



Improving Economic Resilience

20 February 2024

NEW ZEALAND
PRODUCTIVITY COMMISSION
Te Kōmihana Whai Hua o Aotearoa



Supplementary documents to the Improving Economic Resilience inquiry:

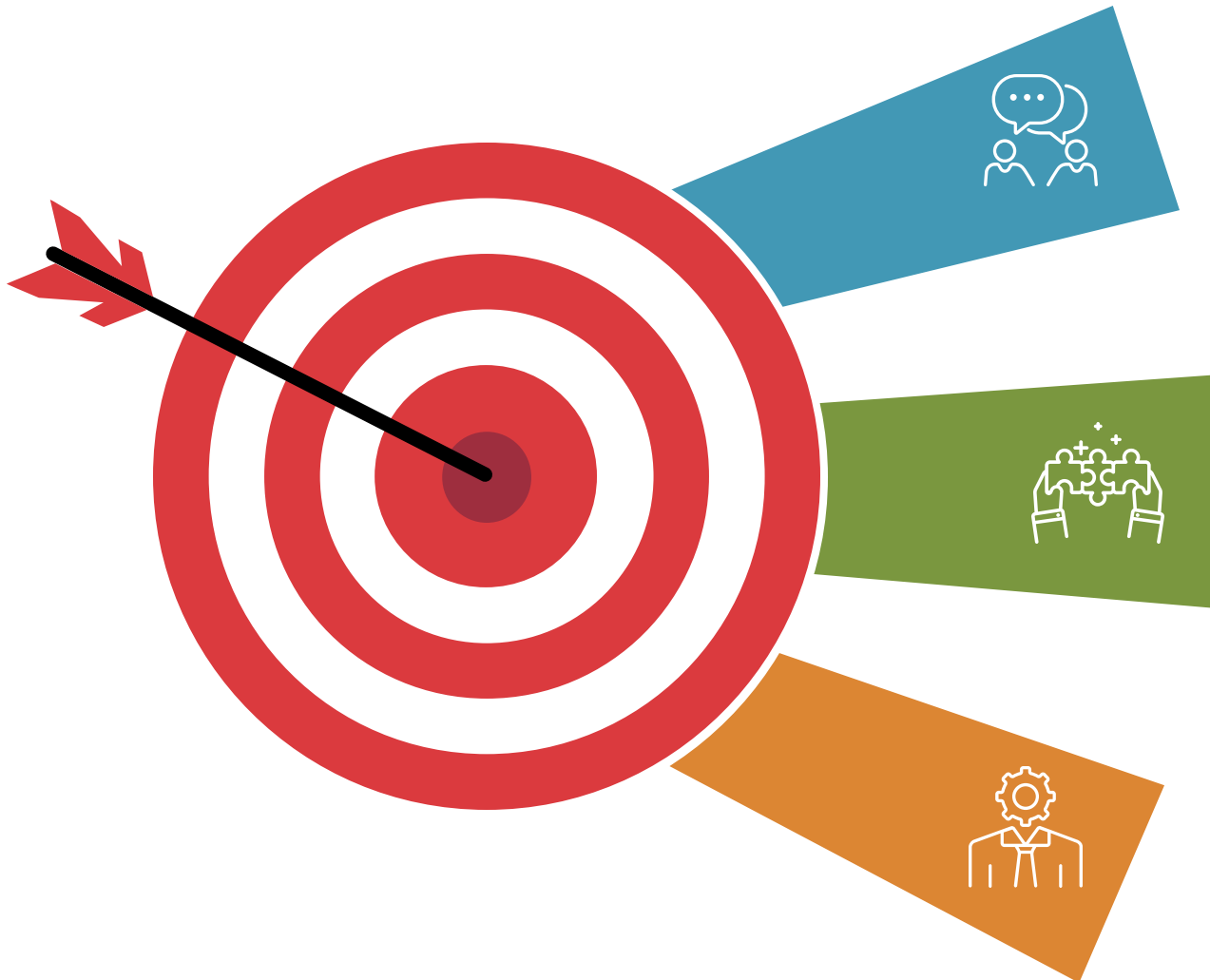
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- Winchester, N. (2023). Supply chain disruption modelling framework
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Outline

- **Building a common language for the inquiry**
 - ToRs, definitions, focus (how do we deal with uncertainty)
- **Understanding our environment, exposures and how bad it could be**
 - Environment scan, trade exposures, representative shocks and labour market impacts.
 - CGE modelling and distributional simulations
- **Recommendations**
 - High level lessons from overseas economies
 - Recommendations for New Zealand

Recommendations in a nutshell



Recommendations 1 to 3

Data and information sharing

Recommendations 4 to 6

Coordinate investments in resilience

Recommendations 7 to 9

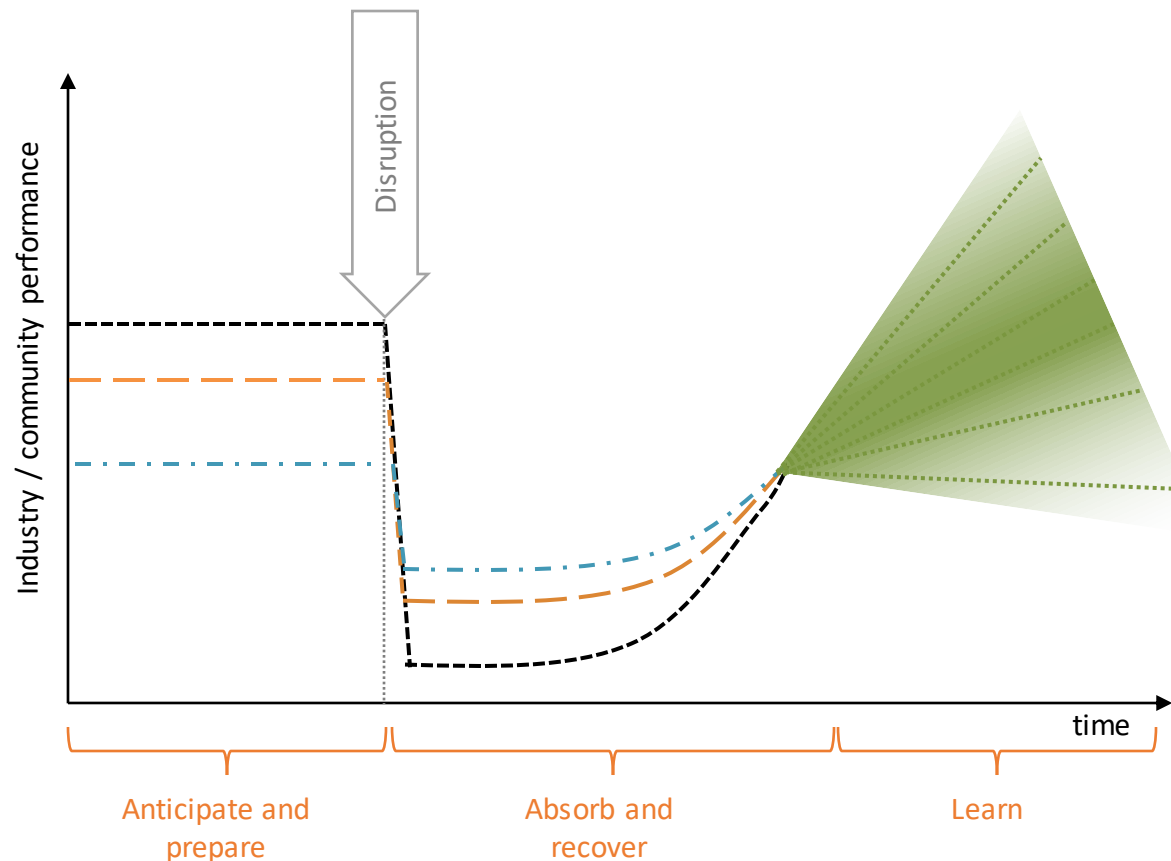
Strategic commitment for the long-term

Inquiry terms of reference

- **identify policies and interventions that can enhance the resilience of New Zealand's economy and living standards to industry-level supply chain vulnerabilities**
- ... recommend policy responses that assist in anticipating, preparing for, responding to, recovering, and learning from **persistent medium-term supply chain disruptions**
- Complement but not replicate existing agency work on critical supplies and critical infrastructures

Economic resilience can reduce impacts

Economic resilience: the capacity of industries and associated communities to anticipate, prepare, absorb, recover, and learn from supply chain disruptions



----- Risk-accepting, reactive approach

No preparation and no up-front costs but full impacts of disruption
=> Under-investment in resilience

- - - Risk-averse, proactive approach

Reduces impacts of disruptions but requires up-front investments

- . . . High risk-aversion approach

Reduced impacts of disruption at high up-front costs
=> Over-investment in resilience

◀ **High uncertainty of outcomes**
Post-disruption performance can be better or worse than pre-disruption one

Building generic resilience

1. Wealth provides resilience



The wealthier we are the more able we are to absorb losses and rebuild quickly.

First line of resilience:
(TSY, MBIE and RBNZ)

National policies – fiscal, monetary and regulatory - shape the availability of **resources for proactive and reactive responses** to supply chain disruptions.

2. Resilience to specific scenarios



Dedicated policies address known risks and critical supplies: energy, fuels, medicines, or natural disasters.

Second line of resilience:
(dedicated agencies)

Emergency services, NEMA, Civil defence, and critical infrastructure **prepare for specific scenarios** that are likely to occur and or be repeated.

3. Generic resilience



Wide variety of speculative or unknown risks with significant impact on supply chains, industries and communities.

Third line of resilience:
(underdeveloped)

Networks create relationships to pool information, insights, and resources to respond to slow and fast disruptions; build on long-term determinants of resilience, productivity, and innovation.

This inquiry focuses on generic resilience

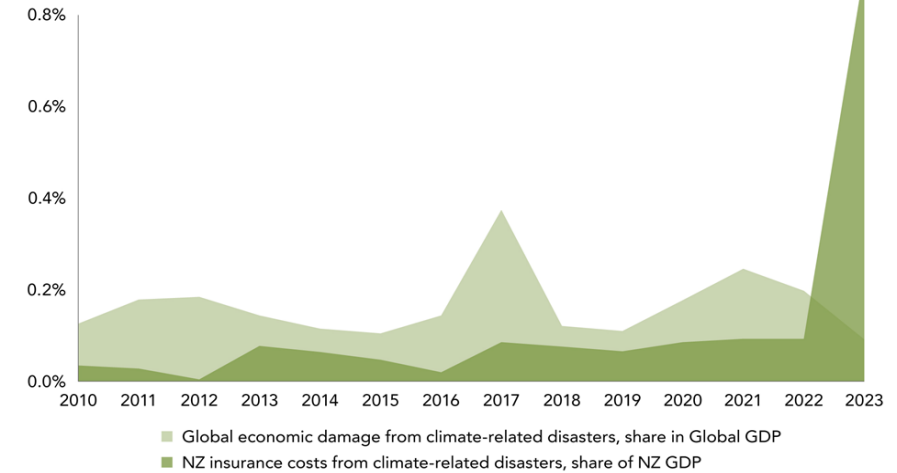


Trends: more volatility, more disruptions

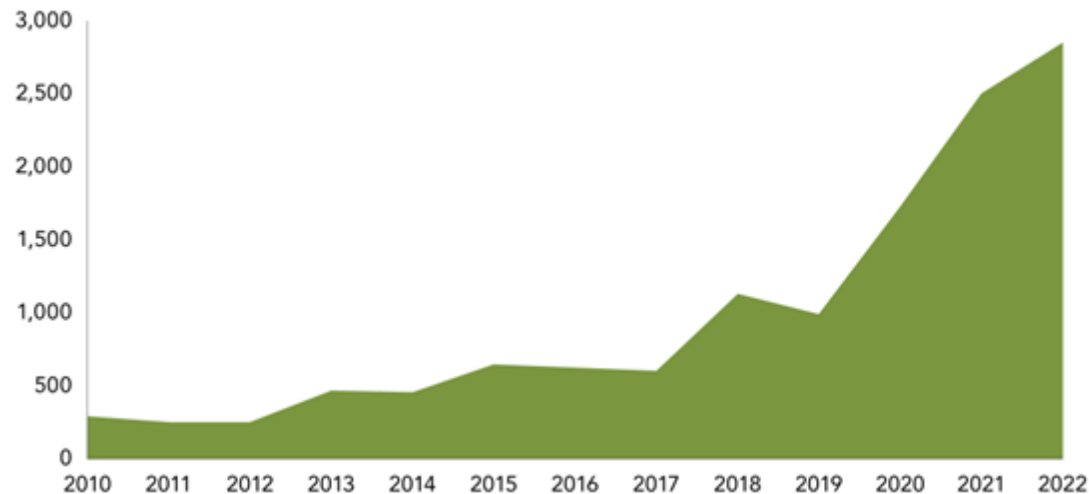
Global supply chains pressures: more volatile



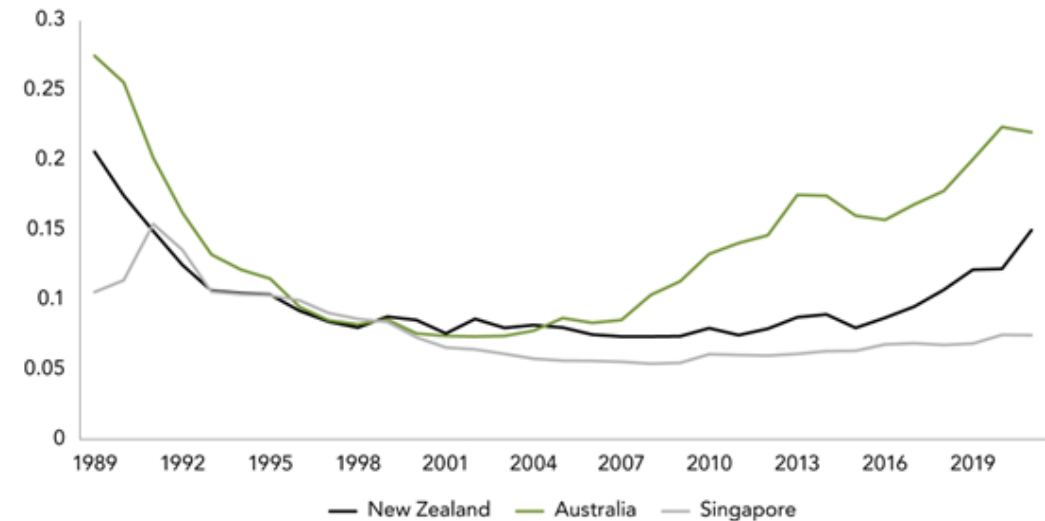
Natural disasters: more frequent and more costly



Trade restrictions: up with geopolitical tensions



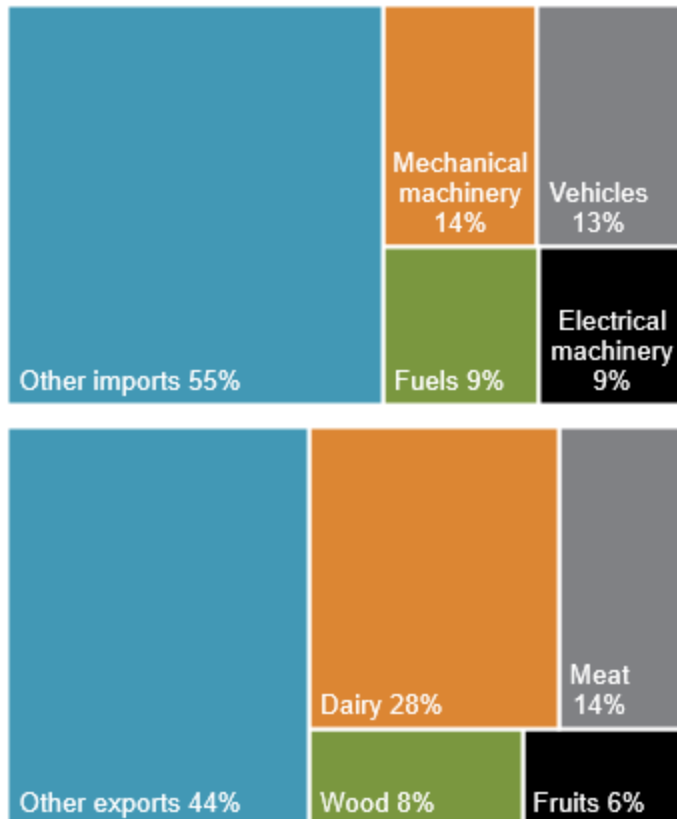
New Zealand's trade: increasing concentration



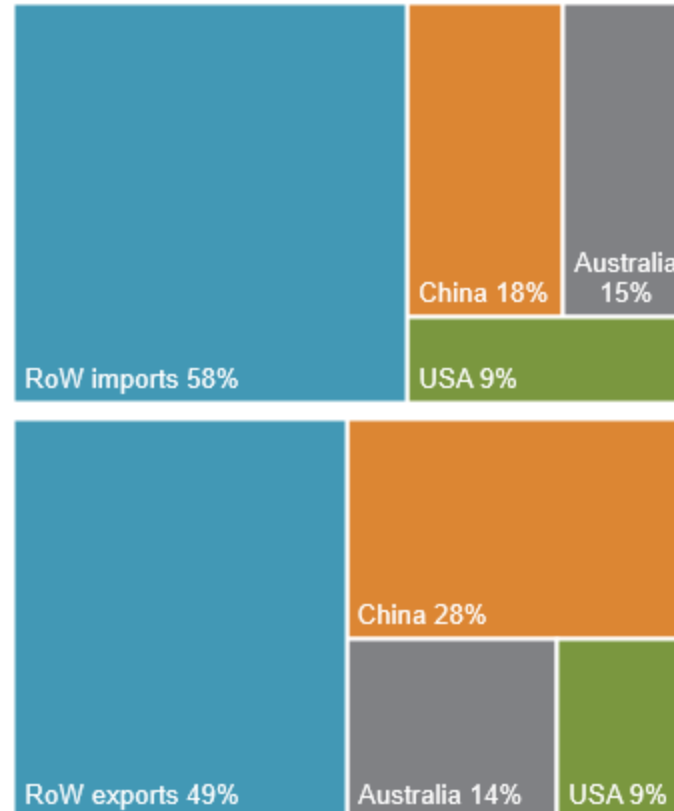
Exposures: significant but criticality unclear

- Trade data analysis indicates significant exposures overall and for specific goods markets
- New Zealand's trade may be even more concentrated than direct trade statistics suggest, due to indirect exposures
- Establishing which concentrated goods, services, and markets are critical requires collaboration with industry experts

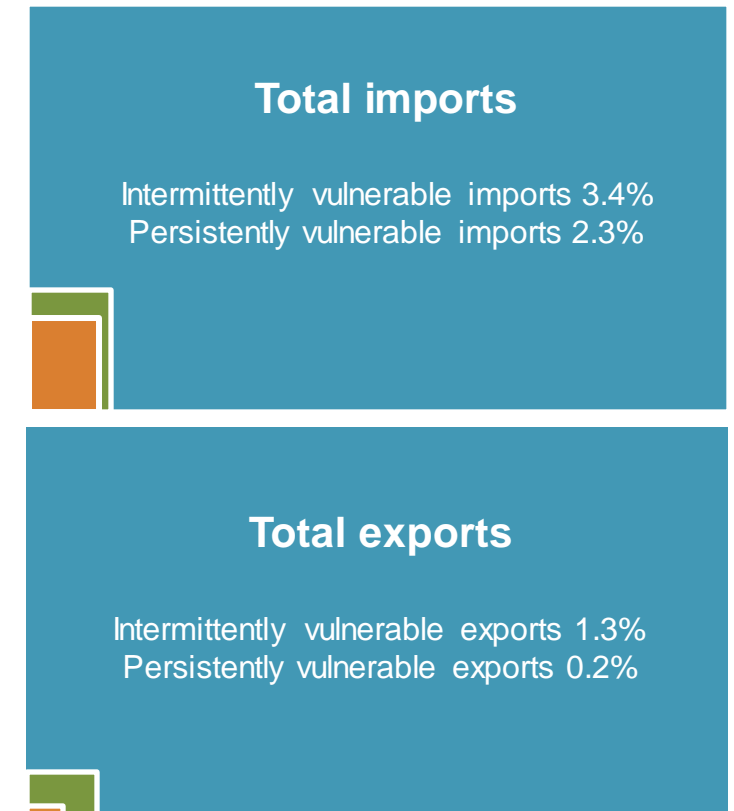
Worsening trade diversification



Few dominant trading partners



Vulnerable to concentrated markets



Shock scenarios: significant impacts

- Economic modelling indicates significant but varied impacts of different disruption scenarios on different industries, regions, and demographic groups

Modelling of disruption impacts

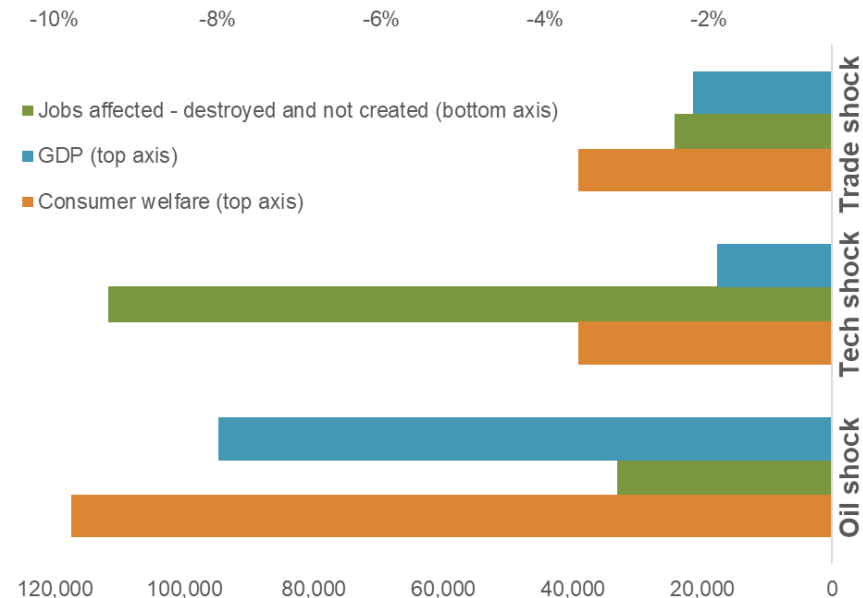
- reduce GDP by 1.4% to 7.5%
- reduce consumer welfare by 3.1% to 9.3%
- 24,000 to 112,000 jobs affected even under the most benign assumptions.

Study of involuntary lay-offs

- 70% find new jobs within 6 months and reach pre-lay-off wage within 3 years
- 20% withdraw from labour market
- 10% emigrate

Distributional impacts simulation

- 212 industries, 17 regions, 6 ethnicities, 11 age groups, and 5 qualification groups
- simulations also estimate the impacts of policy interventions (e.g. labour subsidies)



	Oil shock	Tech shock	Trade shock
Most impacted (job losses)			
Industry	Air & Space	Dairy	Food services
Region (#)	Auckland	Auckland	Wellington
Region (%)	Wellington	West Coast	West Coast
Age group	20-24	30-34	15-19
Qual group	Bachelors	Bachelors	Bachelors
Ethnicity	Asian	Asian	Asian

Modelling distributional impacts

- Modelling similar to research commissioned by Climate Change Comm.
 - Uses CGE forecasting and distributional impact simulation
 - Built from real data
- Compare outcomes **relative to baseline** for ...
 - Different types of shocks
 - Different assumptions
 - Not easy to do with empirical analysis
- Better understanding of direct and indirect effects ...
 - *CGE model*: economy-wide effects (GDP, consumer income)
 - *Distributional model*: the magnitude and distribution of the effects for different industries and workers
- Indicative of what is possible
- Small changes can reverberate throughout the economy

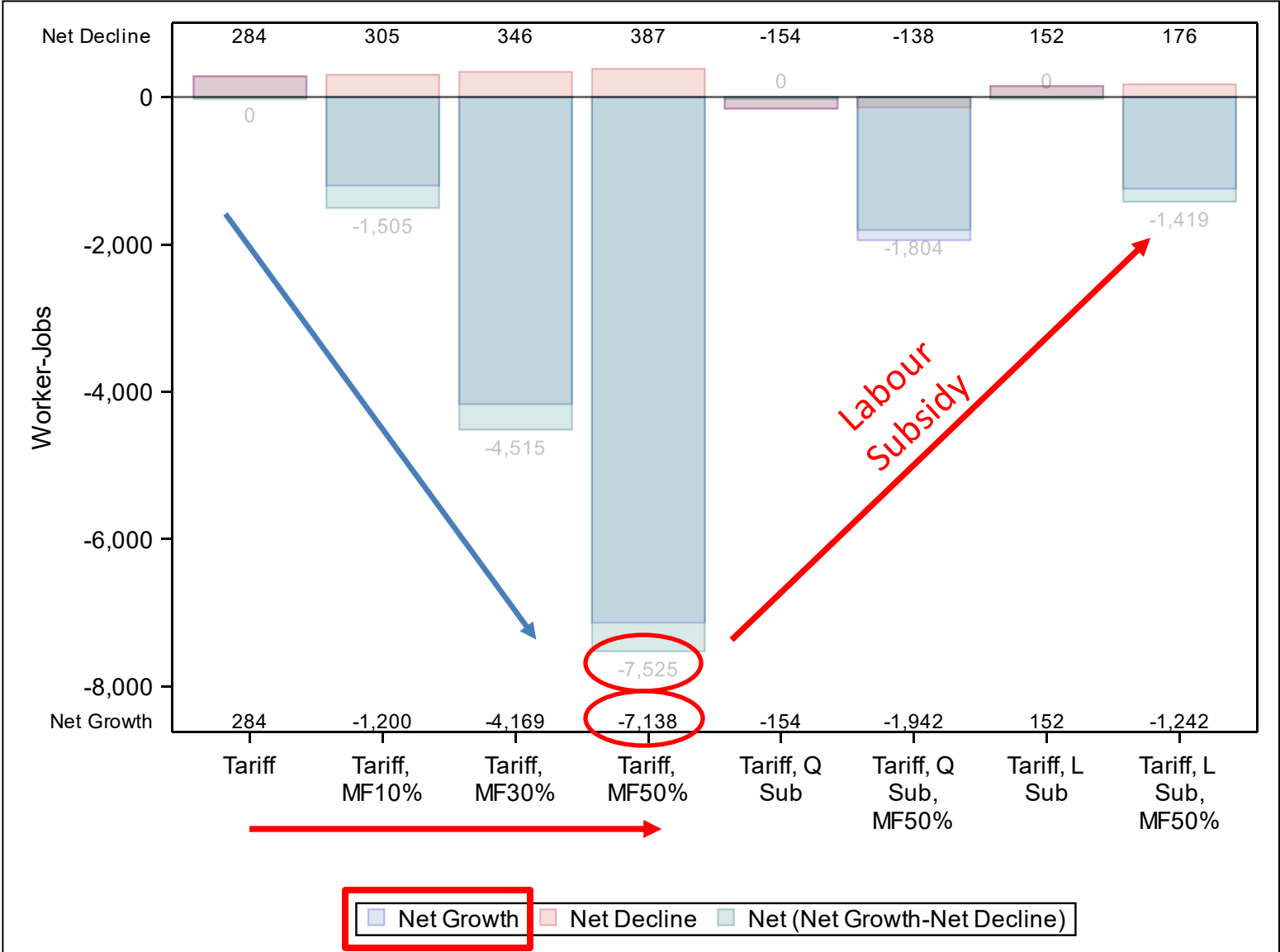
Distributional Impacts Methods – Step 1

- Use CGE results to estimate employment changes in 212 industries using IDI linked employer-employee data
 - Change due to time -- growing vs. declining industries
 - Change due to shock (relative to baseline)
 - Growing industries
 - Dampened growth (-)
 - Accelerated growth (+)
 - Declining industries
 - Accelerated decline (-)
 - Dampened decline (+)
- Scenarios
 - Full employment vs labour frictions
 - No subsidy vs subsidy (output, labour)

Distributional Impacts Methods – Step 2

- Worker & job characteristics simulated
 - for each effect type
 - using 3-digit industry to randomly assign characteristics
 - run 1000 times
- **Net effects** to see *mathematically* if group can offset negatively affected jobs with positively affected jobs
 - "Natural netting"
 - This does not mean they will ... just indicates if it is plausible
 - Also evaluate offsetting potential between groups
- **Affected jobs** to see which groups most likely to face disruption ("churn")
- Analysis primarily built from Fabling & Maré labour tables
 - Labour tables integral to the analysis
 - Loss of labour tables would be huge blow to research in NZ

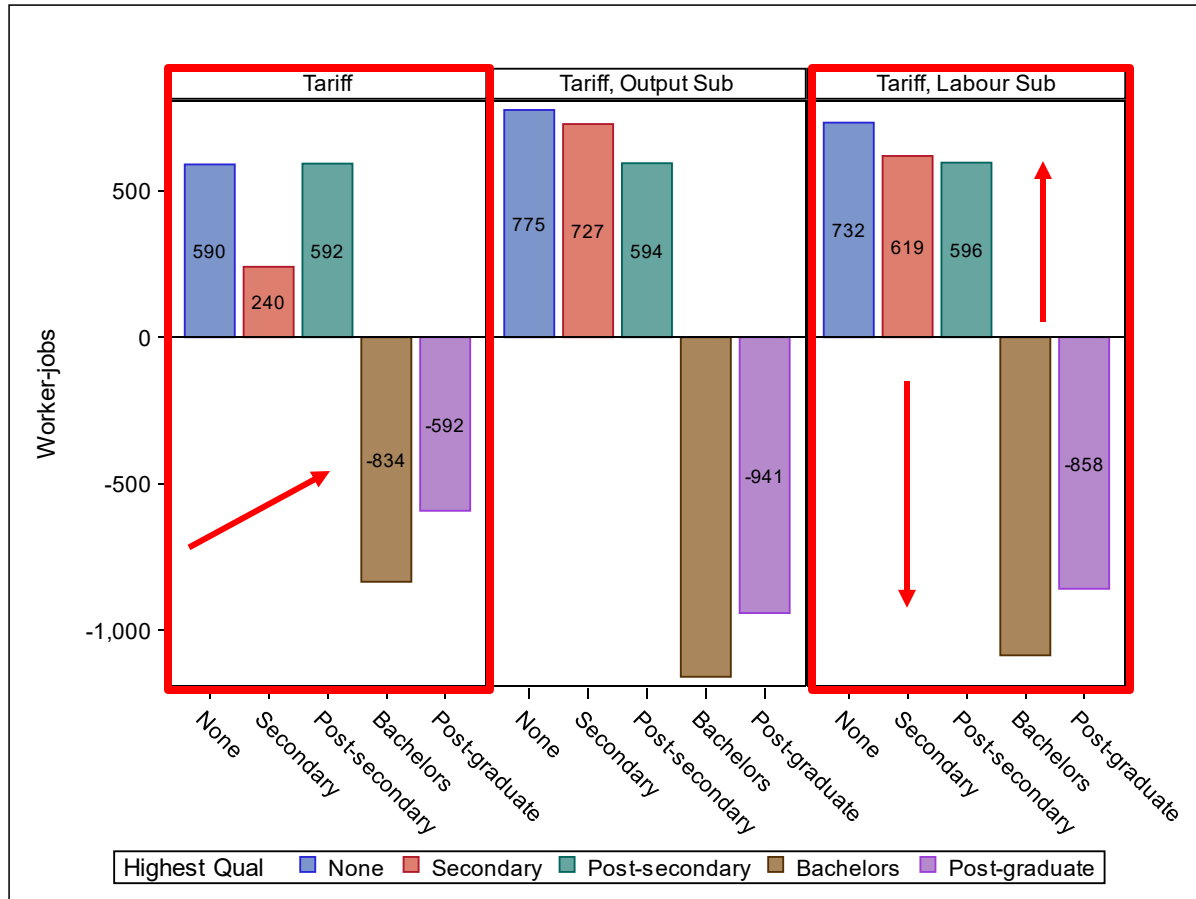
Frictions Worsen Shock Effect -- Intervention Mitigates



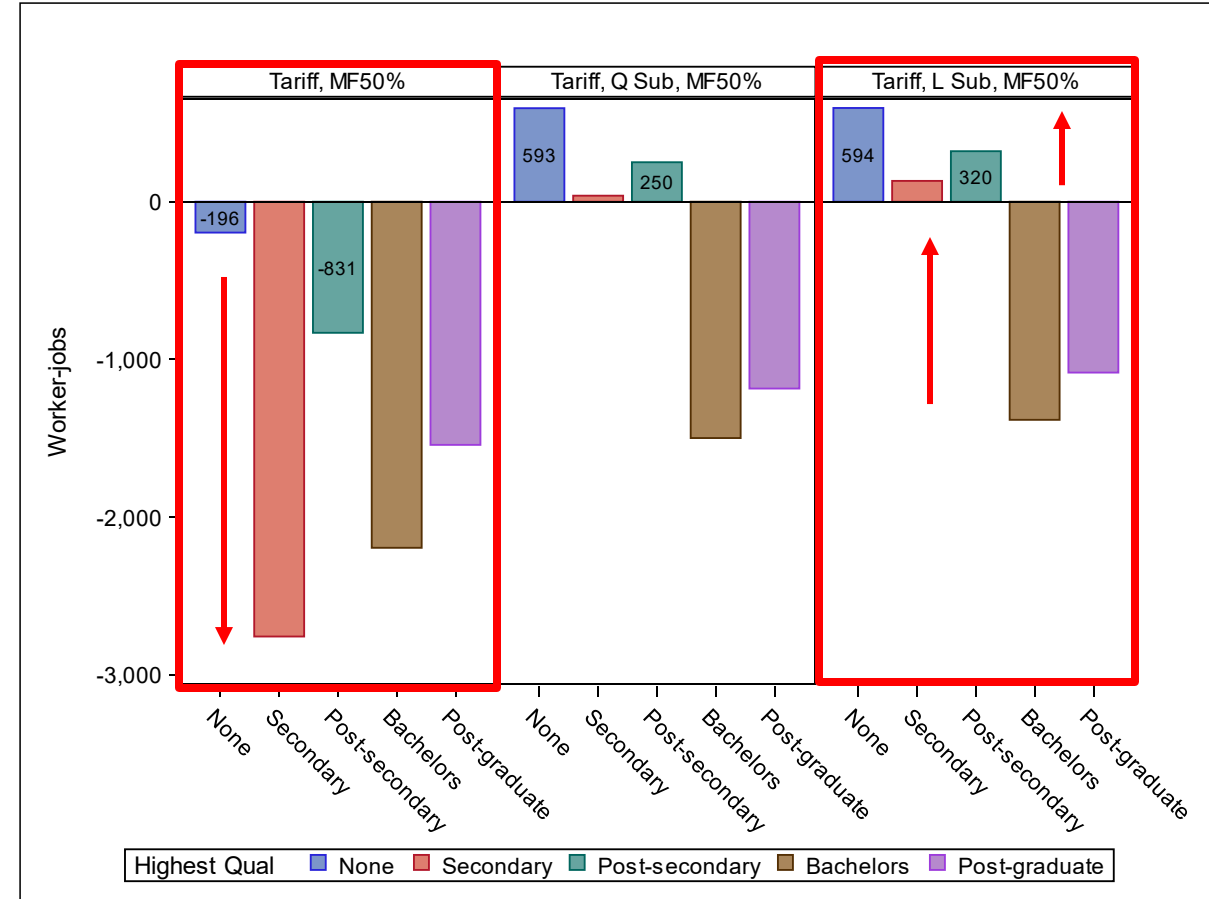
Results are simulated.

Fewer Jobs for Workers with More Education

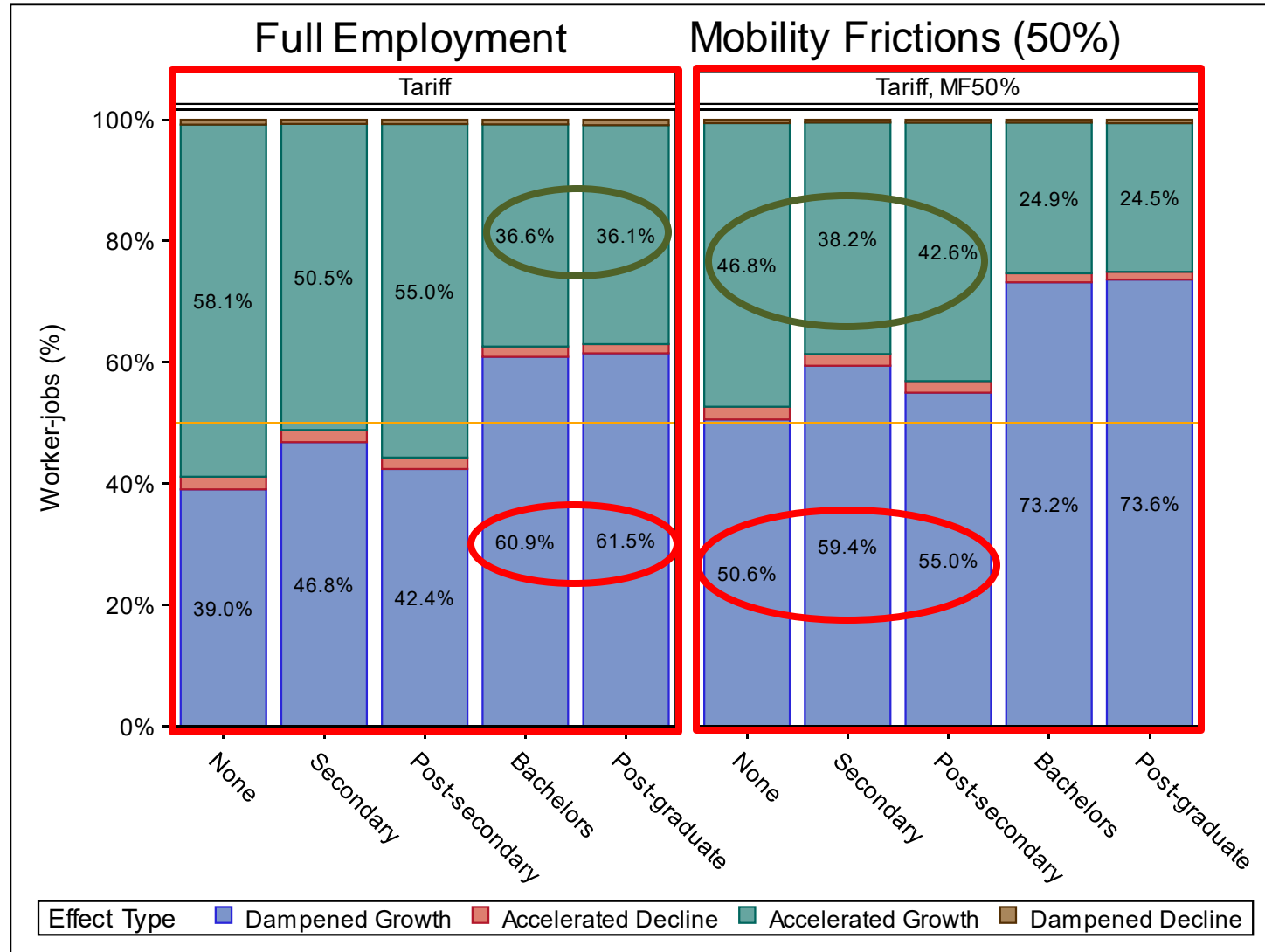
Full Employment



Mobility Frictions (50%)



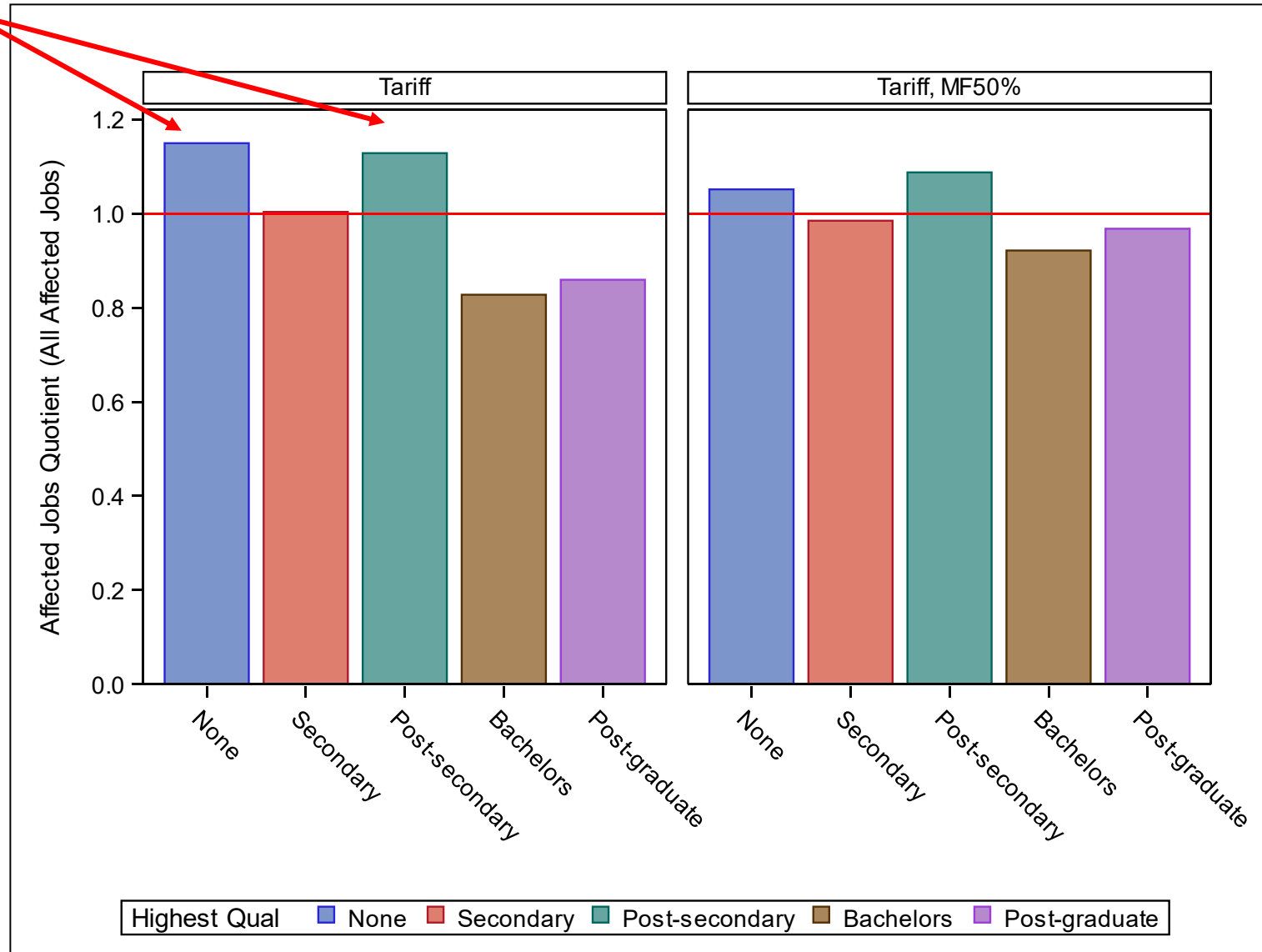
Dampened Growth for Workers with More Education



Results are simulated.

Workers with Less Education More Affected

Overrepresented in
Affected Jobs



Results are simulated.

Modelling Findings

- Changes in growing industries dominate effects across all shocks
- Growth is important as the population grows
 - Output subsidy larger impact on declining industries
- Frictions worsen outcomes but can be mitigated with interventions
 - Labour subsidy generally outperforms output subsidy
 - Other policies can reduce labour frictions
- Some groups impacted on net and some groups impacted by “churn” – some by both

- Risk that modelling technology is lost post NZPC closure

NZ is exposed to a grim global outlook

Outlook is grim

The outlook is shifting and not in New Zealand's favour as geopolitics, climate change, and other changes make persistent disruptions more likely

NZ is challenged

New Zealand is an isolated, small, open economy with productivity, innovation and climate adaptation challenges

NZ is exposed

New Zealand's regional communities are exposed to trade vulnerabilities – urban to imports, rural to exports, and regions with high socioeconomic deprivation scores often to both

Impacts are high

Modelled representative shocks reduce GDP and force massive reallocation of employment across industries and regions that are likely to bring claims for public support

Next questions

How do other economies prepare to reduce the impacts of persistent disruptions?

What can NZ government do to enhance resilience to supply chain disruptions?

Advanced economies: diversify & innovate

Monitor and diversify

Nearly all advanced economies actively diversify and monitor supply chain risks. Many invest in long-term contracts and relationships.

Focus on innovation

Most economies, in particular smaller ones, leverage focused innovation and export strategies to support the competitiveness, diversification, and scale of their frontier industries.

Protectionist strategies

Larger economies also leverage the scale of their diversified domestic markets to onshore parts of global supply chains by subsidising and protecting industries considered important for economic security.

Lessons
for New
Zealand



Resilience recommendations: why

Policy challenge

Recommended solution

Information on critical vulnerabilities

Identifying critical goods, services, and markets requires deep industry insights and trade data analysis



Data with experts

Build government capability to analyse trade data and connect it to industry-government networks to share information and insights (potential for an IEB to work across government silos)

Coordination of proactive investments

Proactive investments in economic resilience to reduce the impacts of disruptions and reliance on ad hoc response after disruptions



Industry-government networks and public co-funding

Strengthen industry-government networks by competitive co-funding of their operation and include resilience criteria in public co-investment programmes to leverage them for resilience

Commitment to proactive investments

Policy flip flops, intertemporal trade-offs and short-term costs create political incentives that undermine long-term and private investments



Private sector voice for commitment to the long-term

Give business and other stakeholders a high-level voice to improve commitment to policies shaping long-term investments in resilience, innovation, and climate adaptation

Resilience recommendations: how

Data with industry experts

Build off existing networks

Make it easy to network – utilise insider knowledge

Connect globally

Industry-government networks and public co-funding

Resilience criteria in co-investment grants

Devolve identification of resilience projects

Modest co-funding for networks' operation

Business voice for commitment to the long-term

Long-term Advisory Group to the PM

Give stakeholders a voice in long-term programmes

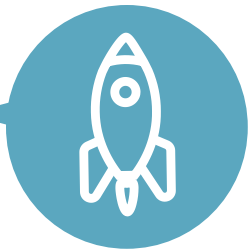
Inter-departmental Executive Board (IEB)

Key takeaways



The future is more volatile and uncertain

Persistent supply chain disruptions are likely to be more frequent and more severe in the next decade than in the last three



Innovation and adaptation are key to improving resilience and more

In a small, distant economy, the private sector and Government need to work together to innovate and adapt to changing circumstances



Strengthen information, foster institutions and give voice to the private sector

A stronger business voice can sustain industry and government commitment to the implementation of long-term policies and help to navigate trade-offs

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Questions

www.productivity.govt.nz

Following the closure of the Productivity Commission on 29 February 2024, our website will become the responsibility of the Treasury.

