Innovation investment decisions: are post(transition) economies different from the rest of the EU?

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Abstract

The slow progress of innovation in transition economies is not related just to firms' decision to invest in innovation activities. Rather, it is worth distinguishing between their decision to increase investment, reduce it, keep their investments at the same level or not invest in innovation activities at all. To understand these decisions we develop and estimate models for post-transition and developed European countries employing multinomial probit. The analysis relies on responses of 2580 firms from 11 post-transition countries and 4058 firms from 18 European countries collected by the Flash Eurobarometer 433 - Innobarometer 2016 survey. We have established that the firms' decision making process in general is mostly related to previous innovation investment experience. In transition countries, the higher the percent of turnover invested in innovation, the lower the probability of an increase in the future. In the firms operating in developed economies, lower turnover from new products is related to the decision to decrease innovation investment in the future.

Keywords: innovation investment, (post)transition economies, developed economies, multinomial probit

Introduction

In their attempt to grow, firms face a decision on engagement in innovation activities. Outcomes of innovation activities contribute to improving business performance, market position and firm growth. However, considering the risks and uncertainties related to the innovation process, it is clearly not a simple decision. Existing findings show that the ability to protect inventions significantly contributes to the propensity of investment in innovation activities (Allred and Park, 2007). Furthermore, it is found that absorptive capacity improves a firm´s potential to innovate and to absorb knowledge developed outside the firm (Cohen and Leventhal,

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1989), but high absorptive capacity of firms that operate on large markets can result in low R&D investment (Grünfeld, 2003). Decision on the adequate investment in innovation is to a large extent complex because of limited funding, on one side, and of the multiple directions of innovation that firms have to choose from, on the other.

Innovation effort in the literature is sometimes simplified to R&D, moreover internal R&D. However, engagement in innovation extends beyond the issue of whether firms have R&D expenditures or not. Firms' decision making process does not only entail whether they will perform innovation activities but also how they will perform it. One example is the decision on engagement in either internal or external R&D. Studies show these are complementary activities (Veugelers, 1997; Cassiman and Veugelers, 2006), especially for firms that invest large amounts in internal R&D. Decisions to develop new technology internally or obtain it from outside are interrelated and most of the firms will use a combination of those two strategies (Veugleres and Cassiman, 1999) although small firms are somewhat more likely to rely on external R&D (Den Hertog and Thurik, 1993). The external R&D is likely to substitute lower intensity internal R&D (Hagedoorn and Wang, 2012).

Firms' involvement in innovation activities can be occasional or more persistent. Empirical findings show that only those that persist in their R&D and innovation efforts are able to reap benefits (Deschryvere, 2014). Furthermore, they are more likely to have higher growth rates (Johansson and Lööf, 2010), simultaneously introduce both product and process innovation[1] (Rammer and Spielkamp, 2006) and cooperate both formally and informally with vertically related firms, customers and suppliers (Bönte and Keilbach, 2005). R&D is indeed an important driver of innovation, but the ability to effectively manage innovation processes in firms without R&D results in innovation success (Rammer, Czarnitzki and Spielkamp, 2009). However, focusing on R&D only does not provide realistic insight into innovation activities in SMEs (Santarelli and Sterlacchini, 1990) and service firms (Kleinknecht *et al.*, 2002) due to more informal involvement in innovation activities.

It would be naive to expect a continuous increase of amount invested in innovation. At certain points, both internal and external factors can result in changes of investment in innovation, for example due to encountered financial constraints.

[1]According to the widely accepted definitions adopted by the Oslo Manual (OECD, 2005), the literature recognises four types of innovation: product innovation, process innovation, marketing innovation and organisational innovation. Product innovation refers to new or significantly improved goods or services. Process innovation includes implementation of a new or significantly improved manufacturing method, delivery and distribution method, logistics, or supporting activities. Organizational innovations are new business practices for organizing procedures, new methods of organizing work responsibilities and decision making and new methods of organizing external relations. Marketing innovation concerns changes in design and packaging, new media or product promotion techniques, new methods for product placement and sales channels and new pricing methods.

Therefore, it is important to understand (1) which factors are significantly likely to affect the decision to invest in innovation activity and (2) if there are differences between firms in (post)transition and developed countries in that respect. In order to understand the rather sluggish innovative activity in (post)transition economies, it is important to explore not just what is behind firms' decision to invest in innovation activities. Rather, it is worth distinguishing between their decision to increase investment in innovation activities, reduce it, to keep it at the same level or not to invest in innovation activities at all. It is likely that these decisions in (post)transition and in developed market economies depend on different factors or on the same factors with different relative importance. Prior evidence is relatively scarce, presumably because of the initial assumption that the decision making process in firms should be universal. However, actual experience has revealed that many assumptions connected to the transferability of market mechanisms did not hold in transition economies or, at least, there were difficulties in the early phases of transition. To the best knowledge of the authors, this is the first attempt to analyse this important issue in a comparative cross-country perspective.

The paper adopts the following structure: the next section is devoted to the presentation of the data sources and empirical strategy used in the following section, focused on the results and discussion. Last section offers conclusions.

1. Theoretical background and model development

The question why firms decide to innovate has interested researchers for a long time. Jorgenson's (1971) neoclassical investment model is focused on the firms' desire to extend productive capacity. Factors external to the firm – such as prevailing technology and technological opportunities have also been stressed in some theoretical models (Dosi, 1988). The decision on the adequate investment in R&D is complex because of limited funding, on one side, and several ideas and innovation projects firms have to choose from, on the other. Innovative firms have to think carefully when choosing among several innovation projects. Procedures for selecting the best projects proposed by Cooper, Edgett and Kleinschmidt (1999), Childs and Triantis (1999), Loch and Kavadias (2002), just to mention few, are useful in that respect.

Firms can face various obstacles in their effort to innovate and the lack of financial resources to support their innovation effort is one of the most common. Young and growth-oriented firms encounter problems when seeking financing from commercial lenders due to perceived risk associated to their operations (Riding *et al*, 2012). Access to financing is somewhat easier for large innovative firms than for SMEs (Ughetto, 2008). This does not mean that insufficient funding leads to abandoning innovation activities. In fact, firms are able to overcome lack of finances and be successful in innovation activities (Radas and Božić, 2012; Božić and Rajh,

2016). However, availability of financial resources is likely to shape the future of innovation investment, especially in the short run.

According to Haned, Mothe and Nguyen-Thic (2014), firms that engage in development and implementation of non-technological innovations are likely to persist in their effort to innovate due to accumulation of competences and returns on past investments. This implies that past innovation generated sales and market success.

Firms' characteristics explain the nature of their involvement in innovation activity. Firms having larger market shares on concentrated market persist in their effort to maintain internal innovation activities (Love and Roper, 2002). Moreover, large firms that face strong peer competition are motivated to perform innovation activities, namely R&D (Piga and Vivarelli, 2004). Presence on foreign market is often studied in the literature in terms of its impact on innovation activities. Extant studies provide evidence that exporting firms are more prone to innovate, but their investments are low (Smolny, 2003). Aw, Roberts and Xu (2011) even find that exporting itself has no impact on the probability to engage in R&D. Extant research findings show that being part of a group is favourable for innovation activities in several ways. These firms are more prone to establish R&D cooperation (Segarra-Blasco and Arauzo-Caro, 2008) and struggle less with innovation problems related to cooperation failure (Lhuillery and Pfister, 2009).

Relying on the above-cited literature, we identify two groups of variables relevant for explaining innovation investment decision. The first group consists of variables depicting different aspects of innovation activities, such as previous involvement or ability to benefit from previous innovation. The other group of variables describes firms' characteristics. We hypothesize that previous experience and involvement in innovation activity in addition to characteristics of the firm are likely to determine the future of innovation investment. We seek to identify if there are differences between (post)transition and developed economies in that respect.

Following variables that describe innovation activity are included in the models:

- *Previous engagement in innovation activities* is indicated in the models by three types of innovation: process, marketing and organizational innovation in the last year. Innovation investment in this dataset is reported by firms with experience in developing either new products or services (or both). Therefore, it would be inappropriate to introduce product innovation as an indicator of innovation activities in these models. However, other types of innovation activities are likely to influence decision on innovation investment in the future. Considering extant evidence on complementarities between deferent types of innovation in general (Schubert, 2010, Mothe and Nguyen-Thi, 2011), experience in developing process, organizational and marketing innovation is likely to affect the future course of innovation activities in firms. Firms whose previous innovation experience includes engagement of various types of innovation are

expected to be less prone to abandon innovation activities. Here, we explore if there is a significant difference in deciding on future innovation investment between firms in post-transition and developed economies with regards to their engagement in process, marketing and organizational innovation development.

- *Percent of turnover invested in innovation activities* in the three-year period (2013 to 2015) as a measure of past innovation activity. Even though investment in innovation vary by sector (Evangelista *et al*. 1997), firms determined to build their growth through innovation are more likely to dedicate a larger share of their resources to innovation activities. Consequently, we can expect their persistence will affect decision on innovation activities in the next period.
- Evidence on the importance of innovation for improving firms' performance is plentiful (e.g. Koellinger, 2008; Hall and Bagchi-Sen, 2002). Positive effects are conditional on market success of innovation. We include *turnover generated by new products* with the aim to capture market success of product innovation. Higher share of turnover generated by new products shows that a firm is able to benefit from innovations, i.e. indicates relative success in commercialization of product innovation. This success is likely to be reflected in future innovation investment decisions. More successful innovators are expected to be less prone to reduce or give up innovation activities in the future.
- By introducing a variable *lack of financial resources for innovations* in the models, we explore the extent to which firms are constrained in performing their innovation activities. Firms often struggle to finance their innovation activities to the extent they intended (D´Este, Rentocchini and Vega-Jurado, 2014). Due to the lack of financial resources, firms are likely to decrease investment in R&D (Tiwari, Mohnen, Palm, and van der Loeff, 2007). The likelihood of having innovation activity is strongly reduced when firms face financial constraints (Savignac, 2008). Furthermore, there is evidence that access to finance for innovative firms is rather difficult (Lee, Sameen and Cowling, 2015). This can be even more the case in (post)transition countries, whose financial systems are still less developed.

In addition to variables describing previous innovation activity itself, models include variables capturing firm characteristics in general. They are:

- *Presence on foreign market*. Extant findings show that presence on foreign market leads to more innovation (Criscuolo, Haskel and Slaughter, 2010). We can expect that firms present on foreign market are more likely to persist in their effort to innovate due to the pressure from fierce competition and market opportunities outside the national boundaries. Relationship between foreign market and innovation is especially important in the case of transition economies (Radas and Božić, 2009). Thus, foreign market can be even more relevant for firms in (post)transition economies that seek to overcome constraints of their (relatively) small national markets.

- Firms *operating as part of a group* are in a position to benefit from knowledge and resources available inside the group that potentially can affect their decision on innovation investment cooperation (Segarra-Blasco and Arauzo-Caro, 2008; Lhuillery and Pfister, 2009). We are particularly interested to see if there are differences between firms in (post)transition economies and developed economies. We expect that acquiring the commercialization skills necessary to operate on competitive markets is of particular interest for firms in (post)transition economies.
- Literature on innovation often takes into account *firm size* as a factor that highly determines innovation processes. It is likely that large firms and SMEs will not manage their innovation investment in the same way (Love and Roper, 2002; Piga and Vivarelli, 2004). This is mainly due to the availability of resources for innovation development. The firm size in the models is indicated by variable *large* taking value 1 if the firm employs more than 250 people and by variable *sme* taking value 1 if the number of employees is between 10 and 249. Base category is *micro firms*, i.e. those that employ less than 10 employees.
- In order to capture short-term growth, we include *turnover growth* in the past year. The rationale behind this is that firms will attune their innovation investment to their overall performance. Growing firms are generally in a position to increase innovation investments (Johansson and Lööf, 2010).
- In the models, we also control for *sector* since it is widely accepted that processes and patterns are different across specific segments of the economy. Sectors included in the models are manufacturing, industry and services, while retail is the base sector.

2. Data and methods

The analysis relies on Flash Eurobarometer 433[2] survey data accessed through GESIS Data Archive. This survey was conducted in February 2016 upon request of European Commission Director-General for Internal Market, Industry, Entrepreneurship and SMEs. Data are collected from micro, SMEs, and large firms in manufacturing, services (including retail) and industry in all EU Member States, Switzerland and the USA. The total sample consists of 14,112 firms. For the purpose of this study, we covered responses of firms from EU countries and Switzerland that were engaged in innovation activities. After excluding missing values, we were left

[2] European Commission: Flash Eurobarometer 433. Innobarometer 2016 – EU business innovation trends. February 2016. TNS Political & Social [Producer]; GESIS Data Archive: ZA6771, dataset version 1.0.0. (2016).

with 2,580 firms from post-transition countries[3] and 4,058 from developed countries[4].

Respondents were asked to report on their innovation investment plans for the next 12 months. There were four mutually exclusive choices: the plan can be to increase innovation investment, decrease it, remain at the same level as previous year, or not to invest in innovation at all. These choices are modelled employing multinomial probit. Multinomial probit models are estimated separately for post-transition and developed economies with the same set of independent variables explained in the previous section. Definitions of the variables in the models and summary statistics are provided in Table 1.

Table 1. Definitions of variables and descriptive statistics

Variable name	Definition	Post-transition countries(%)	Developed countries(%)
Process	1 if a firm developed new or significantly improved process in the three-year period, 0 otherwise	54.42	56.80
Mkt	1 if a firm developed new or significantly improved marketing strategy in the three-year period, 0 otherwise	48.37	53.89
Org	1 if a firm developed new or significantly improved organizational method in the three-year period, 0 otherwise	55.19	56.60
Turn_fall	1 if a firm's total turnover in 2015 has fallen, 0 otherwise	17.09	18.19
Turn_incr	1 if a firm's total turnover in 2015 has risen, 0 otherwise	49.30	49.97
sme	1 if a firm has between 10 and 249 employees, 0 otherwise	52.48	53.72
Large	1 if a firm has more than 250 employees, 0 otherwise	6.47	7.22
Group	1 if a firm operates as part of a group, 0 otherwise	19.18	31.22
Foreign market	1 if a firm sales its products on foreign market, 0 otherwise	47.71	41.28

[3]Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia, and Romania.

[4] France, Belgium, The Netherlands, Germany, Italy, Luxembourg, Denmark, Ireland, United Kingdom, Greece, Spain, Portugal, Finland, Sweden, Austria, Cyprus, Malta, Switzerland.

Fin_problem	1 if a firm reports lack of financial resources for innovation commercialization, 0 otherwise	26.32	21.00
Inno_invest	Percentage of turnover in 2015 invested in innovation:		
	1 = 0	24.38	21.85
	2 = less than 1%	39.57	44.31
	3 = between 1 and 5%,	11.78	11.43
	4 = between 6 and 10%,	8.84	8.60
	5 = 11% and more	15.43	13.81
Turn_inno	Percentage of firm's turnover in 2015 due to innovations:		
	1 = 0	8.99	7.59
	2 = between 1 and 5%,	25.62	25.11
	3 = between 6 and 10%,	24.34	26.61
	4 = between 11 and 25%,	23.33	23.56
	5 = between 26 and 50%,	11.09	9.91
	6 = 51% and more	6.63	7.22
Manufacturing	1 if a firm operates in manufacturing sector, 0 otherwise	17.95	13.87
Services	1 if a firm operates in services, 0 otherwise	36.78	43.74
Industry	1 if a firm operates in industry, 0 otherwise	12.75	11.51

Multinomial probit models are estimated at base outcome "keeping the innovation investment the same", implying that all other outcomes are evaluated with respect to the base outcome. We estimated both coefficients and marginal effects. As marginal effects enable us to conclude on actual probabilities of certain outcome, the next section is focused on them, while the estimated coefficients are presented Appendix.

It is worth noting that we tested several models with larger set of independent variables, including country dummy variables. As controlling for country did not make any significant contribution, we opted for models without country dummy variables. The same applies to other variables that we considered in the process of the data analysis. The estimates presented in the next sections are the ones with the best fit to the data.

3. Results

Results of the multinomial probit for both (post)transition and developed countries are presented in Table 2. The table presents marginal effects, enabling us to compare the relative strength of each variable found to be a significant predictor of specific decision making process.

Positive predictors for making decision to increase innovation in (post)transition economies are connected to a firm's previous success in innovation activities, operating in the industry sector, having developed marketing and organisational innovation, reporting to have financial constraints, but increasing its total turnover. The notion that innovation is positively associated with firm growth has been frequently established due to complementarities between R&D and other operations within the firm – for example, economies of scale and scope (Noteboom, 1994) or production process and marketing changes (Cohen, 1995).

For developed economies, fewer variables turned out to be significant positive predictors for decision to increase innovation investment. For these firms, having marketing and organisational innovation is important, as well as reporting to have financial constraints and being able to increase overall turnover in the previous period. Unlike in (post)transition countries, having developed process innovation in the past is not related to the decision on innovation investment increase in the future.

It seems that financial problems that firms face in both country groupings positively affect the probability to invest more in innovation. This counterintuitive result points to the complexity of financial problems, its perceptions and ability to deal with them when it comes to innovation activities. Previous studies cited in Section 2 have demonstrated that firms are able to cope with the lack of finances and develop innovation (Radas and Božić, 2012, Božić and Rajh, 2016). Although we would expect that struggling to finance innovation leads to lower investment at least, results show the opposite – innovation investment plans do not suffer due to lack of finances. One explanation is that innovative firms are more likely to seek financing and thus, more likely to encounter financial difficulties than other firms. Another is that innovative firms are more likely to overcome financing difficulties and persist in their activities.

The negative predictor for making decision to increase innovation in (post)transition economies is related to firm size. SMEs in (post)transition countries are less likely to decide to increase their investment in innovation. This factor is not equally important for developed economies, where this characteristic of the firm is not significant. Thus, it seems that in (post)transition economies, firms employing from 10 to 249 employees that have already invested in innovative activities are more likely to have lost the momentum. It could be the case that innovation activities are more sporadic than in the more developed economies, where orientation towards innovation is a constant must. Another possibility is the effect of the recent global economic crisis. As Fort *et al*. (2013) argue, smaller firms are more vulnerable to adverse effects on the market – so it could be the case that SMEs in the (post)transition economies were in a more disadvantaged position than their counterparts in developed economies during the recent crisis.

The question is whether these differences persist if we explore the decision to reduce investment in innovation. In (post)transition countries, investment in innovation in the past year is significant: the higher percentage of turnover invested

in innovation in the past increases the probability of reducing investment in the next year. The positive predictor for making this decision in (post)transition economies is also the overall turnover decrease. A similar situation can also be found in the case of developed economies. So, it could be suspected that the firms which have been investing in innovative activities, but their investment has not yet paid off, are planning to reduce investment for innovative activities in the next period. It could be the case that the innovation investment was already at its maximum or less suitable for the level of their innovation activities and the saturation took place. Another possible explanation can be related to the economic activity most of the innovative firms are engaged in (Waldman, 1996) – the internal structure of the economy plays the key role in making investment decisions. Unfortunately, we do not have the opportunity to control the structural relationship between different segments of the economy with our dataset.

In general, it could be argued that firms will try to set their innovation investment at optimal level and time (Barzel, 1968). Overinvestment can also be related to the negative probability of survival on the market. Probably the most difficult decision is connected with maintaining the investment at that optimal level. Farzin, Huisman and Kort (1998) have shown that optimal timing decision is affected by market conditions, the firm's initial technological attributes, and the characteristics of the stochastic innovation process. Although we cannot argue that for each firm participating in the survey the optimal investment level has been reached, we can assume that market conditions as well as average firm initial technological attributes differ between two groups of countries. For (post)transition economies, the strongest positive predictors are found in the variables capturing previous investment in innovation activity. It could be argued that this captures the segment of firms dedicated towards innovation activity.

In both (post)transition and developed economies, higher percentages of turnover invested in innovation are related to an increase in the probability to maintain the same level of investment. The magnitude of marginal effects indicates that this relationship is more pronounced in firms operating in (post)transition economies. Furthermore, for both clusters of countries keeping the constant path of innovative investment it seems to be easier if they are operating within a group. This could be related to the possibility to rely on internal resources developed within a group, but also as a result of peer pressure from other group members. Indeed, Kokko and Kravtsova (2008) emphasize the role of foreign direct investment for the process of innovation diffusion in transition economies. They also establish important differences between technology diffusion and marketing and processing mechanisms related to the relative connectedness of the subsidiary to the parent company.

Table 2. Results of multinomial probit – marginal effects

	Post-transition countries				Developed countries			
	Increase	Reduce	Keep the same	Plan not to invest	Increase	Reduce	Keep the same	Plan not to invest
Process	.036 (.022)*	-.001 (.006)	-.014 (.023)	-.022 (.013)*	.017 (.016)	.008 (.005)	.012 (.017)	-.013 (.009)
Mkt	.081 (.021)***	.001 (.006)	-.058 (.022)***	-.024 (.013)*	.041 (.016)***	.0006 (.005)	-.032 (.017)*	-.010 (.008)
Org	.049 (.021)**	-.013 (.007)**	-.013 (.022)	-.023 (.013)*	.063 (.016)***	-.007 (.006)	-.071 (.017)***	.015 (.008)*
Inno_invest	-.004 (.009)	.016 (.002)***	.044 (.010)***	-.056 (.006)***	-.009 (.007)	.019 (.002)***	.027 (.008)***	-.054 (.004)***
Turn_inno	.029 (.008)***	-.001 (.002)	-.019 (.008)**	-.009 (.004)**	.004 (.006)	-.007 (.002)***	.002 (.006)	.001 (.003)
Fin_problem	.050 (.023)**	.011 (.007)	-.069 (.023)***	.007 (.013)	.060 (.019)***	.008 (.007)	-.081 (.020)***	.014 (.010)
Turn_fall	-.022 (.030)	.029 (.014)**	-.029 (.030)	.021 (.017)	-.024 (.022)	.023 (.010)**	-.037 (.024)	.039 (.014)***
Turn_incr	.050 (.022)**	.011 (.007)	-.045 (.023)**	-.015 (.013)	.037 (.017)**	-.009 (.006)*	-.035 (.018)*	.005 (.009)
sme	-.006 (.021)**	.003 (.006)	.032 (.022)	-.030 (.013)**	.003 (.017)	-.013 (.006)**	.044 (.018)**	-.034 (.009)***
Large	-.050 (.044)	.002 (.015)	.112 (.046)**	-.063 (.017)***	.053 (.034)	-.005 (.009)	.009 (.034)	-.058 (.010)***
Group	-.052 (.026)**	.007 (.009)	.064 (.028)**	-.019 (.016)	-.028 (.017)	.005 (.006)	.041 (.018)**	-.017 (.009)*
Foreign market	.023 (.021)	-.011 (.006)*	.006 (.022)	-.018 (.012)	.015 (.016)	.005 (.006)	.0003 (.017)	-.020 (.009)**
Manufacturing	-.032 (.030)	.002 (.010)	.031 (.031)	-.001 (.018)	.002 (.025)	.013 (.011)	.00003 (.003)	-.015 (.012)
Services	.034 (.024)	.008 (.008)	-.033 (.024)	-.008 (.013)	-.009 (.018)	.008 (.007)	.021 (.019)	-.021 (.009)**
Industry	.056 (.034)*	.004 (.011)	-.057 (.033)*	-.003 (.018)	-.039 (.025)	.025 (.013)*	.026 (.027)	-.012 (.012)
Number of observations	2580				4058			

Notes: Standard errors in parenthesis. *** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent. Baseline category for estimates is keeping the innovation investment in the next year at the same level.

Firms are less likely to keep the same level of investment in innovation if they have financial constraints as well as if they have developed marketing innovation. The first finding is related to their ability to invest, but the second is probably more related to the fact that they already have products in the commercialization phase, which they have prepared marketing strategy for. Additionally for the developed countries, firms are less likely to keep the same level of innovation investment if they had organisational innovation. So, it could be the case that they are still expecting to yield results from the activities undertaken in the past. Tavasolli and Karlsson (2015) analyse persistence in innovation activity according to different types of innovation and conclude that it is the highest in case of product innovation. This could suggest that, although the overall structure of economies is changed, firms' orientation towards their products still dominates over the process and marketing innovation.

Finally, we concentrate on those firms that decided not to invest at all in innovative activities. It is interesting to note that we were not able to identify positive predictors for this decision in (post)transition economies. In developed economies, positive predictors are organizational innovation and the variable depicting decline in turnover. So, this indicates the importance of financial resources for investment plans, which is not a surprising result.

Results show that both in (post)transition and developed countries, there seems to be resilient innovative efforts, as those who have already invested in innovation are less likely to abandon future investments. Innovation development is long term strategic orientation rather than a short-term activity. Once firms engage in innovation activities, they are likely to pursue this path and invest any amount rather than give up completely. Even if it can be assumed that the environment for innovation activities in (post)transition economies is less favourable than in developed ones, firms in these countries do not abandon innovation activities more easily.

In general, the decision making process in both groups of countries is mostly under the influence of previous innovative investment experience. This is testified by the significance of the variable "inno-invest" for making a decision in both analysed cases. Firms that invested more in their innovation activities are more likely to reduce their investment in the future. Relying on these findings, we can conclude that innovation investment in firms was already at its maximum or at least suitable for the level of their innovation activity. However, for both (post)transition and developed economies, results show that any percent of turnover invested in innovation significantly reduces the probability of not investing in innovation in the future. Furthermore, the magnitude of marginal effects shows that in both country groupings, firms are most likely to keep their innovation investment at the same level. However, we did not find any significant impact of the "inno-invest" variable on the decision to increase innovation investment in the future in either (post)transition or developed countries.

The decision to increase investment in (post)transition countries is affected by the success of past innovation activities. The same is found for the decision to maintain the same level of investment or not to invest in the future. This confirms the findings of previous studies revealing a certain degree of innovation persistence (Peters, 2009). The percent of turnover generated by innovation seems to be less relevant for firms in developed economies. It only reduces the probability of investing less if firms were able to generate more turnover from their past innovation activities.

Conclusions

The main topic of the analysis was to distinguish between the different possibilities innovative enterprises face when it comes to making decisions on additional investments in innovation activities. To the best knowledge of the authors, this paper is the first attempt to use the comparative approach to analyse the decision making process of firms, including the decision not to innovate, in (post)transition and developed market economies. The results can provide deeper insights into the reasons for transition economies' rather slow catching up in innovative activities.

The hypothesis analysed in the paper focused on the role of previous experience and involvement in innovation activity and characteristics of the firms. Several important messages can be drawn from the results of the empirical analysis.

The results reveal that process and organizational innovation have different effects on future innovation investment decision in (post)transition and developed economies. While for firms in (post)transition countries, the presence of process innovation in the past increases the probability of investing more in the future and decreases the probability of not investing at all, we found no significant associations in developed countries. It could be the case that, prior to starting product innovation process, firms in (post)transition economies need to adjust their internal processes to accommodate for future innovation activities. Marketing innovations in both groups of countries affect the probability of innovation investment change the same way.

Market success of past innovation activities is a significant predictor of increasing investment in (post)transition economies. Furthermore, in these countries, this variable is associated with the lower probability of giving up innovation investment. This, however, does not hold for firms in developed countries. Although they are not likely to increase investment, firms in developed economies, able to generate higher market success, are in fact less likely to reduce their investments in the future.

Firms facing turnover decrease in both groups of countries will reduce their innovation investment in the next period. In developed countries, they are even likely not to invest in the future. As expected, turnover growth is a positive predictor of increasing innovation investment in (post)transition as well as developed countries.

Belonging to the group of firms in (post)transition economies means a lower probability of increasing innovation investment. For those in developed economies, we did not find this association. They are, on the other hand, less likely not to invest in innovation. For both clusters of countries, firms belonging to the group are the most likely to maintain the same level of investment. Taking into account these findings, we can conclude that firms in (post)transition economies get a certain drive from the group they belong to. On the other hand, those in developed countries are likely to rely on other firms in their group to invest in innovation and benefit from the new ideas, knowledge and innovation without investing in their development.

It is interesting to notice the difference when it comes to the importance of operating on foreign market. In post-transition countries, firms operating outside national borders are less likely to reduce their current level of innovation investment while those in developed economies are less likely not to invest. Interestingly, in neither group of countries, does foreign market push firms to invest more in innovation activities. The reason can be that those firms are investing high amounts in innovation already. However, presence on foreign market is important for not reducing or not investing in innovation in the future.

Our results clearly point that there are important differences in predictors for making decisions to innovate in post-transition versus developed European economies. This is even more important if we take into consideration that we did not explicitly consider policy framework in our empirical strategy. Identified differences suggest that policy framework is important and we cannot simply assume that the decision making process at the firm level will lead to similar outcomes. Thus, the next step in the analysis should incorporate specific policy framework that encourages (or discourages) firm decision making process regarding innovation investment in each country. It should already be clear that this process depends on a large number of factors. However, only after the country-specific factors are accounted for in the empirical analysis, we could start discussing policy implications.

The main limitation of the present analysis is that it is based on cross-sectional data. Each analysed country is in a different stage of the business cycle and, subsequently, firms are faced with specific market conditions. Certainly, the business environment influences a firm's decision to invest in innovation activity. In order to be able to discuss firms' decision making process in more detail, time dimension is required. Thus, future research efforts should be focused on the differences in the innovation decision making process between (post)transition and developed European economies through time.

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Appendix

Results of multinomial probit– coefficients

	Post-transition countries			**Developed countries**		
	Increase	Reduce	Plan not to invest	Increase	Reduce	Plan not to invest
Process	.101 (.081)	-.005 (.152)	-.120 (.104)	.063 (.065)	.170 (.114)	-.088 (.086)
Mkt	.274 (.078)***	.126 (.146)	-.062 (.103)	.154 (.064)**	.061 (.110)	-.036 (.085)
Org	.127 (.080)	-.270 (.147)*	-.136 (.103)	.273 (.065)***	-.012 (.111)	.239 (.087)***
Inno_invest	-.086 (.035)**	.275 (.065)***	-.450 (.047)***	-.019 (.030)	.296 (.052)***	-.506 (.042)***
Turn_inno	.096 (.029)***	.001 (.054)	-.029 (.038)	.008 (.024)	-.147 (.043)***	.006 (.032)
Fin_problem	.229 (.085)***	.351 (.149)**	.174 (.107)	.277 (.074)***	.271 (.121)**	.246 (.096)***
Turn_fall	.005 (.111)	.539 (.197)***	.191 (.131)	-.002 (.089)	.417 (.137)***	.035 (.110)***
Turn_incr	.184 (.0831)**	.317 (.168)*	-.019 (.109)	.151 (.068)**	-.106 (.122)	.095 (.093)
sme	-.069 (.082)	.001 (152)	-.258 (.103)**	-.064 (.067)	-.310 (.117)***	-.359 (.087)***
Large	-.298 (.172)*	-.158 (.338)	-.795 (.276)***	.111 (128)	-.123 (.215)	-.783 (.236)***
Group	-225 (.100)**	.033 (.183)	-.249 (.141)**	-.136 (.070)*	.027 (.123)	-.218 (.099)**
Foreign market	.038 (.079)	-.264 (.154)*	-.138 (.104)	.036 (.063)	.084 (.110)	-.169 (.089)*
Manufacturing	-.124 (.115)	-.0003 (.221)	-.064 (.151)	.008 (.098)	.218 (.172)	-.130 (.136)
Services	.130 (.089)	.226 (.168)	.003 (.114)	-.056 (.070)	.117 (.130)	-.214 (.092)**
Industry	.217 (.122)*	.196 (.232)	.086 (.152)	-.141 (.104)	.320 (.175)*	-.143 (.130)
Intercept	-.678 (.142)***	-2.997***	.488 (.173)***	-.831 (.119)***	-2.593 (.218)***	.129 (.149)
Wald chi (45)	331.32			448.85		
Prob>chi2	0.0000			0.0000		
Number of observations	2580			4058		

Notes: Standard errors in parenthesis. *** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent. Base outcome is keeping the innovation investment in the next year at the same level.