TE TAI ŌHANGA
THE TREASURY

Monthly Economic Indicators

New Zealand Government

October 2019

Executive Summary

- **Economic growth was weaker than forecast in the June quarter but the current account position was largely as expected**
- **Business activity remained weak in the September quarter and is expected to have weighed on domestic economic growth**
- **Inflation was stronger than expected but a slowing economy poses downside risk to forecasts**
- **The IMF downgraded their global growth outlook reflecting rising trade barriers and elevated geopolitical uncertainty**
- **Economic activity has improved in Australia in recent months, possibly reflecting interest rate cuts and tax rebates**

The economy grew in line with market expectations (but weaker than our BEFU forecast) at 0.5% in the June quarter, driven by a recovery in the services industries and growth in agriculture and forestry. Strong export price growth in the June quarter led to an increase in the terms of trade, which supported nominal growth of 1.9%.

The risks to our BEFU GDP growth forecasts in the remainder of 2019 are skewed to the downside with further weakness in firms' sentiment of their own activity weighing on the growth outlook. The September Quarterly Survey of Business Opinion (QSBO) measure of firms' experienced activity fell further from the June quarter and expectations of activity in the next 3 months are also subdued. General business sentiment fell to its lowest level since the March 2009 quarter.

The annual trade deficit narrowed to $5.2 billion in September, driven by increased exports to China. Exports of dairy and meat products remained strong, with the latter assisted by elevated demand for beef and lamb from continued disruptions in the domestic supply of pork in China.

Annual headline inflation was above expectations at 1.5% in the September quarter, driven by strong non-tradables inflation, which reached an 8 year high. Non-tradables inflation is expected to drive headline inflation going into 2020, and tradables inflation is expected to remain subdued as a result of competitive pressures and weaker price growth for imported goods. The risks to our BEFU forecast for annual inflation to reach 2.0% in 2020 are skewed to the downside.

Domestic housing market activity was solid, with national house prices rising and building consents growing (albeit at a slower pace than earlier in the year). Auckland house sales rose while sales in other areas of the country fell, pointing to the possibility of renewed confidence in that region.

The IMF downgraded their global growth outlook reflecting rising trade barriers and elevated geopolitical uncertainty. Subsequently, trade tensions have eased somewhat, with the US and China working towards an interim agreement and some uncertainty around Brexit has been resolved. Chinese GDP growth slowed in the September quarter, and is expected to slow further over the coming year, reflecting ongoing trade tensions with the US. However, supportive fiscal and monetary policy and a healthy labour market should support the economy. In Europe, business sentiment deteriorated in October, but appears to have stabilised in the US. In Australia, economic activity has improved in recent months, possibly reflecting interest rate cuts and tax rebates, however business and consumer confidence still remain at multi-year lows.

This month's special topic looks at the Treasury's revised nominal neutral 90-day rate assumption in the economic forecasts.

ISSN-1175-6780 – Text finalised 30 October 2019

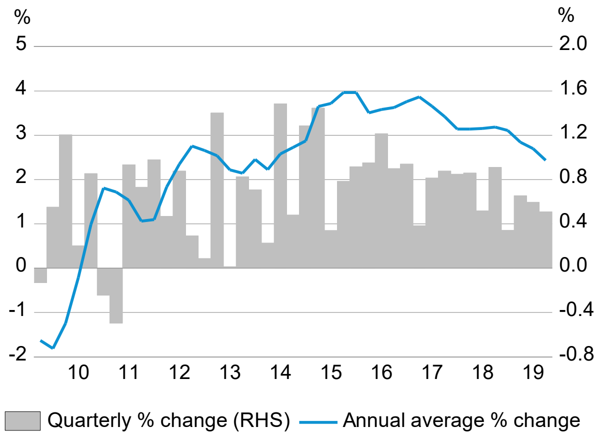
Analysis

The economy grew as expected in the June 2019 quarter but a further deterioration in business confidence in the September quarter is expected to weigh on future economic growth. The annual trade deficit narrowed from rising exports while imports remained largely unchanged. Inflation was above market expectations in the September quarter of 2019, reaching 1.5% on an annual basis but remains below the Reserve Bank of New Zealand's (RBNZ) target of 2.0%. National house prices rose strongly in September following a solid rise in August. Auckland house sales increased 6.7% from August while sales growth in regions outside of the country's largest city was subdued, indicating a possible return of confidence to the Auckland region.

The economy expanded as expected…

Real production GDP expanded 0.5% in the June quarter of 2019, slightly higher than market expectations but weaker than our 2019 BEFU forecast. Annual average growth slowed to 2.4% from 2.7% previously (Figure 1).

Figure 1: Real GDP (production) growth



Source: StatsNZ

The services sector grew modestly in the June quarter, led by rental, hiring and real estate services, supported by a strong labour market and an increase in seasonally adjusted house sales.

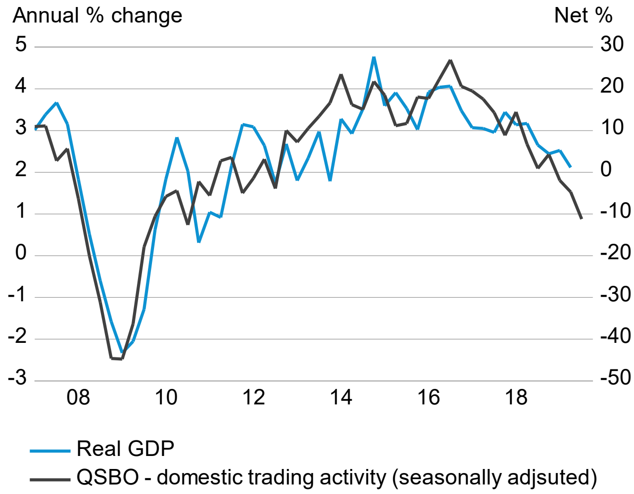
Indications of weaker manufacturing activity in the June quarter were confirmed with manufacturing down 0.8% from the March quarter.

Weakness flowed through from a number of manufacturing sub-groups linked to the production of investment goods. This could reflect weakness in business investment at a time of low business confidence.

…but business confidence deteriorated more…

Business confidence deteriorated further in the latest NZIER QSBO, falling to its lowest level since the March 2009 quarter with a net 35% of firms expecting worsening business conditions. Firms' own activity for the September quarter fell to -11.2, pointing to weaker GDP growth in September quarter of 2019 than forecast at BEFU 2019 (Figure 2).

Figure 2: GDP and experienced domestic trading activity



Sources: StatsNZ, NZIER

Firms continued to report higher cost pressures squeezing profitability, and they do not expect conditions to improve. Pessimism remained broad-based across sectors, and manufacturers continued to be the least confident about business conditions owing to weaker demand and rising costs.

The monthly ANZ Business Outlook survey also suggested weakness ahead. Headline business confidence fell to its lowest level since April 2008 with a net 54% of respondents reporting expectations of deteriorating business conditions in the year ahead. Firms' view of their own activity over year ahead fell 1 percentage point to a net 2% expecting worsening activity. Pricing intentions and inflation expectations fell to near historical lows, suggesting continued subdued inflation in the near term.

...and manufacturing activity remained weak…

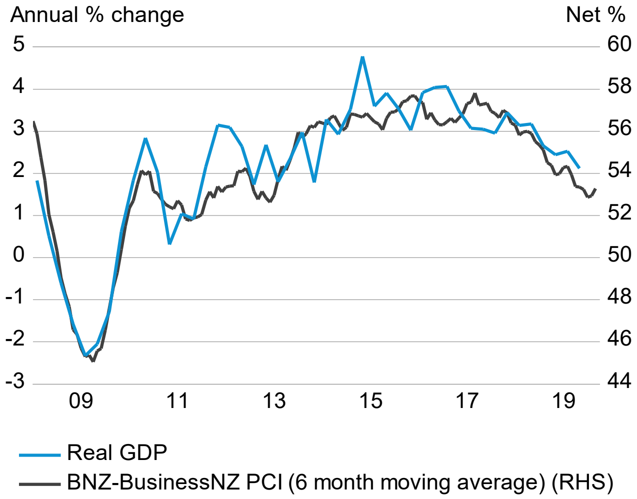
The BNZ-BusinessNZ Performance of Manufacturing Index (PMI) remained in contractionary territory for the third month in a row at 48.4 (unchanged from August), indicating a further slowing in manufacturing activity in the September quarter from the June quarter. Consistent with readings from the QSBO, current activity measures were weak, with the production index falling to 46.2, the lowest level since April 2012. However, early signs of improving future conditions may have emerged with the new orders sub-index rising to 50.1 from 45.9 in August.

…but the services sector was resilient

The BNZ-BusinessNZ Performance of Services Index (PSI) contracted 0.2 points but remained in expansionary territory at 54.4 in September. This takes the index level back to its historical average. Similar to the PMI, indicators of future business rose in the PSI with the new orders/business index rising 2.4 points from August to 59.3 in September. The employment intentions index remained in positive territory at 52.7, above its historical average of 51.6.

The GDP-weighted BNZ-BusinessNZ Combined Performance Index (PCI) showed a 0.2 point contraction in the month of September. Looking through the monthly volatility, PCI expansion remains weaker than in previous years which suggests weaker GDP growth ahead (Figure 3).

Figure 3: GDP growth and PCI

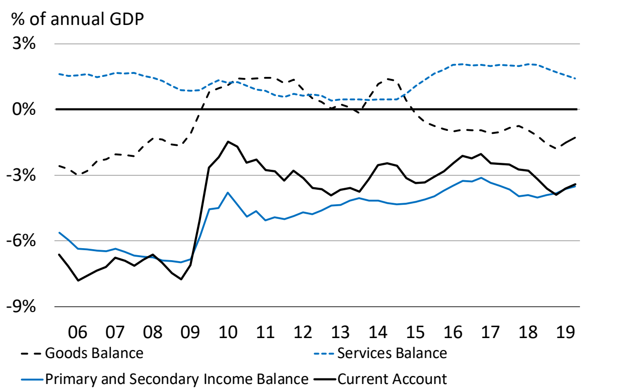


Sources: StatsNZ, BNZ-BusinessNZ

Annual current account deficit fell as expected…

The annual current account deficit narrowed to $10.2 billion (3.4% of GDP) in the June quarter, largely as expected in our BEFU forecast. Recovery in the goods balance continued while the services balance deteriorated further. The income balance was broadly unchanged from the March quarter (Figure 4).

Figure 4: Current account deficit (annual) and components

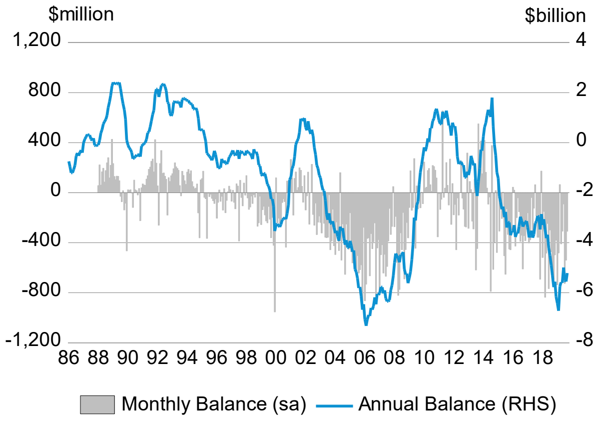


Source: StatsNZ

…and the trade deficit fell in September…

The trade deficit narrowed to $1.2 billion in September to be $5.2 billion annually (Figure 5).

Figure 5: Merchandise trade balance



Source: StatsNZ

Exports increased 4.1% in the month of September, driven by dairy which increased 20.4% in value and 13.0% in volumes. Strong exports of meat products (with volumes rising 8.6% from August) was assisted by elevated demand for beef and lamb from continued disruption to domestic Chinese pork supply. Demand from China remained resilient in September, rising 20.3% from a year ago.

Imports rose 3.6% in the year to September from continued strength in imports of consumption goods (up 6.6%). However, imports of capital goods remained weak (up 0.1% in the year), likely reflecting slowing business investment growth, which poses downside risk to our BEFU GDP growth forecasts.

…but visitor arrivals growth continued to ease

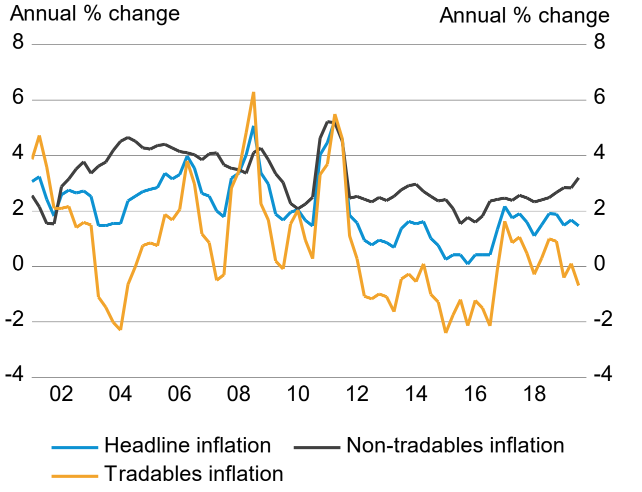
Annual visitor arrivals increased 2.5% in the year ended August, the slowest annual growth in an August year since 2013. The continued slowing growth in visitor arrivals numbers adds downside risk to our exports or services forecasts.

Inflation was above expectations…

Consumer prices grew more than expected, rising 0.7% in the September quarter to be up 1.5% annually (Figure 6) but remains below the Reserve Bank's target mid-point of 2.0% annual inflation. Increases in housing costs, particularly in rates and rents contributed to annual non-tradables inflation reaching its highest rate since 2011 at 3.2%.

Inflation is expected to be driven by non-tradables inflation going into 2020, while tradables inflation is expected to remain subdued as a result of competitive pressures and weaker import price growth. The risks to our BEFU forecast for annual inflation to reach 2.0% in 2020 are skewed to the downside.

Figure 6: CPI inflation by components



Source: StatsNZ

…and commodity prices were unchanged…

The ANZ World Commodity Price Index was unchanged at 294.7 in September. Higher prices for meat, forestry and aluminium offset lower prices in other sectors. Forestry prices rose 0.3% in the month and are slowly recovering from a sharp correction earlier this year and remain 12% lower than last year. The overall index is up 3.4% compared to a year ago. In NZD terms, the index rose 1.4% in the month, driven by a fall in the exchange rate.

…while dairy prices continued to rise

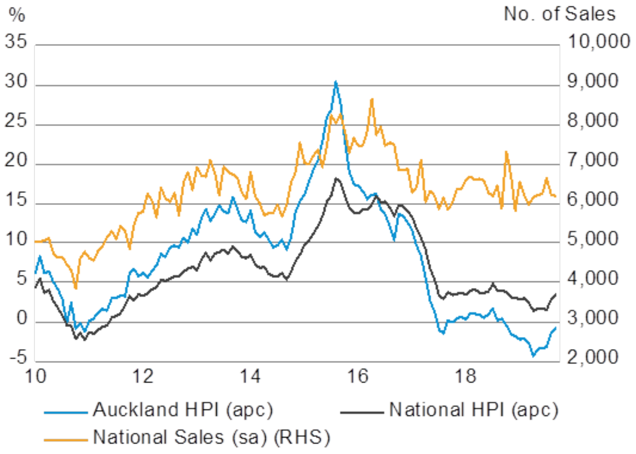
Dairy prices rose at both *GlobalDairyTrade* auctions in October to be up 0.7% from September 2019. Whole milk powder (WMP) prices fell 0.3% in the month while skim milk powder (SMP) rose 5.2%. Continued strength in offshore consumer demand combined with limited expansion in supply is expected to provide support for prices going forward.

Fonterra increased its forecast 2019-2020 farm-gate milk price range from $6.25-$7.25 to $6.55-$7.55, citing reduced supply of global WMP and higher prices for SMP.

Signs of Auckland housing market reigniting…

Broad-based strength in the national housing market in September led to the REINZ House Price Index increasing 0.9% from August, to be up 3.5% on an annual basis (Figure 7). In a sign of renewed confidence in the region, Auckland house sales rose 6.7% from August to be up 10.1% from a year ago. Outside of Auckland however, sales declined by 0.5% from August, following a 6.4% fall in July. Falling interest rates, strong population growth and a general housing shortage are expected to boost housing market activity into 2020.

Figure 7: House prices and sales

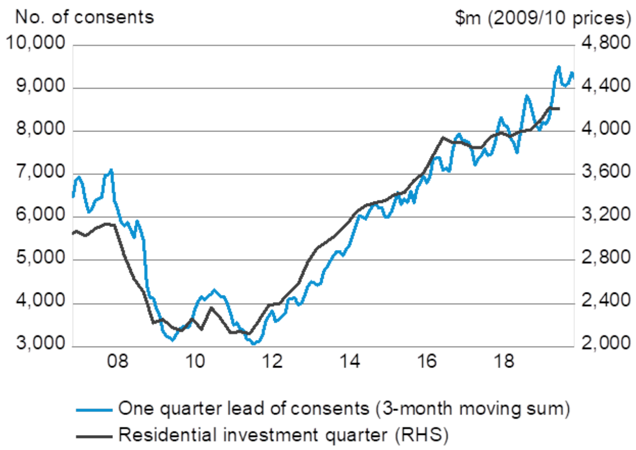


Source: REINZ

…and more construction activity in the pipeline

Building consents rose 0.8% in the August month following a 1.3% fall in July. Consent issuance in August was driven by the multi-unit category which increased 4.6% but was partially offset by a 1.5% reduction in consents for standalone houses from July. Growth in building consent numbers has eased in the second half of the year so far, following strong consent issuance in the first half. High consent numbers in the year to date should produce growth in residential building activity over the rest of 2019, consistent with our BEFU forecast (Figure 8). However, capacity constraints in the construction sector may limit growth to some extent.

Figure 8: Building consents and residential investment



Source: StatsNZ

Migration remained high…

Permanent and long term migration reached 54,000 in the year ended August 2019 to be up 9.4% compared to the previous year. Migrant arrivals driven by non-New Zealand citizens more than offset an increase in the number of New Zealand citizens departing the country.

…and electronic card transactions increased

Electronic card spending has been resilient despite weakening consumer confidence in recent months. Seasonally adjusted electronic card transaction values rose 0.6% in September, following a 1.3% increase in August. Increased spending on consumables drove the upward movement this month.

On a quarterly basis, total transactions increased 0.8% and core retail transactions rose 0.9%, suggesting reasonable household spending growth in the September quarter.

The IMF downgrade the global outlook…

The IMF's October World Economic Outlook downgraded global growth to 3.0% in 2019, and 3.4% in 2020, from 3.2% and 3.5% respectively in the July Update (Table 1). The report pointed to rising trade barriers and elevated geopolitical uncertainty weighing on manufacturing and investment. The report also noted that leading indicators of services activity have softened in some major economies, but remain robust in China.

Table 1: IMF July WEO projections

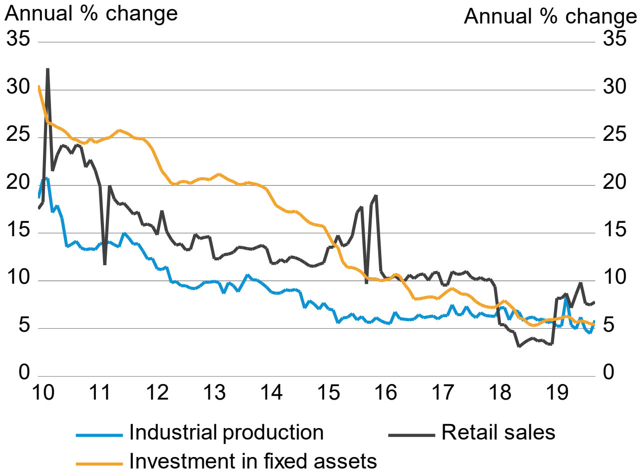
	2018	2019 Projection *(change from July)*	2020 Projection *(change from July)*
World	**3.6**	**3.0** (-0.2)	**3.4** (-0.1)
Australia	**2.7**	**1.7**	**2.3**
Euro area	**1.9**	**1.2** (-0.1)	**1.4** (-0.2)
China	**6.6**	**6.1** (-0.1)	**5.8** (-0.2)
US	**2.9**	**2.4** (-0.2)	**2.1** (0.2)
UK	**1.4**	**1.2** (-0.1)	**1.4** (0.0)

Source: IMF

…as growth continues to slow in China…

GDP growth in China slowed from 6.2% in the June quarter to 6.0% in the September quarter. The weaker outturn was driven by a slowdown in investment, which more than offset a pick-up in consumption. On a monthly basis, the recent slowing in activity data was partially reversed in September. Industrial production growth ticked up from 4.4% to 5.8%, retail sales growth picked up from 7.5% to 7.8% and fixed investment eased slightly from 5.5% to 5.4% (Figure 9). Looking forward, growth is expected to slow further, reflecting trade tensions with the US and slowing global demand. However, supportive fiscal and monetary policy and a healthy labour market should support the economy.

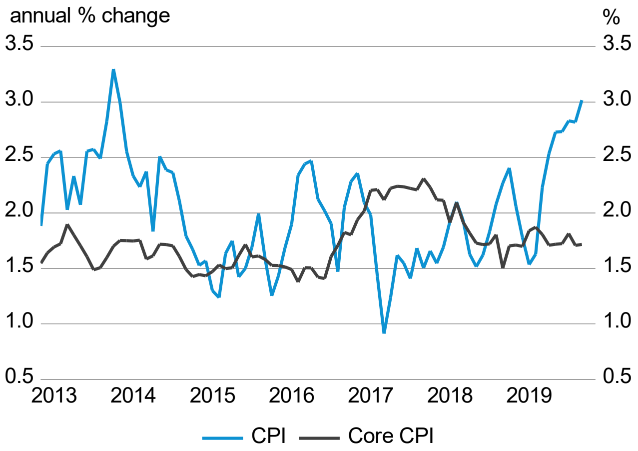
Figure 9: Chinese domestic activity



Source: National Bureau of Statistics of China

Rising inflationary pressures pose a key risk to the Chinese economy. African swine fever is pushing up meat prices, particularly the price of pork, which surged 69% on an annual basis in September. This has put upward pressure on CPI inflation, which rose from 2.8% on an annual basis in August to 3.0% in September. Core inflation, which strips out food and energy prices, remained subdued at 1.7% in September. The risk is that rapidly increasing pork prices may spill over into broader consumer inflation through higher inflation expectations, which would constrain monetary policy choices.

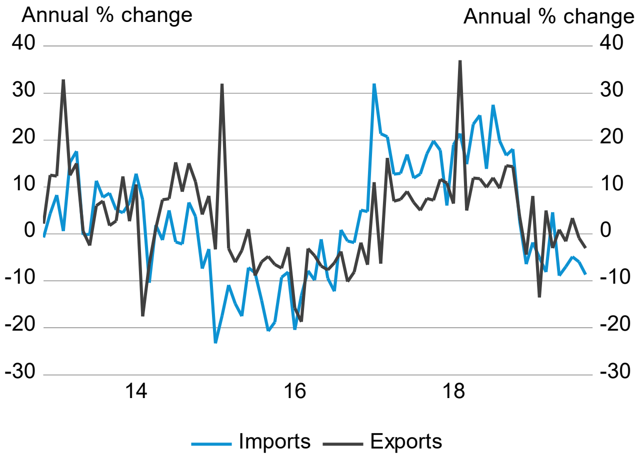
Figure 10: China CPI inflation



Source: Ministry of Agriculutre of China

Trade tensions appear to be easing, with the US and China working towards an interim trade agreement. Meanwhile, the drag of trade tensions was evident in Chinese exports data for September, with USD export values falling 3% from a year ago driven by a 22% fall in exports to the US. Imports were down 9%, with US imports 22% lower than a year ago (Figure 11).

Figure 11: Chinese trade



Source: China Customs/Haver Analytics

…and sentiment weakens further in Europe…

A slowing Chinese economy is not helping sentiment in Europe, where October PMI data for the euro area pointed to a weak start to the December quarter (Figure 12). Overall, the composite euro area PMI was largely unchanged at 50.2, consistent with barely positive GDP growth. Germany remains the main drag on manufacturing activity in the euro area, while activity in France is a bright spot. The European Central Bank left policy settings unchanged this week, following a rate cut to -0.5% and new quantitative easing at their last meeting.

…as Brexit uncertainty retreats

The UK Parliament voted in favour of Prime Minister Boris Johnson's Withdrawal Agreement Bill this month; however, Parliament voted against passing the legislation before the October 31 deadline. The EU have granted the UK an extension to 31 January, which PM Johnson has accepted. In the meantime, the UK will hold a general election on December 12. While a no deal exit on 31 October has been avoided, it is still possible on 31 January.

Activity indicators mixed in other Asian economies…

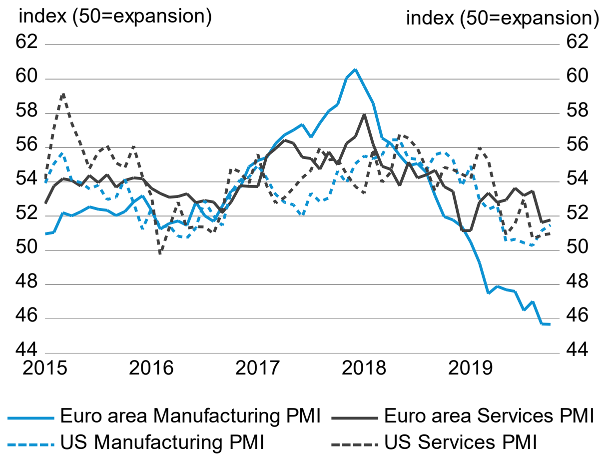
Recent data across emerging economies in Asia show slowing inventory building and firming factory output growth following weakness over the first half of the year. PMIs have been mixed across Asia, with September readings for mainland China, Taiwan and Korea above their June lows, while those for India, Indonesia and Vietnam have weakened further.

Momentum in manufacturing continues to cool in Japan, with the manufacturing PMI falling from 48.9 in September to a three-year low of 48.5 in October. Meanwhile, consumer confidence fell to an eight-year low in September.

…but stabilise in the US…

In the US, PMIs remained in expansionary territory (Figure 12). Both the manufacturing and services measures appear to be stabilising, albeit at a low level. This will raise expectations of a pick-up in the more closely followed ISM manufacturing PMI for the US, which fell to 47.8 in September, from 49.1 in August. The ISM nonmanufacturing PMI for the US also fell sharply in September but remains in expansionary territory.

Figure 12: Europe and US PMIs

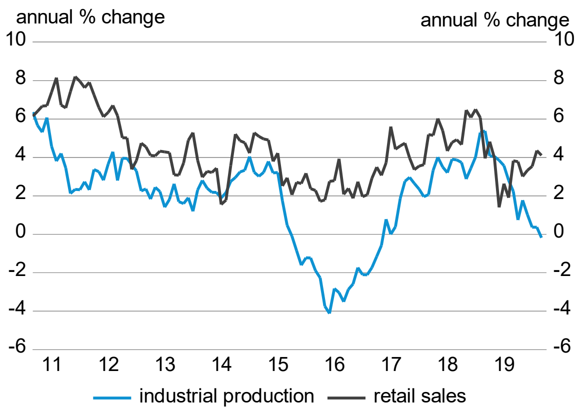


Source: IHS Markit

…but momentum continues to slow

US industrial production continued to slow in September, falling 0.4%. On an annual basis, the index dipped into negative territory for the first time since 2016, down 0.2% following a rise of 0.4% in August. US retail sales momentum also slowed in September, falling 0.3% in the month, from 0.6% in August (Figure 13).

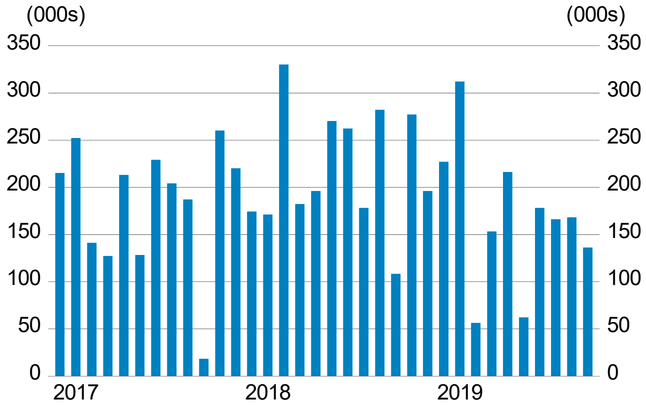
Figure 13: US retail sales and industrial production



Source: Haver Analytics

Employment in the US posted a 136,000 gain in September (Figure 14), while the unemployment rate fell to 3.5%, from 3.7%, the lowest rate in 50-years. Despite the low rate of unemployment, employment growth in the US is slowing, and may spill over to private consumption, which comprises roughly 70% of the US economy. Annual wage growth remained unchanged at 2.9% and annual US CPI inflation was flat at 1.7% in September. Annual core inflation was also flat at 2.4%, reflecting a modest monthly rise of 0.1%.

Figure 14: US employment growth is slowing



Source: Bureau of Labour Statistics

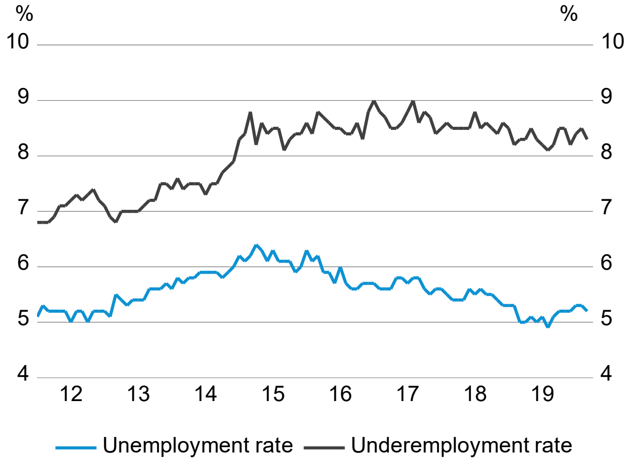
Following softening domestic data, September quarter GDP growth in the US is expected to slow to 1.7% (annualised) from 2.0% in the June quarter. The US Federal Reserve is also expected to lower interest rates by 25bps at their meeting this week. This would take the target range from 1.75-2.0% to 1.50%-1.75% and would be the third consecutive cut this year.

Australian activity improves…

The Australian economy slowed markedly over the first half of 2019. Growth was 1.4% in the June quarter of 2019, from 1.7% in the March quarter. This is well below average growth of 2.7% over 2018. However, leading indicators for the September quarter suggest economic momentum is picking up in Australia. Nominal retail sales in Australia grew by 0.4% in August, from flat sales in July and 0.2% average growth over the past 6 months. On an annual basis, retail sales grew at 2.6%, from 2.4% in July. Home loans, which are a leading indicator of house prices, grew 2.9% in August, to be up 12.0% over the past 3 months. The strength was board based across investor lending and owner-occupiers. Annual growth still remains negative at -5.0% however. August saw another large trade surplus in Australia of $5.9AUDb, though this was smaller than July's surplus ($7.3AUDb) owing to weaker export values (reflecting lower iron ore prices).

Australian employment lifted by 14,700 in September, with annual growth steady at 2.5%. The unemployment rate ticked down to 5.2%, from 5.3% in August. The underemployment rate also ticked down slightly in the month (Figure 15). The small improvement this month has lowered analyst expectations of a rate cut in November, although the data continue to suggest spare capacity in the labour market.

Figure 15: Australian labour market



Source: Australian Bureau of Statistics

Overall, the pick-up in economic activity over August and September may reflect early effects from tax rebates and interest rate cuts, and supports the RBA's narrative of a 'gentle turning point' in the economy over the second half of 2019. However, the stimulus has yet to impact business and consumer sentiment, which remained at multi-year lows in September and October.

…supported by policy stimulus

At its October meeting, the Reserve Bank of Australia lowered the cash rate by 25bps to a record-low 0.75% as widely expected by markets. The move marks the third cut to the cash rate in five months. The Bank signalled its readiness "to ease monetary policy further if needed" in order to achieve full employment and target inflation. Market expectations are for another 25bps cut by May next year.

Special Topic: New Zealand's Nominal Neutral Interest Rate

The nominal neutral interest rate (NIR) is the unobservable interest rate that prevails in an ideal world where the economy grows at its trend rate, inflation is stable at its target and the output gap is closed.[1] Estimates of the nominal NIR have large uncertainties owing to its unobserved nature.

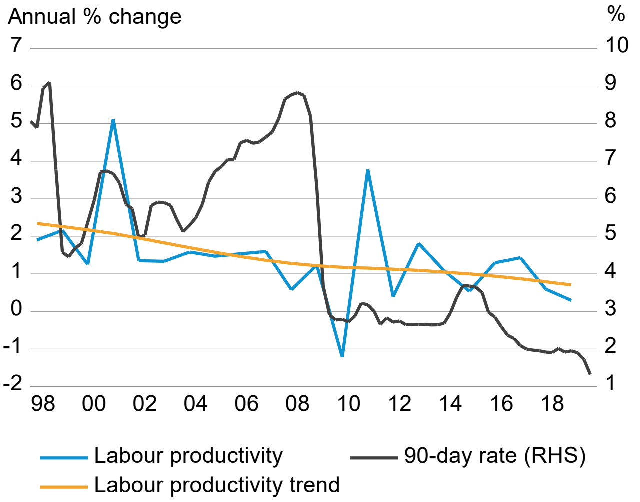
The nominal NIR is an important assumption in the Treasury's economic forecasts as it has direct and indirect influences on short-run interest rates and economic growth. Short-run interest rates below the nominal NIR implies expansionary monetary conditions. All else equal, an expansionary environment produces a relatively stronger growth profile and higher inflationary pressures.

Studies have shown that the NIR has been falling over time in many developed nations, including New Zealand. Accordingly, the Treasury recently revised its terminal nominal NIR assumption from 3.75% at BEFU 2019 to 3.0% for the upcoming Half-Year Economic and Fiscal Update (HYEFU) forecasts, which is the assumed value of the nominal neutral 90-day rate at the end of the forecast period. A lower NIR assumption implies low interest rates have less stimulatory power than previously assumed. This Special Topic explains the indicators and model estimates that have motivated this change.

Various indicators show a falling nominal NIR…

The neutral interest rate is driven by various economic factors including trend economic growth, productivity, and future global growth prospects.

Figure 16: Labour productivity growth and 90-day rates



Sources: StatsNZ, Haver

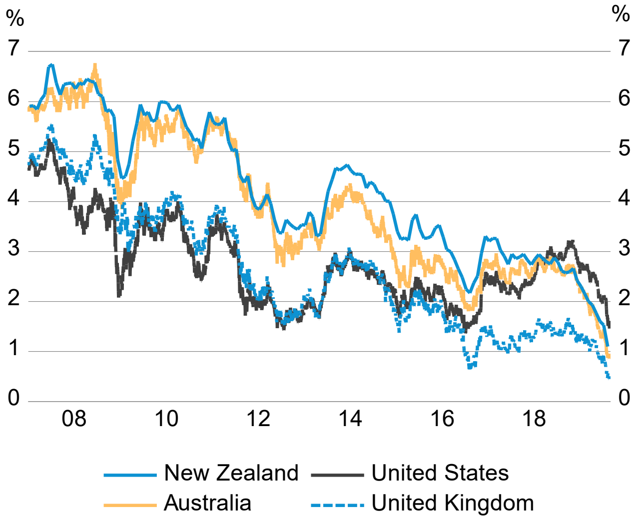
In New Zealand, productivity growth has eased since the Global Financial Crisis (GFC), while interest rates have reached record low levels (Figure 16). New Zealand's dependency on global financial markets implies falling neutral rates in other countries will also contribute to a falling domestic NIR.

Holsten, Laubach and Williams (2017) estimated neutral real interest rates for several countries. Their study found falling NIRs in the United States, Canada, the Euro area and the United Kingdom were driven by falling trend economic growth from demographic change and slowing trend productivity growth. NIR movements are also connected across countries, although country-specific factors also contribute to falling NIRs.[2]

…and markets expect lower future interest rates

Global yields on 10-year bond rates are indicative of market expectations of future economic conditions and have been declining for some time (Figure 17), but are themselves influenced by cyclical factors.

Figure 17: Selected 10-year government bond rates



Source: Haver

One technique to abstract yields of 10-year bonds from cyclical factors to gain insight into market perceptions of the long run is by estimating the implied zero-coupon 5-year-5year forward government bond rate.[3] This is the yield on a 5-year government bond issued 5-years from now, based on current market pricing of 5 and 10-year government bonds. The yield

[1] See Chetwin W and Wood A. (2013) for a discussion about short-run and medium run interpretations for the neutral interest rate.

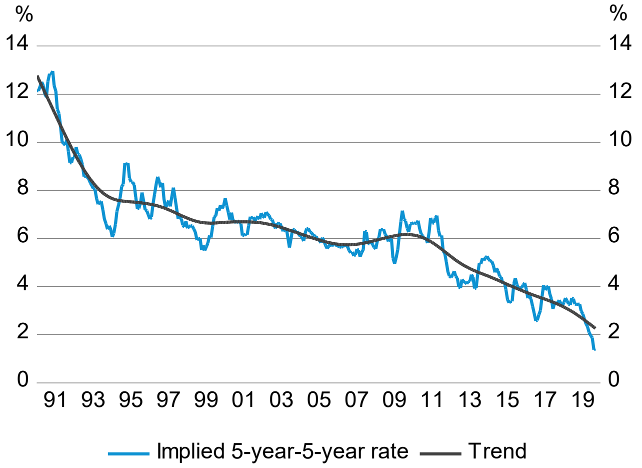
[2] Holsten K, Laubach T & Williams J C. (2017). Measuring the natural rate of interest: International trends and determinants. *Journal of International Economics*, 108(1), pages S59-S75

[3] Richardson J & Williams L. (2015). Estimating New Zealand's neutral interest rate. *Reserve Bank of New Zealand Analytical Notes*, AN2015/05

on this theoretical security is largely driven by market expectations of future economic conditions when the effects of cyclical factors have dissipated.

The implied 5-year-5-year forward bond rate has trended downwards for some time (Figure 18), indicating that market expectations of future short-term interest rates have declined. While the rate of decline appears to have reduced in the decade prior to the GFC, financial markets have increasingly taken the position of a persistently lower interest rate environment in the future.

Figure 18: Implied New Zealand 5-year-5-year forward rate



Sources: Haver, The Treasury

We consider a suite of modelling approaches

Owing to the unobserved nature of the nominal NIR, different models will produce different estimates. A suite of models is used to reduce model uncertainty when estimating the long-run nominal NIR.

This suite of models includes analysis of the historical 90-day rate, estimates of the time-varying intercept of the Taylor rule and estimates of a 'neutral' yield curve based on historical bond yields. Some of these methods are outlined in this Special Topic. The Reserve Bank of New Zealand (RBNZ) also uses a suite of models to estimate the neutral Official Cash Rate,[4] which is closely related to the 90-day rate. These models were selected for the broad economic scope covered, including analysis of market expectations, to estimate the nominal NIR.

Each model has its own uncertainties, and some variables such as the output gap are not directly observable. Market pricing of bonds adds another level of uncertainty around the estimates from time varying risk and liquidity premiums.

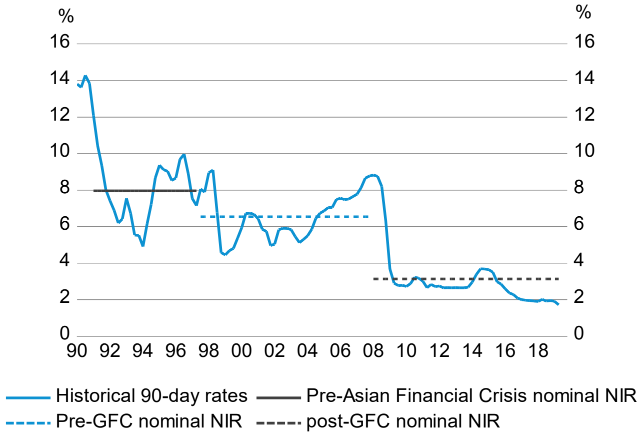
Historical interest rates show a decline…

Research by Hall and McDermott (2016) shows that New Zealand has experienced three business cycles since 1990, when the RBNZ officially implemented its inflation targeting mandate. The first spanned 24 quarters from 1991 to 1997; the second from 1997 to 2007; and the current business cycle began in 2008[5].

We first make the assumption that monetary policy is neutral on average over a business cycle. From there, the nominal NIR can be estimated by taking the average interest rate for each business cycle.[6] Real 90-day rates were used in this exercise to remove the distortionary effects of inflation.

Our estimates suggest that the real NIR has fallen in each successive business cycle since 1990, reaching a level of 1.3% in the current business cycle. In the post-GFC era, annual inflation has averaged 1.8% to date, suggesting a nominal NIR of around 3.1% (Figure 19).

Figure 19: 90-day rates and estimated nominal NIRs



Sources: Haver, The Treasury

[4] Richardson J & Williams L. (2015). Estimating New Zealand's neutral interest rate. *Reserve Bank of New Zealand Analytical Notes*, AN2015/05

[5] Hall V B & McDermott J C. (2016). Recessions and recoveries in New Zealand's post-Second World War business cycles. *New Zealand Economic Papers*, 50(3), December, pages 261-280

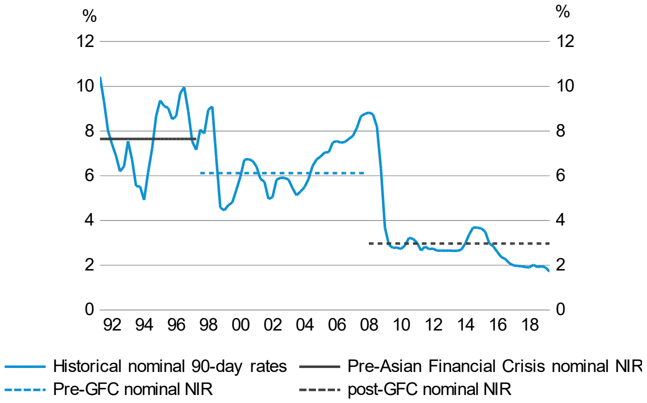
[6] Archibald J & Hunter L. (2001). What is the neutral real interest rate and how can we use it?. *Reserve Bank of New Zealand Bulletin*, 64(3), pages 15-28

…along with the Taylor rule

The Taylor rule captures some of the key variables of interest that policymakers consider when setting nominal short-term interest rates. In Taylor's original specification, the intercept represents the neutral interest rate independent of time and other explanatory variables including inflation deviation from target and the output gap represent the policymaker's key variables of interest.[7] Making the assumption of a time-invariant NIR produces an implausibly high estimate of the current NIR. To allow for some degree of time-dependency and to account for the business cycles identified in Hall and McDermott (2016), dummy variables were introduced to represent each business cycle. Lags were applied to inflation and the output gap to reflect the information set available to policymakers at the time short-term interest rates were set.

The estimation results show a steady decline in the neutral level of the 90-day rate in successive business cycles (Figure 20), with an estimated rate of 3.0% applicable in the post-GFC period.

Figure 20: Estimated NIR from Taylor rule intercepts



Sources: Haver, The Treasury

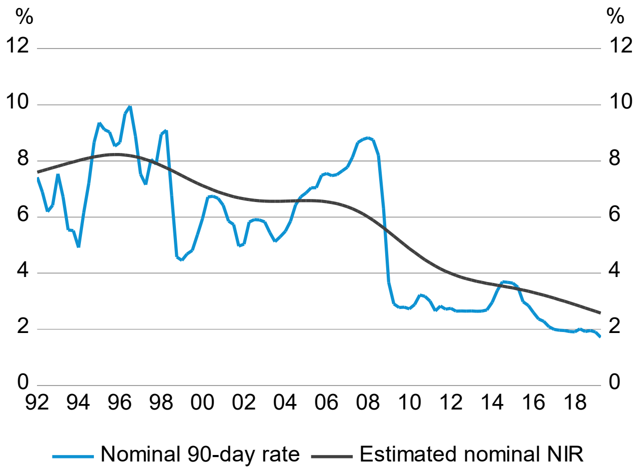
The limitations of the Taylor rule are well documented[8]. However, the use of a Taylor rule provides a useful approximation of policymaking and an indication of how interest rates have moved as a response to inflation and the output gap.

Estimating the NIR from a neutral yield curve

The yield on a 10-year bond usually has a positive premium over a 90-day bill, and the magnitude of this premium forms the basis for the interpretation of the yield curve. If investors believe future rates will rise, then the premium 10-year rates have over the 90-day rate will rise and the yield curve steepens. However, if investors believe future short-term interest rates will drop, then 10-year rates will fall – the two rates come closer together and yield curve flattens. If monetary policy is neutral on average over the business cycle, a steep yield curve will be unwound by a flatter yield curve, implying that deviations from a 'neutral' yield curve would be cancelled out, allowing for the estimation of the NIR over a business cycle.

The RBNZ developed a model with this logic and used a Kalman filter for their estimation.[9] Updating this model with more recent data shows a decline in the estimated NIR since 1992, shortly after the RBNZ adopted an inflation targeting approach to monetary policy (Figure 21). This model estimates the current nominal NIR to be 2.3%.

Figure 21: Estimated NIR from bond yields via Kalman filter



Source: Haver, the Treasury

One of the limitations of the previous approach lies in the omission of monetary policy as a response to changes in the economy. One way to get around this is to introduce a Taylor rule to the model.[10] A similar result is produced from this addition, and the estimates suggest a current nominal NIR of 2.5% (Figure 22).

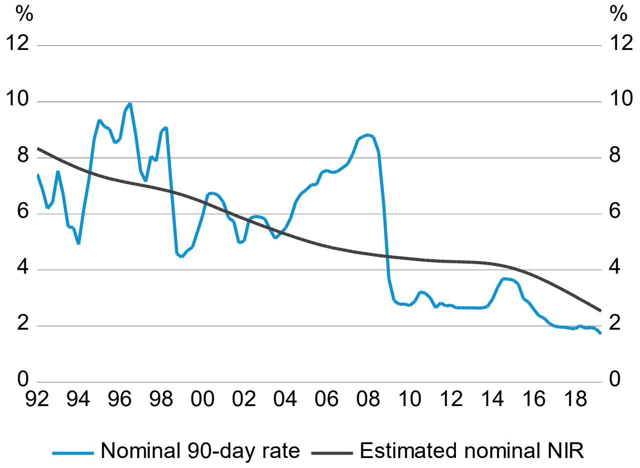
7 Taylor J B. (1993). Discretion versus policy rules in practice. *Carnegie-Rochester Conference Series on Public Policy*, 39(1993), pages 195-214

8 Kendall R and Ng T. (2013). Estimated Taylor Rules updated for the post-crisis period. *Reserve Bank of New Zealand Analytical Notes,* AN2013/04

9 Basdevant O, Bjorksten N & Karagedikli Ö. (2004). Estimating a time varying neutral real interest rate for New Zealand. *Reserve Bank of New Zealand Discussion Paper Series*, DP2004/01

10 See Basdevant, Bjorksten and Karagedikli (2004) for more detail.

Figure 22: Estimated NIR Taylor rule and bond rates model via Kalman filter



Sources: Haver, The Treasury

Conclusion

The models investigated showed estimates of the nominal NIR ranging from 2.3% to 3.1% but the true value remains unknown. We have judged the terminal nominal NIR to be 3.0% in our latest forecasts, which is at the top of the estimated range shown here but is 0.75 percentage points less than what was assumed at BEFU 2019. We will continue to review the level of the NIR over time.

Various measures of the NIR indicate that it has been on a downward trend for over two decades, and markets are not expecting a reversal in the trend seen to date. The fundamentals of the economy indicate that lower trend economic growth, an ageing population and lower productivity growth are likely to continue, which would indicate a lower interest rate environment to keep output growth and inflation stable in the long run.

Monthly Economic Indicators is a regular report prepared by the Forecasting team of the Treasury.

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New Zealand Key Economic Data

Quarterly Indicators

		2017Q4	2018Q1	2018Q2	2018Q3	2018Q4	2019Q1	2019Q2
Gross Domestic Product (GDP)								
Real production GDP	qtr % chg(1)	0.9	0.5	0.9	0.3	0.7	0.6	0.5
	ann ave % chg	3.1	3.2	3.2	3.1	2.8	2.7	2.4
Real private consumption	qtr % chg(1)	1.0	0.3	1.0	1.0	1.0	0.4	0.5
	ann ave % chg	4.7	4.1	3.7	3.5	3.3	3.4	3.3
Real public consumption	qtr % chg(1)	-0.4	0.4	1.3	-0.5	1.0	1.1	0.6
	ann ave % chg	2.8	2.7	3.0	2.2	2.2	2.4	2.1
Real residential investment	qtr % chg(1)	0.7	-0.8	1.2	0.2	2.0	3.1	-0.2
	ann ave % chg	0.9	1.0	2.6	2.5	2.6	3.6	4.0
Real non-residential investment	qtr % chg(1)	3.4	0.9	-0.2	-2.2	1.4	2.0	-0.9
	ann ave % chg	4.7	6.4	7.1	6.2	4.0	2.1	0.7
Export volumes	qtr % chg(1)	0.7	-0.5	1.5	-0.6	1.5	2.7	-1.8
	ann ave % chg	2.3	3.6	3.9	3.5	2.6	2.8	2.6
Import volumes	qtr % chg(1)	3.6	1.3	0.9	-0.7	-0.1	0.6	-0.3
	ann ave % chg	6.9	7.2	8.0	7.8	5.8	3.9	1.8
Nominal GDP - expenditure basis	ann ave % ...	6.3	5.7	5.7	4.9	3.9	3.8	3.6
Real GDP per capita	ann ave % ...	1.3	1.4	1.5	1.4	1.2	1.1	0.8
Real Gross National Disposable Income	ann ave % ...	3.6	3.7	3.5	3.3	2.8	2.4	2.2
External Trade								
Current account balance (annual)	NZ$ millions	-7746	-8136	-9331	-10563	-11438	-10801	-10234
	% of GDP	-2.7	-2.8	-3.2	-3.6	-3.9	-3.6	-3.4
Income balance (annual)	NZ$ millions	-10493	-10652	-11197	-10937	-10591	-10244	-9857
Merchandise terms of trade	qtr % chg	1.4	-2.0	0.4	-0.1	-3.2	1.0	1.6
	ann % chg	7.9	1.8	1.2	-0.3	-4.8	-1.9	-0.8
Prices								
CPI inflation	qtr % chg	0.1	0.5	0.4	0.9	0.1	0.1	0.6
	ann % chg	1.6	1.1	1.5	1.9	1.9	1.5	1.7
Tradable inflation	ann % chg	0.5	-0.3	0.3	1.0	0.9	-0.4	0.1
Non-tradable inflation	ann % chg	2.5	2.3	2.4	2.5	2.7	2.8	2.8
GDP deflator	ann % chg	3.3	1.4	2.2	1.0	-0.3	1.3	1.9
Consumption deflator	ann % chg	1.6	0.7	1.2	1.9	1.6	1.5	1.7
Labour Market								
Employment (HLFS)	qtr % chg(1)	0.4	0.5	0.5	0.8	-0.0	-0.1	0.7
	ann % chg(1)	3.1	2.5	3.2	2.3	1.9	1.3	1.4
Unemployment rate	%(1)	4.5	4.4	4.4	4.0	4.3	4.2	3.9
Participation rate	%(1)	70.8	70.7	70.8	70.9	70.7	70.3	70.2
LCI salary and wages - total (adjusted)(5)	qtr % chg	0.4	0.3	0.5	0.5	0.5	0.4	0.7
	ann % chg	1.8	1.8	1.9	1.8	1.9	2.0	2.1
QES average hourly earnings - total(5)	qtr % chg	0.8	0.9	0.1	1.1	0.9	1.2	1.2
	ann % chg	3.1	3.5	3.0	2.9	3.1	3.4	4.4
Labour productivity(6)	ann ave % ...	0.1	0.6	-0.5	-0.0	0.7	0.3	1.4
Retail Sales								
Core retail sales volume	qtr % chg(1)	1.4	0.7	1.2	0.6	2.0	0.6	0.3
	ann % chg	5.6	4.6	4.5	3.7	5.0	3.9	3.6
Total retail sales volume	qtr % chg(1)	1.1	0.2	0.9	0.3	1.7	0.7	0.2
	ann % chg	5.4	2.8	3.1	2.7	3.5	3.3	2.9
Confidence Indicators/Surveys								
WMM - consumer confidence(3)	Index	107	111	109	104	109	104	104
QSBO - general business situation(4)	net %	-11.8	-10.7	-20.0	-30.4	-17.3	-28.8	-33.7
QSBO - own activity outlook(4)	net %	18.7	10.9	6.9	18.9	19.4	0.4	-12.3

Monthly Indicators

		2019M03	2019M04	2019M05	2019M06	2019M07	2019M08	2019M09
External Sector								
Merchandise trade - exports	mth % chg[1]	9.4	-8.7	3.6	-0.2	-8.1	7.4	4.1
	ann % chg	16.7	10.4	7.3	1.7	-7.3	2.6	5.1
Merchandise trade - imports	mth % chg[1]	-1.7	0.2	1.4	-4.2	4.4	2.9	-0.5
	ann % chg	-3.5	7.4	8.1	-10.3	2.1	3.0	-2.1
Merchandise trade balance (12 month total)	NZ$ million	-5739	-5578	-5602	-4987	-5490	-5551	-5213
Visitor arrivals	number[1]	329,170	318,840	318,660	318,420	322,860	327,310	...
Visitor departures	number[1]	332,580	309,000	305,520	314,830	307,610	321,010	...
Housing								
Dwelling consents - residential	mth % chg[1]	-7.0	-7.3	14.7	-3.9	-1.1	0.9	7.2
	ann % chg	8.7	-4.5	9.3	3.4	24.3	6.0	30.8
House sales - dwellings	mth % chg[1]	-3.9	3.1	0.7	0.6	6.4	-6.4	-0.5
	ann % chg	-9.4	-7.2	-5.1	-0.5	6.8	-3.6	4.5
REINZ - house price index	mth % chg	-0.2	-1.0	0.2	0.3	0.1	1.6	0.9
	ann % chg	2.4	1.4	1.7	1.7	1.5	2.9	3.5
Private Consumption								
Electronic card transactions - total retail	mth % chg[1]	-0.2	0.3	-0.3	0.0	0.0	1.2	0.4
	ann % chg	0.7	4.5	3.2	1.1	1.6	2.8	0.3
New car registrations	mth % chg[1]	-3.2	2.0	-1.4	-2.7	5.8	-1.3	4.6
	ann % chg	-2.9	-0.5	-12.6	-11.0	-5.4	-5.2	4.7
Migration								
Migrant arrivals	number[1]	11,490	11,260	11,870	12,110	12,740	12,080	...
Migrant departures	number[1]	7,830	7,550	8,030	8,350	8,100	8,550	...
Net migration (12 month total)	number	55,242	55,064	54,538	54,274	54,954	53,810	...
Commodity Prices								
Brent oil price	US$/Barrel	66.14	71.26	71.29	64.22	63.92	59.04	*62.83*
WTI oil price	US$/Barrel	58.14	63.86	60.85	54.65	57.44	54.82	*56.96*
ANZ NZ commodity price index	mth % chg	4.1	4.3	2.3	-4.5	-2.8	3.9	1.4
	ann % chg	5.3	8.5	5.7	1.9	0.3	3.7	6.5
ANZ world commodity price index	mth % chg	4.1	2.6	0.1	-3.9	-1.4	0.3	0.0
	ann % chg	0.6	2.2	0.7	-2.4	-0.5	0.9	3.4
Financial Markets								
NZD/USD	$[2]	0.6832	0.6730	0.6563	0.6597	0.6684	0.6436	*0.6342*
NZD/AUD	$[2]	0.9651	0.9463	0.9445	0.9501	0.9567	0.9503	*0.9321*
Trade weighted index (TWI)	June 1979 = 100[2]	74.24	73.23	72.26	72.51	73.32	71.76	*70.78*
Official cash rate (OCR)	%	1.75	1.75	1.50	1.50	1.50	1.00	1.00
90 day bank bill rate	%[2]	1.88	1.81	1.72	1.60	1.56	1.25	*1.15*
10 year govt bond rate	%[2]	2.02	1.96	1.80	1.63	1.55	1.13	*1.16*
Confidence Indicators/Surveys								
ANZ - business confidence	net %	-38.0	-37.5	-32.0	-38.1	-44.3	-52.3	-53.5
ANZ - activity outlook	net %	6.3	7.1	8.5	8.0	5.0	-0.5	-1.8
ANZ-Roy Morgan - consumer confidence	net %	121.8	123.2	119.3	122.6	116.4	118.2	113.9
Performance of Manufacturing Index	Index	51.7	52.7	50.3	51.1	48.1	48.4	48.4
Performance of Services Index	Index	52.6	52.1	53.7	53.1	54.8	54.6	54.4

1 Seasonally adjusted

2 Average (11am)

3 Westpac McDermott Miller

4 NZIER Quarterly Survey of Business Opinion

5 Ordinary Time

6 Production GDP divided by HLFS hours worked

Sources: Stats NZ; Reserve Bank of NZ; NZIER; ANZ; Haver; Westpac McDermott Miller; ANZ-Roy Morgan; REINZ; BNZ-Buisness NZ