Strapped for cash: The role of financial constraints for innovating firms

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Abstract

Since the turn of the century, firms in developed economies invest more in intangible captial than in physical capital. Yet firms that are intangible-intensive are thought to struggle to get access to stable sources of financing. They lack physical assets to use as collateral, and the nature of their investments is plagued by problems related to assymeteric information and moral hazard. Young firms are likely to suffer from these issues to a greater extent than older, more established firms.

In this paper we use unusually detailed data on Norwegian firms to investigate a set of questions: Do intangible-intensive firms appear to be credit constrained? Is this particularly true for younger firms? Does improved access to financing improve their performance? To answer these questions we exploit a reform that was introduced in 2015, allowing firms to use patents as stand-alone collateral. We combine accounting data with data on firms' bank connections and patenting activity. The data covers the universe of active firms, including the very young and small ones, whereas much of the previous literature has used data on publicly listed firms only. The accounting data allows us to differentiate between actual intangibles, goodwill and deferred tax assets. Our sample covers the years 2010-2018.

The reform was set in effect on July 1st 2015, less than 6 months after the details were announced. Prior to this, patents could only be used in conjunction with physical assets and hence not applicable to small and/or intangible-intensive firms The reform was introduced precisely to alleviate financial constraints for innovative firms, and was not part of a bigger tax reform. We define firms as being particularly affected ("treated") by the reform if they had at least one valid patent application in the five years prior

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to the reform. We then compare measures of their access to credit with our control group, consisting of firms that are less affected by the reform. We also investigate their subsequent growth and investment activity. We include industry trends to account for different growth rates across different industries, as well as firm fixed effects. We also include a set of control variables: log employment, log fixed assets, share of intangibles and a dummy for having received public funding. All are measured at baseline and interacted with year dummies to avoid issues related to the fact that these variables can potentially also be affected by the introduction of the reform. In some specifications we interact our variable of interest with a dummy variable indicating whether the firm is young ($\leq$6 years old). Standard errors are clustered at the firm level.

We use several different variables to measure whether a firm is credit constrained: a dummy for having a bank loan, log bank debt, total bank debt relative to sales, the share of short term bank debt in total bank debt, the number of bank connections and the firm-specific interest rate. To investigate how the reform affects the firms' growth and investments, we look at log sales, log number of employees, a dummy for having positive investments and a dummy for having positive investments in intangibles.

Our results indicate that innovative firms show signs of being financially constrained. After the reform was introduced, we see an increase in the number of affected firms accessing bank loans, the average loan sizes, and the number of bank connections. Their share of short term debt decreases. We find no effects on interest rates, but a caveat to note is that we use a relatively crude measure. Across most specifications, young firms do not respond significantly more than older firms. One exeption is the reduced share of short term debt, as this result is almost entirely driven by the young firms.

Where we do see a marked difference in young versus old firms, is in the subsequent growth and investments. Young firms increase employment and investments in both tangible and intangible capital, and see improved sales growth. In terms of robustness, we investigate whether there seems to be differential pre-trends for the treated firms compared to the control group. We find no evidence of this. We also perform a placebo test, checking whether treated firms show different trends in pre-sample data. Again, we find no evidence of this.

Our results support the notion that intangible-intensive firms are credit constrained. Improving access to stable financing through banks improves their subsequent performance. Of course, intangible investments take many other shapes too – mny of which show less potential for being collateralized as compared to patents. There is lots of room for creative policy makers to bridge the gap and improve access to finance for young, intangible-intensive firms.

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