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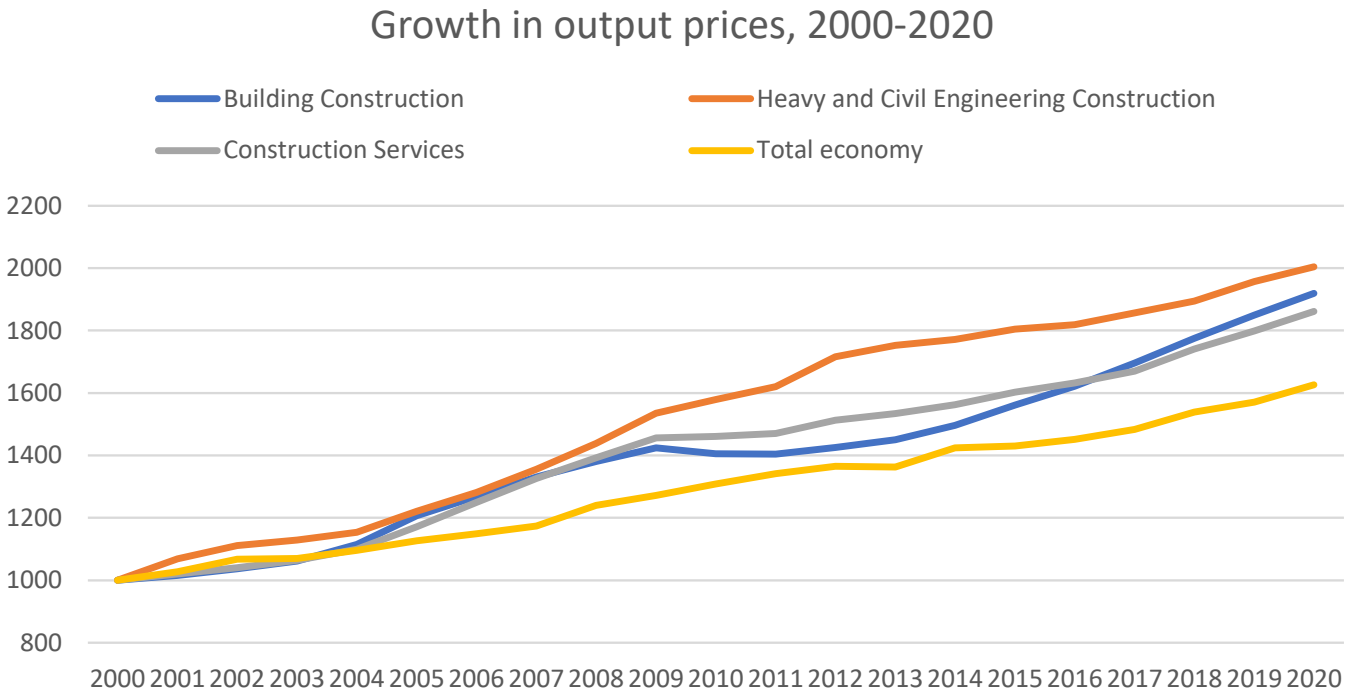
How does New Zealand's construction productivity growth measure up?

Progress update on September 2022 *Research Insights*

Our interest in this area



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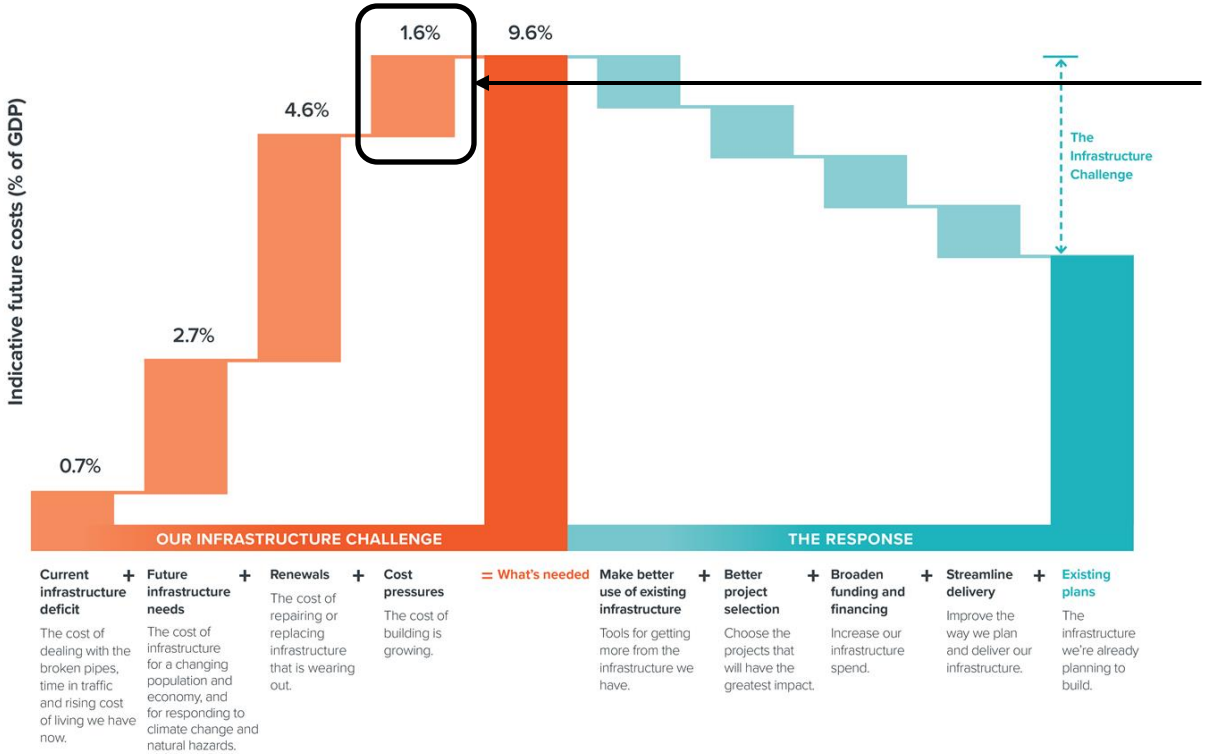
Our interest in this area



Consequences of inaction?

Source: Adapted from Sense Partners (2021)

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Aim of this research

Our aim: Understand and benchmark the economic performance of New Zealand's construction industry, and in particular heavy/civil construction

Key research questions:

- What has productivity ever done for us, anyway?
- How has (labour) productivity evolved in different parts of the construction industry between 2000 and 2020?
- How does our construction productivity growth measure up to other OECD countries (and can we explain cross-country differences)?
- How has the construction sector fared through the early stages of the Covid-19 pandemic? [in progress – not complete]

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Some initial hypotheses

Everyone starts with some assumptions. Here were some of mine:

- Productivity growth is likely to be faster in heavy / civil construction than in building construction due to higher capital intensity, larger project size, and larger, more internationalised firms.
- Boom-bust cycles reduce construction productivity growth by reducing incentives to invest in equipment and training.
- New Zealand is likely to experience comparatively weak construction productivity growth relative to other OECD countries, consistent with our overall productivity growth performance.

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Why do we care about productivity?

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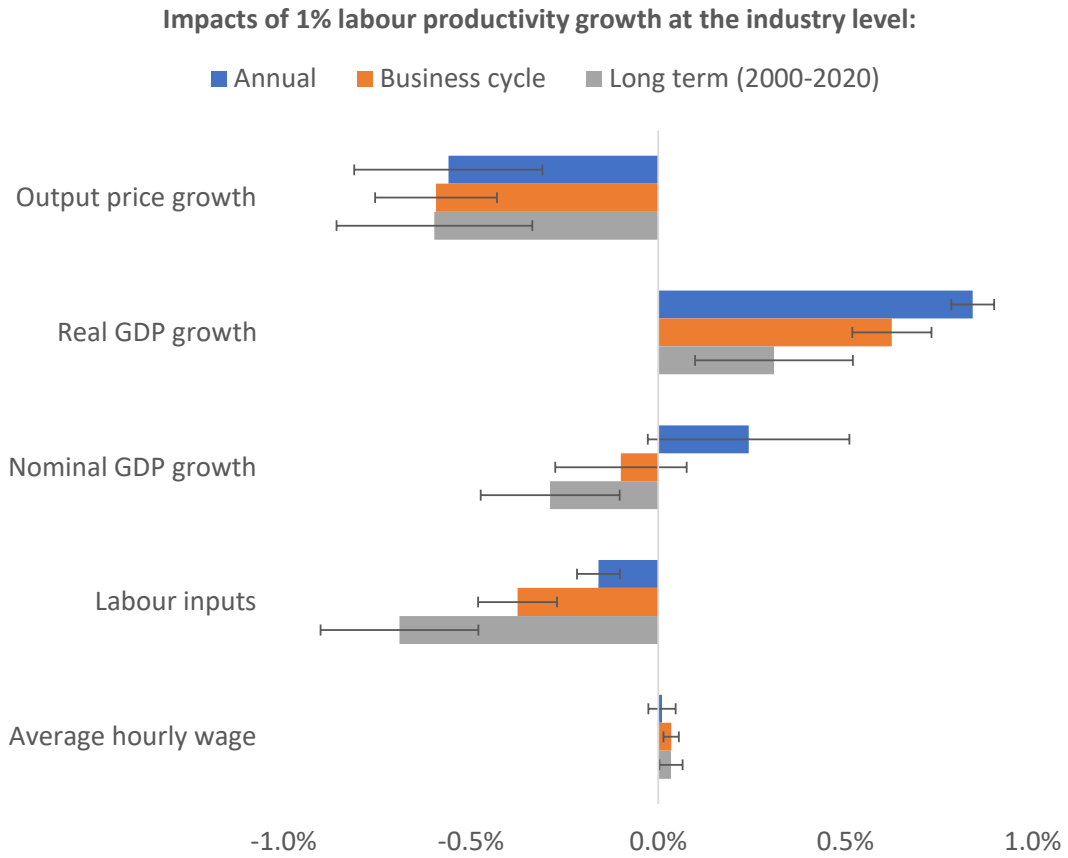
Baumol's unbalanced growth model in NZ



Notes:

1. *Effects are estimated from five reduced-form econometric models with changes in outcome variables (price growth, RGDP growth, etc) on the left hand side and changes in productivity on the right hand side*
2. *Models are estimated using SNZ industry productivity and industry wage data for 2000-2020 period*
3. *Annual difference and business cycle difference models include time and industry random effects; long term model is estimated with OLS*
4. *Results are similar if MFP growth is substituted for LP growth*

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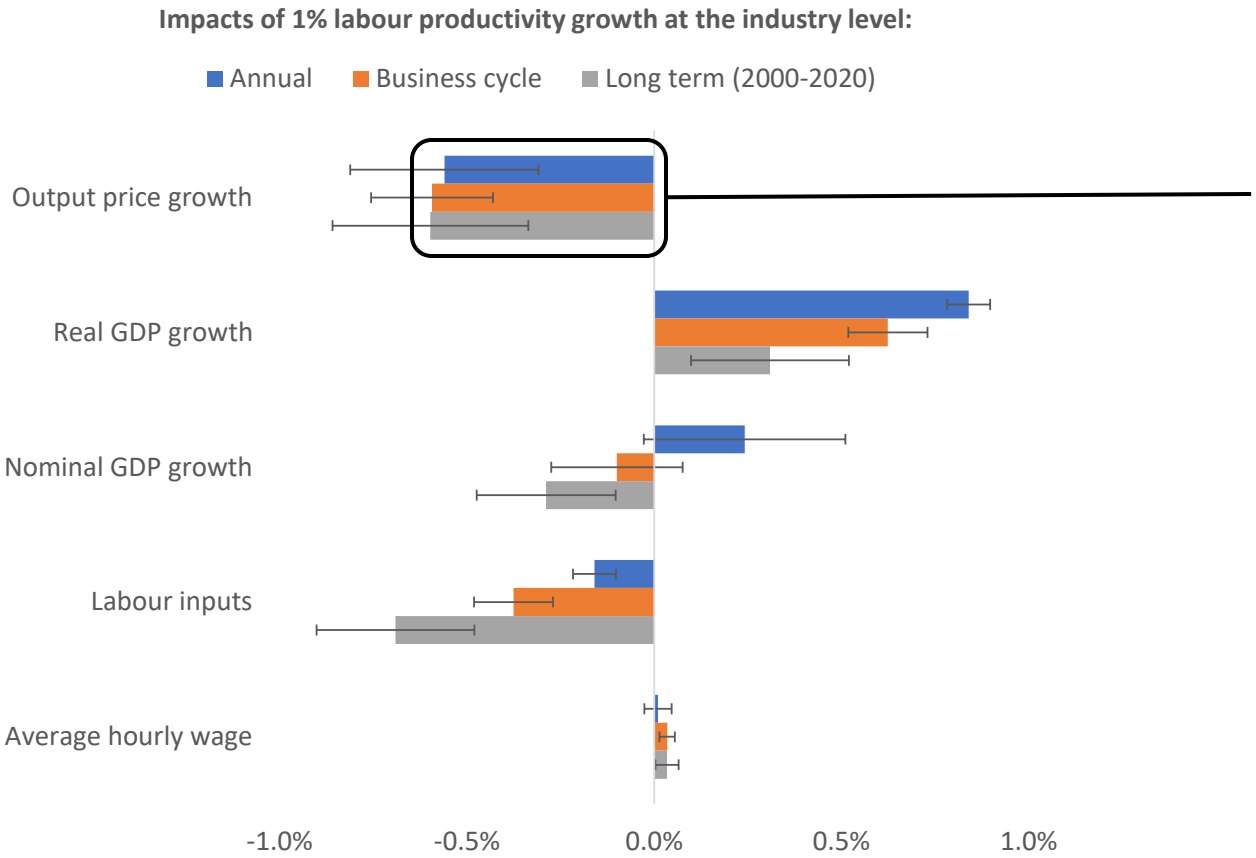
Baumol's unbalanced growth model in NZ



Implication 1: Cost disease

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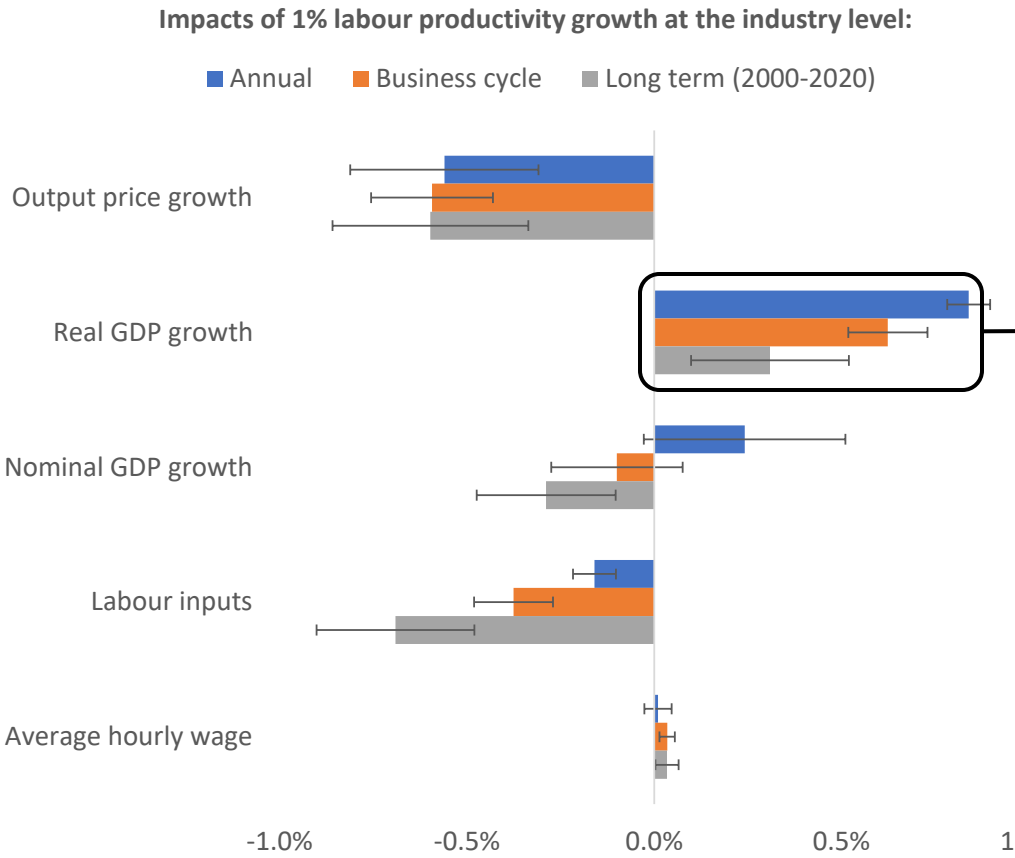
Baumol's unbalanced growth model in NZ



Implication 2:
Stagnating real output

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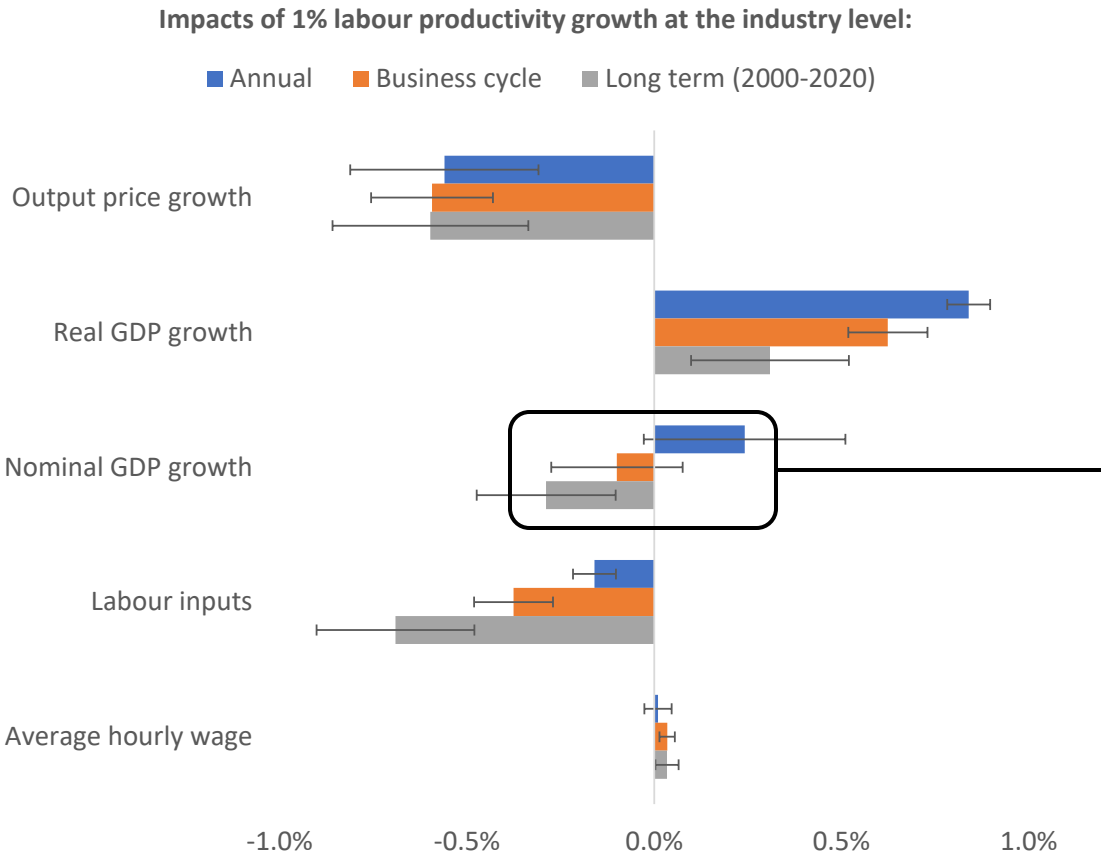
Baumol's unbalanced growth model in NZ



Implication 3: Unbalanced nominal growth

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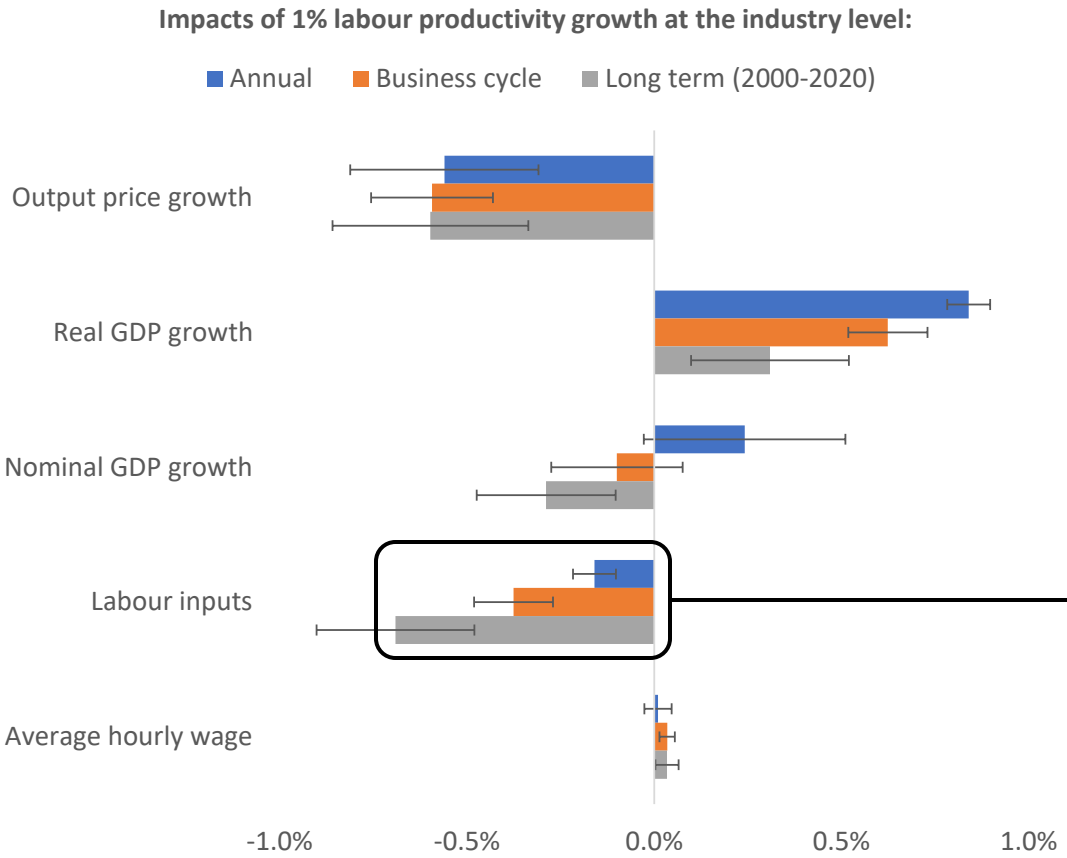
Baumol's unbalanced growth model in NZ



Implication 4: Unbalanced employment growth

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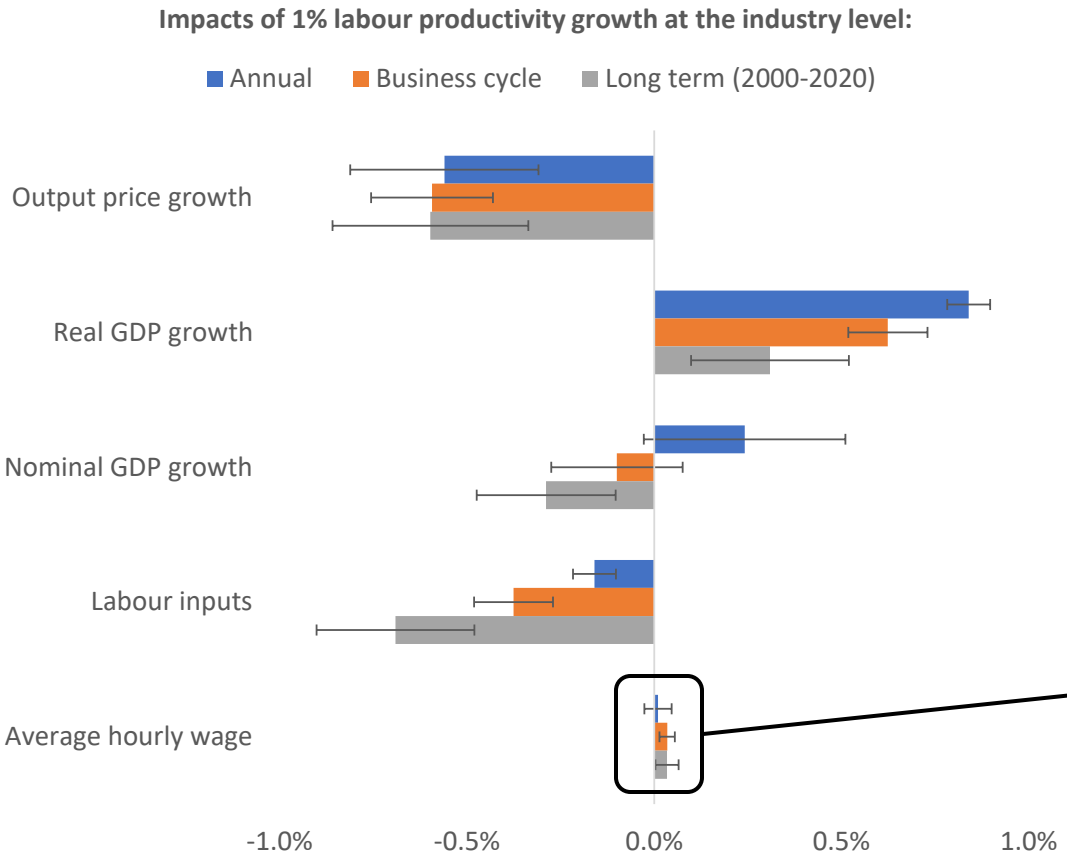
Baumol's unbalanced growth model in NZ



Implication 5:
Uniform wage growth

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Findings (1)

- Baumol's unbalanced growth model holds for the New Zealand economy

- Faster industry productivity growth reduces output price inflation, increases real output, and reduces workforce requirements

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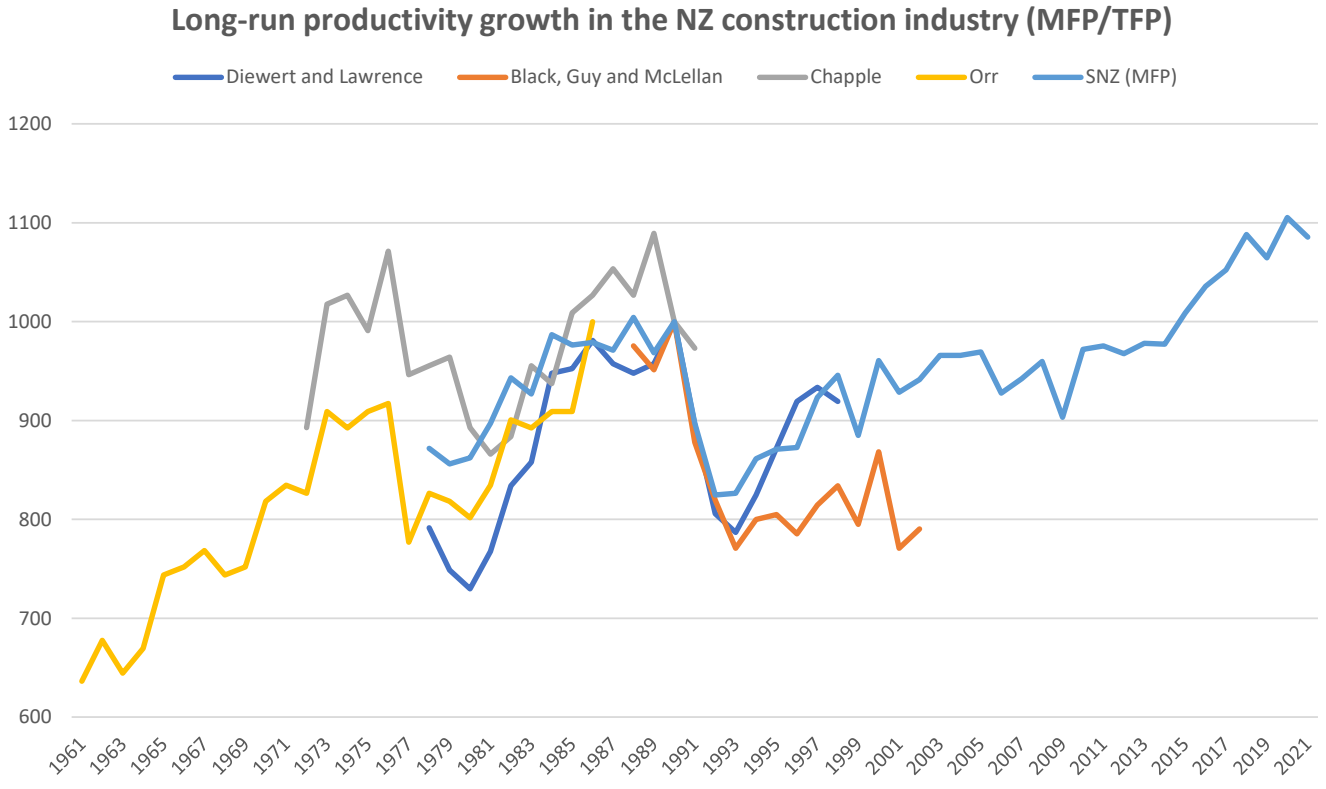
Past research on construction productivity



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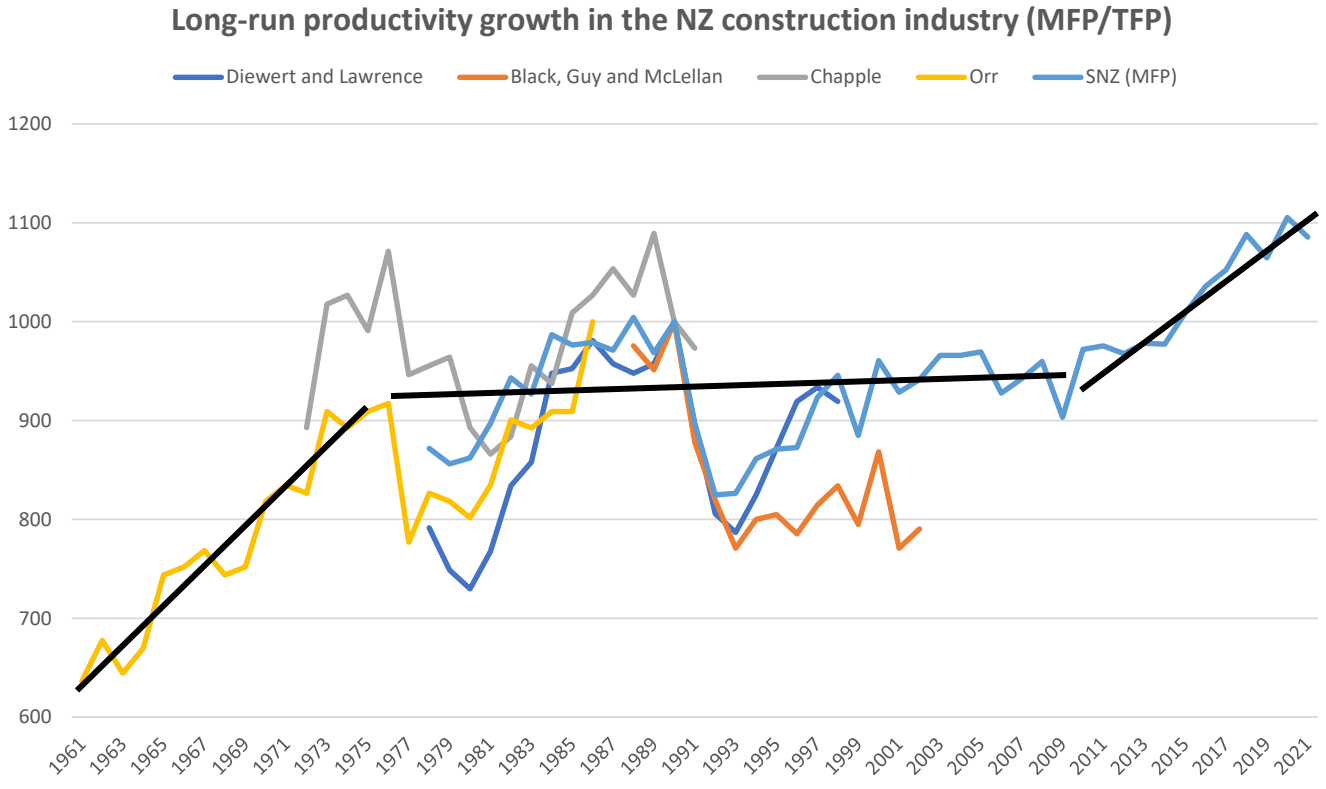
Past research on construction productivity



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Labour productivity trends for sub-industries

SNZ publishes productivity statistics for the aggregate construction industry (ANZSIC06 E)

What's happening in different parts of the industry?

- Building construction (E30)
- Heavy and civil engineering construction (E31)
- Construction services (E32)

We constructed labour productivity estimates for sub-industries using methods and data that are consistent with SNZ's published industry productivity statistics

- Noting Jaffe, Le and Chappell (2016) did this with microdata!

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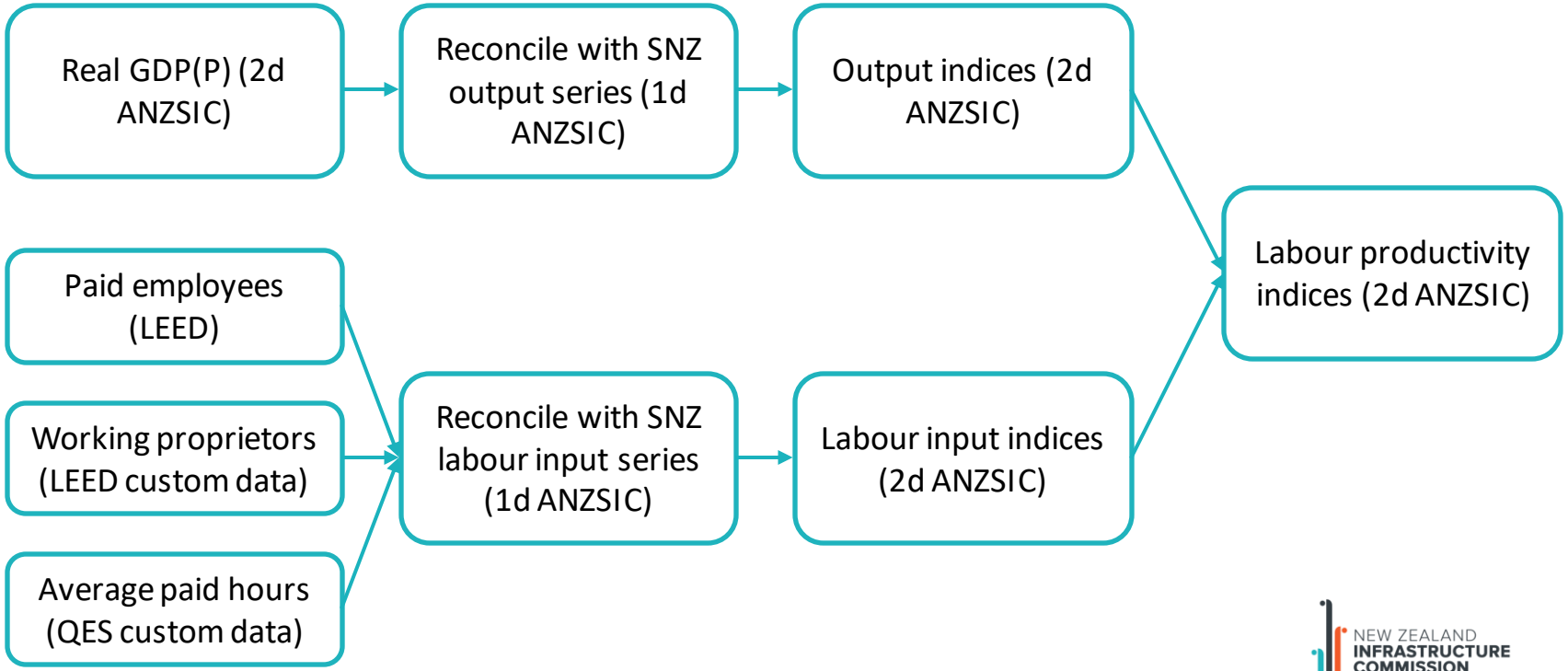
Labour productivity trends for sub-industries



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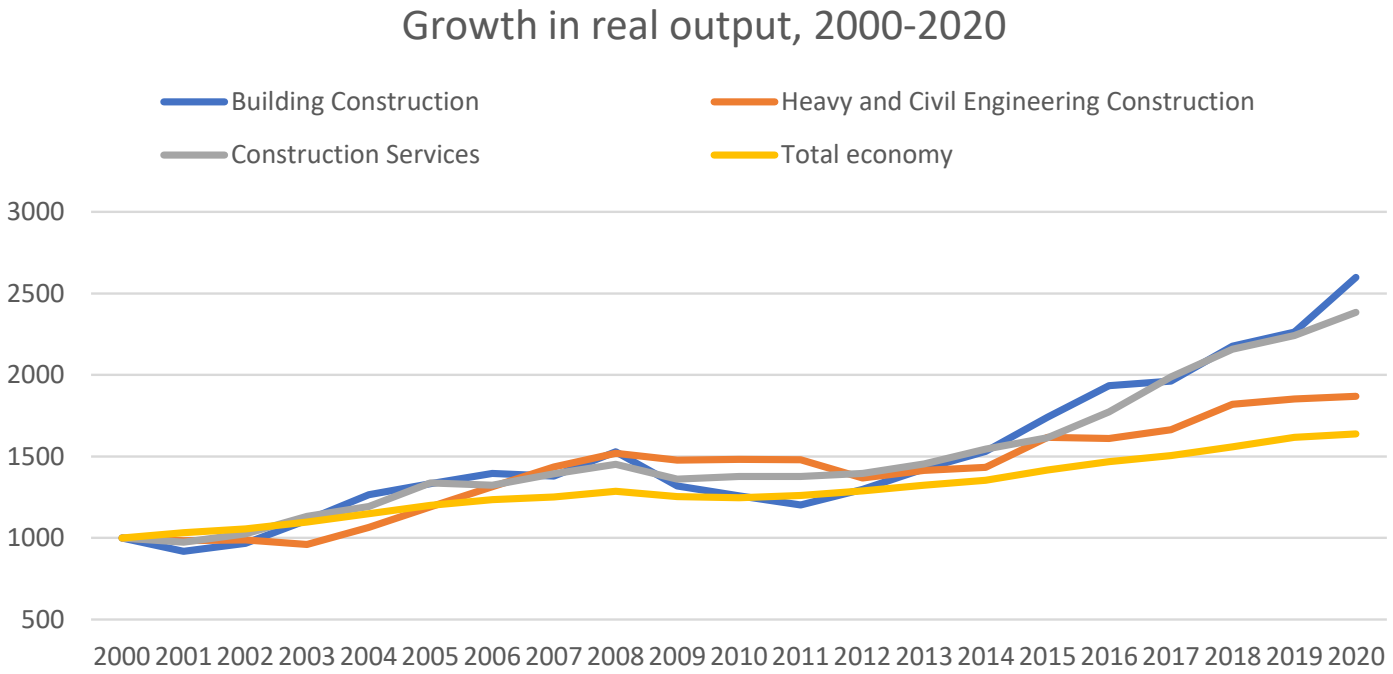
Real output growth trends



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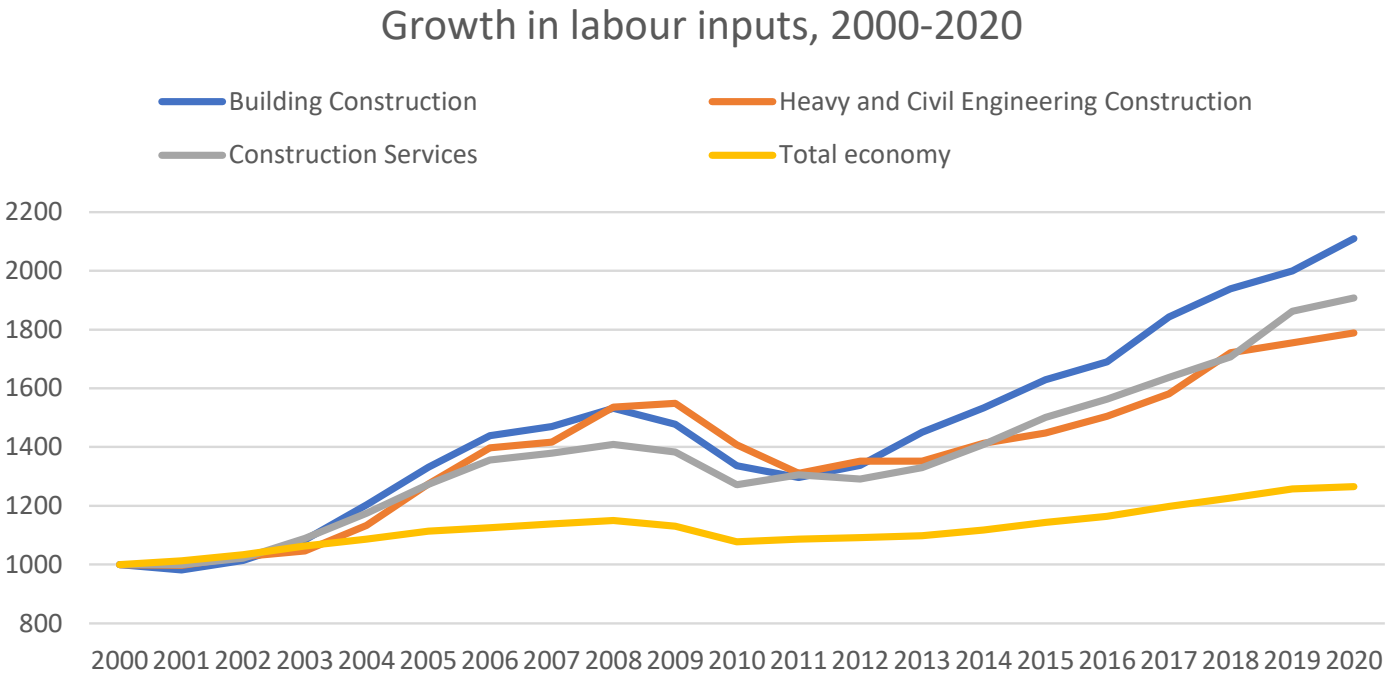
Labour input growth trends



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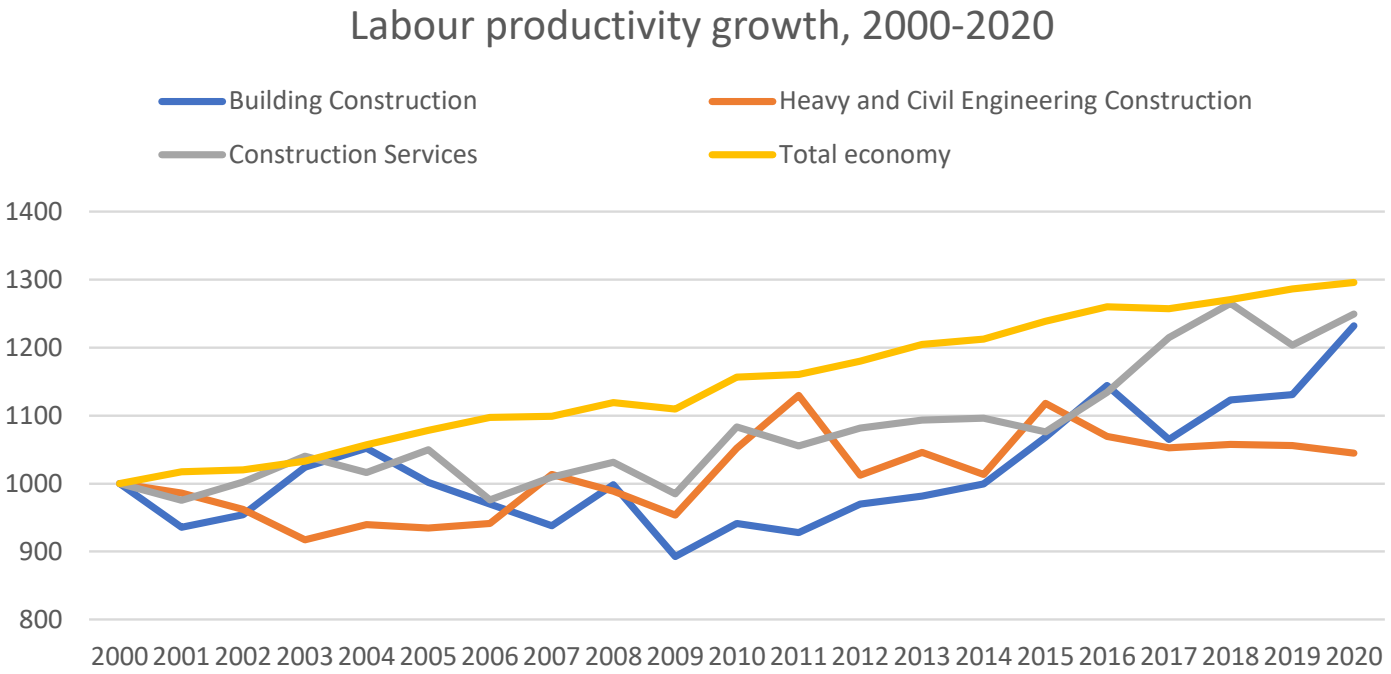
Labour productivity growth trends



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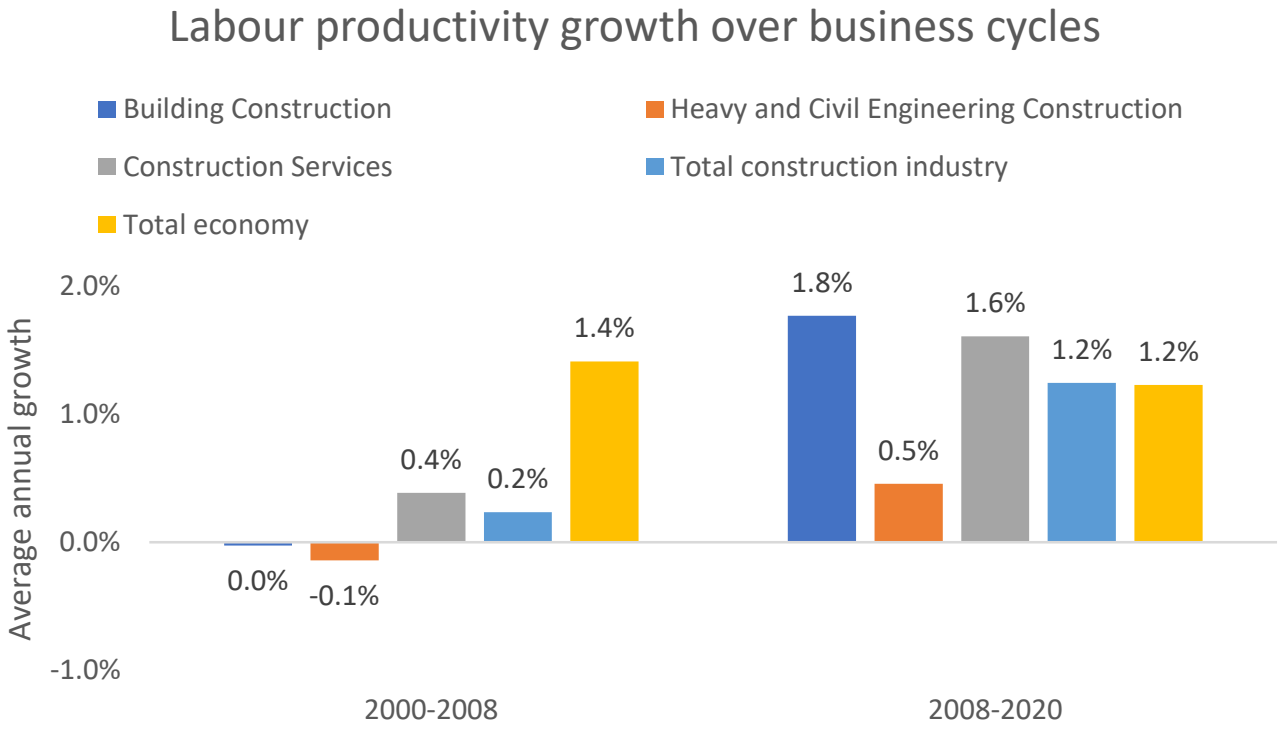
Labour productivity growth over business cycles



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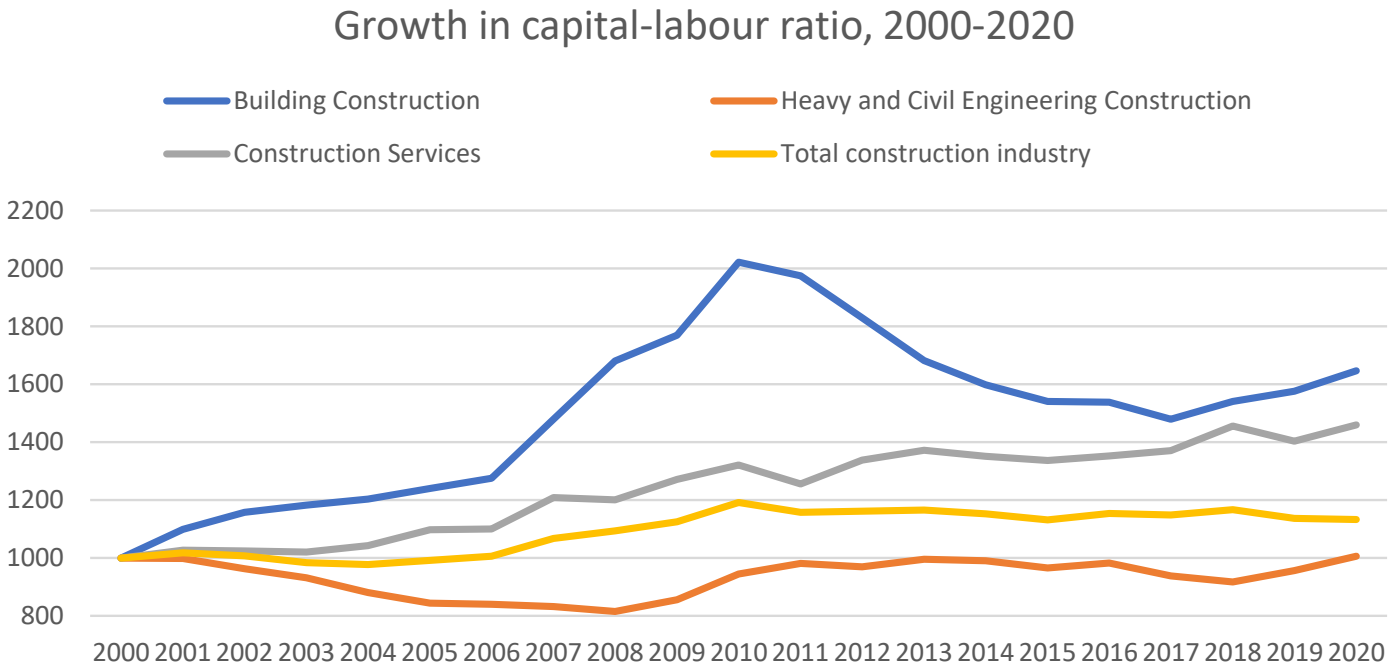
Changes in the capital/labour ratio



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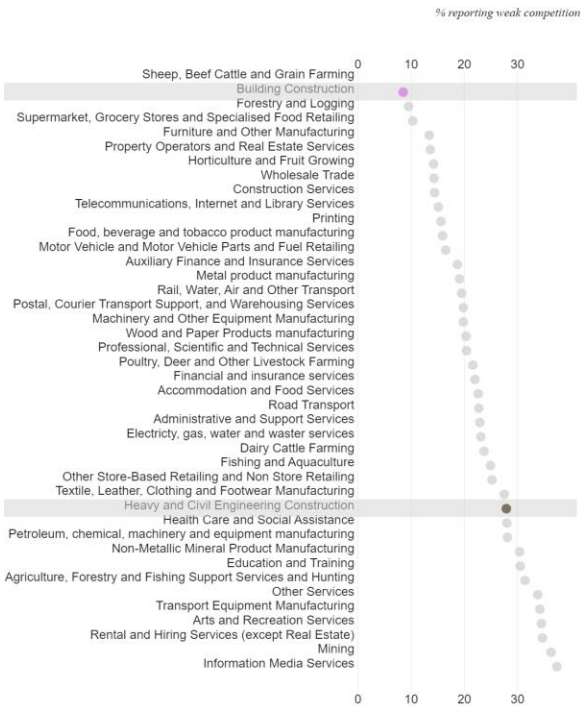
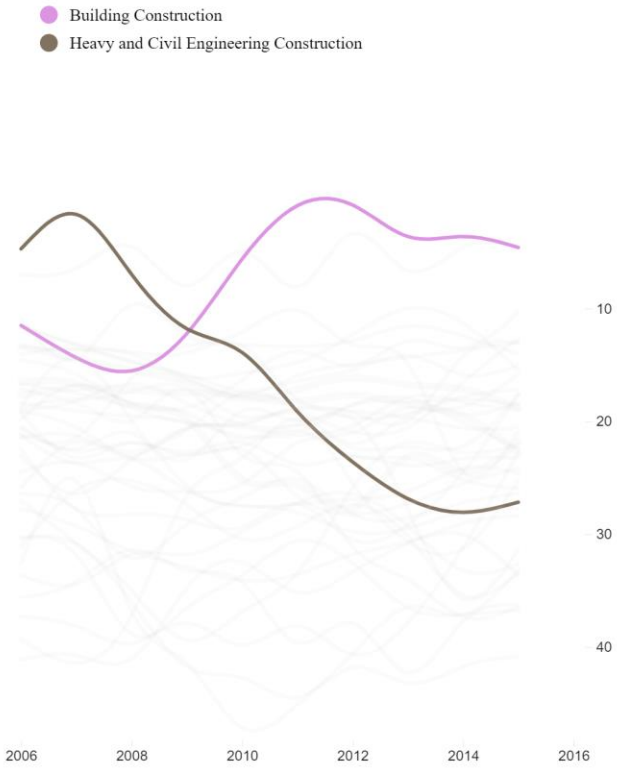
Competition and productivity?





Source: Productivity Commission, "Competition Explorer"
https://www.productivity.govt.nz/competition_explorer/measure

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Findings (2)

- Heavy and civil construction productivity grows more slowly than building construction productivity
- Construction productivity growth accelerated after the GFC
- These differences seem to reflect multifactor productivity growth rather than capital deepening

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International comparisons

We compare *growth* in construction labour productivity rather than *levels* to avoid obvious issues with currency conversions and differing definitions of hours worked and capital stock

We gathered industry productivity data for 34 OECD countries from several sources:

- National statistics agencies (NZ, Aus)
- OECD.Stat (30 countries)
- EU-KLEMS (2 countries; consistent with OECD.Stat)

We focused on comparisons over the last two business cycles (2000-2008; 2008-2020)

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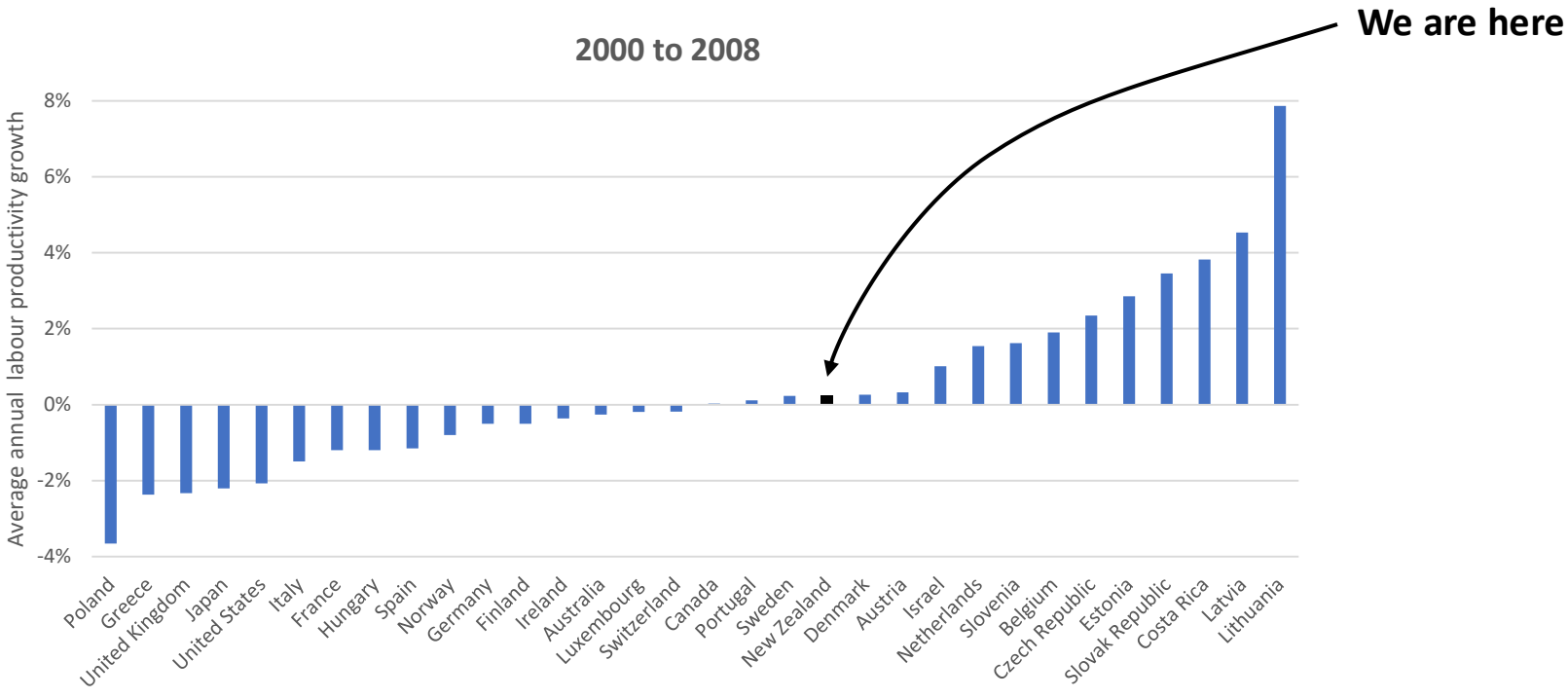
Neither exceptional nor dismal



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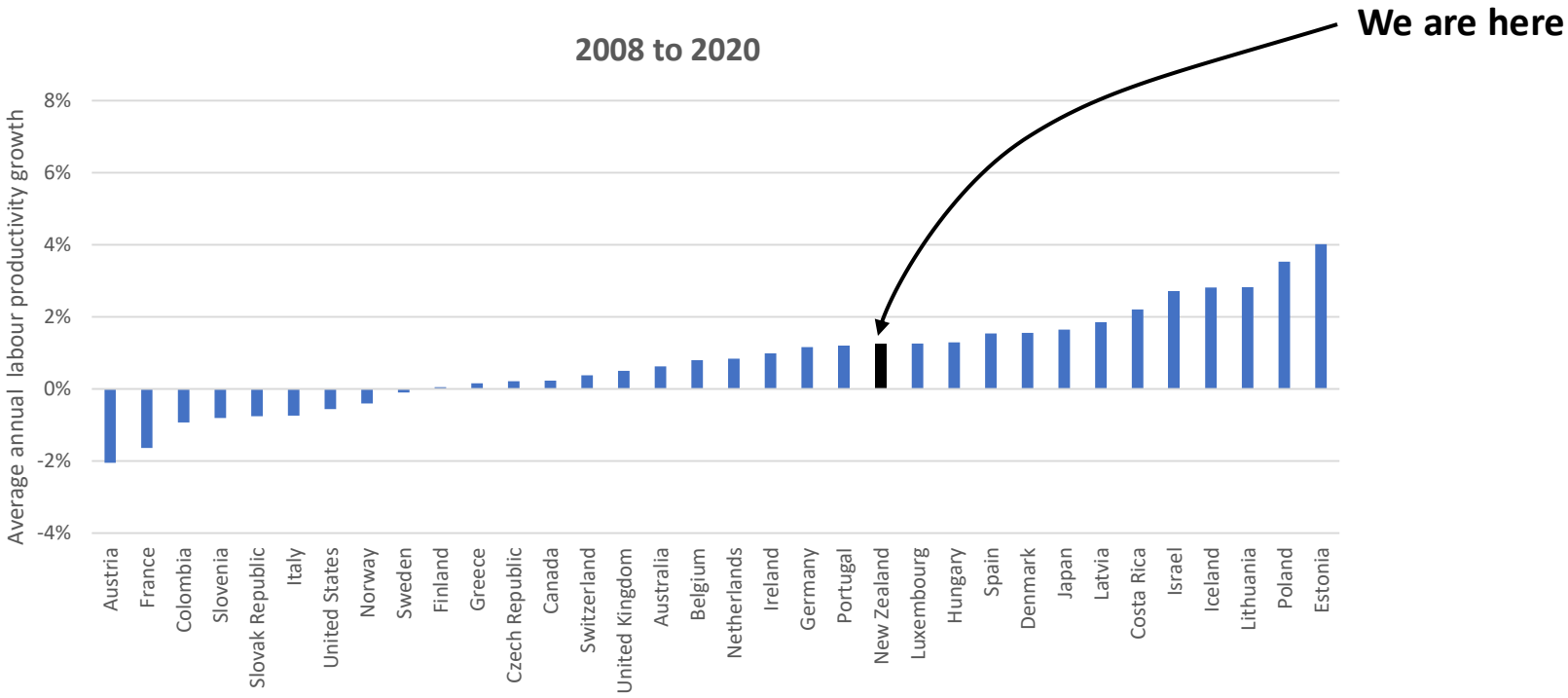

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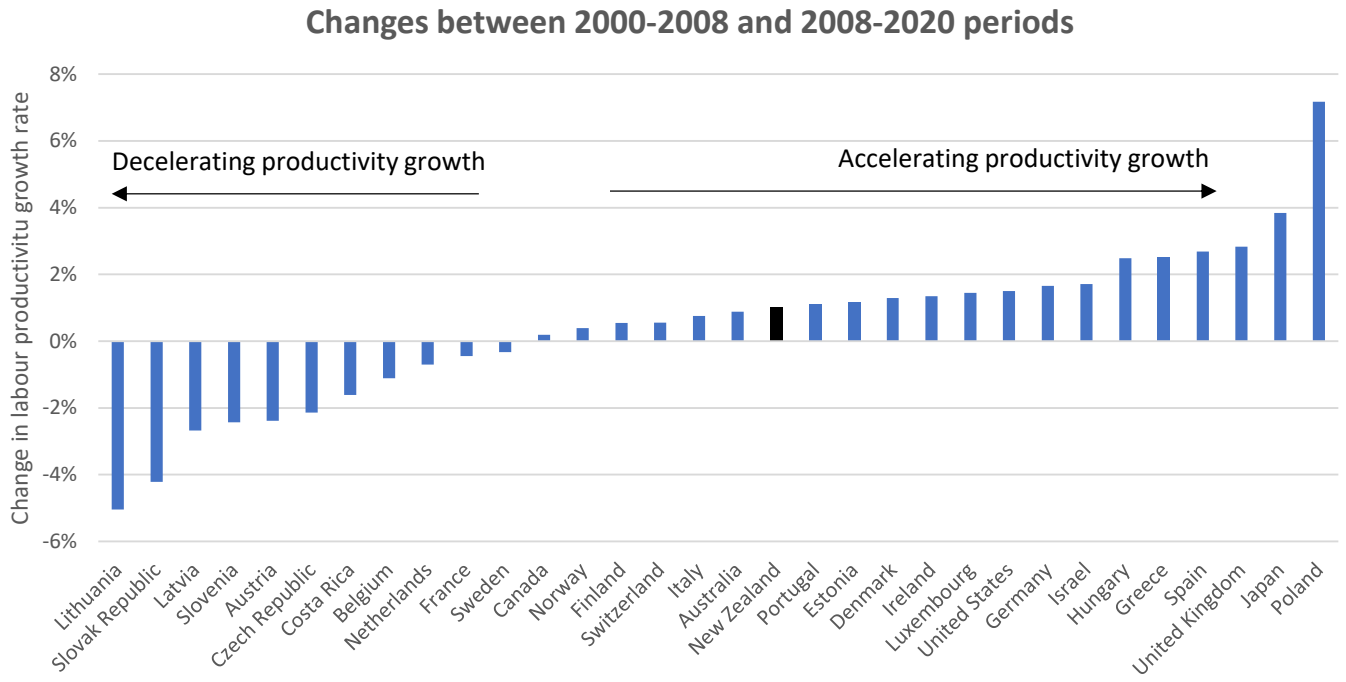
The post-GFC productivity acceleration?



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Why such large variations?

Why does (measured) construction productivity growth vary so dramatically across the OECD?

We considered three types of potential explanations:

- **Market characteristics**: Catch-up growth opportunities; market size; regulation of construction *[labour market regulation?]*
- **Construction market dynamics**: Changes in demand or composition of construction output; boom-bust cycles
- **Methodology**: Differing approaches to measuring quality/price changes may produce different productivity growth estimates

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Correlates of faster labour productivity growth

Model		Long difference (2000-2020)	Business cycles (2000-2008 and 2008-2020)
Outcome variable		Average annual change in labour productivity	Average annual change in labour productivity
Explanatory variables			
Market characteristics	Per-capita GDP at start of period (natural log)	-0.017***	-0.023***
		(0.004)	(0.006)
	Population at start of period (natural log)	-0.005***	-0.004***
		(0.001)	(0.001)
	World Bank construction permit score, averaged over period (0-100)	0.0005**	0.0007***
		(0.0002)	(0.0002)
Construction market dynamics	Average annual change in real house price	-0.072	-0.103**
		(0.090)	(0.050)
	Construction output growth volatility (standard deviation)	-0.042	-0.032
		(0.045)	(0.056)
	Average annual change in road investment share	-0.227	-0.862***
		(0.297)	(0.325)
Methodology	Number of PPI methods in line with OECD preferred approach (0-8)	-0.002***	-0.002***
		(0.001)	(0.001)
Constant		0.241***	0.274***
		(0.052)	(0.071)
Observations		*31*	*56*
R2		*0.672*	*0.464*

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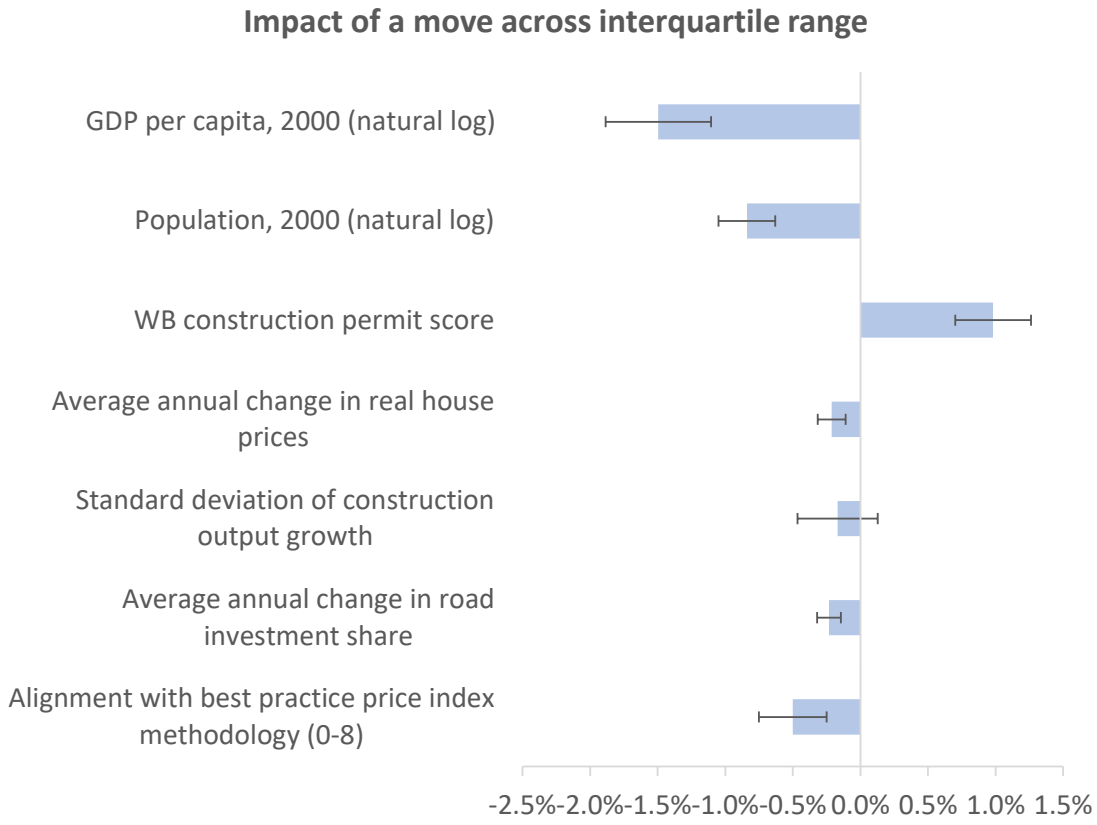
Things that seem to matter (and some that don't)



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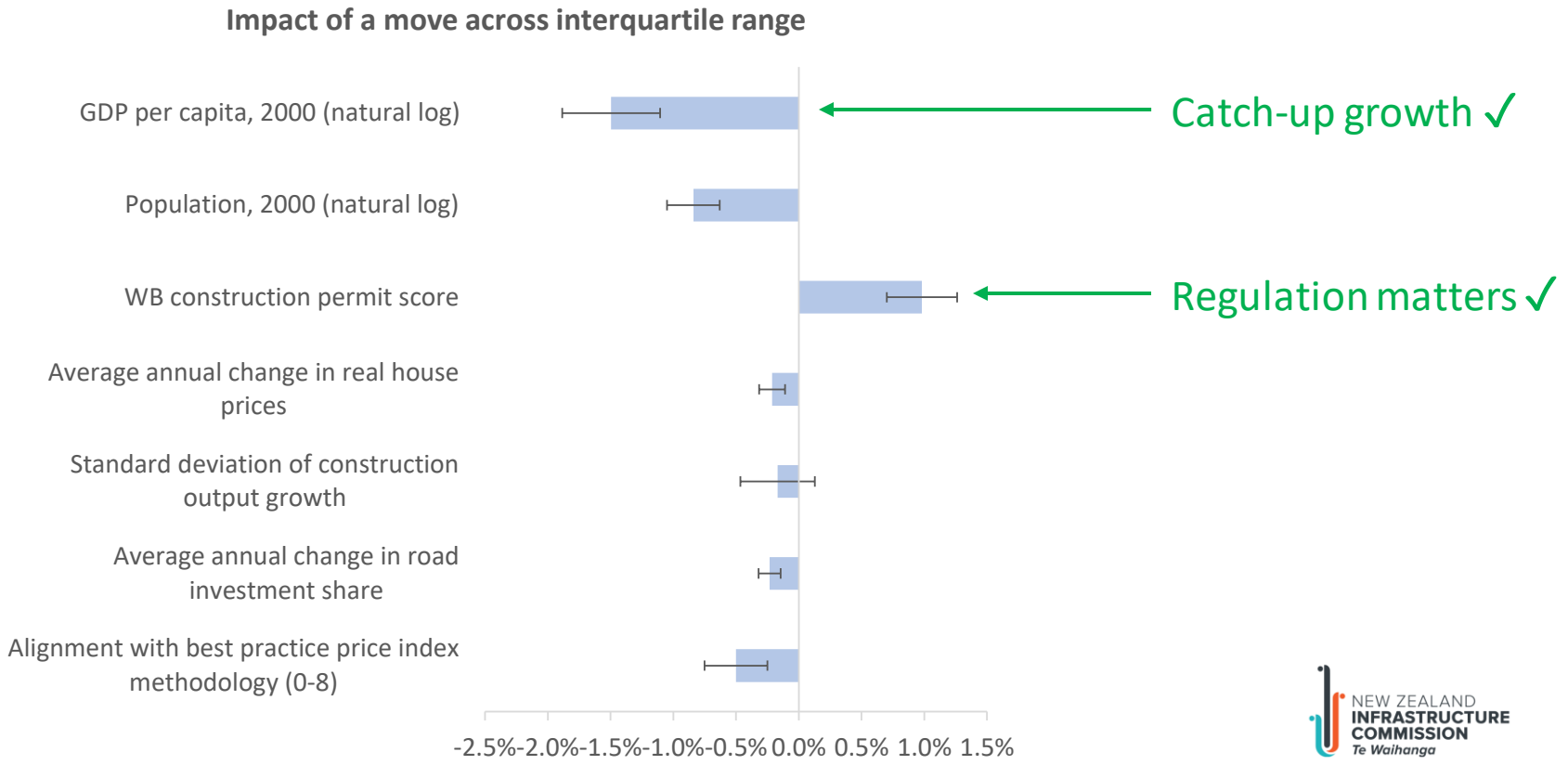

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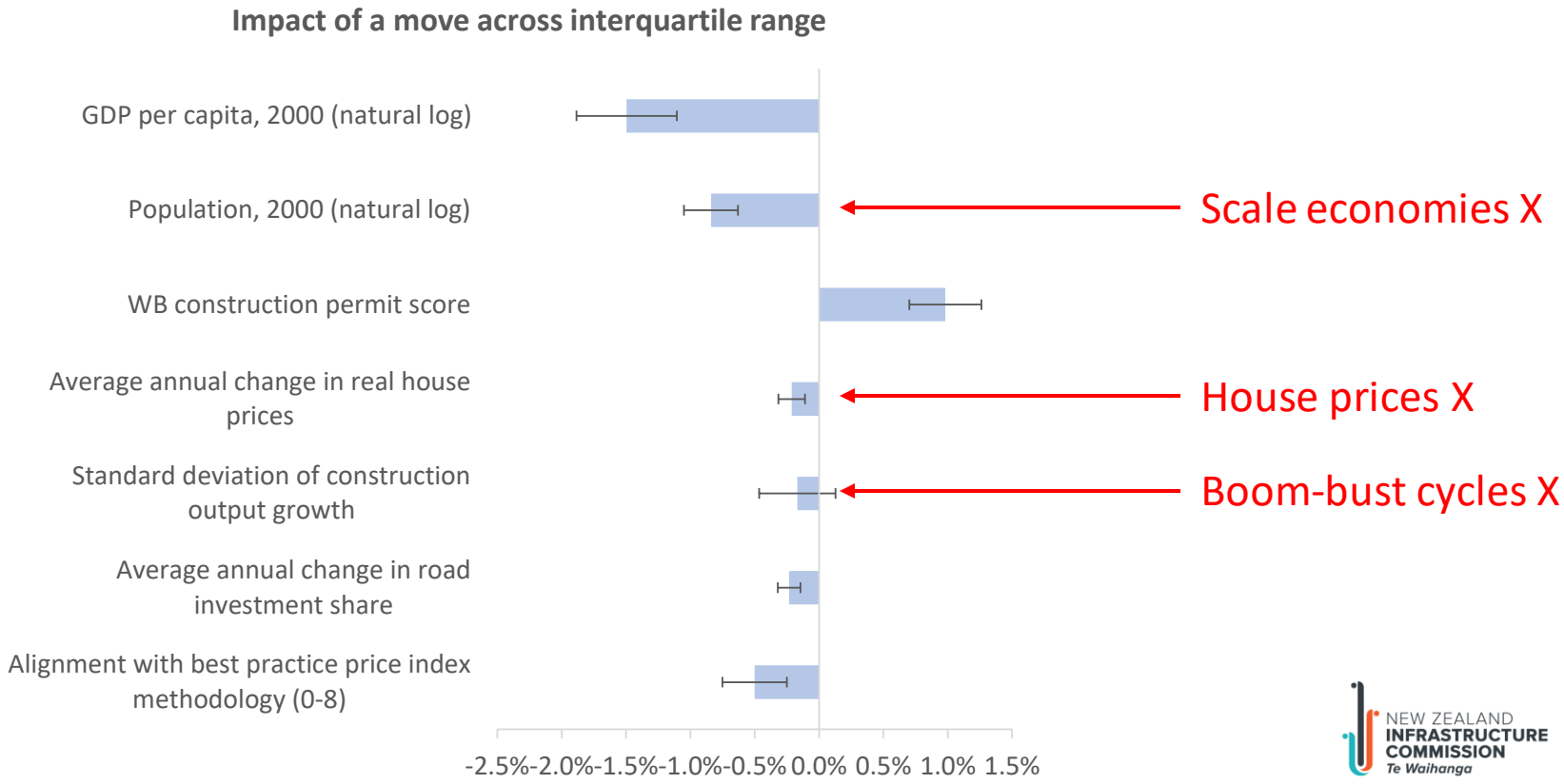

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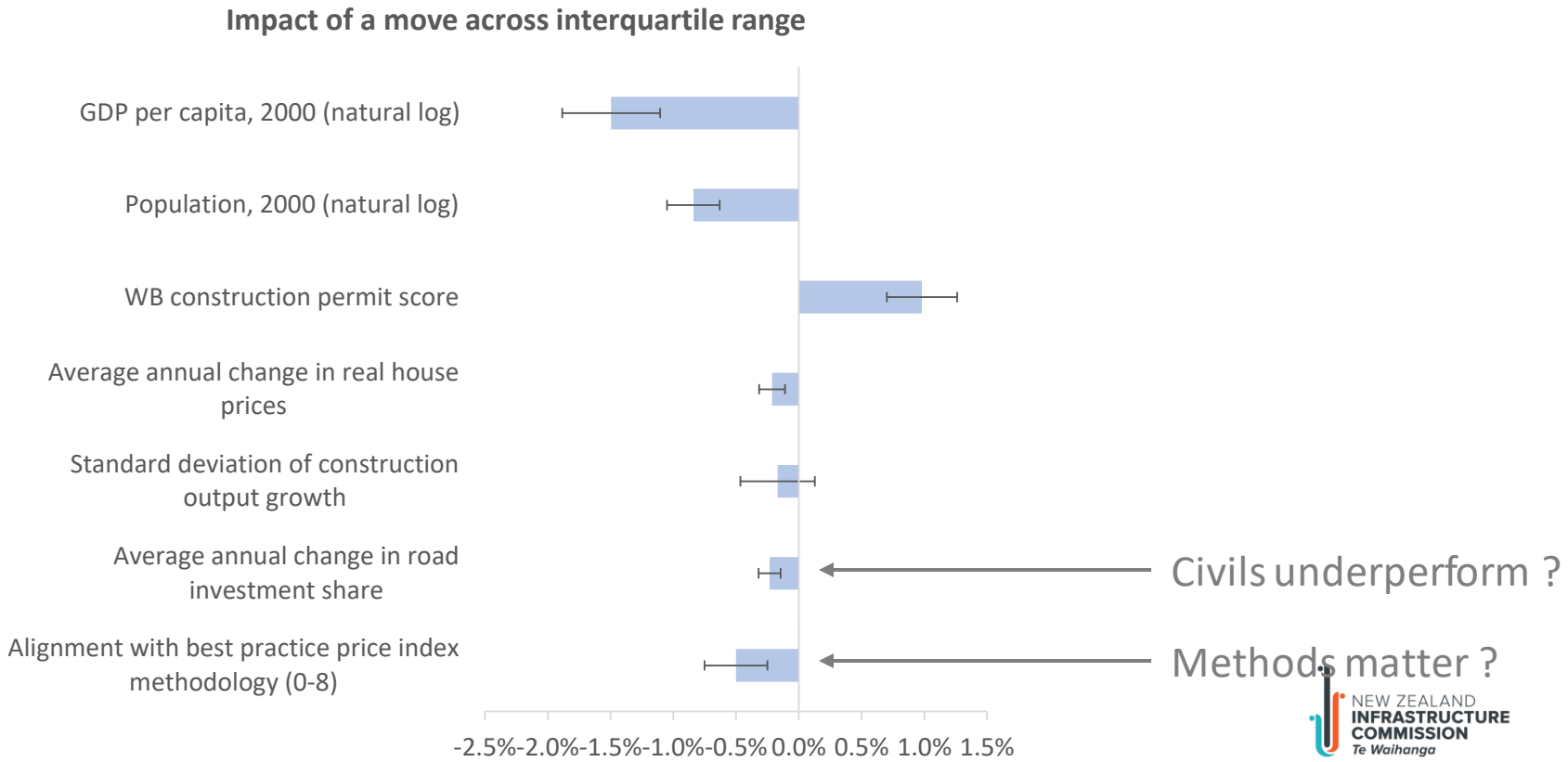

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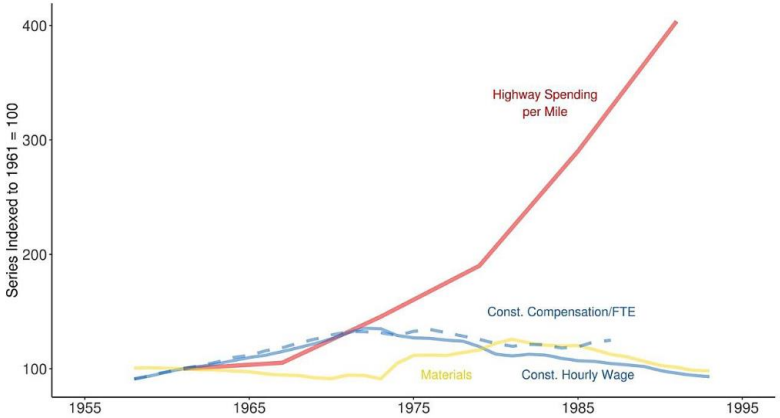
Regulation and productivity growth

FIGURE 4. SPENDING PER MILE AND HIGHWAY WAGE AND MATERIALS PRICES



Notes: This figure shows Interstate spending per mile from our 6-year periods, along with the construction hourly wage (in blue; BLS), construction compensation per full time employee (dashed blue; BEA), and materials prices (yellow; BLS). We index all figures to 100 in 1962.

Sources: Brooks and Liscow (2019)

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Regulation and productivity growth

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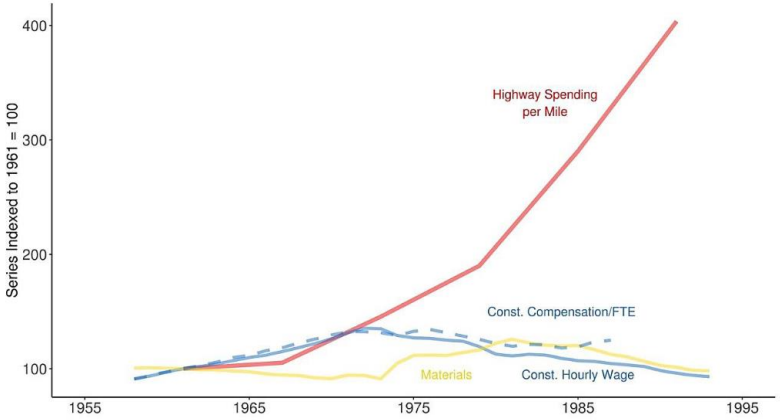

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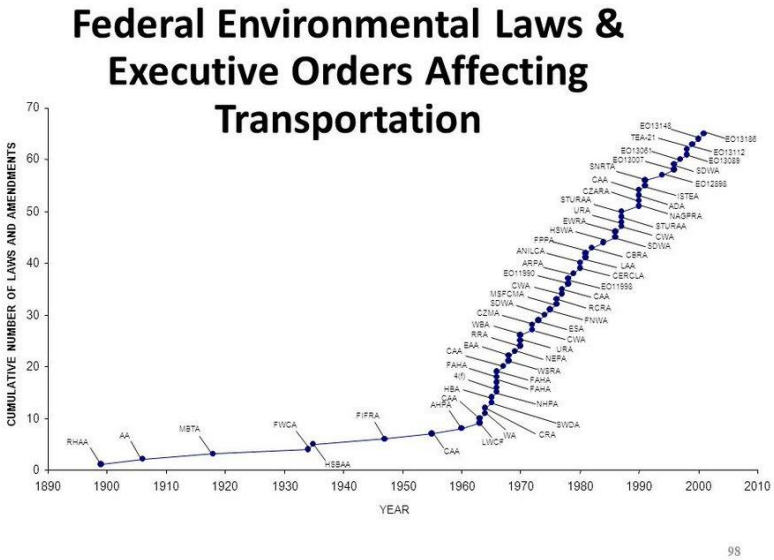

Sources: Brooks and Liscow (2019)
https://slideplayer.com/slide/5984668/

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Regulation and productivity growth

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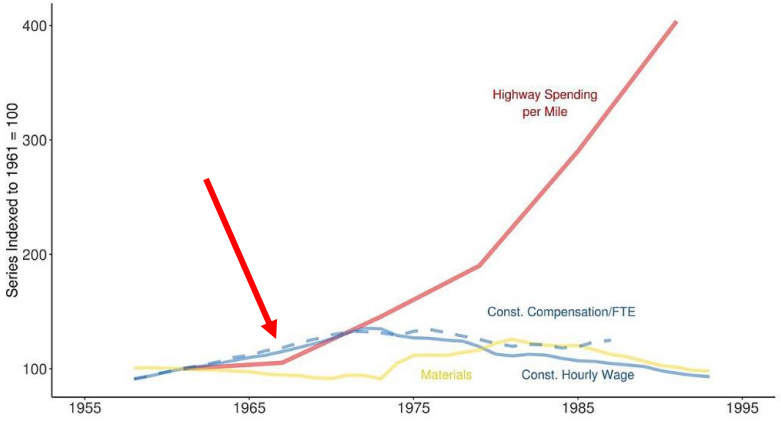

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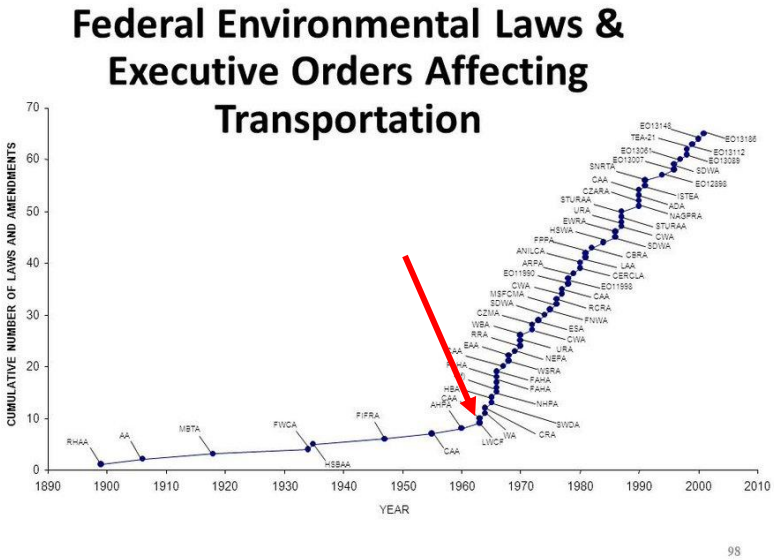

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Sources: Brooks and Liscow (2019)
https://slideplayer.com/slide/5984668/

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Findings (3)

- New Zealand's construction labour productivity growth performance is middling by OECD standards
- Many OECD countries experienced faster construction productivity growth after the GFC
- Cross-country regressions highlight some factors that might matter for construction productivity growth – and others we can probably ignore

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Conclusion: More questions than answers

- Since the GFC, construction productivity growth has accelerated in many OECD countries, including NZ. **Why?**
- New Zealand appears to be an above-average performer on construction productivity growth. **Does this seem right?**
- Infrastructure construction appears to be the worst-performing part of the construction sector. **What could be causing this?**

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Thank you for your time

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