Firmly Focussed: Australia's Future Productivity Growth

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Long term growth in income per capita, and hence economic prosperity, depends on aggregate productivity growth.[1] Australia's future productivity growth will be determined by its success in cultivating two firm-level processes: technology diffusion and resource reallocation. Technology diffusion refers to the spread and adoption of new ideas and innovations in firms. Resource reallocation is the process of low productivity firms shrinking or closing down, allowing their capital and labour resources to be used by more productive firms to expand.

These two microeconomic mechanisms will be essential for Australia's economic prosperity. Historically, the largest productivity benefits of new technologies have been accrued by successful adaptors of new inventions, so establishing technology diffusion channels is critical. Similarly, resource reallocation means that more of the economy's resources are controlled by the most productive firms, so aggregate productivity and output increase. Both measures also reduce the 'long tail' of low-productivity firms, which has positive economic and social consequences.

Thus, Australian Government policy should address three key areas which support these two channels: competition, international trade, and firms' absorptive capacities.

The application of new technologies has historically been more important, if less glamorous, than their invention for productivity growth. Studies of productivity following the introduction of electricity[2] and computers[3] found that only those firms which reorganised business practices to complement the innovations – redesigning factories, decentralising operations – saw significant productivity gains: merely having the new technology was insufficient. Thus, the fact that Australia does not generate many globally new innovations,[4] does not imply any limitation to productivity growth. Knowledge is non-rival and partially non-excludable; the critical factor for productivity growth is not the origination of new ideas but how well those ideas are used by the bulk of firms in an industry to improve production processes. As such, enhancing the economy's technology diffusion capability by establishing frameworks for identifying, assimilating, and exploiting innovations – skills collectively known as a firm's "absorptive capacity"[5] – is essential for economic prosperity.

Firm dynamics and resource reallocation also contribute to aggregate productivity growth. The contraction or exit of low productivity firms allows more efficient producers to increase market share, access more resources and expand, meaning that a greater proportion of the economy's resources are used more productively, and thereby increasing aggregate productivity and output. Moreover, low productivity firms can crowd out more efficient ones: at least in the short and medium run, all firms draw from a finite pool of resources, especially research and development (R&D) resources such as skilled personnel.[6] If such resources are 'trapped' in low productivity firms the growth and innovation activities of more productive firms may be hampered, with negative implications for economic prosperity.

Empirical evidence suggests that these factors can be significant: internationally, net entry is estimated to account for twenty to fifty per cent of total productivity growth.[7] Breunig and Wong[8] reached a similar conclusion using Australian data, and noted that market share reallocation among continuing firms also contributed significantly to productivity growth. Clearly, effective reallocation processes are vital for economic prosperity.

Finally, both international[9] and domestic[10] studies have documented heterogeneity in firm productivity. In both the manufacturing and service sectors, laggard firms' productivity has stagnated while frontier firms' has surged (Figure 1), and there is significant dispersion in productivity levels even in narrowly-defined industries.[9] Both technology diffusion and resource reallocation reduce this dispersion: diffusion increases the productivity level of laggard and middling firms, while firm closures reduce the 'long tail' of particularly low productivity firms. This is clearly beneficial for aggregate productivity and output *levels*, but also has implications for *growth*: particularly laggard firms can fall so far behind the global technology frontier that they cannot learn from it, so reducing productivity dispersion may be a facilitator of technology diffusion in itself.[11]

Firm-level productivity convergence also produces welfare benefits, reducing the cost and increasing the quality of goods and services, and thus raising real incomes.[12] Additionally, growing differences in average wages between firms (rather than differences between the highest and lowest earners within firms) have been found to account for most of the observed increases in income inequality in various countries.[13-15] This is significant because this increasing between-firm wage dispersion has been linked, theoretically and empirically,[15] to the increasing firm-level productivity dispersion: reducing productivity dispersion through diffusion and reallocation may reduce income inequality. Higher income inequality can negatively affect the health, educational, and occupational opportunities of households, as well as economic growth, so this is a worthy social and macroeconomic goal.[16]

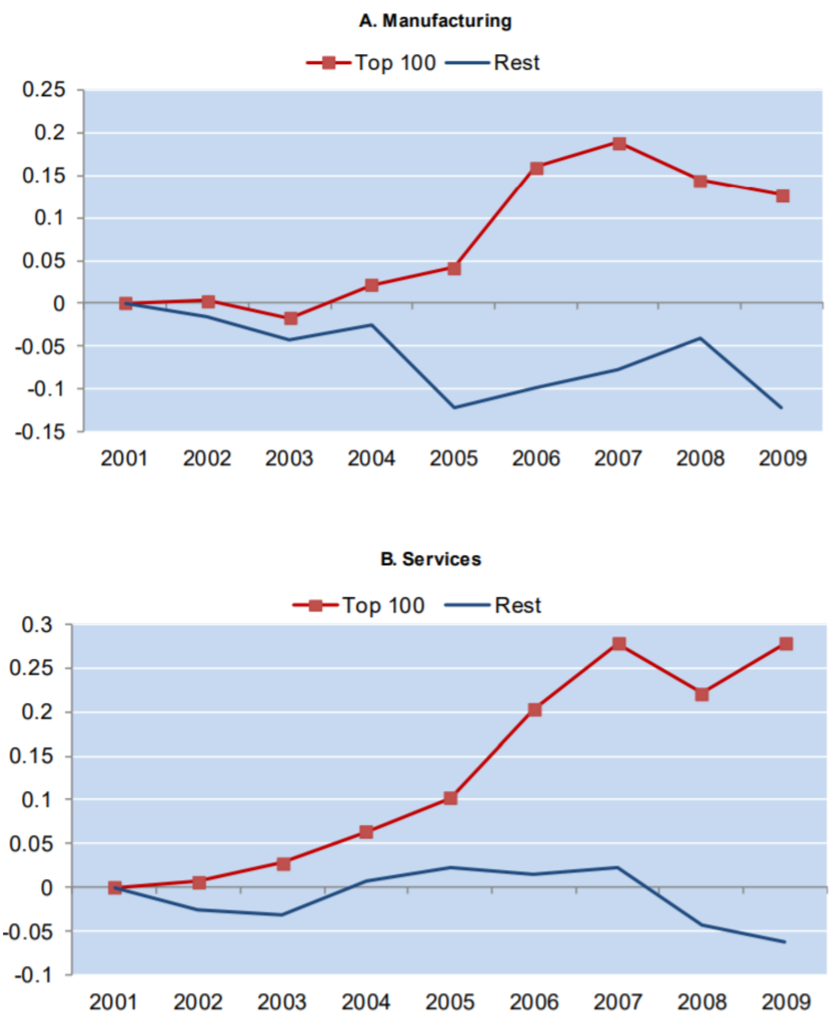

Figure 1: Multifactor productivity over time (percentage difference from 2001 value)
Source: OECD[9(p35)]

Clearly, promoting the firm-level facilitators of productivity growth – technology diffusion and resource reallocation – will be critical for Australia's future aggregate productivity and income growth. As such, Australian Government policies to promote economic prosperity should address three areas that support these mechanisms: competition, international trade and businesses' absorptive capacities.

Competition promotes both resource reallocation and technology diffusion. Tougher product market competition leads to a 'survival of the fittest' selection process: more efficient, presumably lower price producers gain a larger share of the market, while less productive firms close down, freeing their resources for use by more productive firms. This effect can be empirically substantial: Foster, Haltiwanger and Krizan,[17] for example, found that virtually all of the labour productivity growth in the 1990s in the American retail sector was attributable to market selection and reallocation.

Australian[18] and international[19] empirical studies also show that competition stimulates within-firm productivity gains. Competition dispels the monopoly syndrome of X-inefficiency,[20] an effect which Bloom et al.'s[21] findings suggest may be partly explained by competition-induced improvements in management quality. Schmitz[19] highlights another channel: since adopting new innovations often involves "switchover disruptions," if competition reduces output prices the opportunity cost of the implementation also decreases. Both factors promote technology diffusion by increasing the propensity and ability of firms to adopt new technologies.

Similarly, openness to international trade stimulates both mechanisms for productivity growth. Trade promotes competition: imports are an important source of domestic product market competition, while exporters face international competitors. The increase in exporters' effective market size also provides expansion opportunities for the most productive firms, important for reallocation, and promotes technology diffusion: firms have more incentive to make productivity-raising investments since the potential payoffs are higher. Finally, exposure to international best practice, whether through foreign direct investment, multinational activity, or participation in global value chains, is an important source of knowledge for firms in the technology diffusion process.[22]

However, such knowledge spillover benefits – indeed, all technology diffusion – are preconditioned on the absorptive capacities of domestic firms. The key here is that "some knowledge is 'tacit', difficult to codify in manuals in textbooks, and hard to acquire without direct investigation."[23] As such, firms cannot automatically implement new ideas developed elsewhere: they must first recognise the value of, assimilate and apply the innovation to their commercial setting – that is, they must have an adequate level of absorptive capacity.[5] This ability largely depends on the firm's stock of prior related knowledge,[5] so R&D activity and worker education are important for success in adopting a new technology.[23] Business collaboration with universities can be a particularly effective way of developing absorptive capacity: university researchers are likely to be connected to the global knowledge frontier and thus very well-placed to decode the 'tacit' elements of new innovations. These benefits are especially significant for smaller firms, who gain access to high quality knowledge resources which may otherwise be prohibitively costly.[9]

Management factors such as organisational structure and human resource practices also influence absorptive capacity.[24] Often, complementary organisational innovations are required to fully exploit a new technology. One study, for example, found that it was only when tougher people management practices were implemented alongside new IT technology that the full benefits of the innovation were realised in firms.[25] Indeed, management practices have been shown to be a significant factor in explaining cross-country differences in technology diffusion and productivity.[26] Clearly, absorptive capacity is a crucial factor in productivity, and hence income, growth over time.

The decisions of heterogeneous individual firms drive productivity growth. However, with policies in the areas of competition, international trade, and absorptive capacity, governments can influence the progress of technology diffusion and resource reallocation. This is critical since these two processes shape aggregate productivity growth, the miracle by which more output is made from the same inputs, and which underpins economic growth. These cumulative processes of incremental adjustment are Australia's best prospect for future economic prosperity.

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