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## **THE RISKS AND REWARDS FOR INDEPENDENT INVENTORS**

Innovation by the likes of Gyro Gearloose – the brilliant but absent-minded inventor in the Donald Duck cartoons – is extremely risky in terms of the chances of success, according to research by Professor **Thomas Åstebro**, published in the latest issue of the *Economic Journal*. But a handful of so-called ‘independent inventions’ make very large gains and for this reason, Åstebro argues, it is well worth thinking about policies on invention that bring net benefits to society.

The term ‘independent invention’ is used by patent offices to describe a patent that is not assigned to a company. In a broader sense, it encompasses all those inventions that start out at the kitchen table or in the garage with little company backing, including those by Bill Gates, Michael Dell, Steve Jobs and Steven Wozniak.

Åstebro estimates that innovation by independent inventors is extremely risky with an average chance of reaching the market of approximately 7%. Of the lucky 7%, a large proportion that reach the market, 60%, realise negative returns and the average realised return among those that commercialise their inventions is minus 7%. Based on these data, independent inventors might be viewed as of little value to society and their activities discouraged.

But Åstebro also estimates that a ‘mutual fund’ of independent inventions earns a pre-tax return of approximately 11% and that a pool of 6% of the inventions that are identifiable well ahead of market launch earns a pooled pre-tax return of approximately 34%. The reason for the difference between the pooled return and the average return is a ‘skewed’ distribution of return with very large gains for a few inventions.

Approximately 50% of all inventors proceed with development efforts although an independent review shows their idea to be of very little commercial value. Risk-seeking is one of several plausible reasons why so many inventors proceed to develop their inventions while only a small fraction can reasonably expect to earn positive returns on their efforts. Another is that inventors are unrealistic optimists. And a third is that independent inventors are ‘skewness lovers’ who, while realists, are attracted to unfair gambles with negative expected values because of a skewed distribution of return with a minuscule probability of extreme gains.

The research was conducted on a random sample of 1,091 inventions submitted to the Canadian Innovation Centre (CIC) in Waterloo, Canada, by their inventors for a technical and commercial review. The CIC functions as an independent evaluator and charges a fee for the review.

89% of the inventors in the sample are male. Most of their inventions represent relatively modest technical advancements and 47% are consumer-oriented, for example, a new milk container design or a meat tenderness tester. But there is significant fraction of 'high-tech' (6%) and industrial equipment (6%) inventions, for example, an industrial-strength crusher of recycled cans and a computerised and mechanically integrated tree harvester.

From a policy perspective, the issue is not so much to decide whether independent inventors are a 'good thing' as whether there are feasible policies that could bring net benefits. The findings suggest that improvements may be possible. Society as well as most inventors would be better off if inventions that are identifiable early as of poor quality were not pursued. Low-cost public services such as the CIC serve as an important policy vehicle as they may both inform investors of good prospects and discourage poor prospects. Indeed, in related research with Irwin Bernhardt, Åstebro estimates that the 'social rate of return' to the CIC service is between 36% and 70%.

The adequacy of provision of external finance to independent inventors is a matter of concern. Banks and venture capitalists are for various reasons not likely to get involved with evaluating independent inventions. And the incentives for commercial firms to provide accurate invention quality ratings is low as inventors cannot monitor the quality of the advice and the cost of such service is too low to warrant costly vetting of rating firms.

If privatised, there is a tendency for the advising firms to race to the bottom of the quality ladder, devoting any available resources to promoting the availability of the service, as is the apparent case in the United States of so-called 'invention promotion services'. Thus, the provision of an invention rating service by a government agency could help in improving the subsequent allocation of venture capital. It is even possible that more inventions may be funded and both the pooled and average return increase.

ENDS

**Notes for Editors:** 'The Return to Independent Invention: Evidence of Risk Seeking, Extreme Optimism or Skewness-Loving?' by Thomas Åstebro is published in the January 2003 issue of the *Economic Journal*. Åstebro is Associate Professor in Management Sciences at the University of Waterloo in Canada.

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