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Borrowed capabilities – The role of foreign-owned firms and import in the employment level and export diversification of Hungarian microregions

Theses of doctoral dissertation

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1. Introduction and motivation

For a long time now economists have been interested in why some places are more successful in producing products of economic value than others. The production of these outputs entails the combination of different factors of production. Conventional factors like capital and labour stock, or land explain only partially the differences of countries and regions in economic output (*Solow 1956*). For this reason today it is also considered fundamental that the skill level of the labour force, *i.e. human capital* (*Romer 1986, Mackay 1993*), and also the *social capital* of places contribute to the level of production (*Putnam 2000*). A number of scholars in regional science propose that the total output and the production structure of regions also depend on the *territorial capital* these places, which is a compendium of resources and capabilities necessary for production (*Camagni 2009, Tóth 2015, Dombi et al. 2017*).

The appearance of new economic activities is likewise the result of a combinatorial process (*Schumpeter 1934*). The literature on innovation systems also emphasises that the emergence of novel combinations is the result of an interactive learning process, in which different types of actors partake. The linkages of these actors conducive to learning are influenced by a multitude of institutional elements (for a review in Hungarian, see *Vas – Bajmócy 2012*). For this reason the long-term economic success of places is shaped not just by endowment with resources and capabilities, but also by the capacity to renew this capability base from time to time (*Neffke et al. 2011*). These *capabilities* emerge from factors of production, inimitable and immobile resources, organisational routines and competences (*Teece et al. 1997*).

Changes in the capability base go hand in hand with changes in the production structure, which help regions in upgrading into more complex products, representing more value-added. However regions may also lock into less successful production structures. The economic evolution of places is not independent of the current economic structure, which shapes future avenues of change. This means that the current portfolio of economic activities, as well as the capability base behind it, limits the range of feasible future production structures.

Changes in the regional economic structure can be viewed as a branching process, during which new economic activities build upon existing ones, and in part represent novel combinations of these existing activities (*Frenken – Boschma 2007*). This is because search costs increase rapidly as differences between existing capabilities and those required for the

new activity increase. Additionally, the survival chances of activities unrelated to previous ones are lower (*Nelson – Winter 1982*).

Research on this branching process has gained increasing attention in the literature in recent years. The most influential framework for understanding it was offered by the field of evolutionary economic geography. Based on this literature, regional diversification related to pre-existing activities can be seen as the norm, while unrelated diversification as the exception (*Boschma 2017*). Scholars of evolutionary economic geography have shown that regions with capability bases offering more combinatorial potential experience higher growth in terms of employment (*e.g. Frenken et al. 2007, Bishop – Gripaios 2010, Boschma et al. 2012*). Additionally, new economic activities appear more likely in those places that house a related capability base, and thus where the technological relatedness of new and existing activities is stronger (*e.g. Hidalgo et al. 2007, Neffke et al. 2011, Boschma et al. 2013*).

We have far less knowledge on how "borrowed" capabilities, available outside the region influence regional growth and diversification. Import is one of the channels through which these extraregional capabilities can be accessed, by bringing in new capabilities missing from the regional capability base. Related import at the level of countries facilitate export diversification (*Boschma – Capone 2016*). At the regional level *Boschma – Iammarino (2009)* also found that import related to export enhances the growth of employment. Even so, further research on this is needed as learning-by-importing is an important channel for firms newly appearing on international markets (*Marwah – Tavakoli 2004*). This however, to my knowledge, has not yet appeared in the literature on regional growth and diversification.

Another channel for extraregional capabilities may be the presence of foreign firms. Systematic studies of these firms at the subnational level are scarce in the relevant literature (*Beugelsdijk et al. 2010, Iammarino – McCann 2013*). Besides capabilities in the host region, foreign firms also access capabilities from other places through the company network (*Nölke – Vliegenthart 2009*). Research on the role of foreign firms in regional diversification in the Hungarian context has added importance, since following the political and economic transition of the '90s, a duality between foreign and domestic firms has been formed by 2000 (*Szanyi 2010*). This dual economy entails a small number of foreign firms outperforming a much larger number of domestic firms, especially in the case of export.

An additional argument for studying foreign firms is that our knowledge is limited on the microfoundations of regional diversification, *i.e.* the effect that different types of agents (entrepreneurs, new entrants, incumbents, spinoffs, foreign firms, etc.) have on the regional capability base (*Boschma 2017*). This is so despite the management literature thoroughly

documenting that diversification into activities related to the current portfolio is frequent at the organisational level (*Farjoun 1994, Palich et al. 2000*). The few studies focusing on the microfoundations of regional diversification found that novel industries form in those regions, that house a large number of spinoff firms and possible entrants from related industries (*Klepper – Simons 2000, Klepper 2007, Boschma – Wenting 2007, Wenting 2008*). Furthermore, activities less related to the current regional capability base of regions are brought in by firms of extraregional origin, rather than local entrants and incumbents (*Neffke et al. 2018*).

Finally, foreign firms are actors traditionally distinguished by local development policy (*Szalavetz 2000, Varga 2007, Lengyel 2010*). Thus the research presented here is also necessary because thoughts on related variety as of late have also appeared in the policy discourse on place-based policy and smart specialisation strategy. The core of the latter approach first is that the bundle of policy solutions must be put together with the inclusion of local stakeholders. Second, relatedness and embeddedness among local industries fosters long-term regional success, and third there is a need for local industries to cultivate an extensive network with actors from other regions (*McCann – Ortega-Argilés 2015, Thissen et al. 2014, Boschma – Gianelli 2014*). Even though strategic policy documents were created for the EU regions, these strategies so far have offered little success during implementation. Among the many reasons for this, the crudeness of mapping related industries during the initial phase of the planning process is likely to be one. On this note, methods and results described here can certainly contribute to the wider informational bases and the success of smart specialisation and the broader regional economic development policy in Hungary.

2. Objectives of the research and the theoretical background

The objective of this research is twofold. First, through studying international trade portfolios of Hungarian regions I aim to show that the mediating role of technological relatedness is at work in the growth of regional employment and economic diversification of these regions. From the viewpoint of the international literature, this is an aim of replication. Nevertheless, I find this important because consensus in the literature can be obtained precisely by replicating previous studies (*Trochim et al. 2016*). Additionally, the research presented here offers new insights for the Hungarian literature, and the Hungarian regional development policy may be well served by empirical results obtained from data on Hungarian regions.

The second aim of this dissertation is to show that extraregional capabilities can help regional growth and diversification, by analysing the technological relatedness of import and export, and foreign and domestic firms' product portfolios. This research topic can be identified as a research gap in the international literature as well. The added value of this research first is a shift towards the micro-level analysis of regional diversification through differentiating between foreign and domestic firms. Second, the results presented here refine our view on the potential effectiveness of regional development policy. Third, in order to fulfill these research aims I am not simply using methods in the international literature, but also adapt them to context by adding the dimensions of import-export, and ownership.

In order to reach these goals I study the employment growth and the evolution of export portfolios of Hungaria regions. Concerning growth I am looking to answer the question *(1) how technological relatedness mediates regional growth through access to extraregional capability bases?* Concerning the evolution of regional export portfolios I am interested in *(2) how import and foreign-owned firms influence the international trade diversification of Hungarian regions through technological relatedness?*

So as to answer these questions in this dissertation, first I review the literature on the notion of *capabilities* necessary for production and the methods for mapping them. The *resource-based view of the firm* identifies four qualities of resources available to firms (*Neffke et al. 2018*). First, they offer lasting competitive advantage to firms if they are valuable, rare, hard to imitate and hard to substitute (*Barney 1991*). Second, they are strongly related to a specific task based on their role in production (*Penrose 1959*). Third, as firms become more efficient in using some of their resources, so do others became less used. This forces firms to actively search for and to diversify into related activities (*Teece 1982*). Finally, to ensure long-term survival, firms have to renew their resource base from time to time through their dynamic capabilities (*Teece et al. 1997*). *Capabilities* themselves emerge from factors of production, inimitable and immobile resources, organisational routines and competences (*Teece et al. 1997*).

Regions can be considered a bundle of resources and capabilities where firms combine these resources and capabilities during their productive activities (*Lawson 1999, Neffke et al. 2018*). It is also true in the regional context, that the resources are valuable, rare, inimitable and hard to substitute, while they are linked to a narrow range of economic activities. There are some capabilities that become stronger as they are used more intensively. Changes in technology or demand can erode the local capability base that needs to be renewed from time to time. The first three arguments suggest that regional diversification is also path-dependent

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(*Frenken–Boschma 2007, Frenken 2009, Boschma–Frenken 2011a, Boschma–Frenken 2011b, Neffke et al. 2018*), *i.e.* the current economic structure limits the range of possible structures in the future (*David 1985, Arthur 1989, Henning et al. 2013, Lengyel – Bajmócy 2013*). The fourth argument suggests that the long-term economic success of regions depends heavily on how much the local capability base is capable of renewal (*Neffke et al. 2018*).

Capabilities, from a regional perspective, emerge from a place-specific bundle of resources, they sustain local economic activities, are used by several firms, and are primarily accessible from within the region (*Neffke et al. 2018*). The notion of a regional capability base incorporates a number of ideas from the literature, including local access to skilled labour (*Glaeser et al. 1992, Henderson et al. 1995*), the determinants of Porter's diamond (*Porter 1990*), the location-specific untraded interdependencies of geographically concentrating firms (*Storper 1995*), localised learning (*Maskell – Malmberg 1999, Maskell – Malmberg 2006*), local knowledge bases, institutions and networks (*Cooke – Morgan 1998, Boschma 2004, Asheim – Gertler 2005*), participation in interregional knowledge networks (*Sebestyén 2011, 2012*), and the productive knowledge of local firms (*Hidalgo 2015*).

It is agreed upon in regional science that firms can benefit from geographical concentration. There is a link between the agglomeration of economic activities, and the economic performance (income, productivity, employment, *etc.*) of regions (*Lengyel 2010*). These *agglomeration economies* offer increasing returns for regions (*Varga – Schalk 2004*), and contribute to the long-term economic development of places (*Czaller 2016*). Studies in the literature on the effect of agglomeration on regional growth have long been dominated by the opposing ideas of *localisation economies* stemming from specialisation, and *Jacobs-externalities* stemming from the variety of economic activities in regions. It is an open question whether spillovers within industries (specialisation) or between industries (variety) are more conducive of growth (*Glaeser et al. 1992, Henderson et al. 1995, Beaudry – Schiffauerova 2009, Sebestyén et al. 2011, Caragliu et al. 2016*). The former represents less radical combinations of existing capabilities compared to the latter.

In their influential study *Frenken et al. (2007)* propose that it is not specialisation or diversity *per se* that determine the growth of regions, but these two affect growth through different channels of knowledge spillover. The specialisation of the regional economy yields spillovers within industries because of the similar knowledge base of firms within the same industry. Learning between firms of similar knowledge leads to incremental, process innovation that increases productivity within the region. On the contrary, the *related variety* of economic activities begets spillovers between industries, because it is comprised of firms

with different (but not too different) productive knowledge. Learning between firms of related knowledge leads to more radical, product innovation, and causes regional employment growth through the establishment of new product markets.

Empirical evidence so far shows first that related variety has a positive effect on the growth of economic performance of regions, if this performance is measured with employment. Second, regarding the evolution of the regional economic structure over time, it has been demonstrated on a variety of data sources and spatial levels that those activities are more likely to enter regions, that are more related to the existing ones, while those tend to exit that are less related (for a literature review in Hungarian, see *Elekes 2016*).

These empirical works focus primarily on the endogenous sources of regional growth and diversification, and on the recombination of locally available capabilities. However it is an important question whether the growth and diversification of a region can be beneficially influenced by capabilities "borrowed" from other regions. Can access to extraregional capabilities make an economic structure feasible, that was unattainable based on local capabilities? Can it be a tool for decreasing spatial inequalities? Channels for extraregional capabilities include labour mobility (*Inzelt 2008, Neffke – Henning 2013*), access to interregional knowledge networks (*Varga 2007, Hau-Horváth et al. 2016, Varga – Sebestyén 2017*), import (*Marwah – Tavakoli 2004*), and the presence of foreign firms (*Young et al. 1994*).

In my dissertation I study the channels of foreign firms and import. Foreign firms are often considered key actors in regional economic development (*Inzelt 2008, Lengyel 2010, Pavlínek – Žížalová 2016*), however the probability, magnitude and accessibility of positive externalities stemming from their presence to the host economy are still heavily debated in the literature. Scholars argue that we are lacking systematic evidence on the spatial behaviour of these firms at the subnational level (*Beugelsdijk et al. 2010, Iammarino – McCann 2013*). I propose that the technological relatedness of foreign firms and the host economy mediate the potential positive externalities between them.

Hungarian regions are well suited for the purposes of this research as Hungary is a small, open economy where a large portion of *inputs* have to be imported (*Békés et al. 2013, Halpern et al. 2015*), and there is a considerable gap in performance and productivity between foreign and domestic firms (*Szanyi 2010*). The case of Hungarian regions is relevant not just for the Hungarian regional science community, but for other Central and Eastern European dependent market economies as well, where foreign firms are key actors in manufacturing (*Inzelt 2003, 2008, Nölke – Vliegenthart 2009, Lux 2017a, 2017b*). Additionally, as most

empirical evidence in evolutionary economic geography is on regions of developed economies, results of this research are also relevant for less developed economies where the local capability base to produce more complex products is less present (*Hausmann – Hidalgo 2009*). Finally, results of this research may prove useful to those regions of developed economies that face considerable challenges and erosion of the manufacturing capability base following the recession of 2008.

3. Structure of the dissertation, hypotheses and research methods

The dissertation consist of four chapters in addition to the introduction. The purpose of the *second chapter* is to offer a review and systematisation on the concepts used during the empirical research. The argumentation departs from the combination of capabilities into products, emphasising the technological relatedness of products, which is the measure of overlap between capabilities needed to produce different products. I show that the "product space", a tool for mapping the relatedness of products is an appropriate approach for mapping regional capability base in an indirect fashion. I then offer a review of the evolutionary economic geography literature on regional growth and diversification. Based on this I formulate general expectations on Hungarian regions. Finally, I propose that import and foreign firms can be considered channels through which Hungarian regions can "borrow" capabilities from extraregional sources. The most important contributions of this research are linked to these channels, thus I formulate my research hypotheses in this part. These hypotheses concern the employment of Hungarian regions (*Hypotheses 1-3.*), and the evolution of the export structure of these regions over time (*Hypotheses 4-6.*).

In the *third chapter* I study the link between regional employment in export and the technological relatedness of import and export, and the products of foreign and domestic firms. In this chapter I answer the *1st research question*, *i.e. how technological relatedness mediates regional growth through access to extraregional capability bases?* More specifically, I am interested in how technological proximity mediates the learning of domestic firms through importing, spillovers originating from foreign firms, and the access of foreign firms to extraregional capabilities. In order to do so I first present the data used in the research, and the process of sample selection. After that I detail the approach to the measurement of variety based on entropy-decomposition, a widespread operationalisation in the literature. I then present the econometric strategy of fixed-effect panel regression, and the

results of the empirical analysis. The chapter concludes with the discussion of the results, and with the proposition of theses. *Hypotheses 1-3.* are tested in this chapter, that are:

Hypothesis 1.: the related variety of import and export of domestic firms increases the regional employment of domestic firms.

Hypothesis 2.A.: the strong technological relatedness of the export of foreign and domestic firms increases the regional employment of domestic firms.

Hypothesis 2.B.: the technological relatedness of foreign and domestic firms increases the regional employment of domestic firms when these firms are importing.

Hypothesis 3.A.: the related variety of export of foreign firms does not increase the regional employment of foreign firms.

Hypothesis 3.B.: the related variety of import and export of foreign firms increases the regional employment of foreign firms.

In the *fourth chapter* I turn from the regional macro-level to the meso-level by analysing the link between the technological relatedness of import and export portfolios of foreign and domestic firms, and the emergence of new export products in regions. In this chapter I am looking to answer the *2nd research question*, *i.e. how import and foreign-owned firms influence the international trade diversification of Hungarian regions through technological relatedness?* More specifically, I study how technological relatedness of the import and export products of foreign and domestic firms affects the *retention* of export products already present in the region, as well as the emergence of export products *new to the region*. For this purpose I present in the data and sample selection for this empirical exercise, then a detailed description on the co-occurrence-based measurement of technological proximity, as well as on the chosen econometric strategy of linear probability OLS estimation are given. After presenting the results of the study, the chapter concludes with a discussion of these results, and with proposing theses. *Hypotheses 4-6.* are tested in this chapter, which are:

Hypothesis 4.A.: the regional presence of related products exported by domestic firms increases the probability of retaining a product in the regional export portfolio of domestic firms.

Hypothesis 4.B.: the regional presence of related products exported by foreign firms does not increase the probability of retaining a product in the regional export portfolio of foreign firms.

Hypothesis 5.A.: the regional presence of related products exported by domestic firms increases the probability of appearance of a product in the regional export portfolio of foreign firms.

Hypothesis 5.B.: the regional presence of related products exported by foreign firms increases the probability of appearance of a product in the regional export portfolio of domestic firms.

Hypothesis 6.A.: the regional import of products related to the export of domestic firms increases the probability of appearance of a product in the regional export portfolio of domestic firms.

Hypothesis 6.B.: the regional import of products related to the export of foreign firms increases the probability of appearance of a product in the regional export portfolio of foreign firms.

Finally, in *chapter five* I review the results of the thesis deemed most important, and make an attempt to formulate policy conclusions based on them. At the end of the chapter I offer three avenues for further research that, by extending the methods and results presented here, can contribute further to both the Hungarian and the international literature.

I analyse the significance of extraregional capabilities in regional employment and diversification on a sample of 75 Hungarian microregions between 2000 and 2011. The number of microregions included in the study is less than the theoretical maximum, thus my results are valid only for those regions, that showed some level of concentration in terms of international trade during the period in question. However my research aims concern precisely these regions. Like other related empirical studies, I limit the analysis to

manufacturing industries because of the available data. In the empirical parts I rely on a firm level panel microdata provided by the Hungarian Central Statistical Office, containing information on firms operating in Hungary that are using double-entry bookkeeping. Available information includes the location of the company seat, the NACE classification of the main activity, the product composition of the international trade portfolio in SITC classification, and the ownership composition of the firms' total equity capital. For mapping the technological relatedness of products in international trade, I also use a publicly available dataset containing data on international trade volumes between countries by SITC products detailed at the four-digit-level. For the empirical analysis I use a fixed-effect panel regression for studying the link between variety and regional employment in export, while a linear probability OLS-model is used to study regional diversification patterns. Robustness checks for each study are also presented.

4. Main findings

Concerning the *1ˢᵗ research question*, focusing on the link between regional employment in export and the international trade portfolio of Hungarian microregions, I found in general that the variety of export activities offered positive externalities for firms in the region in the context of a dependent market economy as well, if these activities were technologically related. While this was expected based on the empirical literature of related variety, studying this phenomenon in a different empirical setting strengthens the external validity of previous research as well. Furthermore, I found that the context of dependent market economy, the distinction between foreign and domestic firms, and the inclusion of import in the analysis of accessing extraregional capabilities offers additional insights on the economic significance of related variety. I present the results of my research in three groups according to whether the mediating role of technological relatedness in agglomeration externalities presents itself in the host economy, among the foreign firms, or between the two. I draw my conclusions in line with this grouping.

First, horizontal spillovers from the related variety of export are mostly observable within the host economy of regions, *i.e.* domestic firms are successful in recombining the local capability base, which points at potential knowledge spillovers between them. These horizontal spillovers contribute to regional employment in export. As for the access to extraregional capabilities, participation in international value-chains through import offers an important channel for new knowledge for domestic firms in regions. For this reason it is

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beneficial for regional employment if import goes through the host economy, most likely inducing learning-by-importing among domestic firms. This is plausible as 75% of manufacturing export in Hungary consists of intermediate and capital goods, meaning that they are part of an international value-chain (*Békés – Muraközy 2016*). Additionally, a considerable portion of inputs comes from import (*Békés et al. 2013*). The mediating role of technological proximity can been found in learning-by-importing when import and export have more potential connections, have a wider platform for exchange, and there are more opportunities in the recombination of productive knowledge behind them. Then this learning is more conducive of regional employment (*Thesis 1.*).

Thesis 1.: the related variety of import and export of domestic firms increases the regional employment of domestic firms.

Another potential method for accessing extraregional capabilities for the host economy is the presence of foreign firms. The literature attributes importance to *spillovers between foreign and domestic firms* in regional growth. Based on my results we can primarily expect horizontal spillovers between the export of the two groups of firms in a region when there is an extreme strong technological proximity between them. That is, in order for the host economy to get access to the capability base of foreign firms, and to receive spillovers from them, there is a need for stronger technological relatedness (*Thesis 2.A.*), compared to spillovers within the host economy.

Thesis 2.A.: the strong technological relatedness of the export of foreign and domestic firms increases the regional employment of domestic firms.

It is plausible that this is due to the technological gap between foreign and domestic firms in Hungary, as the cost of combining local and non-local capabilities is further increased by this gap beyond the cost of innovation. For this reason my results suggest that the host economy can hope for more incremental learning opportunities from the presence of foreign firms. This conclusion in in line with the fact that domestic firms receive productivity spillovers from foreign firms, especially if the domestic firms are more productive than their peers (*Békés et al. 2009*), and there is stronger geographical proximity between foreign and domestic firms (*Halpern – Muraközy 2007*).

There is merit in further refining these findings by considering the two channels of extraregional capabilities, import and foreign firms together. It turns out that if foreign firms import, then there is again a need for stronger technological relatedness between foreign and domestic firms for the latter group to receive positive spillovers. That is, excluding learning-by-importing leads to a similar situation as we have seen in the case of horizontal spillovers between export activities, where the foreign-domestic technological gap can be bridged by stronger relatedness. However, in the case of import-export relatedness, vertical spillovers may get a bigger role, and my conclusion on stronger relatedness can be extended to these cases as well. In addition to this, if domestic firms import, they become capable of benefiting from the presence of foreign firms with related export activities as well. This suggests that learning-by-importing can *counteract* the foreign-domestic technological gap, meaning that in this case domestic firms can receive spillovers from weaker technological proximity of foreign firms as well (*Thesis 2.B.*).

Thesis 2.B.: the technological relatedness of foreign and domestic firms increases the regional employment of domestic firms when these firms are importing.

In all likelihood, vertical spillovers have a significant role in this case as well, especially becoming a supplier of foreign firms, which, besides the own experience of domestic firms in international markets in importing, links them to the international value-chains of foreign firms as well. This means that they get access to both channels of extraregional capabilities and are successful in combining them.

Finally, from the perspective of the regional economy it is important, that *foreign firms* themselves by their nature have access to extraregional capabilities on their home bases and other branches. Based on my results it seems that foreign firms do not rely on horizontal spillovers among their export activities in regions, most likely because the search routines of multinational firms are often governed from outside the host region, from the home base of the firm (*Nölke – Vliegenthart 2009*). Thus it seems that technological relatedness does not structure the learning of foreign firms among themselves, and these firms do not seek primarily these recombinatorial options in dependent market economies (*Thesis 3.A.*).

Thesis 3.A.: the related variety of export of foreign firms does not increase the regional employment of foreign firms.

Contrary to horizontal externalities, the import of foreign firms is a considerable channel for accessing extraregional capabilities for them, which comes from participating in international value-chains. Technological relatedness mediates the benefits from new capabilities from import, as the related variety of import and export of foreign firms, showing a larger overlap of capabilities is needed for import to be beneficial for regional employment of foreign firms (*Thesis 3.B.*). This leads to the conclusion that the primary channel for foreign firms to access extraregional capabilities, besides their home base, is import, and not the mere presence of other foreign firms.

Thesis 3.B.: the related variety of import and export of foreign firms increases the regional employment of foreign firms.

This seems logical, as individual foreign firms may face difficulties in accessing each others non-local capability bases. At the same time, the existing local capability base is more easily accessible for them even if it is linked to firms of the host economy. The fact that related export variety as well as the import variety related to export in the host economy are both beneficial for foreign firms points to this. Furthermore, unrelated variety within the host economy also begets horizontal spillovers for foreign firms. The latter shows that foreign firms are able to combine even unrelated local capabilities with their own.

Regarding the *2nd research question* on the evolution of international trade portfolios of Hungarian regions, I found that, in general, related diversification happens in these regions as well, meaning that we can expect new products to appear in Hungarian regions if they are related to the existing portfolio of products. It seems so that the structure of the local economy changes through the successful recombination of existing local capabilities. I examined the retention of existing products and the development of new ones separately, and found that the presence of related products in the host economy, as well as in the group of foreign firms was significant in both cases. This highlights the fact that technological relatedness plays a role in both evolutionary processes of variation and retention at the regional scale.

In terms of *variation* this is an important finding because, based on the literature reviewed, the long-term success of regions hinges to a considerable degree on their capacity to extend local economic variety through new economic activities. Complementing and going beyond total factor productivity, this variety offers growth potential to places. In terms of *retention*, it is also important because it shows the robustness of the structure of the local economy and the local capability base behind it. The two mechanisms show the path-

dependent nature of regional economic evolution, *i.e.* that the current capability base limits the range of attainable future capability bases and feasible economic structures as well.

Since, based on the literature, the size of the local capability base is more or less constant over time, and it is specific to the individual region, it can be seen that the success of regions depend not only on the fact that new activities appear, but also on the content of these new activities. If the related diversification of regions strengthens the positions of a region on the periphery of the product space, this can hinder the capacity of these regions to upgrade into more complex products, representing more value-added. Thus it can lead to the lock-in of regions.

The relative stability of the size of the local capability base accentuates that there may be an important role to be played in diversification by capabilities "borrowed" from outside the region *via* the channels of foreign firms and import. These extraregional capabilities can extend the range of possible activities attainable for regions, however they must be combinable with local capabilities already present. I contribute to the related empirical literature primarily by focusing on these channels. The conclusions drawn here are grouped by whether they concern the mechanism of retention or variation

Concerning the mechanism of *retention*, I showed that it is determined primarily by the local capability base of domestic firms, while the stability of the export portfolio of foreign firms does not depend on this (*Theses 4.A.* and *4.B.*).

Thesis 4.A.: the regional presence of related products exported by domestic firms increases the probability of retaining a product in the regional export portfolio of domestic firms.

Thesis 4.B.: the regional presence of related products exported by foreign firms does not increase the probability of retaining a product in the regional export portfolio of foreign firms.

These results highlight the relevance of the dual nature of the Hungarian economy in regional export diversification. If one considers the capability base of the host economy to be the locally available capability base, then this result shows that foreign firms are less embedded in the economy of the host region in terms of retaining their existing economic activities.

As for the mechanism of *variation*, the finding of this research deemed most important is that the capability bases of the two firm groups complement each other when it comes to diversification into new products. That is, a new product is more likely to appear in the

regional export portfolio if both foreign firms and the host economy possess related capabilities (*Theses 5. A.* and *5. B.*).

Thesis 5.A.: the regional presence of related products exported by domestic firms increases the probability of appearance of a product in the regional export portfolio of foreign firms.

Thesis 5.B.: the regional presence of related products exported by foreign firms increases the probability of appearance of a product in the regional export portfolio of domestic firms.

This leads to the conclusion that the combination of the capabilities of foreign firms and the host economy is an important driving force of regional export diversification. Based on the results, this possibility for novel combinations complements the diversification based on the own capability base of each firm group, which driver of diversification is also present in Hungarian regions. It seems that while the separation of foreign firms and the host economy in terms of retention of the capability base is observable, further regional economic evolution is also affected by the relationship of the two. In so far as foreign firms channel extraregional capabilities, these capabilities have an effect on regional export diversification.

Finally, I found the effect of import on export diversification primarily in terms of variation, as related import contributed to diversification into new export products within the host economy (*Thesis 6.A.*). This suggests, that the earlier results on the benefits of import for the export employment level in the host economy are also present in terms of regional diversification. That is, these benefits increase the probability of a new export product appearing in the region and to some extent the retention of existing export products as well. Related import also played a role in the evolution of the regional export portfolios of foreign firms, supporting the emergence of new export products (*Thesis 6.B.*).

Thesis 6.A.: the regional import of products related to the export of domestic firms increases the probability of appearance of a product in the regional export portfolio of domestic firms.

Thesis 6.B.: the regional import of products related to the export of foreign firms increases the probability of appearance of a product in the regional export portfolio of foreign firms.

Besides this, the related import of domestic firms also helped the regional export diversification of foreign firms, most likely through value-chain relations. This underlines that

while foreign firms are channels for accessing extraregional capabilities for regions, they themselves use import as a channel to "borrow" capabilities from outside the host region.

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