



NZ's Agricultural Productivity Report Card: Could Try Harder

The agricultural sector produces over 40% of total merchandise exports. Do dairy and sheep/beef farms contribute to New Zealand's improving level of productivity?

A study by researchers at Motu Economic and Public Policy Research - a not-for-profit, non-partisan research institute – found that the vast majority of the differences between farms were because of differences in their capital, labour, expenditure, and land, rather than due to any particular gains in productivity.

New Zealand has had a long period of poor productivity performance. Research from the Productivity Commission in 2014 showed that while kiwi incomes should be 20 percent above the OECD average, they are instead 20 percent below.

"There are two elements to our research that may be controversial, as we looked at increases in output for firms that increased stock rates and used nitrogen-rich fertilisers," said Dr Adam Jaffe, Motu Director and a researcher on the paper.

Higher stock rates are associated with higher output, with sheep/beef firms that increased their stock rates by 10 percent increasing their output by 1.2 percent (worth around \$1,000 a year on average) compared to the dairy industry's 0.5% increase in output. However, because dairy firms are larger and have higher average stock rates than sheep/beef, the increase in average annual income is considerably greater for dairy firms, being worth on average\$1,800 a year.

"There is a lot of discussion around environmental damage to waterways from dairy farming, particularly those firms who apply nitrogen-rich fertilisers. Our study shows there is still a massive benefit to a dairy farmer who applies effluent, as they will have around 6.5 percent greater output. On average we found an increase of \$500 in output for every additional 13 kg of effluent applied per hectare," said Dr Jaffe.

Sheep/beef firms are more likely to apply non-lime based fertilisers, and less likely to use lime-based fertilisers and effluent than dairy firms.

"Interestingly, the sheep/beef firms who applied fertilisers recorded a 2 percent lower mean output. This is possibly because fertilizers are only applied in response to adverse conditions," said Dr Jaffe.

"Between 2002 and 2008, the level of productivity in the dairy industry increased more rapidly than that of sheep/beef. This has since reversed, following a 35 percent drop in dairy's productivity in

2009. Although some improvement has since been recorded, average productivity in the dairy industry remain lower than in the past," said Dr Jaffe.

"If you're a dairy farmer, our research shows that there's not a financial gain to be made from doing non-dairy activity like forestry. However, sheep/beef farms get quite a lot of benefit – if you also have a few dairy cattle your average output goes up by around 4.5 percent, but you'll be even better off if you harvest forest, which will increase your output by 6 percent, or around \$5,200 a year," said Dr Jaffe.

On average, dairy firms produce greater output, but also use higher inputs. Sheep/Beef farms vary more in their level of output and have a higher proportion of firms operating at a below industry average level. Dairy firms are more homogenous.



Output density across firms

"There were large differences in the productivity recorded across regional councils. We weren't able to assess whether these arise from differences between the regions themselves because of things like preferable climate or being closer to port, or were due to differences between the firms and their management skills and access to capital," said Dr Jaffe.



Long-term Regional Difference in Multifactor Productivity

The above graph takes Northland as a base and ranks the regions from lowest to highest productivity.

The paper includes 83,964 yearly observations from 31,920 agricultural firms. 73% of the observations are from the sheep/beef industry. The proportion of sheep/beef observations fell between 2002 and 2012, with output falling at a faster rate, resulting in dairy firms accounting for over half of the 2012 output, but for only a third of all firms.

The working paper "<u>Agricultural productivity in New Zealand: First estimates from the Longitudinal</u> <u>Business Database</u>" by Motu researchers Eyal Apatov, Richard Fabling, Adam Jaffe, Michele Morris, & Matt Thirkettle, was funded by the Kelliher Charitable Trust and the <u>Productivity Hub</u> under the Longitudinal Business Database Productivity Partnership programme.

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About Motu

Motu Economic and Public Policy Research is an independent economic research institute which never advocates an expressed ideology or political position. A charitable trust, Motu is founded on the belief that sound public policy depends on sound research accompanied by rigorous public debate.

Motu is the top-ranked economics organisation in New Zealand. It is in the top ten global economic think tanks, according to the Research Papers in Economics (*RePEc*) website, which ranks all economists and economic research organisations in the world based on the quantity and quality of their research publications.

If you would like to discuss these findings with Adam Jaffe, you can contact him on <u>adam.jaffe@motu.org.nz</u> or on 022 394 4501.

If you would like to receive the numbers behind any of the graphs, please reply to this email or contact Ceridwyn Roberts on 021 243 6995.