

Patent Trends among Small and Large Innovative Firms during the 2007-2009 Recession

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Purpose

According to the National Bureau of Economic Research (NBER), the Great Recession commenced in December 2007 and ended in June 2009. This research examines whether observable differences in patent behavior between small and large firms occur during this 2007-2009 period.

Background

According to NBER, recessions are typically indicated by a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales.¹ Research and development (R&D) plays an important role in economic productivity. The United States spends approximately 3 percent of its GDP on R&D, and labor productivity growth has been linked with high levels of R&D.² Further, the United States accounts for more than 50 percent of the world's patents.³

Previous literature examines innovation in large and small firms via patent generation. Prior research finds total innovation to be negatively related to industry concentration and unionization

and positively related to R&D, skilled labor, and the number of large firms in an industry. In addition, prior research finds that small firms are less able to protect their patent rights during litigation. Finally, other literature finds that among small firms that do apply for patents, those firms tend to generate higher per capita patents relative to large firms.

This study explores small and large firm patent behavior during the 2007 to 2009 Great Recession. The research first provides a descriptive overview of general trends among small and large firms during the 2007 to 2009 period. The study also includes a comparison of domestic versus foreign patent trends, as well as a regional examination of small and large firm patent behavior in the United States.

Overall Findings

The key observation is that small firm patent activity declined sooner and to a greater degree than large firm patent activity during the 2007 to 2009 period. In addition, small firms increased patent activity sooner than larger firms in the two quarters of 2009 following the end of the recession.

The researcher observed similar small and large firm patent activity across U.S. and non-U.S. patent generators. Also, while the level of patent activity fell on average during the 2007 to 2009 period, China's activity merely leveled off rather than declined.

Finally, the researcher observed that regional small and large firm patent activity behaved consistently with overall U.S. patent activity. The regional examination reveals that California represents a significant portion of the U.S. innovative sector, constituting 22 percent of all large firm patents, and

1 <http://www.nber.org/cycles/cyclesmain.html>

2 Joshua Meltzer, et. al. The United States After the Great Recession: the Challenge of Sustainable Growth. Global Economy and Development Working Paper 60, Brookings (February 2013), available at <http://www.brookings.edu/~media/research/files/papers/2013/02/us%20post%20great%20recession%20meltzer%20steven/02%20us%20post%20great%20recession%20meltzer%20steven.pdf>

3 Ibid.

40 percent of all small firm patents in the dataset. In addition, small and large firms in California provided additional insights. Large firms in California did not follow the generally observed pattern, showing no major declines in patent activity during the recession. By contrast, patent activity among small firms in California declined at a greater rate relative to the U.S. rate overall.

Policy Recommendations

These observations suggest further research and policies as follows:

- Additional empirical study could be conducted to further examine significant underlying causal factors that drove the observed changes in patent activity during the 2007 to 2009 period.
- Following further empirical examination, an exploration of possible policy alternatives, such as ways to smooth R&D burdens for small firms, could be merited. For example, prior literature has explored university partnerships and public sector programs such as Small Business Innovation Research (SBIR), Small Business Technology Transfer (STTR), Advanced Research Projects Agency – Energy (ARPA-E), and Defense Advanced Research Projects Agency (DARPA).

Scope and Methodology

The key parameter of focus in this study is patent generation as measured by U.S. patents issued and assigned U.S. patent applications. Researchers asked whether any observable differences in patent generation would occur across small and large firms during the 2007 to 2009 Great Recession.

The dataset is a subset of a privately held resource based on a thesaurus of 4,000 organizations in three patent systems, including U.S. firms, foreign firms, nonprofits, universities, and government agencies. For this study, the researchers focused on a subset of firms that were granted 15 or more patents between 2005 and 2011. In addition, researchers included all published U.S. patent applications between January 1, 2005, and July 31, 2011.

The research uses descriptive statistics and observable data patterns to identify changes in patent behavior during the period of study. These general observations indicate that further empirical study could be fruitful.

This report was peer-reviewed consistent with Advocacy's data quality guidelines. More information on this process can be obtained by contacting the director of economic research by email at advocacy@sba.gov or by phone at (202) 205-6533.

Additional Information

The full text of this report and summaries of other studies of the U.S. Small Business Administration's Office of Advocacy are available on the Internet at www.sba.gov/advocacy/7540.

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