
# Corporate innovative efficiency: Evidence of effects on credit ratings

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# Corporate innovative efficiency: Evidence of effects on credit ratings

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**ABSTRACT**

This study shows that corporate innovation efficiency (IE) as measured by patents filed or cited divided by R&D expenditures improves credit ratings, but this occurs gradually. This gradual response implies that credit rating agencies (CRAs) impose in the near term a higher borrowing cost on innovative firms than their performance and risk characteristics would justify. We predict and confirm that the gradual improvement of credit ratings in response to IE is amplified for firms with more downside risk, with more financial constraints, and with increased sales or cash flows in the years following the IE. These results suggest a predictable response of CRAs to contemporaneous IE information based on economic factors relevant to credit analysis rather than a response based on CRAs' inefficient or biased use of innovation information.

*Key words*: Corporate innovation, patents, citations, credit ratings, gradual response.

## 1 Introduction

We examine the response of ratings by credit rating agencies (CRAs) to innovation efficiency (IE) information. This is an important topic for corporate finance for several reasons. First, the efficiency with which a firm manages its research and development (R&D) critically affects its performance in the long run. Most research, however, has focused on equity market relations (Deng, Lev, and Narin, 1999; Gu, 2005; Cohen, Dieter, and Molloy, 2013; Hirshleifer, Hsu, and Li, 2013). Second, the few studies that examine how innovation relates credit markets primarily use count measures of innovation (Czarnitzki and Kraft, 2004; Hall, 2010; Amore, Schneider, and Žaldokas, 2013; Frey 2013; Hsu, Lee, Liu, and Zhang, 2015). Higher patent or citation counts may not improve a firm's credit standing because they do not consider the resources used to generate the innovation. Third, potentially the most important, the prior studies of credit ratings and