

# Discussion

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## 1. Roy Green

The merit of this elegant and insightful paper is that it confirms the influence of innovation on firm-level productivity performance. It does so using an unusually large and representative dataset of 7 000 Australian small and medium-sized enterprises. The paper finds that firms that introduced an innovation in one of four defined Australian Bureau of Statistics (ABS) categories achieved a bit over 2.7 percentage points higher productivity per year than the industry average, and that this was increased by 3.3 percentage points when accompanied by an innovation-enhancing collaboration strategy. The four innovation categories are: new or significantly improved goods and services; operational processes; organisational and/or managerial processes; and marketing methods.

This finding is particularly relevant in the context of Australia's productivity slowdown over the past decade, masked as it was by the positive terms of trade effects associated with the resources boom. With the recent sudden – but hardly unexpected – terms of trade reversal, our challenge is to identify new sources of growth and productivity in the Australian economy. For, in the absence of a revival of non-mining trade-exposed activities, we will face an inevitable decline in national income. This paper suggests that a renewed focus on supporting sector- and firm-level innovation strategies would be a fruitful direction for public policy, particularly those strategies with an emphasis on collaboration.

In establishing the argument, the paper begins with the obvious point that 'persistent and large differences exist between firms in output per worker, even after allowing for the magnitude of tangible capital'. Less obvious, however, are the (mainly intangible) factors that account for these differences, and attempts in the existing literature have left an 'unexplained residual'. The authors speculate that at least an element of this residual may be due to variations in management capability and performance, as well as research and technology development. This would certainly align with earlier findings from the literature, including the multi-country research project on management and productivity, 'Management Matters', which was expanded to include Australia (Green 2009).

Unfortunately, this line of thought is not pursued much further because it is subsumed into a discussion of the Solow/production residual in a conventional production function. In turn, the authors posit that changes in this residual can be determined – at least in part – by firm-level innovations. Again, reference is made in this context to 'slow-changing managerial and worker skills', but this factor is not followed up due to lack of data. However, the authors remind us in discussion that this is only the first stage of a much larger study of productivity, so further investigation may be anticipated.

On the other hand, it is possible with the data available to analyse how the degree of competition facing firms affects their productivity. The authors show that 'innovation is only successful in a competitive market'. Moreover, for firms not in a competitive market, collaborative approaches

to innovation are more significant, signifying that 'collaboration for innovation may substitute for inexperience or lack of skill by management'.

Given the demonstrably positive effect of innovation on productivity – and hence on profitability – the authors ask, 'why don't all firms innovate? Why doesn't competition force all firms to be active and aggressive promoters of new products and ways of operating?'. This is a question that is often asked, with no straightforward answer. The paper suggests that an 'explanation is that competition is simply missing in many markets. Managers may know what would improve performance but lack the incentives from competition or the owners of the business to implement them'. There is also the possibility that some firms possess factors of production that others do not, or that 'managers might not innovate because they do not realise that they are inefficient or, if they do, they may not know how to implement the necessary changes'.

The point is that, whatever the reason, management's failure to innovate – even in the interests of the firm, let alone the economy as a whole – should not be depicted as market failure but as 'systems failure'. The authors hint at this by suggesting that a 'complicated constellation of complementary activities may be needed for success, such as: particular collaborations; specialist in-house skills; intellectual property; marketing activities; capital investments; and training for employees'. This is why many advanced countries have established sophisticated national innovation systems, underpinned by foresight exercises, innovation support programs and investment in knowledge and capability building. Australia has a lot of catching up to do.

The further point is that it becomes very difficult, if not impossible, to model such systems in a production function context, or indeed with static equilibrium approaches. More fruitful are Schumpeterian approaches to modelling dynamic systems that are driven by both technological change and non-technological innovations, such as: new business models; design integration; and high performance work and management practices. The authors recognise that, '[g]iven the observed clustering of successful innovators, it is also conceivable that the external environment – that is, local knowledge infrastructure and the depth of the labour market for innovation-savvy workers – matters'.

Finally, the authors highlight the institutional dimensions of knowledge infrastructure, which 'support the generation, sharing and translation of ideas into commercial products'. The authors have demonstrated the significance of innovation for the productivity performance of firms. The next steps are to understand and assess 'what works' in the knowledge infrastructure of market-based economies, the implications for future public policy in Australia, and the institutional elements required for an effective and coherent national innovation system.

## Reference

**Green R (2009)**, *Management Matters in Australia: Just How Productive Are We?*, Findings from the Australian Management Practices and Productivity Global Benchmarking Project, Department of Innovation, Industry, Science and Research, Canberra.

## 2. General Discussion

The discussion opened with questions of clarification about the results and consideration of their implications and interpretation. One participant asked how they should think about the measure of ‘innovation’ used in the paper, given that it was a broader definition than commonly used metrics such as patents or patent citations. Beth Webster replied that most research in Australia had focused on patents and trademarks, and that her own previous research had shown that an increase in the stock of patents or trademarks held by a firm increased its market value and profits. However, these were examples of ‘new-to-the-world’ innovations, while this paper studied a broader measure of ‘new-to-the-firm’ innovations, a much more prevalent form of innovation.

Participants noted that innovation is expensive, risky, and can often lead to firm failure. A participant noted that the paper had excluded firms that went out of business, and another participant cited an earlier conference paper that showed that exit rates for small to medium-sized businesses are in the order of 20–30 per cent after four years. Professor Webster explained that only firms that filed tax returns and earned over a certain threshold (\$70 000) were included in the ABS’s dataset. Generally, firms that had been dropped from the sample had indeed gone into external administration.

A participant followed up by noting that while some small businesses have no desire for growth, others try to innovate, and this paper had not addressed interesting questions about the costs and risk of failed innovation. Were the firms who failed less innovative, or did they try to innovate and fail? In response, Professor Webster mentioned previous research that had showed that firms that had recently applied for patents were indeed less likely to survive, but commented that it is difficult to model both innovation and survival at the same time. However, this paper focused on new-to-the-firm innovations, which are likely to be less risky because they had already been proven in other firms. There were too few firms undertaking new-to-the-world innovations in the sample to be analysed separately in the paper.

Participants asked whether product or process innovations were the more prevalent form of innovation, and which had the larger effect on productivity. One participant drew a contrast between a new marketing strategy for an existing product to win a larger market share, and the creation of a new product, arguing that they had very different implications for aggregate productivity. Professor Webster showed results from the paper suggesting that while the four main types of innovation considered were roughly equally common, product innovation was the only type found to significantly increase productivity.

Discussion then turned to the robustness of the results and methodological questions. Several participants asked whether the authors had tested for interactions between innovation and firm variables such as age, size, industry, tangible capital stock and employment. A positive interaction would imply that innovation not only increases productivity but steepens the path of growth. In response, Professor Webster agreed that there were reasons to imagine that both the level and the slope of the response of productivity to innovation might change with different levels of such variables (e.g. a firm might buy new equipment at the same time as introducing a new product), and that this was an extension the authors would consider.

Relatedly, a participant asked whether differences in productivity by industry affected the results. While the paper had controlled for differences in industry-level productivity in its results, it had not explicitly examined those differences, and Professor Webster agreed that this would be an interesting area for further work.

One participant asked whether the authors would be better to look at the effects of innovation on profits, rather than productivity. Professor Webster agreed that firms were more likely to be motivated by profits than by productivity, and that it could be the dependent variable in the same analysis. However, she noted that productivity was the key concern from a public policy point of view, and was therefore the motivation for the study.

Finally, a participant asked how the paper distinguished productivity gains generated by innovation from those generated by employees within the firm learning and getting better at their roles over time. In response, Professor Webster noted that the paper focused not just on new firms but also existing firms, for whom the learning effect would be much less prevalent. In addition, the paper used a difference-in-differences framework, so such changes would be controlled for to the extent they were stable across firms.

