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**The attraction of export markets in unfulfilled markets:
A case of the New Zealand Wine Industry**

*“How do the characteristics of an export market affect the export
behaviour of the New Zealand Wine Industry?”*

Name student: David Scott Jong-Baw
Student ID number: 513360

Supervisor: Liam C.P. van Son
Second assessor: Bart Kuipers

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1. Introduction

In the past few years global trade has been put to the test due to multiple events that shook the world. Such events included a multitude of lockdowns and restrictions during the global pandemic of Covid-19 (WHO, 2020) and an additional series of unfortunate accidents, e.g. the case of Ever Given. The effects were more severe on supply chains and trade due to the progressed interdependence of countries, following a large trend of globalisation (Baldwin & Freeman, 2022). In consequence, the trade of many goods was affected due to disruptions in the global supply chains, market demand and restrictions.

While some industries are more affected than others by disruptive events, it is the export oriented industries like the New Zealand Wine Industry (further mentioned as the NZWI) who experience the most turbulence (Gwynne, 2006; Yu & Lindsay, 2016). This is due to their rate of dependence on trade between nations. The nation of New Zealand has a relatively small population, barely exceeding 5 million. The domestic market simply does not produce enough demand to facilitate a quick shift toward the domestic market, hence the concern of long lasting effects due to this event.

The New Zealand Wines enjoy a premium status due to their unique comparative advantage on the quality of wine, labour and sustainability (Gwynne, 2006; Forbes et al., 2009; Werdelmann, 2014). This recognition brings with it a growth in demand, which the industry is unable to fulfil due to restraints in either production or supply chains. With unfulfillable demand comes a position of luxury for the producers. In such situations they may choose the export market for their product. Assuming the exporters aim to earn as much profit as possible, they will look for the destination with the best environment. This, consequently, forms the aim of this paper, by posing the following research question:

“How do the size and competitive price characteristics of an export market affect the export behaviour of the New Zealand Wine Industry?”

Given the unique circumstances of both the NZWI and the lingering circumstances after the pandemic, the question remains whether the export

behaviour of the NZWI was affected by the pandemic. This will be answered as well as the main research question, through an adjusted model and making use of the available theories and literature. This model incorporates multiple size and competitive variables to estimate their significance, the highest impacting effects came from the consumption, GDP per Capita and Foreign Direct Investment (FDI). In contrast, relatively insignificant effects came from price, nautical distance and exchange rate. Further the results found no significance for the effects of Covid-19 on the global scale, however further analysis uncovered the significance per country to differ both positively and negatively.

This thesis will further cover the effects of globalisation on world trade and the vulnerability of it in uncertain times, due to external shocks. Further a deeper insight into the NZWI and its operating market will be explored. Following the literature a gravity model will be constructed to attempt to answer the research question and the analysis of its results. Ending with the conclusions of the research as well as consideration of future research into the subject of export behaviour and the NZWI as well as other wine market studies.

2. Literature review

In this section I will start by reviewing the big event that initiated the interest in the time period of this research. We will first look into the global supply chain and how it became vulnerable to disruptive events. Afterwards I will proceed to apply it on the case of Covid-19 and how it affected the global economies and trade networks. Finally, I shall provide a more extensive insight into the history and situation of the NZWI.

2.1 The Vulnerable Supply Chain

While disruptions of the supply chains have been an occurrence since the beginning of supply chains, it was for a large part on smaller scales and much less a global issue. This all changed when globalisation became a popular topic steering the development of the international economy in the late 20th century (Gereffi et al, 2001). after the introduction of global supply chains and “Just-in-Time” (JIT)

strategies. Around the 1950s JIT manufacturing was introduced by Toyota. They managed to reduce inventories, reduce setup times and ultimately managed to save on supply chain costs as well. The success of JIT had not gone unnoticed and in a short period of time it had become widely used. This concept aims for the efficient use of all aspects in the supply chain and was later adopted and towards a more modern sense known as Lean management. Defined as an approach where the elimination of waste, creation of flow and increasing the velocity of the system seeks to improve quality, cost, delivery and safety (Plenert, 2007).

However, Globalisation and the concept of JIT led towards an intensification and the deepening of interconnectedness between countries, meaning the dependency on other countries and the supply chain between are increasingly critical. While it is not a bad thing on its own, developments towards an excessive reliance on suppliers become apparent, where all parties need to work together for the supply chain to function. Additionally requiring an increased layer of maintaining relations and management, which means there is more that can go wrong as well as leaving a larger impact when it does go wrong (Sheffi & Rice, 2014; Jiang et al., 2021).

As Lee (2014) said “The best supply chains aren’t just fast and cost-effective. They are also agile and adaptable, and they ensure that all their companies’ interests stay aligned.” (p. 102). With this he stresses the importance of adhering to the three A’s of ‘agility’, ‘adaptability’ and ‘alignment’, where agility denotes the ability to react swiftly to shocks, adaptability is to adapt over time due to changes in the market and alignment is for the alignment of interests of all parties to reduce hurdles in the chain. However the solution Lee provides for more resilient supply chains is to slightly give up on the efficiency mindset and instead prepare oneself for changing environments. Sheffi & Rice (2005) complement this thinking with a focus on preparing for high-impact/low-probability events where the consequences may be severe and long lasting depending on the preparations and recovery efforts by the company. Through different cases they show the effects of well prepared companies on dealing with disruptive events. Additionally providing us with a framework to analyse the impact of these events.

The most recent extreme disruption occurred around the start of 2019. Covid-19, declared a pandemic on the 11th of March 2020 (WHO, 2020), resulted in a worldwide lockdown. This led to the closing of borders, shifts of demand,

international trade frictions and restrictions on movement of goods and people. A multitude of research has been done on the effects of Covid-19 on our economy. As of the time of writing (June, 2023) the most used academic search engine 'Google Scholar' returns over 1 million results on 'the impact of Covid-19 on the economy'.

The effects of Covid-19 were felt all over the world and the contractions of economies were inevitable (OECD, 2022; Worldbank, 22; CBS, 2020; UNCTAD, 2022). The initial expectations of contractions of global trade were in the double digits, in reality it declined by roughly 8.5% - 9% according to, respectively, the OECD and the UNCTAD due to a strong recovery in the 2nd half of 2020. This can be seen in the data collected by the World Trade Organisation (WTO) where the Merchandise Export Volume Index (MEV Index) showed a decline from 154.79 in the fourth quarter of 2019 to 131.50 in the second quarter of 2020 until it recovered towards 157.04 in the fourth quarter of that same year (WTO seasonally adjusted, 2023). The latest reports on the MEV Index have been between 163.96 and 167.61 in the last 4 quarters, well above the pre-Covid levels.

As such the global economy has now since recovered, but the question remains whether long term effects are still lingering and if so, how significant is this effect. This thesis will attempt to answer this question as well.

2.2 The New Zealand Wine Industry

The NZWI makes for an interesting case due to its geography, role in the economy and dependance on trade. The geography of New Zealand has enabled the production of unique, characteristic and sustainable wines, as such gaining significant recognition and popularity for their premium offerings (Schamel & Anderson, 2003; Forbes et al., 2009). Separating themselves from the cheaper market, they were able to create their own market with demand growing at a faster rate than production. Their role in the economy and its dependency on trade is tied to the export oriented nature of the NZWI (Gwynne, 2006; Hussain et al., 2008). Furthermore, New Zealand wineries are confronted with national policies discouraging domestic sales, of which the excise tax on domestic sales is the largest discouraging factor, which on average is more in tax than the cost of the main ingrediënt grapes. In addition to the policies, the growth of local markets are structurally hindered by the small domestic population of New Zealand (NZ

Winegrowers Annual Report, 2022). This means that the industry relies on exporting its goods to the global market, where demand is in abundance.

The New Zealand Wine Industry (NZWI) has experienced rapid development and international recognition over the past decades. The industry is assisted by the New Zealand Winegrowers (NZWG) which is the national organisation for the country's grape and wine sector since March 2002. They fulfil multiple roles for the industry such as advocacy, providing a marketing platform, facilitating research, providing strategic information, development of sustainable production practices and organising sector-wide events. Since its establishment the growth of the industry can be found all around the board. Where the NZWI boasted a producing area of 15,800 hectares in 2003, they now boast an incredible 41,603 hectares as of 2022. Together with an increase in production from 119.2 million litres of wine in 2004¹ to the production of 383.0 million litres in 2022. (NZWG, 2014; NZWG, 2022) And most notably the growth of export value by 545% from 302.6 to 1,953 in millions of NZ\$ FOB, which is the value of the goods free on board inclusive of the cost of transport (NZ Customs Service, 2022).

Thanks to New Zealand's unique combination of land, people and culture they have come to provide distinct and competitive wines on the global market. Known for their high-quality, premium and sustainable wines with distinctive characteristics. It is not uncommon for consumers to show significant biases towards a certain wine, due to its origin. This is further supported by the many awards claimed by New Zealand wines as shown in the 'Decanter World Wine Awards', the largest and most influential wine competition in the world (Decanter, 2022). Classifying wines in terms of quality has been a topic of discussion for researchers (Anderson et al., 2003). Additionally, Schamel and Anderson (2003) argue the coming of more competitive and more globalised environments in the international wine market and. Where the price and demand of wines from specific regions depend on the quality upgrading of the product, absolute and relative to that of competing producer groups. The conclusion of their work shows the importance of ratings by independent writers/critics/judges, for example wine magazines or awards, and the fact premium consumers are willing

¹2003 was an exceptionally bad year for the yields of New Zealand wines sitting at 4.8 tonnes per hectare resulting in a total production of just 55.0 million litres, hence the decision to use the values of 2004. According to the New Zealand Winegrowers' (NZWG) Annual Report of the NZWI (2014).

to pay for higher-rated wines. The results were further affirmed by Werdelmann (2014) where a similar issue was argued. Finding a significant interdependency between quality, price and reputation. As well as the importance of expert ratings on the quality perception, additionally reducing uncertainty creating stable market demand.

The general information statistics of the NZWI can be found in Table A1 in the appendix. Further on the market demand, when looking at figure 2.2.1, we can see the allocation of the production towards either domestic or external markets. We can clearly see an increase in allocation towards the export market. The domestic market continues to shrink in relative terms, but this is due to the growth in production as domestic sales have been hovering around 50% as seen on figure 2.2.2. This can be explained by the limited population in contrast to the production of wine. This means a stagnation of the domestic market is present and combined with the growth of the industry leads to a continued growth of the export market.

In the case where demand grows more significantly than production, the market will end up in an unfulfilled state. Consumers will likely accept higher prices due to scarcity. Unfulfilled markets provide good opportunities for exporters, to either increase production or choose an export destination returning the highest profits, since there is no indication of additional effort on increasing production, they seek for the better export destinations.

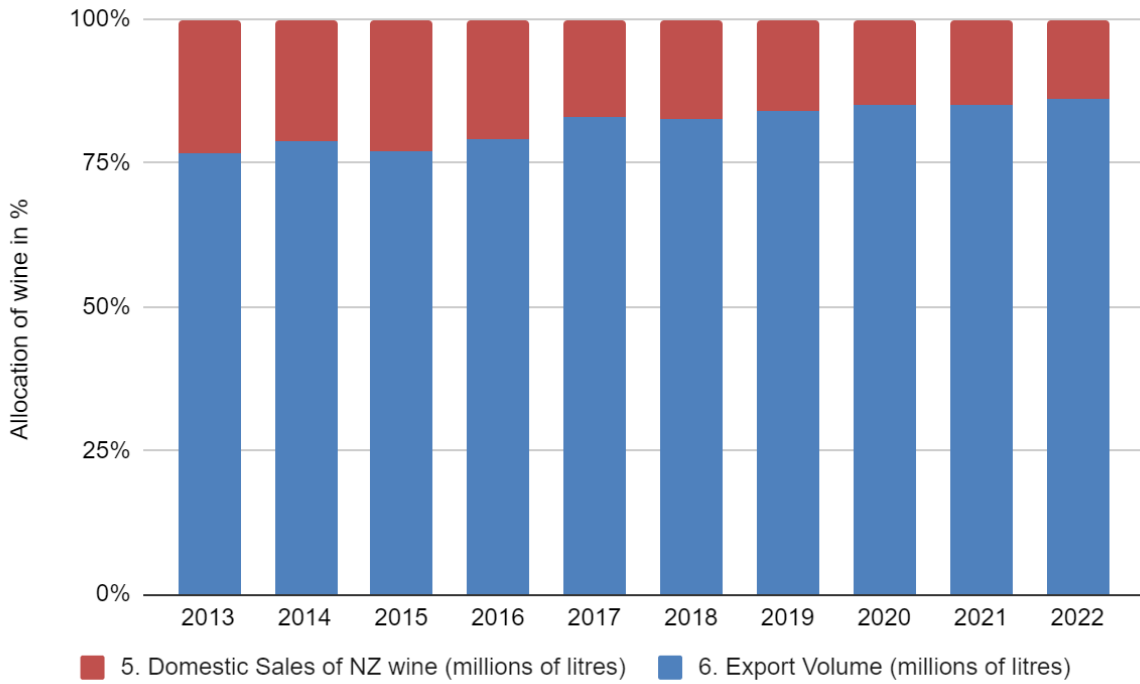


Figure 2.2.1 Allocation of the total NZ production volume per year, 2013-2022

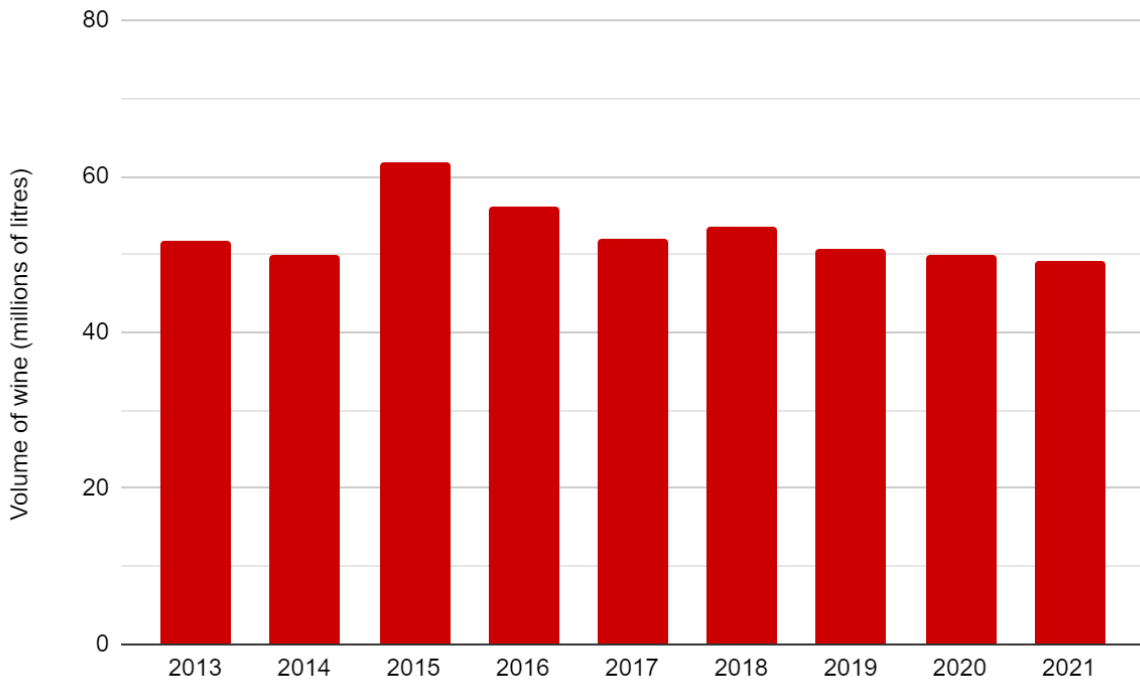


Figure 2.2.2 The volume of domestic sales of NZ wines per year, 2013-2021

3. Data & Methods

The estimates of trade have since years been subjected to variations of the gravity model, which is the result of the long studies by Jan Tinbergen (1962) on import and export flows. Still relatively simple in terms of modern standards, containing only the economic size of two countries as well as the distance between the two economies, it has produced consistent and representative results in the research of trade flows. As researchers began using the model, adjustments were made. The trusted gravity model evolved with the addition of new interpretations, new variables and maybe most important, attempts at estimating trade flows of certain goods and participants, including the trade flow of wine. (Anderson, 1979; Bergstrand, 1989; Dascal et al., 2002; Dal Bianco, 2017)

Even though many changes and variations were made on the gravity model and variable most commonly measured is the total trade flow of all goods or services between countries. In this case only the export flow for a single good, which can be identified by the HTS code 2204, needs to be measured. Considering the main focus the model needs to seek to estimate the export intensity of the NZWI through theoretically relevant explanatory variables for its behaviour the model used in this thesis will be based on the model of Bergstrand (1989) to estimate the single flow of export from the NZWI.

The export value is the export value sent to the Country of Destination (COD) by the country of origin (COO) New Zealand. The export value is often used interchangeably with export intensity, since the latter is what the research of export usually wants to measure (Gourlay et al., 2005; Gashi, 2014, Yu & Lindsay, 2016). With the use of this variable it is possible to measure the gains and losses of export intensity.

3.1 Size

Using the economic size to estimate trade flows with the gravity model is something that has always been the case since Tinbergen (1962). However, more recent studies have argued that point, like the argument of Wakelin (1998) suggesting that when the size of the firms in the COO relates positively with better incentives to sell

domestically, then they will not be moved to export their production. Luckily In the case of the NZWI, selling domestically is discouraged completely, not only by the relatively low population limiting the demand of wine, but also the excise costs put on the sale of wine domestically, which is more expensive than the average cost of their raw materials in combination with policies discouraging domestic sales (NZWG Annual Report, 2022). As mentioned before, this paper seeks to explain the intensity of a single export flow from one origin and in regards to this, a similar study by Gouveia et al. (2018) about the determinants of Port wine exports makes a point to reject the size variable of the COO in accordance with Bergstrand (1989). They allowed for a partial equilibrium model between demand and supply under monopolistic competition. Which is in line with the market position enjoyed by the NZWI, due to its product differentiation and overwhelming demand. As such, with no doubt about the decision to export, exclusively incorporating the attraction of export markets becomes a viable option.

In this model the Gross Domestic Product (GDP), GDP per Capita and the Annual Percentage Growth Rate (APGR) will be used for size variables. The decision to put them in together is due to the variation of countries. Where developed countries enjoy a high GDP per Capita and a slowed rate of growth and developing countries can experience a relatively higher growth rate (Liu & Song, 2021). When inspecting the significance on smaller scales this may provide interesting differences.

GDP and GDP per Capita are classic variables to be found in most gravity models. The regular GDP measures the absolute economic size of the COD, representing one of the attraction forces in the gravity model. The GDP per Capita meanwhile is a measure adjusted for population size, the values used here are additionally converted with a Purchase Power Parity conversion factor to measure fairly for purchasing power regardless of exchange rates. Since the GDP per capita also represents the Purchasing Power (Roman et al., 2016). A case made by Nazlioglu (2013) additionally specifies the relation to the demand of goods which can prove relevant in this model. A positive effect should be expected for both of these variables, due to their positive relation with higher demand for quality wines as well as readiness to pay.

The APGR represents the growth of the wealth in the COD, subsequently indicating the strength of the growth on market potential since wealth is associated

with an increase in wine demand (Liu & Song, 2021). A positive effect is expected due to the positive relation between a growing market and its growth in demand.

The wine consumption per country is also an interesting variable in describing the size of the export markets. The consumption is closely related to the demand and provides an attraction due to the potential export volume which can be sent to the COD, which can facilitate economies of scale for high volumes. Thanks to its more focused nature towards wine it is expected to find a more significant relation through this size variable than for example the general GDP of the COD. Of course this is also expected to have a positive relation to the export value.

3.2 Competitiveness

Besides the standard size, competitive advantage is also an important factor in determining the export behaviour. Competitiveness has a less traditional interpretation in this model, since the norm is to compare the product with its competition, e.g. alternative beverages or wines from other countries. However, since the objective is to estimate the difference in behaviour towards CODs, the interpretation of competitiveness is in the relative attraction of the different export markets. The explanatory variables for this section are all determinators for the price at the export market.

The distance variable, it is one of the most common independent variables of the gravity model. Instead of the usual crow distance, which is the shortest possible distance, the nautical distance follows direct sea routes from port to port expressed in Nautical Miles, with the means to have a more realistic representation of the distances between markets (Searoutes, 2023). The distance variable acts as a proxy for transport cost, which is common practice for the distance variable in gravity models, and as such represents a trade barrier for export intensity to the COD. While the data on actual transport costs would be a significant explanatory variable in economic models and could more accurately estimate its effect, the data is not easily attainable on a large scale and is usually replaced by the more readily available data, albeit less explanatory (Dal Bianco et al., 2016). Additionally the use of transshipping due to the weight of costs and time is likely in this case, it is omitted in this model due to its complexity and the need for difficult to attain data. We still expect the variable to return a negative effect on the export intensity due to extra incurred costs over longer

distances as well as explained by the theoretical relation between transport cost and export intensity.

The price per litre is the price per litre found in the export market. The price of the wine in the market of the COD can be compared to the price of the same wine elsewhere, determining its price competitiveness. We can normally expect the data to present a negative effect on competitiveness of the product, due to the well known relation between prices and demand. This is also present in the negative relation with the export intensity, since the export intensity is dependent on the export/sales in the COD. An increased cost naturally increases the final price on the market unless subsidised. Consequently, products with higher prices become less competitive on the local market. This causes a decrease in demand for the good to a significant degree. Research by Schamel & Anderson (2003) however presents the argument that premium consumers are willing to pay more for premium wines. Nonetheless, the willingness to pay is only proportional to the quality of the wine and the transport cost does not contribute to the quality.

Following the literature this paper assumes the market of New Zealand wines is not yet matured. And as such analysing the export markets, the presence of unfulfilled demand can be argued, the rapid recognition of New Zealand wines has sparked an equally rapid demand for the wines and production can not keep up. Subsequently from the perspective of the NZWI, an increase in the price of their product is more of an incentive to increase the export intensity towards that market. As such a positive relation between price and export value is expected.

Important to note however is the presence of an interaction effect. This can be explained by the calculation of the price on a specific market. The price depends not only on production costs, demand and desired profit margins, transport costs are a big part of this cost picture which is represented in the distance variable. When the distance increases, the price at the destination market naturally increases as well in absolute and relative terms compared to other markets and in turn affects the export value. Following this fact an interaction variable is to be considered for the model.

Additionally the real exchange rate should be introduced, which reflects the relative purchasing power between countries. This is a weighted value of the nominal exchange rate, adjusted for a geometric average of exchange rates. This represents the real effective rate at which the local population of the COD is able to buy goods. The relevance of this lies in the effect of exchange rate on trade demand. A higher

rate increases the CODs potential for imports due to the increase of purchasing power. Further interest in the variable comes forth from inconsistent results from former research on its significance (Karemera et al., 2011; Gouveia et al., 2018) It is expected to see a positive effect on the export value.

More variables that have an effect on the trade barriers are Free trade agreements (FTA). FTAs provide a preferential trade environment through the reduction of tariffs and transport costs, but might also provide easier movement of capital. FTA's are in essence designed to have a positive effect on export intensity.

While not truly in line with the other variables it is a fact that the COO enjoys FDI from some of the CODs. This relation would not only facilitate the production of the NZWI, but would also lower trade barriers with the country due to possible use of shared logistics or communication networks as well as promotion and creation of demand. This is even more so in effect due to the export encouraging policies set in place by the government body (Majeed & Ahmad, 2006). FDIs are consequently expected to carry a positive sign, but are also expected to be significantly impactful in comparison.

Lastly we will test for long term covid effects on the export intensity through a dummy. One of the large shocks during this time period and while the economy swiftly recovered within a year, the long term effects on growth are still up for debate. Estimating short term effects would not be feasible due to the vulnerability and sensitivity of the New Zealand wine production to the weather. Price shocks should be included in the model (Gourlay et al., 2005). This will represent the time period after which the effect might still be lingering. I expect a negative value for this variable, however some CODs may have even experienced a positive effect due to a shift in market demands and exports from the COO.

3.3 Model

The final equation used in this thesis is given by the following equation:

$$\begin{aligned} \ln ExportValue_{i,j,t} = & \beta_0 + \beta_1 * \ln GDP_{j,t} + \beta_2 * \ln GDPpc_{j,t} + \beta_3 * \ln APGR_{j,t} + \\ & \beta_4 * \ln NauticalDistance_{i,j} + \beta_5 * \ln Price_{j,t} + \beta_6 * \ln RER_{i,j,t} \\ & + \beta_7 * \ln Consumption_{j,t} + \beta_8 * FTA_{i,j,t} + \beta_9 * FDI_{i,j,t} + \beta_{10} * Covid_t + \epsilon_{ijt} \end{aligned}$$

$\ln ExportValue_{i,j,t}$, represents the export value/export intensity enjoyed by the COD (j) from the COO(i) at time (t).

$\ln GDP_{j,t}$, is the gross domestic product of the COD(j) at time (t).

$\ln GDPpc_{j,t}$, is the gross domestic product per Capita of the COD (j) at time (t).

$\ln APGR_{j,t}$, is the annual percentage growth rate of the GDP of the COD (j) at time (t).

$\ln NauticalDistance_{i,j}$, is the nautical distance between the main container ports of the COO(i) and the COD(j).

$\ln Price_{j,t}$, is the price per litre of New Zealand wines in the COD (j) at time (t).

$\ln RER_{j,t}$, is the real effective exchange rate of the currency in the COD (j) at time (t).

$\ln Consumption_{j,t}$, is the total consumption of wine in the COD (j) at time (t).

$FTA_{i,j,t}$, is a dummy variable on whether a Free Trade Agreement between the COO(i) and COD(j) was active at time(t), given the value '0' if there are no FTAs in place and given the value '1' otherwise.

$FDI_{i,j,t}$, is a dummy variable on the significant involvement of Foreign Direct Investment by the COD(j) in the COO(i) at time(t), given the value '0' if no significant involvement was found in the past 10 years and given the value '1' otherwise.

$Covid_t$, is a dummy variable given the value '0' when time(t) is before the 1st of January 2020 and given the value '1' otherwise.

3.4 Data

All of the data was obtained in May and June of 2023, with data provided through 2015-2022 on a mostly quarterly basis and yearly basis. The yearly basis has been modified for quarterly use and adjusted for seasonality. The data for the export and trade was obtained from Stats NZ, the official New Zealand official data agency. The second batch of data regarding the GDP variables and exchange rate were obtained from the World Bank, which collects a variety of data on countries. The data on the nautical distance was attained through Searoutes, which provides tools for accurate sea routes and distances as well as a multitude of data on the maritime environment regarding supply chain solutions. Data on the prices of wine per country is obtained from the annual reports from the New Zealand Winegrowers, which contains extensive information on the NZWI. The data on wine consumption per country was obtained from the International Organisation of Vine and Wine (OIV). The OIV is an intergovernmental organisation which provides information for wine producing and consuming countries. Data on the FTAs were obtained from the New Zealand Ministry of Foreign Affairs and Trade. Data on FDIs were obtained from an analysis report, "Insights on Foreign Direct Investment in New Zealand", by KPMG. The final data on Covid was obtained from the World Health Organisation.

4. Results & Discussion

4.1 Results

This section goes over the results of our model based on the collected data from 25 countries who import the highest amount of New Zealand wine over the last 10 years. Together they are responsible for almost 99% of the exports from the NZWI with the top 4 accounting for roughly 80% of the exports. First in this section is the analysis of the data on where some peculiarities were found and how they were dealt with. Afterwards the results of the model with the modified data will be presented and the analysis thereof will be made as well as further discussion.

Mutations to the data had to be done due to the missing data of four countries, the affected countries each had a share between 0.11% and 0.29%, which may be

considered insignificant enough to skew the data and thus have not been replaced by alternatives lower than 0.10%.

Furthermore the data regarding the FTA was at the time of writing not applicable for the model due to its distribution. All of the countries with a FTA are found below the mean of distance and consequently returned a significant value with a negative sign. Following this, alternative models were attempted to reach a normal distribution, but these did not meet expectations. In conclusion, the data on FTAs was not proving useful in explaining the export intensity and the final model was adjusted by removing the FTA entirely to make sure a more complete dataset was utilised. The resulting adjusted model looks as follows:

$$\begin{aligned} \ln ExportValue_{i,j,t} = & \beta_0 + \beta_1 * \ln GDP_{j,t} + \beta_2 * \ln GDPpc_{j,t} + \beta_3 * \ln GDPPr_{j,t} + \\ & \beta_4 * \ln NauticalDistance_{ij} + \beta_5 * \ln Price_{j,t} + \beta_6 * \ln RER_{i,j,t} \\ & + \beta_7 * \ln Consumption_{j,t} + \beta_8 * FDI_{i,j,t} + \beta_9 * Covid_{j,t} + \varepsilon_{ijt} \end{aligned}$$

Table 5.1 Linear regression results for the explanatory variables of the export intensity between the NZWI and the COD, presented by the export value, compared with long term Covid-19 effects

Variable	Export Value			
	(1)		(2)	
	Excluding the Covid-19 variable		Including the Covid-19 variable	
	Coëfficiënt	t	Coëfficiënt	t
In GDP	-0.363*** (0.066)	-5.48	-0.366*** (0.068)	-5.42
In GDPPC	0.884*** (0.103)	8.58	0.878*** (0.106)	8.30
In APGR	0.329*** (0.070)	4.70	0.321*** (0.078)	4.13
In NauticalDistance	-0.430* (0.241)	-1.79	-0.422* (0.243)	-1.73
In Price	0.438 (0.287)	1.29	0.448 (0.341)	1.31
In RER	0.653** (0.287)	2.27	0.661** (0.289)	2.28
In Consumption	0.720*** (0.057)	12.70	0.721*** (0.057)	12.67
FDI	0.796*** (0.121)	6.58	0.799*** (0.122)	6.57
Post Covid	- -	-	0.024 (0.097)	0.25
Distance * Price	-0.000*** (0.000)	-4.71	-0.000*** (0.000)	-4.68
Constant	11.353*** (2.759)	4.12	11.379*** (2.763)	4.12
Observations	520		520	
R ²	0.712		0.712	

Note. Standard errors are in parentheses; the variables; * p < 0.10, ** p < 0.05, *** p < 0.01, for a significance at the 10%, 5% and 1% level respectively.

The results obtained with the OLS regression are shown in Table 5.1. The dependent variable is explained by two different models. Where the first model is the model for export intensity, the second one includes the dummy variable for Covid-19.

First an analysis of the results of the first model as presented in table 5.1. The results show the significance of multiple variables, as such for all of the size effects of GDP, GDP per Capita and APGR. The result for the distance variable shows a negative and significant coefficient. And the variables of the wine consumption and FDI show positive and significant coefficients as well. However the results do not show any significance in regards to the relation of price on the export intensity of wine and a relatively lesser significance from the nautical distance and the RER.

To elaborate, the coefficient of the GDP has a negative sign. This reveals a negative relation between the size of national GDP to the export intensity of wine to such a country, where a 1% increase of the GDP indicates a 0.363% decrease of the export intensity. This is unexpected as larger GDPs are usually positively related to trade. This result may be due to the lack of trade barriers such as tariffs in the model, since countries with a large GDP may also promote higher tariffs and other barriers, and as such show up as a negative coefficient in this model, due to one or more omitted variables.

The result for the GDP per Capita shows the highest impact value out of the size effects. Meaning the purchasing power of a country influences the intensity of the export intensity the most. While the absolute economic size and the growth rate seems to have a lesser effect. The coefficient indicates when the GDP per Capita increases by 1%, the export intensity increases by 0.884%. The importance of purchasing power can be attributed to the luxury nature of the good, which carries the theory of higher incomes demanding more of luxury products, such as New Zealand Wines, consequently relatively increasing demand as well as willingness to pay.

For the APGR the model returns a coefficient, both positive and significant. The growth rate of a country seems to positively impact the export intensity, where a 1% increase of the growth rate returns an increase of the export intensity by 0.329%. This can be explained by the interest in growing markets where gaining market share proves as an investment in future returns, as brand recognition and reputation forming a basis on increased demand for New Zealand Wines.

The result for the distance variable carries a negative sign as expected, however the significance is only at the 10% level, much lower than in usual studies using the gravity model. In the studies of the wine industry however this is much less unusual (Gouveia et al., 2018). Dal Bianco et al. (2016) also found a lower impact of distance on the export of wine, due to the luxury and longevity characteristics of wine as well as the imperfect substitutability of differentiated wines. Additionally, as a result of improved globalisation and supply chain, the continually decreasing shipping costs may also play a role in the relative insignificance of transport costs and distances (Wang et al., 2011).

One of the most surprising results of the model is the insignificance of price on the export value. While also carrying a positive sign as expected, the insignificance indicates the lack of impact of the price of New Zealand wines in the COD on the export intensity. This can be explained by the current market situation of the New Zealand wines where demand continues to be unfulfilled in combination with the imperfect substitutability as previously stated. The demand for these differentiated goods are not significantly affected by scarcity and increasing prices (Schamel & Anderson, 2003). However the expectation of higher prices was to attract higher export value for the NZWI, instead it seems to be of no significance. This may be explained by other obligations and constrictions of export destinations by FDI conditions or through missing variables which would also explain the price such as tariffs and costs made going through customs.

The model reveals the positive significance of the RER, this shows an increase of the export intensity when the currency of the COD appreciates. As such a 1% increase of the RER indicates coefficient indicates an increase of 0.653% of the export value. The theory behind this is well known as an appreciation of the exchange rate encourages imports due to the relatively high purchasing power that comes forth from it. The same can be said in the case of New Zealand wines, where as discussed earlier, the purchasing power is a large factor in establishing a favourable export market for the NZWI.

The consumption of wine in the COD seems to be the most significant variable in this model. This indicates the importance of the demand for the attractiveness of a market. Furthermore, the coefficient presents an increase of 0.720% of the export value when the national consumption of the COD increases by 1%. This can be explained by the positive relation between consumption and demand, where the

increase of consumption naturally leads to an increase of demand for wine in general. This increase of demand fits together with a demand for import consequently raising prices and improving the market conditions for exporters of New Zealand wines.

The third most impactful coefficient however is that of the FDI. Positive and significant it complies with the usual relation between the presence of significant FDIs and trade intensity. In the case of the NZWI export the benefit of FDI is usually paired not only with extra capital, but also with lower trade barriers due to e.g., shared networks and promotion. However, as mentioned earlier the data does not provide an insight to other conditions of the FDI, such as the requirement of exclusive trading partners or other limiting factors. The coefficients indicates in the case of significant FDI by the COD into the NZWI, the COD will enjoy a 0.796% increase in the trade intensity of New Zealand wine.

Looking at the second model in table 5.1, the variable Covid-19 does not show any significance on and as such it can be said, in regards to this model, that the events of Covid-19 did not significantly impact the export intensity for the CODs on average, however more on this subject in the section for further discussion.

So to answer the main research question, the model finds the largest significance for consumption, GDP per capita and FDI as well as for the variables affecting demand. This means the strategy for attracting the export of New Zealand wines is to improve promotion and marketing for increasing demand and as such the size of the export market. Further engaging in the investment of the NZWI enables an easier flow of goods as well as possible conditions to ensure the flow of wine.

4.2 Further Discussion

To further analyse the impact of Covid-19 on individual countries I added country dummy variables to the model as well as an interaction effect between the country and covid to find whether significant effects could be found on a country level. Running these individual regressions returned mixed results, not only for the Covid-19 related variables, but the others as well. Some countries proved a higher significance for APGR in most Asian countries, which is logical due to the developing status for countries like China (Liu & Song, 2021). In contrast the GDP per Capita

and the RER for some of those did not prove significant at all. This can be explained due to the unique characteristics of the countries not captured in the general model.

On to the main point, the covid interaction still mostly returns insignificant values, meaning the export intensity to the market of the COD on a country level was not affected by Covid-19 in the long run. However, a few countries did return significant values for the interaction between covid and the dummy variable for the COD. And more interesting is the existence of both positive and negative values. This means the effect of covid on the export intensity can have either a positive or a negative effect depending on the country, which will be discussed in the following section.

Take the European region where Belgium and Sweden seemed to significantly suffer from the long term Covid-19 effects. They experienced a decrease of 1.608% and 0.658% respectively in export value after the fact. In contrast the significant value found in Europe belongs to Poland and where after the fact they experience a 0.872% increase.

The Figures 5.1.1 and 5.1.2 visualise the export value of the countries in the European Region, divided by the North Sea Area (Figure 5.1.1) and the Baltic Sea Area (Figure 5.1.2) for clarity, the aid for the country codes can be find in Table A2 in the appendix. In Figure 5.1.1. The United Kingdom is excluded due to its Export Value being more than 11 times as large as the Netherlands' which would make the figure uninterpretable. The figures show a steep increase of the export to the German market along with more notable decreases in the Dutch, Belgian and Swedish markets. The remaining countries seem to enjoy a relatively steady growth.

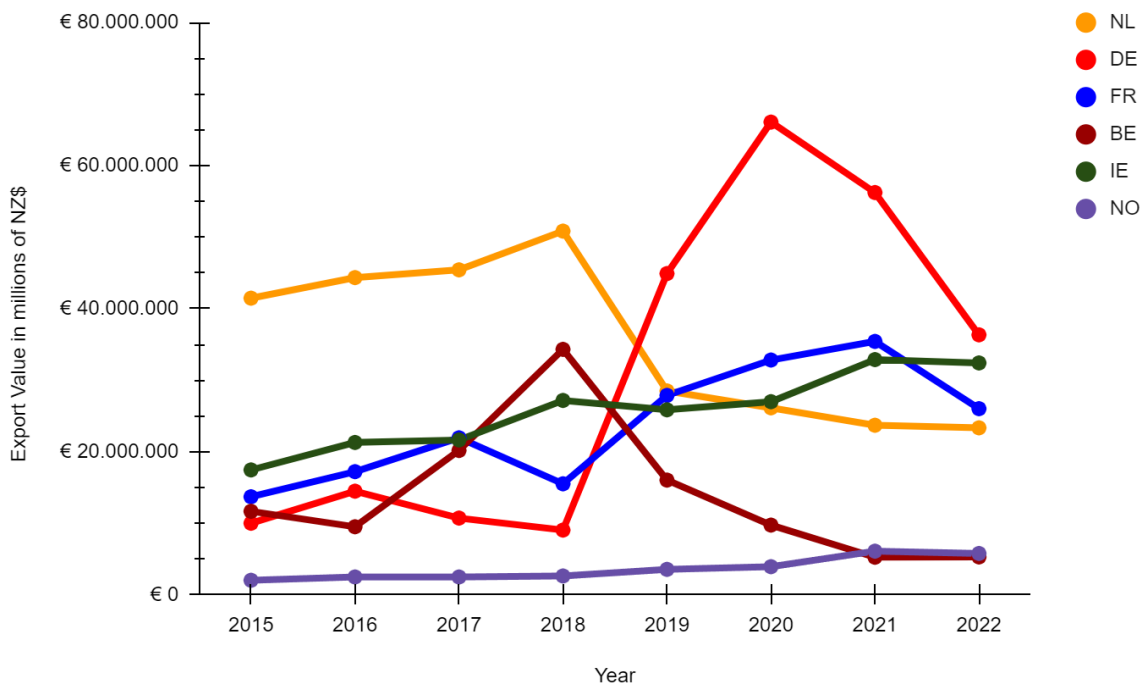


Figure 5.1.1. Export Value of New Zealand wine per COD in the North Sea Area, 2015-2022, with exclusion of the United Kingdom

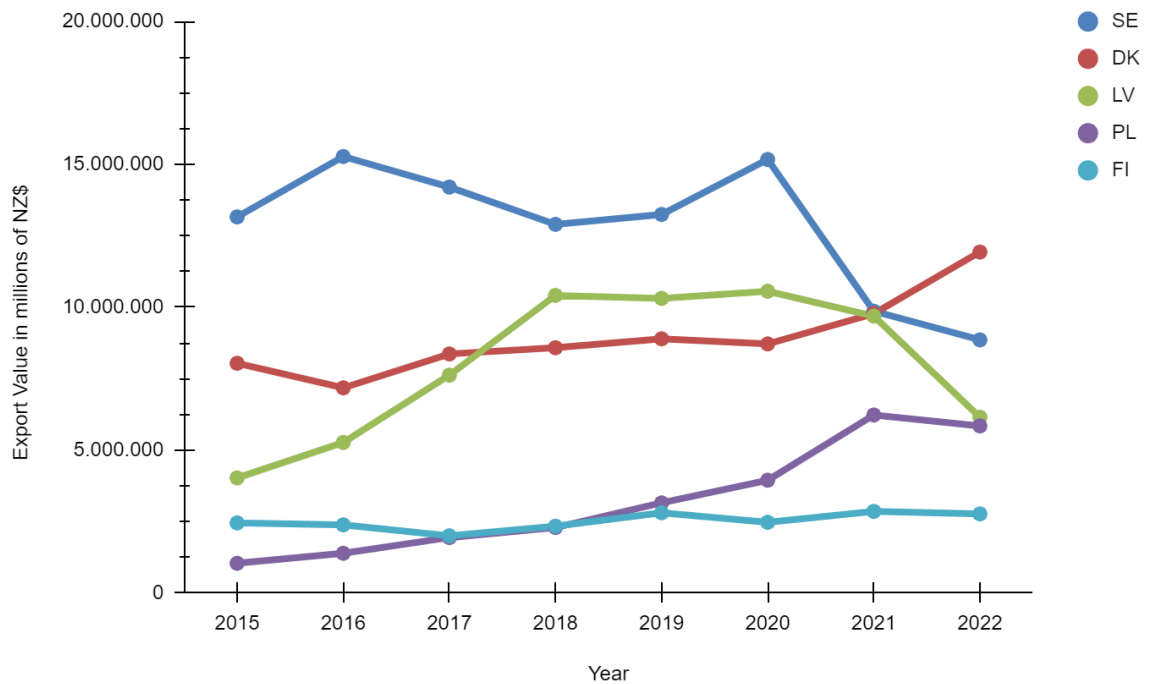


Figure 5.1.2. Export Value of New Zealand wine per COD in the Baltic Sea Area, 2015-2022

In the Pacific region including Oceania, South East Asia (SEA) and North America (NA) the same effect is found. While no significant values were found except

for The Republic of Korea who experienced an increase of 1.563% after the fact, the results show a decrease in China of 0.182% and an increase to all the other countries in the region.

The same visualisation for this region can be seen in Figure 5.2, excluded for the United States of America , Australia and Canada due to their export values being at least 4 times as large as China’s. The figures show a high variance in the export value of New Zealand wines in China, which is not surprising due to the origin of Covid-19 being there, suffering a large decline in the year of 2020. However it seems most of the countries in the SEA region are experiencing a stable environment if not a slight growth of the trade value, especially in the Republic of Korea. This trend does not have to be attributed to the long term Covid-19 effects, but to the natural growth of exports as the NZWI grows.

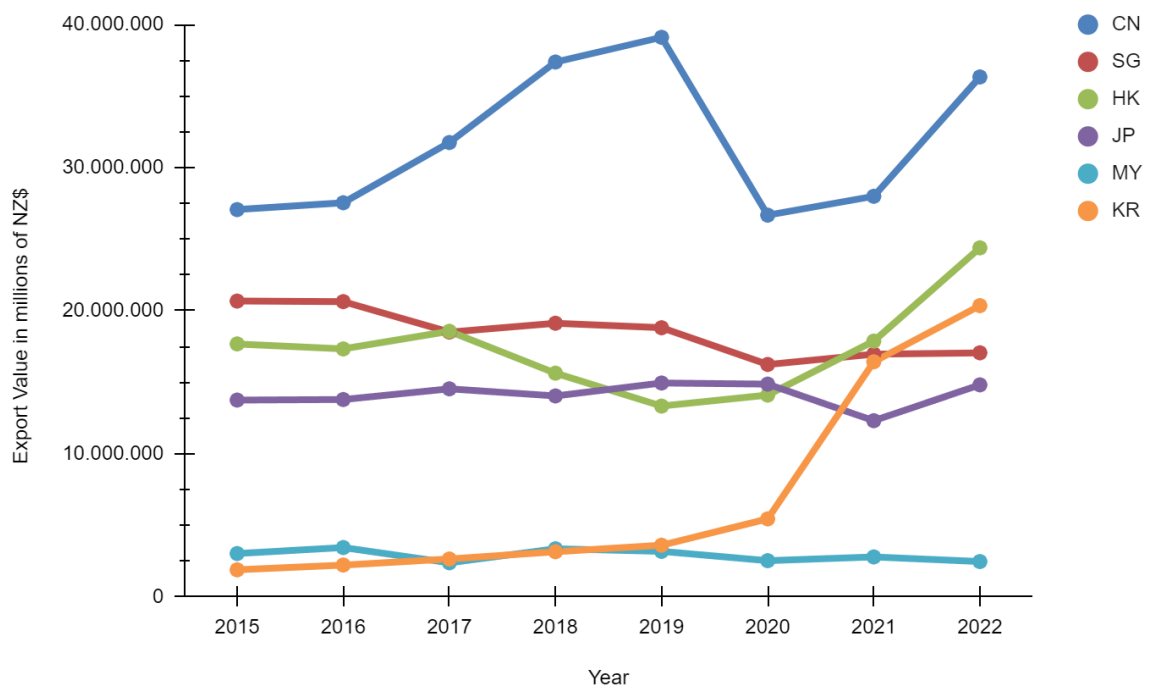


Figure 5.2. Export Value of New Zealand wine per COD in the Pacific region, 2015-2022, with exclusion of the United States of America, Australia and Canada

The large shocks in export intensity can be explained by countries implementing different trade barriers and policies limiting demand at the time of Covid-19. Consequently, inciting a switch of export destinations from the NZWI, this initial switch most likely lingered due to lock-in effects and cost of switching.

Furthermore, due to the limited production a shift between export markets has exponential effects on the growth of trade intensity due to economies of scale where the costs from, logistics, communication, marketing etc., will be reduced due to higher export volumes and consequently export value in the COD.

The secondary research question can thus be answered with an insignificance of the long term effects on a global scale, but significant effects on country levels. Contributing to the shift of export value between different countries and their continued growth as reflected in the figures.

5. Conclusion

Due to the unique characteristics of differentiated goods such as New Zealand wines and their uniquely shaped markets where production can not fulfil demand and exporters have the freedom to decide which export market to engage in and to export either more or less in order to maximise profits. This thesis attempted to estimate the determinants of an attractive export market for the NZWI between 2016 and 2022, during which a great pandemic of Covid-19 paralysed the world and left long lasting effects. The paper has succeeded in addressing the multitude of variables and their impact on the attractiveness of export markets through measuring the export value going to those.

An extended gravity model, measuring only the export of a single exporter to multiple destinations has been used to prove the significance of multiple variants (i.e. GDP, GDP per Capita, APGR, Nautical Distance, Price, Real Exchange Rate, Consumption and FDI) of which wine consumption, GDP per Capita and FDI have the highest impact on the export intensity. In contrast, the distance and exchange rate variables were found to be less significant than the others and the price per litre to be insignificant for the 10% confidence level. Highlighting the unique conditions of the New Zealand wine market where an increase in price is relatively insignificant in affecting the export intensity. This indicates the importance of actively increasing demand through marketing and reputation building to attract New Zealand wine exports. As well as the significance of FDI relations with the NZWI to either lower trade barriers or enforce exclusive rights.

As was furthermore investigated, the thesis found Covid-19 to not have any long term effect on the export intensity between the NZWI and its export markets,

due partially to the growth of both the industry as well as the market. However different countries were affected differently, both in the sign and significance of the effect. As such some benefitted from the long term changes made in export behaviour during the Covid-19 events.

However the limitations of the described model are found to be in the extent of the complexity, where more interactions between variables are likely to be significant than tested in this thesis. The lack of data on tariffs and custom costs would add an improved estimation of the reality, since these differ per country and would increase the costs of exporting to certain markets relative to that of others (Dal Bianco et al., 2016). Additionally the concern of country specific research as shown in the paper, where some effects may prove more important in certain environments than others, such as the trade off between growth countries and established markets. These could be tested independently and compared to find an answer. Furthermore, In regards to the dummy variable FDI I believe it could be improved with a more extensive dataset which includes at least the amount of FDI put into the NZWI by the COD to be able to turn it into a numerical variable to return more than just a relation. Additionally there is the concern of conditions set for individual FDIs which may skew the data towards countries with FDI out of proportion from what was intended.

On the topic of future research there are a few factors to be taken into account which may change the significance of some variables. First is the further reduction of transport costs due to the continued improvement of global supply chains, thus reducing the significance of distance in future gravity models. Second, there may come a time when the market demand for New Zealand wines will cease to outgrow the production of wine and as such a change in the dynamics of the market will certainly play a new role, where consumers may regain more leverage.

At the time of writing, the FTA between New Zealand and the United Kingdom has come into effect on the 31st of May and they are already enjoying relatively lower prices on their New Zealand wines. This will change the FTA distribution, albeit by a little. However, FTA negotiations between New Zealand and the European Union were concluded on the 30th of June 2022 and it is expected to be signed in 2023 and come into effect in 2024. The combination of the two FTAs means 12 of our countries in our dataset will now be above the mean in our database, leading to a more normal distribution of the data. This creates the opportunity for later datasets to discover the effects of the FTA on the NZWI on a larger scale. Although realistically, we will have

to wait at least a year after the FTAs come into effect and a large enough sample can be collected. It is nonetheless something to look forward to for future research.

All in all, there is plenty of opportunity for follow up research and this thesis is nowhere near a complete understanding of the attractiveness of export markets for the NZWI as well as a complete explanation of the export behaviour. More variables such as marketing, cultural ties and the inclusion of FTAs can and should be tested in future research, due to their role in creating demand and reducing trade barriers.

Bibliography

Anderson, J. E. (1979). A theoretical foundation for the gravity equation. *The American Economic Review*, 69(1), 106–116.

Anderson, K., Norman, D. A., & Wittwer, G. (2003). Globalisation of the world's wine markets. *World Economy*, 26(5), 659.

Baldwin, R. & Freeman, R. 2020. Trade conflict in the age of Covid-19
<https://www.ceris.be/blog/analysis-france-vents-over-submarine-snub-but-risks-being-left-alone-on-global-stage/>

Bergstrand, J. H. (1989). The generalized gravity equation, monopolistic competition, and the factor-proportions theory in international trade. *The Review of Economics and Statistics*, 71(1), 143–153.

Centraal Bureau Statistiek (CBS) (2020). Economic contraction of 1.7 percent in Q1 2020, <https://www.cbs.nl/en-gb/news/2020/20/economic-contraction-of-1-7-percent-in-q1-2020>

Decanter (2022). Decanter World Wine Awards 2022: Results announced, <https://www.decanter.com/wine-news/decanter-world-wine-awards-2022-results-announced-480910/>

Dal Bianco, A., Boatto, V. L., Caracciolo, F., & Santeramo, F. G. (2016). Tariffs and non-tariff frictions in the world wine trade. *European Review of Agricultural Economics*, 43(1), 31–57. <https://doi.org/10.1093/erae/jbv008>

Dal Bianco, A., Estrella-Orrego, M. J., Boatto, V., & Gennari, A. J. (2017). Is mercosur promoting trade? insights from argentinean wine exports. *Spanish Journal of Agricultural Research*, Issn 2171-9292, Null 15, N°. 1, 2017. Retrieved 2023, from <https://dialnet.unirioja.es/servlet/oaiart?codigo=6340911>.

Dascal, D., Mattas, K., & Tzouvelekas, V. (2002). An analysis of eu wine trade: a gravity model approach. *International Advances in Economic Research*, 8(2), 135–147. <https://doi.org/10.1007/BF02295344>

Davies, S. W., Rondi, L., & Sembenelli, A. (2001). Are multinationality and diversification complementary or substitute strategies? an empirical study analysis on european leading firms. *International Journal of Industrial Organization*, 19(8), 1315.

Forbes, S. L., Cohen, D. A., Cullen, R., Wratten, S. D., & Fountain, J. (2009). Consumer attitudes regarding environmentally sustainable wine: an exploratory study of the new zealand marketplace. *Journal of Cleaner Production*, 17(13), 1195–1199.
<https://doi.org/10.1016/j.jclepro.2009.04.008>

Gashi, P., Hashi, I., & Pugh, G. (2014). Export behaviour of smes in transition countries. *Small Business Economics : An Entrepreneurship Journal*, 42(2), 407–435.
<https://doi.org/10.1007/s11187-013-9487-7>

Gereffi, G., Humphrey, J., Kaplinsky, R., & Sturgeon*, T. J. (2001). Introduction: globalisation, value chains and development. *Ids Bulletin*, 32(3), 1–8.
<https://doi.org/10.1111/j.1759-5436.2001.mp32003001.x>

Gourlay, A., Seaton, J., & Suppakitjarak, J. (2005). The determinants of export behaviour in uk service firms. *The Service Industries Journal*, 25(7), 879–889.
<https://doi.org/10.1080/02642060500134154>

Gouveia, S., Rebelo, J., & Lourenço-Gomes, L. (2018). Port wine exports: a gravity model approach. *International Journal of Wine Business Research*, 30(2), 218–242.
<https://doi.org/10.1108/IJWBR-02-2017-0008>

Gwynne, R. N. (2006). Export-orientation and enterprise development: a comparison of new zealand and chilean wine production. *Tijdschrift Voor Economische En Sociale Geografie*, 97(2), 138–156. <https://doi.org/10.1111/j.1467-9663.2006.00508.x>

Hussain, M., Cholette, S., & Castaldi, R. M. (2008). An analysis of globalization forces in the wine industry. *Journal of Global Marketing*, 21(1), 33–47.
https://doi.org/10.1300/J042v21n01_04

International Organisation of Vine and Wine (OIV) (2022). Database
<https://www.oiv.int/what-we-do/data-discovery-report?oiv>

Jiang B. Rigobon D. E. Rigobón Roberto & National Bureau of Economic Research. (2021). From just in time to just in case to just in worst-case : simple models of a global supply chain under uncertain aggregate shocks. National Bureau of Economic Research. Retrieved June 29 2023 from <https://www.nber.org/papers/w29345>.

Karemera, D., Managi, S., Reuben, L., & Spann, O. (2011). The impacts of exchange rate volatility on vegetable trade flows. *Applied Economics*, 43(13), 1607–1616. <https://doi.org/10.1080/00036840802600137>

KPMG (2022). Foreign Direct Investment in New Zealand, <https://kpmg.com/nz/en/home/insights/2022/10/foreign-direct-investment-in-new-zealand.htm>
|

Lee, H. L. (2004). The triple-a supply chain. *Harvard Business Review*, 82(10), 102–12.

Liu, A., & Song, H. (2021). Analysis and forecasts of the demand for imported wine in china. *Cornell Hospitality Quarterly*, 62(3), 371–385. <https://doi.org/10.1177/1938965520981070>

Majeed, M. T., Ahmad, E., & Khawaja, M. I. (2006). Determinants of exports in developing countries [with comments]. *The Pakistan Development Review*, 45(4), 1265–1276.

New Zealand Customs Service (2022). Chapter 4 Rules of Origin, Section A, Article 1 Definitions, <https://www.customs.govt.nz/globalassets/documents/legal-documents/roo-nzhkccep-ch4-definitions.pdf>

New Zealand Ministry of Foreign Affairs and Trade (MFAT) (2023). Free Trade Agreements, <https://www.mfat.govt.nz/en/trade/free-trade-agreements/>

Nazlioglu, S. (2013). Exchange rate volatility and turkish industry-level export: panel cointegration analysis. *The Journal of International Trade & Economic Development*, 22(7), 1088–1107. <https://doi.org/10.1080/09638199.2012.660978>

New Zealand Winegrowers (2014). Annual Report: Year end June 2013. Wine Institute of New Zealand: Auckland, <https://www.nzwine.com/en/media/statistics/annual-report/>

New Zealand Winegrowers (2017). Annual Report: Year end June 2016. Wine Institute of New Zealand: Auckland, <https://www.nzwine.com/en/media/statistics/annual-report/>

New Zealand Winegrowers (2018). Annual Report: Year end June 2017. Wine Institute of New Zealand: Auckland, <https://www.nzwine.com/en/media/statistics/annual-report/>

New Zealand Winegrowers (2019). Annual Report: Year end June 2018. Wine Institute of New Zealand: Auckland, <https://www.nzwine.com/en/media/statistics/annual-report/>

New Zealand Winegrowers (2020). Annual Report: Year end June 2019. Wine Institute of New Zealand: Auckland, <https://www.nzwine.com/en/media/statistics/annual-report/>

New Zealand Winegrowers (2021). Annual Report: Year end June 2020. Wine Institute of New Zealand: Auckland, <https://www.nzwine.com/en/media/statistics/annual-report/>

New Zealand Winegrowers (2022). Annual Report: Year end June 2021. Wine Institute of New Zealand: Auckland, <https://www.nzwine.com/en/media/statistics/annual-report/>

New Zealand Winegrowers (2023). Annual Report: Year end June 2022. Wine Institute of New Zealand: Auckland, <https://www.nzwine.com/en/media/statistics/annual-report/>

The Organisation for Economic Co-operation and Development (OECD), (2022). International trade during the COVID-19 pandemic: Big shifts and uncertainty <https://www.oecd.org/coronavirus/policy-responses/international-trade-during-the-covid-19-pandemic-big-shifts-and-uncertainty-d1131663/>

Plenert, G. J. (2007). Reinventing lean : introducing lean management into the supply chain. Elsevier/Butterworth-Heinemann. Retrieved 2023

Román, V., Bengoa, M., and Sánchez-Robles, B. (2016). Foreign direct investment, trade integration and the home bias: Evidence from the European Union. *Empirical Economics : Journal of the Institute for Advanced Studies, Vienna, Austria*, 50(1), 197–229. <https://doi.org/10.1007/s00181-015-0942-y>

Schamel Günter, & Anderson, K. (2003). Wine quality and varietal, regional and winery reputations: hedonic prices for australia and new zealand. *Economic Record*, 79(246), 357–369. <https://doi.org/10.1111/1475-4932.00109>

Searoutes (2023). Routing API, <https://searoutes.com/routing-api/>

Sheffi, Y., & Rice, J. B. (2005). A supply chain view of the resilient enterprise. *Mit Sloan Management Review*, 47(1), 41–48.

Stats NZ (2022). New Zealand International Trade, Database, https://statisticsnz.shinyapps.io/trade_dashboard/

Tinbergen, J., & Twentieth Century Fund (New York). (1962). *Shaping the world economy : suggestions for an international economic policy*. Twentieth Century Fund.

The World Bank (2022). Chapter 1. The economic impacts of the COVID-19 crisis, <https://www.worldbank.org/en/publication/wdr2022/brief/chapter-1-introduction-the-economic-impacts-of-the-covid-19-crisis>

The World Bank (2023). World Development Indicators, Database, <https://databank.worldbank.org/reports.aspx?source=2&series=NY.GDP.PCAP.CD&country=>

United Nations Conference on Trade and Development. (2022). *Impact of the covid-19 pandemic on trade and development; lessons learned*. UNITED NATIONS. Retrieved 2023

Wakelin, K. (1998). Innovation and export behaviour at the firm level. *Research Policy*, 26(7), 829–841. [https://doi.org/10.1016/S0048-7333\(97\)00051-6](https://doi.org/10.1016/S0048-7333(97)00051-6)

Wang, Z., Coyle, W., Gehlhar, M. and Vollarth, T. (2011). The Impact of distance on US agricultural exports: an econometric analysis, Economic Research Service/USDA.

Werdelmann, T. (2014). Quality and Value Creation on the Premium Wine Market, *Journal of Applied Leadership and Management*, ISSN 2194-9522, Hochschule Kempten - University of Applied Sciences, Professional School of Business & Technology, Kempten, Vol. 3, pp. 47-72, <http://www.journal-alm.org/article/view/13416>

World Health Organisation (WHO) (2020). WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020, <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>

World Trade Organisation (WTO) (2023). WTO Stats, <https://stats.wto.org/>

Yu, Y., & Lindsay, V. (2016). Export commitment and the global financial crisis: perspectives from the new zealand wine industry. *Journal of Small Business Management*, 54(2), 771–771.

Appendix

Table A1. General statistics of the NZWI

Var.	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	source
1.	35182	35510	35463	36226	36943	38073	39061	39934	40323	41603	NZ Wine
2.	9,8	12,6	9,1	12	10,7	11	10,7	11,4	9,2	12,8	NZ Wine
3.	1688	1666	1732	1807	1752	1841	1890	1920	2025	N/A	NZ Wine
4.	248,4	320,4	234,7	313,9	285,1	301,7	297,4	329,04	266,4	383	NZ Wine
5.	51,7	49,9	61,9	56,2	52,1	53,6	50,6	50	49,2	42,3	NZ Wine
6.	169,6	186,9	209,4	213,4	253	255	270,4	286,5	284,9	266,1	NZ Wine
7.	1210	1328	1424	1570	1663	1705	1825	1923	1870	1953	NZ Wine
8.	1210	1328	1424	1569	1664	1703	1824	1920	1867	1.957	Stats NZ
9.	N/A	N/A	N/A	1,261	N/A	2,118	0,679	3,288	2,884	N/A	Calculation
10.	76,64%	78,93%	77,18%	79,15%	82,92%	82,63%	84,24%	85,14%	85,27%	86,28%	Calculation
11.	7,0927	7,1052	6,8149	7,3716	6,5865	6,6714	6,72	6,69	6,55	7,32	Calculation

note. *FOB Value according to the definition by Customs.NZ.gvt.; Variables: 1. Producing Area (hectares)2. Average Yield (tonnes/hectare)3. Average grape price (NZ\$/tonne)4. Total production (millions of litres)5. Domestic Sales of NZ wine (millions of litres)6. Export Volume (millions of litres)7. Export Value (millions of NZ\$ FOB)8. Export Value (millions of NZ\$)9. FOB (millions of NZ\$)10. Export volume as % of combined 5 & 6 11. Average export price of New Zealand wine (NZ\$/litre)

Table A2. The Country Code with the Countries' Full Name

Code	Country
AU	Australia
BE	Belgium
BG	Bulgaria
CA	Canada
CN	China, People's Republic of
DE	Germany
DK	Denmark
FI	Finland
FR	France
GB	United Kingdom
HK	Hong Kong (Special Administrative Region)
IE	Ireland
JP	Japan
KR	Korea, Republic of
LV	Latvia
MY	Malaysia
NL	Netherlands
NO	Norway
PL	Poland
SE	Sweden
SG	Singapore
US	United States of America