

Minding our business: Drivers of New Zealand business investment over the last 20 years

Julia Ratcliffe and Eric Tong

Reserve Bank of New Zealand Analytical Note Series

ISSN 2230-5505

The Analytical Note series encompasses a range of types of background papers prepared by Reserve Bank staff. Unless otherwise stated, views expressed are those of the authors, and do not necessarily represent the views of the Reserve Bank.

Reserve Bank of New Zealand
PO Box 2498
Wellington
NEW ZEALAND

www.rbnz.govt.nz

Key findings

- This *Note* analyses the drivers of business investment in New Zealand over 1998 – 2019.
- We find that aggregate demand, financial conditions, and uncertainty exert significant influences on business investment.
- These findings are consistent with the theoretical and empirical literature.

Introduction

Business investment is a volatile component of GDP and a crucial determinant of production capacity. It also plays a key role in the transmission of monetary policy. In this *Note*, we evaluate the potential drivers of New Zealand business investment over 1998–2019.

Our key finding is that demand pressures, financial conditions, and economic uncertainty exert significant influence on business investment. These findings are consistent with the theoretical insights as well as empirical evidence presented in the international literature.

In particular, we find that GDP growth – our proxy to measure changes in aggregate demand – is followed by an increase in investment growth in the subsequent quarters. This is in line with the economic theory of the accelerator channel that highlights the feedback between aggregate demand and investment decisions.

In terms of assessing the impact of financial conditions, we find that positive returns in the equity market are followed by increases in investment – consistent with the postulates of Tobin’s q theory of investment. Also, more stimulatory monetary policy (proxied by a decrease in the short-term interest rate) typically leads to a temporary increase in investment growth.

Similar to the above channels, the effect of macroeconomic uncertainty is transient and statistically significant. Specifically, we find that an increase in uncertainty is correlated with a contemporaneous decrease in business investment, suggesting that uncertainty may delay investment

decisions as firms wait for future outcomes to become clearer.

Determinants of business investment

We consider three potential drivers of business investment that have been investigated in the literature: aggregate demand, financial conditions, and uncertainty. This section briefly describes the intuition behind these drivers.

Aggregate demand and the accelerator channel

The importance of firms’ expectations of future profitability can be traced back to Keynes (1936). According to Keynes, investment is volatile because the ‘animal spirits’ of investors fluctuate in waves of optimism and pessimism about future economic prospects, formed on the basis of current economic conditions. The ‘accelerator model’ incorporates the feedback between output and investment that Keynes saw as the crucial driver of investors’ expectations.

The accelerator model begins with the observation that firms’ capital-output ratio is roughly constant. This implies that businesses invest or disinvest in one period order to maintain a stable capital-output ratio in the next period. This involves making judgements about future output. The model suggests that firms make judgements about future demand based on past profitability. In this respect, an increase in GDP today tends to enhance the business outlook and encourage businesses to invest.

As the capital-output ratio is generally larger than one, this implies that a moderate change in output can trigger a proportionately larger change in investment.¹

¹ The capital-output ratio is often three or higher in advanced economies. It is about 1.6 in New Zealand, calculated as the capital stock divided by GDP.

This feature of the framework explains why it is named the ‘accelerator’ model.

Financial conditions

The influence of financial conditions on business investment has been highlighted in the q theory of investment (Tobin, 1969), which is underpinned by more rigorous microeconomic foundations.

The key insight of the q theory is that financial conditions are as important as the economic outlook in determining business investment. Tobin argued that the rate of investment should be linked to the value of capital relative to its replacement cost, a ratio now popularly known as Tobin’s q . Higher asset prices make it cheaper for firms to finance new investment, as they can offer more collateral to cover lenders’ losses in case of default. All else equal, a lower cost of capital encourages firms to invest.

Financial conditions are the main channel through which monetary policy can influence business investment. Stimulatory monetary policy lowers interest rates, lowering the cost of investment for businesses, and encouraging businesses to invest more.

Financial conditions can also interact with the aggregate demand channel to impact investment through the ‘financial accelerator’ channel (Bernanke, Gertler, and Gilchrist, 1999). This is because credit markets amplify the effect of real and monetary shocks across the economy.² For instance, a drop in sales may damage a firm’s financial position, constraining its ability to repay loans and borrow to finance further investment.

Uncertainty

Given the lead times for planning, as well as the considerable time it may take for an investment to become profitable, firms’ investment decisions can be greatly affected by macroeconomic uncertainty. Uncertainty which is relevant for investment can come

from many different sources, including geo-political, health, or weather events.

When conditions are uncertain, investors value the option to wait – an option that is lost once irreversible investment decisions are made. It is therefore not surprising to observe that firms delay investment purchases in periods of high uncertainty until they are more certain about the future (Bernanke 1983).

Evaluating the drivers of business investment

We assess the drivers of business investment using a linear regression model, estimated on quarterly data spanning 1998 to 2019.³

The dependent variable is private business investment, measured as total investment (gross fixed capital formation) less residential investment and non-market (government) investment. The accelerator channel that relies on the influence of past aggregate demand is proxied by lags of expenditure GDP growth and investment growth. To capture financial conditions, we use a range of indicators: the real return on equity, the change in commodity prices, the change in the short-term interest rate, and the term spread between long-term and short-term government bond yields. Collectively, these variables should proxy for the cost and availability of credit. To proxy for uncertainty, we use a text analytics-based measure developed by Sense Partners (2020). The uncertainty index tracks over time the proportion of news articles that contain certain words related to uncertainty.⁴

We estimate the effects of the independent variables mentioned above, on investment growth *in the subsequent periods* (from 0 – 4 quarters ahead). More formally, the logarithmic change in investment (I) over horizons h is regressed on its own lags and a vector of explanatory variables, X_t :

$$\log I_{t+h} - \log I_{t+h-1} = \alpha^h + \theta^h A(L) \Delta I_{t-1} + \gamma^h X_t + \varepsilon_{t+h} \quad (1)$$

² The inverse relationship between the external finance premium — the difference between the cost to a borrower of raising funds externally and the opportunity cost of internal funds — and the financial position of the borrowing firm creates a channel through which otherwise short-lived economic shocks may have long-lasting effects.

³ Our framework is adapted from Fay, Leduc, and Morel (2017), Banerjee and Lombardi (2015), and Oliner, Rudebusch, and Sichel (1995).

⁴ We have also tested a range of other variables to proxy for financial conditions and uncertainty. See the Technical Appendix for more details on the data used in this analysis.

for $h = 0, 1, 2, \dots, 4$, where $A(L)$ is the lag operator, and θ^h and γ^h are the respective coefficients on the explanatory variables at horizon h .

Our key findings

Table 1 reports the main results. In general, we find that an increase in GDP is followed by a significant boost in investment over the next quarter. Subsequently, the effect fades and investment growth reverts to the normal pace. These results suggest the accelerator channel plays a significant role in driving business investment growth.

As a whole, financial conditions also influence investment decisions. Specifically, we find that positive returns in the equity market tend to be followed by higher investment growth – consistent with Tobin’s q theory.

An increase in commodity prices also boosts investment, albeit temporarily. This finding is consistent with empirical evidence presented in Kamber, Nodari, and Wong (2016). The existence of the estimated positive relationship between commodity prices and investment could reflect a number of factors, including:

- an increase in commodity prices encourages firms to increase business investment as it is now more profitable to sell their products offshore;
- an increase in commodity prices signals that overall domestic spending will be higher in the future as incomes rise, encouraging firms to invest; and
- an increase in commodity prices tends to cause the New Zealand dollar exchange rate to appreciate, making capital imports cheaper.

Monetary policy changes, proxied by changes in the short-term interest rate, also seem to influence investment decisions. Specifically, an increase in short-term interest rate is followed by a decrease in investment in the subsequent quarter.

The uncertainty index exerts a strong negative influence on contemporaneous investment growth.. It verifies our intuition that firms at least postpone investment when prospects about the future are uncertain. The results of this regression are inconclusive about whether investment is simply postponed or outright cancelled due to uncertainty.

Table 1: Estimates of the drivers of investment growth at different horizons

		Investment _t	Investment _{t+1}	Investment _{t+2}	Investment _{t+3}	Investment _{t+4}
Aggregate demand	Δ Investment _{t-1}	-0.27***	-0.05	-0.02	-0.03	0.21*
	Δ Investment _{t-2}	-0.18**	0.04	-0.02	0.10	0.04
	Δ GDP _{t-1}	-0.67	1.47**	1.51**	-2.70***	0.19
	Δ GDP _{t-2}	0.79	2.01**	-2.42***	-0.40	0.76
Financial conditions	Excess equity returns _t	0.12	-0.05	-0.07	0.22**	0.02
	Δ Commodity price _t	0.22**	0.15	-0.13	-0.32***	-0.31***
	Δ Short-term rate _t	1.61	-2.21**	1.11	2.10**	0.30
	Term spread _t	0.60*	0.76	0.55	0.56	0.46
Uncertainty	Uncertainty _t	-1.08*	-0.75	-0.79	-0.49	0.84
R ²		0.19	0.19	0.24	0.35	0.14
N		101	100	99	98	97

*** p<0.01, ** p<0.05, * p<0.1, Newey-West standard errors.

Δ denotes quarter-on-quarter change. The dependent variable is the logarithmic difference in investment at different leads.

To test for robustness, we also estimate a vector autoregression (VAR) which allow for the mutual interactions among variables. The results are consistent with the baseline model, showing that an increase in GDP has a significant positive effect on investment, and an increase in uncertainty has a significant negative impact on investment. The directions of the impact of the short-term rate and commodity prices on investment are also similar. These additional results are discussed in the Technical Appendix.

Conclusion

This *Note* evaluates the key drivers of business investment in New Zealand over the past two decades. We find that demand pressures, financial conditions, and uncertainty are significant drivers of business investment growth.

Our results show that monetary policy is effective in promoting business investment, in that a decrease in the short-term rate increases business investment growth, all else equal. Monetary policy may also influence investment indirectly via its impact on aggregate demand, broader financial conditions, and uncertainty. Further analysis is needed to identify the ways in which monetary policy interacts with the other drivers of business investment to fully understand this transmission channel.

Aggregate demand, financial conditions, and uncertainty are significant drivers of business investment on average over time, but their relative importance may change over time. For example, when uncertainty is high, the impact of monetary policy on financial conditions may be reduced, diminishing its effect on business investment. Extending our analysis to consider the nonlinear effect of monetary policy is an important next step.

The parsimonious empirical model we have presented in this *Note* provides a simple framework that can be used to quantify the effects of the unprecedented global events that have shaped recent history. For example, examining how the heightened uncertainty brought about by the COVID-19 pandemic has weighed on investment decisions in New Zealand is a promising extension that we will consider when new data emerges.

References

- Banerjee, R., Kearns, J., & Lombardi, M. J. (2015). [\(Why\) is investment weak?](#) *BIS Quarterly Review (March)*.
- Bernanke, B. S. (1983). [Irreversibility, uncertainty, and cyclical investment.](#) *Quarterly Journal of Economics* 98 (1): 85-106.
- Bernanke, B. S., Gertler, M., & Gilchrist, S. (1999). [The financial accelerator in a quantitative business cycle framework.](#) *Handbook of macroeconomics*, 1, 1341-1393.
- Dixit, A. K. and Pindyck, R. S. (1994). [Investment under uncertainty.](#) Princeton: Princeton University Press.
- Fay, R., Guénette, J. D., Leduc, M., & Morel, L. (2017). [Why is global business investment so weak? Some insights from advanced economies.](#) *Bank of Canada Review*, 2017 (Spring), 56-67.
- Frankel, J. A. (2012). [The natural resource curse: A survey of diagnoses and some prescriptions.](#) *HKS Faculty Research Working Paper Series*, RWP12-014, John F. Kennedy School of Government, Harvard University.
- International Monetary Fund (2015). [Private investment: What's the holdup?](#) *World Economic Outlook* (April): 111–143.
- Kamber, G., Nodari, G., & Wong, B. (2016). [The impact of commodity price movements on the New Zealand economy.](#) *Reserve Bank of New Zealand Analytical Note*, AN2016/05.
- Keynes, J. M. (1936). [The general theory of employment, interest, and money.](#) New York: Harcourt, Brace.
- Oliner, S., Rudebusch, G., and Sichel, D. (1995). [New and old models of business investment: A comparison of forecasting performance.](#) *Journal of Money, Credit, and Banking* 27 (3): 806-826.
- Rice, A., Vehbi, T., & Wong, B. (2019). [Measuring uncertainty and its impact on the New Zealand economy.](#) *Reserve Bank of New Zealand Analytical Note*, AN2018/01.
- Sense Partners. (2020). [Introducing the New Zealand Economic Uncertainty Index \(NEU\).](#) Technical report.

Tobin, J. (1969). A general equilibrium approach to monetary theory. *Journal of Money, Credit, and Banking* 1 (1): 15–29.