricultural liberalization is also a key concern for a number of other countries, including those that comprise the Cairns group.<sup>4</sup> Furthermore, there are many developing countries that tend to be heavily dependent on agriculture. A more liberalized international agricultural trading system has the potential to bring large benefits to such countries. With the apparent increased power of developing countries in the WTO, and the focus of the new Round of negotiations on development, such arguments may be particularly persuasive.

In Section 2 of this paper, we examine the recent trends in NZ exports, particularly for agriculture and we analyse the distortions that key exports face. We also examine how New Zealand's comparative advantage might be further revealed by full liberalization of all international trade. In the third section, we model two multilateral trade liberalization scenarios, focusing particularly on the anticipated results for agriculture and New Zealand. We conclude with a summary of our preliminary findings and a discussion of some of the major limitations of this study to date.

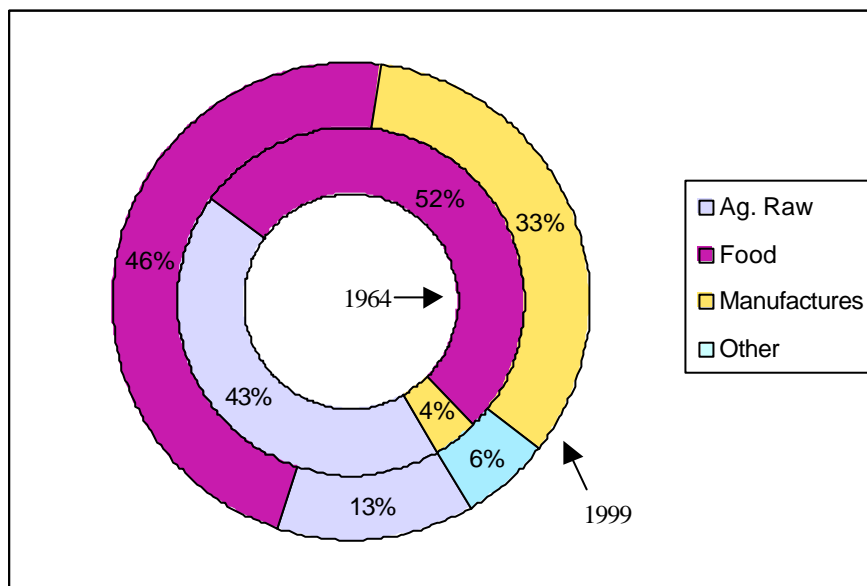
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<sup>4</sup> A coalition of agricultural exporting countries accounting for one third of the world's agricultural exports including NZ, Australia, most of South America and South-East Asian countries.

## 2. Significance of International Agricultural Market Reform to New Zealand

Agricultural production currently generates around 60% of New Zealand's total merchandise exports. Although there has been a decline in the relative importance of agricultural raw materials (from over 40 percent of exports in 1964 to less than 15 percent by 1999), the share of exports accounted for by food products has remained relatively stable over recent decades. As shown in Figure 1, agricultural raw materials now comprise around 13 percent of exports with food comprising almost 46 percent. Within the food category, dairy exports are particularly important, accounting for around 20 percent of total exports.

Figure 1: Commodity export shares for New Zealand, 1964 and 1999



Source: World Bank World Tables (INFOS Database, Statistics New Zealand 2002)

International agricultural market distortions make it difficult for New Zealand to fully exploit its efficient agricultural production. Despite this hurdle, it appears that New Zealand has achieved quite an impressive performance on world markets for a number of key agricultural products. Figure 2 uses the GTAP (Global Trade Analysis Project) version 5 time-series database to examine the cumulative growth in New Zealand's

agricultural exports by commodity between 1993 and 1998.<sup>5</sup> The size of each bubble indicates the relative value of exports, with dairy products (mil) and cattle/sheep meat (cmt) dominating. (Please see Appendix 1 for details of the components of the each abbreviated commodity.)

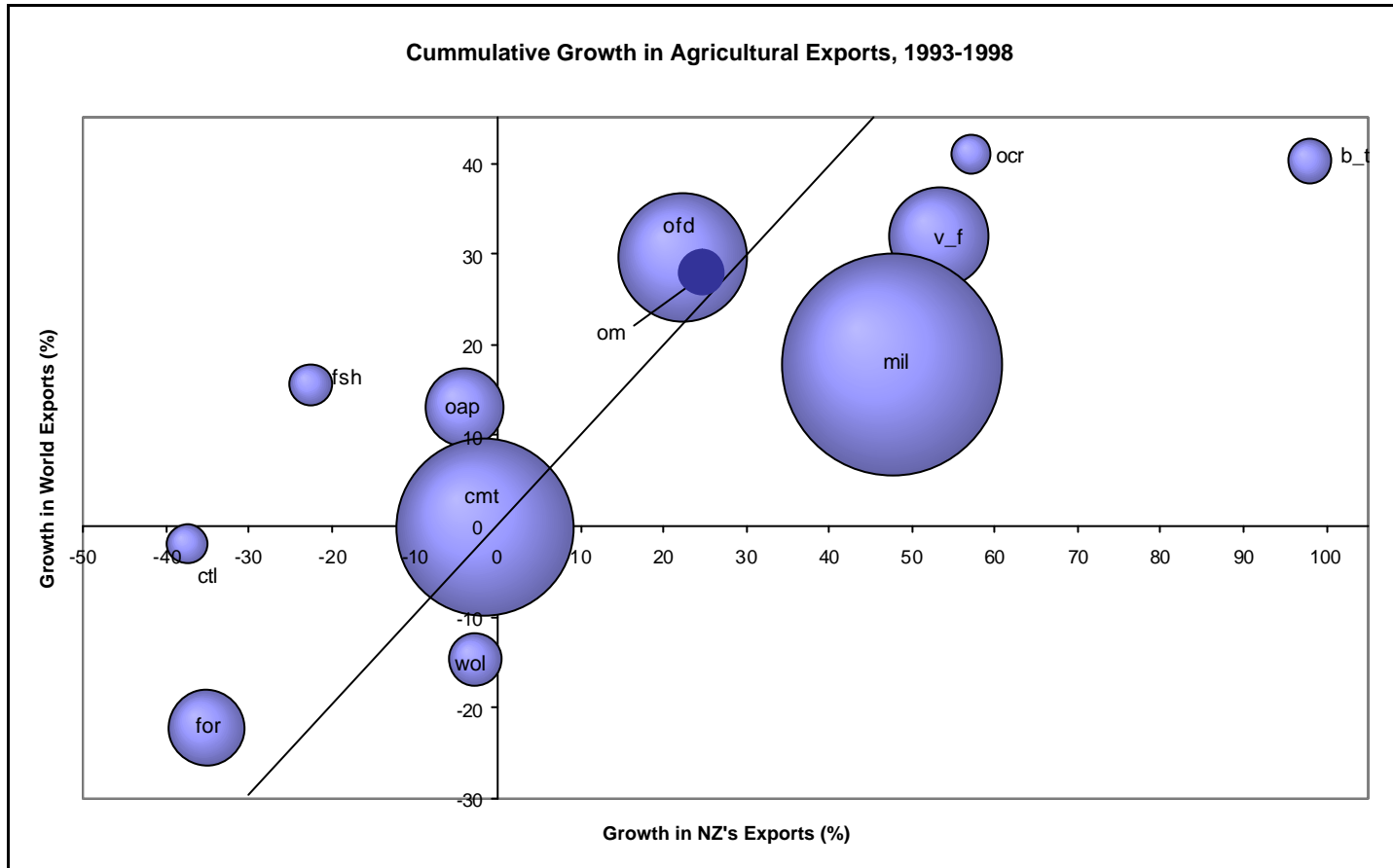
The horizontal axis shows the cumulative growth in the value of New Zealand's exports, by GTAP commodity group, over the five-year period 1993-1998. The relatively small exporting sectors of beverages and tobacco, other crops and vegetables and fruit have shown particularly rapid growth. The value of New Zealand's dairy exports also increased by almost 50 percent over the five year period.

The vertical axis measures the cumulative growth in the quantity of total world exports, by GTAP commodity group, over the period 1993 to 1998. Total world exports have grown relatively strongly for the commodities in which New Zealand has experienced particularly high export growth; this includes beverages, vegetables and fruit, dairy products, and other food. The diagonal line shows constant world market share: if New Zealand's exports of a given commodity grew at the same rate as total world exports, the bubble will lie on this line, reflecting no change in New Zealand's share of world markets (ITC 2001). If the bubble lies to the left of this diagonal line, New Zealand has lost market share for this commodity. Conversely, if the bubble lies to the right of this diagonal, New Zealand exports grew more rapidly than world markets for this commodity, therefore New Zealand increased its share of world markets. During the 1993-1998 period, New Zealand exports of dairy products grew by around 50 percent, while world exports grew less than 20 percent. This indicates an increase in New Zealand's share of world exports of dairy products. New Zealand exports also increased market share in the rapid growth sectors of beverages and tobacco, other crops and vegetables and fruit. The large cattle and sheep meat exporting sectors did not grow, on average, during this period - either for New Zealand or for the world as a whole.

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<sup>5</sup> This method of presentation follows the innovative work of the UNCTAD/WTO International Trade Centre (ITC 2002).

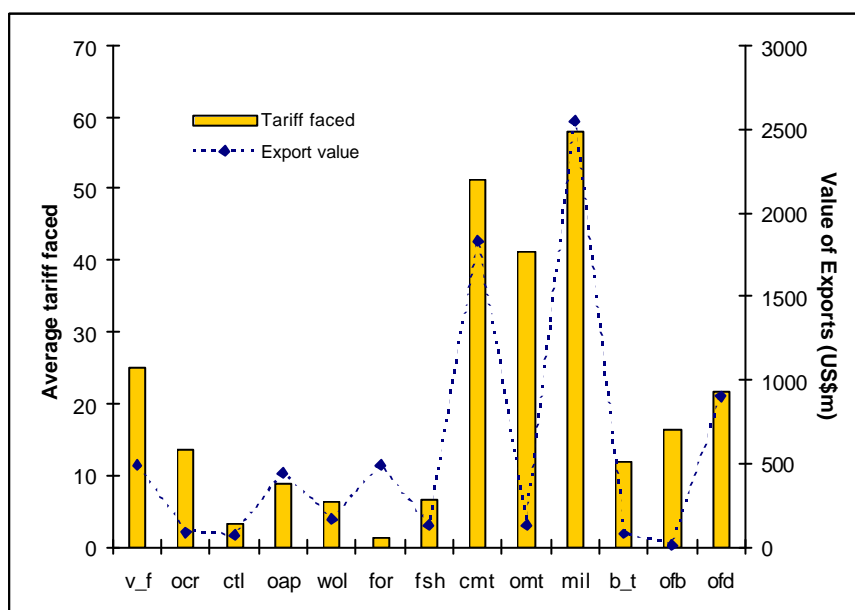
Figure 2: Recent performance of New Zealand's agricultural exports



Source: Authors' calculations using the GTAP version 5 time-series database.

The strong performance of a number of New Zealand's agricultural exports is particularly notable for having occurred despite the high protection afforded these commodities by many countries. New Zealand exports face an average tariff rate of over 18.5 percent across all commodities and markets, this is the highest average tariff rate imposed on exports from *any* country or region in the current GTAP database.<sup>6</sup> For agricultural commodities alone (not including forestry and fisheries), the average tariff rate applied by importers of New Zealand products is more than 42 percent. Figure 3 decomposes this average to show the tariffs faced and export value for key agricultural and natural resource commodities. The highest tariffs faced by New Zealand are for dairy products (mil – almost 60 percent), and meat products, including beef and sheep (cmt – more than 50 percent). As indicated on the right hand axis, these two product groups are New Zealand's largest agricultural exports.

Figure 3: Tariffs faced and value of exports, New Zealand, key agricultural and natural resource commodities



Source: Calculated from GTAP version 5 database.

In an effort to improve our understanding of what New Zealand's comparative advantage would be in the absence of trade distortions, we use the GTAP model to simulate a full removal of import tariffs, export distortions and output

<sup>6</sup> Trade-weighted calculation using the GTAP version 5 database. Figure 5 provides further details of tariffs faced and imposed by GTAP region.

taxes/subsidies.<sup>7</sup> While unlikely to be politically feasible in the foreseeable future, this “full reform” scenario is a useful benchmark that enables us to examine some of the potential impacts of complete liberalization across all markets.

Figure 4 shows the performance of New Zealand’s agricultural exports following a full removal of global export, import and output distortions. The bubbles for dairy and meat products are particularly striking. In both of these export commodities, world markets receive a large boost to export trade following liberalization: 32 percent for dairy products and 43 percent for meat products. Furthermore New Zealand increases market share in these commodities with New Zealand’s exports projected to grow by 70 and 102 percent respectively for dairy and meat products. These results are perhaps not unexpected, given the relatively large tariffs New Zealand faces in these two sectors. Removal of the distortions encourages a movement of resources into these commodities that can now be much more freely exported.

### **3. Reform options and Results**

Cuts to protection that will be agreed upon in the new Round of negotiations are far from certain at this stage of the negotiating process. In this section of the paper we use the GTAP applied general equilibrium model in an effort to analyse some of the likely impacts of further WTO trade reform, including liberalization of agricultural trade. Although the primary focus of this paper is agriculture, it is important to take account of changes in other sectors, therefore we model liberalization of trade across all sectors.

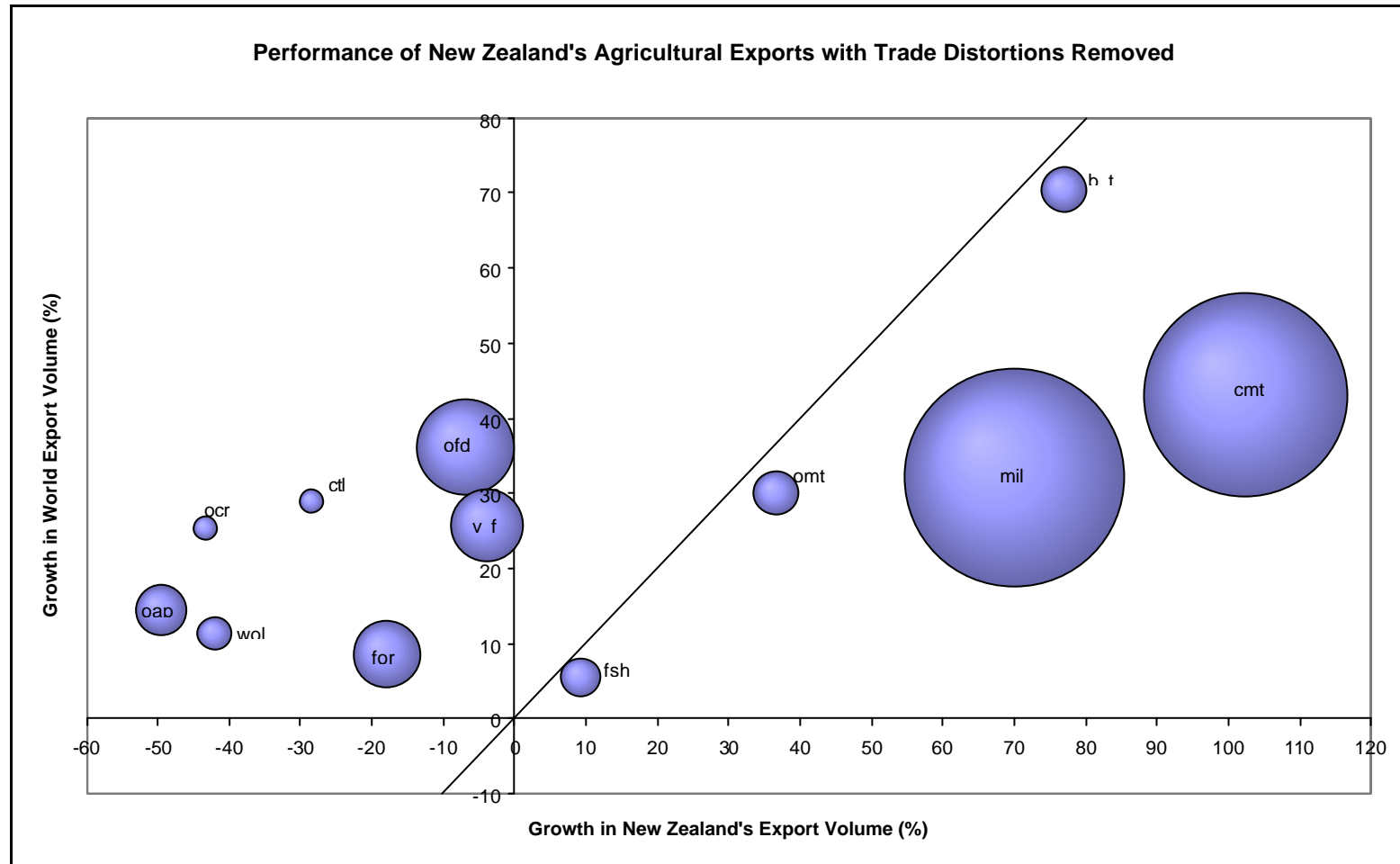
The GTAP model is a multi-region model built on a complete set of economic accounts and detailed inter-industry linkages for each of the economies represented (Hertel 1997).<sup>8</sup> The GTAP production system distinguishes sectors by their intensities in five primary production factors: land (agricultural sectors only), natural resources (extractive sectors only), capital, and skilled and unskilled labour. Producers choose

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<sup>7</sup> See Dimaranan *et al.* (2002a) and Rae and Strutt (2002) for a discussion of other distortions in the database, including factor and intermediate subsidies.

<sup>8</sup> See [www.gtap.agecon.purdue.edu](http://www.gtap.agecon.purdue.edu) for extensive and up-to-date information on the GTAP model and database.

Figure 4: Changes in the quantity of New Zealand's agricultural exports with global import, export and output distortions removed.



Source: Authors' simulation results

inputs that minimise production costs subject to separable, constant returns to scale technologies. Market clearing conditions equate supply with demand for each factor of production. In trade, products are differentiated by country of origin, allowing bilateral trade to be modelled, and bilateral international transport margins are incorporated and supplied by a global transport sector. The model is solved using GEMPACK software (Harrison and Pearson 1996).

We use version 5 of the GTAP database (Dimaranan and McDougall 2002), aggregating the database to 15 regions and 19 commodities from its full 57 sectors by 66 regions. Aggregation of the database aids computation and enables us to highlight sectors and regions of particular interest. The aggregation we use is detailed in Appendix 1.

Two different WTO trade reform scenarios are modelled here. The first reform option we consider is a 36 percent reduction in tariff rates for all countries and all commodities. The second reform option we model is a cocktail approach: tariffs between zero and 5 percent reduce to zero; tariffs between 5 and 100 percent reduce by 36%; and tariffs over 100 percent reduce by a Swiss formula (following Josling and Rae 1999).<sup>9</sup>

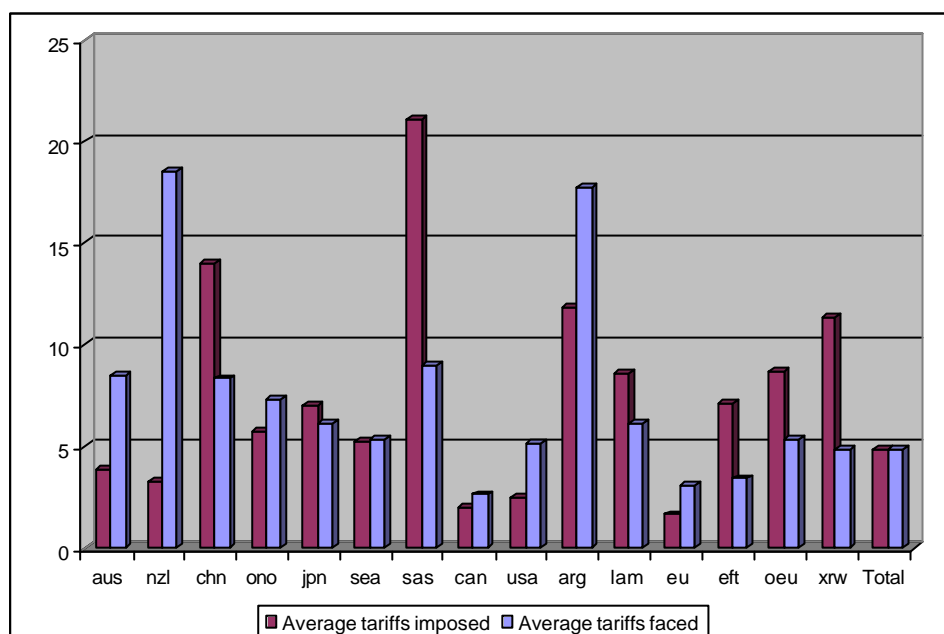
Before turning to the results of these simulations, it is useful to examine the initial distortions in place in the database, since it is the reduction in these that will drive our results. Figure 5 provides an overview of tariff protection in each of the regions in our aggregation. For each country, the first bar indicates the average tariff that is imposed on imports by that country, averaged across all sectors. The average global tariff imposed is 4.8 percent. South Asia, and to a lesser degree China, Argentina and the diverse grouping of the Rest of the World, all impose particularly high average tariffs (over 20 percent in the case of South Asia). The second bar shows the average tariff *faced* by exporters from each region. Although not commonly analysed, these tariff rates that on average are imposed on exports from the country under consideration, can provide very important insights into the likely direction and magnitude of changes resulting from trade reform simulations. It is particularly striking that while New

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<sup>9</sup>  $t_1 = at_0/(a+t_0)$ , with  $t_1$  being the new tariff rate,  $t_0$  being the initial tariff rate and parameter  $a$  is set to 178.

Zealand operates one of the least protected markets in the world, its exports face the highest average tariff rate of any country or region in the GTAP database. As noted earlier, this is primarily due to the most significant agricultural exports facing particularly high tariffs imposed by the importing country (see Figure 3).

Figure 5: Average tariffs faced and imposed by region, trade-weighted across all export commodities



Source: Authors' calculations from GTAP version 5 database.

Table 2 presents a summary of the welfare effects for each region with the two trade reform simulations. The first column for each simulation shows the change in welfare as measured by an equivalent variation in income. The total projected increase in world welfare is \$US38.7b for the 36 percent tariff reduction simulation and an additional 10.6 percent increase in welfare amounting to a total of US\$42.9b for the cocktail tariff reduction simulation. Under the 36 percent reduction in all tariffs scenario, every region shows a welfare increase. However for the cocktail approach to tariff reductions, some small losses are projected for Canada and the European Union. These are very small, less than 0.05% of GDP as indicated in the second column. All regions are projected to experience an increase in real GDP as shown in the final column of Table 2.

Table 2: Welfare effects of trade reform, by country

	<u>Change in EV (\$USm)</u>		<u>EV/GDP (%)</u>		<u>Real GDP change (%)</u>	
	Cocktail	Tariff_36	Cocktail	Tariff_36	Cocktail	Tariff_36
aus	266	367	0.07	0.09	0.03	0.04
nzl	380	358	0.58	0.55	0.09	0.09
chn	4774	3161	0.56	0.37	0.49	0.45
ona	5157	4364	0.58	0.49	0.33	0.23
jpn	5958	7415	0.14	0.17	0.15	0.12
sea	4136	2064	0.63	0.32	0.18	0.17
sas	1862	1673	0.35	0.32	0.45	0.43
can	-277	512	-0.04	0.08	0.14	0.12
usa	2439	135	0.03	0.00	0.02	0.02
arg	895	919	0.27	0.28	0.14	0.14
lam	969	2122	0.06	0.13	0.20	0.21
eu	-231	5060	0.00	0.06	0.08	0.08
eft	2642	1899	0.64	0.46	0.61	0.44
oeu	4836	2527	0.55	0.29	0.29	0.24
xrw	9049	6154	0.59	0.40	0.54	0.48

Table 3: Decomposition of welfare into allocative efficiency and terms of trade effects

	<u>Allocative efficiency effects</u>		<u>Terms of trade effects</u>	
	Cocktail	Tariff_36	Cocktail	Tariff_36
aus	121	141	147	210
nzl	59	62	325	300
chn	4160	3871	739	-791
ona	2888	2076	2176	2154
jpn	6176	5258	-186	2313
sea	1158	1120	2915	875
sas	2375	2277	-445	-534
can	877	740	-1293	-310
usa	1583	1345	993	-1123
arg	444	451	435	433
lam	3256	3428	-1897	-1107
eu	6499	6754	-7249	-2079
eft	2504	1820	127	91
oeu	2551	2081	2177	455
xrw	8269	7334	972	-915

The breakdown of welfare into allocative efficiency effects and terms of trade effects is given in Table 3 (following Huff and Hertel 1996). It can be seen that Canada and the European Union each experience a deterioration in their terms of trade that, in the case of the cocktail simulation, are particularly large and sufficient to overturn the positive welfare impact of improved allocative efficiency. While the allocative efficiency results are similar in magnitude for both simulations, for a number of

countries, some of the terms of trade results differ quite considerably. China, South East Asia, the US and other European countries all experience a significant worsening in their terms of trade when the 36 percent reduction in tariffs is compared with the cocktail simulation. On the other hand, Japan, Canada, Latin America and the EU all show a more favourable terms of trade outcome with the 36 percent tariff reduction than with the cocktail approach.

Table 4 presents the proportional changes in output by sector in New Zealand for the two liberalization scenarios. The magnitude and direction of most results are similar for each simulation. Non-agricultural sectors are aggregated together into textiles, leather and wearing apparel, other manufactured goods and services, as well as extractive industries. With the exception of a very small increase in services, all of these sectors experience some fall in output following trade reform. Most agricultural sectors are projected to increase their output. These increases are very large for some of the most sizeable agricultural commodities, and there is a significant draw of resources from non-agricultural commodities, leading to the fall in output mentioned above. Of particular significance are the increases in dairy and meat products; at 13 and 16 percent, these are significant increases in very large industries.

Table 4: Output changes by sector, New Zealand

	Cocktail	Tariff_36
v_f	1.13	1.60
ocr	1.14	1.69
ctl	3.97	3.84
oap	-8.04	-6.72
mk	10.59	9.06
wol	3.48	3.33
for	-0.78	-1.47
fsh	0.63	0.35
cog	-0.95	-1.05
cmt	16.43	17.05
omt	8.68	8.92
mil	12.97	10.90
b_t	-0.46	-0.40
ofb	0.41	0.49
ofd	0.12	0.59
tlw	-10.99	-14.32
tex	-10.54	-11.28
man	-3.80	-3.20
svs	0.01	-0.01

Given the type of liberalization scenarios modelled, sectors with large tariffs will tend to have the most substantive reductions in absolute tariff levels. In the 36 percent tariff reduction simulation, larger tariffs will be cut by a greater absolute amount than are smaller tariffs. This is an even more important effect with the cocktail approach to liberalization, where the highest tariff rates are reduced the most.<sup>10</sup> Figure 6 shows the growth in New Zealand and world export quantities projected for each simulation. The lighter bubbles show the results for the 36 percent reduction in tariffs simulation while the darker bubbles are for the cocktail simulation. Once again the most salient effect appears to be for the dairy and meat products sectors. These largest of New Zealand's agricultural sectors grow reasonably strongly in world markets following reform - dairy products growing by 8 percent with the 36 percent tariff reduction and 11 percent with the cocktail approach, while meat product exports grow by 8 percent in both simulations. Perhaps of even more interest to New Zealand is that for both simulations, dairy product exports grow by around 50 percent more than total world exports grow and more than three times faster in the case of meat products. As with the output results, dairy products perform a little more strongly under the cocktail simulation, with meat products performing a little better under the 36 percent reduction in tariff simulation. This is because dairy products face more megatariffs (tariffs in excess 100 percent) that are cut more substantially under the cocktail approach than under the straight 36 percent tariff cut.

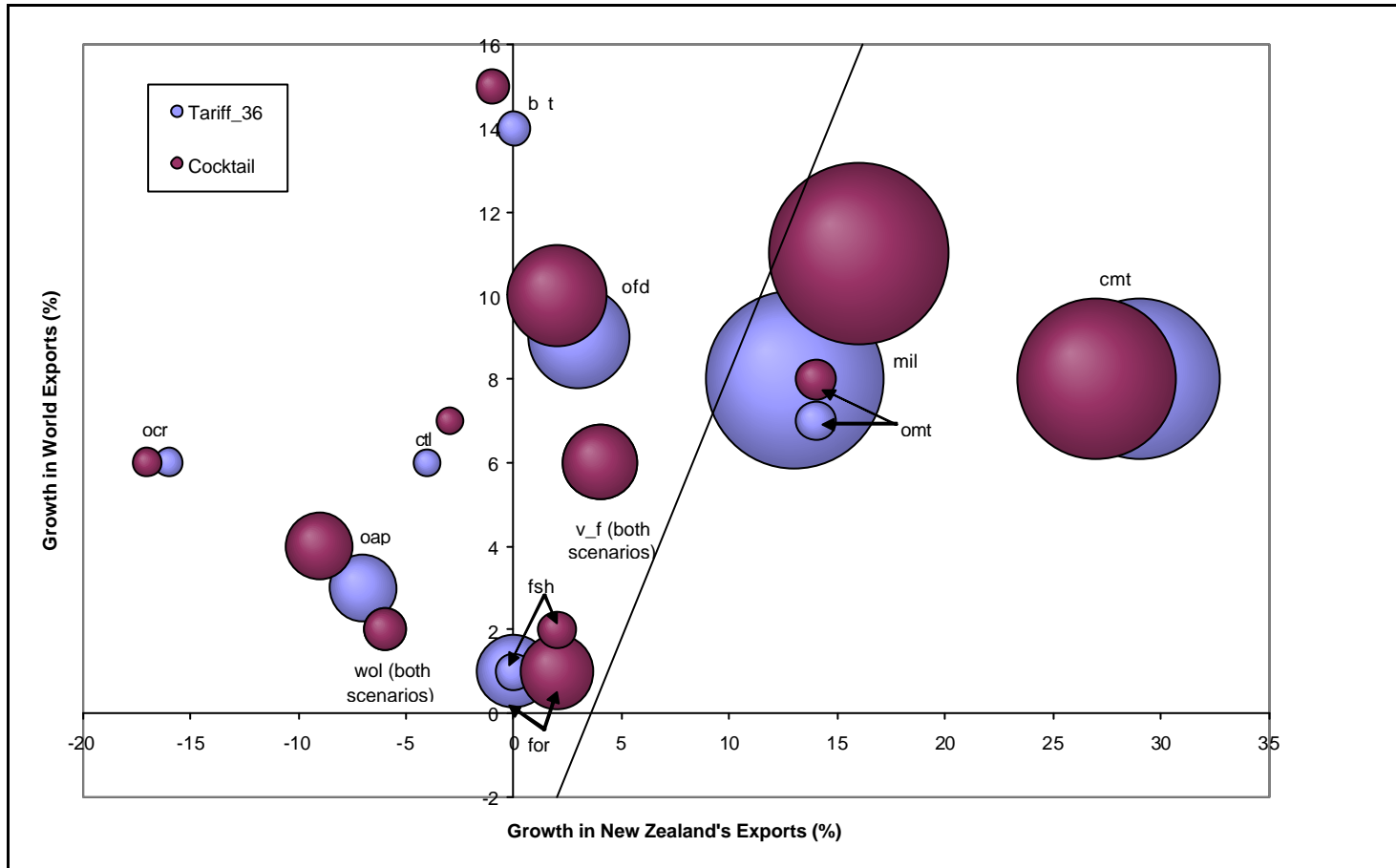
## 4. Conclusions and limitations

In this paper we outlined some agricultural trade opportunities and challenges for New Zealand. We projected the impact of complete trade liberalization, showing how this would enable New Zealand to more fully exploit its comparative advantage in agricultural production, particularly dairy and meat products. We also modelled two WTO reform scenarios that include reductions in tariffs across all sectors by either 36 percent or by a cocktail approach which cuts the largest tariffs more significantly. Results from both WTO trade liberalization scenarios suggest that significant gains

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<sup>10</sup> This is particularly the case for tariffs over 100 percent where the Swiss formula is applied: tariffs over 100 percent will be reduced by at least 36 percent, with progressive reductions as the tariff increases. For example, tariffs over 200 percent will reduce by more than 100 percent.

Figure 6: Changes in the quantity of New Zealand's agricultural exports with trade reform



Source: Authors' simulation results.

are possible from a multi-sector approach to reform that includes the heavily protected agricultural sectors. Projected gains for the dairy and meat product sectors in New Zealand are shown to be large since these sectors face particularly high tariffs. Across all countries, such reform will lead to improved allocative efficiency and increases in real GDP.

Results presented in this paper are very preliminary. In particular they are limited by inadequate modelling of TRQs.<sup>11</sup> It would also be useful to conduct trade reform simulations based on projected datasets (following work initiated by Hertel *et al.* 1996), given that the structure of the global economy will have changed by the time trade reform is agreed upon and implemented.<sup>12</sup> Furthermore, our simulated reforms are very much open to debate; a better understanding of the agreements that will likely be reached will facilitate improved analysis. There are also impacts that we do not attempt to capture in this paper, for example dynamic gains from trade are not captured in a comparative static model of the type used here. Finally environmental impacts of reform may also be important, but are outside the current scope of this work.<sup>13</sup>

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<sup>11</sup> In the GTAP database used, the initial tariffs for countries with TRQs reflect an average of the final bound rates and over-quota tariff rates (Gibson, Wainio and Whitley 2002).

<sup>12</sup> This is likely to be particularly true for rapidly growing developing economies.

<sup>13</sup> See Rae and Strutt (2001) for a recent study on the environmental impacts of livestock with trade reform.

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Appendix 1: Region and Commodity descriptions

<b>Region</b>	<b>Description</b>	<b>Commodity</b>	<b>Description</b>
aus	Australia	v_f	Vegetables and fruit
nzl	New Zealand	ocr	Other crops
chn	China	ctl	Cattle, sheep, goats, horses
jpn	Japan	oap	Other animal products
ona	Other North Asia	rmk	Raw milk
sea	South East Asia	wol	Wool
sas	South Asia	for	Forestry
can	Canada	fsh	Fishing
usa	USA	cog	Coil, oil and gas
arg	Argentina	cmt	Meat: including beef, sheep
lam	Latin America	omt	Other meat
eu	EU	mil	Dairy products
eft	EFTA	ofb	Oils, rice, sugar
oeu	Other Europe	ofd	Other food
xrw	Rest of the World	b_t	Beverages and tobacco
		tex	Textiles
		tlw	Leather and apparel
		man	Manufactured products
		svs	Services