NZIER
NEW ZEALAND INSTITUTE OF ECONOMIC RESEARCH

Cost escalation forecasts

Outlook and forecasting methodologies

NZIER report to Commerce Commission

15 October 2021

About NZIER

NZIER is a specialist consulting firm that uses applied economic research and analysis to provide a wide range of strategic advice.

We undertake and make freely available economic research aimed at promoting a better understanding of New Zealand's important economic challenges.

Our long-established Quarterly Survey of Business Opinion (QSBO) and Quarterly Predictions are available to members of NZIER.

We pride ourselves on our reputation for independence and delivering quality analysis in the right form and at the right time. We ensure quality through teamwork on individual projects, critical review at internal seminars, and by peer review.

NZIER was established in 1958.

Authorship

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1 Purpose

The Commerce Commission commissioned NZIER to provide customised forecasts to support its policy decision-making in telecommunications regulation around pricing. Our short report outlines the outlook for the New Zealand economy, which underpins our forecasts, and includes a description of our methodology.

2 The economic outlook underpins our forecasts

Economic backdrop

Prior to the latest COVID-19 community outbreak discovered in August 2021, the New Zealand economy had been performing strongly. This reflected its responsiveness to the unprecedented amount of fiscal and monetary policy stimulus, with wage subsidy and support payments, increased Government spending and low interest rates boosting demand across a wide range of sectors. Meanwhile, the improvement in business and consumer confidence underpinned increased appetite for spending and investment.

Although discovering community transmission of the new Delta strain of COVID-19 and subsequent lockdown in August closed down a substantial proportion of the New Zealand economy, demand has been resilient. As regions outside of Auckland were able to move down alert levels, demand recovered. One key uncertainty is how long Auckland and nearby regions will have to remain shut off, given the continued outbreaks. The longer restrictions remain, the greater the negative impact will persist as households and businesses hold off on making decisions on spending and investment.

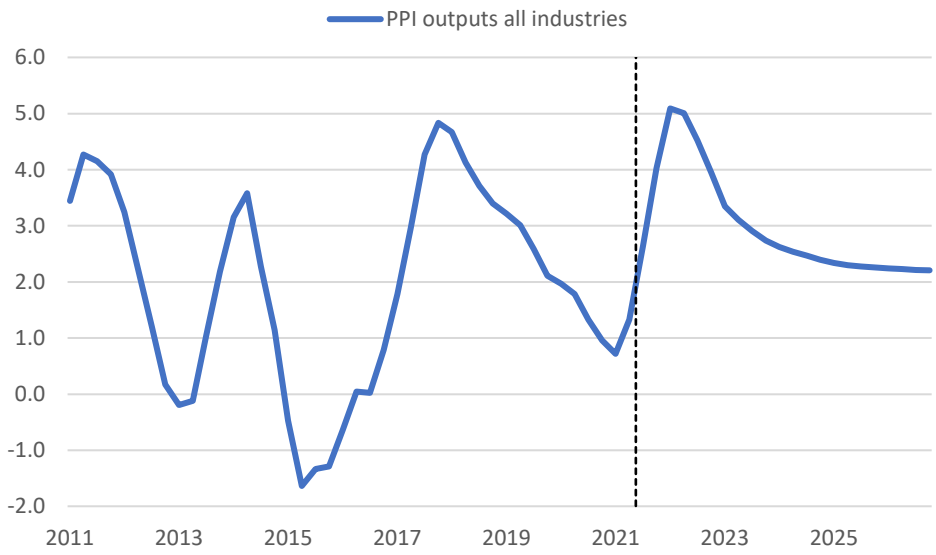
Supply constraints underpin higher inflation pressures

Capacity pressures have become more evident over the past year, reflecting acute labour shortages and supply chain disruptions. The latest COVID-19 community outbreak has exacerbated these pressures, as the prolonged restrictions facing Auckland businesses under Alert Levels 4 and 3 affect the production of materials. Beyond domestic supply, port congestion worldwide had already been affecting the supply of materials across a range of industries in New Zealand. These supply constraints have underpinned solid increases in the Producer Price Index (PPI) and Labour Cost Index (LCI) in recent quarters.

These labour shortages and supply-side constraints are not likely to ease substantially over the coming year. Border restrictions till at least the first quarter of 2022 will limit the ability of firms to bring in workers from overseas. In addition, the global shortage in energy production caused by supply constraints from coal and gas producers worldwide, together with the increase in consumer's demand for electricity as winter draws near for the northern hemisphere, will likely support higher energy prices in the foreseeable future. Already the world is seeing the price of natural gas and coal, and electricity in many countries surge to new highs. The effects of these constraints are reflected in the upward revision to our LCI and PPI forecasts.

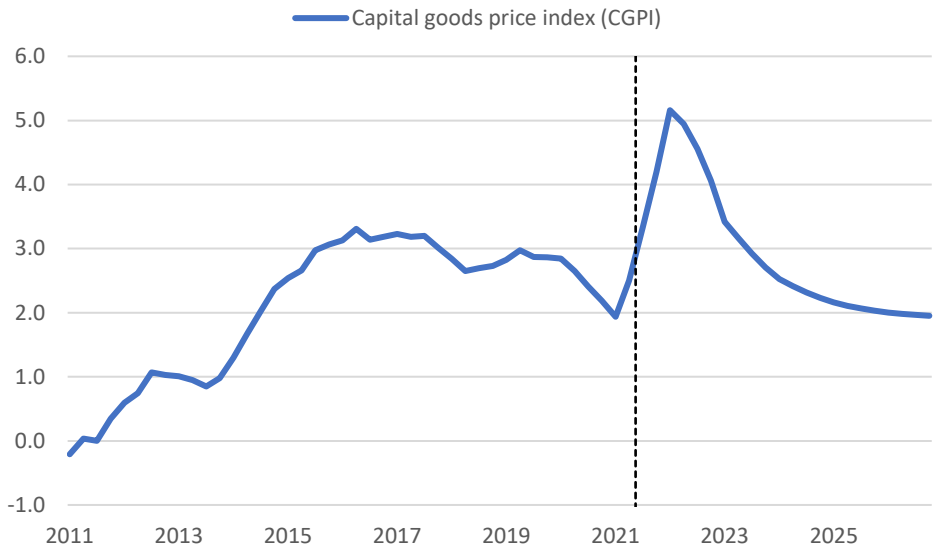
The particularly acute capacity pressures in the construction sector also drive our forecast of strong growth in the Capital Goods Price Index (CGPI) over the coming year.

Figure 1 PPI outputs: All Industries



Source: Stats NZ, NZIER

Figure 2 Capital Goods Price Index (CGPI)

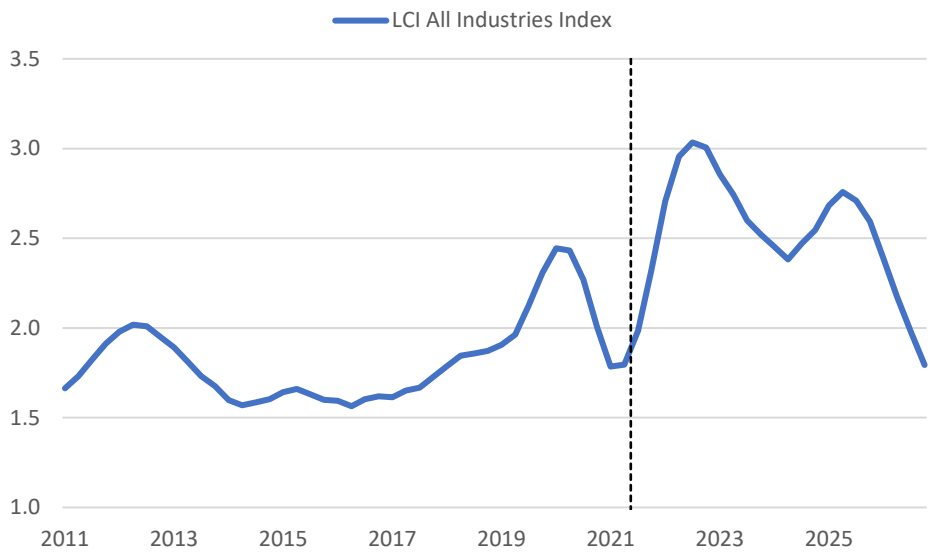


Source: Stats NZ, NZIER

The New Zealand labour market has performed strongly over the past year, as the strong recovery in demand encouraged businesses to hire more workers. The labour market showed signed of resilience, as businesses and households affected by the pandemic pivoted to new opportunities. This was reflected in employment growth in some industries such as construction and professional business services offsetting job losses in others such as hospitality and tourism.

The combination of strong labour demand and tight labour supply has underpinned a lift in wage growth. With businesses reporting labour shortages becoming even more acute, we expect stronger wage inflation over the coming year. Beyond 2022, we forecast wage inflation to moderate as to the relaxation of border restrictions help alleviate labour shortages. Nonetheless, the higher inflation environment overall should keep wage inflation elevated through to 2025.

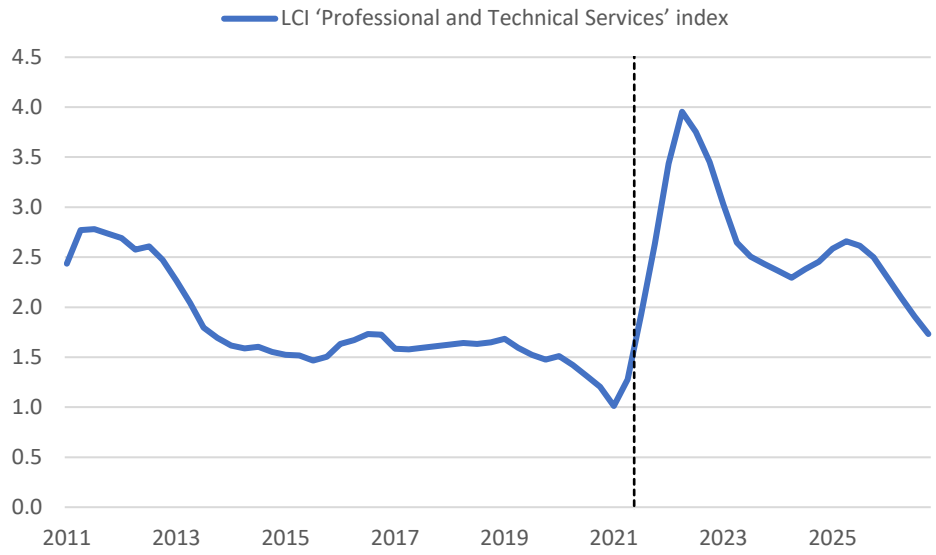
Figure 3 LCI: All Industries



Source: Stats NZ, NZIER

We expect wage growth in the Professional and Technical Services industry to be stronger relative to other industries over the coming year, reflecting relatively strong demand in this industry.

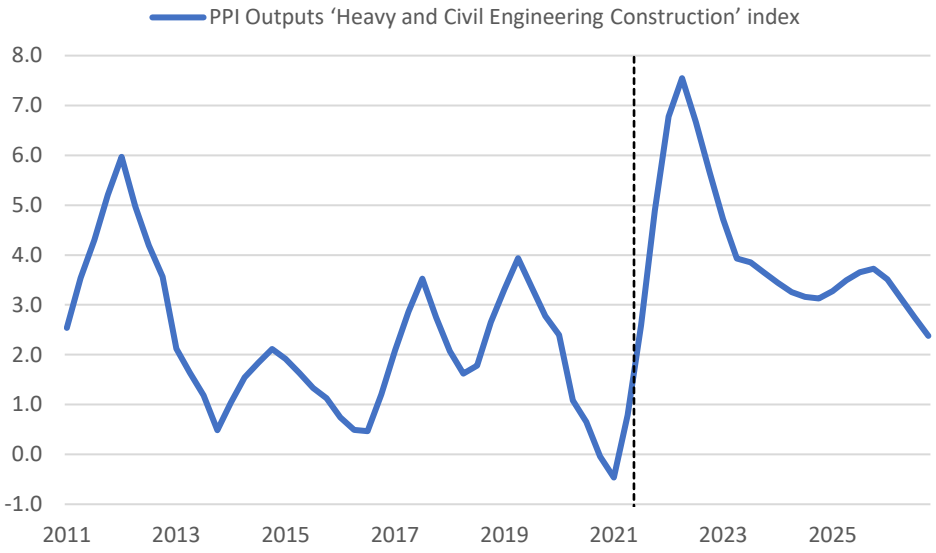
Figure 4 LCI: Professional and Technical Services



Source: Stats NZ, NZIER

Demand for infrastructure construction is ramping up, with the New Zealand Infrastructure Commission reporting an increase in the infrastructure pipeline from $6.1 billion of projects in 2019 to $61 billion in 2021. Much of this construction is planned for the next two years. Against this backdrop, capacity pressures in the construction sector are building up. We expect acute supply constraints will drive a sharp increase in producer prices in the Heavy and Civil Engineering construction industry over the coming year.

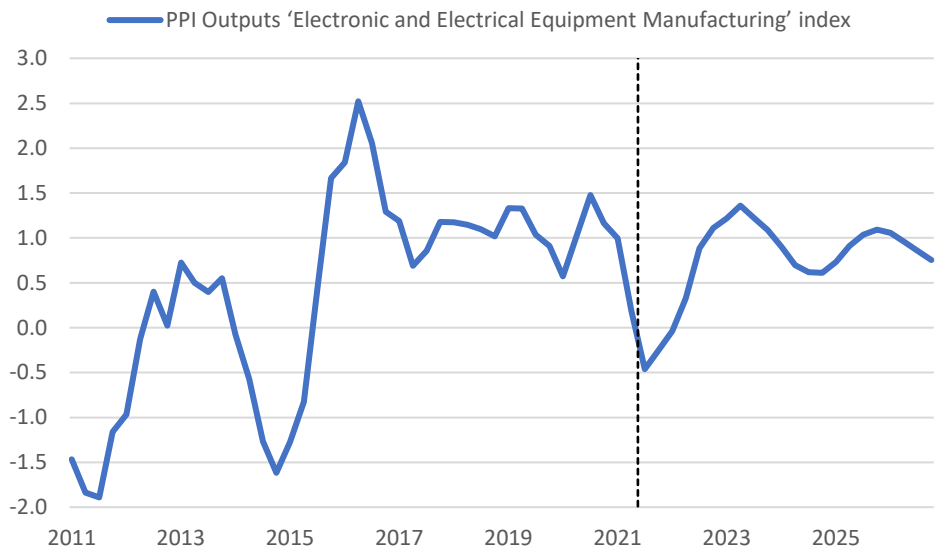
Figure 5 PPI outputs: Heavy and Civil Engineering



Source: Stats NZ, NZIER

The high New Zealand dollar is weighing on the price of imported Electronic and Electrical Equipment Manufacturing in the near term.

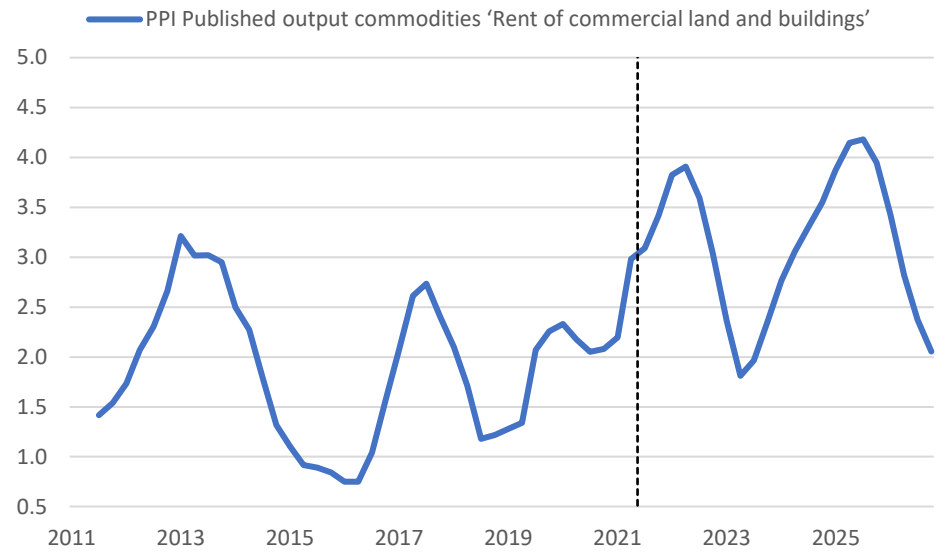
Figure 6 PPI outputs: Electronic and Electrical Equipment Manufacturing



Source: Stats NZ, NZIER

We forecast relatively solid rental growth of commercial land and buildings in the near term, reflecting demand for this group which tends to be more cyclical.

Figure 7 PPI outputs: Rent of commercial land and buildings



Source: Stats NZ, NZIER

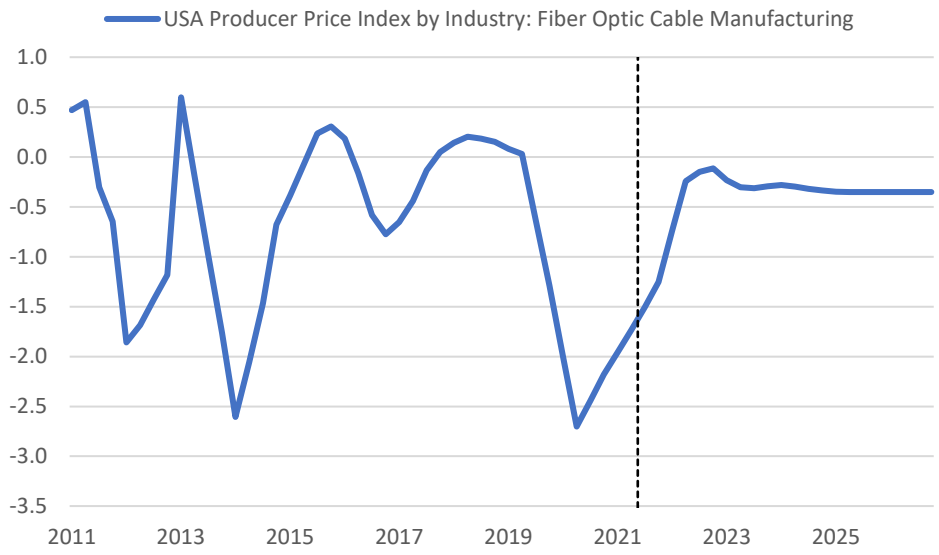
Price of fibre optic cables

There is a range of factors affecting the price of fibre optic cables. The bulk of demand for fibre optic cable is driven by fibre-optic communication, which is a substitute for copper lines. Hence, consistent with the methodology that we used previously, we continue to use the copper price index as a predictor for forecasting the price of fibre optic cables.

Copper is a widely used metal in infrastructure in the energy sector, like energy transmission and energy storage. It is also widely used in the construction, telecommunications, and high-tech manufacturing sectors. Copper prices reached an all-time high around the second quarter of 2021. The price increase in copper over the pandemic period was driven primarily by the optimism of economic recovery due to the global vaccine rollout and the high demand from China. However, the global copper price has reached new highs, leading international agencies like the World Bank and the International Monetary Fund to forecast copper prices to go down in the coming years.

In line with the *Energy & Metals Consensus Forecasts,* which are forecasting the decrease in the global price of copper, we forecast the Fiber Optic Cable Manufacturing Index to decrease slowly in the upcoming years.

Figure 8 US PPI: Fiber Optic Cable Manufacturing



Source: Stats NZ, NZIER

3 The difference with Chorus' forecasts

Data availability drives some differences between the current forecasts and the Chorus forecasts provided in August 2020. As Stats NZ has revised its series and now provides the historical cost indices going back to 2009 only, the current forecasts only use this available data to base our empirical estimations.

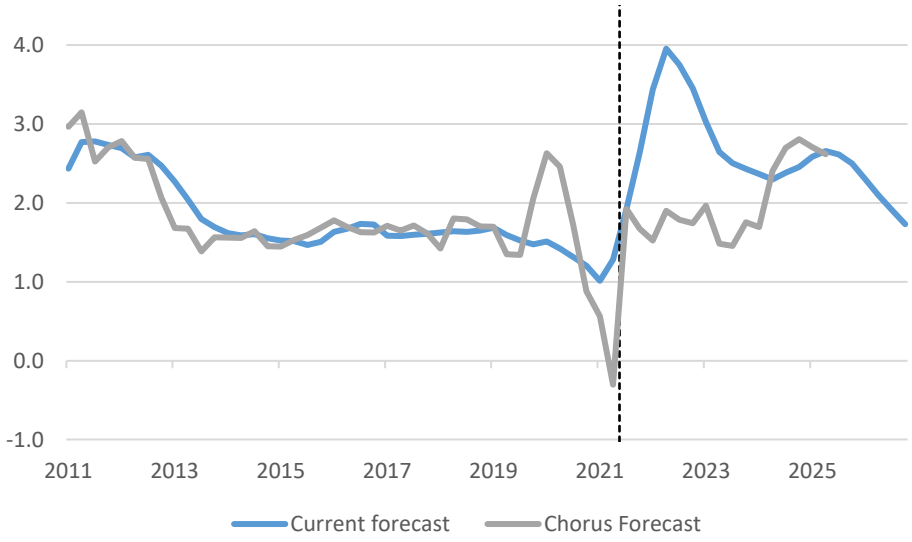
The history of the series provided to Chorus in our forecasts in August 2020 reflected the fitted series rather than the actual data provided in our current forecasts. This also accounts for some of the differences over the history of the series provided.

Another important aspect of the current forecast is that New Zealand's economy performed stronger than expected in August 2020. In our previous forecast, we modelled the economic scenarios in line with the V-shaped scenario outlined by The Treasury.

However, economic activity has been much stronger than this V-shaped scenario incorporated in our August 2020 forecasts, leading to stronger inflation pressures in the New Zealand economy. These factors drive the upward revision to most of our forecasts.

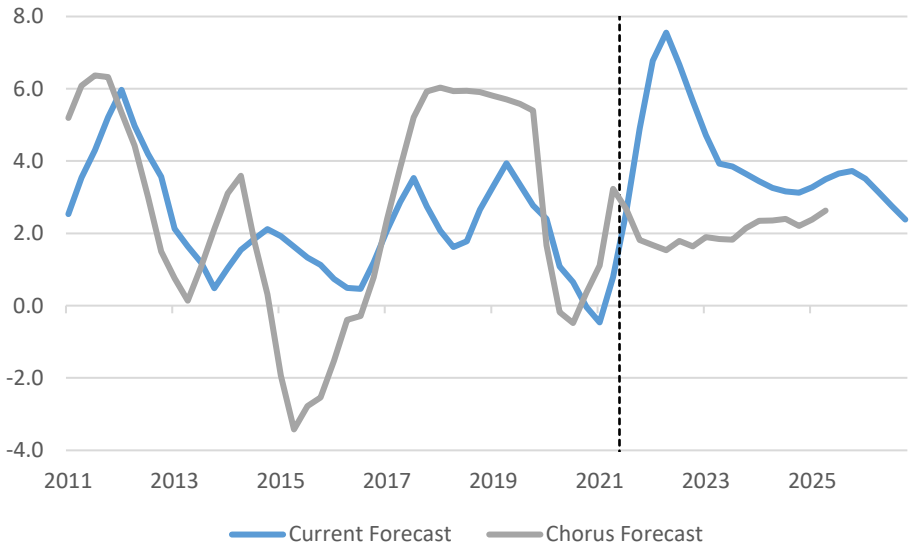
One exception is the price of Electronic and Electrical Equipment Manufacturing, where the stronger than expected New Zealand dollar has weighed on the price of this tradable commodity.

Figure 9 LCI: Professional and Technical Services



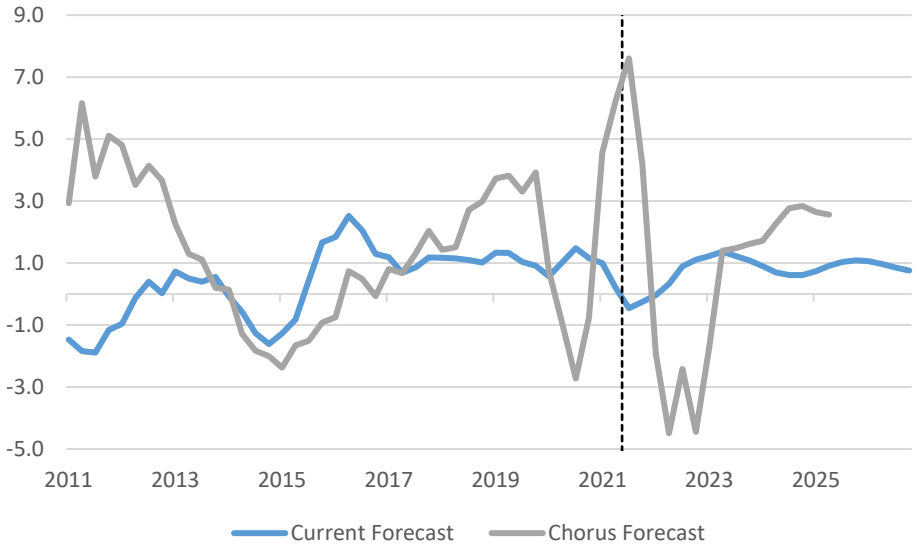
Source: Stats NZ, NZIER

Figure 10 PPI outputs: Heavy and Civil Engineering



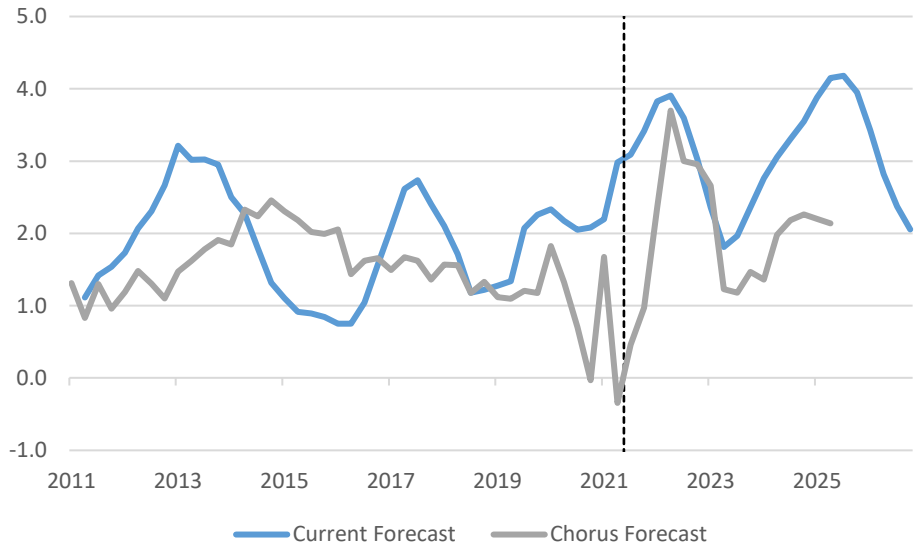
Source: Stats NZ, NZIER

Figure 11 PPI outputs: Electronic and Electrical Equipment Manufacturing



Source: Stats NZ, NZIER

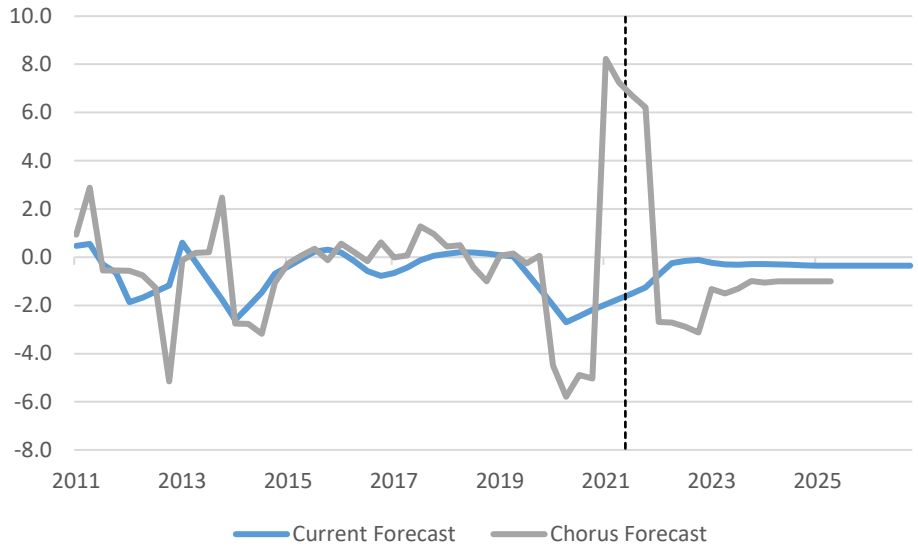
Figure 12 PPI outputs: Rent of commercial land and buildings



Source: Stats NZ, NZIER

The starting point for the price of Fibre Optic Cable Manufacturing is lower than forecast back in August 2020. We have also changed the model specification for this component, as detailed in the next section.

Figure 13 US PPI: Fiber Optic Cable Manufacturing



Source: Stats NZ, NZIER

4 Methodology

4.1 Relevant indices

This report updates the forecasting procedure of the following indices, as requested by the Commerce Commission.

- LCI All Industries Index
- PPI outputs all industries
- LCI 'Professional and Technical Services' index
- PPI Outputs 'Heavy and Civil Engineering Construction' index
- PPI Outputs 'Electronic and Electrical Equipment Manufacturing' index
- PPI Published output commodities 'Rent of commercial land and buildings'
- US Producer Price Index by Industry: Fiber Optic Cable Manufacturing
- Capital goods price index (CGPI).

4.2 Forecasting methodology

The labour cost forecast models make use of three inputs from NZIER's regular forecasts and forecast models:

- forecasts of the all-sectors, all salary and wage rates LCI
- forecasts of gross domestic product (GDP):
    - short term forecasts based on sector – and experience-specific cycles in economic activity
    - long term forecasts based on labour force growth and trend historical multifactor productivity growth
- long term trends in industry-specific GDP forecasts based on a descriptive (Vector Auto-Regression) model of trend shares of GDP by industry.

4.3 LCI ALL industries

The forecast of the LCI All Industries is determined jointly with other key measures of macroeconomic activity. The forecasts are produced through an iterative forecast process that considers both demand and supply aspects of the macroeconomy, institutional settings and economic shocks to global demand or local supply.

The forecast can be accurately described as having both a long term trend component and a cyclical component. The trend component is forecast using the relationship between CPI inflation and overall wage inflation.

4.4 LCI Construction forecast model

Although the Commerce Commission does not directly request forecasts for LCI Construction, forecasts of this index are important as they feed into the forecasts for the

other indexes. LCI Construction forecasts are derived from using an econometric model that considers both the long term trend and the short-run cyclical moment of the index.

Specifically, this model includes two parts:

- a model of the long term trend in the LCI Construction series as a function of all-sectors, all salary and wage rates LCI and population growth as a generalised construction demand measure
- a model of short run and cyclical movements in the LCI Construction series as a function of changes in net migration and the construction industry output gap.

The model fits very well. The LCI model can take into account more than 99% of the in-sample variation. The detailed in-sample modelling output can be found in Appendix A of this report.

4.5 PPI outputs: All Industries

The PPI-outputs index for all industries is forecast using an iterative forecasting process that considers both demand and supply aspects of the macroeconomy, institutional settings and economic shocks to global demand or local supply.

The forecast can be accurately described as having both a long term trend component and a cyclical component. The trend component is forecast using the relationship between CPI and overall PPI inflation.

4.6 PPI outputs: Heavy and Civil Engineering, PPI – Published output commodities: 'Rent of commercial land and buildings' and PPI Outputs: 'Electronic and Electrical Equipment Manufacturing'

The three PPI series is forecast using an econometric model with two parts:

- A model of the long term trend in the PPI-outputs index for the series as a function of all-sectors Producers Price Index for inputs and the LCI Construction
- A model of short run and cyclical movements in the PPI-outputs index for Heavy and Civil Engineering as a function of changes in net migration, the construction sector output gap, and the GDP output gap.

4.7 US PPI by Industry: Fiber Optic Cable Manufacturing

In our previous report to Chorus, to provide forecasts for the price index, we had used the relationship between the (four) lags of copper prices to predict the growth of the 'US Producer Price Index by Industry: Fiber Optic Cable Manufacturing'.

In our revised forecast, in addition to using lags of copper prices, 2 lags of auto regressive terms are also included to capture the cyclical moment in this price index. The regression model fits the observed data very well, with an adjusted R square of 0.935.

Forecasts prepared in line with the model specification are consistent with those forecasts prepared for Chorus (2020), except:

- After testing the model specification, we found a specification involving lags of copper prices and 2 lags of auto regressive terms to capture the cyclical moment in this price index provided a much better fit than the original specification.

- Our previous model specification only used the relationship between the (four) lags of copper prices to predict the growth of the 'US Producer Price Index by Industry: Fiber Optic Cable Manufacturing'.

4.8 Capital Goods Price Index (CGPI)

The CGPI is forecast using an iterative forecast process that considers both demand and supply aspects of the macroeconomy, institutional settings and economic shocks to global demand or local supply.

The forecast can be accurately described as having both a long term trend component and a cyclical component. The trend component is forecast using the relationship between overall PPI inflation and the output gap for the New Zealand economy.

Appendix A Modelling output

Table 1 LCI construction model

Trend equation

Dependent Variable: LN(LCI Construction) Method: Fully Modified Least Squares (FMOLS) Sample (adjusted): 2009Q2 2021Q2				
Explanatory variable	Coefficient	Std. Error	z	Prob.
LN(LCI_All)	1.160513	0.0125199	92.69	0.000
LN(Population(-16))	-0.009969	0.0018041	-5.53	0.000
C	-1.156493	0.0923664	-12.52	0.000
R-squared	0.99		Adjusted R-squared	0.99

Cycle equation

Dependent Variable: Residual from trend equation Method: Ordinary Least Squares (OLS) Sample (adjusted): 2009Q3 2021Q2				
Explanatory variable	Coefficient	Std. Error	t	Prob.
ConstructionGap	-0.0258043	0.0048379	-5.33	0.000
NetMigration(-4)	-0.0001143	0.0000685	-1.67	0.102
AR(1)	0.7801609	0.0679348	11.48	0.000
R-squared	0.79		Adjusted R-squared	0.78

Table 2 LCI Professional and technical service model

Dependent Variable: LN(LCI Professional and technical service) Method: Fully Modified Least Squares (FMOLS) Sample (adjusted): 2009Q2 2021Q2				
Explanatory variable	Coefficient	Std. Error	z	Prob.
LN(LCI_All)	0.964436	0.0432083	22.32	0.000
C	0.2601248	0.3031202	0.86	0.391
R-squared	0.98		Adjusted R-squared	0.98

Table 3 PPI Heavy and Civil Engineering

Trend equation

Dependent Variable: LN(PPI Heavy and Civil Engineering) Method: Fully Modified Least Squares (FMOLS) Sample (adjusted): 2009Q2 2021Q2				
Explanatory variable	Coefficient	Std. Error	z	Prob.
LN(PPI_All)	0.308078	0.0770087	4.00	0.000
LN(PPI_LCI_Construction)	0.799243	0.0652376	12.25	0.000
C	-0.7433897	0.2244979	-3.31	0.001
R-squared	0.97		Adjusted R-squared	0.97

Cycle equation

Dependent Variable: Residual from trend equation Method: Ordinary Least Squares (OLS) Sample (adjusted): 2009Q3 2021Q2				
Explanatory variable	Coefficient	Std. Error	t	Prob.
ConstructionGap	0.0602022	0.0383859	1.57	0.124
GdpGap	-0.1950374	0.1000223	-1.95	0.058
NetMigration(-4)	0.0006634	0.0003103	2.14	0.038
R-squared	0.60		Adjusted R-squared	0.59

Table 4 US PPI Fiber Optic Cable Manufacturing

Dependent Variable: LN (US PPI Fiber Optic Cable Manufacturing) **Method: Fully Modified Least Squares (FMOLS)** **Sample (adjusted): 2004Q4 2021Q2**				
Explanatory variable	Coefficient	Std. Error	z	Prob.
LN(Copper_Price) (-1)	-0.012664	0.0058394	-2.17	0.030
LN(Copper_Price) (-2)	0.0203907	0.0090559	2.25	0.024
LN(Copper_Price) (-3)	-0.0074168	0.0091237	-0.81	0.416
LN(Copper_Price) (-4)	-.0032865	0.0056119	-0.59	0.558
AR(1)	0.7258513	0.0633148	11.46	0.000
AR(2)	0.240527	0.0622674	3.86	0.000
C	0.2542628	0.1155519	2.20	0.028
R-squared 0.941			Adjusted R-squared 0.935	