Are business obstacles different for R&D companies?

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Abstract
Investment in research and development (R&D) is often long-term, making R&D companies extremely sensitive to their environment. Using data from the Business Environment and Enterprise Performance Survey rounds IV (2007-2009) and V (2012-2014), we examine the differences in how severe R&D and non-R&D manufacturing companies in Central and Eastern Europe perceive business obstacles to be. Overall, R&D companies were relatively more troubled by various institutional and regulatory obstacles in their business environment than were non-R&D companies, whose main business concern was the tax rate. Over both rounds of the survey, R&D companies perceived labour and trade regulations as more severe obstacles than non-R&D companies did. During the post-crisis period, R&D companies were also relatively more concerned about political instability, courts and corruption.

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Kas T&A ettevõtted tunnetavad ärikeskkonna erinevalt?

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Kokkuvõte


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Research question

Investments in R&D and innovation are believed to be lower than would be socially optimal, with appropriability problems1, financing constraints, market frictions and institutional deficiencies all being cited as major causes (see Brown et al., 2017, for a recent discussion). For this reason, researchers have put a lot of effort into finding measures for creating an institutional and business environment that would promote innovation and incentivise entrepreneurs and business owners to invest in R&D. Svensson’s (1998) model established a link between the quality of property rights protection, political instability and private investment. Coe et al. (2009) looked at a sample of 24 OECD countries over the period 1971-2004, and found that the strength of the protection of intellectual property rights is positively associated with R&D returns and total factor productivity levels. Brown et al. (2017) analysed a sample of 19 OECD economies from 1990-2006 and revealed that stronger protection for intellectual property, contract enforcement, and comprehensive and accurate accounting standards appear to promote R&D, while tougher creditor rights and R&D tax credits do not.

R&D activity involves extensive medium to long-term investment in human capital, technology and equipment, and research infrastructure in general, and such investment is particularly sensitive to the economic environment, in both its institutional setting and its cyclical turbulence. The effect of cyclical volatility on productivity-enhancing long-term investment in the Schumpeterian paradigm has been investigated by Aghion et al. (2010). More recent empirical evidence in the context of the Global Financial Crisis has been provided by Buca and Vermeulen (2017) and Schoder (2013), and by Maripuu and Männasoo (2014) and Männasoo and Maripuu (2015) in the Central and Eastern European context.

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1 Appropriability problems are when companies are not able to appropriate all the returns from their R&D investments. Subsequently, the private returns to R&D are lower than the overall social returns to R&D, contributing to underinvestment in R&D.
The impact of financing constraints on R&D has been comprehensively treated in Hall and Lerner (2010), and several empirical studies have studied credit frictions in the context of various countries and industries. For example, Cincera and Ravet (2010) examined the importance of financing constraints for R&D spending in large manufacturing companies in the United States and the European Union in 2000–2007. They found evidence of financing constraints in Europe, but not in the United States, and suggested that access to external funding could be improved for European companies seeking to finance R&D activities. Männasoo and Meriküll (2015) looked at financing constraints in Central and Eastern European companies in 2002-2013, and concluded that these constraints are a substantial factor impeding R&D expenditure. Männasoo and Meriküll (2011a, 2011b, 2011c) also examined the effect of cyclical volatility on R&D investment over the years of the recent Global Financial Crisis, and discovered that the importance of credit constraints remained stable over the business cycle.

This brief, descriptive analysis intends to explore the differences in the various business obstacles faced by Central and Eastern European companies that are engaged in R&D and by those that are not. These business obstacles include indicators for financing, taxes, regulation, corruption and the institutional environment in general. The analysis covers two periods, 2007-2009 and 2012-2014, so the data allow us to compare the business obstacles both for the two types of company and for the two distinct phases of the business cycle.

Data and analysis

The data used in this study are from the Business Environment and Enterprise Performance Survey (BEEPS), a firm-level survey based on face-to-face interviews with managers that seeks to gather information on different facets of the business environment. We analyse data from BEEPS rounds IV (2007-2009) and V (2012-2014), and our sample contains information on over 2,200 manufacturing companies from 11 Central and Eastern European countries. For the purposes of this analysis, companies are deemed to be engaged in R&D if they had spent on R&D activities during the past three years, with R&D being defined as “creative work.

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2 Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.
undertaken on a systematic basis in order to increase the stock of knowledge” 3. R&D companies made up 31.6% of all companies during round IV and 19.6% in round V.

The BEEPS questionnaire contains 15 questions on different business obstacles related to institutional, regulatory and infrastructure development aspects of the business environment. Table 1 lists these obstacles as variables together with the corresponding survey question. During the interview, managers were asked to assess the severity of each of these obstacles for their business on a scale from 0 to 4 as follows: 0 – no obstacle, 1 – minor obstacle, 2 – moderate obstacle, 3 – major obstacle, 4 – very severe obstacle. Additionally, the managers were asked to pinpoint the obstacle that most impeded business.

Table 1: Variable definitions

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<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable definition (survey question)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance</td>
<td>To what degree is <strong>access to finance</strong>, which includes availability and cost, interest rates, fees and collateral requirements an obstacle to the current operations of this establishment?</td>
</tr>
<tr>
<td>Crime</td>
<td>To what degree are <strong>crime, theft and disorder</strong> an obstacle to the current operations of this establishment?</td>
</tr>
<tr>
<td>Inadequate labour qualification</td>
<td>To what degree is an <strong>inadequately educated workforce</strong> an obstacle to the current operations of this establishment?</td>
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<tr>
<td>Labour regulation</td>
<td>To what degree are <strong>labour regulations</strong> an obstacle to the current operations of this establishment?</td>
</tr>
<tr>
<td>Courts</td>
<td>To what degree are the <strong>courts</strong> an obstacle to the current operations of this establishment?</td>
</tr>
<tr>
<td>Corruption</td>
<td>To what degree is <strong>corruption</strong> an obstacle to the current operations of this establishment?</td>
</tr>
<tr>
<td>Political instability</td>
<td>To what degree is <strong>political instability</strong> an obstacle to the current operations of this establishment?</td>
</tr>
<tr>
<td>Tax administration</td>
<td>To what degree is <strong>tax administration</strong> an obstacle to the current operations of this establishment?</td>
</tr>
<tr>
<td>Tax rate</td>
<td>To what degree are <strong>tax rates</strong> an obstacle to the current operations of this establishment?</td>
</tr>
<tr>
<td>Permits &amp; Licences</td>
<td>To what degree are <strong>business licensing and permits</strong> an obstacle to the current operations of this establishment?</td>
</tr>
<tr>
<td>Anticompetition</td>
<td>To what degree are <strong>practices of competitors in the informal sector</strong> an obstacle to the current operations of this establishment?</td>
</tr>
<tr>
<td>Customs &amp; Trade</td>
<td>To what degree are <strong>customs and trade regulation</strong> an obstacle to the current operations of this establishment?</td>
</tr>
<tr>
<td>Electricity</td>
<td>To what degree is <strong>electricity</strong> an obstacle to the current operations of this establishment?</td>
</tr>
<tr>
<td>Transport</td>
<td>To what degree is <strong>transport</strong> an obstacle to the current operations of this establishment?</td>
</tr>
<tr>
<td>Access to land</td>
<td>To what degree is <strong>access to land</strong> an obstacle to the current operations of this establishment?</td>
</tr>
</tbody>
</table>
Figure 1: Single greatest business obstacle as reported by R&D and non-R&D companies for BEEPS rounds IV and V

Note: N/A – the company did not select the single greatest business obstacle from among the 15 obstacles provided.
Figure 1 shows the distribution of the single greatest business obstacles as perceived by R&D and non-R&D companies. Among the five most important business obstacles for the two groups are the tax rate, access to finance, an inadequately educated labour force, corruption, political instability, and the informal practices of competitors. Across the two survey rounds, access to finance, an inadequately educated labour force, and corruption rank somewhat higher in list of the most pressing business obstacles for R&D companies, while non-R&D companies are comparatively more concerned about the tax rate and the informal practices of competitors.

Figure 2 contains the arithmetic averages of the severity of 12 business obstacles as self-reported by R&D and non-R&D firms over two rounds of the survey. To test the statistical significance of the differences in the averages of both types of manufacturing company, we run the Mann-Whitney nonparametric rank-sum test on each of the 12 variables. This simple analysis reveals that R&D companies were consistently more troubled with customs and trade regulation and labour regulations over both of the two survey rounds. During survey round IV, R&D companies also saw inadequate labour qualifications as a more serious constraint to business development than non-R&D companies did, but the difference was no longer statistically significantly during round V. During the post-crisis period R&D companies also perceived political instability, corruption, and the courts as a more severe business obstacle than non-R&D companies did.

Generally, it appears R&D companies were more affected by the different business obstacles than non-R&D companies were over both survey rounds. The single business obstacle which was perceived as more pronounced by non-R&D companies than by R&D companies – albeit at only the 10% level of significance – was the tax rate. However, this difference was only evident in round IV. Surprisingly, there was no significant difference in the severity of access to finance as a business obstacle for R&D or non-R&D companies. Additionally, it seems both types of company felt less constrained by these obstacles after the crisis, with most scores considerably improved in survey round V from what they were in round IV.

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4 We exclude three business infrastructure obstacles: electricity, transport, and access to land.
5 The null hypothesis of the Mann-Whitney test is that it is equally likely that a randomly selected value from one sample is different from a randomly selected value from a second sample. It is superior to the Student’s t-test in that it does not assume normal distribution.
Figure 2: Severity of business obstacles for R&D and non-R&D companies for BEEPS rounds IV and V

Notes:
***, **, * show significance at the 1%, 5% and 10% levels according to the Two-sample Wilcoxon rank-sum (Mann-Whitney) test, indicating whether the difference in the means of the two samples is statistically significant.
The circles of the graphs imply the self-reported severity of the business obstacle: centre of the graph – no obstacle, inner-most circle – minor obstacle, middle circle – moderate obstacle, outer circle – major obstacle. The highest severity level, of very severe obstacle, is not included in the graph.
Discussion

The BEEPS survey provides detailed, firm-level data on the business obstacles faced by manufacturing companies in Central and Eastern Europe. The purpose of this study was to investigate if the business obstacles perceived by companies engaged in R&D differ from those of other companies. Additionally, we compared the data for the two types of company over the two periods 2007-2009 (survey round IV) and 2012-2014 (survey round V).

In both survey rounds, R&D companies were consistently more concerned about customs and trade regulation and labour regulations than non-R&D companies were. R&D companies are inherently more dependent on the availability and quality of human capital and international R&D networking, making them more sensitive to institutional frictions related to labour and foreign trade. Although inadequate labour qualification was only a statistically significant discriminant between the two types of company during survey round IV, this obstacle was consistently more frequently selected as the most restrictive by the R&D companies.

An interesting distinction emerged during the post-crisis period in survey round V, when R&D companies started to perceive courts, corruption and political instability to be a more severe obstacle than non-R&D companies did. Funke et al. (2016) studied the general election results in 20 economies over the past 140 years and discovered that after financial crises, political instability tends to rise as voters become more attracted to the extreme right. Indeed, this trend has also been noticeable in the aftermath of the recent crisis. The rhetoric of the extreme right often incorporates an anti-science sentiment and suspicion of foreigners, both of which might be a concern for companies engaged in R&D.

Overall, it appears that R&D companies feel hindered by various business obstacles more than non-R&D companies, whose main concern is the tax rate\(^6\). R&D activities involve medium to long-term investment in human capital, and technology and equipment, and this is extremely sensitive to the different facets of the economic environment. Subsequently, R&D companies might perceive the obstacles in their business setting to be more severe than non-R&D companies do. Although this analysis was primarily concerned with the differences in

\(^6\) Tax related issues at large (see e.g. Hazak, 2009) may have a broader significance in R&D companies’ development.
the business obstacles perceived by R&D and non-R&D companies, it is also important to note that both types of company perceived business obstacles as less severe in the post-crisis period, possibly indicating an improvement in the business environment in Central and Eastern Europe.

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References


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