POLICY BRIEF
Research findings from Innogen

Does Market Selection Reward Innovators? Evidence from the Pharmaceutical Industry*

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Targets to increase R&D intensity to 3% in the EU is a core part of the EC's Lisbon Agenda (2005) which aims to achieve innovation led growth across Europe. Fast growing innovative firms are essential drivers of productivity and economic growth. Yet entrepreneurial small innovative firms do not seem to grow fast enough to drive this innovation led growth (NESTA, 2008).

Our study investigates the relationship between innovation and firm growth in an R&D intensive industry, the pharmaceutical industry, to better understand the firm level factors that determine whether innovation efforts pay off in terms of higher growth. If innovative firms do not always grow more, which characteristics allow firms to grow most from their innovative efforts? Can this help us understand the 'productivity paradox' in this industry in which exponential growth in R&D and patenting has not translated into the discovery of many new drugs?

FINDINGS OF THE STUDY: If market 'selection' works, and if innovation leads to greater efficiency (higher quality and/or lower costs), then we should find a positive relationship between innovation and firm growth. Yet, the empirical evidence for the impact of innovation on firm growth does not always confirm that innovation efforts reward firms in terms of their growth (Brouwer et al., 1993). Does this mean market selection fails?

The study investigates the relationship between innovation and firm growth for different "types" of firms within the US pharmaceutical industry. The findings suggest that innovation (proxied via R&D spending, patents and citations) positively affects growth rates only for some types of firms, with many others not reaping much benefit at all from their innovative efforts. Those firms which grow more due to their innovative efforts are those that are *persistent* innovators, have biotechnology *alliances,* and are *small*. This indicates that market selection operates on a mix of firm characteristics rather than *innovation* per se and if there are not enough such firms in the industry, this may help to partly understand the 'productivity paradox' above.

Results also find that it is firms with these three characteristics that are found to shape 'complex' non-gaussian properties of firm size and growth (e.g. bimodality of firm size distributions and *fat tails* in the growth distributions) which have puzzled industrial economists (Cabral and Mata, 2003). Normal size distributions only appear for firms that do not benefit from their innovative efforts! Understanding the structural characteristics of innovation that lead to non-normal distributions in size and growth is fundamental if theory is to inform policy in a useful way.

POLICY IMPLICATIONS: The DIUS *Innovation Nation White Paper* (DIUS, March 2008) claims that allowing innovation to translate into growth is a key priority of the UK industrial policy. This study suggests that besides trying to raise R&D intensity figures (UK being 6th amongst the G7), it is fundamental for the UK innovation policy to better understand which firm level characteristics allow R&D and patenting activity to have an effect on growth. It is critical to gain insights on how this relationship differs across different sectors. Is 'persistence' in innovation important in computers as it is in pharmaceuticals? Is it more important in specific phases of the industry life-cycle?

References:

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