



Taxation, user cost of capital and investment behaviour of New Zealand firms

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Highlights

This research investigates the relationship between the cost of financing additional productive capital (the user cost of capital, or UCC), the amount of investment undertaken by NZ businesses, and the capital stock in New Zealand. The larger the response of investment and the capital stock to changes in the UCC, the more important factors that increase the UCC (e.g. higher interest rates, taxes) are for explaining capital shallowness and low labour productivity in New Zealand.

This study finds:

- › higher financing costs do lead to lower investment by New Zealand firms and a lower capital stock
- › the decline in overall productive capital tends to be smaller for manufacturing firms than the average firm, but there are significant differences between the responsiveness of individual businesses
- › New Zealand businesses tend to have similar investment behaviour, when faced with a change in financing costs, to overseas businesses.



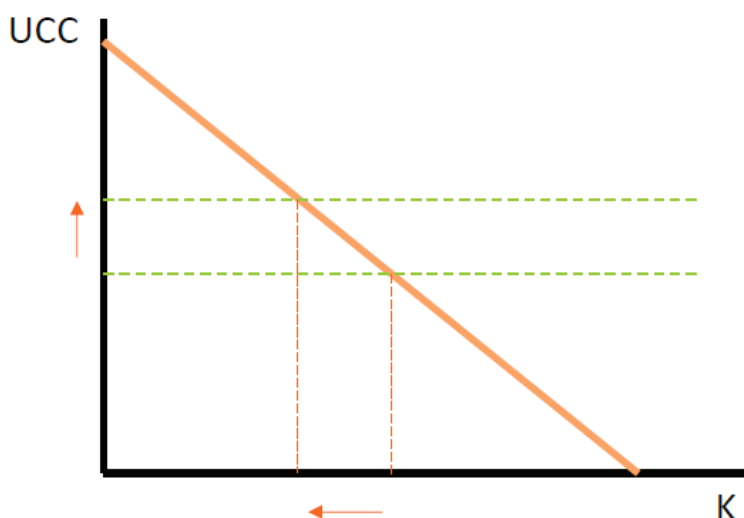
Why did we do this study, and what is it about?

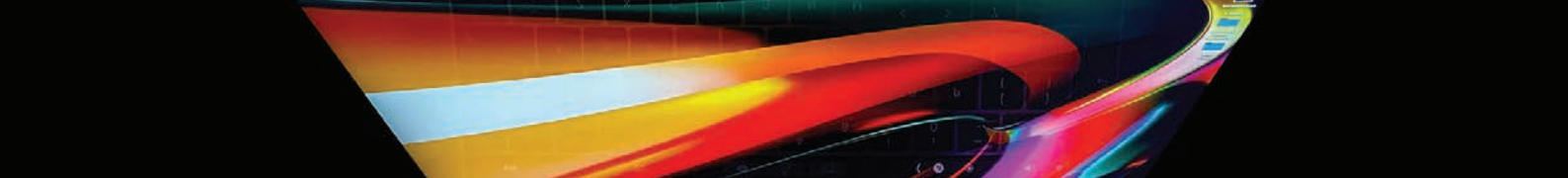
When it comes to making goods and services, New Zealand is often noted as being capital shallow. This means that business investment (i.e., spending on physical assets such as buildings, machinery and equipment, computers and vehicles in any given year), and the resulting stock of assets that builds up over time, is low compared to other similar countries. Given that, understanding what prevents businesses from investing, and the implications for government policy, is especially valuable.

Business investment depends on a range of factors including the number of sales the firm expects to make, the ability for a business to borrow, the knowledge and processes of workers in the firm, the “lumpiness” of the capital items purchased (a building as compared to a computer) and the cost of financing the additional capital equipment. In this work, we focus on the relationship between business investment and the cost of financing additional capital (the user cost of capital).

What is the user cost of capital?

- › The user cost of capital is a measure of the expenses faced by the owner or renter of a capital asset resulting from the use of the asset for a given period of time. It is also sometimes referred to as the “implicit rental price” or the “price of capital services.” It typically takes into account the price of the capital asset, the expected change in its price over the period, the interest rate, the depreciation rate, and taxes.
- › By way of example, let’s assume a New Zealand business leases a factory for a year. In this case, the user cost is simply the price of renting the factory. This rent compensates the factory owner for “wear and tear” (depreciation) over the year, taxes on the rental income, the change in the factory’s market value over the year, and the foregone interest the owner could have earned if he/she had instead sold the factory and invested those funds.
- › When making an investment choice therefore, the UCC indicates the rate of return required for the additional investment to be undertaken.
- › When the UCC goes up, firms are unwilling to undertake additional investments that offer a lower pre-tax rate of return. As a result, firms have an incentive to decrease investment through time towards some lower level of desired capital stock. This simple relationship is shown in the graph below.



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- › Without other costs associated with adjusting the capital stock (e.g. lags in building and delivery, costs associated with rushed building) this transition to a new desired capital stock is instantaneous. However, in practice (due to lumpiness of investment in certain industries) this transition doesn't happen instantaneously. Adjustment costs are taken into account to smooth this path. With adjustment costs this is the "long-term change", but there is also a change in the flow of investment through time based on adjustment costs (short-term change).
 - › Importantly, the user cost of capital depends on what firms expect regarding interest rates and taxes. In this paper, we focus on the taxation component. We make use of changes in personal and corporate tax settings between 2005/06 and 2011/12 to generate changes in the expected user cost of capital, and then consider how much these observed changes explain what happened with investment and ultimately the amount of capital in the economy during this period.

What data did we use?

We used firm-level data for the tax years from 1999/00 to 2016/17 that are sourced from Stats NZ's Longitudinal Business Database (LBD), supplemented with information on changes in the tax regime which occurred in 2005/06, 2009/10, 2010/11 and 2011/12.

Within the LBD we used:

- › data on investment, output, profit, and fixed assets sourced from the Annual Enterprise Survey (AES)
- › data on Industry classifications, drawn from the Longitudinal Business Frame (LBF)
- › employment information from the Linked Employer-Employee Data (LEED)
- › IR4 data to include foreign owned firms.

What methodology did we use?

We used two different techniques to calculate the relationship between business investment and the user cost of capital: a structural model (Euler Equation method) and a reduced form model (Error-correction Model, or ECM). Given the decision to invest is influenced by many different factors including the lumpiness of investment and expectations of future sales, using both techniques allows us to understand the impacts of tax induced UCC changes over both the short term and the long term.

The short term impacts are useful for understanding how government, or the central bank, could stimulate demand. To estimate the short-term impact, we used an Euler Equation model. This model is widely used in investment literature and allows for assumptions such as rational expectations and adjustment costs to be taken into account.

However, when looking at New Zealand's productive capacity, the question of interest is how much the capital stock will change following an adjustment in the UCC – i.e., the long-term relationship. To estimate the long-term relationship between changes in the UCC and the capital stock, we used an Error-correction Model - which makes use of the cointegration between these two variables to calculate the relationship.





What are the findings?

The findings are:

- › The Euler equation method indicates that a one standard deviation increase in the UCC is associated with an average short-term investment rate decrease of nearly 20%. This was similar to the results found in Fabling et al (2015).
- › However, there was a significant difference in results between types of firms. For example, using this method, there was not a clear relationship between the UCC and investment in the capital-intensive manufacturing industry – suggesting that there was a limited link between the expected cost of financing and the overall amount of investment in the general economy in the short-term.
- › Over the long term, the ECM indicates a larger elasticity of -1.4, implying that a one percent increase in the UCC would reduce the capital stock by approximately 1.4%.
- › Furthermore, for the manufacturing sector the ECM indicates a long-run elasticity of almost -1. Although this is a smaller decline for the average firm, it does indicate that manufacturing firms are responsive to the cost of financing over the long term.

Conclusions and implications

Taken together, the two approaches used to investigate the relationship between the UCC, business investment and our stock of productive capital suggest that New Zealand firms do respond to higher tax rates and interest rates, and in a similar way to businesses overseas.

However, given the policy importance of the relationship between the cost of financing additional investment and the amount of productive investment in New Zealand, further work is necessary to determine which types of firms and assets are most responsive.

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