FINAL REPORT

Impacts of the New Zealand-European Union Free Trade Agreement on the New Zealand Economy

A Dynamic Computable General Equilibrium Analysis

ImpactECON

Impacts of the New Zealand-European Union Free Trade Agreement on the New Zealand Economy

A Dynamic Computable General Equilibrium Analysis

Authors: Terrie Walmsley,[1] Peter Minor[2] and Anna Strutt[3]

[1] Terrie Walmsley, Managing Director and Chief Economist, ImpactECON, LLC.
[2] Peter Minor, Director and Senior Economist, ImpactECON, LLC.
[3] Anna Strutt, Professor, Waikato Management School, University of Waikato, New Zealand.

Table of Contents

Table of Tables

Table of Figures

Acronyms

AVE	ad valorem equivalent
BREXIT	United Kingdom's exit from the European Union
CEPII	Centre d'Etudes Prospectives et d'Informations Internationales
CGE	computable general equilibrium
CIF	cost, insurance and freight
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
CSTQ	country-specific tariff rate quota
EIF	entry into force
EU	European Union
FOB	free on board
FTA	free trade agreement
GDP	gross domestic product
GDyn	Dynamic GTAP
GTAP	Global Trade Analysis Project
HS	harmonised system
IEDyn	ImpactECON Dynamic model
LDP	landed duty paid
MFAT	Ministry of Foreign Affairs and Trade (New Zealand)
MFN	most favoured nation
MFNTQ	most favoured nation tariff rate quota
MPI	Ministry for Primary Industries (New Zealand)
MT	metric tons
NTM	non-tariff measure
NZ	New Zealand
TRQ	tariff rate quota
UK	United Kingdom
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNITC	United Nations International Trade Commission
WTO	World Trade Organization

Executive Summary

This report was prepared at the request of the New Zealand Ministry of Foreign Affairs and Trade (MFAT). It presents results from a large-scale modelling effort undertaken to improve understanding of the potential economic impacts on New Zealand of a free trade agreement between New Zealand and the European Union (NZ-EU FTA).

We model three scenarios:

— Scenario 1: a conservative scenario with tariff reductions, plus limited quota liberalisation, along with small reductions in goods and services non-tariff measures (NTMs);

— Scenario 2: a moderate scenario with more rapid tariff reductions, moderate quota liberalisation, further reductions in goods and services NTMs, and some improved trade facilitation.

— Scenario 3: an ambitious scenario with all tariff reductions on entry into force (EIF), extensive quota liberalisation, more ambitious reductions in goods and services NTMs, and further improvements in trade facilitation.

Each of these scenarios is modelled against a baseline projection of the global economy to 2040 that does not include the impacts of a NZ-EU FTA but captures tariff reductions already committed to in other trade agreements to avoid double-counting. We focus our analysis on results relative to the 2035 baseline, by which time all the scenarios modeled will be fully implemented.

In all of the NZ-EU liberalisation scenarios modelled, New Zealand's real gross domestic product (GDP) is projected to increase over the period of implementation of the agreement, with more ambitious reform leading to larger potential gains. The overall impacts on New Zealand's real GDP and real exports of the scenarios modelled are summarised in Table E- 1. In the first scenario, real GDP is projected to increase by 0.17 percent relative to the 2035 baseline, increasing to 0.24 percent in the second scenario and 0.33 percent in the third. In constant 2019-dollar terms, these increases range from just over NZ$1b to almost NZ$2b. We find that New Zealand's exports to the world also increase progressively as the extent of the liberalisation modelled increases: total real exports are projected to increase by 0.39 percent in Scenario 1, in Scenario 2 the increase is 0.50 percent and in Scenario 3 it is 0.65 percent. In dollar terms, these increases in New Zealand's real exports range from NZ$0.6b to NZ$1b (Table E- 1). This export growth is driven by exports to the EU, which increase by between NZ$1.3b and NZ$2.3b, with total export growth somewhat dampened by reductions in exports to other regions.

Table E- 1 Simulated change in New Zealand's real GDP and exports relative to the 2035 baseline, NZ-EU FTA scenarios 1-3 (percent and NZ$ million)

	Scenario 1	Scenario 2	Scenario 3
R E A L G D P			
Percent	0.17	0.24	0.33
NZ$m[a]	1,043	1,434	1,994
T O T A L E X P O R T S			
Percent	0.39	0.50	0.65
NZ$m[a]	608	783	1,012
E X P O R T S T O T H E E U			
Percent	12.73	17.10	22.72
NZ$m[a]	1,314	1,765	2,345

a. Constant 2019 NZ dollars.

Source: Authors' model results.

In terms of the various components of the FTA modelled, we find tariff reductions to be particularly important, contributing over two thirds of the GDP gains in Scenario 1, just over half of the gains in Scenario 2 and almost 40 percent of the gains in Scenario 3. Quota liberalisation contributes between 12 and 16 percent of the gains in each scenario we model. Reductions in goods NTMs contribute 12 percent of the gains in the first scenario, 19 percent in the second scenario and 28 percent in the most ambitious third scenario. Services NTMs contribute a little less, 9 percent in the first, 14 percent in the second and 20 percent of the GDP gains in the third scenario, while the limited trade facilitation we model has a negligible effect on New Zealand's real GDP.

We find that in all scenarios modelled, exports increase across the four aggregate sectors of agriculture, processed foods, manufactures and services. In terms of processed foods, we find exports of beef, dairy and wine to the EU all expand. Exports of beef make particularly strong contributions to the expansion of processed food exports, increasing by 3,000MT in the first scenario, 4,700 MT in the second scenario and 6,100 MT in the third. We also find New Zealand's butter, cheese and milk powder exports expand with reductions in tariffs and improved quota access. Wine exports to the EU benefit from reduced tariffs in the scenarios modelled, augmented by reductions in NTMs in the second and third scenarios.

1 Introduction and Background

This report was prepared at the request of the New Zealand Ministry of Foreign Affairs and Trade (MFAT). It presents results from a large-scale modelling effort undertaken to improve understanding of the potential economic impacts on New Zealand of implementing the proposed New Zealand-European Union free trade agreement (NZ-EU FTA). The European Union and New Zealand aim to achieve "a deep and comprehensive high-quality Free Trade Agreement", with negotiations formally launched in June 2019 and eleven rounds completed by July 2021.[4]

The EU currently comprises 27 member countries.[5] It is a significant part of the global economy, comprising approximately 6 percent of the world's population, 18 percent of global gross domestic product (GDP) and more than 30 percent of world trade (World Bank, 2021). In the year to December 2021, the EU purchased 5.9 percent of New Zealand's exports of goods and services and supplied 15.2 percent of imports, making it New Zealand's 4th largest partner in terms of total trade value.[6] Table 1 summarises some key indicators for New Zealand and the EU. While the EU is a large and relatively wealthy region of the world that contributes a significant proportion of global trade, there is considerable diversity among member countries. For example, total GDP ranges from almost NZ$6 trillion in Germany, to NZ$23 billion in Malta, with 12 member countries having smaller economies than New Zealand. GDP per capita ranges from nearly NZ$180,000 for Luxembourg to NZ$15,500 for Bulgaria, with 18 member countries having a lower GDP per capita than New Zealand.

---

[4] https://www.mfat.govt.nz/en/trade/free-trade-agreements/free-trade-agreements-under-negotiation/european-union-eu-new-zealand-free-trade-agreement/timeline-for-negotiations/

[5] Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

[6] When treating the EU region as a single country, https://statisticsnz.shinyapps.io/trade_dashboard/.

Table 1 Overview data for New Zealand and EU, 2020[7]

	GDP (NZ$ billion)	GDP per capita (NZ$)	Population (million)	Exports (NZ$ billion)	Imports (NZ$ billion)
New Zealand	324	63,756	5	78	73
EU	23,526	52,537	448	11,027	10,086

Source: World Bank (2021).

1.1 Our Approach

To model the potential impacts of implementing a NZ-EU FTA, we employ a dynamic computable general equilibrium (CGE) model of the world economy, with detailed regional and commodity disaggregation, along with global projections made to the year 2040. This modelling approach enables us to capture key features of the various economies involved, including inter-sectoral and inter-regional linkages. We are able to simulate the projected direction and magnitude of impacts on the New Zealand economy of various different FTA scenarios, over the period of implementation. Global CGE models are powerful tools for policy analysis; however, as with any modelling work, simplifying assumptions are needed.[8]

While the final outcome of the NZ-EU negotiations remains uncertain, the aim is for a modern, high-quality agreement. In the current study, we focus our analysis on reductions in tariff and quota barriers on goods trade; increased harmonisation and reductions in the cost of non-tariff measures (NTMs)[9] on goods trade and services trade; and improvements in trade facilitation. The aspects of the agreement we model, and assumptions made, are discussed in the report, with further detail provided in appendices. Additional factors that are not modelled may also influence the impact of any agreement on New Zealand and the current study is not intended to be a full cost-benefit analysis that captures all potential implications of the FTA.

1.2 Organisation of the Report

The report proceeds as follows: Section 2 briefly summarises the modelling framework, baseline construction and policy scenarios modelled, supplemented by more detailed explanations and data in the appendices. Section 3 presents results from our modelling, focusing first on an overview of

---

[7] Converted to NZD applying a 2020 exchange rate of 0.65, calculated using the simple average of B1 monthly exchange rates from the Reserve Bank of New Zealand https://www.rbnz.govt.nz/statistics/b1/

[8] The use of CGE models, along with their strengths and limitations, has been widely discussed in the literature. For example, Piermartini and Teh (2005) provide an overview of the use of CGE models for trade policy analysis; studies such as Francois and Martin (2010) and the qualifications section of Anderson and Strutt (2014) provide discussion of reasons CGE models may underestimate the full impacts of trade reform.

[9] A non-tariff measure (NTM) is a policy measure, other than a tariff, which may restrict trade. Many NTMs are legitimate measures to achieve particular objectives, such as biosecurity or protecting consumer health and safety, and some measures apply equally to domestic and imported products.

the potential impacts of the FTA on New Zealand and followed by more detailed analysis of selected sectors. Section 4 offers our concluding comments.

2 Modelling Framework and Scenarios

2.1   Model and Database

In this study, we employ an extended version of the ImpactECON Dynamic model (IEDyn Walmsley, et al., 2015),[10] based on the dynamic GTAP model (GDyn) (Ianchovichina and Walmsely, 2012). GDyn is a recursive dynamic model that provides a theoretically consistent method for projecting long term macro- and micro economic variables, allowing for the modelling of trade policy impacts in the year and economic environment that they are projected to occur. GDyn is in turn based on the widely used standard GTAP model (Hertel, 1997; Corong et al., 2017), long considered the benchmark for analysis of trade agreements.

The IEDyn model used here improves on the GDyn model in several important areas.[11] First, our model and database include the number of workers and wages by occupation (5 categories), sector and region. This facilitates analysis of the number of jobs created or lost by occupation and sector. It also enables us to model the movement of workers across sectors and the impact of this movement on wages, which differ by occupation. Second, alternative assumptions regarding labour are incorporated. In particular, it is assumed that while wages are upwardly flexible, they fall only gradually over time, thereby potentially creating unemployment.

The IEDyn model is further extended to allow for improved modelling of NTMs (Walmsley and Strutt, 2021), along with more detailed modelling of selected trade flows in beef, sheep meat and dairy products that are subject to tariff rate quotas (TRQs).

The GTAP v10.1 2014 database (Aguiar et al., 2019) provides the starting point for our analysis. The data are aggregated into 22 regions and 32 commodities, with some further disaggregation of quota sectors, as detailed in Appendix I. The GTAP 2014 database is first adjusted to take account of improved estimates of tariffs,[12] then updated to 2019 using historical data. The updated 2019 data are then further disaggregated for analysis of TRQs and TRQ rents (see Appendix I, Table I- 2). The resulting 2019 database is then used as the starting point for our simulations. Separating the baseline into two parts allows us to more accurately track aggregate trade flows for beef & sheep meat and dairy between 2014 and 2019, and to disaggregated these trade flows and incorporate

---

[10]   The model is solved using Gempack (Horridge, Jerie, Mustakinov & Schiffmann, 2018) and includes complementarities (see Harrison, Horridge, Pearson, and Wittwer, 2002).

[11]   Other improvements made to the IEDyn model are outlined in Walmsley, Minor and Strutt (2015).

[12]   Using the altertax facility. However, adjustments were made to the traditional altertax facility developed by Malcom (1998) to minimise changes in the value of exports at FOB and CIF prices. This ensures a better match between the COMTRADE data and resulting trade data in the updated GTAP Data Base.

appropriate quota rents for 2019 for beef, sheep meat, butter, cheese and other dairy products. Further details of the inclusion of quotas can be found in Appendix II.

2.2   Baseline Projections

2.2.1   MACRO PROJECTIONS

A business-as-usual or baseline scenario must be established for the dynamic model. Our baseline essentially extends from 2014 to 2040, giving ample time for implementation of all the components of the FTA we model. To build the baseline scenario, forecasts are obtained for key exogenous variables, including population, labour by education, real GDP, and investment. Forecasts to 2023 (or 2026 for some variables) for real GDP, investment, savings, and global exports are obtained for 191 countries from the IMF's World Economic Outlook database (April, 2021). After 2023/2026, we assume that technological change, risk premiums and other relevant rates undergo some limited convergence towards steady state rates, unless the evidence prior to 2023/2026 suggests otherwise. Forecasts for labour by education to 2040 are obtained from CEPII (French research organisation Centre d'Etudes Prospectives et d'Informations Internationales), with the methodology documented in Fouré et al. (2012) and updated to reflect more recent forecasts in total labour growth from the UN (2019). Population forecasts to 2040 are obtained from the UN (2019) forecasts.

It is worth noting that the baseline scenario does include a global decline in production and trade due to the closure of business and travel restrictions placed on businesses and people due to the COVID pandemic. This decline in global production results in unemployment that is eliminated gradually over time during our baseline. While it is possible that the FTA may impact the speed of the recovery process, particularly in the EU, we assume that the FTA does not impact the rate at which unemployment returns to pre-pandemic levels. The results may therefore be considered conservative; however, we believe this assumption is likely to best capture the impact of the FTA.

2.2.2   TARIFF AND NON-TARIFF BARRIER PROJECTIONS

To capture changes in tariffs since 2014, including major trade agreements ratified since 2019, we employ several data sources reviewed below.

New Zealand

New Zealand's most favoured nation (MFN) tariff data were updated employing 2019 tariffs (HS10) and trade values (HS10).[13]

We then applied United Nations International Trade Centre (UNITC) data which projects applied tariff rates for trade agreements ratified before 2019 at the HS6 level.[14] The list of trade agreements

---

[13]   Data from Stats NZ as conveyed to ImpactECON, LLC by MFAT.
[14]   Data can be downloaded from https://www.macmap.org/

includes the Comprehensive and Progressive Agreement for Trans-Pacific Trade Partnership (CPTPP) as well as remaining tariff reductions from earlier trade agreements, such as the New Zealand-China FTA.[15] These tariff reductions, along with macro-economic data, are included to project the state of the New Zealand economy to 2024, when the NZ-EU trade agreement is assumed to enter into force.

European Union

WTO TRQs allocated to the EU because of Brexit on red meat (beef and sheep) and dairy (cheese and whole milk) products are assumed to remain unchanged over the baseline. Imports under the WTO quota are initially either constrained by a prohibitive WTO quota, constrained by the WTO quota but with out-of-quota imports, or unconstrained by the WTO quota due to low fill rates. Over the baseline, growth in imports leads to changes that alter the fill rates of these constraints, although in this case there was no change in the extent to which the quota constrained trade. For instance, the EU quota on New Zealand exports of beef was binding, while the EU quota on sheep meat remained non-binding over the baseline.

As with New Zealand, we project EU tariffs, in the baseline, accounting for trade agreements ratified before 2019 employing the UNITC tariff projections to 2050, contained on the MacMap trade site.[16]

2.3   Policy Scenarios

We focus our analysis on reductions in tariff barriers on goods trade; changes in quota access; reductions in the cost of NTMs on goods trade; reductions in NTMs on services trade; and improvements in trade facilitation. Table 2 summarises the three main scenarios explored to examine the impact of the NZ-EU FTA. In each scenario, implementation begins in 2024 and is completed by 2029 or 2031, depending on the scenario.

Table 2 Summary of scenarios

Tariffs	Quotas	Goods NTMs	Services NTMs	Trade Facilitation
S C E N A R I O 1 : C O N S E R V A T I V E				
Negative list, see Section 2.3.1, final reductions in 2031 (excludes tariffs on beef and dairy)	Quotas expanded over 7 years. Tariff changes moderate (EIF)	Zero reduction for animal-based products[a] and beverages & tobacco 2.5 percent reduction for other sectors All implemented over 5 years from EIF	2.5 percent reduction implemented over 5 years from EIF	None

---

15 Trade agreements which were under negotiation, or which had not been ratified as of mid-2021, such as the New Zealand-UK FTA, are not included in the baseline data.

16 The UNITC does not separate the UK from the EU when projecting FTA tariffs. We assume EU preferential tariffs apply to the UK post-Brexit. The UK has made extensive efforts to extend all EU ratified trade agreements to the UK employing continuation agreements https://www.gov.uk/guidance/uk-trade-agreements-with-non-eu-countries

Tariffs	Quotas	Goods NTMs	Services NTMs	Trade Facilitation
		S C E N A R I O 2 : M O D E R A T E		
Negative list, see Section 2.3.1, final EU reductions by 2029 (excludes tariffs on beef and dairy)	Quotas expanded over 7 years. Tariff changes larger (EIF)	Zero reduction for animal-based products[a] 5 percent reduction for other sectors, including beverages & tobacco Implemented over 5 years from EIF	5 percent reduction, implemented over 5 years from EIF	7.5 percent reduction in customs processing time for imports from the EU to NZ, implemented over 5 years from EIF
		S C E N A R I O 3 : A M B I T I O U S		
Negative list, see Section 2.3.1, all reductions on EIF (excludes tariffs on beef and dairy)	Quotas expanded over 7 years. Tariffs removed (EIF)	Zero reduction for animal-based products[a] 10 percent reduction for other sectors, including beverages & tobacco Implemented over 5 years from EIF	10 percent reduction, implemented over 5 years from EIF	15 percent reduction in customs processing time for imports from the EU to NZ, implemented over 5 years from EIF

a. Raw milk, cattle & sheep, other animals, wool, beef & sheep meat, other meats, and dairy.

Source: Authors' construction.

2.3.1 TARIFFS

New Zealand

Tariffs for New Zealand were calculated based on trade weighted HS10 2019 data. Specific rates were replaced by HS6 averages from the UNITC MacMap database (2014). Tariffs then were trade weighted to the GTAP sector level.

New Zealand's tariffs on EU imports average 2.1 percent (Table 3). On average, the highest New Zealand tariffs are on processed food, averaging 3.1 percent. These products make up just over 10 percent of New Zealand merchandise imports from the EU. In contrast, manufactures comprise over 88 percent of New Zealand's imports from the EU, with applied tariffs averaging 2.0 percent. In the three scenarios modeled in this report, New Zealand is projected to eliminate all tariffs on imports from the EU. In contrast to Scenarios 2 and 3, for which all tariffs are removed on EIF, Scenario 1 provides for up to a seven-year phase-out of selected tariffs, after which time all tariffs will be eliminated on New Zealand imports from the EU.

Table 3 New Zealand imports from the EU and MFN tariff rates, 2019 (NZ$ million and percent)

Sector	NZ$m	MFN rate (%)
	A G R I C U L T U R E	
Fisheries	0.0	0.0
Fruit and vegetables	15.2	0.0
Live animals and raw milk	6.1	0.0
Other crops	75.1	0.0
Wool	2.6	4.0
Total	99.0	0.1

Sector	NZ$m	MFN rate (%)
P R O C E S S E D F O O D		
Beef & sheep	1.4	0.0
Beverages & tobacco	187.3	0.6
Dairy	192.7	3.5
Other food	538.2	3.4
Other meats	139.7	4.7
Total	1,059.2	3.1
M A N U F A C T U R E S		
Electronics	928.5	2.8
Extractive	31.3	0.8
Forestry and wood	64.6	2.6
Light manufactures	436.2	4.1
Other machinery and equipment	1,614.2	3.4
Other manufactures	5,547.9	1.3
Total	8,622.9	2.0
T O T A L		
Total	9,781.1	2.1

Source: Ministry of Foreign Affairs and Trade (MFAT). Analysis by ImpactECON, LLC.

In summary, New Zealand tariffs on imports from the EU are low and will be reduced to zero. While there is some variation in tariff rates between sectors, the highest average tariffs are still low, less than 5.0 percent, with overall tariffs averaging 2.1 percent.

EU

Table 4 shows the updated EU tariffs, EU imports from New Zealand and Scenario 1 tariff reductions. EU tariffs on goods imported from New Zealand average 4.6 percent (excluding TRQs). While tariffs on manufacturers are relatively low at 2.0 percent, tariffs on agriculture and processed food average approximately 6.0 percent. Significant tariff variations within agriculture and processed food are illustrated by comparing the high average tariff of 11.2 percent on fisheries to zero percent on raw wool. The relatively high tariffs do not account for TRQ rates, which are often significantly higher (see Section 2.3.2). Since over two-thirds of New Zealand's exports to the EU are agriculture and processed food, free trade access could provide significant new market access for these products (with the important exception of TRQs, which are projected to be expanded, but not eliminated in most cases).

Table 4 EU imports from New Zealand and average tariffs applied, 2019 base and Scenario 1 tariffs through 2030 (percent and million Euro)

Sector	Average tariff (%)				EU imports from New Zealand Euro (million)
	Base 2019	EIF 2024	2028	2030	
A G R I C U L T U R E					
Fisheries	11.2	0.0	0.0	0.0	3.3
Fruit and vegetables	6.7	0.9	0.0	0.0	442.0
Live animals and raw milk	6.7	5.0	0.0	0.0	48.8
Other crops	1.3	0.0	0.0	0.0	49.6
Wool	0.0	0.0	0.0	0.0	72.4
Total	5.5	1.0	0.0	0.0	616.1
P R O C E S S E D F O O D					
Beef & sheep	TRQ	TRQ	TRQ	TRQ	552.0
Beverages & tobacco	6.8	5.9	1.7	0.0	120.0
Dairy	TRQ	TRQ	TRQ	TRQ	63.8
Other food	7.4	2.2	0.1	0.1	173.8
Other meats	0.6	0.0	0.0	0.0	58.5
Total	6.0	3.1	0.6	0.1	968.2
M A N U F A C T U R E S					
Electronics	1.4	0.0	0.0	0.0	70.1
Extractive	2.7	0.0	0.0	0.0	2.7
Forestry and wood	0.0	0.0	0.0	0.0	48.2
Light manufactures	1.4	0.0	0.0	0.0	73.6
Other machinery and equipment	1.0	0.0	0.0	0.0	74.1
Other manufactures	2.6	1.3	0.2	0.1	441.6
Total	2.0	0.8	0.1	0.1	710.3
T O T A L					
Total	4.6	1.9	0.4	0.1	2,294.6

Source: Trade data from EuroStat. Tariff data from EU TARIC. Phase out schedule constructed in consultation with MFAT. Analysis by ImpactECON, LLC.

In the case of New Zealand, all tariffs are assumed to be eliminated at EIF of the FTA in Scenarios 2 and 3, and by year seven in Scenario 1. In the case of the EU, for Scenario 1, we assume most tariff lines would be phased-out in four stages (EIF, three-, five- and seven-year phase-outs).[17] The remaining exempt tariff lines include products with TRQs.[18] By 2030, most EU imports from New Zealand will be duty free, with the main exception being products covered by TRQs, which are covered in the following section. In Scenario 2, the extended phase-out was foreshortened by shifting products into an earlier phase-out period (e.g., products provided a five-year phase-out in

---

[17] Products selected for extended tariff-phase out, were determined in consultation with MFAT.
[18] Detailed list of tariff lines and their assumed elimination schedules are available upon request.

Scenario 1 were shifted into the three-year phase-out in Scenario 2). In Scenario 3, all tariffs not exempt from tariff phase-out are removed at EIF.

2.3.2 TARIFF RATE QUOTAS (TRQS)

When the UK separated from the EU, EU TRQs were split between the EU and the UK, primarily based on TRQ use. Two types of TRQs were available to EU importers and both types were split: 1) country-specific tariff quotas (CSTQs); 2) MFN tariff quotas (MFNTQs). As their name suggests, country-specific quotas can only be used by the country named on the CSTQ. On the other hand, MFNTQs are often first come, first served, though they can also be set partially based on historical shipments. Barring the availability/use of CSTQs or MFNTQs, New Zealand exporters can employ out-of-quota MFN tariffs (which often contain a specific rate component). However, MFN tariffs are frequently set to be prohibitive. The availability and use of TRQs varies by product and we briefly review the TRQs of significance to New Zealand exporters below (Tables 5 and 6).

Table 5 EU country-specific tariff rate quotas (CSTQs) for New Zealand, pre- and post-Brexit

Product	CSTQ volume (metric tons)		CSTQ in-quota tariff	MFN out-of-quota tariff (ad valorem equivalent, %)			MFN out-of-quota specific rate
	EU (Pre-Brexit)	EU (Post-Brexit) (a)		Low	Avg.	High	
High-quality grass-fed beef	1,300	846	20%	24.1	34.2	64.9	12.8% + specific rate (varies)
Sheep and goat	228,389	114,184	0.0%	24.8	37.0	48.6	12.8% + specific rate (varies)
Butter-aged for at least 6 weeks	74,693	47,177	€86.9/100KG (~17-20%)	16.7	33.5	44.2	Varies (€189-€231/100KG)
Cheese – for processing	4,000	1,670	€17.1/100KG (~3%)	--	30.0	--	€185.2/100KG
Cheese – cheddar	7,000	4,361	€17.1/100KG (~6%)	--	54.0	--	€167.1/100KG

a.   *Subject to ongoing Article XXVIII negotiations.*

Source: Commission Regulation (EC) No 2535/2001; No 1354/2011; and Regulation (EU) 2019/216 of the European Parliament and of the Council. Ad valorem equivalents of specific rates estimated by ImpactECON, LLC.

Beef and Sheep

New Zealand is an unconstrained exporter of sheep meat to the EU, due to the relatively large CSTQ New Zealand had pre- and post-Brexit (228,389 and 114,184 MT respectively). The CSTQ tariff rate is zero. Therefore, we do not project any change in New Zealand's margin of preference into the EU market because of the NZ-EU FTA.

Table 6 EU most favoured nation tariff rate quotas, pre- and post-Brexit

Product	MFN in-quota volume (metric tons)		MFN in-quota tariff rate
	EU (Pre-BREXIT)	EU (Post-BREXIT)	
Frozen meat of bovine	54,875	43,732	20.0%
Frozen beef intended for processing - includes offal	63,703	19,676	20.0%
Sheep and goat	200	178	0.0%
Butter - includes fats and oils	11,360	11,360	€94.8/100KG
Cheese – mozzarella	5,360	5,360	€13.0/100KG
Cheese - for processing	20,007	11,741	€83.5/100KG
Cheese – cheddar	15,005	14,941	€21.0/100KG

Source: Commission Regulation (EC) No 2535/2001; No 1354/2011; and Regulation (EU) 2019/216 of the European Parliament and of the Council.

In contrast to sheep meat, EU beef imports are highly restrictive. New Zealand had access to just 1,300 MT of high-quality beef import quotas (CSTQ) into the EU pre-Brexit.[19] Post-Brexit, 846 MT of CSTQ for high quality beef was allocated to New Zealand for the EU market. In both cases, New Zealand fills its quota. The TRQs on EU imports of beef from New Zealand are binding. The estimated MFN (out-of-quota) ad-valorem equivalent on EU imports of beef from New Zealand averaged 34.2 percent (Table 5). New Zealand exporters of beef pay the 20.0 percent tariff under both New Zealand's CSTQs and MFN TRQs (in the case that they can be procured). This leaves a sizable gap between the TRQs tariff rates and the MFN tariff rate of 34.2 percent.

In Scenario 1, it is assumed that New Zealand would be provided a new CSTQ for 3,000MT of EU beef imports at a 7.5 percent in-quota tariff. In Scenario 2, it is assumed that New Zealand is provided 10,000MT at a 3.75 percent in-quota tariff. Finally, in Scenario 3, it is assumed New Zealand would be provided a CSTQ of 20,000MT at a zero percent in-quota tariff. In all scenarios, the new CSTQ is phased in over seven years, but the tariff rate is effective on EIF.[20] These scenarios are summarised in Table 7.

Dairy

New Zealand exports to the EU of dairy products are significantly constrained by EU quotas, tariffs, and import rules. Therefore, New Zealand dairy exports to the EU are primarily comprised of two categories of goods: 1) butter and; 2) cheese.

The EU CSTQ on natural butter (in contrast to oils) is 47,177 MT, significantly higher than New Zealand's 2019 exports of butter to the EU (less than 2,000 MT). New Zealand producers report significant barriers to exporting to the EU market under the CSTQ, including the specific tariff rate,

---

[19] High quality beef is defined as grass fed beef, among other specifications.
[20] FTA quotas are phased-in in equal parts.

which makes their products uncompetitive in the EU market, except maybe in strong demand years. In Scenario 1, we assume a meaningful quota of 6,000 MT is agreed to at 30.0 percent of the MFN tariff rate. In Scenario 2, the quota is increased to 40,000 MT at ten percent of the MFN tariff. Scenario 3 provides a quota of 75,000 MT at a zero percent tariff (Table 7).

EU imports of cheese from all sources have been historically restrictive. Restrictions have included both modest TRQ volumes, high in-quota tariffs, and complex rules under which the TRQs are managed. New Zealand producers report that most exports of cheese to the EU take place under outward processing arrangements or under MFN (non-TRQ) rates due to the EU import rules and high in-quota rates. Given these facts, and that the MFN rate on out-of-quota cheese imports exceeds 50 percent, New Zealand's exports of cheese to the EU have been modest, well within the CSTQ. The NZ-EU FTA will establish a new CSTQ. In Scenario 1, a new CSTQ of 15,000 MT at 50 percent of the MFN tariff rate is assumed. In Scenario 2 a 26,000 MT CSTQ is assumed at ten percent of the MFN rate. In Scenario 3 a 37,000 MT CSTQ is assumed with a zero percent tariff rate (Table 7).

Some additional TRQs on whole milk products and whey are also expected to be reduced by the EU as part of the FTA with New Zealand. These changes are also shown in Table 7. New Zealand exports of these goods to the EU are relatively small.

Table 7 Changes in quotas under the NZ-EU FTA

	Scenario 1	**Scenario 2**	**Scenario 3**
Beef	New quota (3,000MT) and reduction in tariffs to 7.5% on beef	New quota (10,000MT) and reduction in tariffs to 3.75% on beef	New quota (20,000MT) and reduction in tariffs to 0% on beef
Butter	New quota on butter (6,000MT) with improved conditions and lower tariffs (14%)	New quota on butter (40,000MT) with improved conditions and lower tariffs (5%)	New quota on butter (75,000MT) with improved conditions and lower tariffs (0%)
Cheese	New quota on cheese (15,000MT) with improved conditions and lower tariffs (27%)	New quota on cheese (26,000MT) with improved conditions and lower tariffs (5%)	New quota on cheese (37,000MT) with improved conditions and lower tariffs (0%)
Whole milk powder (WMP)	New quota on WMP (6,000MT) with improved conditions and lower tariffs (25%)	New quota on WMP (7,000MT) with improved conditions and lower tariffs (5%)	New quota on WMP (8,000MT) with improved conditions and lower tariffs (0%)
Whey	New quota on whey (3,500MT) with improved conditions and lower tariffs (0%)	New quota on whey (7,250MT) with improved conditions and lower tariffs (0%)	New quota on whey (11,000MT) with improved conditions and lower tariffs (0%)

Source: Authors' construction.

2.3.3   NON-TARIFF MEASURES (NTMS)

Goods NTMs

NTMs on goods take many forms, including technical standards, import licensing, sanitary and phytosanitary regulations. While goods NTMs often serve legitimate purposes (UNESCAP, 2019),

they can raise costs and inhibit international trade. Thus an important focus for trade agreements can be reducing the costs of NTMs by lowering unnecessary barriers or harmonising regulations in ways that support trade. Unlike with tariffs, specific duties and TRQs, direct measures of the restrictiveness of these measures are limited; therefore, econometric estimates of the ad valorem equivalents (AVEs) of the NTM's trade restrictiveness are generally employed in analysis such as this.

For modelling the impact of reductions in goods NTMs in the NZ-EU agreement, we use new econometric estimates of AVEs from United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP).[21] These estimates are based on highly detailed and internationally consistent datasets of NTMs, collated through significant national and international efforts led by United Nations Conference on Trade and Development (UNCTAD) and supported by other key international agencies (UNCTAD, 2013).[22] The econometric estimates are undertaken at the HS6 level to capture the magnitude of bilateral NTMs at a very detailed level, which we then aggregate to the GTAP sectoral level for modelling. Table 8 summarises the trade-weighted average goods NTM estimates for imports to the EU from New Zealand and imports to New Zealand from the EU, as well as indicating the proportion of bilateral merchandise imports that each of these aggregate sectors contributes.[23]

Table 8 Average AVE estimates for imported goods NTMs and sectoral contributions to bilateral goods imports by aggregate sector (percent)

Sector[a]	EU		New Zealand	
	EU goods imported from NZ, 2024 base (% of total)	AVE (%)	NZ goods imported from EU, 2024 base (% of total)	AVE (%)
Crops	19.4	25.3	0.9	3.2
Animal products	34.2	4.1	2.2	13.8
Other processed foods	6.1	15.0	5.5	9.6
Beverages & tobacco	4.2	62.5	1.9	11.0
Light manufactures	7.4	2.1	25.6	15.9
Heavy manufactures	28.7	21.6	63.8	13.0

a. Aggregated sectors are detailed in Appendix I, further split to crops (sectors 1 and 2), animal products (sectors 3-9 and 14), other processed foods excluding beverages & tobacco, light manufactures (sectors 13 and 16-20), with heavy manufactures accommodating remaining manufacturing sectors.

Source: Authors estimates, based on GTAP model results and UNESCAP NTM estimates.

---

[21] We are grateful to Alex Kravchenko for providing an updated version of UNESCAP's (2019) econometric estimates of AVEs for goods NTMs.

[22] Including the Food and Agriculture Organization of the United Nations, International Monetary Fund, International Trade Centre, Organization for Economic Cooperation and Development, United Nations Industrial Development Organization, World Bank, World Trade Organization. As part of this international effort, a highly detailed database of New Zealand's NTMs was developed and later updated by a team at the University of Waikato (Webb & Strutt, 2020).

[23] In our modelling, we apply more disaggregated NTM estimates at the sectoral level that matches our GTAP aggregation.

Since New Zealand and the EU have existing agreements on sanitary measures, including the EU-NZ Veterinary Agreement, we do not model reductions in NTMs for animal-based products. For beverages & tobacco, we assume no reduction in NTMs in the first scenario, a 5 percent reduction in the second scenario and a 10 percent reduction in the third scenario. For other commodities, we model a 2.5 percent reduction in the first scenario, a 5 percent reduction in the second scenario and a 10 percent reduction in the third scenario. All reductions are implemented evenly over the 5 year period from EIF.

Services NTMs

For services NTMs, we employ services barrier estimates from CEPII (Fontagné et al., 2016). We model a 2.5 percent reduction in services NTMs in the first scenario, 5 percent reduction in the second scenario and a 10 percent reduction in the third scenario. All reductions are implemented evenly over the 5-year period from EIF. Table 9 illustrates the estimated NTMs for the EU and New Zealand, as well as the proportional contribution to services imports made by each sector.

Table 9 Services NTMs AVE estimates and sectoral contributions to bilateral services imports (percent)

Sector	EU		New Zealand	
	EU services imports from NZ, 2024 (%)	AVE (%)	NZ services imports from EU, 2024 (%)	AVE (%)
Air and other transport	35.4	16.1	28.5	22.9
Government services	8.8	56.1	6.0	62.5
Business and financial services	18.7	28.3	30.1	52.7
Trade and communication	21.3	31.9	23.3	52.0
Construction	0.4	27.4	2.9	52.8
Other services	15.4	.	9.2	.

Source: Import values from GTAP database version 10. Ad-valorem equivalents (AVEs) from Fontagné et al., 2016 with additional analysis by ImpactECON.

Modelling of NTMs

In each of the scenarios modelled, the reductions in costs imposed by goods and services NTMs are divided into changes in import productivity and a productivity gain that captures the impacts on exporters' production costs (Walmsley and Strutt, 2021). We split these impacts evenly, with half of each shock implemented through each mechanism, drawing on insights from Webb et al. (2020), based on detailed empirical analysis of this issue.

While we believe the NTM estimates used here are the most appropriate currently available, this remains an emerging area of empirical research and we acknowledge a range of challenges remain, including in the estimating of AVEs, the modelling of reductions and uncertainty about the level of reductions in NTM costs that may be achieved in practice through implementation of trade agreements. We note that caution is appropriate when assessing the results of liberalisation of these barriers.

2.3.4   TRADE FACILITATION

Since improvements in trade facilitation have already been achieved through the implementation of the WTO trade facilitation agreement and other agreements, the gains from trade facilitation are expected to be relatively small. We do not model any reduction in time to trade from New Zealand to the EU.[24] For imports from the EU to New Zealand, the World Bank Doing Business-Trading Across Borders, reports, on average, it takes 25 hours, or 1 full day, to clear New Zealand customs. On average, a one-day delay is estimated to be the equivalent of a 1.1 percent tariff on New Zealand imports. For imports from the EU to New Zealand, we implement no reduction in time to trade in the first scenario, a 7.5 percent reduction in the second scenario and a 15 percent reduction in the third scenario, implemented evenly over the 5-year period from EIF.

---

[24]   The most current data available at the time of this report were for 2019. The 2019 Trading Across Border report indicates customs clearance in the EU of less one day, and frequently zero. https://www.doingbusiness.org/en/data/exploretopics/trading-across-borders

3 Potential Impacts of a New Zealand-EU FTA

In this section, we present results for the three scenarios modelled (Table 2):

— Scenario 1: a conservative scenario with tariff reductions, plus limited quota liberalisation, and small reductions in goods and services NTMs;

— Scenario 2: a moderate scenario with more rapid tariff reductions, moderate quota liberalisation, more ambitious reductions in goods and services NTMs and some trade facilitation.

— Scenario 3: an ambitious scenario with all tariff reductions on EIF, extensive quota liberalisation, further reductions in goods and services NTMs and further trade facilitation.

We focus primarily on the effects of these scenarios on New Zealand, and on results for 2035, since all scenarios modelled will be fully implemented before then. However, results reported over time are relative to our full baseline to 2040. We begin by examining the overall impacts on GDP, investment, and trade flows. We then turn to detailed analysis of selected sectors. Finally, we examine the sensitivity of some of our results to assumptions regarding quota rents. Most results are reported as percentage changes relative to the 2035 baseline,[25] or in millions of 2019 New Zealand dollars.[26]

3.1   Macroeconomics Impacts

We first explore the potential impacts of the NZ-EU FTA on aggregate economic indicators including real GDP, investment, and trade flows. We also use decompositions to explain some of the mechanisms driving results.

3.1.1   REAL GDP

Simulated changes in real GDP in 2035, due to the NZ-EU FTA scenarios modelled, are summarised in Table 10. In the first scenario, New Zealand's real GDP is projected to increase by 0.17 percent per year, relative to the 2035 baseline. This increases to 0.24 percent in the second scenario and 0.33 percent in scenario 3. In constant 2019-dollar terms, this means that in 2035, real GDP is between NZ$1b and NZ$2b higher than the baseline value. The EU also gains in each liberalisation scenario,

---

[25]   Appendix III provides some supplementary results, reported relative to the 2040 baseline for comparison.

[26]   To update values from their 2014 GTAP US dollar base to 2019 NZ dollars, we first adjust from real to nominal using World Bank GDP deflators for New Zealand, the EU or the world (https://databank.worldbank.org/). We then convert to New Zealand dollars, applying a 2019 exchange rate of 0.6593, calculating using the simple average of B1 monthly exchange rates from the Reserve Bank of New Zealand (https://www.rbnz.govt.nz/statistics/b1/).

though the gains are much smaller in percentage terms. For the UK there is a small decline in GDP, with a small increase for the rest of the world (RoW).

Table 10 Simulated effects on real GDP, relative to the 2035 baseline (cumulative percent and NZ$ million differences from baseline)

	Percent			NZ$m		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
NZ	0.17	0.24	0.33	1,043	1,434	1,994
EU	0.00	0.00	0.00	769	1,008	1,614
UK	-0.01	-0.01	-0.01	-645	-642	-681
RoW	0.00	0.00	0.00	2,458	2,007	1,461

Source: Authors' model results.

3.1.2 REAL GDP DECOMPOSITION

Each of the scenarios modelled includes multiple policy components, which each contribute to the final outcome. Figure 1 (a, b and c) provides a decomposition of the real GDP impacts by policy instrument, illustrating how each of the component impacts real GDP to cumulate to the total change for each of the three scenarios respectively. The liberalisation of tariffs contributes 67 percent of the gain in Scenario 1, 52 percent of the gain in real GDP in Scenario 2 and 37 percent in Scenario 3. Reductions in goods NTMs contribute 12, 19 and 28 percent to Scenarios 1, 2 and 3 respectively, followed by TRQs on dairy and beef which contribute 12, 16 and 15 percent and finally reductions in services NTMs which contribute 9, 14 and 20 percent, respectively. The larger increases in the proportions attributable to goods and services NTMs in Scenarios 2 and 3 reflect the fact that NTMs are liberalised successively more in each scenario. The increase in the proportion due to TRQs also reflects larger cuts in in-quota tariffs and the greater expansion of quotas in Scenarios 2 and 3. This, along with the increased liberalisation of NTMs, explains the fall in the proportion of the total attributable to tariffs in each scenario, although they still explain the greatest proportion of the changes in GDP in all three scenarios.

Figure 1 Decomposition of New Zealand's real GDP growth, relative to baseline (cumulative percent contribution of each component)

a. Scenario 1
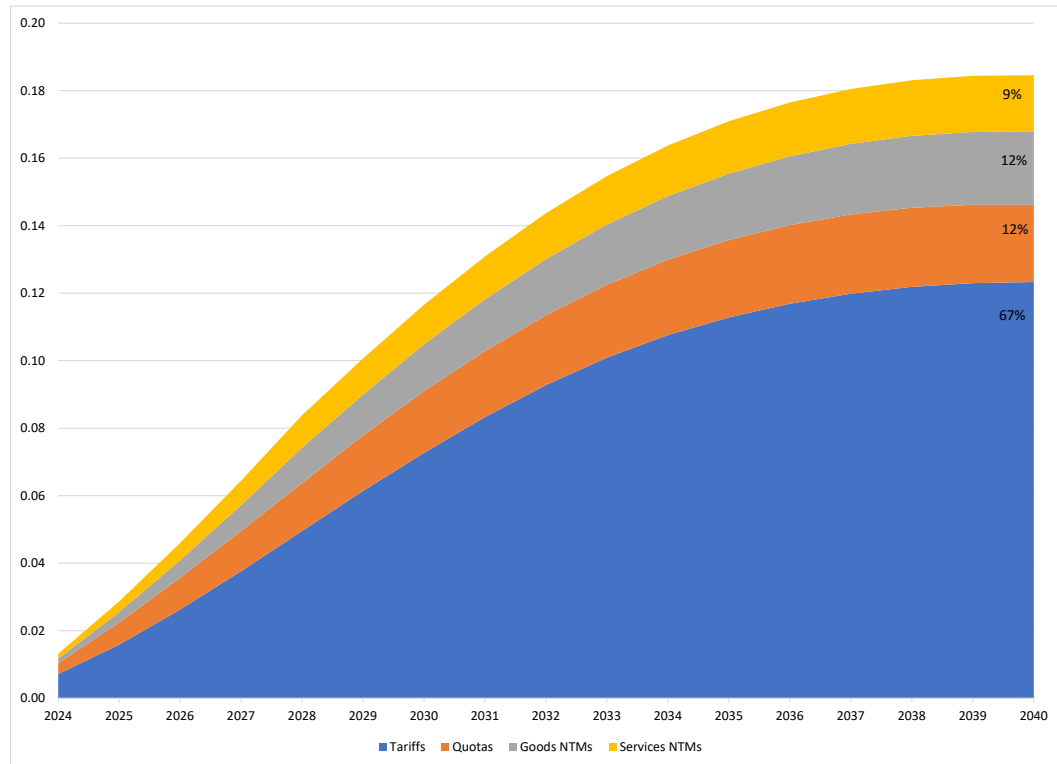
Source: Authors' model results.

b. Scenario 2
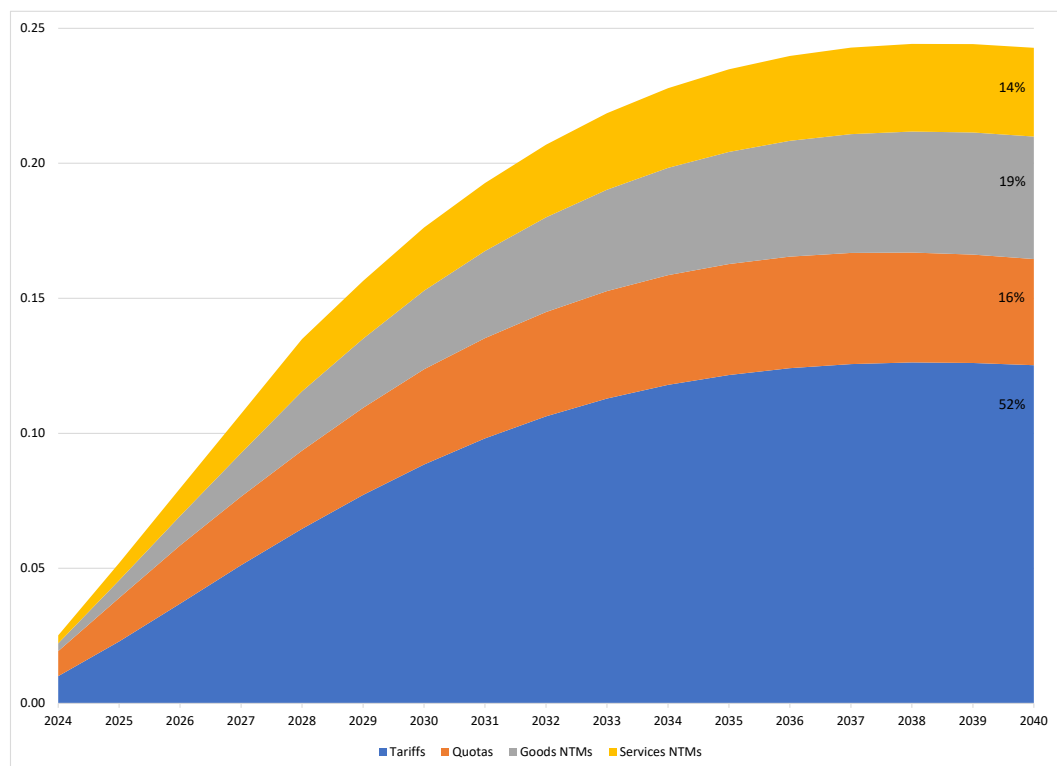
Source: Authors' model results.

c. Scenario 3
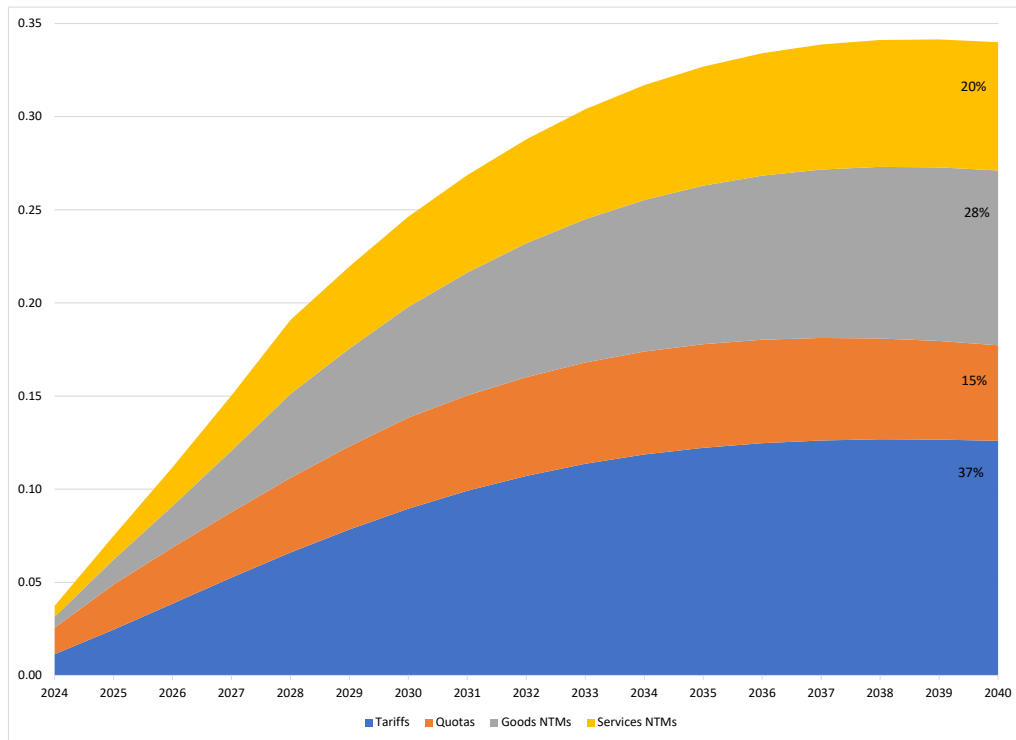
Source: Authors' model results.

3.1.3 REAL INVESTMENT

New Zealand investment rises to a peak of 0.75 to 1.16 percent above baseline values between 2029 and 2031 under the three scenarios, before falling to an increase of 0.50 to 0.69 by 2040 (Figure 2). The rise in investment is due to the rise in returns to capital and fall in the price of capital goods. This rise in investment adds to the capital stocks, causing real GDP to increase further over time. The increase in investment is accompanied by an increase in the trade deficit as investment rises faster than savings.

Figure 2 New Zealand's real investment relative to baseline (cumulative percent change)
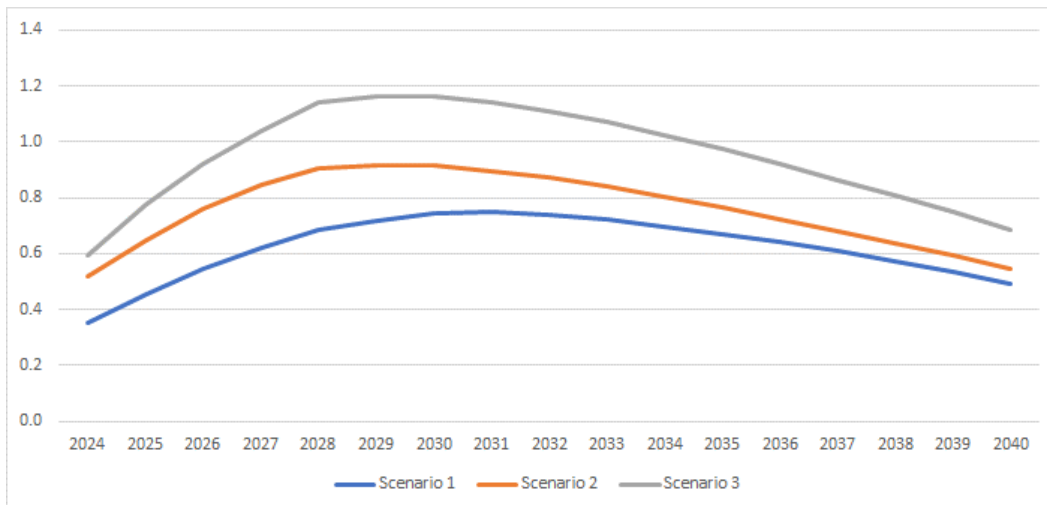
Source: Authors' model results.

3.1.4 INTERNATIONAL TRADE

Table 11 illustrates that New Zealand's total real exports rise between 0.39 percent and 0.65 percent in the three scenarios modelled, relative to the 2035 baseline. Bilateral trade between New Zealand and the EU rises considerably as a result of the NZ-EU FTA, as shown in Table 12. In the case of New Zealand, this increase in exports to the EU is due largely to increased exports of fruit & vegetables, beef and dairy, with sectors such as processed food, beverages & tobacco and chemicals, rubber & plastics also contributing. New Zealand's exports to and imports from the rest of the world fall, as trade with the EU rises. The EU exports less within the EU and to the ROW due to trade diversion, although EU imports from the rest of the world (RoW) rise, particularly for manufactured goods and services, as a result of the FTA with New Zealand. Since a large proportion of EU trade is with other EU countries, even a very small percentage decline in trade within the region leads to a relatively large dollar reduction.

Table 11 Simulated impact on overall real exports and imports, 2035 (cumulative percent and NZ$ million differences from baseline)

	Percent			NZ$m		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
E X P O R T S						
NZ	0.39	0.50	0.65	608	783	1,012
EU	-0.02	-0.02	-0.01	-2,882	-2,535	-2,232
UK	-0.10	-0.10	-0.10	-2,108	-2,136	-2,139
RoW	0.01	0.01	0.01	3,762	3,414	3,359
I M P O R T S						
NZ	0.73	0.88	1.15	1,248	1,496	1,966
EU	0.02	0.02	0.02	2,419	2,620	3,137
UK	0.02	0.02	0.02	382	380	346
RoW	-0.01	-0.01	-0.01	-5,462	-5,739	-6,227

Source: Authors' model results.

Table 12 Simulated impact on New Zealand and EU bilateral exports at fob prices, 2035 (cumulative percent and NZ$ million differences from baseline)

	Percent			NZ$m		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
E X P O R T S F R O M N Z T O :						
EU	12.73	17.10	22.72	1,314	1,765	2,345
RoW[a]	-0.47	-0.67	-0.91	-676	-955	-1,295
E X P O R T S F R O M E U T O :						
NZ	10.62	12.40	16.03	2,722	3,175	4,106
EU	-0.02	-0.02	-0.03	-1,587	-1,794	-2,078
RoW[a]	-0.05	-0.05	-0.05	-4,007	-3,867	-4,170

a.   *Including the UK.*

Source: Authors' model results.

This increase in bilateral trade between New Zealand and the EU causes New Zealand's exports and imports to rise. New Zealand's total imports increase by 0.73 percent in Scenario 1, rising to a 1.15 percent increase in Scenario 3. EU exports fall by between 0.01 and 0.02 percent depending on the scenario, which translate to relatively large dollar values, given the size of this region. This fall is primarily due to the fall in exports to the rest of the world (Table 12). We also note that if some current export markets were to become less attractive in the future, the FTA provides improved potential for New Zealand exporters to shift more focus to the EU.

3.2 Sectoral Results

In this section, we analyse sectoral results for New Zealand for the scenarios modelled. We begin with an overview of impacts across the four aggregate sectors of agriculture, food, manufactures and services (see Appendix Table I- 1). We then focus attention on some processed food export sectors of particular interest: beef & sheep meat, dairy and beverages & tobacco (wine).

3.2.1 OVERVIEW

Table 13 reports the impact of the NZ-EU FTA on production, exports and imports for the aggregate sectors of agriculture, processed food, manufactures and services. These results indicate that exports increase across all aggregate sectors in all three scenarios. The growth in exports tends to increase, particularly for the processed food and services sectors, as the level of ambition increases. Imports also increase across all sectors, with particularly strong increases in manufactures. These changes in trade flows influence New Zealand's output in each sector, with all sectors expanding, apart from manufactures (Table 13).

These aggregate sectoral effects are decomposed by policy instruments in Table IV- 1, Appendix IV. We find the direction of the changes in sectoral trade and production are generally driven by the liberalisation of tariffs, though reductions in goods and services NTMs also contribute to most sectors expanding exports and production, particularly in the more ambitious scenarios. At this aggregate sectoral level, liberalisation of tariffs stimulates New Zealand's exports and imports of all goods and services. The growth in exports that accompanies tariff liberalisation is particularly evident in the manufactures sector, but also the agriculture and food sectors. Reductions in goods NTMs stimulate exports of all aggregate goods sectors, which increase as the level of scenario ambition increases. Expansions in exports due to NTM reductions are strongest for agriculture and manufactures, with less of an impact on processed foods, reflecting our assumption that NTM barriers do not reduce for animal-based products such as beef and dairy products. Reductions in services NTMs expand exports for services, with the effects increasing in magnitude as the extent of ambition increases. Quota liberalisation has a positive impact on exports of aggregate processed foods, since this sector includes the goods impacted by quotas; however, the impact on exports from other sectors is negative. Results for production indicate that production increases for all aggregate

sectors, with the increase largest for services, reflecting strong growth particularly in construction as well as business and financial services.[27]

Table 13 Simulated impact on New Zealand sectoral production, exports and imports, 2035 (cumulative percent and NZ\$ million differences from baseline)

	Percent			\$NZm		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
P R O D U C T I O N						
Agriculture	0.15	0.20	0.24	117	154	188
Food	0.11	0.18	0.24	124	199	267
Manufactures	-0.03	-0.04	-0.05	-59	-63	-93
Services	0.20	0.25	0.33	1,647	2,068	2,710
E X P O R T S						
Agriculture	0.67	0.66	0.69	90	88	93
Food	0.31	0.41	0.50	223	296	361
Manufactures	0.51	0.54	0.58	222	232	250
Services	0.17	0.40	0.84	41	95	202
I M P O R T S						
Agriculture	1.05	1.19	1.42	29	33	39
Food	1.49	1.63	1.80	170	186	207
Manufactures	0.73	0.82	1.02	927	1,047	1,298
Services	0.46	0.79	1.43	144	244	444

Source: Authors' model results.

3.2.2   BEEF AND SHEEP MEAT

In this analysis we assumed that the quota rents were 14 percent, exactly equal to the difference between the in- and out-of-quota tariffs imposed by the EU on New Zealand (pre-Brexit) beef. Figure 3 illustrates the changes in the quotas and in New Zealand exports under the three scenarios. With each successive scenario, the quota is expanded (compare dashed lines in Figure 3) and in-quota tariffs reduced further than the previous scenario (see Table 7). New Zealand exports of beef to the EU also expand further with the greater liberalisation assumed in each scenario. In scenario 1, exports track the expansion in the quota, while in scenarios 2 and 3, exports initially expand with the quota, but then stabilise around 4,700 and 6,100 MT respectively. It is the removal of the tariff and the reduction in quota rents, due to the gradual removal of the quantity constraint, that drives this expansion in trade. But since the rents are fairly small at 14 percent, most of the expansion in trade takes place in the initial period following the liberalisation of the in-quota tariff and initial expansion of the quota.

---

[27]   See Appendix IV, Table IV- 4 for details. Aggregate sectoral employment changes and wages are also shown in Appendix IV, Table IV- 2 and Table IV- 3.

Figure 3 New Zealand's simulated beef exports to the EU compared to liberalised quota in Scenarios 1-3 over time (metric tons)
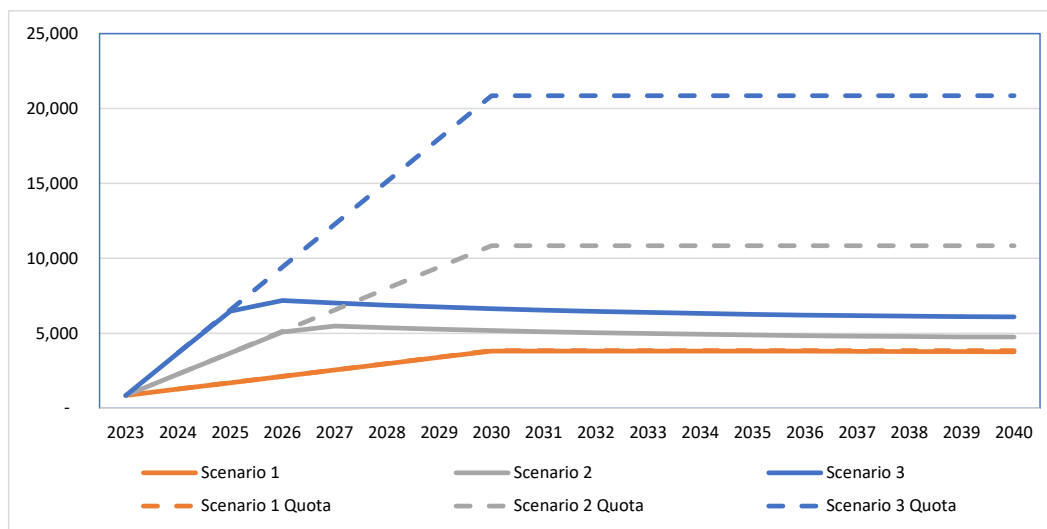
Source: Authors' model results.

In the case of sheep meat, we see a decline in exports to the EU as farmers substitute towards producing and exporting more beef or dairy in response to reductions in tariffs and quotas. Unlike beef, sheep meat exported under the existing quota is not binding and is already duty free.

3.2.3 DAIRY

The four dairy commodities subjected to TRQs by the EU are butter, cheese, milk powder and whey. None of these commodities are exported to the EU in significant quantities using existing quotas, although New Zealand does export butter duty free under a processing agreement. As tariffs are removed on EIF and new country-specific quotas are implemented, there is some expansion in New Zealand exports of all four dairy commodities to the EU.

In the case of butter (Figure 4), New Zealand exports initially increase as the in-quota tariff is reduced on EIF to a level just above the new quota created under the FTA in all three scenarios, with the excess being sold under the original WTO quota. The extent of the increase in butter exports depends on the reduction in tariffs, with larger increases in exports in Scenario 3 than in Scenario 1, due to the larger tariff reductions assumed. As the CSTQ rises further, a larger portion of New Zealand's exports of butter can fall under the CSTQ until 2025 when all exports are covered by the CSTQ. At this point, further liberalisation of the quota does little to stimulate exports further and hence exports stabilise. The liberalisation of the EU quota on whey (Figure 5) follows a similar pattern, with exports initially expanding slightly beyond the CSTQ, before stabilising at a long run value below the CSTQ. The initial WTO in-quota tariff on whey is relatively small at 10.15 percent compared to the butter, milk powder and cheese which vary from 34 percent for butter to 54 percent for cheese. Existing exports are also small, which is why there is little expansion in exports of whey.

Figure 4 New Zealand's simulated butter exports to the EU compared to liberalised quota in Scenarios 1-3 over time (metric tons)

Source: Authors' model results.

Figure 5 New Zealand's simulated whey exports to the EU compared to liberalised quota in Scenarios 1-3 over time (metric tons)
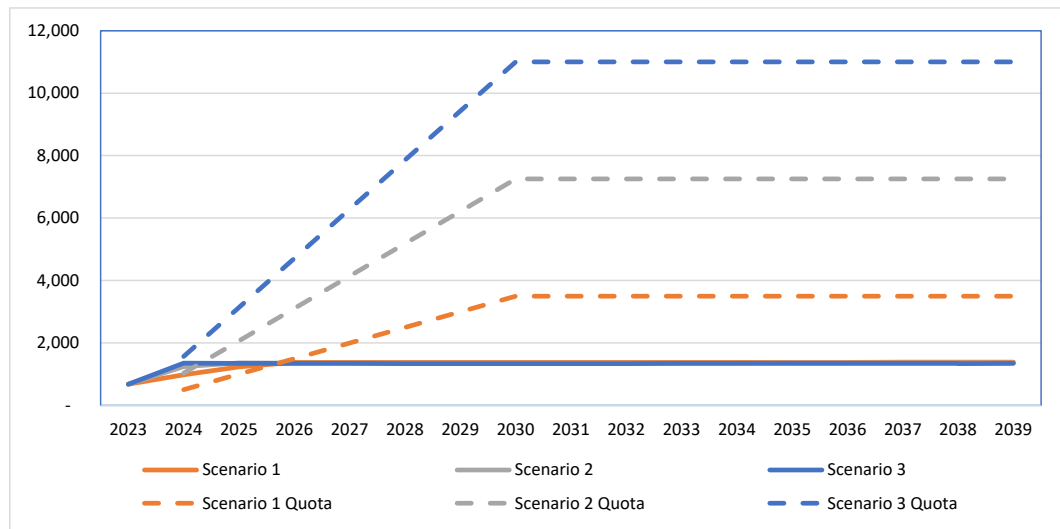
Source: Authors' model results.

In the case of New Zealand's exports of milk powder to the EU on the other hand, the fall in tariffs on EIF is considerable and exports rise higher than the CSTQ in the first few years of the FTA. As a result, as the CSTQ increases over time, and a larger share of New Zealand's exports of milk powder fall under the CSTQ, the average tariff continues to fall, further expanding exports over time. Exports remain above the CSTQ in all three scenarios for the entire period examined (Figure 6).

Figure 6 New Zealand's simulated milk powder exports to the EU compared to liberalised quota in Scenarios 1-3 over time (metric tons)
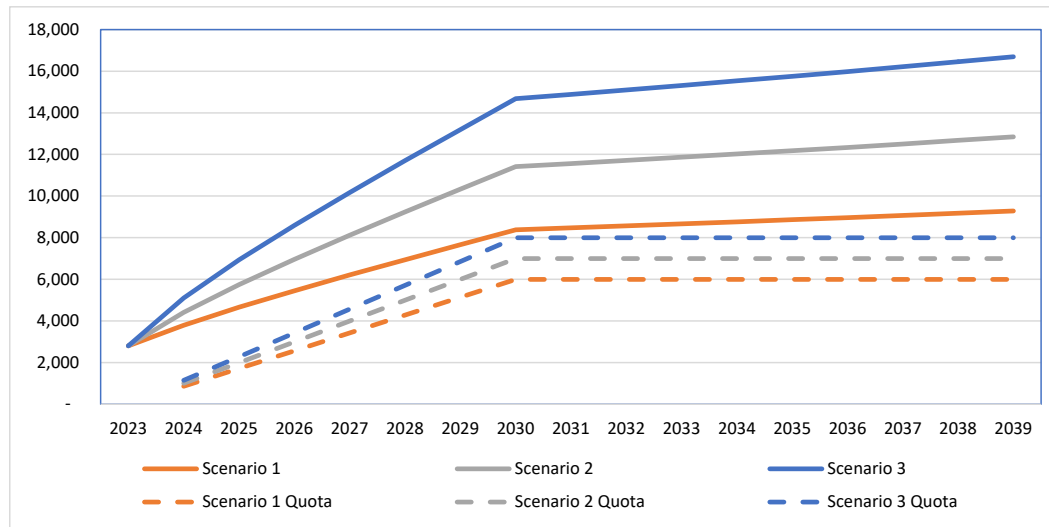
Source: Authors' model results.

Finally, the tariff on cheese is also initially very high and hence exports of cheese expand. In this case, however, we assume that while exports of cheese can expand, they are limited by the CSTQ. This reflects the fact that cheese exported under the CSTQ is not required to meet the restrictive NTMs that are in place when cheese is exported under the existing WTO quota. For this reason, in scenarios 2 and 3, exports of cheese expand at the same rate as the quota, with the amount sold over quota fixed due to restrictive NTMs (Figure 7). In scenario 1, the in-quota tariff falls less than in scenarios 2 and 3 and hence the increases in exports is lower in the long run than in the other scenarios, indeed the increase in exports is less than the CSTQ.

Figure 7 New Zealand's simulated cheese exports to the EU compared to liberalised quota in Scenarios 1-3 over time (metric tons)
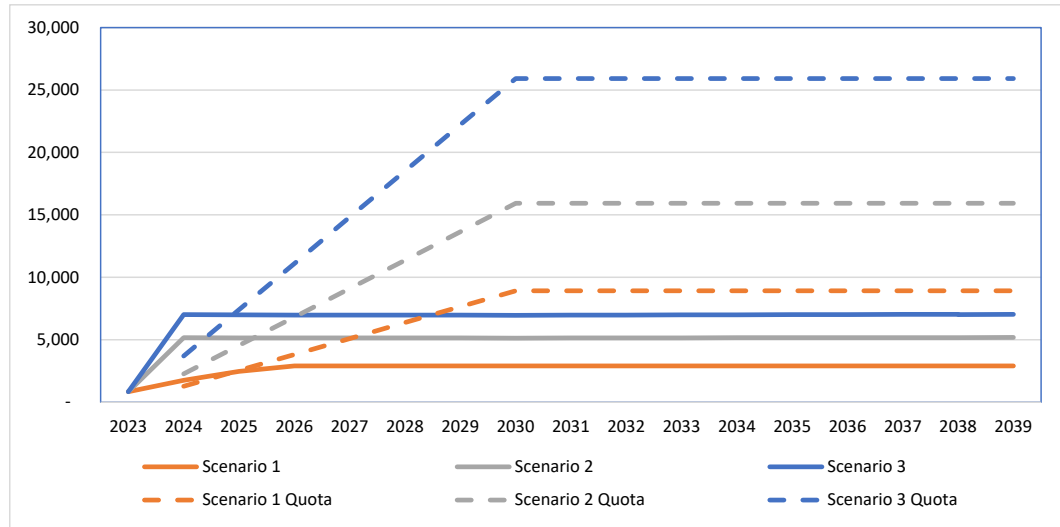

Source: Authors' model results.

It is worth noting that the simulated gains from the removal of the TRQs on dairy are likely to be conservative estimates, since the model uses existing trade flows between the EU and New Zealand,
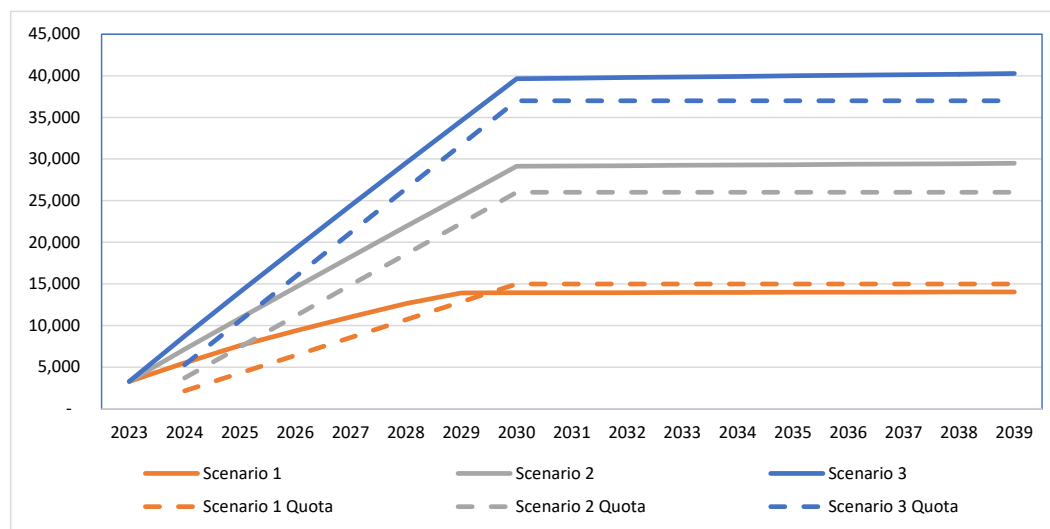
which are very low, as a starting point to estimate the potential for trade under the FTA. In a highly constrained market, where costly tariffs, quotas, rules and regulations cannot be offset by rents, New Zealand firms lack the incentives needed to export their product to the EU, preferring instead to export to larger markets in Asia, where New Zealand has had more success in developing open trading relations. However, when these barriers are reduced, as in this FTA, this could lead New Zealand firms to reconsider, thereby resulting in larger increases than those based on existing trade flows might suggest.

3.2.4   BEVERAGES AND TOBACCO (WINE)

The impact of the NZ-EU FTA on New Zealand's beverage & tobacco sector is provided in Table 14, noting that wine comprises 97 percent of exports from New Zealand to the EU in this sector. The EU imposes relatively high tariffs on New Zealand imports (see Table 4), averaging 6.8 percent, compared with an average tariff faced by all merchandise imports of 4.6 percent. These tariffs reduce to zero by 2030 in Scenario 1, somewhat faster in Scenario 2 and on EIF in Scenario 3. Since there are no quotas on this sector and no reductions in NTMs in Scenario 1, the tariff reductions contribute almost all of the gains in terms of exports, with exports to the EU increasing by 14 percent or NZ$40m per year by 2035 (Table 14) and production increasing by 0.34 percent, almost NZ$50m. In Scenario 2, there are some reductions in the relatively high NTMs on beverages & tobacco (see Table 8), leading to a further 3 percent or NZ$10m expansion of exports to the EU, which doubles in Scenario 3 when the NTM reductions are doubled for this sector. These changes in exports to the EU account for most of the total changes in New Zealand's exports for this sector. Quota liberalisation has a small negative effect on New Zealand's total exports from the beverages & tobacco sector, due to the general equilibrium impacts of the quotas on land and fruit and vegetables.

Table 14 Simulated impact on New Zealand production and exports of beverages & tobacco to the EU, 2035 (cumulative differences from baseline, percent and NZ$ million)

	Production		Total exports		Exports to EU	
	Percent	NZ$m	Percent	NZ$m	Percent	NZ$m
S C E N A R I O 1						
Tariffs	0.34	50	0.77	45	14.11	40
Quotas	-0.02	-3	-0.08	-5	-0.10	0
Goods NTMs	0.01	1	0.00	0	0.00	0
Services NTMs	0.01	2	0.01	0	0.01	0
Total – Scenario 1	**0.34**	**50**	**0.69**	**41**	**14.00**	**39.7**
S C E N A R I O 2						
Tariffs	0.35	52	0.80	47	14.14	40
Quotas	-0.03	-4	-0.13	-8	-0.16	-1
Goods NTMs	0.08	12	0.17	10	3.04	10
Services NTMs	0.02	3	0.02	1	0.02	0
Trade facilitation	0.00	0	0.00	0	0.00	0
Total – Scenario 2	**0.43**	**64**	**0.85**	**50**	**17.44**	**50**

	Production		Total exports		Exports to EU	
	Percent	NZ$m	Percent	NZ$m	Percent	NZ$m
S C E N A R I O 3						
Tariffs	0.35	52	0.80	47	14.14	40
Quotas	-0.03	-5	-0.18	-11	-0.22	-1
Goods NTMs	0.17	25	0.35	20	6.23	20
Services NTMs	0.04	7	0.03	2	0.04	0
Trade facilitation	0.00	0	0.00	0	0.00	0
Total – Scenario 3	**0.53**	**79**	**1.00**	**58**	**21.03**	**60**

Source: Authors' model results.

3.3   Sensitivity Analysis

In the main simulation we assumed that New Zealand's exports of cheese were restricted to the FTA CSTQ because regulations and requirements (NTMs) on the WTO TRQs were considered to be prohibitive. Figure 8, shows the implications of this for New Zealand's exports of cheese to the EU. In the case of scenario 1, there is a small difference in exports in 2023 between the restricted (main simulation) and unrestricted (sensitivity analysis) cases, with slightly more exports when cheese exports are unrestricted. The difference all but disappears over time. In scenarios 2 and 3, the differences between the restricted (Figure 7) and unrestricted (Figure 8) cases are much greater, with cheese exports to the EU continuing to grow beyond the CSTQ. That said, since the increase in New Zealand's exports of cheese to the EU is small and comes at the expense of cheese sales in other markets, the impact on real GDP is less than 0.005 percent in all three scenarios considered.

Figure 8 New Zealand's simulated cheese exports to the EU compared to liberalised quota in Scenarios 1-3 over time, assuming unrestricted cheese exports (metric tons)
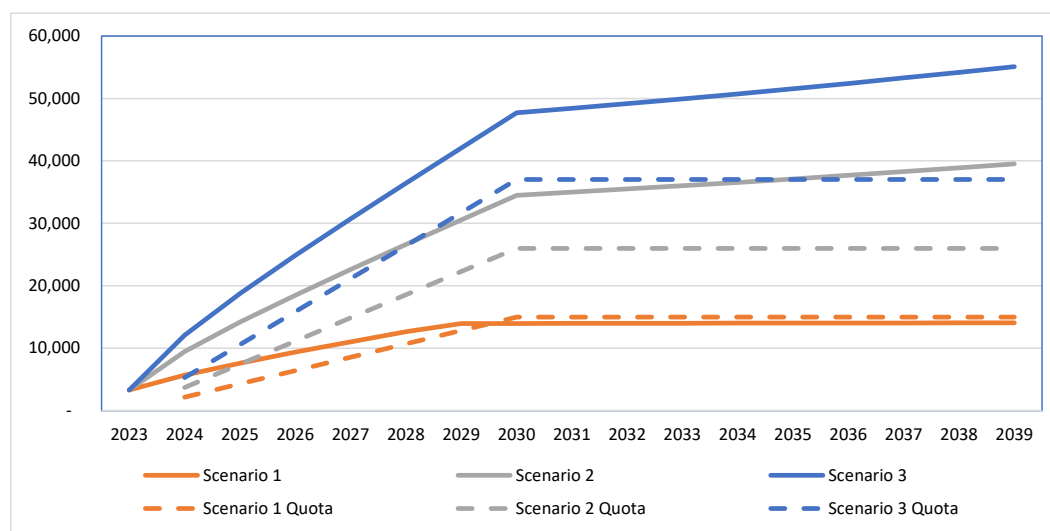
Source: Authors' model results.

4 Conclusions

This report modelled potential impacts of a proposed NZ-EU FTA, including on New Zealand's GDP, trade and investment. Since the negotiations have not yet concluded, assumptions had to be made on the type and level of liberalisation that might be agreed. The elements of the NZ-EU FTA modelled were reductions in tariffs, liberalisation of TRQs, reductions in goods and services NTMs, and improvements in trade facilitation. Three scenarios were constructed with common liberalisation of tariffs but faster implementation in the more ambitious scenarios. Quota liberalisation becomes increasingly ambitious in each of the scenarios, as does the reduction in goods and services NTMs and improvements to trade facilitation.

In all scenarios modelled, New Zealand and the EU as a whole gain from the FTA in terms of real GDP expansion. New Zealand's GDP is simulated to increase by 0.17 percent in the first scenario, rising to 0.24 in the second and 0.33 percent in the third scenario, representing gains of between NZ$1b and NZ$2b per year by 2035. The gains are driven principally by reductions in tariffs, which contribute over two-thirds of the gain in the first scenario, more than 50 percent in the second and 37 percent of the gains in the third scenario. Quota expansion contributes between 12 and 16 percent of the gains. Reductions in goods NTMs contribute 12 of the gains in the first scenario, rising to 28 percent in the most ambitious third scenario. For services NTMs, the contribution is slightly smaller, at 12 percent of the GDP gains in the first scenario, rising to 20 percent in the third. The very limited trade facilitation we model has negligible impacts on results.

Overall, the proposed FTA agreement represents an opportunity to expand New Zealand's market access to the EU, with exports to the EU growing by 12.7 percent in the first scenario, 17.1 percent in the second and 22.7 percent in the third scenario. While there will be some reduction in New Zealand's exports to other markets, the increases in export flows to the EU lead to New Zealand's overall exports expanding by between 0.39 and 0.65 percent, which represent an increase of between NZ$0.6b and NZ$1b in 2035. We find that New Zealand's exports increase across all aggregate sectors in all three scenarios. The growth in exports tends to increase, particularly for the processed food and services sectors, as the level of ambition increases. These changes in trade flows contribute to New Zealand's sectoral output growth, with all aggregate sectors expanding apart from manufactures, where there is an increase in exports but even greater increase in imports from the EU.

References

Aguiar, A., Chepeliev, M., Corong, E. L., McDougall, R., & van der Mensbrugghe, D. (2019). The GTAP Data Base: Version 10. *Journal of Global Economic Analysis, 4*(1), 1-27. doi:doi:http://dx.doi.org/10.21642/JGEA.040101AF

Anderson, K., & Strutt, A. (2014). Emerging Economies, Productivity Growth, and Trade with Resource-Rich Economies by 2030. *Australian Journal of Agricultural and Resource Economics*, 58(4), 590-606.

Corong, E. L., Hertel, T. W., McDougall, R., Tsigas, M. E., & van der Mensbrugghe, D. (2017). The Standard GTAP Model, Version 7. *Journal of Global Economic Analysis, 2*(1), 1-119.

Fontagné, L., Mitaritonna, C., and Signoret, J. (2016). *Estimations of Tariff Equivalents for the Services Sectors*. CEPII.

Fouré, J., Bénassy-Quéré, A. & Fontagné, L. (2012). *The Great Shift: Macroeconomic Projections for the World Economy at the 2050 Horizon*. CEPII Working Paper, 2012-03.

Francois, J. F., & Martin, W. (2010). Ex Ante Assessment of the Welfare Impacts of Trade Reforms with Numerical Models. Chapter 13 in *New Developments in Computable General Equilibrium Analysis for Trade Policy*, edited by John Gilbert, (Vol. 7, pp. 379-424). Emerald Group Publishing.

Harrison, W. J., Horridge, J.M., Pearson, K. R., & Wittwer, G. (2002). A Practical Method for Explicitly Modeling Quotas and Other Complementarities. *Computational Economics*, June 2004, Vol. 23(4), 325-341. [A preliminary version was Centre of Policy Studies and the Impact Project Preliminary Working Paper No. IP-78, Melbourne (April), pp.19. See: http://www.copsmodels.com/elecpapr/ip-78.htm]

Hertel, T. W. (Ed.). (1997). *Global Trade Analysis: Modeling and Applications*. Cambridge and New York: Cambridge University Press.

Horridge, J.M., Jerie, M., Mustakinov, D. & Schiffmann, F. (2018). *GEMPACK Manual*, GEMPACK Software, ISBN 978-1-921654-34-3

Ianchovichina, E. I., & Walmsley, T. L. (Eds.). (2012). *Dynamic Modeling and Applications for Global Economic Analysis*. New York: Cambridge University Press.

International Monetary Fund (IMF) (2021). *World Economic Outlook Database*. Retrieved from http://data.imf.org

Malcolm, G. (1998). *Adjusting Tax Rates in the GTAP Data Base*. GTAP Technical Paper, 15. Center for Global Trade Analysis: West Lafayette.

Piermartini, R. & Teh, R. (2005). *Demystifying Modelling Methods for Trade Policy*. WTO Discussion Paper No. 10.

United Nations (UN) (2019). *World Population Prospects: The 2019 Revision.* Retrieved from https://esa.un.org/unpd/wpp/

United Nations Conference on Trade and Development (UNCTAD) (2013). *Classification of Non-Tariff Measures*. February 2012 Version. UNCTAD/DICT/TAB/2012/2, UN: New York and Geneva.

United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) (2019). "Evaluating the Impact of Non-tariff Measures on Trade and Investment in Asia and the Pacific." Chapter 2 in *Asia-Pacific Trade and Investment Report 2019: Navigating Non-tariff Measures towards Sustainable Development*. New York: United Nations.

United Nations International Trade Centre (UNITC) (2014). Market Analysis and Research Division of Market Development. *Trade Statistics for International Business Development.* Geneva, Switzerland. Retrieved from https://www.trademap.org/Docs/TradeMap-Userguide-EN.pdf

Walmsley T. L., Minor, P., & Strutt, A. (2015). *The Vietnamese Economy through 2035: Alternative Baseline Growth, State-Owned Enterprise Reform, a Trans-Pacific Partnership and a Free Trade Area of Asia and the Pacific.* Report to the World Bank. Retrieved from https://impactecon.com/potential-scenarios-for-growth-in-vietnam/

Walmsley, T., & Strutt, A. (2021). A Comparison of Approaches to Modelling Non-Tariff Measures. *Journal of Global Economic Analysis*, 6(1), 1-33. doi:http://dx.doi.org/10.21642/JGEA.060101AF

Webb, M., Strutt, A., Gibson, J., & Walmsley, T. (2020). Modelling the Impact of Non-tariff Measures on Supply chains in ASEAN. *The World Economy*, 43(8), 2172-2198. doi:10.1111/twec.12955

Webb, M., & Strutt, A. (2020). Non-Tariff Measures in New Zealand. In D. P. Rial & M. R. Anandika (Eds.), *Non-Tariff Measures in Australia, China, India, Japan, New Zealand and the Republic of Korea: Preliminary Findings* (pp. 55-65). Geneva: United Nations Conference on Trade and Development (UNCTAD).

World Bank (2019). *World Bank Doing Business Data.* Retrieved from http://www.doingbusiness.org/data

World Bank (2021). *World Development Indicators*. Retrieved from https://databank.worldbank.org/source/world-development-indicators

Appendix I Aggregation of the GTAP Data Base

Table I-1 Sectoral aggregation

No.	Sector modelled	Description	GTAP sectors*	Major sectors used for reporting results
1	Fruit & Veg	Vegetables, fruit, nuts	V_F	Agriculture
2	Other Crops	Other crops: rice, sugar, wheat, other grains, oilseeds, other crops and plants.	PDR, C_B, WHT, GRO, OSD, PFB, OCR	Agriculture
3	Raw Milk	Raw milk	RMK	Agriculture
4	Cattle & sheep	Live cattle, sheep, goats, horses etc.	CTL	Agriculture
5	Other Animals	Live pigs, poultry, eggs, honey etc.	OAP	Agriculture
6	Wool	Raw wool, silk etc.	WOL	Agriculture
7	Beef & Sheep meat	Beef and sheep meat etc.	CMT	Processed food
8	Other Meats	Other meat: pork, poultry etc.	OMT	Processed food
9	Dairy	Dairy products	MIL	Processed food
10	Rice, Sugar and & oils	Processed rice, sugar and vegetable oils	PCR, SGR, VOL	Processed food
11	Processed Foods	Other processed foods including fish, vegetables, cereals etc.	OFD	Processed food
12	Beverages & Tobacco	Beverages and tobacco products	B_T	Processed food
13	Forestry & Wood	Forestry and wood products	FRS, LUM	Manufactures
14	Fisheries	Fisheries	FSH	Agriculture
15	Extractive	Extraction of coal, oil, gas & other minerals; manufacture of petroleum & coke	COA, OIL, GAS, P_C, OXT	Manufactures
16	Textiles	Textiles	TEX	Manufactures
17	Apparel	Wearing apparel	WAP	Manufactures
18	Leather	Leather products	LEA	Manufactures
19	Paper Products	Paper and paper products	PPP	Manufactures
20	Motor Vehicles	Motor vehicles & parts	MVH	Manufactures
21	Electronics	Office and electronic equipment	ELE, EEQ	Manufactures
22	Other Machinery	Other machinery and equipment	OME	Manufactures
23	Other Manufactures	Transport equipment and other manufactures	OTN, OMF	Manufactures
24	Chemicals, Rubbers and Plastics	Chemicals, rubber and plastic products	CHM, BPH, RPP	Manufactures
25	Mineral & metal products	Fabricated metal products and non-metallic mineral products	FMP, NMM	Manufactures

No.	Sector modelled	Description	GTAP sectors*	Major sectors used for reporting results
26	Metals	Iron & steel and non-ferrous metals	I_S, NFM	Manufactures
27	Construction	Construction	CNS	Services
28	Business and Financial services	Business, insurance and financial services	OBS, OFI, INS, RSA	Services
29	Transportation	Air and other transport	ATP, WTP, OTP, WHS	Services
30	Trade & Communications	Trade and communications	AFS, CMN	Services
31	Public services	Government services	OSG, HHT, EDU	Services
32	Other Services	Other services	ELY, GDT, WTR, ROS, DWE	Services

See https://www.gtap.agecon.purdue.edu/databases/v10/v10_sectors.aspx#Sector65 for details of the 65 GTAP sectors.

Source: Authors' aggregation of the GTAP Data Base (Aguiar, Chepeliev, Corong, McDougall, & van der Mensbrugghe, 2019)

Table I- 2 Disaggregation undertaken to implement quotas

No	Sector modelled	Description	GTAP sectors	Disaggregated sectors
7	Beef & Sheep meat	Beef and sheep meat etc.	CMT	Beef Sheep meat Other ruminant meats
9	Dairy	Dairy products	MIL	Butter under quota Butter for processing Cheese Milk powder Whey Other dairy

Table I- 3 Regional aggregation

No.	Countries modelled	Description	Original GTAP regions*
1	New Zealand	New Zealand	NZL
2	United Kingdom	United Kingdom	GBR
3	Germany	Germany	DEU
4	France	France	FRA
5	Ireland	Ireland	IRL
6	Denmark	Denmark	DNK
7	Netherlands	Netherlands	NLD
8	Spain	Spain	ESP
9	Italy	Italy	ITA
10	Belgium	Belgium	BEL
11	Poland	Poland	POL
12	Greece	Greece	GRC

No.	Countries modelled	Description	Original GTAP regions*
13	Rest of Western EU	Austria, Finland, Luxembourg, Portugal, Sweden	AUT, FIN, LUX, PRT, SWE
14	Rest of Eastern EU	Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Romania, Slovakia, Slovenia	BGR, HRV, CYP, CZE, EST, HUN, LAT, LIT, MLT, ROU, SVK, SVN
15	Western Europe not in EU	Norway, Switzerland, rest of EFTA	CHE, NOR, XEF
16	Turkey	Turkey	TUR
17	Australia	Australia	AUS
18	China	China	CHN
19	Rest Asia	Japan, Taiwan, Korea, Hong Kong, Mongolia, Rest of East Asia, Singapore, Indonesia, Vietnam, Brunei, Malaysia, Lao PDR, Cambodia, Philippines, Thailand, Rest of South-east Asia, India, Bangladesh, Nepal, Pakistan, Sri Lanka, Rest of South Asia	JPN, TWN, KOR, HKG, MNG, XEA, SGP, IDN, VNM, BRN, MYS, LAO, KHM, PHL, THA, XSE, IND, BGD, NPL, PAK, LKA, XSA
20	US	United States	USA
21	Rest Americas	Canada, Mexico, Central and South America	CAN, MEX, PER, CHL, BOL, BRA, ARG, XNA, COL, ECU, PRY, URY, VEN, XSM, CRI, GTM, HND, NIC, PAN, SLV, XCA, DOM, JAM, PRI, TTO, XCB
22	Rest of world (RoW)	Rest of world – including: Oceania, Middle East, Russia, Eastern Europe and Former Soviet Union, and Africa	XOC, BHR, IRN, ISR, JOR, KWT, OMN, QAT, SAU, ARE, XWS, EGY, MAR, TUN, XNF, BEN, BFA, CMR, CIV, GHA, GIN, NGA, SEN, TGO, XWF, XCF, XAC, ETH, KEN, MDG, MWI, MUS, MOZ, RWA, TZA, UGA, ZMB, ZWE, XEC, BWA, NAM, ZAF, XSC, XTW, ALB, BLR, RUS, UKR, XEE, XER, KAZ, KGZ, XSU, ARM, AZE, GEO, SER, IRQ, LBN, PSE, SYR, SDN

* See https://www.gtap.agecon.purdue.edu/databases/regions.aspx?version=10.211 for details of the 147 GTAP v10 countries and regions.

Source: Authors' aggregation of the GTAP Data Base (Aguiar, Chepeliev, Corong, McDougall, & van der Mensbrugghe, 2019)

Appendix II Modelling Quotas

Beef, sheep meat and dairy are important components of New Zealand's trade with the EU, covered by a number of WTO TRQs that are expected to be liberalised as part of the FTA with the EU, with new quotas introduced. A major constraint in modelling these quotas is that the quotas involve products that are aggregated into broader commodity groups in the underlying GTAP database. For instance, beef and sheep are aggregated into 'beef & sheep meat' (CMT), while butter and cheeses are aggregated into 'dairy products' (MIL). Given the importance of these quotas in the analysis of the FTA, we have chosen to disaggregate imports of these two commodities by the EU to allow the model to capture the impact of changing or adding quotas, as well as differences in in-quota or out-of-quota tariffs. To explain how quotas are incorporated, we will first discuss the disaggregation of the data, followed by how they were modelled.

Disaggregating beef & sheep meat imports and dairy

In deciding how to disaggregate the GTAP's beef & sheep meat and dairy sectors, special attention is paid to which products at the HS-8 level are subject to quotas or likely to become subject to quotas as part of the FTA, and which are not. In the case of those goods subject to quotas, we grouped commodities subject to the same WTO quota (CSTQs and/or MFN) into one category. When the commodity was not subject to quotas, it was usually aggregated into a rest of category (e.g., other ruminant meat), unless there were special circumstances that suggested disaggregation might be useful. For instance, New Zealand's butter can be exported to the EU under a WTO quota or duty free under a "further processing" agreement; as such it was useful to keep both of these commodities disaggregated. Lists of disaggregated commodities for analysis of the quota is available in Table I-2, Appendix I.

Modelling quotas

TRQs are a mix of tariffs and quantitative restrictions applied by importers to specific commodities, often agricultural goods. Traditionally a tariff, called an in-quota tariff, is applied on imports of the commodity from one or more countries up to a pre-specified quantity (the quantitative restrictions). Once the pre-specified quantity is reached any further imports must pay a higher, often prohibitive tariff, called an out-of-quota tariff. If the quantity traded is less than the quota, then the price is equal to the c.i.f price plus the in-quota tariff (called landed duty paid (LDP)); and if the quantity traded is greater than the quota then the price is equal to the c.i.f price plus the out-of-quota tariff. If the quantity traded is equal to the quota then the price will fall somewhere between the LDP (in-quota tariff) and the LDP (out-of-quota tariff), with any difference between the domestic price and the LDP (in-quota tariff) being extracted by the exporter as rents, these are known as quota rents.

In many FTAs, negotiations involve offering the partner country country-specific quotas and reduced in-quota (and occasionally out-of-quota) tariff rates that can be used by exporters in addition to existing WTO quotas, resulting in multiple tiers of tariffs and quantity constraints. These tiers reflect the fact that we assume exporters will use the quota with the lowest tariff first (usually the

CSTQ negotiated as part of the FTA), then look for other quota arrangements (e.g., WTO quota), before finally exporting under the out-of-quota tariff rate.

In the model we allow two types quotas to be implemented consecutively on any commodity. The first quota assumes the out-of-quota tariff rate is not prohibitive (we refer to this as a 'soft' quota), while the second quota assumes that the out-of-quota tariff is prohibitive (we refer to this as a prohibitive quota). For instance, using beef quotas as an example, Figure II- 1 illustrates the quotas that exist in the baseline (before the implementation of the NZ-EU FTA) on beef. EU imports of beef are subject to a WTO quota where the in-quota tariff is 20 percent and the out-of-quota MFN tariff rate is 34 percent. Since the WTO quota is binding, it is assumed that this out-of-quota tariff rate of 34 percent is prohibitive and hence we treat this as a prohibitive quota in the model. This is implemented using a complementarity (inequality) in which quota rents prohibit imports from rising above the quota.[28] The rent is assumed to be earned by the exporting firms. One issue with modelling binding quotas, such as this one, is that we need an estimate of the rents earned by the exporting firms from these quotas, in this case we assume the rate is 14 percent, the difference between the in- and out-of-quota tariff rates.

Figure II- 1 Implementation of multiple quotas on beef in baseline
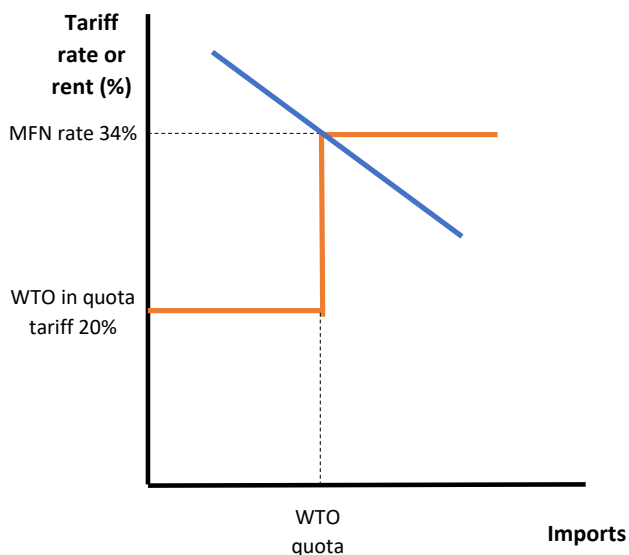
Source: Authors' construction.

Figure II- 2 illustrates the impact of the NZ-EU FTA on the EU quota on New Zealand beef. As part of the FTA, a CSTQ will be added which allows some New Zealand beef to be imported into the EU duty free. Any additional beef exported by New Zealand to the EU over and above the CSTQ, is assumed to enter under the WTO quota, at a tariff of 20 percent. We assume that New Zealand's access to the WTO quota does not change and hence it is added to the CSTQ provided under the

---

[28]   A final check is made to ensure that the rents do not exceed 55 percent, that is, the MFN tariff of 75 percent less the in-quota tariff of 20 percent, as this would indicate that the MFN tariff rate of 75 percent is not be prohibitive.

FTA, and hence the supply curve (orange line in Figure II- 2) shifts right. The CSTQ is therefore treated as a 'soft' quota in the model, where the average tariff applied on EU beef imports from New Zealand is a weighted share of the CSTQ in-quota tariff of 0 percent and the WTO in-quota tariff of 20 percent. The weights are based on the quantity of imports obtained from the model that fall under the CSTQ and the WTO quotas respectively. In the case of beef, trade under the WTO quota is relatively small compared to the CSTQs to be obtained under the FTA. If demand for imports reaches the WTO quota (as was the case in the baseline), then rents rise to prohibit further increases in imports. Figure II- 2 summarises the system of quotas implemented on beef under the NZ-EU FTA.

Quotas on sheep, butter, milk powder, and whey are treated in a similar way, except that in these cases, the WTO quotas were under-filled in the baseline and hence rents were assumed to be zero. In the case of New Zealand exports of cheese to the EU, the WTO quota is also under-filled and rents are assumed to be zero, however there exists other NTMs levied on cheese that are considered to be prohibitive and hence little trade occurs under the WTO quota. We assume that these NTMs are removed for the new FTA CSTQ, allowing exporters to fill these quotas, however any trade above the CSTQ quota is subject to these NTMs and hence there is unlikely to be any growth in exports above the CSTQ. We examine the impact of this assumption in the sensitivity analysis section. The in- and out-of-quota tariff rates, as well as any changes in those rates and the quotas under the NZ-EU FTA are outlined in Section 2.3.2.

Figure II- 2 Implementation of multiple quotas on beef under the NZ-EU FTA
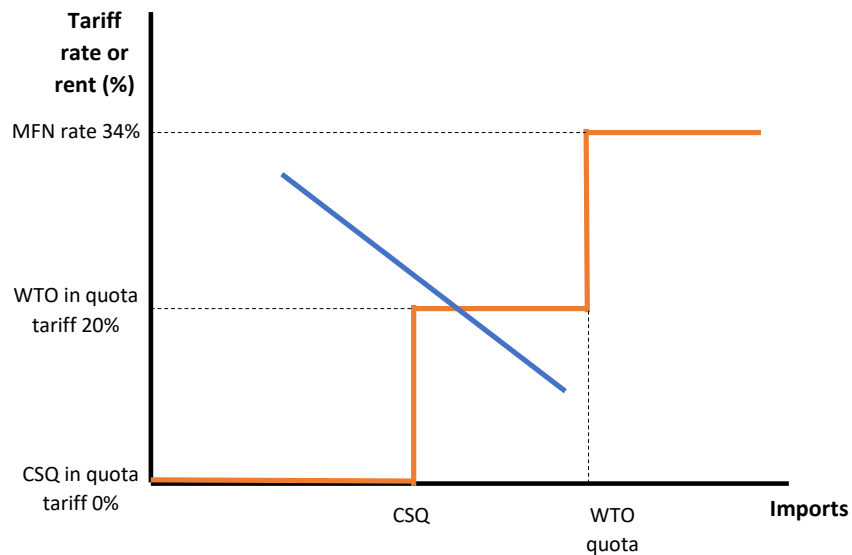
Source: Authors' construction.

Additional assumptions on beef and cattle

A number of additional assumptions were made in an attempt to capture the complexities of beef production and improve the modelling of the removal of tariffs and the quota on New Zealand

exports of beef to the EU. We assumed that the supply of land was very sluggish between sectors[29] and hence land did not move between agricultural sectors, specifically into the cattle and sheep sector to raise production.

---

[29] Parameter used in GTAP to reflect supply of land across sectors was reduced to (almost) zero.

Appendix III Supplementary Results Relative to 2040 Base

The following tables report results for selected key indicators as deviations from the 2040 baseline, rather than the 2035 baseline results generally reported in the body of the report. While the pattern of results is very similar, some differences emerge. Real GDP gains for New Zealand in all scenarios are slightly larger than in 2035 (compare Table 10 and Table III-1): there are slightly higher percentage increases by 2040, but the dollar equivalents also increase due to expansion of the baseline economy between 2035 and 2040. GDP gains for the EU expand a little, reductions for the UK are smaller and gains for the rest of the world are somewhat smaller than in 2035.

Table III- 1 Simulated effects on real GDP, 2040 (cumulative percent and NZ$ million differences from baseline)

	Percent			NZ$m		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
New Zealand	0.18	0.24	0.34	1,290	1,698	2,377
EU	0.01	0.01	0.01	2,595	2,811	3,698
UK	0.00	0.00	-0.01	-326	-306	-370
Rest of world	0.00	0.00	0.00	2,062	1,598	847

Source: Authors' model results.

Results for changes in exports show a similar trend to GDP for New Zealand, when comparing 2040 with 2035 impacts. In particular, the percentage increases in real exports are larger in 2040 than 2035 and the dollar equivalents also increase (compare Table 11 and Table III-2). While New Zealand's exports to the EU increase by a similar amount in 2040, exports to the rest of the world do not decline as much in 2040 as they did in 2035 (Table III-3), giving rise to the overall expansion of exports for New Zealand. New Zealand's imports increase a little less in percentage terms when comparing 2040 results with those from 2035; however, the dollar increases are a little higher due to the larger baseline trade flows in 2040 (compare Table 11 and Table III-2).

Table III- 2 Simulated impact on overall real exports and imports, 2040 (cumulative percent and NZ$ million differences from baseline)

	Percent			NZ$m		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	E X P O R T S					
NZ	0.53	0.65	0.84	924	1,130	1,456
EU	-0.02	-0.01	-0.01	-2,955	-2,590	-2,080
UK	-0.08	-0.08	-0.08	-1,879	-1,886	-1,914
RoW	0.02	0.02	0.01	8,197	7,808	7,535

	Percent			NZ$m		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
			I M P O R T S			
NZ	0.66	0.79	1.04	1,314	1,562	2,051
EU	0.02	0.02	0.03	3,967	4,142	4,774
UK	0.02	0.02	0.02	359	356	320
RoW	0.00	0.00	-0.01	-2,209	-2,427	-2,967

Source: Authors' model results.

Table III- 3 Simulated impact on New Zealand and EU bilateral exports, 2040 (cumulative percent and NZ$ million differences from baseline)

	Percent			NZ$m		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
		E X P O R T S F R O M N Z T O :				
EU	12.71	16.85	22.33	1,355	1,795	2,380
RoW	-0.22	-0.36	-0.50	-351	-583	-818
		E X P O R T S F R O M E U T O :				
NZ	10.51	12.26	15.87	3,226	3,765	4,873
EU	-0.01	-0.01	-0.02	-997	-1,244	-1,460
RoW	-0.06	-0.06	-0.06	-5,249	-5,132	-5,441

Source: Authors' model results.

Appendix IV Supplementary Sectoral and Employment Results

Table IV-1 Simulated impact on New Zealand aggregated sectoral production, exports and imports decomposed by policy instrument, 2035 (cumulative differences from previous instrument, NZ$ million and percent)

	Scenario 1				Scenario 2					Scenario 3				
	Tariffs	Quotas	Goods NTMs	Services NTMs	Tariffs	Quotas	Goods NTMs	Services NTMs	Trade facilitation	Tariffs	Quotas	Goods NTMs	Services NTMs	Trade facilitation
PRODUCTION (PERCENT)														
Agriculture	0.10	0.05	0.01	0.00	0.11	0.08	0.02	0.00	0.00	0.11	0.11	0.03	0.00	0.00
Food	0.01	0.10	0.00	0.00	0.02	0.15	0.01	0.00	0.00	0.02	0.20	0.01	0.01	0.00
Manufactures	0.03	-0.07	0.00	0.01	0.05	-0.12	0.00	0.02	0.00	0.06	-0.16	0.00	0.05	0.00
Services	0.15	0.02	0.02	0.01	0.16	0.03	0.04	0.02	0.00	0.16	0.04	0.08	0.05	0.00
PRODUCTION (NZ$M)														
Agriculture	75	37	6	-1	83	60	12	-1	0	83	83	24	-2	0
Food	8	113	0	2	25	161	8	5	0	26	216	16	9	0
Manufactures	47	-131	2	23	97	-208	3	44	2	99	-289	5	93	-1
Services	1,263	132	158	93	1,304	250	331	181	2	1,307	343	678	384	-2
EXPORTS (PERCENT)														
Agriculture	0.78	-0.16	0.06	-0.01	0.78	-0.23	0.13	-0.01	0.00	0.78	-0.32	0.26	-0.03	0.00

	Scenario 1				Scenario 2					Scenario 3				
	Tariffs	Quotas	Goods NTMs	Services NTMs	Tariffs	Quotas	Goods NTMs	Services NTMs	Trade facilitation	Tariffs	Quotas	Goods NTMs	Services NTMs	Trade facilitation
Food	0.13	0.18	0.00	0.00	0.15	0.25	0.01	0.00	0.00	0.15	0.34	0.02	-0.01	0.00
Manufactures	0.64	-0.20	0.07	0.01	0.70	-0.32	0.15	0.01	0.00	0.71	-0.44	0.30	0.02	0.00
Services	0.05	-0.14	0.00	0.26	0.10	-0.21	-0.01	0.52	0.00	0.11	-0.29	-0.02	1.06	0.00
EXPORTS (NZ$M)														
Agriculture	105	-22	9	-1	105	-32	17	-2	0	105	-43	35	-4	0
Food	96	129	-1	-2	111	181	7	-3	0	111	242	13	-6	0
Manufactures	275	-86	31	3	303	-140	63	5	1	308	-193	128	8	0
Services	12	-33	0	62	25	-51	-3	125	0	25	-71	-5	253	0
IMPORTS (PERCENT)														
Agriculture	0.89	0.08	0.07	0.01	0.90	0.11	0.15	0.02	0.00	0.90	0.15	0.32	0.05	0.00
Food	1.34	0.10	0.04	0.01	1.35	0.17	0.09	0.01	0.00	1.35	0.24	0.18	0.03	0.00
Manufactures	0.59	0.06	0.06	0.01	0.57	0.10	0.12	0.03	0.00	0.57	0.14	0.24	0.06	0.00
Services	0.10	0.09	0.02	0.25	0.08	0.15	0.04	0.51	0.00	0.08	0.21	0.08	1.05	0.00
IMPORTS (NZ$M)														
Agriculture	24	2	2	0	25	3	4	1	0	25	4	9	1	0
Food	154	11	5	1	155	20	10	2	0	155	27	21	3	0
Manufactures	758	77	73	19	731	128	153	36	0	730	175	315	78	0
Services	31	28	6	79	25	47	13	160	0	25	65	26	328	0

Source: Authors' model results.

Table IV- 2 Simulated change in employment by aggregate sector relative to the 2035 baseline, New Zealand, Scenarios 1-3 (percent)

	Agriculture	Food	Manufactures	Services
S C E N A R I O 1				
Professionals and managers	0.25	0.04	-0.19	-0.01
Technical and assistant professionals	0.25	0.04	-0.19	-0.02
Clerks	0.25	0.04	-0.19	-0.01
Service workers	0.25	0.05	-0.18	-0.03
Agricultural and low skilled workers	0.21	-0.06	-0.28	0.12
S C E N A R I O 2				
Professionals and managers	0.32	0.08	-0.23	-0.01
Technical and assistant professionals	0.32	0.07	-0.23	-0.02
Clerks	0.32	0.08	-0.23	-0.01
Service workers	0.32	0.09	-0.22	-0.03
Agricultural and low skilled workers	0.27	-0.04	-0.33	0.12
S C E N A R I O 3				
Professionals and managers	0.37	0.11	-0.31	-0.01
Technical and assistant professionals	0.37	0.09	-0.31	-0.03
Clerks	0.38	0.11	-0.30	-0.02
Service workers	0.38	0.13	-0.28	-0.04
Agricultural and low skilled workers	0.32	-0.03	-0.42	0.15

Source: Authors' model results.

Table IV- 3 Simulated change in real wages relative to the 2035 baseline, New Zealand, Scenarios 1-3 (percent)

	Scenario 1	Scenario 2	Scenario 3
Professionals and managers	0.22	0.28	0.39
Technical and assistant professionals	0.21	0.28	0.39
Clerks	0.21	0.28	0.39
Service workers	0.21	0.28	0.39
Agricultural and low skilled workers	0.29	0.36	0.49

Source: Authors' model results.

Table IV- 4 Simulated impact on New Zealand sectoral production, 2035 (cumulative differences from baseline, NZ$ million and percent)

	Percent			$NZm		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
A G R I C U L T U R E						
Fruit & Veg	0.57	0.62	0.71	73	79	90
Other Crops	0.19	0.24	0.32	6	8	11
Raw Milk	0.00	0.05	0.07	-1	18	26
Cattle & sheep	0.20	0.28	0.38	29	41	54
Other Animals	0.26	0.26	0.25	13	13	13
Wool	-0.20	-0.28	-0.40	-3	-4	-5
Fisheries	0.00	0.00	0.00	0	0	0
P R O C E S S E D F O O D						
Beef & Sheep meat	0.47	0.65	0.87	109	151	203
Other Meats	-1.44	-1.51	-1.64	-47	-49	-53
Dairy	-0.01	0.05	0.08	-5	22	36
Rice, Sugar and & oils	-0.44	-0.50	-0.59	-19	-21	-25
Processed Foods	0.16	0.15	0.13	35	32	28
Beverages & Tobacco	0.34	0.43	0.53	50	64	79
M A N U F A C T U R E S						
Forestry & Wood	0.15	0.17	0.21	26	31	38
Extractive	0.01	0.01	0.01	2	4	5
Textiles	0.52	0.51	0.49	4	4	4
Apparel	0.35	0.39	0.45	8	9	10
Leather	1.88	2.04	2.37	9	9	11
Paper Products	0.11	0.13	0.14	12	14	15
Motor Vehicles	-0.04	-0.14	-0.35	-1	-4	-10
Electronics	-0.18	-0.19	-0.24	-15	-16	-20
Other Machinery	-1.00	-1.00	-1.00	-120	-120	-120
Other Manufactures	0.21	0.31	0.50	14	20	33
Chemicals, Rubbers and Plastics	0.13	0.05	-0.13	38	15	-35
Mineral & metal products	-0.01	0.05	0.14	-1	11	32
Metals	-0.16	-0.18	-0.25	-36	-41	-57
S E R V I C E S						
Construction	0.56	0.64	0.81	760	868	1099
Business and Financial services	0.18	0.22	0.28	470	571	703
Transportation	0.09	0.14	0.22	47	74	114
Trade & Communications	0.14	0.18	0.25	190	256	346
Public services	0.04	0.08	0.14	58	113	186
Other Services	0.12	0.18	0.26	123	185	261

Source: Authors' model results.