

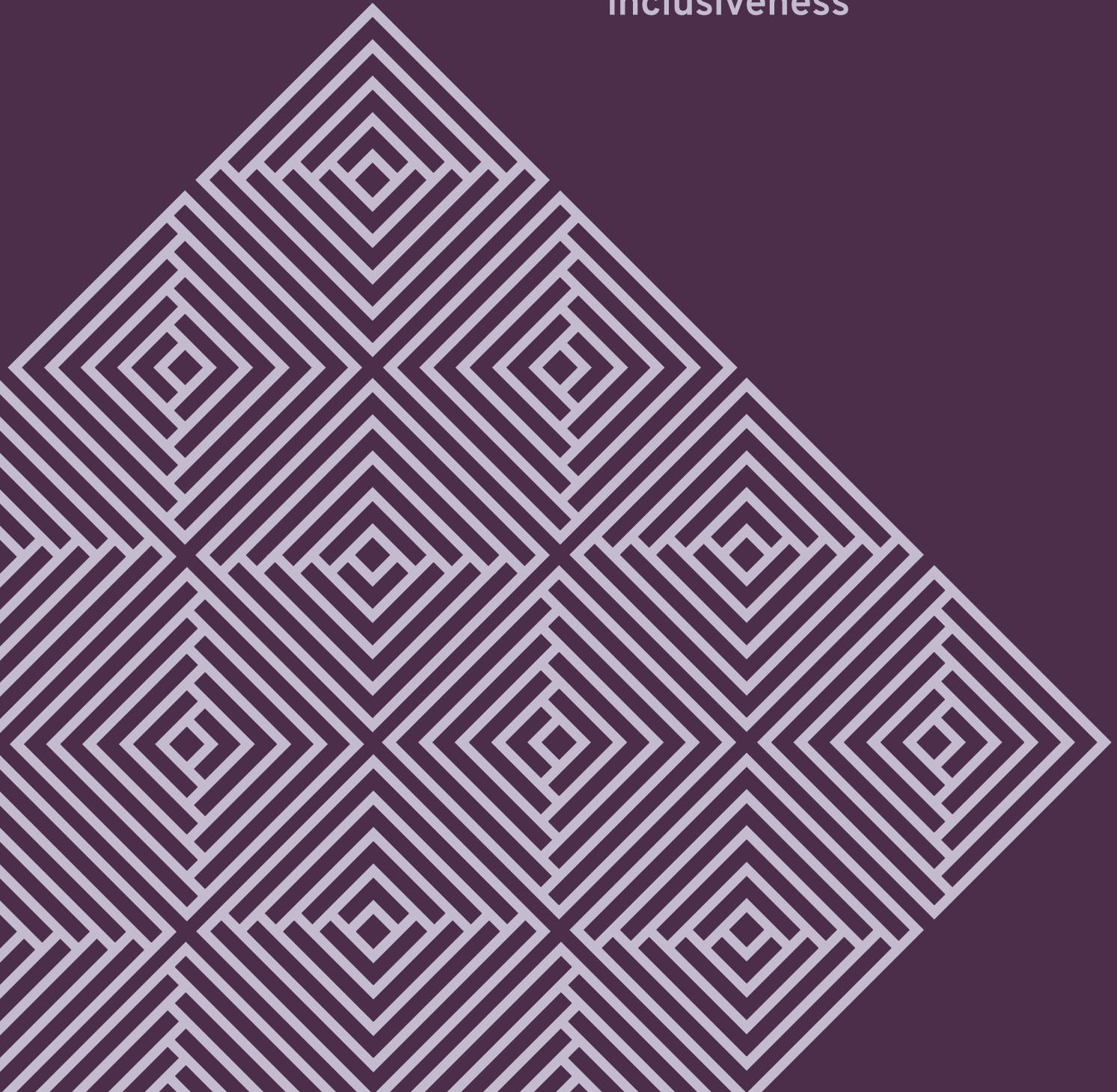


NEW ZEALAND
FOREIGN AFFAIRS & TRADE
Manatū Aorere

MFAT Working Paper:

Understanding the
linkages between
trade and productivity,
sustainability and
inclusiveness

June 2020





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Executive Summary

Evidence shows that trade and other forms of international engagement often provide aggregate economic and other benefits. This is particularly true for smaller economies. However, engaging with the world can have associated environmental, social and other costs.

Based on theory, overseas experience and partial indicators for New Zealand, we know that the benefits and costs of trade have been unevenly spread across New Zealand. However, there is insufficient data in a New Zealand context to estimate these disparities. Nor is there a set of indicators to assess how the distribution of costs and benefits are changing over time.

This paper attempts to bridge some of that gap in the New Zealand context. It presents initial analysis examining the linkages between trade and productivity, sustainability and inclusiveness, with a focus on trends that may be influenced by trade and trade policy.

Domestic policy settings and regulations will play important roles determining the linkages and trends observed between trade and productivity, sustainability and inclusiveness. While this paper is largely silent on broader policy settings, the analysis is part of a much longer program of work and we expect to publish further papers, drawing on international work in this area as well as domestic research and case studies.

Future research will move from understanding the potential linkages to understanding the drivers of these trends, including the positive and negative effects that trade and domestic policy settings and other factors have. This future research should provide more concrete evidence on where benefits and costs have not been evenly shared. In short, this paper focuses on correlation while future work will examine causation.

Finally, this paper and the analysis within was undertaken prior to COVID-19. We initially intended to publish the paper at about the time New Zealand went into Level 4 lockdown. All data within goes to the end of 2019 at the latest. Many of the trends and correlations observed within will have been impacted by COVID-19. In some cases, the economic recovery from COVID-19 may be an opportunity to modify these trends. We see this paper as useful in painting a picture of trade in a world before COVID, something of a baseline for future comparisons.



Productivity

Productivity growth is the key driver of per-capita income growth over the long-term. New Zealand's aggregate productivity performance has been poor, both in a growth sense and relative to other countries. There is evidence that productivity is higher in the tradables sector compared to the non-tradables sector. This suggests that New Zealand's weak aggregate productivity may stem in part from relatively weak international connections, including low trade intensity, that reduce the size of the tradables sector compared to the non-tradables sector. Weak productivity in the non-tradables sectors also affects productivity in the tradables sectors.

Sustainability

Trade can generate a mixture of potential positive and negative effects on the environment. Some of these effects, such as greenhouse gas emissions, are not constrained by national boundaries.

On the export side, there is evidence of negative effects on soil and water quality, primarily arising from increased agricultural production under the environmental and other regulatory settings at the time. Agriculture generates about half of New Zealand's greenhouse gas emissions. Forestry provides some offset. Although they make a significant absolute contribution to New Zealand's total emissions, New Zealand's dairy and meat industries are amongst the most emissions efficient in the world. New Zealand's emissions intensity has been declining, both overall and for the agriculture sector. New Zealand's consumption patterns have also contributed to an increase in carbon dioxide emissions, in part through imported products.

The trends above need to be considered in the context of where New Zealand's comparative advantage lies. Specialising in exporting agricultural production where New Zealand is relatively environmentally efficient and importing products others are more efficient at producing results in lower global emissions and reduces New Zealand's global environmental impact. Trade can help diffusion of environmentally enhancing technology.

Trade can also contribute to economic sustainability if it maintains or improves New Zealand's resilience to economic shocks. Too much dependence on a narrow set of markets or products increases the risk associated with an adverse outcome in a particular market. New Zealand's import diversity has increased somewhat (become less concentrated), particularly in terms of the diversification by origin. In contrast, export diversity has declined over the past decade, from both a market and product perspective. Linked to the increase in export product concentration, New Zealand's Economic Complexity Index, a measure of how diversified and complex a country's export basket is, has also declined over time. However, diversification needs to be balanced against specialisation to make the most of comparative advantage.

Inclusiveness

Tradables employment is higher in New Zealand's regional economies, reflecting in large part the regional nature of export-intensive primary production and tourism. However, economic outcomes tend to be weaker in the regions, with incomes lower and unemployment higher. This may reflect agglomeration effects that benefit major urban centres (particularly Auckland).

There is some evidence that New Zealand regions with greater international connections tend to experience better economic outcomes, even if they lag urban centre outcomes. While there is a divergence between economic outcomes in New Zealand's urban centres compared to the regions, this divergence is less pronounced than in many other countries.

As with many of our international peers, most of New Zealand's businesses and traders are small. Small and Medium Enterprises (SMEs) account for 99 percent of businesses and hence the majority of exporters are SMEs, although

the majority of exports are from large companies. New Zealand SMEs engage in exporting at a similar rate to their international peers. Research by the OECD suggests that in countries where export propensity by SMEs is higher, the wage gaps between SMEs and large firms is smaller. Wages for New Zealand SME employees are generally lower than for larger firms, potentially reflecting lower productivity. Increasing SME participation in trade may be one way to improve productivity and wages in SMEs.

In New Zealand, female employment in the tradable sector is low relative to men. Female-owned businesses are also less likely to be engaged in trade because they tend to be smaller and more likely to be involved in services. As a result, women are less likely to receive the benefits associated with stronger international connections. Other economies such as Canada and the European Union have similar trends of relatively low female participation in export or tradable sectors.

Māori and Pacific Peoples are reasonably well engaged with trade. Māori and Pacific Peoples are more likely to be employed in the export workforce than Europeans; and Māori businesses account for significant shares of the forestry, fishing, and sheep and beef sectors. However, Māori and Pacific Peoples have tended to earn less in tradables sectors than other New Zealanders. International comparisons of indigenous people outcomes are difficult. However, there is some evidence that Australian and Canadian indigenous populations have experienced similar outcomes to Māori.

Interactions and trade-offs

The dimensions examined in this paper are overlapping, with interactions between them. This is perhaps most obvious within inclusiveness. Regional economies, SMEs, women and Māori are all interlinked to some extent: the share of employment in SMEs tends to be higher outside major urban centres; Māori make up a higher share of the population in (North Island) non-urban regions; women-owned businesses tend to be smaller. Improving regional outcomes from trade may therefore boost SME and ethnic outcomes. Similarly, improving SME outcomes may boost outcomes for regions and women.

There may also be trade-offs between improving outcomes along one dimension and the outcomes achieved in another. One of the more notable ones is the relationship between productivity and inclusiveness. Much of the productivity gains through trade come through increased competition and resource allocation away from less efficient firms to more efficient firms. These channels may exacerbate regional inequality if resources are directed towards urban centres, which may have some efficiency advantages from agglomeration benefits, economies of scale, or proximity to logistics hubs.

Similarly, less efficient SMEs may go out of business. This may also have gender or ethnic implications, given some of the interactions noted above. The extent to which other firms and regions can absorb dislocated workers will be a critical factor in minimising the potential negative impacts of this trade off.

Another potential trade-off is the relationship between productivity and sustainability. New Zealand's aggregate productivity might improve as export firms scale up to meet offshore demand, but this might increase negative effects on the environment. On the other hand, improving productivity may help reduce environmental impacts.

Metrics to track over time

This paper proposes an initial suite of metrics that could be used to track trends in the linkages between trade and productivity, sustainability and inclusiveness. The table below summarises these metrics; more details are available at the end of sections three, four and five. These metrics should be refined and supplemented over time. In particular, distributional data is still patchy.

Table 1: Summary of proposed metrics

Productivity	Sustainability	Inclusiveness
<p>Productivity</p> <ul style="list-style-type: none"> • Labour productivity in export/tradables sector • Employment share of export/tradables sector • Trade intensity • Ratio of NZ productivity to OECD, small advanced economies • Upstream Global Value Chain engagement • Foreign direct investment • Firm level labour productivity • Capital goods imports • Migrant skills • Companies with overseas offices • International patents 	<p>Environmental Sustainability</p> <ul style="list-style-type: none"> • Production and demand related GHG emissions • Emissions efficiency by sector • Emissions efficiency by agricultural export • Air and sea transport emissions • Nitrogen balance and leaching • Phosphorous and nitrogen concentration in fresh water <p>Economic Sustainability</p> <ul style="list-style-type: none"> • Economic complexity index • Product concentration index • Market concentration index • Current account and trade balance • Terms of trade 	<p>Regional economies</p> <ul style="list-style-type: none"> • Regional share of export/tradables employment • Regional export/tradables value-add <p>Small and Medium Enterprises</p> <ul style="list-style-type: none"> • Share of SMEs engaged in tradables • Share of SMEs income from exports • SME earnings gap with large firms <p>Gender</p> <ul style="list-style-type: none"> • Female share of tradables employment • Female share of median earnings in tradables sector • Female business ownership rates <p>Ethnicity</p> <ul style="list-style-type: none"> • Māori / Pacific Peoples share of tradables employment • Māori / Pacific Peoples share of median earnings in tradables sector • Māori business and asset ownership rates

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1

Introduction

Evidence shows that trade and other forms of international engagement often provide aggregate economic and other benefits. This is particularly true for smaller economies. For example international engagement encourages and allows specialisation and productivity gains from economies of scale and encourages diffusion of technology.

However, engaging with the world can have associated environmental, social and other costs, and these costs, together with the benefits of trade, are likely to be unevenly distributed across society.

Based on theory, overseas experience and partial indicators for New Zealand, we know that the benefits and costs of trade have been unevenly spread across New Zealand. However, there is insufficient data in a New Zealand context to estimate these disparities. Nor are there a set of indicators to assess how the distribution of costs and benefits are changing over time. This paper attempts to bridge some of that gap in the New Zealand context.

A better understanding of the impact of trade at an economy-wide level and across sustainable and inclusive dimensions will help to inform and improve future policy development – whether for trade policies or domestic policies. Furthermore, the future evaluation of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) as outlined in the Joint Declaration on Fostering Progressive and Inclusive Trade with Canada and Chile will require an in-depth understanding of the impact of trade across a broader range of areas (e.g. gender, SMEs, regional employment) that MFAT has not assessed in depth previously.

The Government's economic plan and the Trade for All Agenda are focused on improving the wellbeing and living standards of all New Zealanders. Trade and other international connections (including investment, people and information flows) have an important role to play in supporting the economic plan. As a key proponent of New Zealand's trade policy, it is important that MFAT can identify the contributions of trade and trade policy across the three key dimensions of the Government's economic plan (productivity, sustainability, inclusiveness) and refocus trade policy if required.

The focus of this paper is to examine the linkages between trade and productivity, sustainability and inclusiveness. Where possible the paper looks at these trends from a tradable versus non-tradable lens, or another relevant trade lens. The paper also proposes a suite of metrics that could be used to track trends over time. While domestic policy settings and regulations play important roles determining the observed linkages and trends, the initial analysis in this paper largely silent on broader policy settings.

Section two provides a brief overview of the contribution trade makes to New Zealand's economy. Sections three, four and five of this paper focus on linkages between trade and productivity, sustainability and inclusiveness, respectively. Each section is further broken into more specific areas of interest and concludes with a table of proposed metrics. Section six summarises the main findings and provides some high level thoughts on potential interactions and trade-offs between the different dimensions.

The analysis set out in this paper is part of a much longer program of work. We expect to publish further papers, drawing on international work in this area as well as domestic research and case studies. Future research will move from understanding the potential linkages to understanding the drivers of these trends, and the positive and negative effects, that trade and domestic policy settings and other factors have. In short, this paper focuses on correlation while future work will examine causation.

Finally, this paper and the analysis within was undertaken prior to COVID-19. We initially intended to publish the paper at about the time New Zealand went into Level 4 lockdown. All data within goes to the end of 2019 at the latest. Many of the trends and correlations observed within will have been impacted by COVID-19. In some cases, the economic recovery from COVID-19 may be an opportunity to modify these trends. We see this paper as useful in painting a picture of trade in a world before COVID, something of a baseline for future comparisons.

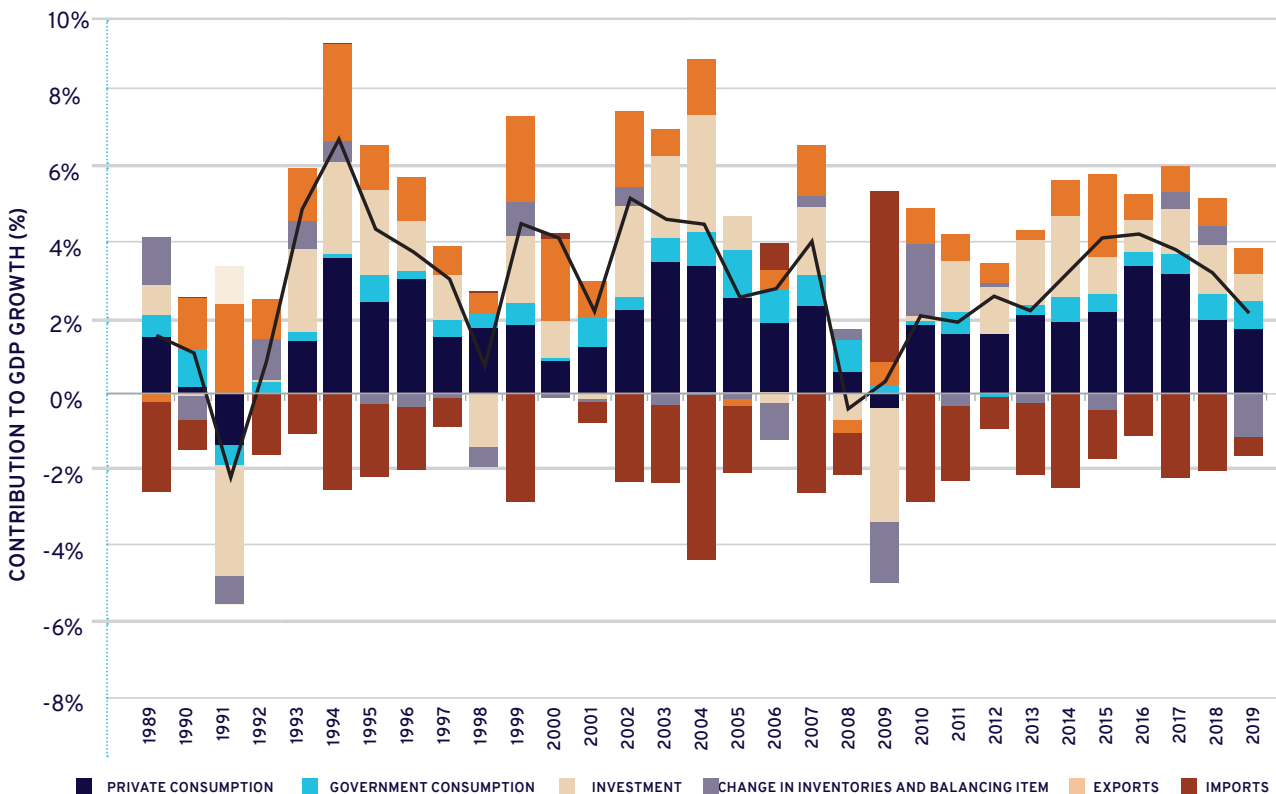
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The role of trade in the New Zealand economy

Trade makes a key contribution to New Zealand’s economy and economic performance more generally. Exports and imports each make up just under a third (28 percent) of the economy as measured by Gross Domestic Product (GDP). This is lower than many of New Zealand’s small advanced economy peers and a little below the OECD median (see page 19).


Over the past three decades, exports of goods and services have contributed, on average, around 1 percentage point of real GDP growth per annum (Figure 1). In line with global trade growth trends, the contribution to growth from exports has been slightly lower on average in the post GFC period than it was through the 1990s and 2000s.

Figure 1: Contributions to real GDP growth



Source: Stats NZ

Note: The line denotes total GDP growth

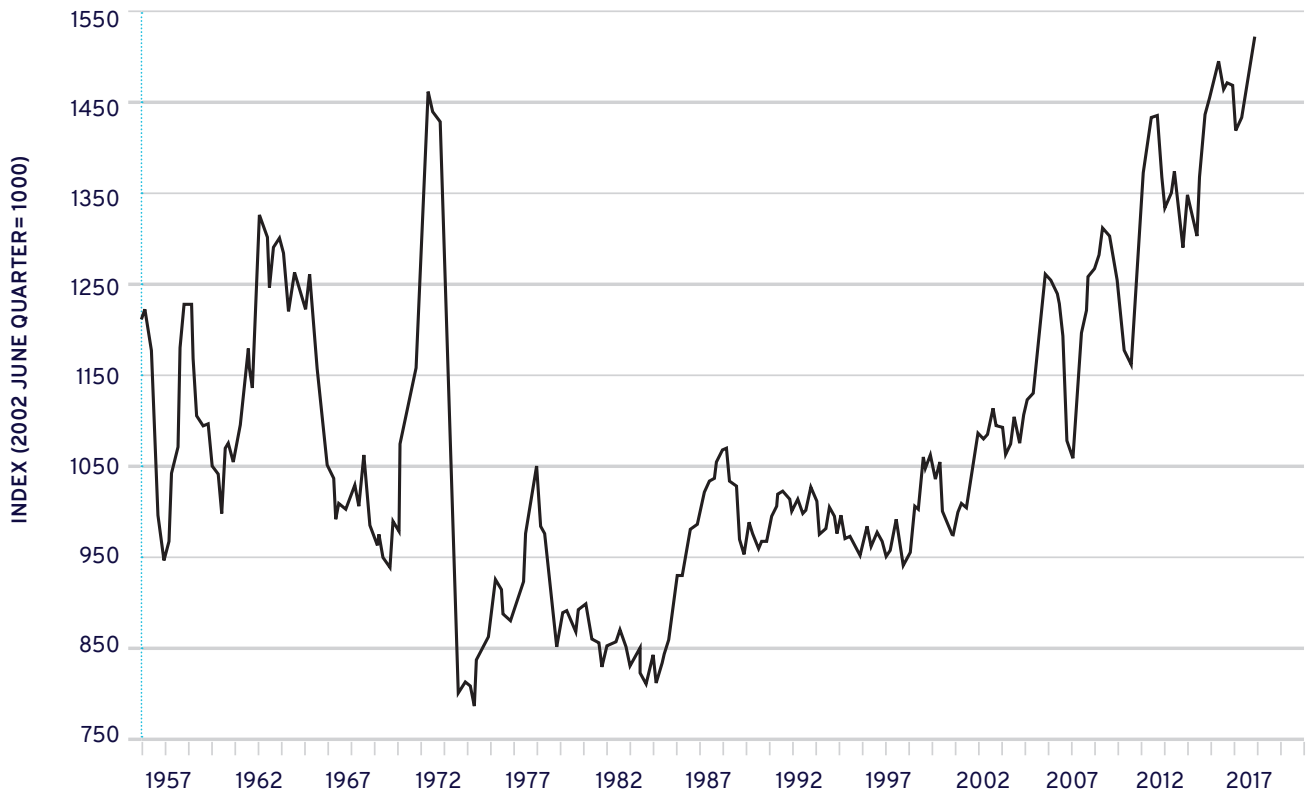


More importantly, the income earned from exports has allowed New Zealand to import a growing range of consumer, intermediate and investment goods, without deterioration in the trade balance. This has been assisted by a steadily rising terms of trade (the ratio of export prices to import prices) since the early 2000s (Figure 2).

The rising terms of trade over the past two decades has, in large part, reflected increasing export prices, particularly of key commodities such as dairy and meat. However, falling import prices, particularly of capital goods, have also made an important contribution to the increase in the terms of trade. A combination of growing international competition and technological progress has contributed to this general decline in New Zealand's import prices.

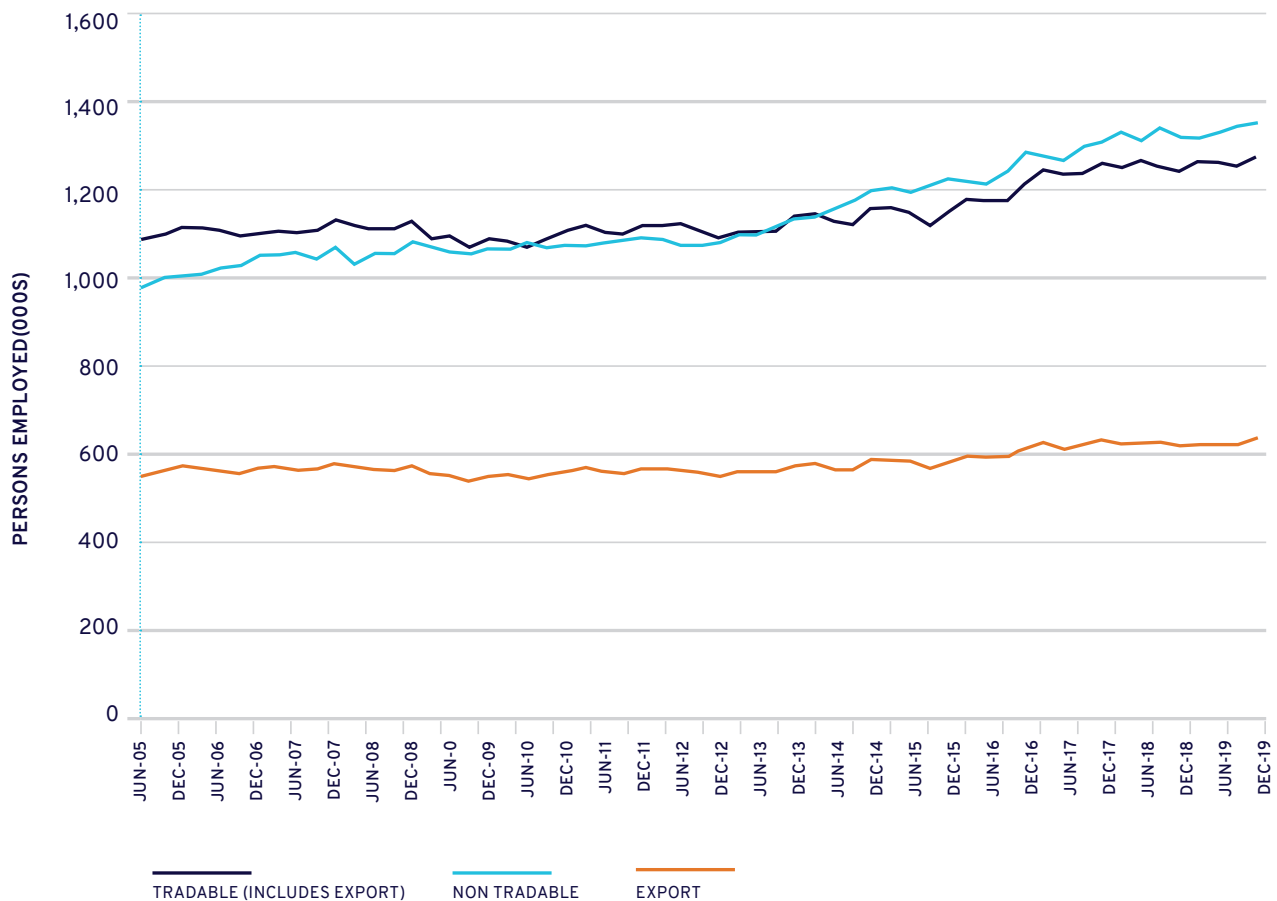
Currently, just under a quarter of New Zealand workers (approximately 620,000 people) derive their livelihoods from producing goods and services for export (Figure 3). This group includes workers producing goods and services that are exported directly, plus other workers who produce goods and services that are (ultimately) exported through other firms. And around half of New Zealand workers (1,262,000 people) are employed in the more broadly defined "tradables" sector. The tradables sector is that part of the economy impacted by international conditions and includes those firms and people who produce exports, supply goods and services that are inputs to exports, produce exportable goods (goods and services sold domestically that could have been exported), or face import competition. The export sector is a subset of the tradables sector.

Figure 2: Merchandise Terms of Trade



Source: Stats NZ

Figure 3: Employment in export, tradables and non-tradables sectors



Source: Stats NZ, MFAT calculations based on Bailey and Ford (2018)

3

Productivity

Productivity measures how effectively resources are combined to produce goods and services – specifically, how much output is produced per unit of input (labour and capital (including land)). Productivity growth is the key driver of per-capita income growth over the long-term, which in turn is an important determinant of living standards and wellbeing. More efficient production may have other benefits such as improving sustainability by reducing the resources needed to produce a given amount of output.

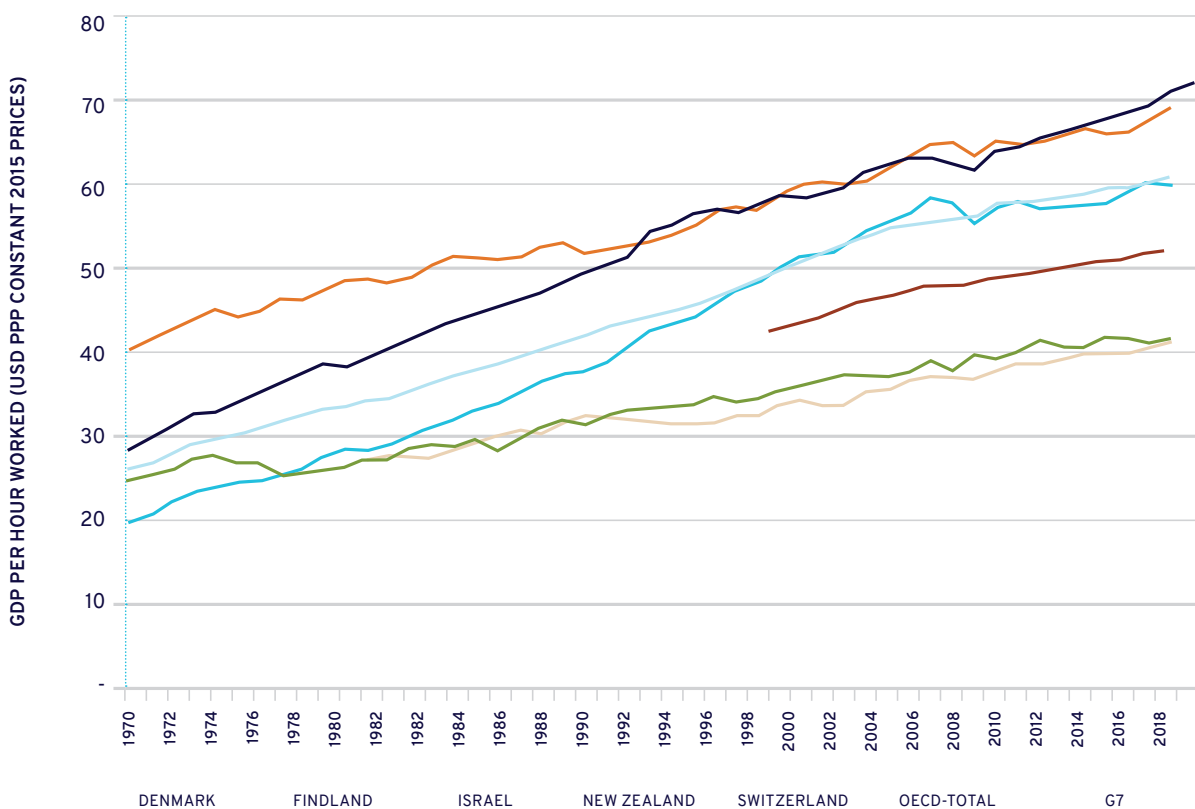
This section focuses on the relationship between trade and productivity. Foreign direct investment (FDI) also plays a key role in productivity growth. However, the role of FDI is not covered in this paper. We intend to pick up FDI/productivity links in future research.

3.1 Productivity

New Zealand's productivity performance

New Zealand's productivity is lower than in most other developed economies, and has been growing at a slower pace for decades (Figure 4). GDP per hour worked in New Zealand in 2018 was about 78 percent of the OECD average, and about 60 percent of the Small Advanced Economies Initiative (SAEI) unweighted average. ³This is down from 82 percent and 68 percent in 2000. This sub-par productivity performance has been a key contributor to New Zealand's relatively low per-capita incomes.

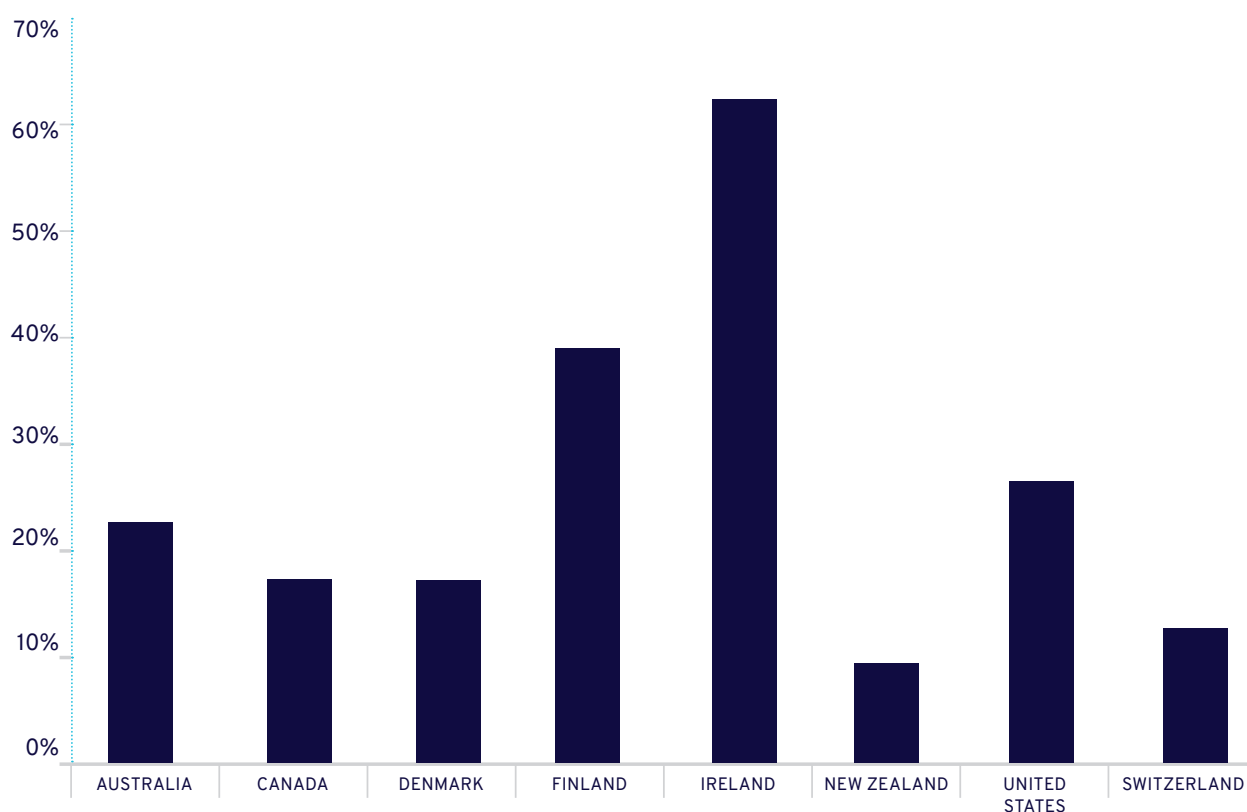
Figure 4: GDP per hour worked (USD PPP constant 2015 prices)



Source: OECD

These trends hold across other indicators of productivity. For example, growth in New Zealand's multi-factor productivity, which measures the overall efficiency with which capital and labour are combined, is also weak (Figure 5).

Figure 5: Growth in multi-factor productivity 1990 – 2018*



Source: OECD

* 1990-2014 for Ireland and 1992-2018 for Switzerland

In principle, New Zealand's low productivity baseline means its productivity should grow more quickly through time ("convergence" theory). But this convergence effect is conspicuous by its absence. Though New Zealand began in 1980 with low labour productivity relative to others in the OECD, its productivity growth since has remained among the lowest in the OECD (Figure 6). Based on our starting point, New Zealand's productivity growth should have been closer to Japan or Finland than to Portugal.

³The SAEI is a collaboration between Denmark, Finland, Israel, Ireland, New Zealand, Singapore and Switzerland. For the purposes of this paper, the countries involved are useful as comparators of roughly similar sized, advanced economies.

Figure 6: International Productivity Growth Since 1980



Source: OECD

According to the Productivity Commission, New Zealand’s low productivity is due partly to weak international connections, small domestic markets, and low levels of capital investment, including in knowledge-based capital (Conway 2018). While not the whole solution, stronger international connections can help improve productivity by increasing competition, providing access to new markets, encouraging economies of scale, and introducing firms to the global frontier of ideas, innovation and technology.

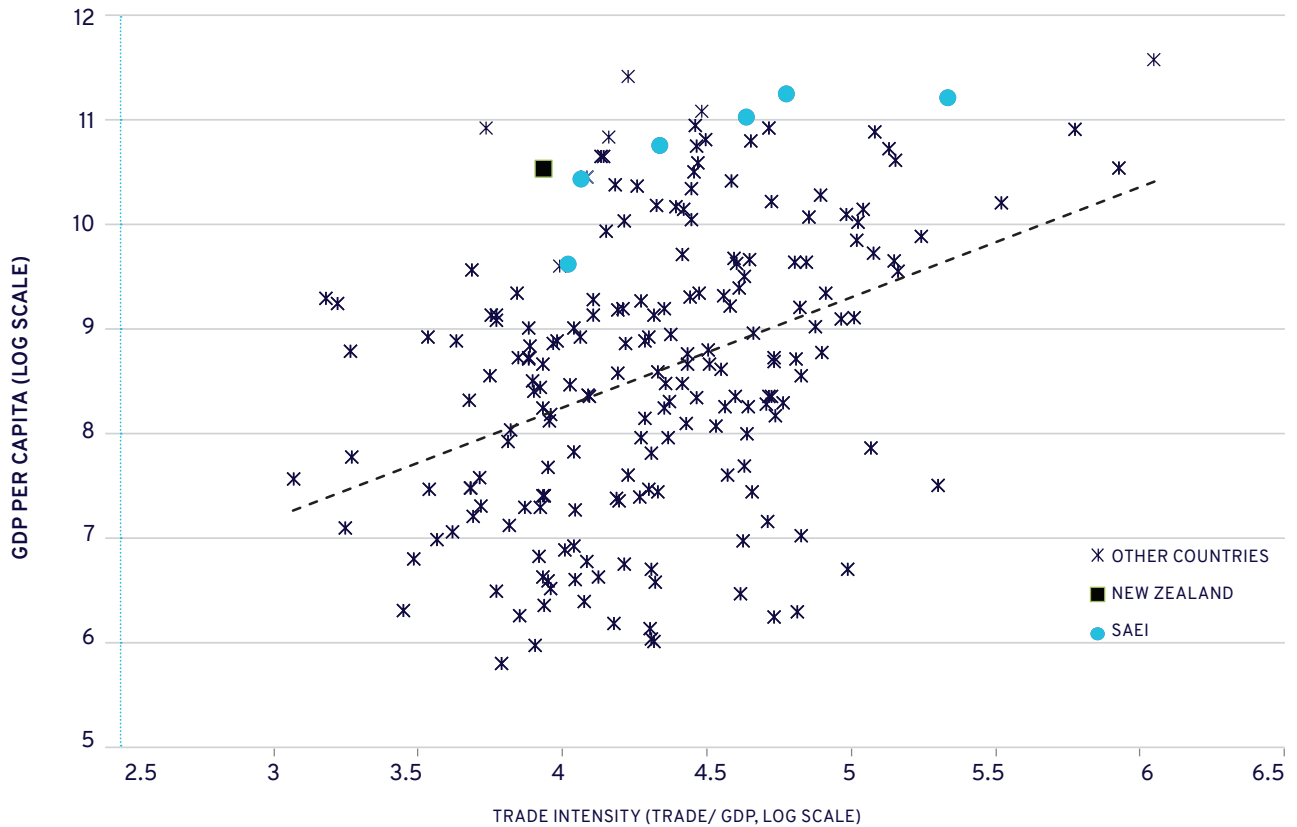
The link between trade and productivity⁴

Evidence of a link between productivity and trade has been established in multiple datasets, for numerous countries, and for different measures of productivity. At the macro-level, countries that trade more tend to have higher productivity and per-capita incomes (Figure 7). Typically, countries with higher trade intensity have higher per-capita GDP.

However, this sheds no light on causality. While higher trade could lead to higher incomes (via higher productivity), it could be that other factors positively impact both trade and income. Exactly how trade and productivity interact is complex, with several theories on causality, and varying degrees of support for each in the empirical literature

⁴ Most studies investigate the link between exports and productivity. A small number of studies look also at imports with similar results.

Figure 7: Country-level relationship between trade and income (2017)



Source: World Bank

Countries and industries become more productive from trade exposure because trading firms are more likely to expand and through technology diffusion. International trade encourages firms to invest in capital and to increase employment in order to meet higher international demand and to achieve better economies of scale.

As trading firms grow they pull resources from less productive, domestic-only firms and from the non-tradables sector. Increased competition from trade can also boost competition and support this reallocation. Hence increased trade increases sector and country average productivity, regardless of whether it changes in-firm productivity.

Another major driver of productivity gains from trade is technology diffusion. This is thought to take place in two steps, first from firms that are at the global technology or productivity frontier to internationally connected firms, and then from those internationally connected firms to laggard domestic firms. The diffusion channel would be expected to change in-firm productivity.

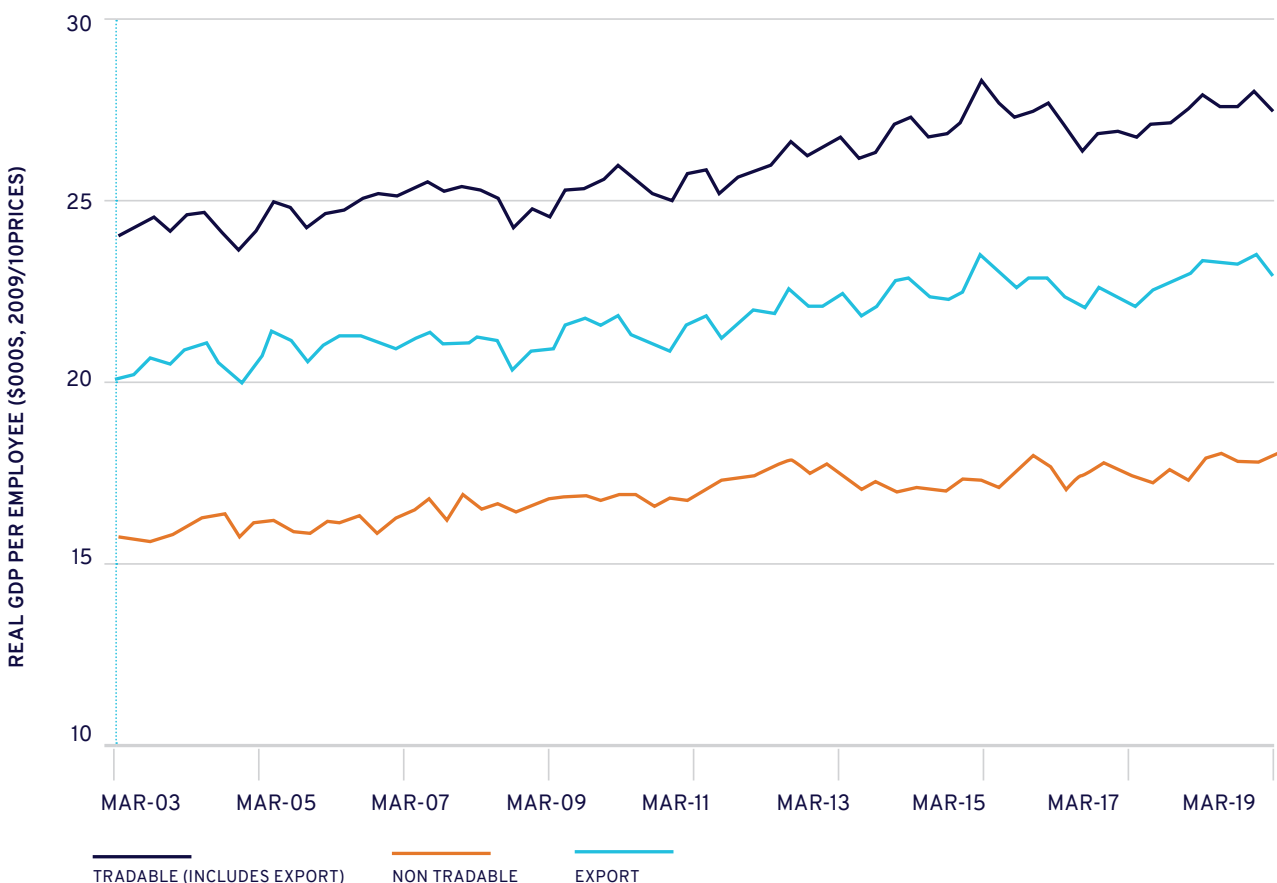


At the level of the firm most research finds that more productive firms are more productive before they start trading. A high level of productivity is necessary before a firm can overcome the high fixed costs associated with exporting. This has been confirmed in the New Zealand context too. Evidence that firms become more productive because of exporting is patchy. Most studies find no conclusive evidence of firms learning-by-exporting.

New Zealand research investigating the role of investment concludes that exporting leads to capital deepening, and that this increases the firms' labour productivity.⁵ New Zealand research also finds evidence that manufacturing and service sector firms that export tend to innovate more. Country-specific knowledge can also be important, and firms with a higher share of workers from a specific country are more likely to export to that country.

Overall in New Zealand, productivity (measured as GDP per employee) is higher in the tradable sector compared to the non-tradable sector (Figure 8). Given many non-tradables components are embedded in tradables products, weak productivity in the non-tradables sectors also affects productivity in the tradables sectors.

Figure 8: Real GDP per employee in tradable and non-tradable sectors



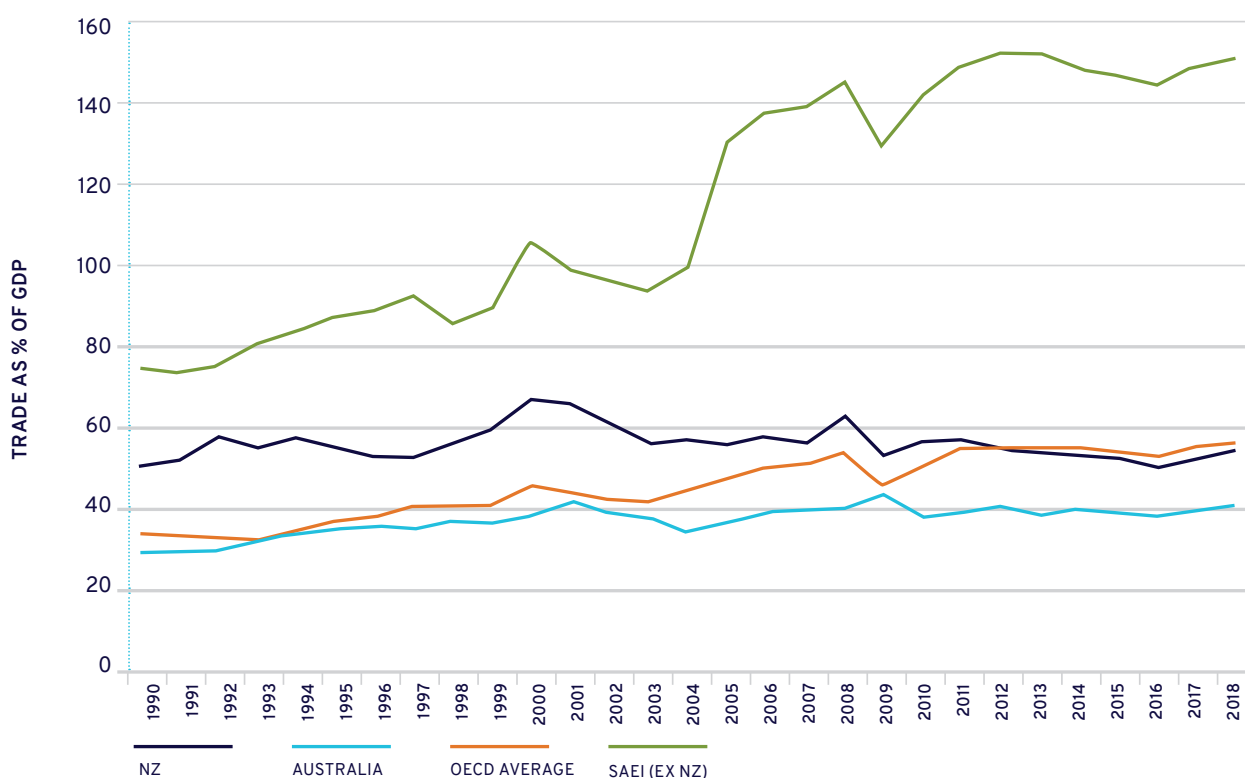
Source: Stats NZ, MFAT calculations

⁵ New Zealand insights noted in this paragraph are drawn from Under the Hood: Insights from Recent Firm-level Productivity Research in New Zealand (Productivity Commission 2018).

New Zealand's trade intensity

New Zealand's exports and imports make up a relatively small share of the economy compared to other advanced economies (Figure 9). There are a number of plausible explanations including distance to markets, weak engagement with global value chains, and an overvalued real exchange rate.

Figure 9: International trade intensities (goods and services, exports plus imports)



Source: OECD

Note: SAEI average is weighted by GDP

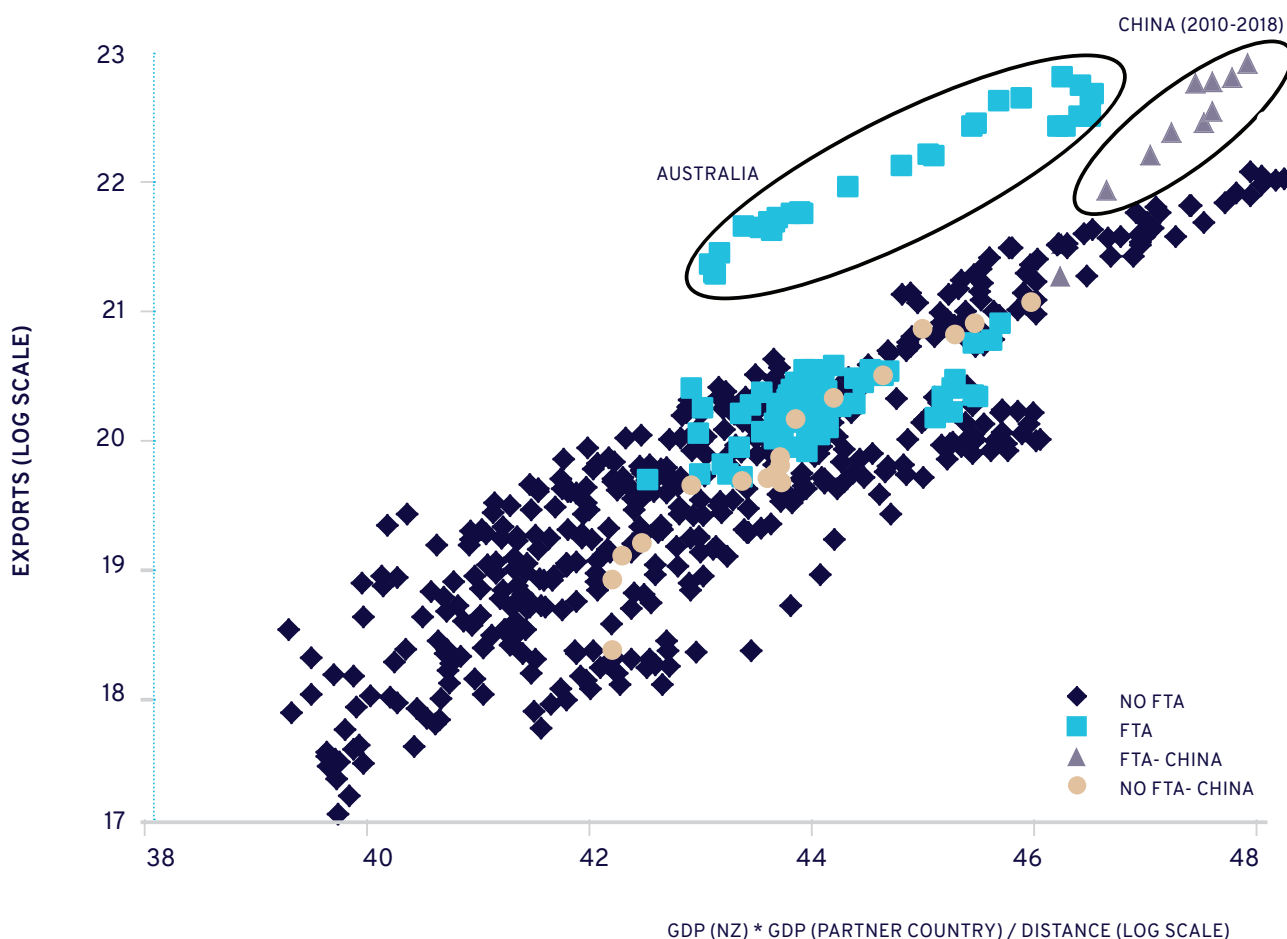
Distance to markets

New Zealand has never (and probably will never) fully overcome its physical isolation. This isolation depresses our trade intensity and means distance conditions market access. Through the 1990s and into the 2000s, digital technologies made communication with the world easier and looked poised to decouple trade from geography.

However, over the same period New Zealand's trade became increasingly Tasman-centric. Buoyed by Closer Economic Relations (CER), Australia nudged aside Japan, the U.K., and U.S. in 1992 as New Zealand's largest trading partner. China then overtook Australia in 2012.

Using gravity modelling, New Zealand's trading relationships with Australia and possibly China are the only ones to break the shackles of distance (Figure 10). And the result for Australia, our geographically and culturally closest market perhaps emphasises that distance still matters. New Zealand's trade with Australia is considerably more diverse and less commodity-based than for any other major trading partner, more akin to the bilateral trade relationships seen within Europe or South East Asia.

Figure 10: New Zealand's merchandise trade by gravity* (1990 – 2018)



Source: Stats NZ, World Bank, MFAT calculations

* Gravity modelling is common in economic analysis of trade. At its simplest, it posits that one economy's trade with another is positively correlated with the size (mass) of that economy and negatively correlated with the distance to that economy. The equation looks similar to the physics equation for gravity (without the inverse square), hence the name "gravity" models.

Engagement with global value chains

The OECD, World Bank and others highlight a link between global value chain (GVC) participation and productivity. GVCs allow firms to specialise in their most productive activities by outsourcing non-core tasks (sourcing inputs from offshore – upstream or backward GVC participation); or, by focusing on providing inputs to foreign firms' production processes (exporting intermediate products – downstream or forward GVC participation).

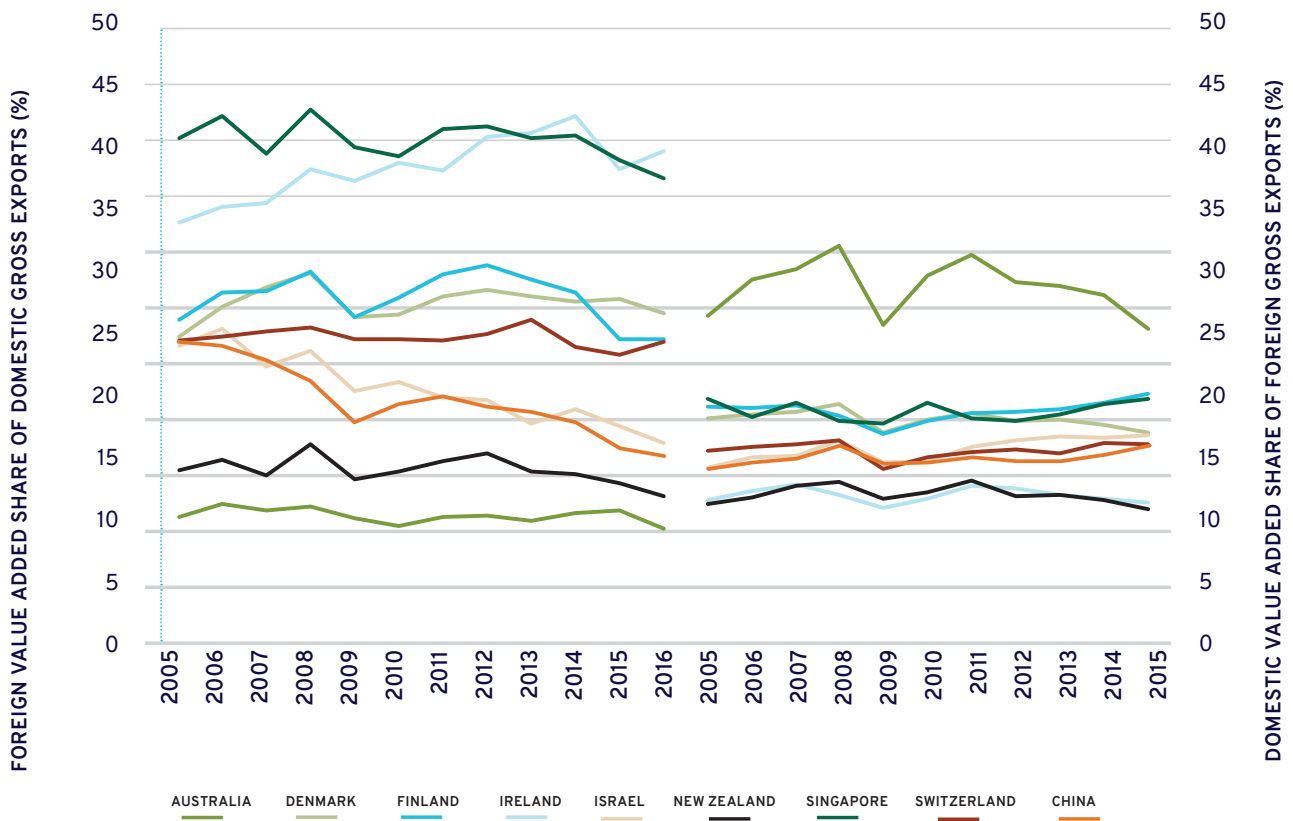
Particular to firms in smaller economies, upstream GVC participation provides access to a wider variety and quality of inputs than available domestically, and often at lower prices. Research suggests that firms directly importing inputs to production are more productive than counterparts who only source inputs domestically.⁶

⁶ See for example Halpern et al 2015 or Bas and Strauss-Kahn 2014

New Zealand is less engaged both downstream and upstream along GVCs than most of our small advanced economy peers (Figure 11). The foreign value-added share of New Zealand gross exports - upstream connections - was 14 percent in 2015. That is, relatively few intermediate imports are inputs into New Zealand exports. The small advanced economy average is 30 percent. Nor is New Zealand well connected downstream, with 12 percent of New Zealand exports used in other country's production of exports.

Economically successful small economies engage more upstream along GVCs than they do downstream. New Zealand's relatively low engagement with GVCs is likely a function of distance as well as the structure of the economy. For example, New Zealand's primary exports are largely oriented towards final consumption use rather than as intermediate inputs to other production processes, nor do primary exports need as many intermediate inputs in their own production.

Figure 11: International engagement in GVCs



Source: OECD

Overvalued exchange rate

A further potential explanation of New Zealand's relatively low export intensity is an overvalued real exchange rate. An overvalued exchange rate makes New Zealand exporters less competitive in global markets. This may particularly impact non-commodity exporters and offer a partial explanation for why New Zealand's export product diversity remains relatively low and concentrated in primary products (see section 4.2 for further details). That said, an overvalued exchange rate or, rather, the factors that caused it (e.g. relatively high interest rates relative to the rest of the world), may have larger direct negative impacts on investment and in turn productivity than the impact on productivity via reducing trading intensity.

The flipside of an overvalued exchange rate is that it makes imports relatively cheaper for New Zealand. This benefits both consumers, through access to relatively cheaper imported goods, and firms with a higher share of imported inputs to production. It also makes imported capital goods relatively cheaper which, to the extent that it encourages increased volumes of imported capital goods, should help improve productivity through increasing the capital stock and facilitating technology transfers.

Conclusion

Productivity growth is the key driver of per-capita income growth over the long-term, which in turn is an important determinant of living standards and wellbeing. The link between trade and productivity is well established. Broadly speaking, increasing trade can help improve productivity by increasing competition, providing access to new markets, encouraging economies of scale, reallocating resources, and introducing firms to the global frontier of ideas, innovation and technology. Trade is critical for ensuring New Zealand has access to the latest technology.

New Zealand's productivity performance has been poor, both in a growth sense and relative to other countries. Nor has New Zealand experienced much of a "convergence effect". There is evidence that productivity is materially higher in the tradables sector compared to the non-tradables sector. This suggests in turn that New Zealand's weak aggregate productivity stems in part from relatively low trade intensity and weak international connections that reduce the size of the tradables sector compared to the non-tradables sector. Weak productivity in the non-tradables sectors also hampers productivity in the tradables sectors.

Distance to markets, relatively low engagement with global value chains, and an overvalued real exchange rate are some potential factors contributing to low trade intensity. Some of these factors (i.e. distance) cannot be changed, although digital technology or other innovations may help to mitigate them.

3.2 Metrics for trade productivity

Table 2: Metrics for trade and productivity

INDICATOR	WHY IT MATTERS	DESIRED TREND	ACTUAL TREND	DATA QUALITY	SOURCE	DATA COMMENTS
Labour productivity in export/tradables sector (Figure 8)	Productivity growth is the key driver of per capita income growth	↗	↗		Stats NZ MFAT	GDP per person employed in tradable sector MFAT calculations (see Bailey and Ford, 2018) Ideally should be on hours worked basis
Employment share of export/tradables sector (Figure 3)	Increasing employment in more productive tradables sector should increase aggregate productivity	↗	↗		Stats NZ MFAT	Stats NZ HLFSS data MFAT calculations (see Bailey and Ford, 2018)
Trade intensity (Figure 9)	A proxy for increased international connectedness; increased connectedness should increase aggregate productivity	↗	↗		Stats NZ	Exports as % of GDP or Exports plus Imports as % of GDP
Ratio of NZ productivity to OECD, small advanced economies average (Figure 4)	A proxy for distance from the global productivity frontier; over time the ratio should increase i.e. decrease the gap ("convergence" theory)	↗	↗		OECD Productivity and ULC	GDP per hour worked USD PPP constant 2010 prices, ratio of NZ to comparator Range of other productivity metrics could be used Lagged about 2 years
Upstream Global Value Chain engagement (Figure 11)	Increasing engagement allows for greater specialisation and potentially reduces costs	↗	↗		OECD TIVA	Foreign value added share of NZ gross exports Lagged 3-4 years
TIMELY AND GOOD QUALITY DATA				SOME ISSUES WITH TIMELINESS AND/OR DATA METHODOLOGY		SIGNIFICANT ISSUES WITH TIMELINESS AND/OR DATA METHODOLOGY

INDICATOR	WHY IT MATTERS	DESIRED TREND	ACTUAL TREND	DATA QUALITY	SOURCE	DATA COMMENTS
Foreign direct investment	Increasing foreign direct investment usually increases productivity	↗	↗		Stats NZ	FDI as % of GDP
Firm level labour productivity	Increasing firm level productivity should increase aggregate productivity	↗	N/A	N/A	Stats NZ LBD or IDI	Challenging to present on a national or aggregated basis
Capital goods imports as an indicator of investment / productivity	Capital goods imports are a key channel for technology/innovation diffusion, as well as helping to increase the national capital stock	↗	↗		Stats NZ	Readily available in monthly and quarterly data
Migrant skills		↗	↗		MBIE	% of skilled migrants category approvals/ over total migrant application approval
Companies with overseas offices	A proxy for increased international connectedness should increase aggregate productivity	↗	N/A		Stats NZ	Lagged about 5 years
International patents		↗	↗		OECD	New Zealand patents % of rest of world and by country Lagged about 3 years
TIMELY AND GOOD QUALITY DATA		SOME ISSUES WITH TIMELINESS AND/OR DATA METHODOLOGY		SIGNIFICANT ISSUES WITH TIMELINESS AND/OR DATA METHODOLOGY		

4

Sustainability

Sustainability can take different forms: environmental, fiscal, economic, and social. The two most obvious interactions with trade are environmental sustainability and economic sustainability. Aspects of social sustainability are discussed in section 5 “Inclusiveness”.

4.1 Environmental Sustainability

Trade and environmental sustainability

Trade can generate a mixture of potential positive and negative effects on the environment and natural resources of countries. The effects of trade on the environment are often broken into scale/income, composition and technique effects:⁷

- **Scale/income effect:** an increase in economic activity and income as a result of trade raises the total amount of pollution and creates environmental damage. However, rising incomes could have positive effects for the environment since increasing per-capita incomes may lead to greater demand for (and ability to pay for) improved environmental quality.⁸
- **Composition effect:** trade changes the composition of production within an economy. The impact on the environment will depend on the production structure of an economy and its areas of specialisation or comparative advantage (and therefore, the type of production that is scaled up or down as a result of trade).
- **Technique effect:** trade is an important channel for the transfer of innovation and technologies across borders, which can improve the spread and uptake of environmentally-friendly technologies and have a positive impact on the environment.

The magnitude and direction of these effects will be highly dependent on domestic regulatory and policy settings, as well as producer and consumer preferences. For example, environmental regulations will play a critical role in setting limits (or not) around scaling production and the subsequent environmental effects this might have.

Some environmental impacts are not constrained by national boundaries. For example, greenhouse gas (GHG) emissions or water pollution may originate from production within a specific country but contribute to global emissions levels and ocean pollution respectively. Depending on relative environmental efficiencies, increased negative impacts in one country from trade may lead to net global positive impacts if it displaces less efficient activity elsewhere. Of course, the opposite can also hold, if trade or barriers to trade see activity shift to less environmentally efficient producers.

Local environmental effects of exporting

Trade connects New Zealand producers with the international marketplace. Because the global market is much larger than the domestic one, incentives from trade can lead industries with a comparative advantage in production to expand significantly. For New Zealand, this is particularly true in the case of primary goods sectors like agriculture and forestry and services like tourism and education. Effects on soil and water are the main local environmental concerns related to agriculture production in New Zealand, as highlighted in *Environment Aotearoa* 2019.^{9,10}

⁷ Martínez-Zerzoso (2018) provides an overview of the literature examining these effects.

⁸ The relationship between increasing income and environmental quality can change with the level of income. For low incomes, increasing economic activity may increase pollution, whereas at higher income levels further increases in income may be associated with improved environmental quality.

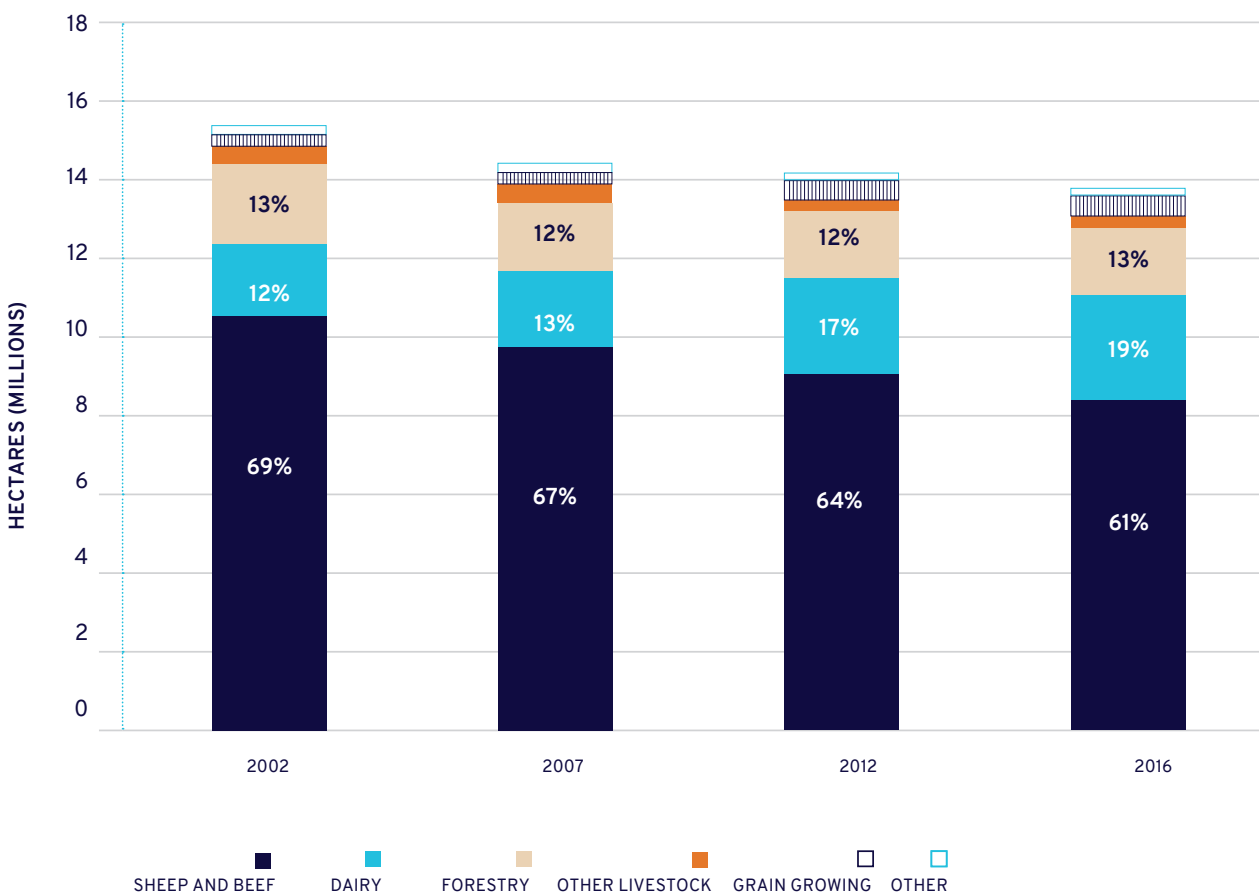
Environmental impacts from exports will depend on the volume (or scale) of exports, the composition, and the environmental efficiency over time. The net impacts will be significantly influenced by domestic environmental regulation and its enforcement.

Land use, soil and water

Around 80 percent of New Zealand primary sector land is pasture where dairy cows, beef cattle, and sheep graze. Though this share of pasture-based farming has not changed, land used for dairy farming in New Zealand rose by 42 percent between 2002 and 2016 to match international demand, primarily through the conversion of land from sheep and beef farming (Figure 12).

In line with the change in land use, the number of dairy cows rose by 50 percent between 1999 and 2012 (driven by growth in the South Island), while sheep and beef cattle numbers fell 32 percent and 20 percent respectively. Since 2012 the total dairy herd has been stable around the 5 million mark, with a slight downwards trend since 2016 when the size of the dairy herd peaked.

Figure 12: New Zealand Primary Sector Land Use (2002-16)



Source: Ministry for the Environment, Stats NZ.

⁹ Ministry for the Environment and Stats NZ (2019).

¹⁰ Almost half of the respondents in the Stats NZ Environmental Perceptions survey said that farming is the main cause of an issue with fresh water quality.

An increase in domestic dairy production to meet increased international demand has contributed to an increase in New Zealand's nitrogen surplus (up nearly 40% over the two decades to 2016). While nitrogen is essential for plant growth, an excess of nitrogen above what is needed by pasture and plant growth (i.e. a surplus) can result in nitrogen being lost either through the soil into waterways, or into the air as a gas (nitrous oxide, a GHG emission).

The shift from sheep and beef farming to dairy farming is associated with increased leaching of nitrogen from agricultural soils. Cattle excrete more nitrogen than sheep, due to both a higher concentration of nitrogen in urine and a higher volume of urine. More intensive farming in some parts of the country (i.e. more animals per paddock) can also contribute to nitrogen loss. The use of nitrogen fertilisers has also increased; the risk of leaching depends on when the fertiliser is applied.

Agriculture impacts the soil in other ways too. Robust, aerated soils are necessary for plant growth. But heavy grazing herds can compact soils or erode them, and increase the risk of polluting run-off into waterways.

New Zealand's surface freshwater reserves (lakes and rivers) have been affected by changing land use and the intensification of farming. Excess nutrients (such as nitrogen), pathogens and sediment can contribute to pollution of waterways. Models of water quality in New Zealand rivers show that for most water quality variables, 50-90 percent of river length in pastoral farming areas exceeded relevant ANZG default guideline values for 2013-17. This compares to less than 30 percent of the river length in native land-cover class.¹¹

The change in river quality from 2008 to 2017 has been mixed across sites, although slightly more sites recorded an improving trend rather than a deteriorating one. The pastoral and native land-cover classes had similar proportions of sites with improving and worsening trends. However, understanding the causes of the trends in water quality is difficult due to the complex interactions of factors that affect water quality in the various catchments (including human activities as well as variations in climate or other natural processes) and the potentially long lag times between land-use changes and the subsequent impact on water quality. This means that water quality today may be the result of land-use changes and management practices that occurred many years ago.

Efforts to mitigate the environmental impacts of farming have accelerated in recent years. The Sustainable Dairying: Water Accord was launched in 2013 as part of the dairy industry's effort to improve water quality.¹² A range of mitigation techniques have been used to reduce nutrient losses and to improve waterways, including on the management of shed effluent, bridging and fencing waterways, and through riparian planting. For example, livestock are now excluded from 98 percent of Accord farm waterways and just over half of farms have riparian management plans in place.¹³ This is an example of "technique" effects in action to offset scale/composition effects associated with trade.

The Government also has a significant work programme underway to improve the quality of New Zealand's fresh water. It recently consulted on rules and regulations to improve freshwater management, with an aim of materially improving water quality within five years. Part of the government's proposal includes new requirements that would control high risk farming activities and limit agricultural intensification, and requirements that would improve farm management practices.¹⁴ These will likely induce further "technique" and "scale" effects.

¹¹ Ministry for the Environment and Stats NZ (2019). Australian and New Zealand guidelines for fresh and marine water quality. Because of the way a default guideline value is defined, under natural conditions it is expected that about 20 percent of river length will not meet the value.

¹² The Accord was a five-year voluntary commitment from New Zealand's dairy farmers, DairyNZ, dairy processors and supporting partners to take action to improve waterways. Through the Dairy Tomorrow Strategy - which the Accord will transition into - the dairy sector has made a strong commitment that they will continue to work with communities, councils and government to lead work to improve waterways.

¹³ Dairy NZ (2019), 'Sustainable Dairying Water Accord - Five Years On'

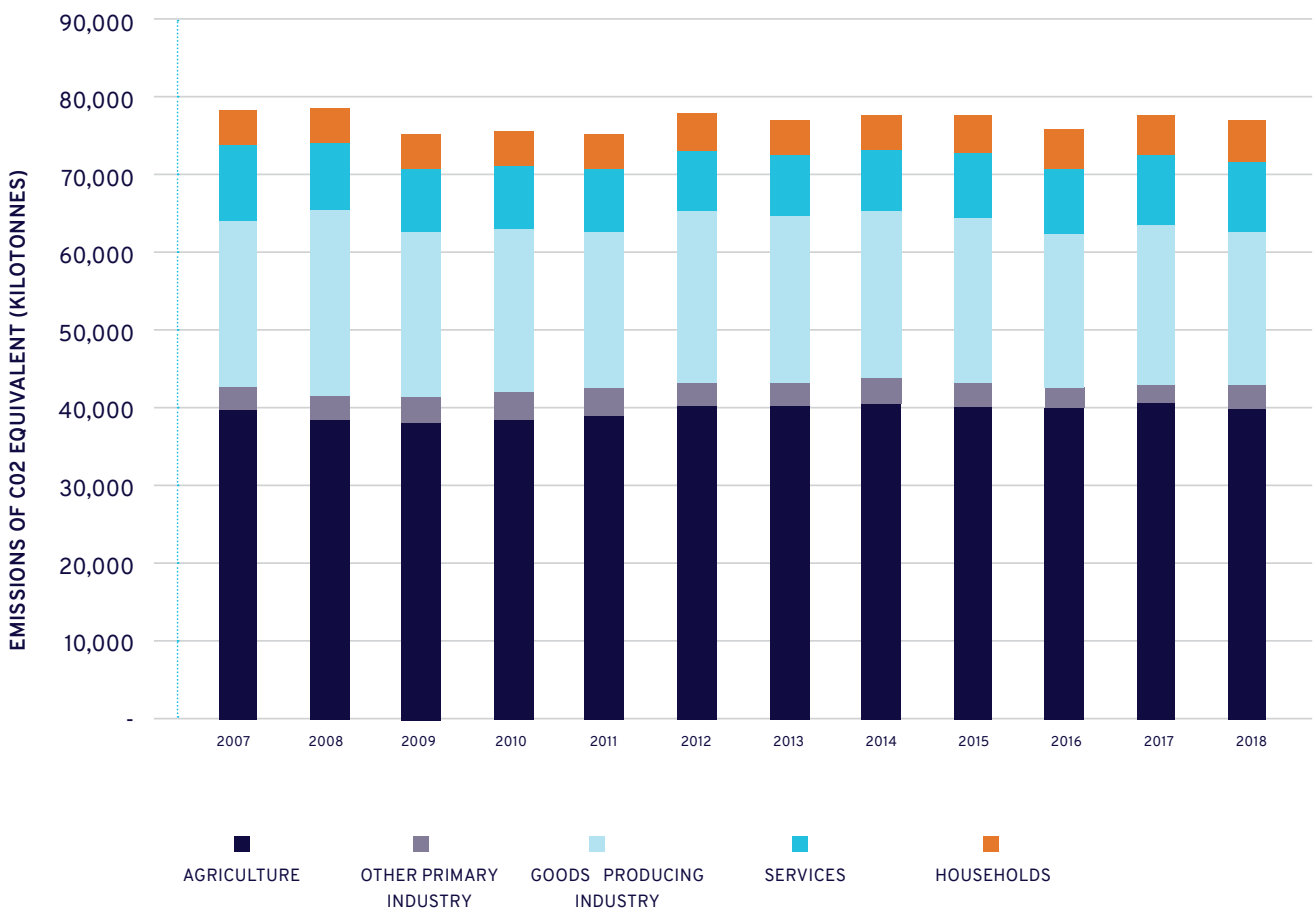
¹⁴ Ministry for the Environment (2019).

Global environmental effects of exports – greenhouse gas emissions

Some environmental consequences of trade are not bound by national borders. Climate change driven by GHG emissions is the most pressing of these.

At a sector level, agriculture – particularly the dairy and sheep and beef sectors – is both a large export earner and a large contributor to New Zealand emissions (Figure 13). Around 80 percent of output from the agriculture sector is ultimately sold offshore, and accounted for roughly 40 percent of New Zealand’s total exports in 2019. ¹⁵Agriculture in New Zealand is largely a sheep and beef meat and dairy industry, although other industries such as horticulture have grown in recent years. Livestock farming leads to methane discharges (from enteric fermentation) and nitrous oxide emissions. As a result, agriculture makes up about half of New Zealand’s total emissions.

Figure 13: New Zealand emissions by industry sector and households



Source: Stats NZ

¹⁵ Agriculture exports include dairy, meat and wool, horticulture, and arable exports.

While agriculture makes a large absolute contribution to New Zealand's total emissions, globally New Zealand is an efficient supplier of relatively high emitting agricultural products like dairy and beef¹⁶. Based on FAO emissions measures, New Zealand is broadly similar to other major beef exporters and more efficient than the world average. When the full dairy production chain is considered, New Zealand dairy exports are amongst the world's most emissions efficient¹⁷. This is partly because New Zealand's pasture-based dairy system and mild climate means there is less reliance on grain for feed and temperature controlled barns than more intensive dairy systems. Nor do subsidies and other trade barriers artificially incentivise production in New Zealand.

Agriculture is not the only exporting sector responsible for emissions. Tourism is among New Zealand's largest earners, contributing 13 percent to total exports. The emissions associated with international tourism are generated through air travel to and from New Zealand as well as by activity once tourists arrive in the country (e.g. driving). Under international climate change agreements, emissions from international air travel are not counted against country's domestic GHG inventories and are instead dealt with under the International Civil Aviation Organisation (ICAO). Efforts to reduce emissions through the ICAO will take effect from 2021, but consumer attitudes toward tourism may affect this sector before then (for example, the rise of "Flight Shame" in parts of Europe).

Similarly to aviation, emissions related to sea transport are not counted in domestic inventories. Instead they are addressed by the International Convention for the Prevention of Pollution from Ships (MARPOL). Despite New Zealand's distance to many markets, sea transport emissions are a relatively small share of New Zealand's emissions (approximately 1 percent in 2018).

At just under 7 percent of exports, forestry is New Zealand's fourth largest export earner. The forestry and logging industry is a small contributor (under 1 percent in 2017) to carbon emissions. But because trees sequester and store carbon, New Zealand's forests and further planting help offset New Zealand's total emissions. In 2018, nearly one-third of emissions were offset by the land use, land-use change and forestry sector.

New Zealand is becoming more emissions efficient (less emissions intense). Between 2007 and 2018, the size of the economy increased by 33 percent and the population increased by 16 percent while total emissions decreased by 1 percent. As a result, overall GHG intensity fell by 22 percent, with intensity in the agriculture sector falling 14 percent. This is an example of technique effects offsetting scale effects.

The potential role of trade in reducing net environmental impacts

Trade helps facilitate better resource allocation across countries, meaning that products could be produced where it is the most environmentally efficient to do so (i.e. emissions-based comparative advantage). However, varied GHG-mitigation policies across countries (including diverse carbon pricing approaches) and trade barriers can result in distortions and inefficiencies with respect to emissions intensity in production and trade flows. This can result in higher global emissions if production and exports from an efficient producer shift to a relatively inefficient producer. This effect is known as "carbon leakage".

For example, to the extent that there is and continues to be demand for relatively GHG-intensive products such as dairy and meat, from a global perspective it is desirable for that demand to be met by relatively efficient producers such as those in New Zealand.

As well as improving resource allocation, trade can help facilitate the spread of environmentally enhancing technologies and innovations. This can occur through trade in "environmental goods" (products that are used for preserving the environment e.g. renewable energy technologies such as wind turbines), which have technology embodied in them, as well as trade in "environmental services". About 5% of New Zealand's goods imports are environmental goods.¹⁸

¹⁶ Blandford and Hassapoyannes (2018)

¹⁷ FAO (2013). New Zealand is modelled alongside Australia as part of Oceania.

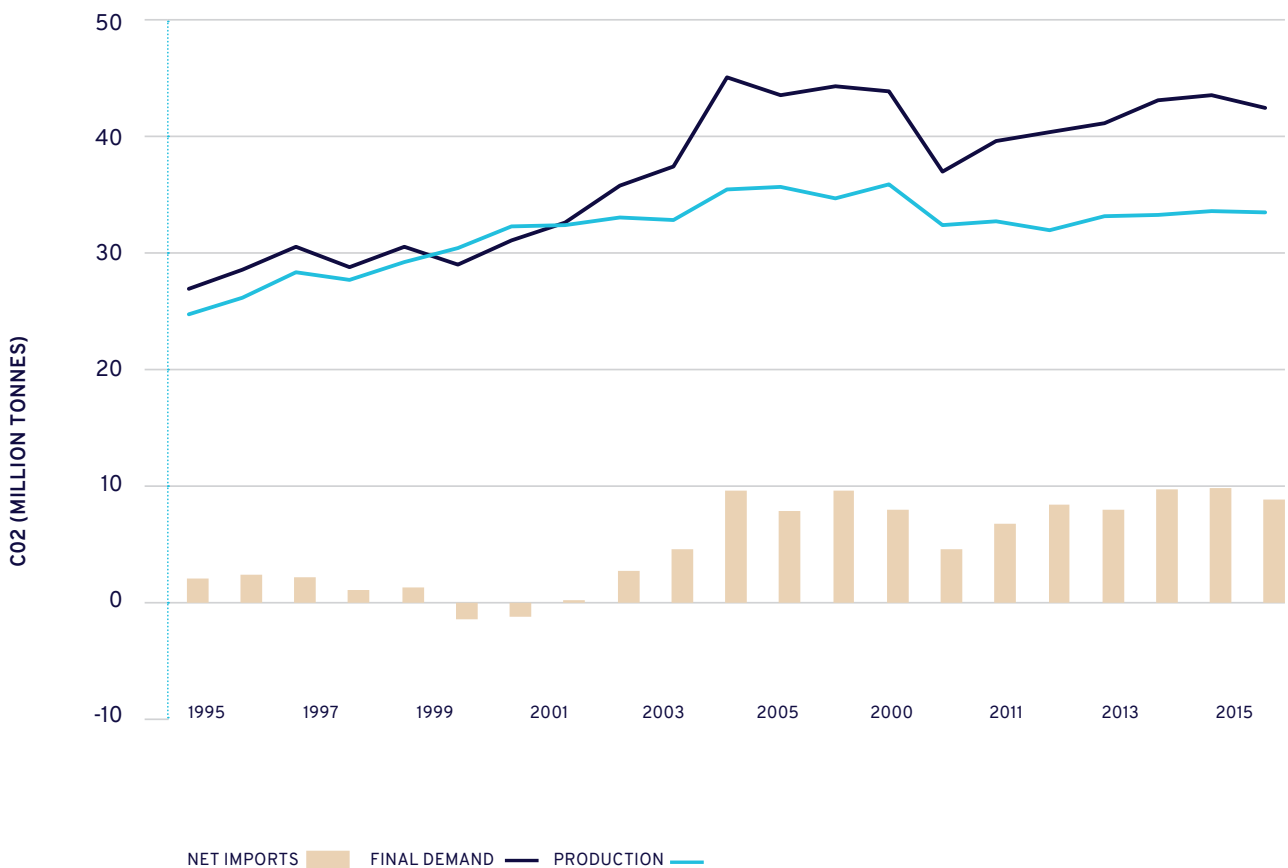
¹⁸ There is no international consensus on the goods that should be considered environmental. This statistic is based on the OECD's Combined List of Environmental Goods (CLEG), which includes goods under 248 6-digit HS codes. The main limitations of the CLEG are that the HS lines include both environmental and non-environmental goods, and that products are characterized by multiple end-uses, including non-environmental applications.

Environmental impacts of imports

When it comes to trade and the environment, the focus tends to fall on exports. This is perhaps unsurprising. The effects of production on the environment seem more direct than those of consumption. Furthermore, in the context of climate change, the international community places responsibility for emissions on the production side rather than the consumption side. But production is only part of the story – New Zealand’s consumption profile also has an effect on New Zealand’s and the global environment.

Consumption (or demand) based emissions capture the emissions from final demand that has been emitted anywhere in the world along global production chains. Figure 14 plots the carbon dioxide (CO₂) embodied in New Zealand’s production and consumption or final demand (this includes only CO₂, not other GHGs like methane). New Zealand, like most developed countries, is a net importer of CO₂. In other words, New Zealand’s consumption patterns have also contributed to an increase in CO₂ emissions, in part through imported products.

Figure 14: CO₂ only emissions embodied in production and consumption



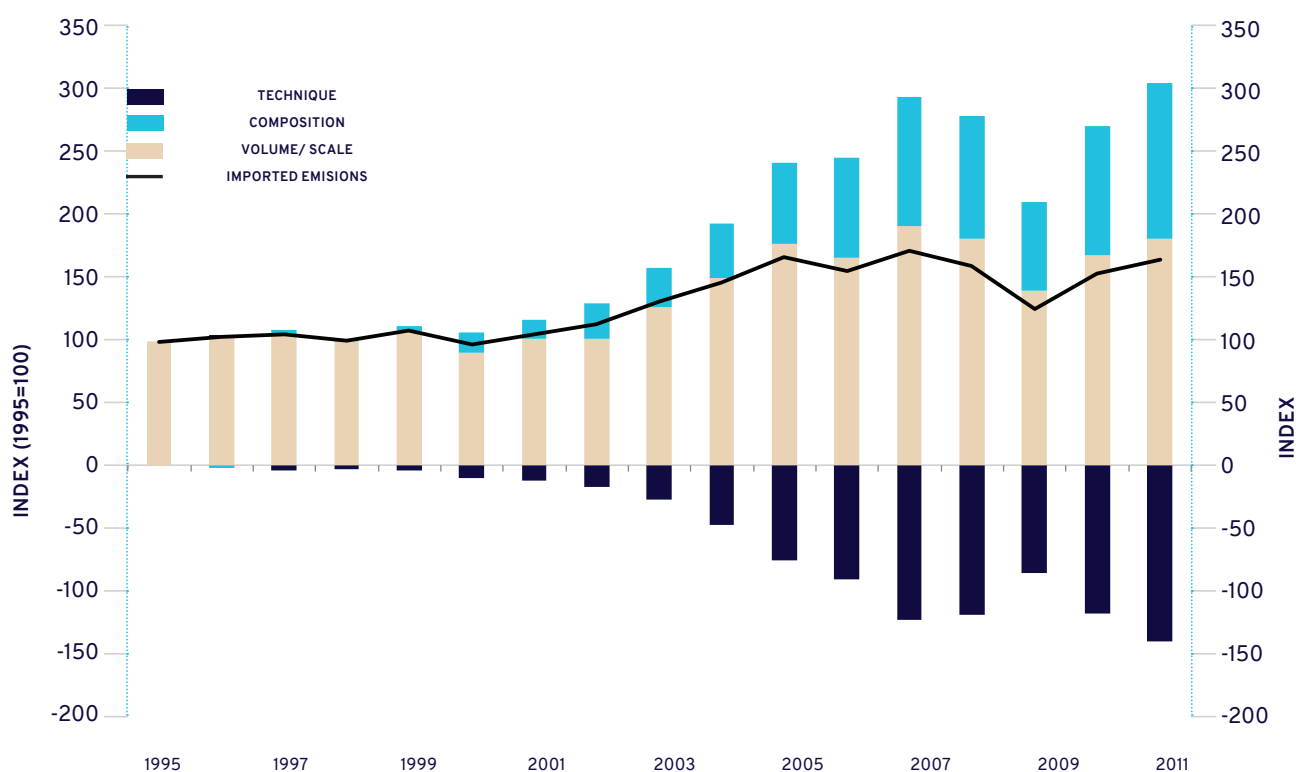
Source: OECD

Note: Data prior to 2005 are from an archived dataset

As noted, this particular OECD measure only includes CO2 emissions. As far as we are aware, there is currently no publicly available comprehensive measure of consumption-based emissions that includes agriculture-related GHG emissions like methane. Work is under way to bridge this gap. Under a more comprehensive measure, New Zealand is likely to be a net exporter of GHG emissions.

The increase in imported emissions can be decomposed into scale, composition and technique effects (Figure 15). From 1995 to 2011, New Zealand's imported emissions increased by 66 percent. This was largely driven by overall growth in imports (83 percentage points), but also a change in the composition of imports towards more carbon-intensive products (25 percentage points). These two effects have been partly offset by technology improvements over time (-42 percentage points).¹⁹

Figure 15: Decomposition of New Zealand's imported emissions



Source: OECD

¹⁹ See Gargous (2019) for a discussion on the trends of emissions embodied in imports among OECD and non-OECD economies.

Conclusion

While key drivers of environmental performance will be domestic regulation and policy settings, and consumer and producer preferences, trade can generate a mixture of potential positive and negative effects on the environment. The effects of trade on the environment are often broken into scale, composition and technique effects. Some of these effects, such as on climate change, are not constrained by national boundaries.

On the export side, there is evidence of mostly negative scale and composition effects on the local environment, primarily arising from increased agricultural production. For example, nitrogen leaching has contributed to pollution of waterways in farming areas. It is difficult to determine to what extent technique effects have mitigated some of these negative effects, particularly as it can take some parts of the environment a long time to respond to positive (and negative) changes in land use. The extent of scale and composition techniques is likely to be reduced or reversed in the future as domestic environmental policies change.

The export-intensive agriculture sector, particular dairy and meat production, generates about half of New Zealand's GHG emissions. Forestry provides some offset. All up, exports generate a significant share of New Zealand's emissions. While agriculture makes a large absolute contribution to New Zealand's total emissions, New Zealand's dairy and meat industries are amongst the most emissions efficient in the world. New Zealand's emissions intensity has been declining, both overall and for the agriculture sector, an example of technique effects offsetting scale effects.

The trends above describe a negative impact on the environment in New Zealand from exports under the domestic environmental and other regulatory settings in place at the time. However, this needs to be considered in the context of where New Zealand's comparative advantage lies. Trade helps facilitate better resource allocation across countries, meaning that products could be produced where it is the most environmentally efficient to do so (e.g. emissions-based comparative advantage). Specialising in agriculture production where New Zealand is relatively efficient (both from a production perspective and from an emissions perspective) may reduce New Zealand's global environmental impact. This is perhaps most relevant in relation to GHG emissions.

Trade can also play an important role in the diffusion of environmentally enhancing technologies and innovations.

Looking at emissions from a consumption-lens rather than a production one, New Zealand's consumption patterns have also contributed to an increase in CO₂ emissions, in part through imported products.

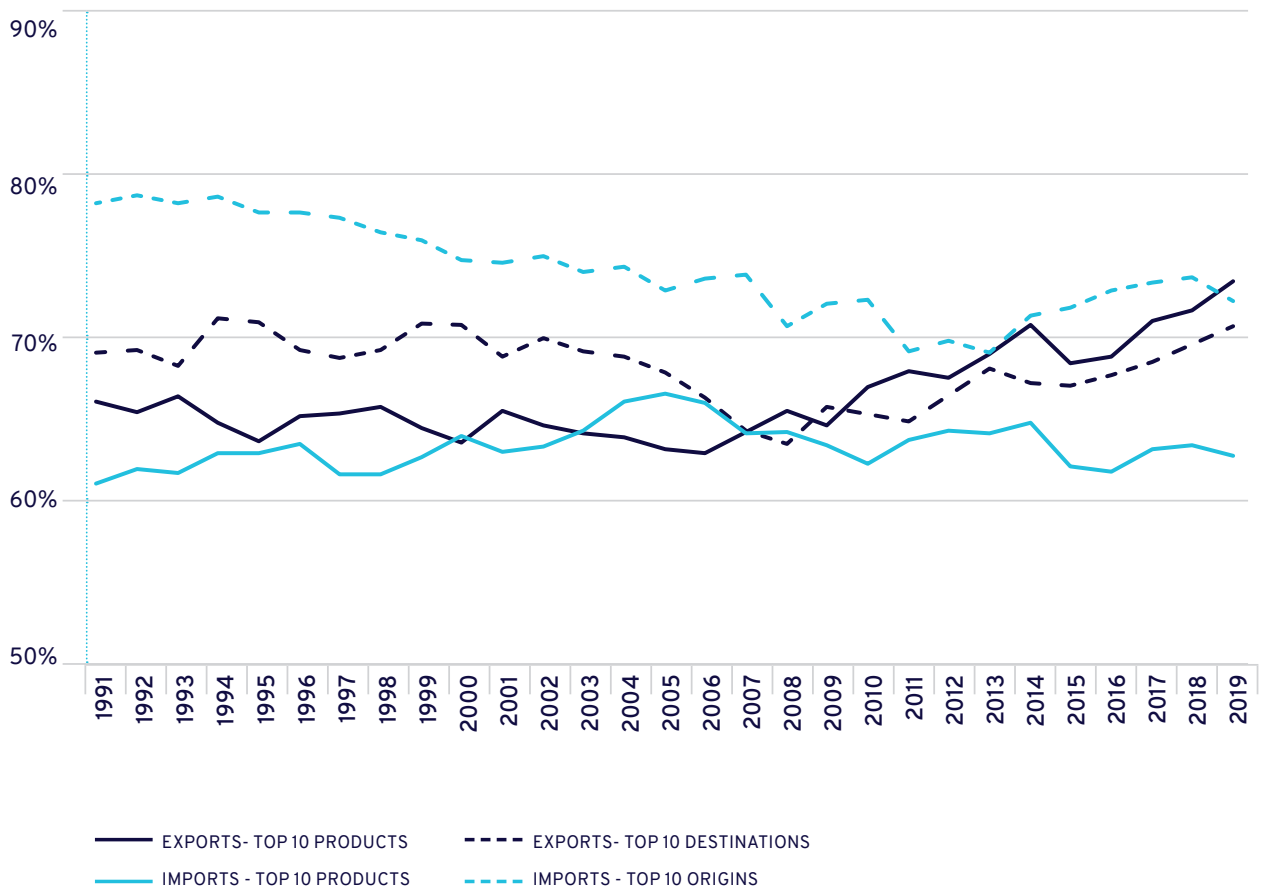
4.2 Economic Sustainability

Economic resilience and diversification of trade

Resilience is an important component of economic sustainability. It is important to have sufficient diversity across export (and import) markets to avoid the risk of undue disruption from a significant downturn or disruption in one particular market. Similarly, there should be sufficient diversity in the types of goods and services that are exported.

However, this needs to be balanced against where a country's comparative advantage in production lies, which may require some concentration to achieve economies of scale or to maximise the efficiency of resource allocation.

Figure 16: Market and product diversity of goods exports and imports



Source: Stats NZ

Note: Products defined at the HS2 level

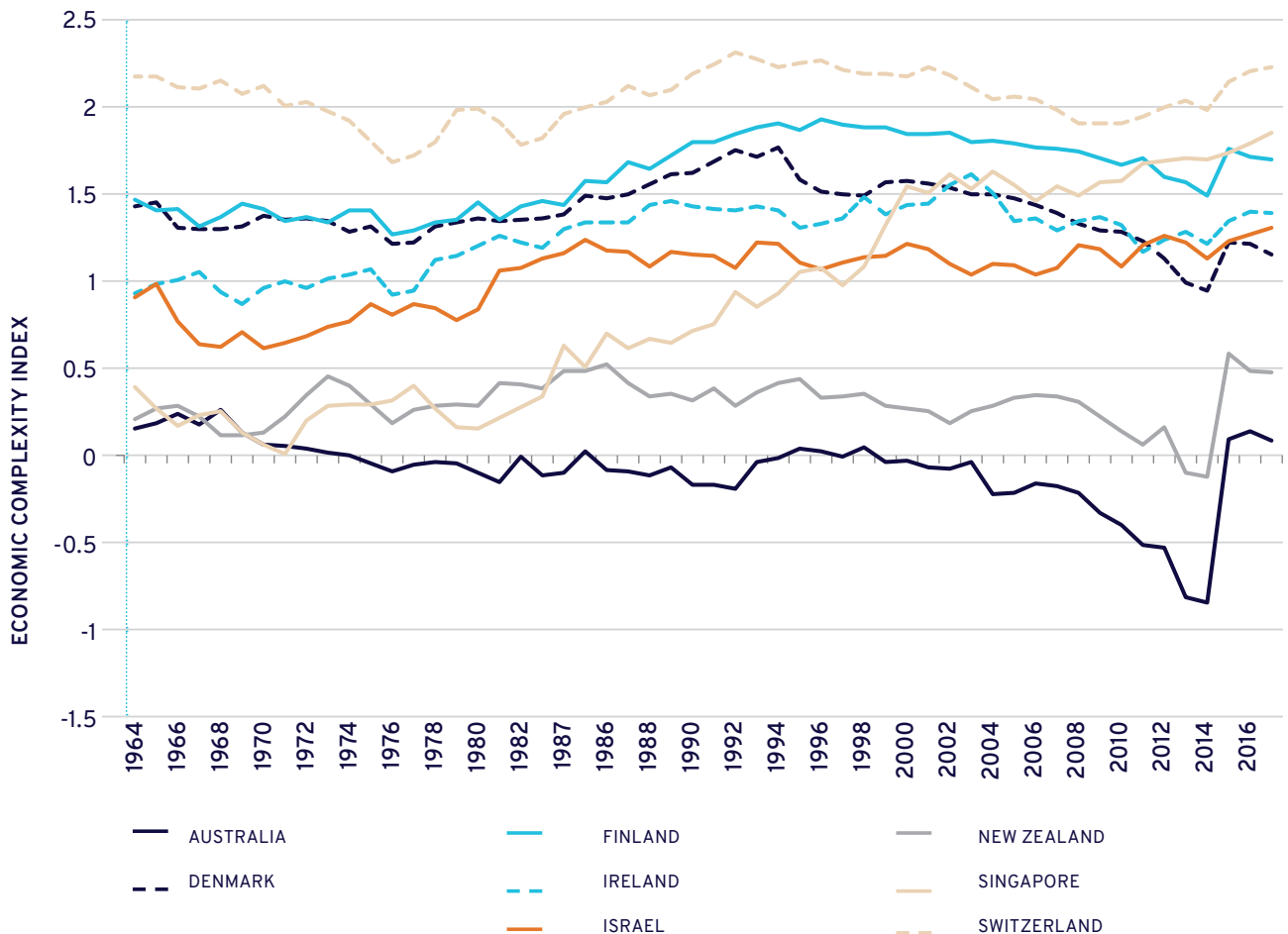
Figure 16 plots the shares of the top 10 merchandise trade partners and top 10 trade products for both exports and imports. By these measures, import diversity has increased somewhat, with the top 10 share of import origins generally declining over time while the share of top 10 products has remained broadly flat. In contrast, export diversity has declined (become more concentrated) since the GFC, with both the top 10 market and top 10 product shares increasing over the past decade or so. Using a Hirschman Herfindahl Index (a commonly used concentration measure) confirms these observations.

However, there is a balance to achieve with diversity. Greater diversity at either a market or product level could come at a cost in terms of productivity or value. For example, more diversity could result in spreading resources too thin and losing economies of scale efficiencies, or some reorientation away from the best-returning product or market.

The Economic Complexity Index (ECI) is a measure of how diversified and complex a country's export basket is. Effectively, it reflects the amount of knowledge that is embedded in the productive structure of an economy and is strongly correlated with a country's level of prosperity in terms of income per capita. It appears to be an indicator/driver of a country's future income growth. Ultimately, countries can only increase their score in the Economic Complexity Index by becoming competitive in an increasing number of complex industries.

However, countries with natural resource endowments can be relatively rich without being complex. This needs to be taken into account when interpreting New Zealand's ECI, given New Zealand's land endowment that has led to a relatively high share of agricultural-based exports that tend to be less complex. Countries with a high share of agricultural or natural resource based exports tend to have a low economic complexity score (Figure 17).

Figure 17: Economic complexity index



Source: Observatory of Economic Complexity

Note: The structural break between 2014 and 2015, prominent for New Zealand and Australia, is due to a methodology change in the index.

Perhaps of more concern is the broadly sideways trend in New Zealand's ECI. This may relate in part to the increasing concentration of export products noted earlier. But it may also be indicative that New Zealand has not been successful in increasing the complexity of export products. This is also likely to have a link to weak productivity performance.

Conclusion

Trade can also contribute to economic sustainability if it maintains or improves New Zealand's resilience to economic shocks. Too much dependence on a narrow set of markets or products increases the risk associated with an adverse outcome in a particular market, although this is mitigated by having market opportunities elsewhere.

New Zealand's import diversity has increased somewhat, particularly in terms of the concentration by origin. In contrast, export diversity has declined (become more concentrated), from both a market and product perspective.

Linked to the increase in export product concentration, New Zealand's Economic Complexity Index, a measure of how diversified and complex a country's export basket is, has declined over time. This decline may also be linked to New Zealand's relatively weak productivity performance discussed in section two.

4.3 Metrics for trade and sustainability

Table 3: Metrics for trade and sustainability

INDICATOR	WHY IT MATTERS	DESIRED TREND	ACTUAL TREND	DATA QUALITY	SOURCE	DATA COMMENTS
Environmental Sustainability						
Production related GHG emissions (Figure 14)	Reducing emissions is necessary for reducing climate change impacts and to meet international commitments	↗	↗		OECD	CO2 embodied in international trade – production and final demand A CO2 equivalent measure, capturing other gasses, would be better if available Not explicitly related to trade Lagged about 4 years
Demand related GHG emissions (Figure 14)		↗	↗			
Emissions levels / emissions efficiency by sector (Figure 13 – shows level(s))	Increased efficiency should contribute to lower aggregate emissions	↗	↗		Stats NZ	Tonnes of CO2 equivalent & tonnes of CO2 equivalent per dollar of value add by industry Not explicitly linked to exports Lagged about 2 years
Emissions efficiency by agricultural export	Increased efficiency should contribute to lower aggregate emissions	↗	↗		FAO	kg CO2eq/kg product Narrow measure that doesn't pick up full impacts Lagged about 3 years
TIMELY AND GOOD QUALITY DATA		SOME ISSUES WITH TIMELINESS AND/OR DATA METHODOLOGY		SIGNIFICANT ISSUES WITH TIMELINESS AND/OR DATA METHODOLOGY		

INDICATOR	WHY IT MATTERS	DESIRED TREND	ACTUAL TREND	DATA QUALITY	SOURCE	DATA COMMENTS
Nitrogen balance and leaching	Reducing these improves local environmental outcomes. A decoupling between pasture based exports and local environment impacts could point to improved efficiency and/or better value add.	↗	↗		OECD Stats NZ / MfE	Kg per hectare or kg Not explicitly linked to exports Lagged about 3 years for balance and 2 years for leaching
Nitrogen and phosphorous concentration in fresh water		↗	↗ (at high level)		Stats NZ / MfE	mg/m3 and/or % of river length that does not meet ANZG DGV Not explicitly linked to exports Lagged about 2 years
Air quality / pollution		↗	↗		Stats NZ	Particulate matter concentrations (PM2.5 and PM10) Lagged up to 5 years
International sea freight emissions	Reducing emissions from transportation is necessary for reducing climate change impacts and to meet international commitments	↗	↗		MfE GHG Inventory MfE GHG Inventory	Tonnes of CO2 equivalent generated by transport to and from NZ Not explicitly linked to exports Lagged about 2 years
International aviation emissions		↗	↗			
TIMELY AND GOOD QUALITY DATA		SOME ISSUES WITH TIMELINESS AND/OR DATA METHODOLOGY		SIGNIFICANT ISSUES WITH TIMELINESS AND/OR DATA METHODOLOGY		

INDICATOR	WHY IT MATTERS	DESIRED TREND	ACTUAL TREND	DATA QUALITY	SOURCE	DATA COMMENTS
Economic Sustainability						
Economic complexity index (Figure 17)	An increasing ECI indicates increasing diversification and/or increased complexity (a proxy for value add) of export basket	↗	↗		Observatory of Economic Complexity	Economic Complexity Index Lagged about 2 years
Product concentration index - exports	A decreasing index indicates reduced product concentration / increased diversification	↘	↘		Statz NZ	Calculate Hirschman Herfindahl Index for each
Product concentration index - imports		↘	↘			
Market concentration index - exports	A decreasing index indicates reduced market concentration / increased diversification	↘	↗			
Market concentration index - imports		↘	↘		Goods and services trade balance as % of GDP	
Current account balance	Indicator for country aggregate trading, saving and investment behaviors	↗	↗		Statz NZ	Current account balance as % of GDP
Trade balance	A surplus or deficit is not inherently bad, however a large balance may signal structural imbalances	↗	↗		Statz NZ	Goods and services trade balance as % of GDP
Terms of trade (Figure 2)	Shows New Zealand's relative purchasing power overseas	↗	↘		Statz NZ	Overseas trade index terms of trade
TIMELY AND GOOD QUALITY DATA		SOME ISSUES WITH TIMELINESS AND/OR DATA METHODOLOGY		SIGNIFICANT ISSUES WITH TIMELINESS AND/OR DATA METHODOLOGY		

5

Inclusiveness

Some population groups and regions in New Zealand persistently experience lower wellbeing, partly as a result of the economy failing to deliver equal opportunities or equitable outcomes. This includes people living in regional areas, those working for Small and Medium-sized Enterprises (SMEs), women, and Māori and Pacific Peoples. By increasing productivity and wages, trade benefits these groups – but it may also be a source of further dislocation.

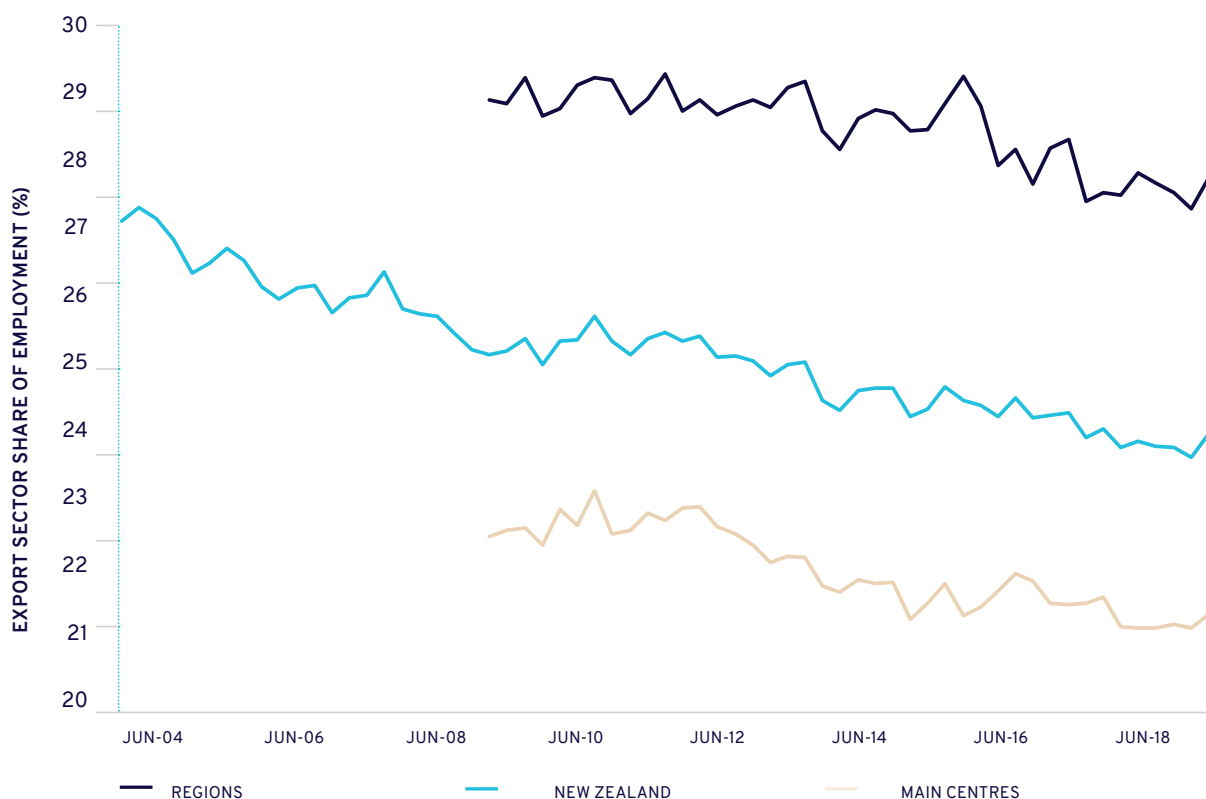
There are challenges assessing and monitoring trade and inclusiveness due to the lack of data and limited academic studies exploring the relationships. As with the relationship between productivity and sustainability and trade, domestic policy settings will have an important bearing on the linkages between trade and inclusiveness.

5.1 Regional Economies ²⁰

New Zealand’s regional economic performance

In New Zealand, the share of export-related employment in regions is higher than the main urban centres (Figure 18). This primarily reflects the regional nature of export-intensive primary production and tourism. However, much of the associated knowledge-intensive and high value-added business activity (even within the primary sector) occurs in the main urban centres, meaning the regions may not capture some of the positive benefits associated with international trade.

Figure 18: Export share of employment



Source: Stats NZ, MFAT

One key challenge in unlocking the trade-potential of regions is the difficulty for firms located outside of the main centres to access agglomeration benefits. When complementary firms locate in close proximity to each other, this boosts firm productivity through allowing greater specialisation, and the transfer of technology and knowledge.

Agglomeration forces can attract people and resources away from the regions, with many of New Zealand's more export-intensive, larger, and higher paying firms clustering in hubs in the main urban centres – particularly Auckland.

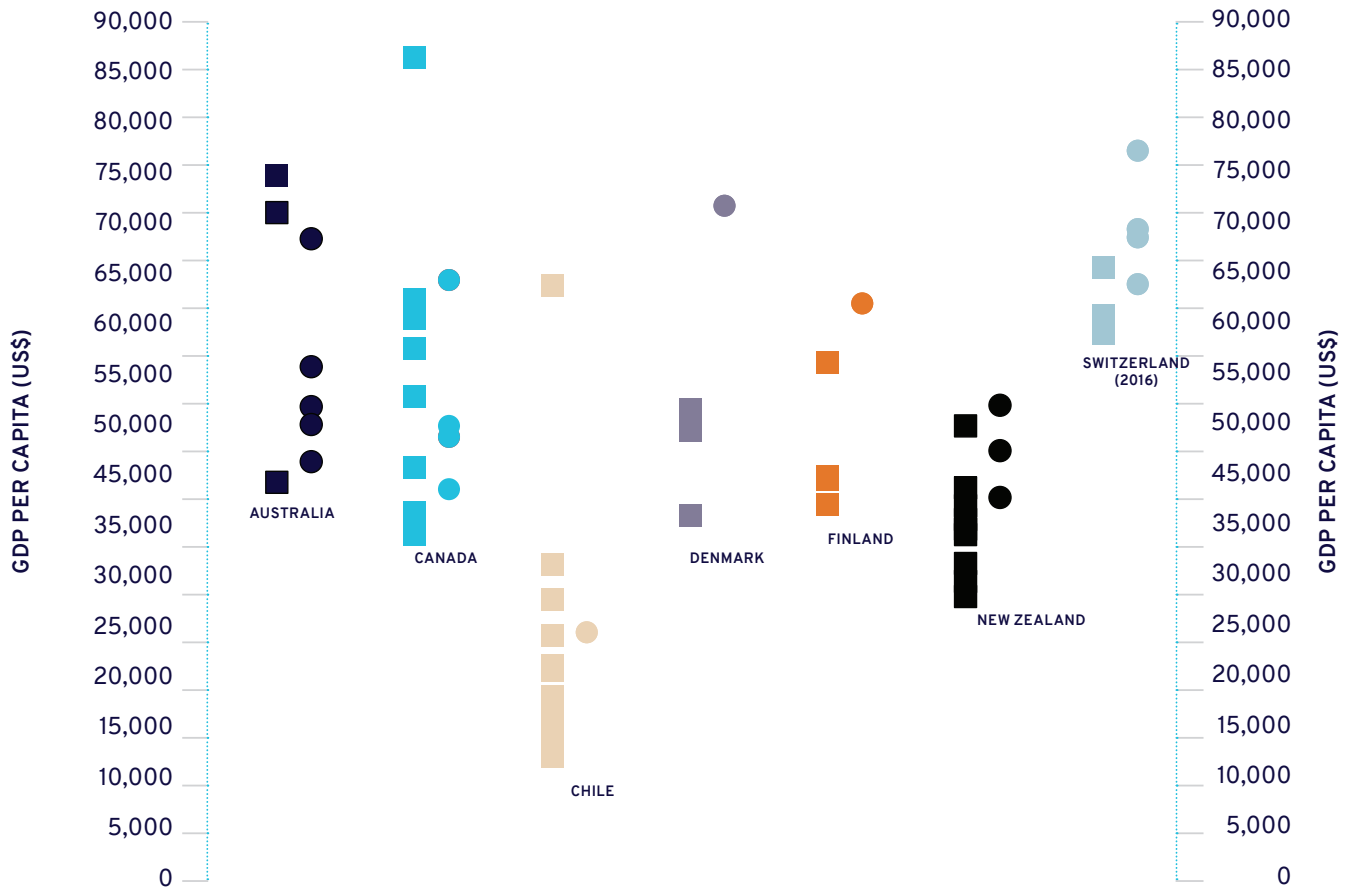
Average regional GDP per capita for 2018 was roughly 20 percent less than average urban centre GDP per capita. Household incomes in regional areas trail urban ones by a similar proportion. And unemployment rates are roughly 14 percent higher outside the cities. These aggregate statistics are also consistent with studies using firm level data. For example, labour productivity in Auckland firms is estimated to be 13.5 percent higher than other urban areas and 11.3 percent higher than rural areas (Mare 2016).

The connectivity of regional economies to the main urban centres is also made more difficult by New Zealand being a long, thin and sparsely populated country. Small, insular, and geographically-segmented regional markets compound the challenge of New Zealand being distant from foreign markets.

Compared to other small advanced economies countries, New Zealand appears to be toward the lower end of the rankings when it comes to urban-regional divergence (Figure 19). In terms of income, New Zealand's regional and urban areas are more tightly clustered than Australia, Canada and Chile. Mineral-rich Northern Territory and Western Australia, North West Territories, and Antofagasta respectively stretch the top end of these countries' income distributions. New Zealand's urban and regional areas are also more tightly clustered than either Denmark or Switzerland where service hubs Copenhagen and Zurich tug the upper tail.

²⁰ "Regional economies" refers to those outside of the Auckland, Wellington or Canterbury regions which have different characteristics due to their major urban centres.

Figure 19: GDP by region for New Zealand and selected countries (2017 unless stated)



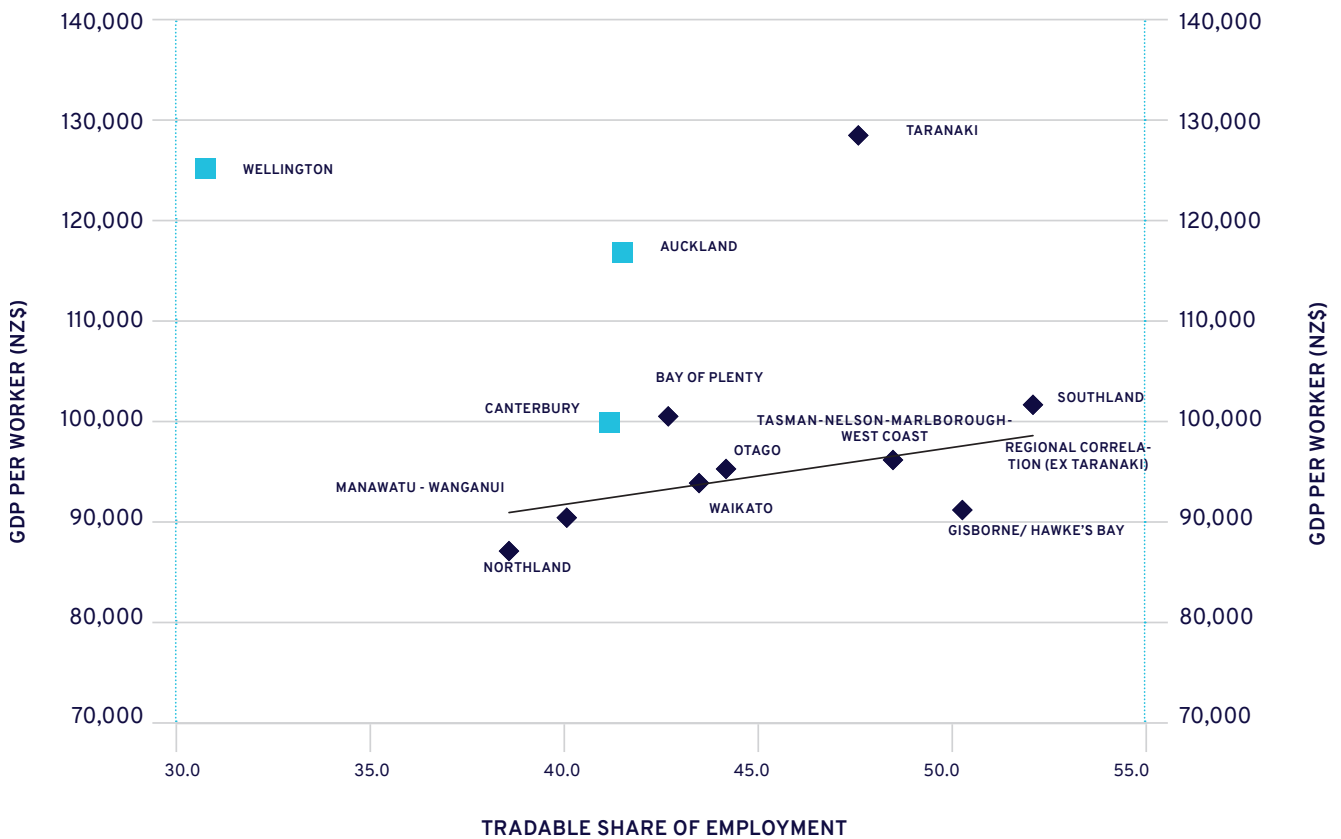
Source: OECD

Circles are more urban areas, squares regional areas

New Zealand regions with greater international connections tend to experience better economic outcomes

At a regional level (i.e. excluding the main urban centres), the tradable share of employment is positively correlated with household income and productivity (measured as GDP per worker, Figure 20), and negatively correlated with the unemployment rate. These correlations become somewhat stronger when Taranaki, which is an outlier (at least on the income and productivity measures), is excluded.

Figure 20: Regional GDP per worker and tradable employment (year to March 2018)



Source: NZIER, Stats NZ

These data suggest that regions with higher tradable sector activity – and therefore, greater international connections – tend to experience better outcomes around incomes and employment. This is consistent with results at the firm-level and aggregate economy level.

Of course, these simple correlations with the tradable share of employment shed no light on the causality of the relationship i.e. whether being more involved in trade leads to successful regions, or whether successful regions are more likely to get involved in trade.

Conclusion

Tradables employment is higher in New Zealand’s regional economies, reflecting in large part the regional nature of export-intensive primary production and tourism. However, economic outcomes tend to be weaker in the regions, with incomes lower and unemployment higher. This may reflect agglomeration effects that benefit regions with major urban centres (particularly Auckland). For example, much of the knowledge-intensive and high value-added business activity associated with trade (even within the primary sector) occurs in the main urban centres.

There is some evidence that New Zealand regions with greater international connections tend to experience better economic outcomes, even if they lag urban centre outcomes. However these observations of correlations shed no light on the causality of the relationship i.e. does greater trade lead to more successful regions or do more successful regions tend to be more involved in trade?

While there is a divergence between economic outcomes in urban centres compared to the regions, this divergence is less pronounced than many other countries. New Zealand's regional income gaps are smaller than other OECD countries and about average compared to small advanced economies. In part this stems from no real "outlier" regions in New Zealand; other countries often have a resource-rich region or service-hub city that create larger gaps. The closest example in New Zealand is Taranaki, which is not particularly divergent from the rest of the country in a global sense.

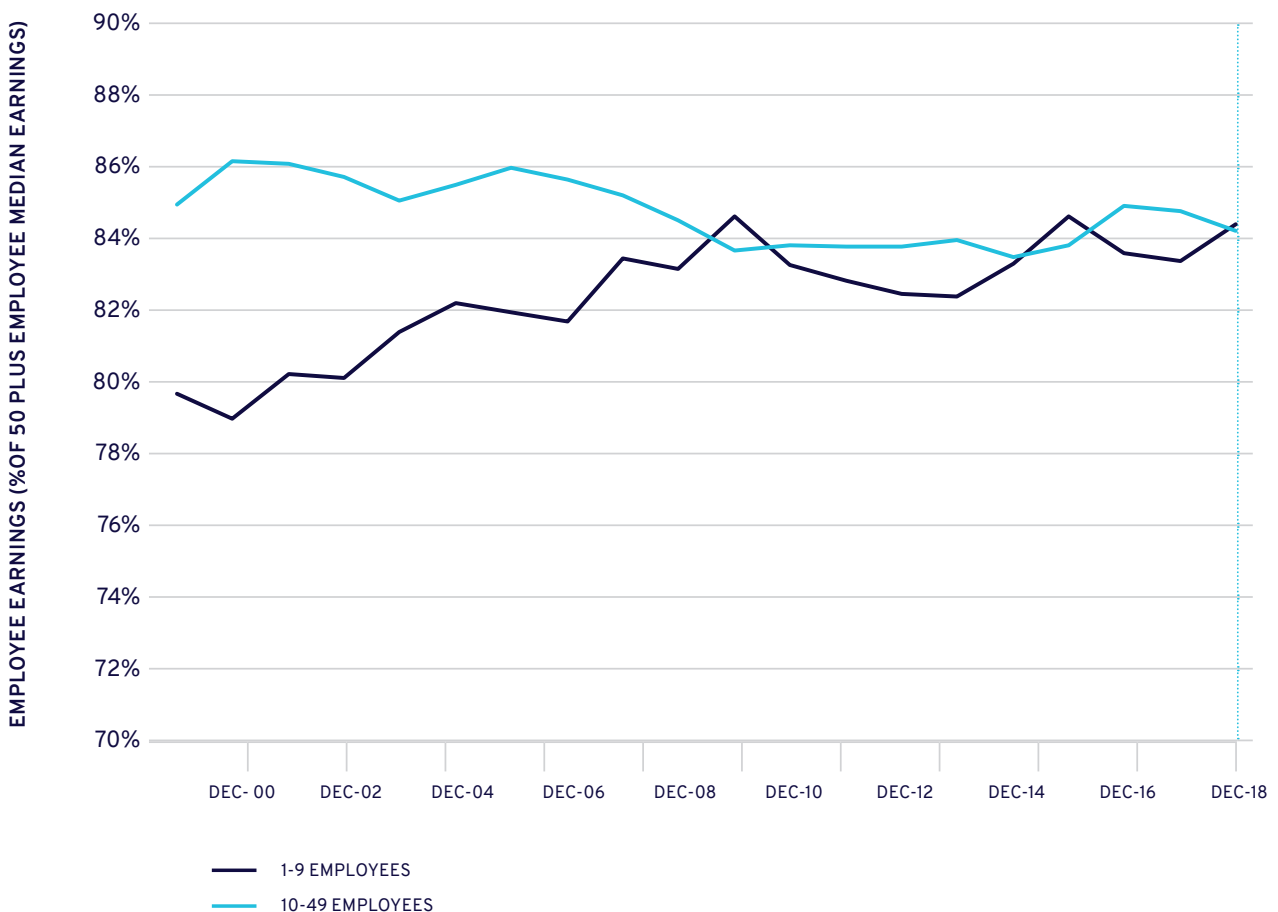
5.2 Small and Medium Size Enterprises

Composition of New Zealand businesses

Most of New Zealand's businesses and traders are small. SMEs (defined as having less than 50 employees in this report) account for 99 percent of New Zealand's businesses.²¹ Given the prevalence of SMEs in New Zealand's business landscape, the majority of New Zealand's exporters are SMEs, although they only make up a small fraction of total trade.

Despite a high number of SME exporters in absolute terms, the participation rate of SMEs as direct exporters is relatively low. In 2018, less than a quarter of New Zealand SMEs export (this figure excludes firms less than 6 employees; including these smaller firms would further reduce export participation). This compares to one third of large firms.

Figure 21: Employee Earnings Proportional to Large Firms



Source: Stats NZ

That said, more SMEs export indirectly by supplying goods and services to larger domestic firms that export. Most New Zealand farms will be in this category: for example, 87 percent of the output from dairy cattle farming is ultimately exported, but very few dairy farms export directly. Many SMEs also engage in – and benefit from – international trade as importers of competitively priced foreign inputs and technology.

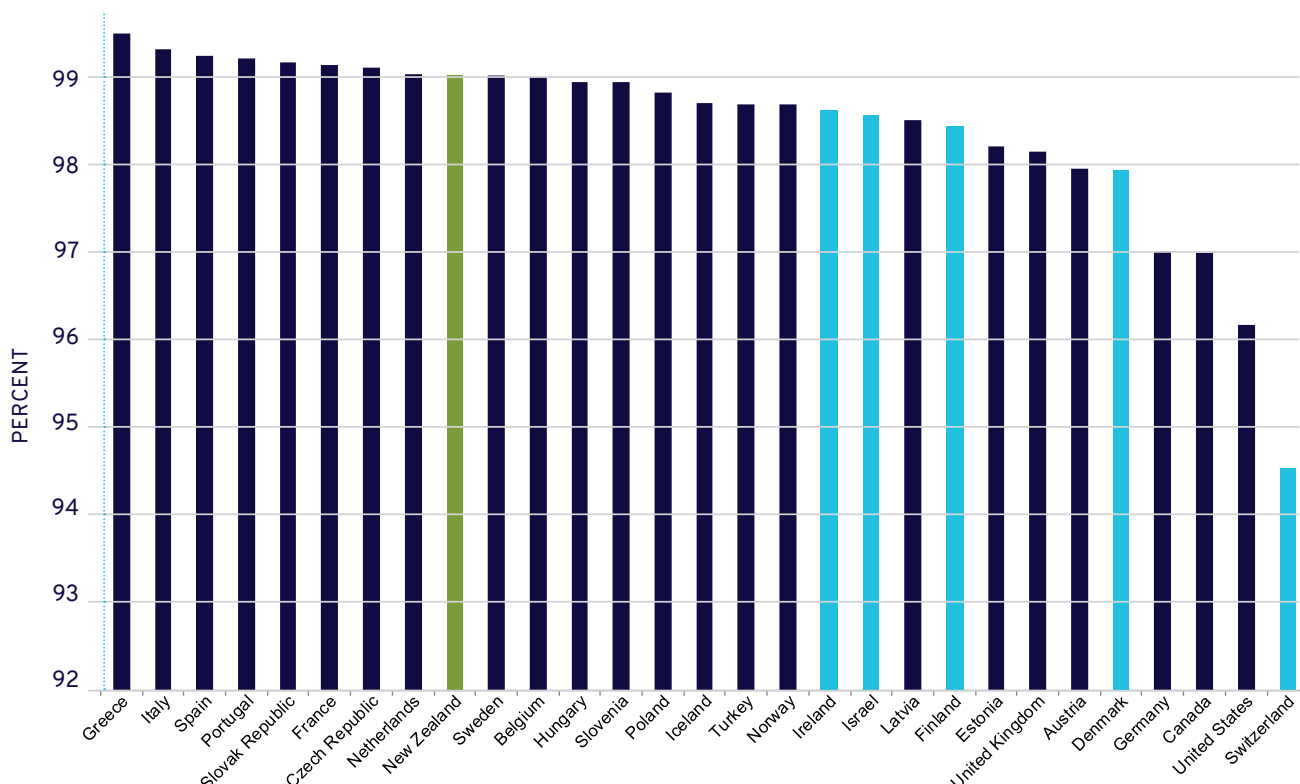
Wages for smaller firms are generally lower than for larger firms. Average pay per worker is around 15 percent lower in SMEs (Figure 21). The gap between ‘small’ (1-9 employees) and ‘medium’ (10-49 employees) businesses closed in the decade prior to the GFC. Over the past few years there has been little difference between different sized SMEs on these aggregated measures.

International comparisons of small and medium enterprises

Although data limitations make cross-country comparisons difficult²², the main trends we see in New Zealand appear similar to other small advanced economies and developed economies more generally.

First, among OECD countries, nearly all businesses are SMEs (Figure 22), with Switzerland having the lowest proportion at 95 percent. New Zealand SMEs do, however, appear to be smaller than in most OECD countries with a relatively small proportion of SMEs having between 10 and 50 employees. Firms of this size account for only 4 percent of New Zealand’s firms, which is the lowest share among our SAEI peers (excluding Singapore) – see figure 23.

Figure 22: SME share of total firms (SAEI countries denoted in light blue, 2016)

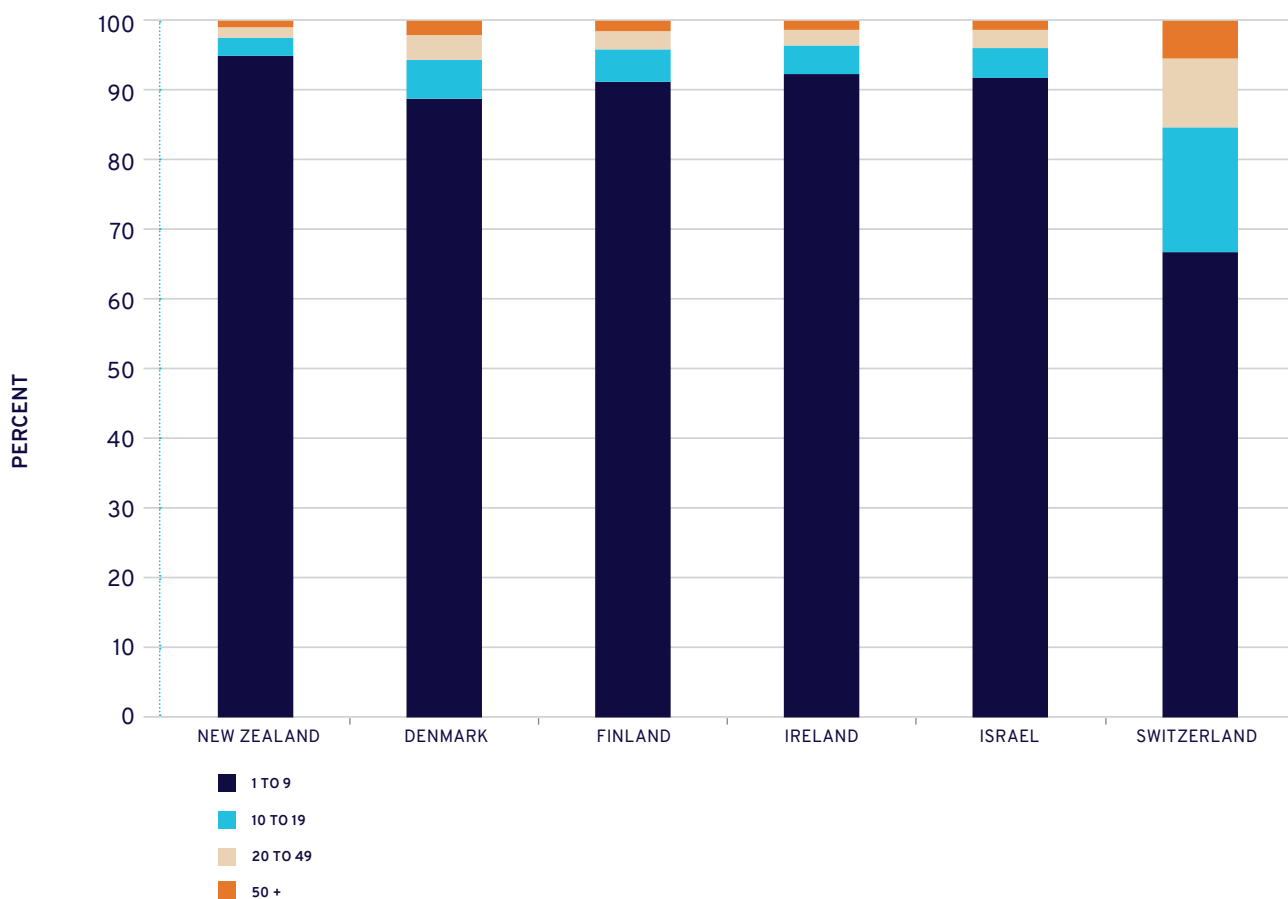


Source: OECD

²¹ There are no universally accepted definitions of what defines “micro”, “small”, “medium” and “large” firms. Under some definitions, such as the OECD’s, a SME is defined as having fewer than 250 employees, with a “medium” firm having between 50-249 employees, and a “large” firm 250 or more employees.

Second, globally there is generally a positive relationship between enterprise size and participation in trade – similar to what we see in New Zealand. This trend reflects the increased costs (both fixed and variable) associated with trade that disproportionately affect the ability of smaller firms to participate in trade. The WTO reports that in developed economies only 9 percent of industrial firms with less than 10 employees are exporters. This compares to 38 percent of firms with 10 to 49 employees, and 58 percent and 66 percent of larger firms with 50 to 249 employees and 250+ employees respectively.

Figure 23: Proportion of firms by number of persons employed (2016)

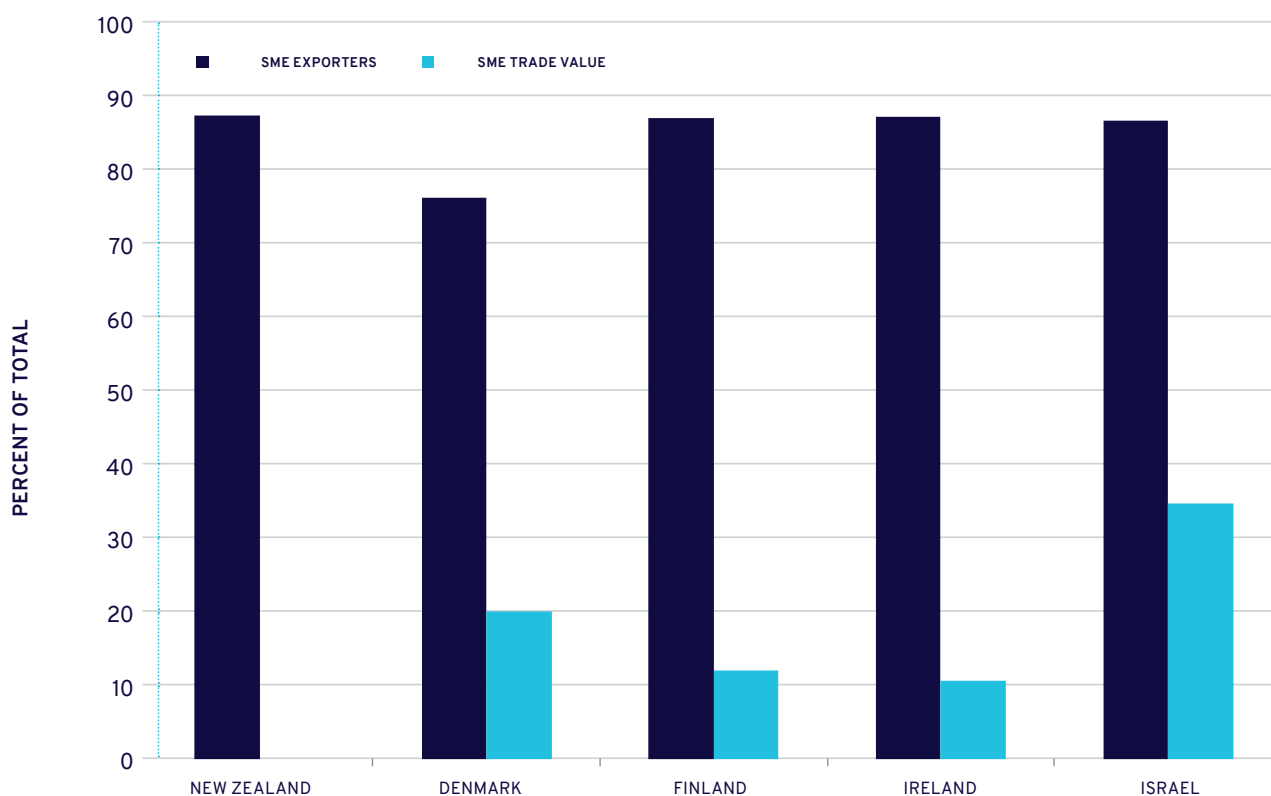


Source: OECD

²² For example, New Zealand's statistics show a relatively large number of enterprises: 50 – 70 percent more than in Denmark, Finland and Ireland – which all have larger populations than New Zealand. While part of the difference could be genuine and be due to smaller enterprises in New Zealand, New Zealand's data for very small enterprises may be inflated by the inclusion of enterprises such as dormant companies.

Although New Zealand's data on export participation can't be easily compared across countries, the proportion of New Zealand's exporting firms that are SMEs is similar to in other SAEI countries (figure 24). That said, New Zealand's share would be a bit higher than shown in figure 24 if it included data for exporting firms with between 1 and 5 employees (which are captured in the other countries' statistics).

Figure 24: SME share of exporting firms and of total export value (2017)



Source: Stats NZ, OECD

Note: New Zealand data doesn't include firms with less than 6 employees.

New Zealand's SME performance

New Zealand's SMEs account for around 40 percent of employment and 35 percent of value-added – suggesting they are less productive on average than larger firms. SMEs can face many challenges relative to large firms including difficulty taking advantage of economies of scale, getting access to credit or investment, or lack of appropriate skills.

Stronger participation by SMEs in global markets can help SMEs learn, evolve and exploit economies of scale, reinforcing growth and employment, and enhancing productivity. As discussed in the section on productivity, exporting firms – or firms engaged in international trade more broadly – tend to be more productive than firms selling only into the domestic market. Research by the OECD suggests that in countries where export propensity by SMEs is higher (measured as SME's share of exports divided by the share of output), the wage gap between SMEs and large firms is smaller.

The rise of GVCs over the past two decades offers new opportunities for SMEs to engage in international markets – whether as direct exporters, suppliers to large firms that export, or importers of competitively priced foreign inputs and technologies. Technological progress, including the expansion of e-commerce, may help to reduce barriers for SMEs to engage in trade.

Conclusion

Globally, there is generally a positive relationship between enterprise size and participation in trade. This reflects the costs associated with trade, which affect SMEs relatively more than larger businesses. Research by the OECD suggests that in countries where export propensity by SMEs is higher, the wage gaps between SMEs and large firms are smaller.

Most of New Zealand's businesses and traders are small. SMEs account for 99 percent of businesses and hence, given this prevalence, the majority of exporters are SMEs. New Zealand's business profile is similar to other countries, although New Zealand SMEs tend to be smaller on average than their international peers. New Zealand SMEs also appear to engage in exporting at a similar rate to their international peers.

Wages for New Zealand SME employees are generally lower than for larger firms. This likely reflects lower productivity in SMEs; SMEs account for about 40 percent of employment nationally but only 35 percent of value add. Increasing SME participation in trade may be one way to improve productivity and wages in SMEs relative to larger companies.

New Zealand data on SMEs exports and imports is not readily accessible, with the lack of the equivalent of the OECD Trade by Enterprise Characteristic a notable issue. Without this data it is difficult to determine exactly how export oriented SMEs are. International comparisons also need to be treated cautiously due to differing definitions and measurement of SMEs.

5.3 Gender

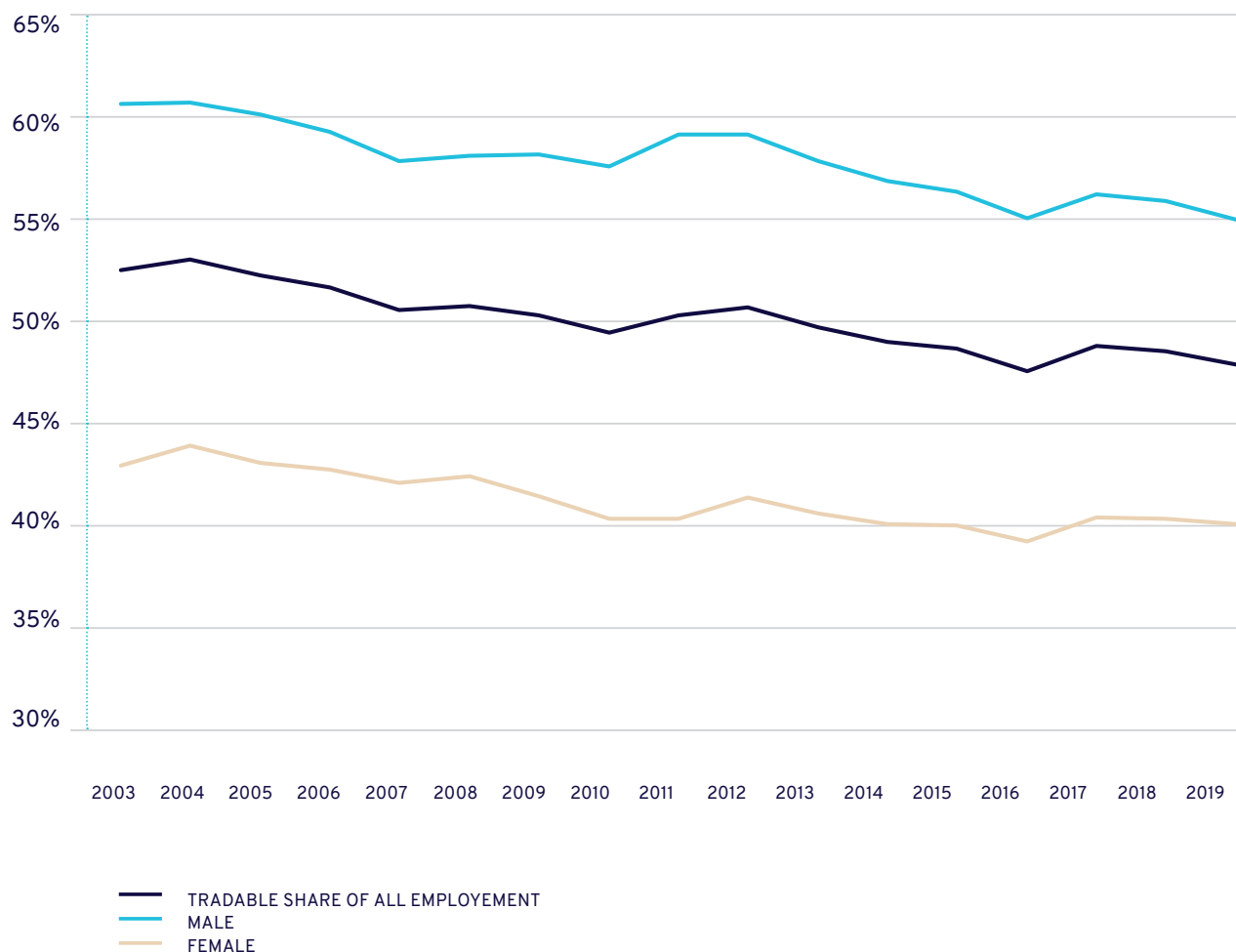
Women as employees

In New Zealand, female employment in the tradable sector is low relative to men (Figure 25). About 40 percent of employed women work in the tradables sector compared to 55 percent of employed men, reflecting the high representation of women in largely non-tradable service sectors like health and education. (Women make up just under 50 percent of the total workforce). Other economies such as Canada and the European Union have similar trends of relatively low female participation in export or tradable sectors, although the topic of trade and women's economic empowerment is relatively unexplored in a developed country context.²³

As a result, women are less likely to receive the benefits of higher productivity and wages associated with stronger international connections. Similarly, the benefits of any new policies that increase opportunities for the tradable firms are more likely to accrue to men.



Figure 25: Female and Male Employment in Tradables Sectors



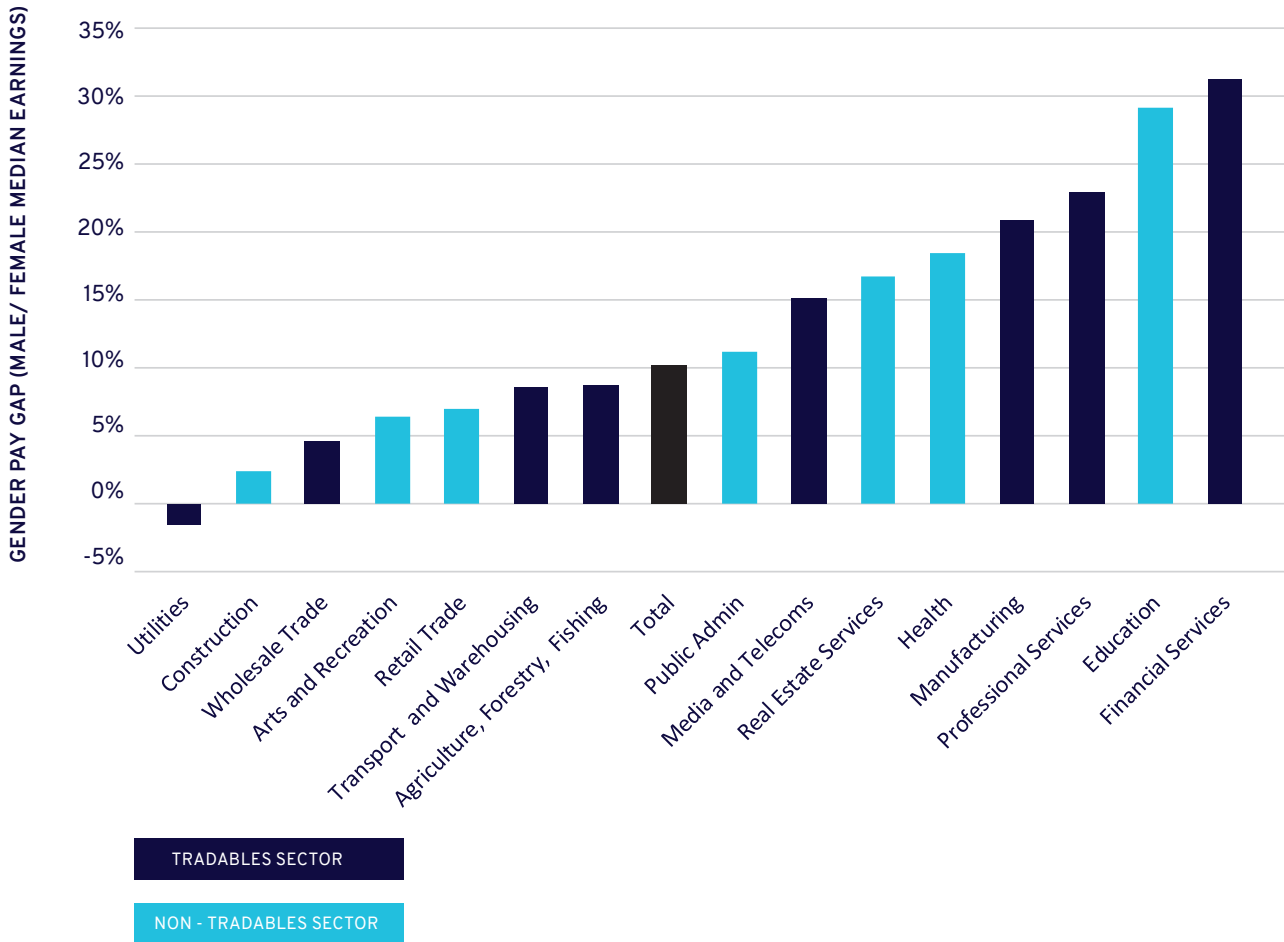
Source: Stats NZ, MFAT calculations

It is unclear whether there are specific barriers to female participation in the tradable sector – for example, mismatches in qualifications and skills or biases against women working in particular jobs or industries – or whether the employment outcomes observed reflect different employment preferences of males and females.

Ensuring any barriers are removed and increasing employment opportunities for females in the tradables sector could help to narrow the tradables employment gap and improve the earnings prospects of females in New Zealand. However, this may not be enough to reduce New Zealand’s overall gender pay gap, given indicative evidence of large pay gaps in some tradable sectors (Figure 26). Another way to help narrow the tradable sector gender employment gap could be lifting trade exposure in sectors (mostly services-orientated) that have higher shares of female employment, although this could be challenging for some sectors such as health.

²³ Existing research on gender and trade focuses on developing countries. It suggests that international commerce reduces income inequality. Much of this effect is related to women moving from rural areas to cities, and from employment in agriculture (often subsistence agriculture) to more productive sectors – including services and industry.

Figure 26: Gender earnings gap by sector



Source: Stats NZ

Note: This is indicative only as industries are defined as tradable or non-tradable at the very broad ANZSIC06 industry level.

Women as business owners

Another angle to assess trade and women’s economic empowerment is through women as business owners. Female-owned firms could directly engage in trade or indirectly as suppliers to exporters in global value chains or through import competition.

While there is no data in New Zealand looking specifically at female-owned businesses and trade, statistics on female entrepreneurship suggest that female-owned businesses are less likely to be engaged in trade than male-owned counterparts for (at least) a couple of reasons. Firstly, female-owned businesses tend to be smaller which can make it harder to engage internationally due to the fixed costs involved (see the SME section for example). And secondly, female-owned businesses are more likely to be involved in the production or delivery of services which tend to be less tradable than goods. ²⁴Overseas research has identified some barriers to female-owned firms’ participation in trade, including barriers or poor access to finance, training and networks.

²⁴According to OECD data, 80 percent of self-employed females (including those with employees) are in services industries compared to 66 percent of self-employed men.

Conclusion

The link between trade and women's economic empowerment is relatively unexplored in a developed country context. It is unclear whether there are specific barriers in New Zealand to female participation in the tradable sector or whether the employment outcomes observed reflects different preferences of males and females, including factors such as gender norms around parenting and caring.

In New Zealand, female employment in the tradable sector is low relative to men. Female-owned businesses are also less likely to be engaged in trade, partly because they tend to be smaller and more likely to be involved in services. As a result, women are less likely to receive the benefits associated with stronger international connections. Other economies such as Canada and the European Union have similar trends of relatively low female participation in export or tradable sectors.

Increasing female participation in tradables sectors could help improve economic outcomes for women. However, it may not reduce New Zealand's overall gender income inequality as pay gaps tend to be higher in tradables sectors. Lifting the trade exposure of sectors (mostly services-oriented) with higher shares of female employment may be another way to narrow the tradable sector gender employment gap.

5.4 Ethnicity

Māori business involvement and employment in tradables sectors

Much of Māori business exposure to trade stems from a relatively high share of land and other primary sector assets within the overall Māori asset base. Altogether, Māori enterprises account for 40 percent of New Zealand's forestry, 50 percent of the country's fishing quota, 30 percent of sheep and beef production and 10 percent of dairy production²⁵. In 2018, Māori authority businesses employed over 12,000 workers, up 50 percent from 2010, and Māori SMEs employed a further 8,000 people (up 40 percent from 2010).²⁶

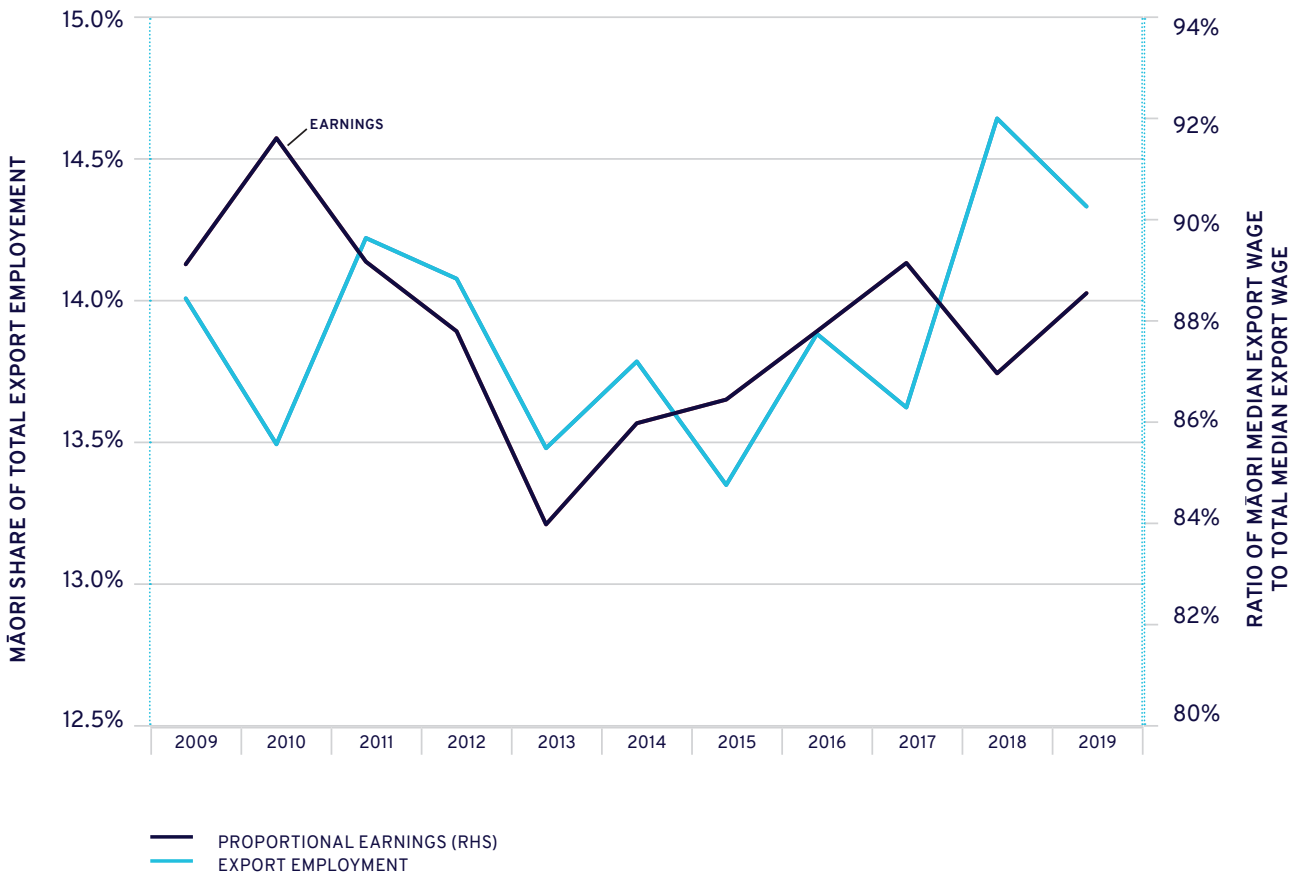
Evidence suggests that despite government efforts to address social and economic disparities in New Zealand, the historical effects of colonisation are still visible in outcomes for Māori today. Over the past decade, the median Māori wage has stagnated at roughly 15 percent less the European wage and 10 percent less the median wage. Unemployment among Māori is currently about 5 percentage points higher than European unemployment and at times over the past decade the difference has been almost twice that. These economic disparities have tangible adverse effects on Māori health and well-being.

From 2009 to 2019 the share of Māori employed in export sectors has remained relatively stable around 14 percent, a little higher than their share of overall employment (around 13 percent). That said, for the more broadly defined tradables sector, the shares are similar to non-tradables (both about 13 percent). Notwithstanding the significant interdependence between the success of the Māori economy and New Zealand's export sector, it should not be assumed that the flow of benefits to Māori is without its challenges. Māori median export wages are about 10 percent less than the overall median export wage. For tradables wages, the difference is about 15 percent (similar to the total wage gap for Māori).

²⁵ Chapman Tripp Te Ao Māori Trends and Insights Pipiri 2017

²⁶ <https://www.stats.govt.nz/information-releases/tatauranga-umanga-maori-statistics-on-maori-businesses-201718>. Māori business statistics are based on businesses that can be readily identified as Māori enterprises and are not an exhaustive list. The employment estimates are therefore likely to be a lower bound. For example, Ngai Tahu alone employed nearly 22,000 people in 2016.

Figure 27: Māori Export Employment and Earnings

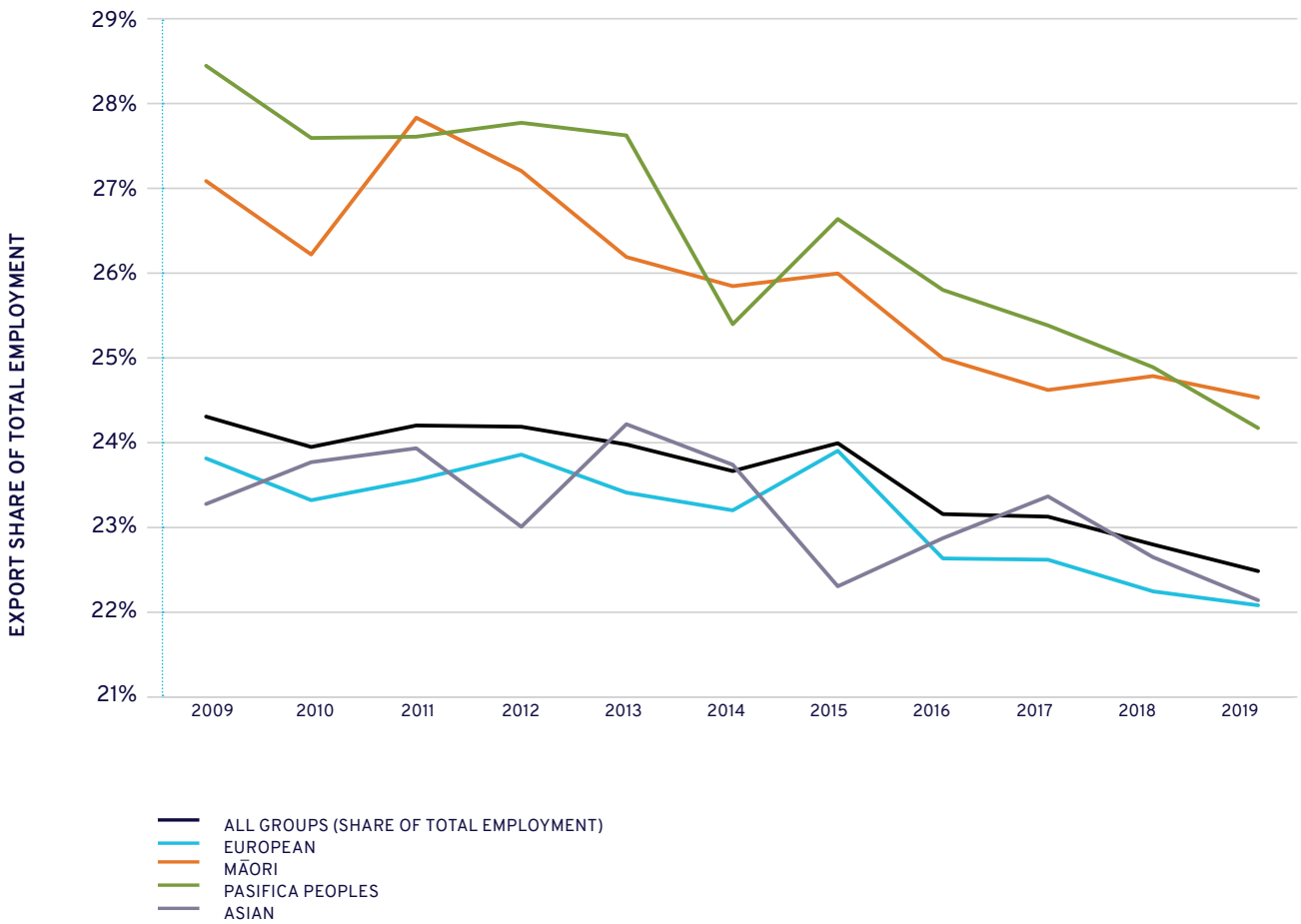


Source: Stats NZ, MFAT calculations

Export and tradables employment for other ethnic groups


The share of export employment for Pacific Peoples (and Māori) tends to be higher than for Europeans and higher than the national export employment share (Figure 28).

Figure 28: Export employment by ethnic group



Source: Stats NZ, MFAT calculations

Note: Due to small sample size for some industry and ethnic combinations data was suppressed by Stats NZ. In these cases MFAT interpolated estimates, which does not alter the overall shares.



The higher share comes largely through high concentrations of Pacific Peoples employment in the related, export-oriented Manufacturing and Transport, Postal and Warehousing industries. Employment in Agriculture, Forestry and Fishing industries is also relatively high. By contrast, the Asian share of export employment is broadly similar to that of the national export share. However, when it comes to tradables employment, employment of Pacific Peoples and Asians is not materially different to their respective overall shares of employment.

International comparisons of export employment by indigenous peoples

Ethnicity, race and nationality intersect in complex ways, making clean international comparisons difficult. Australia and Canada both have indigenous populations with some parallels in their colonial histories and current economic outcomes to Māori. In terms of income inequality for example, Canadian indigenous peoples earn roughly 90 percent of non-indigenous incomes. Australian aboriginal peoples and Torres Strait Islanders are similarly disadvantaged.

Conclusion

Māori and Pacific Peoples' economic outcomes lag those of other New Zealanders, in turn contributing to lower socio-economic outcomes. Policies which support greater participation in the tradable sector by Māori and Pacific Peoples may contribute to bridging the economic divide.

Māori and Pacific Peoples are reasonably well engaged with trade. Māori and Pacific Peoples are more likely to be employed in export industries than other groups, although their share of employment in tradables sectors is broadly in line with other groups. Māori businesses account for significant shares of the forestry, fishing and sheep and beef sectors. However, Māori and Pacific Peoples have tended to earn less in tradables sectors than other New Zealanders.

International comparisons of ethnic outcomes are difficult. However, there is some evidence that Australian and Canadian indigenous populations have experienced similar outcomes to Māori.

5.5 Metrics for trade and inclusiveness

Table 4: Metrics for trade and inclusiveness

INDICATOR	WHY IT MATTERS	DESIRED TREND	ACTUAL TREND	DATA QUALITY	SOURCE	DATA COMMENTS
Regional economies						
Share of export/tradables employment by region	Increasing employment in more productive tradables sector should increase regional productivity and incomes	↗	↗		Statz NZ	Stats NZ HILFS data MFAT calculations (see Bailey and Ford, 2018)
Export/tradables sector productivity by region	Increasing export/tradables sector productivity should lead to higher regional incomes	↗	N/A	N/A	Statz NZ	Could potentially be constructed using the Bailey/Ford approach and Stats NZ regional GDP data
Small and Medium Enterprises						
Share of SMEs engaged in exports	Higher export propensity by SMEs tends to lead to higher productivity and reduced earnings gaps with large firms	↗	↗			Business exports by Business Size, share of SMEs with non-zero exports Annual data (BOS)
Share of SMEs income from exports		↗	N/A	N/A	Statz NZ	New Zealand lacks the equivalent of the OECD Trade by Enterprise Characteristics database broken down by business size Could potentially be accessed through LBD
SME earnings gap with large firms (Figure 21)		↗	↗		Statz NZ	Ratio of SME earnings per employee to large firm earnings per employee Not directly linked to exports Lagged about 1 year, LEED data
TIMELY AND GOOD QUALITY DATA		SOME ISSUES WITH TIMELINESS AND/OR DATA METHODOLOGY		SOME ISSUES WITH TIMELINESS AND/OR DATA METHODOLOGY		SIGNIFICANT ISSUES WITH TIMELINESS AND/OR DATA METHODOLOGY

INDICATOR	WHY IT MATTERS	DESIRED TREND	ACTUAL TREND	DATA QUALITY	SOURCE	DATA COMMENTS
Gender and Ethnicity						
Female share of tradables employment (Figure 25)	Increasing employment in more productive tradables sector should increase female incomes	↗	↗		Stats NZ	Stats NZ HLFS data MFAT calculations (variation on Bailey and Ford, 2018)
Female share of median earnings in tradables sector		↗	↗			
Māori share of tradables employment	Increasing employment in more productive tradables sector should increase Māori incomes	↗	↗		Stats NZ	Annual data (June qtr HLFS) Question over how rigorous the median wage estimates are following this approach given weighting and other issues
Māori share of median earnings in tradables sector		↗	↗			
Pacific Peoples share of tradables employment	Increasing employment in more productive tradables sector should increase Pacific Peoples incomes	↗	↗		Stats NZ	
Pacific Peoples share of median earnings in tradables sector		↗	↗			
Share of Māori ownership by asset / asset type	Increasing ownership in more productive tradables sector should increase Māori incomes	↗	N/A		Stats NZ	May be obtainable through the Longitudinal Business Database
Share of Māori owned export businesses		↗	N/A			
Share of women owned export businesses	Increasing ownership in more productive tradables sector should increase female incomes	↗	N/A			
TIMELY AND GOOD QUALITY DATA						
SOME ISSUES WITH TIMELINESS AND/OR DATA METHODOLOGY			SIGNIFICANT ISSUES WITH TIMELINESS AND/OR DATA METHODOLOGY			

6

Conclusion

This paper presents initial analysis examining the linkages between trade and productivity, sustainability and inclusiveness, with a focus on trends that may be influenced by trade and trade policy. The analysis has largely been descriptive in nature and focused on correlation.

Future research will focus on what factors may have caused this uneven distribution of benefits and costs, including trade and domestic policy settings. This forthcoming research will aim to inform and improve future policy development.

Section two noted the important contribution that trade makes to the New Zealand economy. Around a quarter of employment is directly related to exporting, while about half of employment is in the internationally exposed tradables sector.

Section three covered reasonably familiar ground – New Zealand’s poor productivity performance, both in growth terms and relative to other countries. Productivity in New Zealand’s tradables sector is materially higher than in the non-tradables sector, suggesting that part of New Zealand’s poor aggregate productivity performance may stem from a relatively small tradables sector.

Section four focused on environmental and economic sustainability. Trends in environmental statistics at a national level were negative for exports and imports. However, evaluation of environmental impacts needs to be considered in the context of policy settings in place at the time and where New Zealand’s comparative advantage lies. Specialising in agriculture production where New Zealand is relatively environmentally efficient reduces New Zealand’s global environmental impact.

Trends in economic sustainability, examined from a resilience lens, were more mixed. New Zealand’s exports have become less diversified and less complex in the last decade while imports have become more diversified.

Section five examined inclusiveness from four different angles: regional economies, SMEs, gender and ethnicity. Tradables employment is higher in New Zealand’s regional economies but economic outcomes weaker. Those regions with greater international connections tended to experience better outcomes. New Zealand’s urban-regional divergence is less pronounced than many other countries.


Most New Zealand businesses are small and most exporters are SMEs, although it is difficult to know how much export value is generated by SMEs. Wages for New Zealand SME employees are generally lower than for larger firms, potentially reflecting lower productivity. New Zealand’s business profile is similar to other countries.

In New Zealand, female employment in the tradable sector is low relative to men and female-owned businesses are less likely to be engaged in trade. Other economies such as Canada and the European Union have similar trends of relatively low female participation in export or tradable sectors. Gender pay gaps tend to be higher in tradables sectors than non-tradables sector.

Māori and Pacific Peoples are more likely to be employed in the export workforce than non-Māori and Māori businesses account for significant shares of the forestry, fishing and sheep and beef sectors. However, Māori have tended to earn less in tradables sectors than other New Zealanders. There is some evidence that Australian and Canadian indigenous populations have experienced similar outcomes to Māori.

Sections three, four and five of this paper looked at the links between trade and productivity, sustainability and inclusiveness in isolation of one another. Clearly, however, there are linkages between the different areas.

The dimensions examined in this paper are overlapping, with interactions between them. This is perhaps most obvious within



inclusiveness. Regional economies, SMEs, women and Māori are all interlinked: the share of employment in SMEs tends to be higher outside major urban centres; Māori make up a higher share of the population in (North Island) non-urban regions; women-owned businesses tend to be smaller. For example, in 2017 there were about 6,500 Māori women business owners, about 60% of whom were located outside the main urban areas.²⁷ Improving regional outcomes from trade may therefore boost SME and ethnic outcomes. Similarly, improving SME outcomes may boost outcomes for regions and women.

There are similar interactions within sustainability. Environmental sustainability contributes to economic sustainability and vice versa.

There may also be trade-offs between improving outcomes along one dimension and the outcomes achieved in another.

One of the more notable ones is the relationship between productivity and inclusiveness. Much of the productivity gains expected to be received through trade come through increased competition and resource allocation away from less efficient firms to more efficient firms. These channels may exacerbate regional inequality if resources are directed towards urban centres, which may have some efficiency advantages from agglomeration benefits, economies of scale, or proximity to logistics hubs.

Similarly, less efficient SMEs may go out of business. This may also have gender or ethnic implications, given some of the interactions noted above. The extent to which other firms and regions can absorb dislocated workers will be a critical factor in minimising the potential negative impacts of this trade off.

Another potential trade-off is the relationship between productivity and sustainability. As discussed, the environmental impacts of trade can be broken into scale, composition and technique effects. Driving for productivity gains from economies of scale may increase negative scale effects on the environment. Composition and technique effects may help mitigate this trade off. On the other hand, improving productivity may help reduce environmental impacts.

The analysis set out in this paper is part of a much longer program of work and further papers are expected to be published over time, drawing on international work in this area as well as domestic research and case studies. Future research will move from understanding the potential linkages to understanding the drivers of these trends, and the positive and negative effects, that trade and domestic policy settings and other factors have.

The final output of this paper is a proposed suite of metrics that can be used to track trends in the impact of trade on productivity, sustainability and inclusiveness over time. These metrics could should be refined and supplemented over time. In particular, distributional data is still patchy. Eventually this should emerge into a framework for assessing the impact of CPTPP.

²⁷ Ngā wāhine kaupakihi: he tirohanga (Māori women in business: insights). Report for Ministry for Women June 2019

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