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COMPETITIVENESS OF A CATCHING-UP ECONOMY IN THE ERA OF GLOBALISATION: EVIDENCE FROM THE NEW EU MEMBER STATES



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INTRODUCTION

This monograph focuses on two relevant topics of modern economics: national competitiveness and sustainable integration of catching-up economies within the network of global interconnections.

The concept of national competitiveness is an ambiguous area at the intersection of the theories of growth, development and foreign trade. Over the years, this controversial topic has been the subject of much political and academic discussion, with main disputes focusing on definitions, models and measures of competitiveness on the national level. In this study, we broaden the cost-based trade perspective and define national competitiveness as the ability to reach developmental goals in the era of globalisation. We further categorise these goals as instrumental (understood as evolution of trade structure towards high-tech specialisation that enables economic growth, measured by GDP per capita) and fundamental (reflecting socio-economic development without environmental degradation, measured by “beyond GDP goals”).

Researchers share the opinion that technological change constitutes one of the fundamental driving forces of economic growth, and thus, in our understanding, sustainable national competitiveness. However, it is recognised that in the era of globalisation, innovation is not solely generated by individual companies but it can also result from international cooperation. In this context, Foreign Direct Investment (FDI), one of the major channels through which technology and know-how are circulated on a global scale, gains particular importance.

In the process of building their strong competitive positioning, small catching-up economies – characterised by limited economic and technological potential – have a particular interest in gaining access to the resources of multinational enterprises. Due to supply and demand constraints, these economies are forced to actively seek opportunities in the external environment, mainly through integration within the global economy. Thus, the main goal of our research is to assess the role of internationalisation of a catching-up economy in shaping its long-term competitiveness.

This monograph aims to contribute to the international discussion on the topic that is crucial from the point of view of catching-up economies in the era of globalisation. We exemplify catching-up economies with the New EU Member States (NMS, EU-10 or

– in a few partial analyses – four Visegrád countries, V4, or Central and Eastern European countries, CEE), that accessed the EU in the years 2004 and 2007. We pay particular attention to the NMS because of their unique economic heritage and developmental path. All countries in this group were dealing with the communist past in the process of transition “from plan to market”. They had to rebuild their institutions, economic policies as well as to reshape the behaviour of producers, consumers and public authorities. They also had to undergo the process of adjustment to the EU rules and standards before accessing the grouping. The NMS started their way to the market economy with ineffective institutions, relatively outdated economic structures, tendency to autarky and with constrained economic ties determined by central planning rather than the actual economic interests.

Over 15 years after the accession, the NMS are much further on their developmental path and it is reasonable to expect them to continue climbing the innovation ladder and converging to the most advanced EU members. Nevertheless, in this monograph, we stress that for these countries reaching high levels of sustainable competitiveness may constitute a particular challenge, due to their current export specialisation structure – mainly in the resource- and labour-intensive industries.

Since we define competitiveness as the ability to achieve developmental goals, we propose a set of objectives of a competitive catching-up economy (in relation to growth, trade volume and trade structure) and benchmark the performance of the EU-10 against these predefined criteria. We assume that the most competitive economies are these that are the best/fastest in achieving their goals and converging to the pattern of the most developed European economies (e.g. in our analyses Germany was set as a benchmark). We focus on the NMS, complementing the analyses with further global examples to demonstrate the interconnections between competitiveness and internationalisation.

Our project lasted over four years and the research was based on numerous databases, including the data from various years in order to cover the longest possible period. However, as specific sectoral data were used e.g. in the calculation of Porter’s diamonds and our partial analyses were conducted sequentially in different years, we were forced to use different time-series in various parts of our research due to the limited availability of data. Even when discussing similar phenomena, we sometimes used different periods of analysis for e.g. exports statistics at different levels of aggregation. Nevertheless, all our partial analyses took into consideration the year of the EU accession of 8 out of 10 countries we analysed (2004). All analyses include the years of the last global economic crisis (2008-2009) and the years of recovery (usually until 2014; in the case of the most disaggregated data on the automobile industry until 2011). Despite the time heterogeneity, we think that our research will shed new light on the problem of competitiveness of a catching-up economy. We have been systematically publishing

our research results in Polish and international journals, with this monograph being a compilation of the most important findings.

The developed conceptual frameworks are the result of critical analysis of the Polish and international scientific literature and are based on the main conclusions drawn in the research process. We cite the respective literature sources chronologically to stress the pioneer works first, and then to mention the successors, followers and those who built-up on the achievements of predecessors but considerably extended their works. Sometimes, when citing short papers, or when the approach to the problem was scattered across a large number of pages, we resigned from the citation of specific pages, suggesting the reader should study the whole text.

This monograph is addressed to the researchers studying theoretical and empirical aspects of competitiveness as well as to those interested in the developmental problems of the NMS. Furthermore, with the best practice examples and policy recommendations we want to attract the attention of politicians and students of all degree levels pursuing economics and management.

Our monograph is structured as follows. In Chapter 1, we discuss the concept of competitiveness of a national economy and interlink it with disaggregated competitiveness at the sectoral and firm level. We present an interdisciplinary model as well as approaches to how measure and shape competitiveness. In Chapter 2, we discuss developmental constraints of catching-up economies and investigate in how far integration within the network of international interconnections enables overcoming these barriers and enhancing competitiveness. A particular focus is laid on the role of FDI in shaping long-term competitiveness of a small catching-up economy – this relation is exemplified with the case studies of Ireland and Singapore. In Chapter 3, we analyse the competitiveness evolution of NMS treated as catching-up economies. Basing on the suggested competitiveness model, we investigate the ability of the NMS to achieve their developmental goals: welfare, exports volume and structure as well as innovative capabilities. In Chapter 4, we evaluate the role of foreign direct investment in shaping competitiveness and innovativeness of a catching-up economy exemplified by the NMS or their representatives (Poland). The monograph is concluded with the main research project findings.

NATURE, MODELS AND STRATEGIC FRAMEWORK OF COMPETITIVENESS

The transformative potential of the third industrial revolution (Schwab 2016), together with falling trade and investment barriers, changed the rules of the competitive game: making it more fierce and borderless (Zahra 1999; Porter, Rivkin 2012). The emergence of global markets was driven by a rising power of a new breed of powerful actors: the multinational enterprises (Dunning, Lundan 2008). Advanced resources and a large scale of activities allowed them to significantly increase the levels of international competitiveness and generate high profits at a cost of the companies that did not manage to establish their positions in the new hypercompetitive environment (D'Aveni 2010).

These developments in the international business reality fueled discussions about the nature of competition on the macro level in times of globalisation. It became visible that some countries outperformed others thanks to a large scale of exports, and thus better integration of selected industries within the global economy (Baily 1993; Papadakis 1994; Waheeduzzaman 2011, p. 111; Porter, Rivkin 2012). A considerable interest of policy makers and business strategists and a resulting popularity of this topic – also in the media (Thompson 2004, p. 197) – inspired debates amongst scholars about the nature and the very sense of discussing the competition between the nations in the academia (Krugman 1991b, 1996).

Rooted in controversies, macro competitiveness became a broadly covered, but not clearly defined, research area. Difficulties in grasping this phenomenon led to confusion in its modelling and measuring (Dunn 1994; Waheeduzzaman, Ryans 1996; Olczyk 2008; Berger, Bristow 2009; Siggel 2010; Misala 2011) – leaving space for further interdisciplinary studies. Despite the definitional ambiguities, a consensus on the nature of the international competitiveness has been reached: it should be seen as a multi-dimensional concept and

analysed at different levels of aggregation (Berger 2008; Daszkiewicz 2008): company level (micro), industry/cluster level (mezo) and national level (macro)¹.

This chapter addresses the concept of international competitiveness mostly at the national level. Based upon the originally developed taxonomy, we propose an interdisciplinary, multi-layered model of international competitiveness (Subchapter 1.1). In Subchapter 1.2 we discuss approaches to measure the competitiveness of national economy in the settings of the World Economic Forum (WEF) and the Institute of Management Development (IMD). Subchapter 1.3 concentrates on controversies over the concept of national competitiveness. Following the latest research trends, we extend the debate to the interconnections between national competitiveness and sustainability to show that these concepts do not necessarily have to be “foes”. Finally, in Subchapter 1.4, we analyse selected strategies to increase the competitiveness of countries on different levels of development.

1.1. A taxonomy of international competitiveness

A broad variety of approaches to defining and modelling international competitiveness can be found in the scientific literature across various disciplines: from strategic management to trade theory to developmental economics². Scientists study competitiveness through the lens of one of these fields or attempt to connect insights in a multidisciplinary manner (e.g. Martin 2005; Cho, Moon 2008). A number of perspectives stimulate the scientific research but at the same time confuse the public debate with simple analogies between companies, industries and nations. This may lead to the misinterpretation of reality and/or inspire counter-productive policies – the fact famously referred to by Krugman (1994) as a “dangerous obsession”. In this subchapter, we aim at sorting out various definitions of competitiveness.

1.1.1. In search of definitional consensus on international competitiveness

We are presenting a systemic definitional overview with the aim to develop a taxonomy of competitiveness. In order to achieve this research objective, we address competitiveness at the micro-, mezo- and macro-levels, classifying the sources of international competitiveness for each level of analysis. We distinguish three types of variables: a national economy, an

¹ Some researchers extend the international competitiveness analysis to the “mega” level, referring to relative performance of trading blocks and integration groupings within the global economy (Cho 1998). An in-depth original discussion on the aggregation levels of competitiveness can be found in Žmuda (2017).

² An original discussion on the taxonomy of international competitiveness is presented in the research paper by Žmuda (2017).

industry, and a firm. Inspired by the two-dimensional classification (level of analysis and the variable) by Chaudhuri and Ray (1997), in Table 1.1, we propose our approach to the identification of ten main perspectives on international competitiveness present in the literature. The macro level of the international competitiveness analysis, encompassing literature in categories 1–4, deals with the key issues of growth theory and is rooted in the question: why some countries outperform others.

Table 1.1. Ten approaches to analyse international competitiveness

Analysis Level	Analysis focus	Variable	Analysis Category	Analytical approach
Macro	Evaluation of competitiveness of a national economy	National economy	1 Macro – Macro	Competitiveness as the ability of a nation to grow in GDP terms
		National economy	2 Macro – Macro	Competitiveness as the ability of a nation to develop sustainably in beyond-GDP terms
		Industry	3 Mezo – Macro	Competitiveness of a nation as a sum of competitive industries/clusters: ability to increase productivity through innovation, resulting in structural adjustments (evolution of RCA toward high-tech specialization)
		Firm	4 Micro – Macro	Competitiveness of a nation as a cumulative ability of firms acting within the national boundaries to compete on global markets (domestic market share, export performance)
Mezo	Evaluation of competitiveness of industries/ clusters as platforms for innovation, stimulating national competitiveness	National economy	5 Macro – Mezo	Territorial and institutional factors shaping the emergence of clusters (new economic geography; institutional economy)
		Industry	6 Mezo – Mezo	Sectoral factors shaping the emergence of clusters (Porter’s diamond of competitive advantage and its extensions)
		Firm	7 Micro – Mezo	Firm-level characteristics, determining diffusion of knowledge and creation of innovation within clusters
Micro	Evaluation of competitiveness of firms as building blocks of competitive clusters and nations	National economy	8 Macro – Micro	Political, legal, and socio-economic factors shaping the ability of a company to achieve above-average returns (institutional perspective on business)
		Industry	9 Mezo – Micro	Sectoral factors (“Porter’s 5”) shaping the ability of company to achieve above-average returns (industrial-organization perspective)
		Firm	10 Micro – Micro	Resources and activities creating core competencies as a base for above-average returns (resource-based view on a firm)

Source: own elaboration based on Chaudhuri and Ray 1997, pp. M – 85.

A wide body of literature in category 1 deals with competitiveness understood as a national ability to grow in the conditions of a global economy, evaluated through a macroeconomic lens in a growth accounting manner. Main determinants of macro-competitiveness in this approach, expressed in the GDP per capita terms, include exchange

rates and interest rates (Zorzi, Schnatz 2010), capital investment (Landau 1990), economic freedom (Bujancă, Ulman 2015) or quality of institutions (Huemer et al. 2013). To some researchers, competitiveness is a function of cheap and abundant labour and/or available resources (Huggins, Izushi 2015). Leading competitiveness reports, based on complex benchmarking of economy-wide indicators (Global Competitiveness Report (GCR) by WEF and World Competitiveness Yearbook (WCY by IMD) emerge from this category (Radło 2008, pp. 6–7). They sum up the performance of individual indicators into one overall tier to achieve transparency and comparability across the analysed countries (Ketels 2016, p. 29).

Over the last years, as scholars stressed the necessity of finding a balance between actions aimed at boosting national productivity levels, responsible use of natural resources and strengthening of social welfare (Samans et al. 2015; Thore, Tarverdyan 2016), the macro-competitiveness discourse was enriched by the socio-environmental aspects – also in the understanding of GCR and WCY. These goals in the “beyond-GDP terms”, together with the strategies to address them, form main research areas of category 2 in the sustainable national competitiveness discourse. The focus lies here on institutions and their efforts to shape conditions supportive of the sustainable competitiveness of a nation: productivity enhancements, environmental conditions, socio-political stability and development of human resources (Doryan 1993).

Researchers agree that labour productivity, through its impact on the efficiency of production processes and production costs (Auzina-Emsina 2014) constitutes one of the major determinants of the competitiveness of a nation³. As studies reveal significant variations in the productivity across regions and industries (Gugler et al. 2015), considerable research attention was laid on the identification of innovative clusters of related companies and industries operating within a given location and evaluating their importance in shaping national competitiveness (Delgado et al. 2014). Consequently, category 3 deals with macro-competitiveness, evaluated through benchmarking the profitability of industries and/or groups of industries in the national and cross-national perspective (Johnston, Chinn 1996). What is more, in this discourse, reaching back to the evolutionary economics, scholars associate industrial ability to compete with exports specialisation patterns (Castellacci 2008). In this view, national competitiveness is defined as the ability to adjust the export structure to global trade trends through evolution of specialisation towards advantages based on knowledge and innovation (Wysokińska 2012). This approach stresses a close relationship between the ability to innovate, productivity and trade, associating the long-term competitiveness with structural characteristics of the economy.

³ According to Krugman (1996), this is actually the only meaningful way of discussing competitiveness on the level of national economy.

The evolution of productivity and trade structure begins with the efforts at the level of a single firm. Hence, category 4 analyses the national competitiveness from the perspective of the cumulated micro-success of internationally competitive companies (Chesnais 1986). In this perspective, the relative economic success of a country is reflected in the share of domestic firms in the total consumption of a particular good or category of goods (the market). This success can be evaluated through the domestic market lens (reflected in domestic market shares or import penetration rates) and/or through the global market lens (reflected in the exports volumes of the domestic companies) (Papadakis 1994, 1996).

There is a general consensus that competitiveness of a nation is stimulated by its capability to innovate (Fagerberg 1988; Dosi, Soete 1991; Faucher 1991; Castellacci 2008; Atkinson, Ezell 2012; Pelagidis, Mitsopoulos 2014). In the era of increased flows of production factors (including flows of ideas), the generated innovation does not have to be based on the efforts of single, domestic companies but may result from the emergence of networks between domestic and foreign companies (Roper, Hewitt-Dundas 2015). As multinational enterprises are continuously spreading their value chains across locations around the world, destinations with particular locational advantages emerge (Gugler et al. 2015), creating platforms for intensified technological cooperation. In this way, clusters are born, as geographically concentrated companies within a certain industry and/or group of industries (Delgado et al. 2014). The clusters as centres of excellence enable forward, backward and horizontal innovation flows (Huggins, Izushi 2015), providing a basis for development of a knowledge-economy, thus enabling an upgrade of a host country within the global value networks (Fundeanu, Badele 2014). Emerging from the cluster theory, the mezo-level of international competitiveness analyses clusters as drivers of national competitiveness through linkages and spillovers of information, skills and technology across firms and industries (Huggins, Izushi 2015). As there is a wide spectrum of approaches to understand the factors determining the emergence of clusters, literature categories 5–7 have been introduced to group them.

Category 5, within the theory of new economic geography, concentrates on the locational advantages which determine the emergence of clusters. In the 1990s, researchers from the Krugman's school (1991a) "rediscovered" geography as a factor determining trade specialisation (Tingvall 2004, p. 667). In this discourse, industrial linkages, combined with increasing returns to scale (IRS) and decreased transportation cost – support emergence and development of clusters (Tingvall 2004). Reaching to the evolutionary economics, spatial collective learning in the regional context and the spatial connotation of IRS can be explained (Boschma, Lambooy 1999). This observation is of particular importance for tracing the motives behind the ever increasing "slicing" of the activities of multinational enterprises in search of the optimal locations for particular activities along their value chains (Buckley, Ghauri 2004; Ottaviano, Puga 1998; Redding 2010). As firm-

specific assets become increasingly mobile across the borders within the global economy (Dunning 1998), locational advantages help to better understand new developments in international business.

Inspired by studies of economic geographers, Porter (1990) developed a comprehensive, interdisciplinary framework to indicate the reasons behind the economic success of countries, embodied in the concept of “competitive advantage of a nation”. In his research, Porter showed that the forces determining national competitiveness are not equally divided but rather “clustered within particular regions within national economy”. Based on this observation, he developed a diamond model as a set of self-reinforcing conditions for a long-term productivity growth of companies, acting within internationally competitive industries. The systemic nature of the diamond model focuses on the nature of the business environment, stressing the importance of horizontal and vertical linkages between companies within industries, thus highlighting the importance of clusters (Huggins, Izushi 2015). Porter’s study sets the basis for research in category 6, concentrating on sectoral characteristics that shape the success of companies as a part of an internationally competitive industry/cluster.

In this popular discourse, numerous researchers focused on adjusting the diamond model to specific characteristics of the analysed countries, taking under consideration developments of the global economy. Dunning (1993) stressed the importance of globalisation and the emergence of global value networks, suggesting the inclusion of multinational enterprises as an external factor influencing the national competitive advantage. The growing importance of internationalisation was supported by further studies on the diamond, resulting in numerous extensions of Porter’s framework (Bellak, Weiss 1993; Cartwright 1993; Hodgetts 1993; Rugman, Verbeke 1993). The most comprehensive approach was suggested by Moon, Rugman, and Verbeke (1995) in the concept of the generalised double diamond. Their model was applied by many researchers to highlight the role of international interconnections in shaping competitive advantage of small, catching-up economies (Liu, Hsu 2009; Postelnicu, Ban 2010; Molendowski, Żmuda 2013).

Research shows that the emergence of clusters enables flows of ideas within the cluster, an accelerated learning process and spatial knowledge creation. Consequently, clusters and other forms of inter-firm collaborations may improve firms’ absorptive capacity in the process of coevolution with their knowledge environment (Lewin, Volberda 1999; Van den Bosch et al. 1999). Research within category 7 deep-dives into the process of knowledge diffusion and innovation creation in the regional and global perspective, concentrating on firm-level characteristics. It indicates diverse organisational determinants of absorptive capacity: level of prior related knowledge (Cohen, Levinthal 1990), organisation forms and combinative capabilities (Van den Bosch et al. 1999; Runiewicz-Wardyn 2012), or the importance of micro-interlinkages within the clusters (Fundeanu, Badele 2014). Evidence

shows that cluster participation stimulates the learning process and, together with the emergence of global pipelines of knowledge communication, creates a set of advantages not available for cluster outsiders (Bathelt et al. 2004).

The micro-level of the international competitiveness focuses on firms as building blocks of industrial and national competitiveness. International competitiveness is understood here as the ability of a single company to achieve and sustain above-average returns in the global markets. Competitive advantage stems from the ability of a company to create value for its customers that exceeds the costs of generating this value (Porter 1985). In the strategic management discourse, investigation of sources of the micro-competitiveness constitutes one of the most prominent research areas – with three main theoretical perspectives: institution-based (macro-view within category 8), industrial-organisation (mezo-view within category 9), and resource-based perspective, enriched by the notion of dynamic capabilities (micro-view within category 10).

Companies do not exist in a vacuum – they are surrounded by diverse environmental forces that impact their performance (Kolasiński 2012). The higher the level of unpredictability of the external environment, the higher the operational risk – resulting in a lower willingness to commit to long-term investments. This observation constitutes the basis for studies within category 8: the institution-based view of a firm. Departing from the metaphoric “rules of a game”, North (1990, p. 3) defines institutions as “humanly devised constraints that shape human interaction (...) and structure incentives in human exchange, whether political, social, or economic”. The institutional perspective is related to the transaction costs theory (Williamson 1981) and assumes that costs associated with making an economic exchange of any kind are high when institutions do not constrain and eliminate opportunistic behaviours of market players. In consequence, the stronger the institutions, the lower the operational risk and the higher trust in business contacts. Stable institutional conditions encourage long-term investment (Wojtyna 2008), which leads to higher productivity and ultimately supports reaching developmental goals.

The literature in category 9 points out a dominant impact of the industry environment on the company’s ability to achieve above-average returns (Porter 1981). The industrial organisation (I/O) model assumes that within respective industries, firms are endowed with comparable resources and follow similar strategies. As the resources are highly mobile across firms, managers identify an industry with the highest potential for above-average returns through the analysis of its structural characteristics. In the most popular analytical model, attractiveness of an industry is evaluated through the prism of the five forces: bargaining power of buyers, bargaining power of buyers and suppliers, competitive rivalry, market entry barriers and product substitutes (Porter 1980). The I/O perspective occupies a prominent position in the strategic management research with diverse approaches to conceptualise industrial environment, providing evidence

on how industrial characteristics influence the profitability of firms (Dess et al. 1990; McGahan, Porter 1997; Sharp et al. 2013).

The debate on sources of company's competitive advantage was further extended by the resource-based view, within category 10. In this perspective, researchers argue that a firm's above-average profitability is determined by its unique resources, capabilities and organisational processes (Barney 1986; Conner 1991; Mahoney, Pandian 1992; Wernerfelt 1984). It is assumed that firms emerge as homogenous entities, but as they grow, they develop distinct bundles of tangible and intangible resources that constitute a basis for their ability to outperform the competitors (Wernerfelt 1995; Rumelt 1997). These valuable and rare skills and resources are embodied in their core competencies: "collective learning in the organisation, especially how to coordinate diverse production skills and integrate multiple streams of technologies" (Prahalad, Hamel 1990, p. 81). The concept of core competencies provides a theoretical basis for the strategic actions aimed at reaching corporate developmental goals (increasing long-term-profitability).

1.1.2. Systemic international competitiveness

Basing on the presented approaches to defining international competitiveness, in this section, we introduce a comprehensive model of international competitiveness. To grasp the very sense of the concept of "systemic competitiveness", we reach back to the roots of micro-competition in the theory of strategic management and extend it to mezo- and macro-levels. With this logic, we aim at highlighting that the macro competitiveness is not only a sum of its micro- and mezo-parts, but also a system of their interconnections.

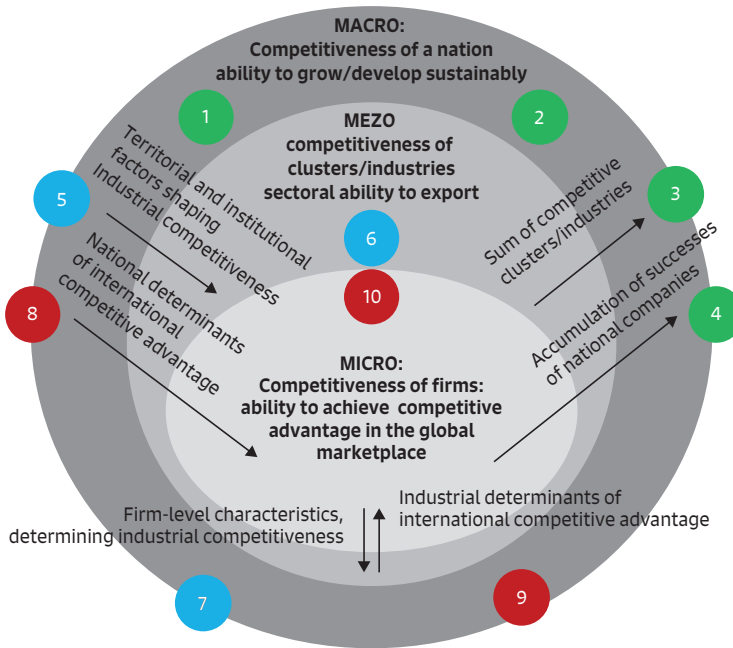
The origins of the competitiveness debate can be traced back to the theory of strategic management and the concept of competitive advantage, popularised by Porter (1985). "Competitive advantage is at the heart of a firm's performance in the competitive markets", and is determined by the appropriateness of the activities contributing to the company's performance (Porter 1985, pp. 1–2). Competitive advantage is a result of the implementation of the strategies that competitors are unable to duplicate or find too costly to imitate. Flint (2000, p. 123), aiming to grasp the sense of "sustainable competitive advantage", stresses its "reference to a contest which results in an achieved goal consisting of some form of superior reward, be it financial or non-financial in nature".

We follow this logic. International competitiveness is defined in our research as the ability of an economic agent⁴ to reach developmental goals. In the systemic competitiveness,

⁴ Following Chesnais (1991, p. 144), we assume the "existence of an active *economic agent* (a "subject" of the economic process) that makes choices, defines strategies, and seeks to control variables". At the company level, there are no concerns about this logic, embodying the agent in the person of a strategic manager. However, moving to the mezo- and macro-levels of the national economy, the ability to achieve goals implies an active role of governments,

this means that competitiveness of a system is enabled by bundled, self-reinforcing abilities. This understanding of competitiveness as set of abilities can be traced back e.g. to the works by Trabold (1995) and Relijan et al. (2000).

Figure 1.1. Competitiveness Onion: a multi-layered model of international competitiveness



Source: own elaboration based on Chaudhuri, Ray 1997, p. M – 85.

However, the goals differ on every aggregation level of international competitiveness (micro, mezo and macro). The goal of the company is to achieve above-average returns in the international markets through offering products that competitors find too costly to imitate (cost-leadership strategies) or impossible to duplicate (differentiation strategies) (Porter 1985). Sectoral/industrial competitiveness is understood as the ability of industries to compete with their foreign counterparts (Castellacci 2008), reflected in growing shares of domestic industries in the world exports (Cohen, Zysman 1988), and through increasing levels of technological advancements and productivity (Castellacci 2008). The ultimate goal of a competitive economy is to grow and enable high and sustained living standards for its citizens (Porter 1990; Porter, Rivkin 2012), additionally stimulated by

through industrial and technological policies. Chesnais (1991, pp. 144–145) stressed that this depends on the ability to establish cooperative agreements between the state and the business world: leading to a win-win situation from all three perspectives: of a company, industry and a state. As the goals of the economic agents at each level are not mutually exclusive, international competitiveness constitutes a multidimensional phenomenon.

efforts to increase attractiveness of a given location for mobile (both domestic as foreign) factors of production.

Following this logic, in the model presented in Figure 1.1, international competitiveness is evaluated from several perspectives as “a cause, an outcome and a means of achieving” goals at each of the aggregation levels (Waheeduzzaman, Ryans 1996, p. 20). The competitiveness sphere (“onion”) includes all ten, mutually influencing dimensions of competitiveness, discussed in Section 1.1.1. The analytical categories (1-10) attributed to level are marked in colour (green for macro, blue for mezo and red for micro).

The metaphor of an onion reveals that competitiveness is a multi-dimensional phenomenon comprising three layers: micro (firm), mezo (industry/cluster) and macro (national economy). In the systemic perspective, the interconnected layers of competitiveness create a complex whole – a competitiveness sphere. The systemic character of the model shows that agents do not reach their goals in isolation. Agents at each of the aggregation levels have their own goals, which are met in a form of cumulative efforts (bottom-up dependencies: research categories 3 and 4). Furthermore, each of the layers constitutes a powerful determinant of competitiveness, achieved at the remaining levels of aggregation (top-down determinants: research categories 5, 8 and 9; bottom-up determinants: research category 7). All these efforts shift the systemic competitiveness onto a higher level, enabling the economy to develop.

The macro layer of the competitiveness onion illustrates the national “ability to grow/develop sustainably” and is understood as a sum of competitive industries/clusters with their joint capacities to enhance productivity through innovation. Cumulative shifts in productivity within industries stimulate evolution of trade specialization and result in structural adjustments (“ability to adjust”). Internationally competitive industries/clusters are made up of firms able to compete in global markets (“ability to sell”).

1.2. Main measures of national competitiveness

Over the last years, numerous indicators of competitiveness of national economies and measurement methods have emerged. This refers to measuring the competitive capacity of the national economy as well as its international competitive position in a given period. Determinants describing the competitiveness of individual countries have become an object of analysis of numerous researchers and international centres. In this subchapter, we describe the most important measures of competitiveness and competitive position.

The International Management Institute is one of such centres. It publishes the results of its studies in annual reports, compiled as the World Competitiveness Yearbook (WCY), which includes several dozen countries. Since 2004, the World Bank has also been preparing

its annual Doing Business reports, devoted to analysis of the conditions of conducting business in the examined countries. The Foreign Direct Investment Confidence Index, prepared annually by the consulting company A.T. Kearney, is also used relatively often to examine the international competitive capacity of an economy. The Human Development Index (HDI, a synthetic measure of the quality of life in a given country), is published yearly by the UNDP and is also used to measure the international competitiveness of a country.

In recent years, one of the most comprehensive and most frequently quoted rankings has been that of the international competitiveness of economies (The Global Competitiveness Report, GCR). It is the product of a comparative study of economic development conditions in individual countries prepared on an annual basis by the World Economic Forum (WEF)⁵. The countries covered are ranked in terms of competitiveness measured by an index developed for this purpose. At present (2017), it is calculated on the basis of 114 factors grouped into 12 pillars divided into 3 categories with regard to specific countries: basic requirements, efficiency enhancers as well as innovation and sophistication factors. With regard to each determinant, individual countries receive scores of 1 to 7, where 1 and 7 denote the lowest and the highest possible scores respectively. The list of factors used to establish the competitive position of a country is presented in Table 1.2.

Table 1.2. Determinants of the competitive position of a country according to the Global Competitiveness Report

GLOBAL COMPETITIVENESS INDEX		
Basic requirements sub-index	Efficiency enhancers sub-index	Innovation and sophistication factors sub-index
Pillar 1. Institutions Pillar 2. Infrastructure Pillar 3. Macroeconomic environment Pillar 4. Health and primary education	Pillar 5. Higher education and training Pillar 6. Goods market efficiency Pillar 7. Labour market efficiency Pillar 8. Financial market development Pillar 9. Technological readiness Pillar 10. Market size	Pillar 11. Business sophistication Pillar 12. Innovation
↓	↓	↓
Key for factor-driven economies	Key for efficiency-driven economies	Key for innovation-driven economies

Source: WEF 2017, p. 24.

⁵ The report was first published in 1979 and has gradually covered an increasing number of countries (140 in 2017). Initially, it contained a ranking based on the Competitiveness Index, indicating the foundations of fast economic development in the medium and long term. In 2000, a new index calculation methodology was introduced, and the name was changed to the Growth Competitiveness Index, to distinguish it from the microeconomic competitiveness indexes used under various names in a number of reports. In 2004, it was replaced by the Global Competitiveness Index, covering not only macroeconomic determinants but also microeconomic factors facilitating an assessment of the ability of a country to achieve economic growth. Another modification was introduced in 2008: it consisted in the inclusion of productivity determinants, believed to significantly influence the standards of living in individual countries. (WEF 2009, pp. 3-7). Data currently published by the WEF according to the methodology concerned cover the period from 2006.

In order to compute the composite indicator of the competitive position, it is essential to place the country concerned in the relevant group defining its stage of development. The weights assigned to specific pillar groups depend on the value of GDP per capita of the country in question. They are presented in Table 1.3.

Table 1.3. Weights of the determinants of the competitive position of a country according to the stage of development (GDP per capita)

Specification	Stage 1: factor-driven	Transition from stage 1 to stage 2	Stage 2: efficiency- driven	Transition from stage 2 to stage 3	Stage 3: innovation- driven
GDP per capita (in USD)	2,000	2,000–2,999	3,000–8,999	9,000–17,000	17,000
Weight for basic requirements (in %)	60	40–60	40	20–40	20
Weight for efficiency enhancers (in %)	35	35–50	50	50	50
Weight for innovation and sophistication factors (in %)	5	5–10	10	10–30	30

Source: WEF 2017, p. 320.

The data presented in Table 1.3 show that in the WEF ranking basic requirements are of key importance to economies whose development is mostly based on traditional factors of production (their GDP per capita does not exceed USD 2,000). Efficiency enhancers are crucial for economies mainly driven by investment (GDP per capita of USD 3,000 to USD 17,000). Innovation and sophistication factors are particularly vital to countries whose development is innovation-driven. These are countries at the top (third) stage of economic development (their GDP per capita exceeds USD 17,000). It is worth emphasising that efficiency enhancers have the highest weight among the determinants of a country's competitive position. At the same time, basic requirements play a relatively significant role in defining the competitive position of the lowest-income countries (Molendowski 2017). The classification of the EU-members from the Central and Eastern Europe (EU-10) covered by the analysis bases on the assumptions presented in Table 1.4.

Table 1.4. Classification of the EU-10 countries by stage of development with GDP per capita thresholds

Stage of development	Years	
	2006	2017
Stage 2: efficiency-driven	Bulgaria, Lithuania, Latvia, Poland, Romania, Slovakia	Bulgaria
Transition from stage 2 to stage 3	Czechia, Estonia, Hungary	Lithuania, Latvia, Poland, Romania, Hungary, Slovakia
Stage 3: innovation-driven	Slovenia	Czechia, Estonia, Slovenia

Source: WEF 2007, p. 13; WEF 2018, p. 320.

Basing on the information presented in Table 1.4, we conclude that the weights in the 2006–2017 WEF Reports considerably changed for the selected determinants of the international competitive positions of the EU-10 economies. In 2006, in the case of majority (six) of the analysed countries the competitive position was shaped mostly (in 50%) by efficiency enhancers and basic requirements (in 40%). In contrast, in 2017, six of these countries showed significantly smaller importance of basic requirements (decrease from 40% to 30%) in favour of innovation and sophistication factors (increase from 10% to (10%;30%)), whereas in three of them the most essential role, in addition to efficiency enhancers (50%), was played by innovation and sophistication factors (30%).

1.3. National competitiveness and sustainability⁶

In the times of socio-environmental challenges of the global economy and the rising power of multinational enterprises, discussion on macro-competitiveness is still vivid, even decades after first publications (Kinra, Antai 2010; Porter, Rivkin 2012; Aiginger 2016; Badinger et al. 2016). The neoclassical doctrine, rejecting the legitimacy of the strategic developmental policy, is questioned more strongly than ever before (Atkinson, Ezell 2012; Ali 2013; Haar 2014). Researchers and practitioners stress the necessity of designing a long-term sustainable global, as well as a national developmental path to deal with the global challenges and to enable inclusive growth of the world population.

The debate on the competitiveness of a nation has thus been extended to include social aspects. Scholars urge the governments to find a balance between actions aimed at increasing national productivity levels, enabling a responsible use of natural resources, and strengthening of the social welfare (Samans et al. 2015; Thore, Tarverdyan 2016). The strategies to address these goals have become a subject of concern to national governments and supranational institutions.

The Lisbon Strategy, the Strategy Europe 2020 as well as the United Nations Sustainable Development Goals, all set smart, inclusive and sustainable growth as a top priority on their agendas. Recent efforts of the OECD and the World Bank are focused on developing suitable approaches to measure the socio-economic success of countries that would allow for cross-country comparisons. They stress the need to discuss the policies aimed at stimulating growth and prevent “environmental degradation, biodiversity loss, and unsustainable natural resource use”. What is more, the World Economic Forum, as an institution behind the leading global competitiveness benchmarking report, raised the

⁶ An original discussion on the national competitiveness in the context of sustainable developmental goals is presented in Żmuda (2020). The original publication is available at link.springer.com

concern to include sustainability indicators into their index (Thore, Tarverdyan 2016) to evaluate the global progress towards building a sustainable and inclusive economy (Samans et al. 2015; Schwab 2014).

Acknowledging the growing importance of the socio-environmental aspects, our objective in this subchapter is to define and model national competitiveness in the context of sustainable development goals. We focus on the question whether national competitiveness can lead to reaching “beyond GDP goals”, as well as whether the productivity growth can be achieved without the environmental degradation and social inequalities.

1.3.1. Controversies over the national competitiveness concept⁷

National competitiveness belongs to the most misunderstood economic concepts (e.g. Porter 1990, Krugman 1996; Mulatu 2016). The controversies can be traced back to former US President Bill Clinton, who stated that each nation “like a big corporation competes in the global marketplace”. Indeed, it has been observed that in the globalised world, in the era of increased international trade and investment flows, some countries visibly outperformed the others in relation to their export performance and growth rates. Inspired by this finding, American politicians came up with the idea of benchmarking the performance of national economies to point out “winners” and “losers” in the international division of labour. This gave rise to the idea of an “unfair” competition between nations, implying that companies from the emerging economies, through lower labour costs and less strict legal standards, as well as – presumably – “unethical” business and protectionist government practices, outperformed the companies from the developed countries in relation to export performance. In consequence, this caused job reductions and a decrease (or stagnation) of living standards in the most developed countries (Baily 1993; Thurow 1993; Tyson 1993; Papadakis 1994). Together with the progressing globalisation and increasing socio-economic inequalities, the popularity of a zero-sum game approach to national competitiveness has gained global popularity in the media and among populist politicians.

Already in the 1990s, the idea of competition on the macro level, where one country gains at the expense of others, was questioned by the scholars, who claimed that it contradicted the classical trade theories. The main doubts were expressed by Krugman, who based his criticism on three arguments presented in the famous paper “The competitiveness – a dangerous obsession” (1994).

⁷ An original discussion on the meaning of the national competitiveness concept is presented in Żmuda, Molendowski (2016a).

Firstly, companies losing a competitive edge, fall into financial problems and eventually cease to exist. Due to the fact that the “bottom line” of competitiveness on the macro-level cannot be defined, there is no point in discussing competitiveness of countries. Secondly, competition on the micro level has a nature of a zero-sum game. A company that offers products and services that better meet the needs of customers, achieves above-average returns, and financially outperforms a less competitive rival. Transferring this relation to the macro level would mean that the success of one country translates into a loss for another, which would lead to the emergence of winners and losers in the international trade. But according to the key statement of the Ricardian theory (Ricardo 1817), each country has a “comparative advantage in something” – thus neglecting the mercantilist heritage. Thirdly, export competitiveness is crucial for achieving the socio-economic development in a smaller country. For a more self-sufficient large economy, growth does not solely depend on international trade, but rather on the ability to efficiently use and redistribute domestic resources. Summing up the Krugman’s points, the concept of national competitiveness is not universal and can only be used as a more “catchy” way to define the level of national productivity (Dunn 1994; Krugman 1994; Cho, Moon 2008; Olczyk 2008). Krugman went with his criticism even further, warning against the obsession with national competitiveness. In his view, it may get dangerous through encouraging counter-productive policy actions, leading to protectionist behaviours or even causing trade wars. As a concluding remark, he raised the question about the very sense of discussing national competitiveness on the academic level.

It is worth responding to Krugman’s criticism to resolve the confusion around the rationale of studying the national competitiveness and to identify the core of this concept. Its complexity can only be revealed when evaluated from a broad perspective, through the lens of developmental economics. Thus, in our analysis we refer to the most comprehensive meaning of competitiveness, understood as a contemporary approach to fundamental problems of economic development, set in the era of globalisation (Reinert 1995; Martin 2005, p. 7; Fagerberg et al. 2007; Radło 2008).

According to the first point of Krugman’s criticism, academic discussion on national competitiveness is pointless due to inability to define its bottom line. However, simple comparisons between the micro and macro levels are misleading in this case. Less competitive economies do not disappear from the international arena, but it does not prove that one cannot discuss the concept of national competitiveness. It has a different – qualitative instead of quantitative – nature (Jagiello 2008, p. 13; Aiginger, Vogel 2015; Aiginger 2016). National competitiveness should be thus analysed in a dynamic, comparative perspective to reflect changes in the national structure of production and trade towards specialisation based on knowledge and innovation (Aiginger, Böheim

2015). Consequently, a competitive economy follows an evolutionary developmental path – from resource-intensive to high-technology specialisation (Wysokińska 2012).

This argumentation is connected with the response to the second argument of Krugman's criticism that foreign trade is not a zero-sum game. It cannot be questioned that every nation has at least one comparative advantage in something. However, it has to be stressed here that the comparative advantage theory assumes the lack of mobility of factors of production (Kojima, Ozawa 1985, p. 136). In the times of globalisation and regional economic integration, free flow of production factors has developed to the extent not seen ever before. Rivalry between countries is thus reflected in the ongoing competition for mobile factors, especially technological know-how, highly qualified specialists and innovative entrepreneurs. Competitiveness relates in this perspective to the level of attractiveness of a given location for the domestic and international advanced factors of production.

This shifts the focus of the competitiveness debate to the national institutions and their role in attracting attention of the multinational enterprises with their high-end, advanced resources, as well as encouraging innovative entrepreneurship efforts to stimulate positive externalities for the whole economy. In this perspective, setting favourable conditions for the development of technological capabilities enables upgrading the production lines, leading to gradual phasing-out of obsolete technology, and as a consequence, stimulates national productivity (Thore, Tarverdyan 2016, pp. 108–109). A more effective use of production factors driven by innovation, strengthens organisational and managerial skills, becoming the basis for structural adjustment and changes in the competitiveness of the industrial sectors (Cho, Moon 1998; Porter 1990). Thus, it can be assumed that countries at similar levels of development are “competing” to create a favourable context for business activity to attract companies to selected sectors of the economy – to occupy a better position in the new international division of labour.

In the era of international interconnections, not only small catching-up economies, but also big leaders cannot underestimate the power of globalisation. For countries where exports contribute only to a small extent to GDP, the relative strength of their industries in global markets is as important as for trade dependent small open economies. Otherwise, under free market conditions, imported goods may replace uncompetitive national products – as it was the case of Japanese cars, eliminating American manufacturers in the 1970s. What is more, slowing growth of the leading economies is frequently caused by the reallocation of production sites to the locations offering more (cost) attractive conditions. Thus, being internationally competitive is – for both small and big countries – a matter of ability to sustain existing and creating new jobs and thus being able to increase the living standards of their citizens.

1.3.2. “Low road” vs “high road” to competitiveness

Globalisation creates a new context for economic activity on the micro level: basing on their strengths, companies actively seek growth options through integration within the network of international interconnections. Also economies, to achieve developmental goals, are forced to strategically improve their international standing through the ability to identify and promote “sectors of the future” (Sung 2006, pp. 38–42), where the prospective comparative advantages can be developed. The basis for the future success has to be strategically designed with the most important elements, such as strengthening of the qualified human resource base, development of technological capabilities and establishment of favourable institutional setting, able to adapt to the changing external conditions (Oziewicz 2007, pp. 22–23). These “strategic behaviours” of economies can be bound together as approaches to strategically build national competitiveness (Reinert 1995, p. 29).

Competitiveness can be properly shaped only when its relative nature is acknowledged. Nation’s performance and strategies how to improve it should be thus benchmarked to its historical achievements, as well as to its closest peers and continuously adjusted in line with the global developments. In this sense, it is essential to categorise the countries along their characteristics into the “strategic groups” (Cho, Moon 2005). Under the term strategic group, we understand entities sharing similar developmental characteristics and following comparable strategies to achieve goals. We define two main strategic groups in the international arena, distinguished by their developmental level: emerging (catching-up) economies and high-income most developed countries. Referring to the concept of competitive advantage in strategic management, two different strategies to enhance national competitiveness can be assigned to these two strategic groups (Aiginger, Vogel 2015).

The concept of “low-road” to competitiveness has been inspired by cost-leadership business level strategy with the focus on cost competition. In this approach, to achieve advantage on the international market, a country has to be able to offer low wages, low taxes, and low energy prices. On the contrary, the “high-road” to competitiveness is conceptionally related to the differentiation strategy. This strategy is built around the national efforts to raise productivity through development of innovative capabilities with the goal to become a quality or innovation leader. The main differences between these two strategic approaches are presented in table 1.5. This distinction is appealing and seems to accurately reflect the competitive positions of the countries on the global competitive arena. There are countries like Bangladesh, following the “low-road” to competitiveness, whereas countries like Switzerland pursue the “high-road” to competitiveness strategy.

In one of the definitional approaches discussed in Section 1.1.1, competitiveness of a nation is defined as a sum of successes of competitive companies active within its

territory. Inspired by the theory of strategic management, we define competitiveness as an ability to reach developmental goals. Assuming that the fundamental goal of a nation is to increase the living standards of its citizens, long-term macro-goals are not a simple sum of micro-goals. Companies, following the cost leadership strategy, through further cost reductions can reach their goals, that is achieve a competitive advantage. However, this will lead only to the benefit of their shareholders – the interests of other stakeholder groups and the society as a whole will be marginalised. Thus, following the “low-road” to competitiveness does not lead to achieving the fundamental goal of the economy. National welfare cannot be improved without wage increases, which are impossible to keep the business costs low. Lacking investment in high-tech production facilities and the use of cheap fossil resources will lead to the environmental degradation and harm the wellbeing of the next generations.

Table 1.5. Low-road versus high-road to competitiveness

	Low-road strategy	High-road strategy
Competitive advantage	Low costs (wages, energy, taxes)	Quality, sophisticated products, productivity
Growth drivers	Subsidies, dual labour market, inward FDI	Innovation, education, universities, clusters
Ambitions	Cost advantage, flexible labour	Social empowerment, ecological excellence, trust
Instruments	Import taxes, protectionism, devaluation (external, internal)	Business environment, entrepreneurship, dialogue
Objectives	Catching-up in GDP per capita, employment	Beyond GDP goals

Source: Aiginger, Vogel 2015, p. 506.

To conclude our findings, let us state that the national competitiveness should be evaluated as a dynamic national ability to reach long-term developmental goals – understood as an ability to climb-up within the international division of labour towards specialisation based on knowledge and innovation, which supports increased welfare and improved living standards of citizens.

1.3.3. Modelling sustainable national competitiveness

For decades economic scholars have been searching for ways how to evaluate national ability to reach development goals and how to benchmark relative success of a country on the international arena.

In Subchapter 1.1, we catalogue these approaches. We show that traditionally, researchers used GDP per capita as the main indicator measuring national economic

prosperity. In this perspective, national competitiveness was connected to the productivity level, achieved through a mix of factors seen as classical growth determinants.

As the long-time analysis results show that increased productivity does not always lead to the inclusive development, in the recent years the discussion on the national competitiveness has been complemented by the socio-environmental aspects. Scholars studying the sustainable competitiveness emphasised the need for strengthening the social welfare and promoting a responsible use of natural resources (Samans et al. 2015; Thore, Tarverdyan 2016). In this discourse, new approaches to modelling and measuring conditions for sustainable national competitiveness were developed – with the most important attempts of Stiglitz-Sen-Fitoussi Commission’s “Beyond GDP Goals” concept (Stiglitz et al. 2010) and a set of “Better Life Indicators” suggested by OECD (Aiginger 2014, p. 17)

The best-known approach to tackling the socio-economic aspects of development was introduced by the United Nations and defined in *Global Sustainable Development Report* (2015, p. 42) as “a prosperous high-quality life that is equitably shared and sustainable”, stressing the need “for new integrated economic metrics of progress beyond GDP, Human Development Index, and other established aggregates” (*Global Sustainable Development Report* 2015, p. 40).

This overarching ambition sets the ground for promoting more precise objectives, formulated by the United Nations within 17 Sustainable Development Goals (SDGs) – “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (*Global Sustainable Development Report* 2015, p. 40) – see Table 1.6. Sustainable Development Goals take into consideration six factors crucial for sustainable development, namely nature, people, life support, economy, community, and society. The SDGs are currently seen as universal goals of political aspiration, applying to all countries, both developing and developed (*Global Sustainable Development Report* 2015, p. 40).

Table 1.6. Sustainable Development Goals

What is to be sustained?	What is to be developed?
<p>Nature Goal 13. Take urgent action to combat climate change and its impacts. Goal 14a. Conserve the oceans and marine resources for sustainable development. Goal 15a. Protect and restore terrestrial ecosystems. Goal 15d. Combat desertification. Goal 15e. Halt reverse land degradation and halt biodiversity loss.</p>	<p>People Goal 1. End poverty in all its forms everywhere. Goal 2. End hunger achieve food security and improved nutrition and promote sustainable agriculture. Goal 3. Ensure healthy lives and promote well-being for all ages. Goal 4. Ensure inclusive and equitable quality education and promote life-long learning opportunities for all. Goal 6. Ensure availability and sustainable management of water and sanitation for all. Goal 7. Ensure access to affordable, reliable, sustainable, and modern energy for all. Goal 8b. Promote decent work for all. Goal 16b. Provide access to justice for all.</p>

cd. tabeli 1.6

What is to be sustained?	What is to be developed?
<p>Life support Goal 12. Ensure sustainable consumption and production patterns. Goal 14b. Sustainably use the oceans and marine resources for sustainable development. Goal 15b. Promote sustainable use of terrestrial ecosystems. Goal 15c. Sustainably manage forests.</p>	<p>Economy Goal 8a. Promote sustained, inclusive and sustainable economic growth, and full and productive employment. Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster the innovation. Goal 10. Reduce inequality within and among countries. Goal 11. Make cities and human settlement inclusive, safe, resilient, and sustainable. Goal 17a. Strengthen the means of implementation (finance, technology, capacity building, systemic issues policy and institutional coherence, and data, monitoring, and accountability).</p>
<p>Community Goal 16a. Promote peaceful societies.</p>	<p>Society Goal 5. Achieve gender equality and empower all girls and women. Goal 16a. Promote peaceful and inclusive societies for sustainable development. Goal 16c. Build effective, accountable and inclusive institutions at all levels. Goal 17b. Revitalize the global partnership for sustainable development.</p>

Source: *Global Sustainable Development Report 2015*, p. 41.

Also the World Economic Forum scholars in their Global Competitiveness Report stress the necessity of linking the concepts of sustainability and national competitiveness. They point out that “although competitiveness can be equated with productivity, sustainable competitiveness can be linked to a broader concept that focuses on aspects beyond the mere economic effects to include other important elements that render societies sustainably prosperous by ensuring high-quality growth (...) and producing the kind of society in which we want to live” (Corrigan et al. 2014 p. 55). It was concluded that economic competitiveness is a necessary but not sufficient condition for long-term prosperity (Corrigan et al. 2014, pp. 64–65). Reflecting the need for introducing the environmental sustainability and social sustainability-adjusted measures of competitiveness, a final sustainability-adjusted Global Competitiveness Index was introduced. This constitutes an important step in connecting the Sustainable Development Goals (SDGs) and competitiveness as prerequisites for the long-term sustainable growth (Corrigan et al. 2014, p. 63) – see Table 1.7.

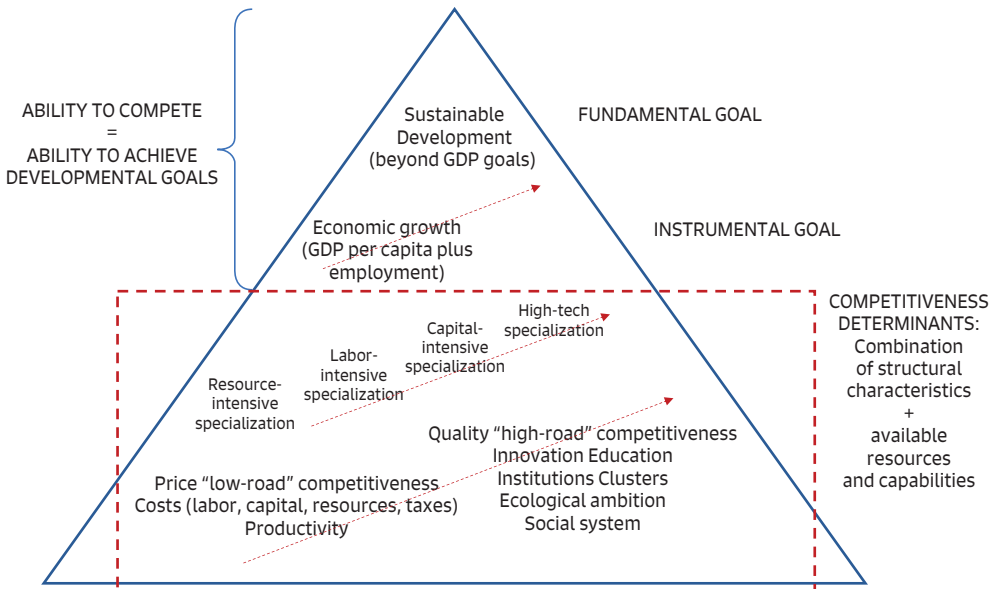
Basing on the research conclusions presented in this chapter, we associate macro-competitiveness with the national ability to reach development goals and present our sustainable competitiveness model in Figure 1.2. We categorise development goals as instrumental (understood as evolution of trade structure towards high-tech specialisation that enables economic growth, measured by GDP per capita) and fundamental (reflecting socio-economic development without environmental degradation, measured by “beyond GDP goals”).

Table 1.7. Sustainable Development Goals and Global Competitiveness Index equivalents

Goals proposed by UN's SDGs	Equivalent in Global Competitiveness Index
Goal 3: Attain healthy lives for all.	4 th Pillar: Health sub-pillar
Goal 4: Provide quality education and life-long learning opportunities for all.	4 th Pillar: Primary education sub-pillar 5 th Pillar: Higher education and training
Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all.	7 th Pillar: Labour market efficiency
Goal 9: Promote sustainable infrastructure and industrialization and foster innovation.	2 nd Pillar: Infrastructure 12 th Pillar: Innovation
Goal 16: Achieve peaceful and inclusive societies, access to justice for all, and effective and capable institutions.	1 st Pillar: Institutions

Source: Corrigan et al. 2014, p. 63.

Figure 1.2. Sustainable Competitiveness Model



Source: own elaboration based on Aiginger, Böheim 2015; Aiginger, Vogel 2015; Aiginger 2016.

Reaching the development goals is determined by the combination of national structural characteristics and available resources/capabilities that can be actively shaped by the competitive strategy. As discussed in Section 1.3.2, strategies to enhance competitiveness depend on the starting position on the global competitive arena. The low-road strategy focuses on cost-based competition, whereas the high road competitiveness is rooted in the development of innovative abilities. A national effort should be made to climb-up within the international division of labour through expansion of the advanced factor

endowments. The dynamic nature of the model reflects that competitiveness constitutes a continuous effort to “reach a better version of yourself”, placing countries on competitive developmental paths.

1.4. Strategies to enhance sustainable competitiveness at different stages of development

In this subchapter, we discuss strategies to shape national competitiveness, taking under consideration various possibilities that economies have on different levels of development⁸.

We can distinguish three fundamental stages of development which are linked with measuring competitiveness of countries by Global Competitiveness Index proposed by WEF (2017, pp. 319–320). These stages correspond with stages from Table 1.3 and also refer to classification of countries (developing, catching-up and developed) discussed later in Chapter 2.

In the first stage, countries compete based on their factor endowments – primarily unskilled labour and natural resources. Maintaining competitiveness at this stage of development depends primarily on well-functioning public and private institutions, a well-developed infrastructure, a stable macroeconomic environment and healthy workforce who have received at least a basic education.

As a country becomes more competitive, productivity will increase, and wages will rise with advancing development. Countries will then move into the second stage of development, when they begin to develop more efficient production processes and increase product quality because of higher wages, and they cannot increase prices. At this point, competitiveness is increasingly driven by higher education and training, efficient goods markets, well-functioning labour markets, developed financial markets, the ability to harness the benefits of existing technologies, and a large domestic or foreign market.

As countries move into the third stage, wages may rise so much that they are able to sustain those higher wages and the associated standard of living only if their businesses are able to compete using the most sophisticated production processes and generating further innovation.

To sum up, the strategies to enhance the competitiveness of a country depend at the stage of development. In the next section, we discuss the role of industrial policy in improving the competitiveness of national economy.

⁸ An original discussion on the industrial policy spaces supporting sustainable development is presented in Źmuda (2020). The final publication is available at link.springer.com

The governing authorities in the majority of the catching-up economies were strongly influenced by the neoliberal Washington Consensus recommendations in their convergence strategies. To boost economic growth, and thus to reach the standards of the wealthier countries, their development policies were mostly dominated by liberalisation, deregulation, privatisation, and cuts in government expenses. State interventions, treated as an interference in the free market, were limited to a minimum, and eligible only to correct the market failures. Experience shows that these actions were strengthening mostly the economic competitiveness of the supply side of the catching-up economies (Kumi et al. 2014, p. 539), leaving the socio-environmental issues out of the main policy scope.

The neoclassical growth theory supports a passive role of the state, assuming that in the long-term, poorer countries should catch-up to reach the income levels of their more developed peers. History shows, however, that we are closer to experiencing a “big time divergence”, rather than a convergence within the global economy (Pritchett 1997). Numerous studies reveal that despite the massive improvements in the global productivity levels and a rise of living standards, social and economic inequalities are characteristic of the modern times (Piketty 2014). Scholars stress that liberalisation of international trade and investment has further strengthened the global divisions as opposed to enhancing the convergence. The traditional domination of the rich North has been continued through aggressive internationalisation of the multinational enterprises into the poor South. Competitiveness of most of the low- and medium-income countries was traditionally based on natural resources and/or historically determined underdevelopment, enabling low-wage competition. Favourable cost position made South an attractive host for FDI – at a price of maintaining their “low-road competitiveness”.

What is more, the global economic inequalities are associated with the rise of socio-ecological imbalance. In majority of low- and middle-income countries the recent productivity growth was driven by an intensive development of most polluting industries like steel, aluminium, cement and glass. Specialisation in these areas is associated with above average greenhouse gas emissions stemming from extensive fossil fuel consumption (Burchard-Dziubinska 2011). In the reality of lacking global pollution norms, high emission industries will be further relocated to the countries with the lax institutional setting. As a result, neither will the global environmental goals be achieved nor will the catching-up economies progress in the process of socio-economic catching-up.

The emergence of the discourse supporting the macro-sustainability calls for new strategies to enhance national competitiveness. In the light of the failure of the Washington consensus, there is a place for a new industrial policy for catching-up economies to let them embark on the high-road to competitiveness and achieve beyond-GDP goals. Strategic efforts should concentrate on strengthening “capabilities, good institutions, and high

ambitions for social and ecological behaviour” to enhance national competitiveness linking high sectorial productivity and positive external effects (Aiginger 2014, p. 19).

However, the transition from low-road to high-road sustainable competitiveness strategy is challenging for catching-up economies due to the clear connection between environmental protection policies and competitiveness of selected pollution-generating industries (Burchard-Dziubinska 2011). Even though upgrading the technological standards of the high-emission sectors in catching-up economies will contribute towards developing a quality-based competitive positioning and entering the high-road strategic path, it could pose a threat to industrial fundamentals of these economies. Thus, the transition countries building up their economic position mainly through low-cost competition, without a long-term plan for structural adjustments, run a risk of getting stuck in the “middle-income trap”.

The latest evidence shows that green innovation enables structural transition and, in consequence, the upgrading of the specialisation patterns. What is more, researchers point out that economic and environmental indicators are correlated in the most developed economies, with France and Germany being the best practice examples for integrated innovation-economic-environmental performance (Gilli et al. 2013). This can be achieved by catching-up economies through joined efforts at the micro-, mezo-, and macro-levels, with supra-national, national, and regional institutions actively guiding and supporting this change.

1.5. Summary

In this chapter, we indicate the complexity and the multidimensional character of the international competitiveness. To grasp the very sense of this phenomenon, we catalogue the existing definitions with the aim to develop a taxonomy for navigating through the main approaches to international competitiveness. Following Chaudhuri and Ray (1997), we address competitiveness at three aggregation levels: micro (firm), mezo (industry) and macro (economy). We group sources of international competitiveness for each of the analysis dimension and distinguish their variables: the whole economy, an industry and a firm.

The suggested taxonomy created a basis for developing a multi-layered model of interconnections between micro-, mezo- and macro-dimensions of international competitiveness, in order to illustrate the systemic character of this phenomenon. We emphasise that as none of the competitiveness layers should be evaluated in isolation, the market and the state should support each other and jointly contribute to the systemic competitiveness. In this context, we concluded that a key role of regional and national

institutions is to design rules enabling development of innovative clusters, including internationally competitive companies. Such a joint effort would lead to the enhancement of the competitiveness of the whole economy.

Since the beginning of the 21st century, characterised by the accelerated pace and magnitude of changes in the global economy, the concept of an unfair competition between countries has increasingly gained the media attention. The power of populist voices and a rise of nationalistic movements spreading across the globe may be a “dangerous obsession” scenario that Krugman warned against. In consequence, more than ever, the discussion on national competitiveness has to be related to the theory of economics and supported by evidence-based arguments. For the benefit of future generations, efforts to enhance national competitiveness should take under consideration social inclusion and environmental preservation.

Thus, in this chapter we link competitiveness with the concept of sustainability to show that socio-economic development without ecological degradation should constitute the ultimate long-term goal of a competitive economy. What is more, we point out that the modern competitiveness debate should concentrate on national strategies to reach linked economic, social and environmental goals. Following Kumi et al. (2014), we concluded that the neoliberal competitive strategies support reaching instrumental goals, do not lead to achieving the sustainable development goals. That is why, future debate should focus on the role of the state and its institutions in stimulating sustainable national competitiveness.

Another relevant finding of this chapter, which opens the next part of this book, relates to the strategic positioning of catching-up economies in the globalised world. A transition from a “low-road” to sustainable competitiveness strategy is particularly challenging for these countries, as their economic upgrade is mainly driven by cost advantages and high-emission industries. In order not to stuck in the “middle-income trap”, they should develop a long-term competitive strategy, focusing on institutional support for eco-innovation and efforts to increase the levels of education and consciousness – for both production and consumption.

DETERMINANTS OF COMPETITIVENESS OF A CATCHING-UP ECONOMY

In this chapter, we focus on the characteristics and sources of competitiveness of a catching-up economy. Our analysis begins with the identification of developmental limitations of catching-up economies, conditioning their worse starting situation and weaker opportunities to build an internationally competitive position. We present how the progression of globalisation with its main manifestations – the liberalisation of trade and the flow of production factors, the intensification and evolution of international trade, and the development of international value chains – create opportunities to overcome development barriers for catching-up economies (Subchapter 2.1). In Subchapter 2.2, we investigate the interconnections between the inflow of foreign direct investment (FDI) and competitiveness of a catching-up economy. Theoretical considerations are supported with the case studies of two small catching-up economies (Ireland and Singapore) in Subchapter 2.3. The chapter is concluded with the presentation of the competitiveness model of a catching-up economy (Subchapter 2.4).

2.1. Competitiveness of a catching-up economy in the era of globalisation

Despite definitional disputes, presented in Chapter 1, scholars agree on two aspects. Firstly, due to the relative nature of competitiveness as a phenomenon, nation's performance should be benchmarked to its historical achievements, as well as compared to its closest peers – countries with comparable developmental conditions. Secondly, in times of intensified international interdependencies, there is a need to consider competitiveness

from the global perspective (Snowdon, Stonehouse 2006). Therefore, when evaluating competitiveness at the macro-level, it is recommended to group economies along their common features and to assess the significance of global interconnections for their development.

In this sense, it is essential to differentiate the countries and basing on their developmental characteristics, categorise them as comparable entities (Cho, Moon 2005). Traditionally, the degree of industrialisation has been considered one of the basic criteria for classifying countries. Nowadays, as there are other possible development scenarios (e.g. based on services), industrialisation is no longer the only distinguishing feature of technological advancement. Therefore, we focus on the level and dynamics of economic development, identifying three groups of countries: developed (industrialised), developing (less developed), and catching-up (Pritchett 1997; Cho, Moon 1998, 2005; Fagerberg, Srholec 2005).

We are particularly interested in small catching-up economies¹, which include Poland and other new EU member states. The basic criterion for this division is natural developmental constraints², which condition a greater dependence of the success of these countries on integration within the global economy and, as a result, the need for greater economic openness (Castello, Ozawa 1999).

2.1.1. Internal developmental constraints of a catching-up economy

There is no single commonly accepted definition of catching-up economy³. Therefore, for the purpose of our analysis, following Castello and Ozawa (1999), we define catching-up economy through its characteristics. We lay a particular emphasis on the demand and supply constraints. According to Porter's diamond⁴, these limitations determine a relatively

¹ Economies can also be divided into "small" and "large", depending on their size and bargaining power on a global scale. Development conditions for small and large economies are so different that they cannot be treated as comparable entities (Castello, Ozawa 1999). The economic potential of the state is therefore an important element to be taken into account when considering competitiveness conditions. In trade theory, it is referred to as a "false comparative advantage", resulting from having a large and absorbent internal market. In the neoclassical theory of economics, a small open economy is defined in the context of perfect competition, and its distinguishing elements include (Grossman, Helpman 1991): perfect elasticity of demand on the world markets (consumers are price-takers of exported goods); financial system integrated with the international financial system (the level of the national interest rate depends on the level of interest rates in the world); research and development activity not affecting the accumulation of knowledge on a world scale (it does not generate sufficient positive externalities). According to these characteristics, the NMS can therefore be classified as small open economies.

² An original discussion on competitiveness of a catching-up economy is presented in Czarny, Żmuda (2018a).

³ As Castello and Ozawa (1999) point out, in economic considerations the concept of a catching-up economy (due to its distinctive features) can be considered the same as the terms "newly industrialised", "less developed" or "small open" economy.

⁴ According to the Porter diamond model (1990), there are four interdependent sets of national conditions at mezo- and macro-economic levels that determine the ability of companies from this country to achieve international

lower chance of achieving international competitive advantage for companies operating within the territory of a catching-up economy (Moon et al. 1998). As a result, when defining the competitiveness of the economy as a cumulative ability of domestic companies to achieve international success, these limitations determine the weaker competitiveness of entire national economies.

Demand factors include – on one hand – the limited size of the internal market and not sophisticated demand of domestic buyers. A relatively low domestic demand does not allow for the development of production necessary to take advantage of the increasing returns to scale (IRS)⁵. On the other hand, the lack of pressure of local consumers on improving the quality and innovation level of goods and services offered (mainly due to a lower purchasing power in the catching-up economies than in the developed economies) does not encourage companies to seek new solutions: in the spheres of production, technology, and marketing.

One of the main supply-side constraints of catching-up economies is low domestic capital endowment, which limits expenditure on research and development (R&D), education, basic and technological infrastructure, and determine lower quality of human resources. According to Porter's diamond, long-term competitiveness of a nation is determined by the quality, uniqueness and efficient use of domestic factors of production – not their quantity. In the resource-based view, the sustainable competitive advantage is based on rare, difficult-to-imitate, highly specialised intangible resources, rather than basic physical resources (Rumelt 1997).

The lack of capital also leads to limited specialisation opportunities for catching up economies, and thus, their lower share in the international division of labour. This in turn results in a potentially less efficient use of production factors. Due to the fact that companies do not achieve successes in a vacuum, the challenge for business development in catching-up economies is the lack of presence of specialised suppliers and competitive companies from related industries – which does not favour the dissemination of innovation and does not stimulate the need to modernise the applied solutions. In cluster theory, the key importance is attached to informal relations between elements of the system which, apart from lowering communication costs, favour the exchange of ideas, research and development cooperation, and generate synergies (Delgado et al. 2014).

competitive advantage: demand conditions, access to production factors, competition between companies, development of related and supportive industries.

⁵ Production with increasing returns to scale is characterised by a decrease in unit cost as production increases at constant factor prices (Czarny 2006, pp. 63–118). The simplest technique with IRS shows the presence of the cost of starting production (independent of the quantity manufactured), e.g. investment cost, and a constant average cost of production. With such a technique, prices can be lowered as production increases. These cost characteristics are demonstrated by the majority of manufacturing industries (see e.g. Czarny 2002, pp. 23–24).

The effect of lacking motivation of domestic companies to innovate and improve productivity levels is further strengthened by the lack of fierce competition between (a few) local companies and a choice of firms' competitive strategies. In catching-up markets, companies often choose to follow cost leadership strategies and base competitive advantage on low production costs, thus neglecting investment in research and development.

Consequently, the limitations described above, potentially worsen opportunities for catching-up economies to achieve a strong position in the international arena. Nevertheless, numerous empirical studies (see Subchapter 2.3 on Ireland and Singapore as well as e.g. Rugman, Verbeke 1993; Molendowski, Żmuda 2013) show that many smaller economies, according to Porter's model, doomed to fail in the global competitive battle, actually managed to build a strong international position (e.g. Southeast Asian economies (Singapore) and in the EU (Ireland, as well as Estonia, Slovakia and Romania (Czarny, Folfas 2017 and Czarny, Żmuda 2017)).

Successes of catching-up economies call for verification of the classical approach to their competitiveness. Scholars see it as no longer valid due to its static nature and lack of consideration of external conditions – particularly the development of the global markets and increasing role of multinational corporations. On the basis of this observation, Castello and Ozawa (2014, p. 18) formulated a definition of the small (catching-up) economy that fits very well to the objectives of our study: a small (catching-up) economy is the one which, being limited by its own economic potential, in order to increase levels of productivity and improve the wealth of its citizens, should make a strategic use of the opportunities associated with the integration within the network of global interconnections.

2.1.2. Impact of globalisation on the developmental opportunities of a catching-up economy

Globalisation, defined as “the progressive internationalisation of economic activity” (Czarny 2005, p. 5) is process of creating a liberalised and integrated global market for goods and inputs. It sets a new context for competitiveness analysis of catching-up economies. It offers new developmental opportunities, neutralising their supply and demand constraints. Through expanding domestic economic potential, catching-up economies have better chances to achieve success on the international arena (Castello, Ozawa 1999, pp. 11–12).

Thanks to exporting, companies are overcoming the limitations of low domestic demand. Through integration within common markets, which enable free movement of capital, technology and human resources, catching-up economies gain access to the basic and advanced factors of production crucial for their development. International hypercompetition exposes companies from the catching-up economies to foreign

competitors and to demanding buyers from all over the world, encouraging them to raise standards and increase levels of productivity and innovation. The integration within the international division of labour and global manufacturing networks offers access to highly specialised suppliers and – more generally – supporting industries. Participation in clusters enables emergence of international business cooperation and access to modern technologies.

In the following paragraphs, we analyse the main areas of positive impact of globalisation on the developmental opportunities of catching-up economies: intensification and evolution of forms of international trade, liberalisation of trade and the movement of production factors, as well as the development of global value chains (GVCs).

Intensification and evolution of forms of international trade

As the forms, scope, intensity and geographical directions of international cooperation have evolved over the last years, new participation options for the catching-up economies emerged. Today's opportunities to overcome developmental limitations are better than ever before, provided that, firstly, policy makers correctly assess the strengths and weaknesses of their economies and, secondly, they adapt to the rules of globalisation.

Traditionally, international trade constituted the main form of economic contact between countries (in the past, in form of inter-industry trade, nowadays more and more often through intra-industry trade – respectively: iIT and IIT). The reason for inter-industry trade, which involves the exchange of products from diverse industries, is the presence of absolute or relative (comparative) cost advantages. This export specialisation primarily results from differences between countries in manufacturing techniques, factor productivities, consumer tastes, factor endowments and location⁶.

Under free competition⁷, trade was beneficial to all countries specialised in producing goods, where they had a comparative advantage (either producing the commodity at a relatively lower cost than its trading partners, or the average cost was the least distant from the cost elsewhere). Goods with different physical characteristics were traded across industries and their production required different structures and quantities of inputs. Since the benefits of such trade were related to international differences, the greater the differences, the more intensive exchange and the greater the benefits from trade.

The advantages of inter-industry trade were available to all, who properly assessed the strengths and opportunities of their economies. The disadvantage was the inertia of the

⁶ Ricardo (1817), Heckscher (1919, 1949), Ohlin (1924, 1991), Ottaviano, Puga (1998).

⁷ Free competition corresponds to model of perfect competition. It is characterised by the absence of barriers to entry, perfect market transparency and low level of concentration of sellers and buyers to such an extent that none of them individually affects the price of the product.

specialisation and the impossibility to shift the specialisation patterns without changing the operating conditions, i.e. without a demand or supply shocks. For developing as well as for catching-up economies, this could mean the consolidation of outdated (e.g. resource- and labour-intensive) production and export structures with no opportunities for technology-intensive specialisations. In an extreme case, monocultures developed with all of their drawbacks (e.g. immiserating growth, resource curse, Dutch disease – for more see Czarny 2007). An additional opportunity, although also a threat, for weak open economies was their exposure to fierce competition on the global market and dependence on the global economic situation (Czarny, Śledziowska 2012, pp. 15–18).

Nowadays, countries with similar structural characteristics are trading more intensively with each other. This growing convergence of national economies is manifested through unification of consumption patterns, consumer behaviour and production methods, resulting in an increased importance of intra-industry trade. The subject of such trade is similar products from one industry. Trade is conducted despite the lack of differences between techniques available and used in different countries, there is also a similarity of relative factor endowments by trade partners. Specialisation is becoming narrower than industry specific. It deals with tasks rather than products (production of a single variety or the performance of a single set of activities). The main reasons for intra-industry trade are product differentiation (i.e. multiple varieties meeting the same needs⁸) and increasing returns to scale. Due to, for example, the presence of manufacturing industries producing differentiated goods and rich buyers declaring demand for different types of goods, IIT is conducted mainly by developed (industrialised) countries.

Traditionally, due to simultaneous production and consumption, services were non-tradable, and therefore could not be exchanged internationally (for more see e.g. Kuźnar 2007). Nowadays, technological progress makes it possible to work remotely and to transfer services via material carriers. International flows of services take place both within multinational companies (e.g. commissioning accounting work to industries with lower labour costs) and outside them (accounting for banking operations with the use of intercontinental time shifts).

Liberalisation of trade and the movement of production factors

The conditions of trade also changed. In 1947, the General Agreement on Tariffs and Trade (GATT), replaced by the World Trade Organization (WTO) in 1995, promoted

⁸ Differentiated products are defined as products manufactured in many varieties. Product differentiation can be horizontal (concerning non-quality characteristics) or vertical (quality) – see e.g. Czarny (2002).

multilateral liberalisation of trade in goods and services⁹. It means not only reduced customs duties but also prohibited or restricted use of non-tariff barriers¹⁰.

The possibilities of including catching-up economies into the network of international interconnections were further strengthened by the discriminatory liberalisation of economic cooperation, leading to the creation of common markets within the regional groupings (Oziewicz 2007, p. 12; Molendowski 2012). In this context, the concept of a “very open economy” was suggested. According to this approach, mobile factors of production include not only capital but also labour (within the free market of factors; see Dascher 2000). Krugman (1997) points out, that in this context, the differences between very open small catching-up economies within integrational groupings and regions of large countries, are disappearing.

The intensification of trade and – more broadly – international economic cooperation is additionally supported by the liberalisation of many spheres of economic activity, at both national and supranational levels. In the case of Central and Eastern European countries, the changes were mainly driven by the transition “from plan to market” and the associated opening up of their economies to foreign trade and the inflow of foreign direct investment. Moreover, many countries are experiencing the progressing privatisation and deregulation of sectors traditionally state-owned or monopolised. This evolution enabled the possibility of foreign capital inflows into these sectors.

International disproportions in access to capital are decreasing to a large extent due to the foreign capital investment, especially FDI flows. Modern production techniques, which previously decided about comparative advantages of industrialised countries, are spreading globally via FDI. As a consequence, the industrialisation of less developed countries is taking place. The development of manufacturing industries in these countries enables their participation in IIT. Industrialisation is accompanied by rising per capita income, leaving less space for monoculture in agriculture and leading to a more differentiated structure of commodity production. The consumption of manufactured goods is also increasing due to their greater availability and lower prices. The formerly dominant exchange of raw materials and food from the South for manufactured goods from the North is being replaced by the exchange of one type of manufactured goods for the other (North-North trade; for more details see e.g. Kol, Tharakan 1989).

⁹ The trade barriers were not reduced in some sensitive sectors (e.g. parts of agriculture).

¹⁰ That does not mean that protection is generally disappearing. Multilateral agreements on trade liberalisation and banning or restricting the use of certain tools are accompanied by the introduction of new methods of protecting internal markets, especially during the economic crisis – for more see e.g. Baldwin (2011). For example, recently anti-dumping procedures have been used as an instrument of protection. At the same time, the WTO still tolerates collective protection associated with the discriminatory liberalisation of cooperation in regional groupings.

Simultaneously, migration from the poor and overpopulated countries of the South to the rich and ageing countries of the North changed the characteristics of the labour markets – reducing the problems with the shortage of workers (especially skilled workers) and low wages. As a result of better education of producers and consumers, natural resources are used more efficiently than in the past. As a consequence, international differences in natural resources' endowments are becoming less important, while other factors, such as human capital, are increasingly gaining importance.

The development and change of trade patterns determine technological progress, which results in a decrease in the transaction costs of foreign cooperation, particularly concerning the transportation and communication costs. Thanks to the IT revolution, national borders are no longer hindering the flow of goods and production factors. Cooperation is supported by progress in air, sea and road transportation. It is also becoming cheaper to store goods at low temperatures. Technological progress is changing not only the production techniques, but also the characteristics of traded goods.

Development of global value chains

A significant part of international flows of goods and production factors is related to the internationalisation of production and the emergence of multinational corporations (MNCs). MNCs shape the structure, size and dynamics of international trade and other forms of economic cooperation. FDIs partly replace and partly create trade. Sometimes trade by MNCs takes place for reasons other than normal commercial transactions, e.g. due to the tax policy. Trade is increasingly taking place within MNCs (intra-firm trade), often involving the transfer of final goods or intermediate inputs (intermediaries, components) in order to avoid or minimise taxation. In other cases, production is divided into parts located in various countries, thus optimising their operating conditions and minimising costs.

With the growing complexity of manufactured goods, the process of their production is prolonged, and becomes multi-stage. Furthermore, there is an international fragmentation of production, i.e. division of the production process into parts located in different countries characterised by locational advantages. The latest data show that trade in intermediate goods, manufactured in the cheapest locations, is developing faster than trade in final goods.

Production fragmentation, lower transportation costs and IT development diminish the importance of physical distance as a determinant of international economic cooperation (“death of distance”). This helps developing countries, as well as catching-up economies, to participate in the cooperation networks as they can undertake the production of a component, not the entire final product. What is more, the development of this type of fragmented production often does not require the existence of positive agglomeration

effects, i.e. the presence of a network of cooperative and infrastructural links, which are lacking in these economies. Production fragmentation and the international division of supporting tasks and activities led to the emergence of global value chains¹¹, usually coordinated by MNCs (World Investment Report 2013, p. 122). The higher the participation in GVCs, the more intensively the country cooperates within the international networks of production.

The participation in GVCs may involve the use of foreign components for domestic production (backward participation) and the supply (production) of intermediaries for foreign production of final products (forward participation). The first form can be referred to as a share in the lower parts of global value chains¹², and the second as a share in their upper parts. The nature of participation in GVCs informs about the position of a given country within the international division of labour and indirectly proves its competitiveness. A relatively high share in the lower parts of GVCs and a low share in the upper parts usually indicates that the country imports foreign components and converts them into the final products. Such a country is usually competitive in terms of wages and therefore assembly plants are located within its territory. This country is not a leader in innovation, which means that it buys technologically advanced intermediaries abroad and exports the assembled final product. At the same time, a relatively big share in the upper parts of GVCs with a small share in the lower parts means that the country supplies components for production abroad. This is mainly the case of countries with relatively advanced technology and know-how. These are the home countries of the largest MNCs, which account for the majority of global R&D (Participation of Developing Countries... 2015, p. 7).

Thus, also in this case, catching-up economies are threatened with the preservation of unfavourable (e.g. labour-intensive) patterns of specialisation. While these may be considered desirable after the opening of the economy, their permanent existence may be a sign of a failed internationalisation strategy – sustained resource- and labour-intensive advantages and hindered evolution towards specialisations based on knowledge and innovation.

To sum up, the competitiveness of a catching-up economy in the era of globalisation is a very complex issue. Nevertheless, having managed to outline its basic aspects we believe that it is a sufficient theoretical foundation for our empirical studies in Chapters 3 and 4.

¹¹ There are inaccuracies in the name of GVCs, because they can be networks branched in different directions and not just two-way chains – see Czarny, Folfas 2017.

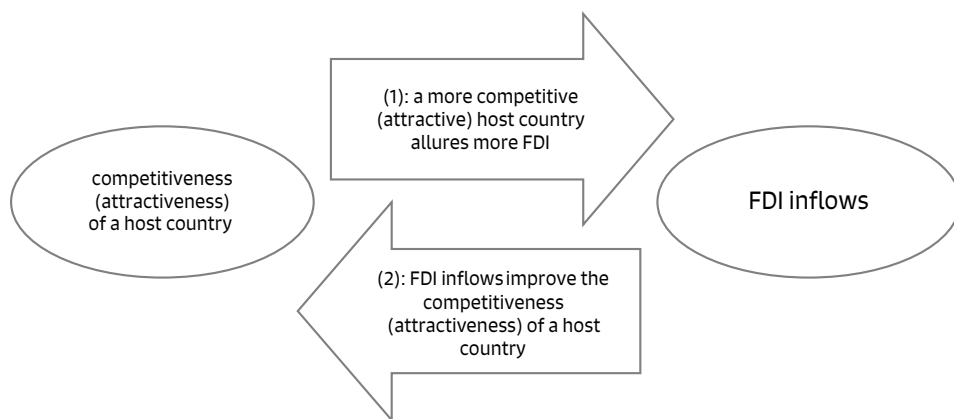
¹² The term “upper parts” refers not only to GVCs but also to other multi-stage production processes. The upper parts are beginning the production process like, for example, the extraction and processing of raw materials into intermediaries. In this context, the production of final goods (for consumers as well as for producers) is referred to as the “lower part” of the production process.

2.2. Interdependencies between FDI inflows and competitiveness of a catching-up economy as a host country

In this subchapter, we identify the interdependencies between FDI inflows and competitiveness of a host country. We focus on catching-up economies as host countries (with an example of the EU-10 states). Firstly, we argue that a more competitive host country attracts more FDI. Secondly, we explain how FDI inflows can improve the competitiveness of a host economy.

In economics as a social science, the interdependence (state of being dependent upon one another) is a very frequent phenomenon. One of the examples of the interdependencies is the relation: growth-driven FDI and FDI-led growth. The former one means that economic growth (good economic performance) in a host country attracts more FDI inflows to the analysed country. In the case of the latter, FDI inflows can lead to a faster economic growth (better economic performance), which in turn can lead to further FDI inflows.

Figure 2.1. Interdependencies between competitiveness (attractiveness*) of a host country and FDI inflows



* On the one hand, competitiveness and attractiveness can be treated as synonyms. On the other hand, attractiveness seems to be a broader category. Thus, in preliminary considerations we treat both terms as equivalent, but in detailed studies we focus rather on competitiveness.

Source: own study.

Figure 2.1 illustrates general interdependencies between competitiveness of a host country and FDI inflows. The relationship (1) is described in more detail in Section 2.2.1, which concentrates on various host country characteristics as determinants of FDI inflows. Some of these characteristics can be treated as measures of a host country's competitiveness (also if we define competitiveness as an ability of the host economy

to achieve development goals). The relationship (2) is scrutinised in Section 2.2.2, which describes a number of mechanisms of the impact of FDI inflows on a host country's competitiveness.

2.2.1. Host country characteristics as determinants of FDI inflows

In this section, we describe selected host country's characteristics as determinants of FDI inflows. The choice of characteristics is intuitive; however, the fundamental features of a host country seem to have been included.

Behrman (1972) developed the typology of FDI to explain different objectives of this type of investment. He distinguished: resource seeking FDI, market seeking FDI, efficiency seeking FDI and strategic asset (capabilities) seeking FDI.

The resource seeking FDI's are aimed at obtaining and securing specific resources which are not available in the home country or buying specific resources at a lower cost than in the home country. Dunning¹³ (1993, p. 57) distinguishes three types of resource seekers: (1) those seeking physical resources such as raw materials and agricultural products, (2) those seeking cheap and well-motivated unskilled or semi-skilled labour, and (3) those seeking technological capacity, management or marketing expertise, and organisational skills.

Market seeking FDI's are oriented at identifying and exploiting new markets for the firms' final products. The market seekers invest in a particular country or region in order to serve markets in this country or region.

The motivation of efficiency-seeking foreign direct investors is to rationalise their production, distribution, and marketing activities through common governance and synergy building among geographically dispersed operations. This rationalisation is linked with increasing returns to scale and economies of scope as well as with international specialisation whereby firms seek to benefit from differences in product and factor prices (Dunning 1993, pp. 59–60).

Multinational corporations pursue strategic operations through the purchase of existing firms and/or assets in order to protect specific advantages with the goal to sustain or advance their global competitive position. These acquisitions can be referred to as strategic asset/ capabilities seeking FDI.

Using Behrman's typology, it is possible to create a list of crucial determinants of FDI inflows (Table 2.1) which can be empirically verified. These determinants mirror various characteristics of a host country which illustrate its competitiveness.

¹³ Dunning is the author of FDI theory (OLI paradigm – see more Dunning 1993, 2000, 2006). Earlier, the theory of FDI was developed by e.g.: Mundell (1957), Posner (1961), Vernon (1966), Kojima (1975), Buckley and Casson (1976), Williamson (1981) and Caves (1996). Dunning merged previous approaches into one theory.

Table 2.1. Determinants of FDI inflows in empirical studies*

Determinants of FDI inflows	Examples of empirical studies
<p>size of market measured by GDP, GNI, population, GDP per capita or GNI per capita</p> <ul style="list-style-type: none"> ▪ bigger markets (countries, regions) are accompanied by more intensive FDI inflows (especially of market-seeking FDI) as bigger markets mean increasing returns to scale and economies of scope as well as more space for firms producing non-tradeable goods and services 	<p>Akin (2009); Altomonte (2000); Altomonte, Guagliano (2001); Bellak et al. (2008); Bevan, Estrin (2004); Billington (1999); Buch et al. (2005); Busse, Hefeker (2007); Clausing, Dorobantu (2005); Deichmann (2001); Dellis et al. 92017); Disdier, Mayer (2004); Dumludag et al. (2007); Erdal, Tatoglu (2002); Gorbunova et al. (2012); Hussain, Kimuli (2012); Jadhav (2012); Janicki, Wunnava (2004); Jun, Sing (1996); Kirpatrick, Parker Zhang (2006); Kohler (2013); Mfinaga (2018); Mottaleb (2007); Mughal, Akram (2011); Nasir (2016), Nigh (1986); Petrochilas (1989); Petrović-Randelović et al. (2017); Phung (2016); Resmini (2000); Root, Ahmed (1979); Schneider, Frey (1985); Shamsuddin (1994); Shukurov et al. (2016); Smarzyńska Javorcik (2004b); Smarzyńska, Wei (2001); Torrisi (1985); Torrisi et al. (2008); Tsai (1994); Wheeler, Mody (1972); Zhang (2001b)</p>
<p>market size growth measured by GDP/GNI growth rate, GDP per capita growth rate, or population growth</p> <ul style="list-style-type: none"> ▪ positive correlation between market size growth (perceived as future attractiveness of market) and FDI inflows 	<p>Akin (2009), Billington (1999); Busse, Hefeker (2007); Demirhan, Masca (2008); Erdal, Tatoglu (2002); Folfas (2015); Kang, Jiang (2012); Mottaleb (2007); Petrović-Randelović et al. (2017)</p>
<p>labour cost measured by unit labour cost</p> <ul style="list-style-type: none"> ▪ positive correlation with FDI inflows (higher unit labour cost goes together with higher efficiency which can be crucial for efficiency-seeking FDI) 	<p>Benassy-Quere, Lahreche-Revil (2005); Boudier-Bensebaa (2005); Walkenhorst (2004); Wei (2000); Wheeler, Mody (1992)</p>
<p>labour cost measured usually by unit labour cost and sometimes by gross wages/earnings or total labour costs</p> <ul style="list-style-type: none"> ▪ negative correlation between labour cost and FDI inflows (many, especially resource-seeking, FDI chase low-cost labour in host countries, especially in labour-intensive industries; too high labour costs in host countries can reduce FDI inflows) 	<p>Ballak et al. (2008); Carstensen, Toubal (2004); Dellis et al. (2017); Holland, Pain (1998); Janicki, Wunnava (2004); Lansbury et al. (1996); Torrisi et al. (2008)</p>
<p>quality of labour measured by education of workers or population</p> <ul style="list-style-type: none"> ▪ positive correlation between the well-educated labour force in host countries and FDI inflows (especially in capital or knowledge intensive industries and strategic asset FDI) 	<p>Carstensen, Toubal (2004); Nunenkamp (2002); Quazi, Mahmud (2004); Zhang (2001b);</p>
<p>corporate tax measured by nominal or effective tax rate</p> <ul style="list-style-type: none"> ▪ higher taxes discourage foreign investors 	<p>Bellak et al. (2008); Billington (1999); Carstensen, Toubal (2004); Gastanaga et al. (1998),</p>
<p>differences in taxation between home and host country measured by the difference in nominal or effective tax rates</p> <ul style="list-style-type: none"> ▪ differences in taxation allow tax optimisation (for example via transfer pricing), thus they allure FDI inflows 	<p>Benassy-Quere, Lahreche-Revil (2005), Folfas (2011)</p>
<p>geography measured by the distance between home and host countries or contiguity between home and host countries and cultural distance (contiguity, common language, participation in the same RTA)</p> <ul style="list-style-type: none"> ▪ geographic closeness and cultural similarity allure more FDI inflows (especially market-seeking FDI) 	<p>Bellak et al. (2008); Bevan, Estrin (2004); Benassy-Quere, Lahreche-Revil (2005); Buch et al. (2005); Folfas (2012)</p>

Determinants of FDI inflows	Examples of empirical studies
risk <ul style="list-style-type: none"> negative correlation between the level of risk in a host country and FDI inflows (foreign investors avoid risk, especially political risk) 	Busse, Hefeker (2007); Carstensen, Toubal (2004); Habib, Żurawicki (2002); Jun, Singh (1996), Quazi, Mahmud (2004); Shamsuddin (1994)
corruption <ul style="list-style-type: none"> negative correlation between the size of corruption in a host country and the FDI inflows (higher quality of institutions – both formal and informal – reduces corruptions and attracts more FDI) 	Dumludag et al. (2007); Gastanaga et al. (1998); Habib, Żurawicki (2002); Jadhav (2012); Kang, Jiang (2012)
international trade <ul style="list-style-type: none"> FDI inflows to the host country are accompanied by more intensive imports of the host country (FDI and trade are complements) 	Aizenmann, Noy (2006), Bouras, Raggad (2015) ; Carter, Yilmaz (1999); Clausing (2000); Dauti, Voka (2016) ; Fontagné (1999); Head, Ries (2001, 2004); Markusen (1983); Pfaffermayr (1996)
international trade <ul style="list-style-type: none"> FDI inflows to the host country are accompanied by less intensive imports of a host country (FDI and trade are substitutes) 	Egger (2001); Helpman et al. (2004)

* Studies in bold refer to the NMS as host economies.

Source: own study.

All empirical studies cited in Table 2.1 focus on catching-up economies as host countries. Additionally, those in bold refer to the NMS countries. All empirical studies are based on econometric models, mostly on static models estimated using cross-sectional or panel data. Thus, estimation results prove only correlation between FDI inflows and host country characteristics. However, in a few studies, dynamic econometric models are employed which gives proof for casual relationship between a host country’s characteristics and FDI inflows.

To sum up, a lot of empirical studies confirm that factors (measures of competitiveness) such as size of market, market size growth, labour cost, quality of labour, taxation, distance, risk, corruption and international trade are crucial determinants of FDI inflows. This conclusion refers to catching-up economies, and among them, to EU-10 countries.

2.2.2. FDI inflows as a determinant of enhancing the competitiveness of host countries

Whether FDI inflows are beneficial to host countries or not, has been put up for debate for a long time. The theory states that the FDI inflows have multiple positive effects on a host country’s economy and FDIs are often a source of enhancing the welfare and competitiveness. Table 2.2 presents empirical studies on the impact of FDI inflows on exports, growth and innovations of the host countries.

All empirical studies cited in Table 2.2 focus on catching-up economies as host countries (those in bold refer to the NMS). They are based on dynamic econometric models, which allows to confirm causality.

Table 2.2. Empirical studies illustrating the impact of FDI inflows on exports, growth and innovations in host countries*

Impact of FDI inflows on exports, growth and innovations in host countries	Examples of empirical studies
A positive impact of the FDI inflows on the exports of host countries (FDI inflows leads to increase in exports value of a host country)	Aitken et al. (1997); Barua (2003); Chen, Swenson (2014); Chen et al. (2010); de Freitas, Mamede (2008); Habib (2009); Ibrahimova (2010); Kneller, Pisu (2007); Kumar (2012); Maček et al. (2015); Mahmoodi, Mahmoodi (2016); Marona, Bieniek (2013); Merabet (2017); Oztruk, Acaravci (2012); Pfaffermayr (1994); Rădulescu, Pelinescu (2012); Rădulescu, Serbanescu (2012); Rózański, Starzyńska (2008); Stojčić, Orlić (2016); Sun (2009); Swenson (2008); Tadesse, Shukralla (2013); Wongpit (2006), Xu, Lu (2009); Zhang (2005); Zhang, Felmingham (2001); Zysk, Śmiech (2014)
FDI inflows as a Granger-cause of real GDP growth of a host economy	Afsar (2007); Asghar et al. (2011); Chowdhury, Mavrotas (2005); Čičak, Sorić (2015); Esso (2010); Feridun, Sissoko (2011); Guru-Gharana, Adhikari (2011); Har et al. (2008); Magnus, Fosu (2008); Mahmoodi, Mahmoodi (2016); Marona, Bieniek (2013); Mawugnon, Qiang (2011); Majagaiya (2010); Moudatsou, Kyriakidis (2009); Oztruk, Acaravci (2012); Pradhan (2009); Samad (2009); Tang et al. (2008)
FDI inflows as a source of innovation in a host country (FDI inflows have a positive effect on e.g. the introduction of new products in host countries, the number of domestic patent applications in host countries, the innovation capability of host countries, the productivity of labour force, R&D activities or as a significant way of capturing advanced technologies)	Aitken, Harrison (1999); Cheung, Lin (2004); Erdal, Gocer (2015); Hu, Jefferson (2001); Ji (2006); Liu, Wang (2003); Sivalogathan, Wu (2014); Smarzynska (2004a)

* Studies in bold refer to the NMS as host economies.

Source: own study.

Many empirical studies confirm the positive impact of FDI inflows on exports and real GDP growth of host countries. They refer also to catching-up economies (e.g. the EU-10 states). However, there is a poor evidence of FDI inflows as a source of innovation in the EU-10. Additionally, there are studies (i.e. de Simone, Manchin 2008; Weresa, Napiórkowski 2018) suggesting a negative impact of FDI inflows on the innovation level in the NMS due to brain drain (foreign investors fish out well-educated workers and encourage them to emigrate or acquire host assets making them unavailable for local companies). It is proven that FDIs in these countries are more focused on imitation/adaptation of new ideas invented abroad than on innovation that can be patented.

One of the distinguishing features of transnational corporations is their ownership advantage in terms of technological capabilities and innovation. However, the contribution of FDI towards raising the technological level of the host country is not automatic (Dosi, Soethe 1991, p. 108). An effective diffusion of knowledge in the host country is necessary to build an internationally competitive position in the long run (Cervantes 1997). In this context, a diffusion of knowledge should be understood as “a process through which

innovation is communicated over time through various channels to the participants of the system” (Rogers 1995, p. 5). In time, the line separating innovation from diffusion disappears because “generation and further adaptation of knowledge are part of the same process” (Dörschuck 2004, p. 52). This has an important implication for a catching-up economy¹⁴. If a country does not have sufficient resources and/or the ability to create knowledge itself, it can adopt and develop a strategy of imitation. An effective diffusion of knowledge depends, to a large extent, on the technological capabilities of the host country, which are “necessary to master foreign technology, adapt it to local conditions, improve, and then develop in the long run” (Dunning 1988, p. 53). These abilities, embodied in human capital, also referred to as absorptive capacity, determine the pace of technological progress. Absorption capacity is not limited to the ability to take external information but is additionally related to the skills of applying the incoming knowledge and its dissemination within the whole system (Cohen, Levinthal 1990 pp. 128–131).

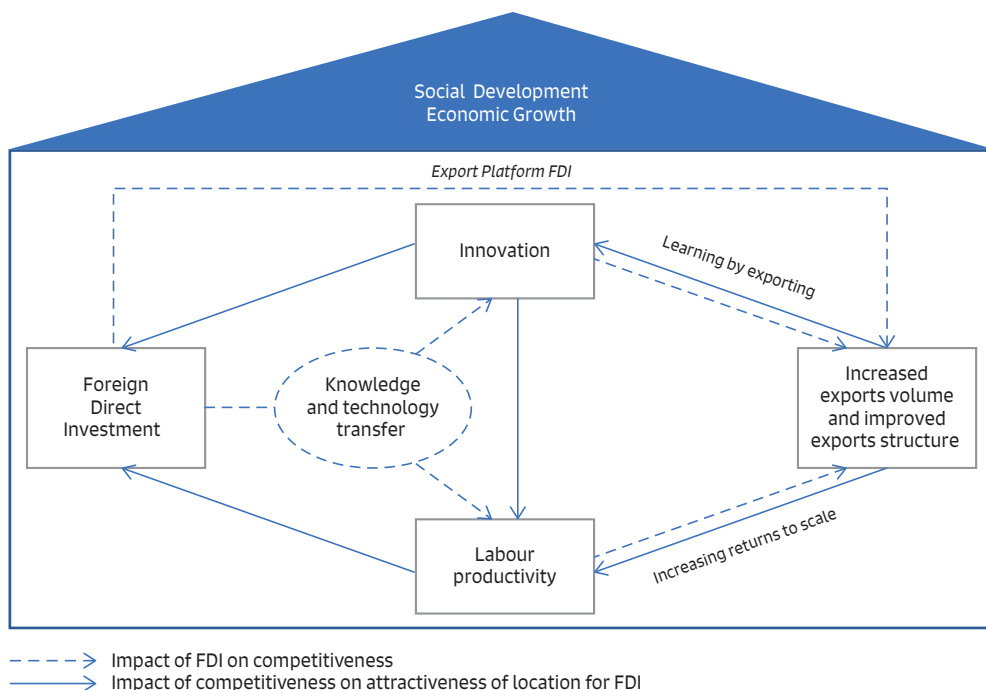
The growth of technological capacity and innovation of the host country stimulate the competitiveness of its exports. An improvement in export competitiveness, understood as the host country’s ability to adapt to the changing conditions of demand and supply in international markets, is reflected in the quantitative and qualitative changes in exports (Oziewicz 1998, p. 158). An adjustment takes place based on the evolution of the production structure towards activities at a higher technological level and use of more advanced skills. This argument assumes that a competitive economy is going through the stages of intensive use of various production factors, identical with the stages of country’s economic development, therefore, as a result it contributes to the gradual increase in the standard of living of citizens.

It seems that the assessment of the role of FDI in shaping the competitiveness of a host economy should not only be based upon their direct impact on the ability to achieve specific instrumental goals of a competitive economy but should also be considered in the context of mutual interactions. As Oziewicz (1998 p. 156) points out, “this is most visible in the case of capital, technology, and trade creation, where benefits in one sphere may improve the situation in the other. The stimulative effect of FDI is, therefore, multiplied.” In this way, through synergies, the overall impact of FDI on the fundamental goal of the competitive economy, that is, on its socio-economic development, may be greater than the impact on individual instrumental objectives. As it is schematically shown in Figure 2.2, the relation between FDI and competitiveness is based on bilateral interdependencies. Figure 2.2 is a more detailed version of Figure 2.1.

¹⁴ An original discussion on the impact of FDI on competitiveness of a catching-up economy is presented in Molendowski, Remer and Żmuda (2017).

On one hand, the inflow of FDI and the accompanying transfer of knowledge and technology stimulate innovation and increase labour productivity, contributing to changes in the production structure. If some of the manufactured goods are intended for international markets, FDI will have a positive impact on the volume and structure of exports. What is more, if a catching-up economy is a member in an integration grouping and creates a particularly business-friendly environment, foreign investors may be interested in choosing this location for the export-platform FDI. This will directly lead to the intensification of host country's trade with other members of the group. This pattern proved to be a successful strategy for Ireland hosting American export-platform FDI in the 1990s. On the other hand, improved technological capabilities and higher labour productivity are encouraging further FDI inflows. Moreover, involvement in export activities may generate further positive effects, including higher production efficiency (that is, better use of IRS and utilisation of overproduction) as well as greater innovative performance of entities through education and experience (learning by exporting). Consequently, the described interactions become the basis for achieving the fundamental goal of a competitive economy: economic growth and social development (Mińska-Struzik 2014).

Figure 2.2. Interdependencies between inflow of FDI and competitiveness as an ability of the economy to achieve development goals



According to the previous considerations, efficiency- and strategic asset-seeking FDI appear to be the most profitable types of direct capital inflows for catching-up economies. They seem to be crucial in the context of increasing competitiveness of host countries via structural changes in exports, real economic growth, and innovation.

However, multinational corporations are often not interested in improving the competitiveness of a host catching-up economy. They sometimes try to transfer the money or resources out of host economies, which can be seen as strategy that results in downgrading the host country's competitiveness. MNCs may also extract from host nations most of the benefits resulting from their investments, either through tax and tariff benefits or through tax avoidance or tax evasion. This harmful strategy sometimes becomes a fundamental reason for FDI inflow to selected countries. In Chapter 4, we give examples from the NMS illustrating this phenomenon. In catching-up economies, FDIs (especially resource-seeking ones) in mineral and raw material production often give rise to complaints about foreign exploitation in the form of low prices paid to host nations and/or the use of highly capital-intensive production techniques inappropriate for labour-abundant developing and catching-up countries, lack of training of local workers, overexploitation of natural resources, as well as creating dualistic "enclave" economies (Salvatore 2013, p. 382). Sometimes host countries try to defend themselves against MNCs' harmful strategy, but they do it extremely rarely.

To sum up, the impact of FDI inflows on competitiveness of a host country seems to be a much more complicated issue than reverse interdependencies discussed in Subchapter 2.2. Focusing on catching-up economies, we aimed at presenting some theoretical background and to make review of empirical studies confirming its impact.

2.3. Building competitiveness of a catching-up economy in the globalised world: cases of Singapore and Ireland

The purpose of this subchapter is to present the success stories of two catching-up economies, Singapore and Ireland¹⁵. Both of them, within a short period, managed to significantly elevate the levels of their competitiveness on the global scene.

As countries located at opposite ends of the world: Singapore and Ireland, at first glance, seem not to have much in common. They belong to different cultural circles, and as a result, they were shaped by different socio-political conditions that determined their economic development. A detailed analysis, however, allows to identify their common

¹⁵ An original discussion on competitiveness of Ireland and Singapore as developmental states is presented in Žmuda (2016b).

features. These small island states, although geographically and culturally distant, may be considered sisterly in the economic and strategic context. Both countries have implemented a strategy of stimulating economic development, based on integration within the global economy – the factor that allows to include Singapore and Ireland into one strategic group. In both of these catching-up economies, the spectacular growth achieved in the 1990s was due to comparable starting conditions and similar developmental strategies (Hewitt-Dundas et al. 2010), based on controlling the benefits of progressing globalisation. Since the 1980s, mainly due to the inflow of FDI and export promotion, both economies have occupied top positions in the ranking of economic globalisation (Dreher 2006), reaching top positions in the competitiveness reports in the 2000s. Singapore and Ireland, as “children of globalisation”, built up their global position on the ability to effectively integrate within the network of international interconnections. Unlike most other catching-up economies, which, according to the Washington Consensus, followed a free market strategy, the “Asian Tigers”, including Singapore (and Ireland), contrasting with other Western European countries – implemented the developmental state model (O’Riain 2004).

A high degree of economic openness constitutes an opportunity for a catching-up economy, but also a threat in the face of external shocks. The dependence on the situation of foreign markets and strong international connections contributed to the imbalance of Ireland’s economy during the global crisis and to the weakening of its competitive position. Singapore, simultaneously, emerged unscathed from the crisis of 2008–2009, remaining in the forefront of the world’s most competitive economies for two decades.

In this subchapter, we bring to light the foundations of competitiveness of Singapore and Ireland. The study includes a literature review and an analysis of the economic policies implemented in both countries. We are looking for strategic and institutional similarities that shaped the basis for their economic convergence. What is more, we analyse the main determinants of their competitiveness as well as investigate the reasons behind different performance of these countries during the global economic crisis. Based on the conclusions drawn, we formulate policy recommendations for catching-up economies, in particular the EU-10 countries.

2.3.1. Developmental state model as a form of stimulating competitiveness of a catching-up economy

In the competitiveness debate presented in the previous subchapters, we define competitiveness as an ability to reach developmental goals. We stress that for a small catching-up economy, the convergence, as the main growth objective, can be reached through the extension of its supply and demand base (Castello, Ozawa 1999; Molendowski, Żmuda

2013). This can be achieved by integration within the network of global interconnections – predominantly through opening the economy to the flows of FDI (supply extension through access to advanced production factors via inflows of FDI and access to basic production factors via outflows of FDI), as well as engagement in international trade (demand extension, enabling higher efficiency through IRS).

The developmental state model can be seen as a strategic response of the catching-up economy to its natural limitations to achieve a strong global competitive position. The concept of developmental state was first formulated by Johnson (1982) and extended by Wade (1990) as “an attempt to distinguish between motivation for free market interventionism as seen in the West and the economic practice of Southeast Asian countries.” In the case of developmental state, intervention is aimed at setting a long-term development path, and not as in a free market economy, undertaken only if the market mechanism does not ensure efficient allocation of resources (Sung 2006, pp. 38–39).

In the developmental state, governmental and non-governmental institutions play a key role as advisory units, mediating between politicians and the private sector. These multidimensional consultations drive economic changes (Yeung 2003, pp. 7–8). Following the developmental state model, a catching-up economy, based on its strengths, has a chance to overcome natural limitations and achieve developmental goals through designing and implementing a strategy of programmed integration within the global division of labour.

2.3.2. Singapore and Ireland as developmental states

Singapore is one of the examples of the South Asian developmental state. Its political and economic system relies on highly centralised and hierarchical institutions, focused on acquiring FDI (Hock 1990). The interventionism of the Singaporean government is based on three foundations: (1) labour market control (Yeung 2003, p. 18), (2) a tax system that creates incentives for foreign investors (Park 2006), and (3) state-owned enterprises balancing foreign influences (Huff 1995, p. 1424).

Including Ireland into the group of developmental states is not as obvious as in the Singaporean case. Nevertheless, O’Riain (2004) proves that Irish state intervention into free market mechanisms is closer to Asian than European practices. Although the accelerated pace of economic development that took place in Ireland in the 1990’s is often cited as an example of an effective neoliberal policy, benefiting from the positives of globalisation (investment activities of international corporations) and regionalisation (inflow of aid from EU funds) (Rosa 2003) a decisive role of non-governmental institutions in giving direction to economic changes should be emphasised (Kirby, Carmody 2009).

The common features of developmental state models in Ireland and Singapore include:

- export promotion strategy and participation in the international division of labour in order to overcome the development barriers related to small domestic market and limited resources (Hock 1990, p. 64);
- consistent economic policy focused on developing the “sectors of the future”: IT, pharmaceutical, biotechnology and financial services;
- due to the lack of natural resources and qualified specialists, creation of comparative advantages through the policy of attracting export-oriented FDI to the selected sectors of the future;
- creating a system of incentives for investors to increase locational attractiveness to foreign capital. In Ireland, the first free economic zone was created in Shannon in 1958, and its range was gradually expanded throughout the country (O’Riain 2004, p. 71). One of the most liberal tax systems in the EU was created there (since 1998, corporate tax at the level of 12.5% – Barry 2004, p. 16). Simultaneously, there is a system of support for foreign investors in Singapore (Park 2006) with a low corporate tax rate (40% until 1986, and from 2010: 17% – IRAS 2013);
- support for foreign investors provided by specialised non-governmental institutions (Industrial Development Agency in Ireland and the Economic Development Board in Singapore), closely cooperating with the boards of MNCs in order to learn about the needs of investors, to meet them and as a result, to attract additional capital;
- social partnership between business, trade unions and the government, which especially at the initial stages of development enabled both economies to maintain cost competitiveness as a factor attracting FDI (Yeung 2005, p. 13).

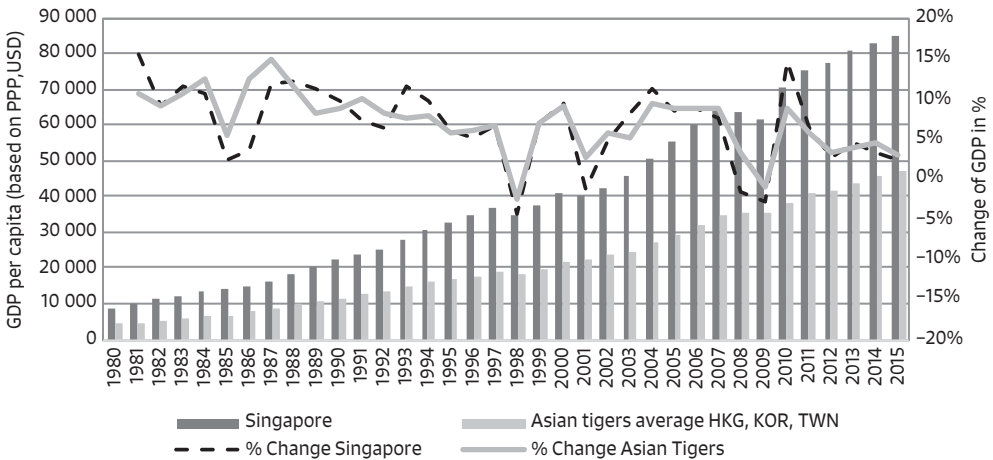
The success of institutions supporting competitiveness in Singapore and Ireland can be attributed to the creation of a supportive environment for the development of competitive companies. Singapore was consistently second in the economic freedom ranking from the first Heritage Foundation Report (1995). The efforts of the Irish agencies were crowned with the promotion from the 27th position in this ranking in 1996 to the 3rd in 2001. In the following years, Ireland and Singapore topped the ranking until the outbreak of the last crisis. In the years 2008–2015 Ireland’s position in the ranking worsened (a decline from position 2 to 8).

2.3.3. Competitiveness model of the Developmental State: a Singaporean case

The Singapore’s competitive position within the global economy, seen as a competitive outcome, measured by country’s growth rates (Figure 2.3) and evaluated through its position in the ranking of competitiveness, shows an impressive performance over the

last two decades¹⁶. It is, however, interesting to indicate the pillars of this success. The features of the “Singaporean Competitiveness Model” constitute a complex mix of socio-cultural, historic and geopolitical factors, that met in one point in time, transforming this poor fishermen’s village at the end of the world into the global multicultural hotspot.

Figure 2.3. Singaporean GDP per capita growth rates in the years 1980–2015



Source: own study based on IMF, World Economic Outlook Databank, access: 30.04.2016.

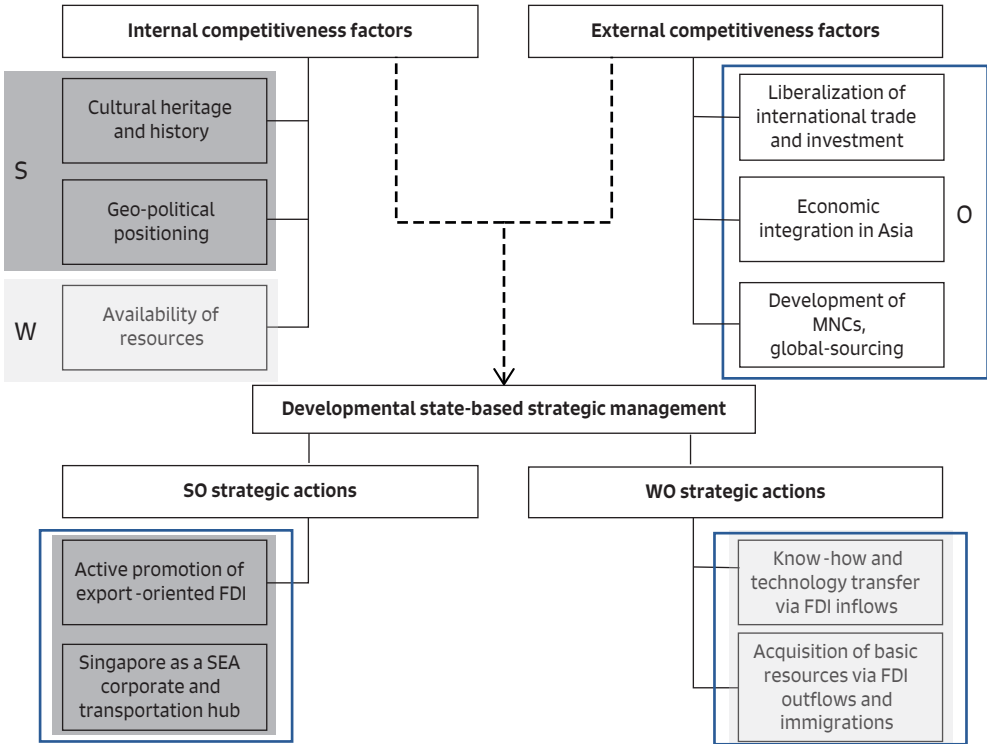
As shown in Figure 2.4, the elements of the model, categorised into: internal and external ones are bounded by the effective developmental-state strategy, aimed at exploiting national strengths and taking advantage of global opportunities (SO strategies) on the one hand, and taking advantage of opportunities to overcome the country’s weaknesses (WO strategies) on the other.

In 1965, after years British hegemony, Singapore gained independence. This small, distant, underdeveloped, resource-poor island was “left on its own” – with the post-colonial British heritage being: the English language spoken officially, entrepot trade expertise (Blomqvist 2004, p. 25) and centralised, hierarchical institutions. Despite – or maybe in response – to the new-country’s turbulent incumbent phase, the institutions were strengthened even further in the first two decades of independence. From this standpoint, the interventionism was directed towards controlling the labour market (O’Riain 2004 p. 207), development of tax system favorable for investment (Park 2006) and creation of government-linked companies (Lim, Pang 1986). A high bargaining power

¹⁶ An original discussion on sustainability and transferability of the Singaporean Competitiveness Model is presented in Žmuda (2016c).

of the Singaporean government was created by the informal institutions in the cultural settings of collective “Asian values”: high work ethics and saving culture (Drelich-Skulska (ed.) 2007, pp. 68–84).

Figure 2.4. Singaporean Competitiveness Model

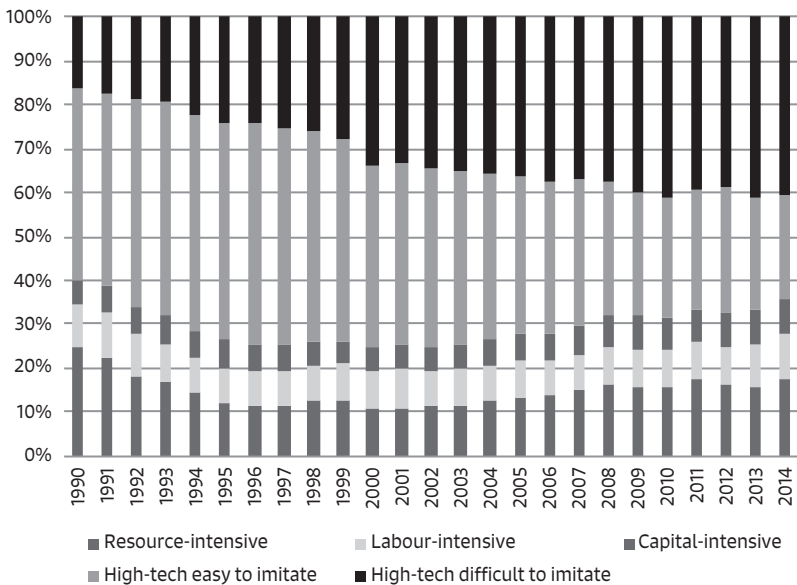


Source: own elaboration.

These prerequisites allowed the Singaporean government to follow a developmental state concept with a goal to design a growth path for the country. This was achieved through selecting the “industries of the future” and developing them with the support of strong agencies and strategic industrial policy (Huff 1995). However, it is important to mention that the Singaporean strategy is unique and differs strongly from the classical Asian “developmental state” model. Considering the internal supply and demand constraints, prohibiting a small economy like Singapore from realising its developmental goals, the economic upgrade was based upon smart integration within the global economy. As globalisation is accelerated by the activity of multinational enterprises, these were selected as key competitiveness accelerators (Sung 2006, p. 38).

Together with the expanding liberalisation of international trade and flows of production factors, as well as progressing economic integration, Singapore’s geographic positioning as a safe English-speaking gateway to Asia was transformed into one of its most valuable assets. It was developed into a cornerstone of an externally-driven growth strategy, based on promotion of export-oriented FDI. In the 1970s and 1980s, a decreased bargaining power of workers, resulting in low labour costs, was the reason for majority of American off-shore investments in Asia to be placed in Singapore (Huff 1995, p. 1429). Following this strategy, Singapore was gradually increasing its engagement within the global economy to become the most globalised economy in the world (KOF index of globalisation¹⁷).

Figure 2.5. Evolution of Singapore’s Revealed Comparative Advantage Indexes along with the factor intensities over the period 1990–2014



Source: own study based on UNCTAD data, access: 30.04.2016.

Strong, hierarchical institutions of the developmental state enabled Singapore to attract foreign investors looking for a safe location in Asia to further explore this continent. Through export-platform FDIs, MNCs helped Singapore to not only increase its export

¹⁷ The KOF Index enables comparing the degree of economic globalisation of most countries in the world with data available on the Institute’s website (Swiss Federal Institute of Technology Zurich <http://globalization.kof.ethz.ch/>), ranging back to 1980. The index of economic globalisation was created based on the following indicators: foreign trade (as % of GDP), FDI stock (as% of GDP); value of portfolio investments (as% of GDP); salaries for foreign employees (as% of GDP); existence of hidden import barriers; foreign trade taxes; capital market restrictions. A detailed description of the variables in Dreher (2006).

volume, but also – through know-how, knowledge and technology transfer – transform the export structure. Especially in the 2000s, in order to make the maximal use of the opportunity associated with the booming global demand, the Singaporean government attempted to shift the aggregate supply curve through import of international human resources with high qualifications (Wah 2012, p. 131). This is how, due to inflows of highly specialised workers, the Singaporean economy managed to develop capabilities necessary to “create” a comparative advantage in the industries of the future (Grabowski 1994, p. 414). Consequently, as presented in Figure 2.5, Singapore managed to gradually shift the export structure towards technology-intensive difficult-to-imitate products. In order to stay attractive for high-tech investments, Singapore continually strengthened its global positioning as a high-tech hub by the increased expenditure into R&D, exceeding the OECD average.

Singapore, as a small island, lacked not only advanced but also basic resources. Liberalisation of the labour market enabled Singapore to find the way to overcome also this second weakness. Through massive migrations from the poorer neighbouring countries, Singapore got access to a cheap labour force, significantly increasing the national human resources base (Hui, Hashami 2007, p. 53).

2.3.4. Types of developmental state models

Singapore and Ireland adopted similar development strategies, but they implemented a different type of developmental state: bureaucratic or network state (O’Riain 2004). The main element distinguishing both types of developmental states is the degree and strategy of coordinating external influences. Thus, although these countries pursued similar strategies, Ireland’s institutional integration into the global economy was higher, and the independence of national institutions and companies lower than in Singapore (Table 2.3).

Table 2.3. Developmental state characteristics: bureaucratic versus network state

Strategy type	Developmental bureaucratic state (DBS) Singapore	Developmental network state (DNS) Ireland
Collective developmental strategies	Creation of national "champions" through dependence management <ul style="list-style-type: none"> ▪ Strategic protectionism ▪ Industrial subsidies ▪ National banking system 	Creation of globalised regions through networking global contacts <ul style="list-style-type: none"> ▪ Local networks around global capital ▪ Globalisation of the regional systems of innovation
Autonomy of institutions	Cohesion of national bureaucracy <ul style="list-style-type: none"> ▪ Institutions docked internally ▪ Internal reporting ▪ Tight linkages 	Elasticity of the government structures <ul style="list-style-type: none"> ▪ Institutions docked internally and externally ▪ External reporting ▪ Loose linkages

Source: O’Riain 2004, p. 37.

Although the analysed economies were affected to a different degree and extent by the effects of the global economic crisis, which began in September 2008, we can distinguish areas of the most important differences between Ireland and Singapore as representatives of different types of the developmental state model:

- **Social capital:** In Singapore, there was an Asian cult of work and savings, while the Irish, due to strong cultural relations with the USA, as the economic situation improved in the 1990s, adopted a consumer lifestyle, heavily indebted. Loans granted to the private sector by Irish banks increased to 200% of GDP in 2008 (EU average: 100% (Lavery, O'Brien 2005)).
- **Current account and budgetary situation:** Before the outbreak of the crisis, the countries surveyed recorded different current account balances. In Ireland, reduced transfers from the EU, an outflow of productive investments, a fall in the volume of exports of goods and stagnation in the real estate market contributed to reduced budget revenues. In Singapore, large exports and re-exports stimulated an increase in current and budget surpluses. It resulted in different options for saving economies when the crisis broke out.
- **Research and development:** While Singapore increased spending on R&D from 1995, reaching the OECD average in 2006, relatively low expenditure in Ireland only slightly increased in 2009, and technology was mainly obtained through the purchase of licences.
- **National banking system:** In the 2000s, both countries evolved into global financial service centers. However, in Singapore, the authorities supervised the banking system, and Ireland, thanks to poor control of financial flows, became known as the "Wild West of European Finances". The structure of liabilities was also different. Before the outbreak of the crisis, banks in Singapore relied heavily on domestic resources, while in Ireland over 37% of the deficit was financed by deposits and securities from international capital markets (Lavery, O'Brien 2005).
- **Pre-crisis prices and wages:** Labour costs grew in Ireland in the 2000s faster than in other EU countries, which – given the appreciation of the effective nominal EUR / USD exchange rate – reinforced the effect of deteriorating price competitiveness. In addition, the Irish real estate bubble began to grow in the mid-2000s. Simultaneously, in Singapore, tighter labour market control and employing cheaper employees from neighbouring countries contributed to a slower wage growth, especially in less technologically advanced economy areas. The Singapore public housing system meant less opportunity for speculation on the real estate market. A slower increase in prices in Singapore weakened the rate of growth of the real exchange rate. The specificity of the Singaporean economy as a transshipment port also allowed the price increase in imports to be passed on to export prices.

- Monetary policy and exchange rate regulation: Singapore and Ireland as small open economies depend on export success. Ireland's participation in the European Monetary Union (EMU) was associated with limited possibilities to adapt the exchange rate to changing external conditions. Meanwhile, in Singapore, monetary policy instruments influenced export prices.
- The economic situation in the region and the reaction of trade partners to the outbreak of the crisis: The growing imbalance of the US economy and the economic problems of the EU Member States contributed to a significant reduction in demand for Irish products and services. In turn, a favourable economic situation in the Asia-Pacific region supported the growth in Singapore.

2.3.5. Implications for catching-up economies

The examples of Ireland and Singapore prove that developmental state strategy focused on attracting export-oriented FDI, as a factor leveraging national ability to catch-up, can lead to a long-term growth. As presented, this convergence is not unconditional though. To sustain high attractiveness for foreign capital, especially investment in the high-value, technology-intensive sectors, governments need to set a clear vision, fitting to the development of the global economy and adjusted to changing expectations of the MNCs.

The analysis shows that the discussed competitiveness model was based on a unique mix of internal and external socio-cultural, historic and geopolitical factors, that met at one point in time and were perfectly matched. Many of these factors like: historical heritage, geographical strategic positioning, and the offset of globalisation, constitute a set of unique characteristics of Singapore and Ireland that can be repeated in the NMS only to a limited extent.

These two success stories – considering the strong elements of both economies, but also areas of prospective future difficulties – enable drawing general conclusions for other catching-up economies, lacking national resources and large domestic markets. In order to sustain high attractiveness in the eyes of foreign investors, host country's institutions continually have to:

1. ensure stability of policy and rules of law in the country; lack of institutional turbulences increases the security of a location for investment, lifting the levels of investors' trust;
2. enable economic freedom for both local and foreign companies;
3. ensure rigid governance over banks and other financial institutions in order not to be vulnerable to global external shocks and negative impacts of financial globalisation;
4. invest in up-to-date infrastructure as well as R&D expertise and facilities: support with financial aids R&D efforts of both public and private entities;
5. create attractive environment for the qualified international specialists;

6. install productivity enhancers to boost productivity growth rates; as an example, the Singaporean Economic Strategies Committee (ESC) recommends installing a Foreign Worker Levy, based upon higher taxes paid by employers for hiring low-qualified foreign workers (ESC 2010, p. 6);
7. develop incentives for firms to invest in human resources: enable access to education and healthcare in order to avoid development of dual economy;
8. support development of “national champions” – strong national companies (and sectors), balancing the role of MNCs; support local innovative start-up scene to mitigate the danger of development of a two-speed economy;
9. develop social security nets to work on reducing the economic inequalities;
10. encourage private savings and ensure a healthy budget situation to mitigate the vulnerability to shocks in the global markets;
11. promote exports diversification as a factor reducing the sensitivity of an open economy to external shocks.

2.4. Modelling competitiveness of a catching-up economy

This subchapter constitutes a comprehensive attempt to conceptually model competitiveness of a catching-up economy as a method for cross-national benchmarks¹⁸.

2.4.1. Catching-up economies as a strategic group on the global competitiveness map

Following the discussion presented in Section 2.1.1, we categorise countries into three strategic groups: developed, developing and catching-up. The developing and catching-up economies are contextually different from the mature, developed countries and can be characterised by weaker institutions, as well as underdeveloped physical and technological infrastructure (Abramowitz 1986). These characteristics affect the business profitability – but to a different extent in the developing and catching-up economies. Developing countries, due to the lack of basic infrastructure necessary to conduct business operations, constitute a very risky business environment and are frequently neglected as investment locations. This fact pushes them even further behind the developed economies, stimulating the global divergence. On the contrary, the catching-up economies, due to the availability of basic infrastructure and institutions, offer opportunities for above-average

¹⁸ An original discussion on modelling competitiveness of a catching-up economy is presented in Žmuda (2018).

returns on invested capital. This encourages mobile factors of production to flow into these locations, supporting their socio-economic convergence.

We evaluate competitiveness of a catching-up economy in the growth-theory context (Reinert 1995, pp. 23–24; Radło 2008, p. 77) as the ability to increase the national productivity level and grow in the socio-economic terms to reach the levels of the most developed countries. It implies, as pointed out earlier in this chapter, that the central points of discussion on the competitiveness of a catching-up economy are closely related to the convergence debate.

As discussed in Subchapter 2.1, globalisation through cross-national technology transfer and migration of human capital, embodying the advanced know-how, can further speed up the rate of convergence. This assumption is supported by the open-economy neoclassical growth model, where the convergence is driven by the technological diffusion, enabling closing the technological gap in the developing countries (Barro, Sala-i-Martin 1992). According to economic theory, integration shapes the national specialisation patterns, based on resource endowments and available technology. In addition, if the accumulation rates of endowments and technology are unequal among countries, comparative advantages will change over time (Tingvall 2004, p. 666).

The main goal of the regional economic integration in general and the European Union in particular, is the socio-economic cohesion between the member states and – as a key external goal being the increased competitiveness of the EU as a whole – in the global markets. The question arises, however, in how far in the era of liberalised flows of production factors and opportunistic relocation strategies of the MNCs, the pursuit of increasing living standards in the more-privileged (richer) EU states endangers the upgrade in socio-economic well-being of the less-privileged (poorer) EU-members – thus contradicting the cohesion objective. Another issue raised in relation to the competitiveness-cohesion goals is whether the principle of the cohesion does not endanger the quality of the research undertaken within the EU (through unequal redistribution of the research fund in favour of the poorer countries) – thus engendering its global competitiveness (Sharp 1998). The third controversial topic within the cohesion-competitiveness discussion would be the fears of the richer countries' population for the relocation of labour-intensive activities of internationally acting companies to the poorer countries within the integrational groups. This would support the convergence of the catching-up economies (for example the NMS within the EU), but simultaneously, stimulate the increasing structural unemployment within the richer countries. All of these aspects should not be underestimated in the competitiveness-cohesion research, as if not addressed properly by academia and policy makers, may lead to protectionist policies frequently raised by the populist parties across Europe. In this sense, it is worth elaborating on the factors supporting convergence, which firstly: shift the position

of catching-up economies within the international division of labour and secondly: increase the competitiveness of the whole integrated group. We address this issue in the next sections.

2.4.2. Factors determining the pace of socio-economic catching-up

Backwardness is not an automatic condition for convergence (Pritchett 1997). A wide body of research has come up with the conditions upon which a catching-up economy has the chance for accelerated closure of the socio-economic gap to the most developed countries. These conditions can be generally divided into two sub-categories: the “inherited” factors that do not change over time, and the factors “that can be shaped” by well designed and implemented policies. The main inherited elements that determine the starting position of a country in the competitive battle include the national geography, history and culture (social substance). The area of policy interventions covers the technological and absorptive capacity, general level of governance and quality of human resources and institutions (Fagerberg, Srholec 2005). We present an overview of the selected key convergence determinants below.

Among the elements, traditionally shaping the well-being of nations are the geopolitical factors, availability of natural resources and geographic position. Interestingly, despite the fact that they do not evolve over time, the impact of the same factors on the competitive position of a country may change. For example, Ireland as a remote, resource-poor, England-dependent island “at the end of Europe”, was for years one of the most marginalised countries on the continent. Thus, its geopolitical situation constituted one of the main developmental barriers. Progressing European integration together with the liberalisation of global trade and investment flows transformed Irish geographic location between the USA and the EU into a valuable asset, supporting the strategic building of its competitiveness (O’Sullivan 1993; Burnham 2003; Anyadike-Danes et al. 2011).

Another aspect that does not evolve over time and cannot be influenced by policy interventions is the social fabric surrounding the business, embodied in the local culture. Culture is understood in this context as a set of core values that legitimate objectives and support different behaviours. The cultural selectivity hypothesis suggests the link between culture and the level of national competitiveness with flexibility, continuous improvement, and individualism supporting individual and macro-success (Tsang 1999). Language, religion, and ethnic grouping have their roots in the history of a country and/or region (Fagerberg, Srholec 2005). These significantly influence the national attitudes and constitute an important part of national cognitive maps (Wilson et al. 2014, p. 307), setting “the context of choice” (Patten 2014) and building up social capital (Fukuyama 1995). Research shows that distinct values across nations can support or hinder the

accumulation of knowledge, thus impacting their ability to compete on the global markets (Tsang 1999).

Besides the inherited factors, there are also elements that can be influenced by a well-designed strategy. Catching-up, just like developing economies, lag behind the developed countries in regard to technological competence, but what enables the convergence process is the capability to assimilate the inflows of knowledge from outside. A successful diffusion of knowledge is a prerequisite for building an internationally competitive position. It depends to a large extent on the host country's absorptive capabilities that are essential to master a new technology, adapt it to local conditions, refine and then develop in the long term. These capabilities, embodied in human capital and the general level of the education, determine the pace of technological progress. Absorption capabilities are not limited to the ability to acquire information from outside but are additionally related to the skill of applying the in-flowing knowledge and its dissemination throughout the national innovation system. As a result, the link between knowledge diffusion and the process of learning depends on the skills of the individuals within the countries, reflecting the cumulative and non-linear nature of this phenomenon. This points out that absorption capacity is dynamic, based on improving the ability to harness the accumulated knowledge. In this sense, through feedback within the system, the innovation process takes the form of a closed cycle. Such a broadly understood human side of catching-up is labelled by Abramowitz as a social capability. He stresses that convergence is possible when a catching-up country is "technologically backward, but socially advanced" (Abramowitz 1986, p. 388).

Extensive research stresses the impact of the quality and stability of institutions on the pace of convergence. According to institution-based approach, transaction costs are high when institutions do not regulate and do not eliminate the opportunistic behaviour of individuals and business entities. As a result, the stronger the institutions, the lower the risk and the higher the levels of trust in business deals. This stimulates the long-term investment and determines the effective utilisation of physical and human capital. Thus, the institutions influencing productivity stimulate the ability of a nation to reach its socio-economic goals. Institutions, in the broad sense, indicate the "quality of governance" in the country and in the narrow sense, point out the "rules of the game" (Fagerberg, Srholec 2005).

The fundamental task of institutions is to minimise risks by signaling to the actors within the system what behaviour is acceptable. As the institutions can evolve over time, research stresses the importance of the stability of the institutional order and governance. Rapid institutional changes increase the uncertainty and confuse the market participants, which negatively impacts long-term investment decisions.

Rules cover conditions impacting the economic freedom (to execute market transactions), by supporting property rights and its legal protection. They are essential for the emergence of competition. The economic freedom is restricted by institutions through the legal framework that aims to eliminate the opportunistic behaviour that could harm other system participants. Such fundamental limitations include the legal conditions that guarantee compliance with the contract. This category also includes the compliance with patents, licensing rights or concessions.

2.4.3. Smart integration within the international division of labour as a strategy to enhance competitiveness of a catching-up economy

As discussed in Subchapter 2.2, for a catching-up economy – with limited access to resources and often lacking large, sophisticated internal markets – the convergence, being the main growth objective, can be achieved through the extension of its supply and demand base (Castello, Ozawa 1999; Molendowski, Żmuda 2013). This is enabled by integration within the network of global interconnections as a part of a “smart” competitiveness strategy (Lall 2004) in the developmental state style.

The concept of a developmental state (discussed in Subchapter 2.3) enables “designing a state capacity to intervene in the economy to guide its development” (Caldentey 2008). The goal of such a strategy is to design a growth path for the country within the global economy by strengthening the areas of specialisation towards those based on knowledge and innovation. Following the strategic management logic, reaching developmental goals may be achieved through strategic actions that, building upon national strengths, exploit the external opportunities or actions that, taking advantage of opportunities, aim at overcoming national weaknesses. Thus, such a “Smart Strategy” has two dimensions: internal, which aims at boosting national convergence abilities and external, which supports the attracting of foreign production factors to the selected industries of the future.

In its internal dimension, designing strategies to shape competitiveness refers to “creating the right environment for output maximisation”, which in consequence, leads to the increased national welfare (Cotis et al. 2010, pp. 19–20). The main focus of these strategies should be laid on stimulating market competition and strengthening the firm’s and worker’s ability to adjust to the competitive pressures. Main policy areas include: investment in physical and technological infrastructure (Kiel et al. 2014; Palei 2015), strengthening social capital through investment in education and health (Baldacci et al. 2008), enforcement of regulations in the product and labour markets (Blahó, Szajp 2005), encouraging entrepreneurship and enterprise development (Bateman 2000; Acs, Szerb 2007), providing support for SMEs (Taylor 2004), as well as supporting broadly

understood economic freedom (Bujancă, Ulman 2015) and openness of the economy (Slaughter 1997; Zhang 2001). In its external dimension, the strategy should support development of strong agencies to attract foreign investors (Huff 1999).

2.4.4. Competitiveness pyramid of a catching-up economy

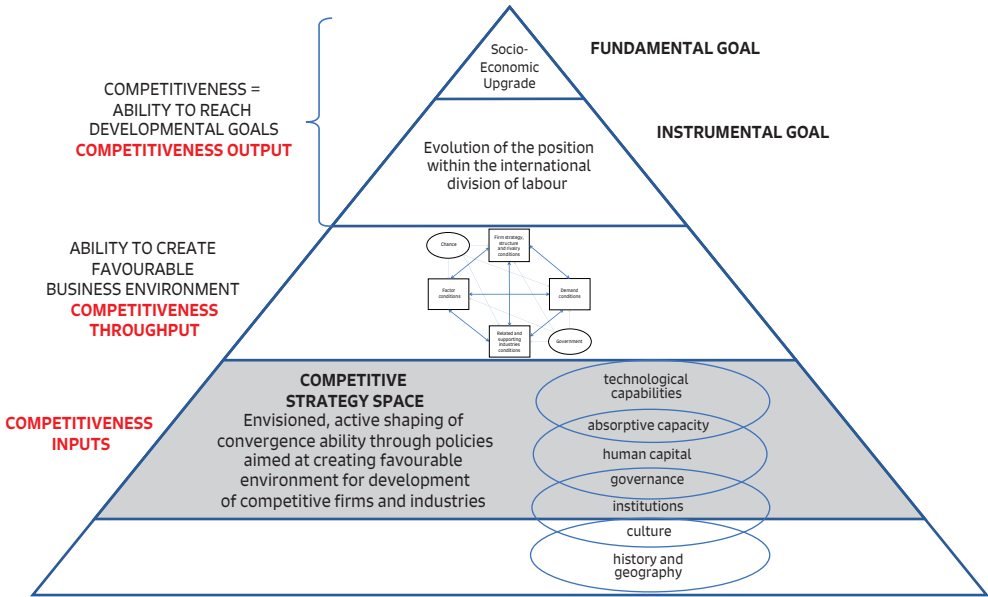
To summarise the findings indicated so far, we present a multidimensional competitiveness model of a catching-up economy. It is a result of the analysis of competitiveness dimensions through the prism of convergence determinants. The findings are concluded in the form of a competitiveness pyramid of a catching-up economy (Figure 2.6).

Following the definition suggested in this chapter, we associate competitiveness with the national ability to achieve its developmental goal. We further divide the goals into fundamental and instrumental, whereas reaching an instrumental goal supports reaching a fundamental goal. The socio-economic upgrade, which enables converging to the standard of the most developed countries, has been set as fundamental goal of a catching-up economy. Thus, it is placed at the top of the pyramid – as the crowning of efforts undertaken at lower pyramid levels. The instrumental goal is to strengthen the country's position within the international division of labour, understood as ability to increase the profits from domestic and foreign production factors and exchanging them under the open economy conditions. Reaching this goal is reflected through the evolution of export structure towards the specialisation based on knowledge and innovation – as a result of increased levels of innovation and improved productivity. All the developmental goals are referred to as competitiveness outputs.

The competitiveness of a nation is enabled by cumulative successes of competitive companies operating within its territory. These successes, reflected in the productivity levels, are rooted in the quality of business environment. Thus, we see national sources of competitive advantage as competitiveness throughputs. The more supportive the domestic business environment, the greater the chances for companies to achieve competitive advantage on the international markets, and the more attractive this territory gets for foreign production inflows. Strong companies build up mezo-competitiveness: at the cluster and industry levels.

The base of the pyramid, the competitiveness inputs, is made by a set of key convergence determinants, supported by a smart competitive strategy. The strategy includes all the actions the government takes to strengthen the convergence ability through investment in infrastructure, improvement of the quality of business environment, strengthening social capital and increasing attractiveness of the location for foreign direct investment.

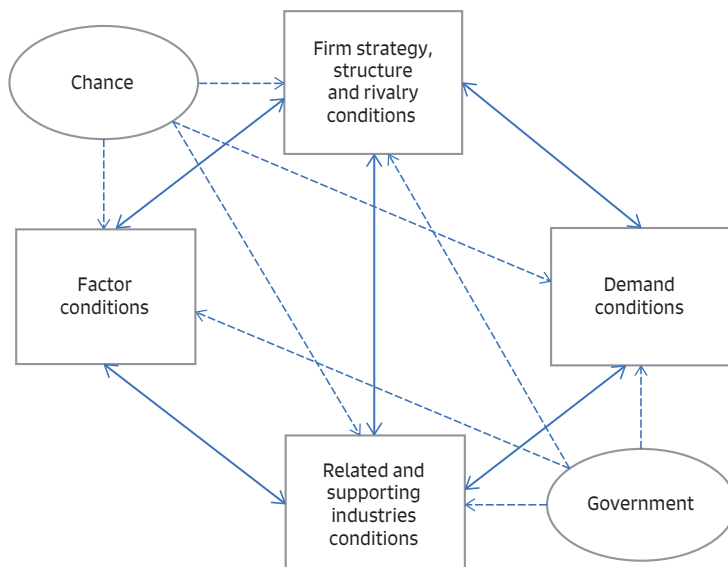
Figure 2.6. Competitiveness pyramid of a catching-up economy



Source: own elaboration based on competitiveness models by the National Competitiveness Council 2016, Porter 1990, Fagerberg, Srholec 2005, p. 33.

The competitiveness inputs (the inherited factors and those that can be shaped over time) enable throughput competitiveness: competitiveness of a country determined by the quality of a business environment that supports the companies operating within its territory to successfully compete in the global markets (Porter, Rivkin 2012). The cumulative success of companies and industries on the global competitive arena supports reaching the output competitiveness. Our model stresses the active role of government in designing and implementing a strategy enhancing national competitiveness.

This very logic can be found in Porter’s diamond model, where the competitiveness of a nation is associated with the national productivity level and results from the efficient use of available production factors on the business level. Joint micro-successes are enabled by interrelated mezo- and macro-determinants (sources of national competitive advantage): factor conditions, demand conditions, related and supporting industries, firm strategy, structure and rivalry – supported by external factors: chance and government. The “diamond” of interactions between these elements constitutes the context for business development (Figure 2.7). Numerous researchers focused on adjusting the diamond model to the characteristics of the global economy to reflect the growing importance of international trade and flows of production factors. This is of particular relevance when applying the model to catching-up economies.

Figure 2.7. Diamond of national competitive advantage

Source: Porter 1990.

2.5. Summary

In this chapter, we conceptualise and model the competitiveness of a catching-up economy in the era of global interconnections. Acknowledging that every economy is characterised by features that establish basis for building its competitiveness, we treat catching-up economies as a separate strategic group on the international arena.

By distinguishing the starting positions of economies at different stages of development, following Porter's diamond approach, we found that small catching-up economies, by their characteristics, possess relatively weaker sources of a national competitive advantage. It is visible mainly through internal developmental constraints on the demand and supply side. Consequently, these limitations potentially worsen opportunities for companies from the catching-up economies to achieve a strong competitive position on the international arena.

Nevertheless, we argue that these limitations may be neutralised by the benefits of the integration within the international economic networks. This is possible due to the development of the global economy, in particular the liberalisation of trade and the flow of production factors, the intensification and evolution of forms of international economic cooperation, as well as the development of global value chains.

Evidence shows that by taking advantage of the opportunities currently created by the external environment and through a properly constructed and implemented “smart” integration strategy, a catching-up economy, whose companies obtain additional sources of competitive advantage from outside, has a chance to improve its international competitive position and, as a result, achieve developmental goals.

Due to a high degree of globalisation of production and the alignment of consumer preferences, international competition is associated with the evolution of specialisation (production and export) as a result of a more effective use of more advanced production factors, with the main focus on modern technology. The catching-up economies, while building their position in the global value chains, should therefore aim at eliminating the outdated patterns of specialisation in resource- and labour-intensive industries. Their success, i.e. promotion to the group of developed countries, depends on whether and how fast they manage to move to technology-intensive production and specialisation based on knowledge and innovation. Due to the prospective growth of income from the use of more advanced production factors, social welfare could increase – which constitutes the fundamental goal of a competitive economy.

The best practice examples of Ireland and Singapore show that smaller economies, according to Porter’s model, doomed to fail in the global competitive struggle, achieved significant successes. These countries, as “children of globalisation”, built up their global position on the ability to effectively integrate within the network of international interconnections. This was achieved through “smart” opening their economies to the flows of foreign direct investment, as well as engagement in international trade.

In our analysis, we pay special attention to the interdependencies between FDI inflows and competitiveness of a host catching-up economy. We identify two-way relations: on the one hand: a more competitive host country attracts more FDI; on the other hand: FDI inflows affect host country’s exports, growth and innovativeness, thus improving its competitiveness. A number of mechanisms of the impact of FDI on competitiveness has been identified. The most important factors are transfers of knowledge and technology, and in effect: the improvement of innovativeness and stimulation of quantitative and qualitative changes in the structure of foreign trade. Following the empirical studies, we confirm a decisive role of domestic factors in stimulating the positive effects of FDI inflows on the socio-economic development of a catching-up economy, and thus its competitiveness in the long run.

We suggest a model, which is a multidimensional view on the competitiveness of a catching-up economy, to conclude our conceptual findings. In this model, the “ability to upgrade” socio-economic positioning, embodied in the pace of convergence, constitutes a fundamental goal for a catching-up economy. The ability to reach this fundamental goal is enabled by achieving an instrumental objective: evolution of position within international

division of labour. Reaching both fundamental and instrumental goals of the nation is supported by ability of companies, operating within its territories to sustain pressures of global competition and successfully establish their presence abroad (Porter, Rivkin 2012, p. 56). The creation of the environment, supportive of globally competitive companies – both domestic and foreign – depends on the set of interrelated social, institutional, economic, and technological determinants of convergence.

The first two chapters of this monograph constitute a theoretical foundation for the empirical investigation into the competitiveness of the EU new member states in the years 2000–2014.

CHANGES IN COMPETITIVENESS OF THE NEW EU MEMBER STATES

In this chapter, we present the analysis results aimed to identify selected aspects of competitiveness of the New EU Member States (NMS), treated as catching-up economies. We open our discussion with developing the classification of the NMS in order to create homogenous groups, encompassing countries with similar levels of competitiveness, measured by the Global Competitiveness Index (GCI), using the one-way analysis of variance (ANOVA) (Subchapter 3.1). Along with the competitiveness model dimensions, suggested in Chapter 2, we check the ability of the NMS to achieve their developmental goals. In Subchapter 3.2, we concentrate on the fundamental goal, analysing changes in the NMS welfare. Then, we proceed to the instrumental goals. In Subchapter 3.3, we have a look at changes in NMS exports. Of our special interest are the changes in the geographical structure and the exports evolution towards specialisation based on knowledge and innovation. In the next part (3.4), we present the results of analysis of changes in the NMS technological potential. We discuss the role of institutions in shaping inventive activity of catching-up economies as well, investigating the connection between technological potential and ability to innovate. In Subchapter 3.5, we focus on the evolution of determinants of the competitive positions of the NMS (from basic requirements through efficiency enhancers to the innovation and sophistication factors). The Summary follows Subchapter 3.6.

3.1. The NMS international competitive position

In this subchapter, we present the results of analysis of the NMS competitive position. We begin with grouping these countries along their competitiveness levels. Then, we analyse changes in Poland's competitive position in relation to the other NMS.

Over the last years, researchers introduced a number of national competitiveness measures with many approaches to rank countries, based on the levels of their competitiveness. As we demonstrated in Subchapter 1.2, one of the most comprehensive and most frequently quoted rankings is the Global Competitiveness Report (GCR) that bases on the Global Competitiveness Index. We will use this ranking to benchmark the competitiveness of Poland against the other NMS.

3.1.1. Competitiveness of the NMS and their trade and investment links with the EU-15

This section offers the classification of the NMS based on the level of their competitiveness measured by the GCI¹. The groups differ in the value of the GCI. The sample of the NMS contains, as usual, 10 countries: Bulgaria, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. We include into these considerations, remarks about the possible linkages between the competitiveness of the NMS and their trade and investments relationships with the EU-15 states.

The analytical tool applied in this research is a one-way analysis of variance (ANOVA) with the following data divided into three parts. The first part contains basic information about the GCI. In the second part, we present the results of ANOVA. The third part describes the special positions of Czechia, Estonia and Slovenia in the context of their trade and investment links with Germany, Finland and Austria, respectively.

The dependent variable in this research is the value of GCI in 10 NMS at the same point of time and coming from a single edition of GCR (one dependent variable and one ANOVA for one edition of the Report). These cross-sectional data referring to the whole population (set) of states are treated like a sample from a hypothetical general population. Even if in reality the hypothetical population does not exist, it can be defined

¹ The report was published for the first time in 1979 and was systematically extended to the new countries. In 2015, it included over 140 countries. Initially, it contained the Competitiveness Index prepared under the supervision of J. Sachs, in which bases for the mid- and long-term- economic development were shown. In 2000, its name was changed to the Growth Competitiveness Index to differentiate it from the current microeconomic competitiveness indices issued under the various names in the various reports. In 2004, it was replaced by the GCI prepared by the World Economic Forum in cooperation with X. Sala-i-Martin with the use of studies by M. Porter.

as a population created by the repeated events: the measuring of the competitiveness at the different points of time.

Table 3.1. The GCI values in the NMS

GCR edition	2006–2007	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013	2013–2014	2014–2015	2015–2016	2016–2017	2017–2018
Bulgaria	3.98	3.93	4.03	4.02	4.13	4.16	4.27	4.31	4.37	4.32	4.44	4.46
Romania	3.98	3.97	4.10	4.11	4.16	4.08	4.07	4.13	4.30	4.32	4.30	4.28
Estonia	4.82	4.74	4.67	4.56	4.61	4.62	4.64	4.65	4.71	4.74	4.78	4.85
Lithuania	4.49	4.49	4.45	4.30	4.38	4.41	4.41	4.41	4.51	4.55	4.60	4.58
Latvia	4.47	4.41	4.26	4.06	4.14	4.24	4.35	4.40	4.50	4.45	4.45	4.40
Czechia	4.67	4.58	4.62	4.67	4.57	4.52	4.51	4.43	4.53	4.69	4.72	4.77
Poland	4.39	4.28	4.28	4.33	4.51	4.46	4.46	4.46	4.48	4.49	4.56	4.59
Slovenia	4.48	4.48	4.50	4.55	4.42	4.30	4.34	4.25	4.22	4.28	4.39	4.48
Slovakia	4.54	4.45	4.40	4.31	4.25	4.19	4.14	4.10	4.15	4.22	4.28	4.33
Hungary	4.49	4.35	4.22	4.22	4.33	4.36	4.30	4.25	4.28	4.25	4.20	4.33

Source: own study based on the World Economic Forum 2007–2018.

Additionally, in this research, the factor in ANOVA is the NMS affiliation with the group (subset, category). The set of 10 NMS is divided into groups by different criteria. The first criterion is based on the geopolitics and/or cultural similarity of the countries. Thus, there are three groups: (1) the Baltic states (Estonia, Latvia and Lithuania), (2) Bulgaria and Romania which joined the EU not in 2004, but in 2007, and (3) the Visegrad countries (Czechia, Hungary, Poland and Slovakia) together with Slovenia. According to the second criterion, Czechia, Estonia and Slovenia are detached from the previous groups and they create a separate group. These three countries are quite specific as they are strictly and uniquely tied (in the economic, political and cultural sense) with Germany, Austria and Finland respectively. Moreover, these small economies achieve relatively higher levels of competitiveness (measured by the GCI) than similar-sized Slavonic/ Visegrad and Baltic countries. In Table 3.1, we present Estonia in comparison with Lithuania and Latvia, as well as Czechia and Slovenia in comparison with – respectively – Slovenia and Hungary². Finally, the third criterion is a simplified version of the second criterion. In this last setting, there are only two groups of countries: (1) Czechia, Estonia and Slovenia and (2) Bulgaria, Romania, Lithuania, Latvia, Poland, Slovenia, Slovakia and Hungary.

² Poland is much bigger than the Baltic and other Slavonic/Visegrad countries, thus it is not taken into consideration as the reference country.

Table 3.2. The ANOVA results (part I)

Factor – the state affiliation with the group	
Group 1: Estonia, Latvia and Lithuania (Baltic countries)	
Group 2: Bulgaria and Romania (states which joined the EU not in 2004 but in 2007)	
Group 3: Czechia, Hungary Poland, Slovakia and Slovenia (Visegrad countries plus Slovenia)	
Dependent variable	F-value (F-value = Mean square between/Mean Squared Error)
GCI (2006-2007)	16.20***
GCI (2007-2008)	12.57***
GCI (2008-2009)	7.07**
GCI (2009-2010)	8.24**
GCI (2010-2011)	5.25**
GCI (2011-2012)	3.23
GCI (2012-2013)	1.82
GCI (2013-2014)	0.61
GCI (2014-2015)	0.18
GCI (2015-2016)	0.52
GCI (2016-2017)	0.74
GCI (2017-2018)	1.52

*** p < 0.01, ** p < 0.05, * p < 0.1

Source: own study based on the computations made in STATA.

Table 3.3. The ANOVA results (part II)

Factor – the state affiliation with the group of countries	
Group 1: Lithuania and Latvia	
Group 2: Bulgaria and Romania	
Group 3: Poland, Slovakia and Hungary	
Group 4: Estonia, Czechia and Slovenia	
Dependent variable	F-value (F-value = Mean square between/Mean Squared Error)
GCI (2006-2007)	16.29***
GCI (2007-2008)	19.79***
GCI (2008-2009)	13.41***
GCI (2009-2010)	16.31***
GCI (2010-2011)	4.76*
GCI (2011-2012)	2.87
GCI (2012-2013)	2.34
GCI (2013-2014)	1.04
GCI (2014-2015)	0.89
GCI (2015-2016)	1.47
GCI (2016-2017)	1.64
GCI (2017-2018)	2.28

*** p < 0.01, ** p < 0.05, * p < 0.1

Source: own study based on the computations made in STATA.

According to the ANOVA results (Tables 3.2–3.4), the third criterion is the best in order to create homogenous groups containing countries with similar levels of competitiveness measured by the GCI. Firstly, in the case of the third criterion, there is the highest number of the dependent variables with the statistically significant F-value. Secondly, the third criterion is also the best in the case of the most recent edition of GCR (the highest F-value for the 2017–2018 edition).

Table 3.4. The ANOVA results (part III)

Factor – the state affiliation with the group of countries	
Group 1: Czechia, Estonia and Slovenia	
Group 2: Latvia, Lithuania, Bulgaria, Romania, Hungary, Poland and Slovakia	
Dependent variable	F-value (F-value = Mean square between/Mean Squared Error)
GCI (2006-2007)	4.14*
GCI (2007-2008)	5.32*
GCI (2008-2009)	13.52***
GCI (2009-2010)	24.95***
GCI (2010-2011)	8.10**
GCI (2011-2012)	4.23*
GCI (2012-2013)	4.57*
GCI (2013-2014)	1.87
GCI (2014-2015)	0.98
GCI (2015-2016)	2.98
GCI (2016-2017)	3.85*
GCI (2017-2018)	7.60**

*** p < 0.01, ** p < 0.05, * p < 0.1

Source: own study based on the computations made in STATA.

Czechia, Estonia and Slovenia as the countries with special trade and investment links with Germany, Finland and Austria

For the purpose of calculating the intensity of trade between the new member states (Czechia, Estonia and Slovenia) and the EU-15 members (Germany, Finland and Austria respectively), we applied the index proposed by Srivastava and Green (1986). It is the ratio of the actual value of trade between countries *i* and *j*, to the expected value of trade between the two countries. For example, if country *i* accounts for 10% of the value of the world exports and country *j* accounts for 5% of the value of the world imports, then the expected value of exports from country *i* to country *j* would be 0.5% ($0.1 \times 0.05 = 0.005$) of the world exports. If the actual value of exports from country *i* to country *j* is 0.8% of the world exports, the index of the intensity of trade between countries *i* and *j* (calculated

from the point of view of the exporter, i.e. country i) is 1.6. If the value of the trade intensity index proposed by Srivastava and Green is greater than 1, it means that the trade relation between countries i and j is stronger than expected based on the countries' shares in the world trade. In this case, we can speak about special or especially intensive bilateral relations. The indices smaller than 1 reflect a weaker-than-expected relation.

The values of the trade intensity indices confirm that the trade relations between Czechia and Germany, Estonia and Finland, as well as Slovenia and Austria are very strong and they are almost always much stronger than the trade relationships between other NMS and Germany, Finland and Austria – see Table 3.5. What is most noticeable is the strength and the uniqueness of the trade relations between Estonia and Finland. In this case, the values of the trade intensity index are extremely high.

In order to assess the intensity of the FDI relationships between a host country (Czechia, Estonia and Slovenia) and a home country (Germany, Finland and Austria respectively), we use the FDI intensity index based also on the idea of the trade intensity index developed by Srivastava and Green (1986). The FDI intensity index between host country (i) and home country (j) is equal to the ratio that compares the actual value of the FDI inward stock³ in country i coming from country j with the expected value given the world position of each of partners as the host and home countries respectively. Analogically to the trade intensity index, if the FDI intensity index is greater than 1, the bilateral FDI relation between country i and country j is stronger than would be expected based on the relative importance of the two economies as the host and home countries. If the index is less than 1 than the relations are weaker than expected.

The values of the FDI intensity index confirm that also the investment relations between Czechia and Germany, Estonia and Finland, as well as Slovenia and Austria are very strong and they are almost always much stronger than the trade ties between other new member states and Germany, Finland and Austria, respectively – see Table 3.6. Again, worth mentioning is the strength and the uniqueness of the FDI relationship between Estonia and Finland. Simultaneously, in the case of the FDI the relationship between Slovenia and Austria is even stronger.

³ We use the FDI stocks (instead of flows) in calculating the value of the FDI intensity index for two reasons. Firstly, in the case of disinvestment, the value of the flows is negative. It is debatable how to compute the FDI intensity index in such cases. Secondly, the FDI stocks represent the long-term investment position of the host or home country in the world FDI. The flows represent the short-term (annual) investment position and are more exposed than the stocks are to the short-term fluctuations, especially in the cases of small countries – for more, see Folfas 2010.

Table 3.5. The values of the trade intensity indices

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
IMPORTER: GERMANY																							
EXPORTER																							
Bulgaria	1.02	1.08	1.21	1.25	1.20	1.20	1.26	1.30	1.39	1.35	1.36	1.32	1.37	1.27	1.55	1.55	1.75	1.65	1.97	1.90	2.01	2.05	2.08
Croatia	2.49	2.17	2.48	2.03	1.93	1.91	1.95	1.70	1.52	1.48	1.48	1.41	1.35	1.49	1.50	1.51	1.48	1.64	1.89	1.76	1.78	1.79	1.86
Czechia	4.24	4.32	4.56	5.21	5.25	5.42	5.04	5.45	4.76	4.58	4.65	4.36	4.10	4.25	4.42	4.64	4.70	5.05	4.99	5.02	5.08	4.95	5.05
Estonia	0.81	0.85	0.71	0.66	0.91	1.02	0.82	1.13	1.07	1.09	0.84	0.68	0.70	0.70	0.84	0.76	0.67	0.72	0.73	0.76	0.83	0.84	1.12
Hungary	3.19	2.87	4.70	4.34	4.73	4.98	4.71	4.79	4.36	4.18	4.13	3.95	3.79	3.70	3.48	3.64	3.60	4.00	4.16	4.40	4.40	4.27	4.20
Latvia	1.54	1.65	1.76	1.87	2.08	2.30	2.20	2.10	1.91	1.76	1.41	1.32	1.12	1.03	1.11	1.18	1.11	1.15	1.09	1.01	0.96	1.04	1.05
Lithuania	1.62	1.54	1.45	1.57	1.98	1.92	1.66	1.41	1.27	1.36	1.30	1.17	1.41	1.00	1.33	1.44	1.34	1.26	1.15	1.14	1.25	1.18	1.13
Poland	4.33	4.13	4.20	4.34	4.47	4.65	4.54	4.36	4.13	3.91	3.91	3.65	3.46	3.51	3.58	3.74	3.80	3.89	3.98	3.98	4.17	4.02	4.01
Romania	2.05	2.20	2.15	2.35	2.19	2.10	2.06	2.12	2.02	1.98	1.95	2.13	2.27	2.29	2.58	2.63	2.72	3.00	2.97	3.04	3.14	3.31	3.53
Slovakia	2.08	2.27	3.02	3.44	3.36	3.61	3.59	3.55	3.99	3.80	3.57	3.14	2.82	2.77	2.68	2.79	2.94	3.41	3.32	3.45	3.55	3.36	3.17
Slovenia	3.43	3.57	3.68	3.34	3.72	3.61	3.35	3.25	2.79	2.62	2.47	2.47	2.62	2.74	2.73	2.95	3.12	3.44	3.27	3.15	3.27	3.15	3.15
IMPORTER: FINLAND																							
EXPORTER																							
Bulgaria	0.31	0.30	0.30	0.37	0.37	0.37	0.27	0.31	0.27	0.22	0.21	0.76	0.47	0.34	0.35	0.39	0.40	0.43	0.41	0.88	0.73	0.46	0.43
Croatia	0.19	0.08	0.07	0.05	0.10	0.09	0.27	0.20	0.37	0.20	0.24	0.22	0.23	0.28	0.35	0.32	0.47	0.60	0.46	0.59	0.50	0.46	0.58
Czechia	0.79	0.72	0.71	0.80	0.79	0.80	0.84	0.78	0.77	0.71	1.02	1.03	0.99	1.14	1.25	1.29	1.24	1.16	1.17	1.30	1.46	1.39	1.44
Estonia	38.20	32.11	28.21	32.27	34.79	52.43	55.64	39.65	40.12	41.78	48.29	32.14	30.86	33.04	38.69	37.94	32.63	35.25	39.27	36.72	43.28	40.07	41.38
Hungary	0.74	0.61	0.82	0.76	0.67	0.68	1.25	1.35	1.49	3.76	1.91	1.00	0.82	0.91	0.73	0.78	0.55	0.62	0.78	0.68	0.91	0.87	0.84
Latvia	5.72	4.16	2.78	3.67	3.45	3.70	4.49	4.54	4.91	4.96	6.39	4.98	5.20	5.09	5.52	6.58	6.13	5.95	5.93	4.58	4.80	4.98	4.88
Lithuania	1.91	1.71	1.33	1.45	1.89	2.47	2.73	2.29	2.80	1.61	1.81	1.54	2.33	2.46	3.43	3.11	2.87	2.90	3.30	3.27	4.26	4.86	4.36
Poland	2.74	2.26	2.32	1.54	1.74	1.34	1.57	1.29	1.17	1.44	1.42	1.19	1.24	1.56	1.70	1.58	1.63	1.76	1.87	2.05	2.03	2.06	1.93
Romania	0.15	0.13	0.13	0.22	0.07	0.06	0.07	0.09	0.12	0.14	0.19	0.22	0.30	0.33	0.40	0.54	0.52	0.55	0.58	0.66	0.76	0.70	0.80
Slovakia	0.79	0.47	0.64	0.64	0.73	0.81	0.77	0.94	1.24	1.29	1.31	1.88	1.06	2.43	0.59	0.73	0.68	0.68	0.62	0.62	0.80	0.78	0.73
Slovenia	0.45	0.46	0.44	0.41	0.39	0.52	0.63	0.55	0.48	0.53	0.55	0.62	0.65	0.61	0.64	0.64	0.61	0.65	0.63	0.56	0.59	0.56	0.75

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
EXPORTER																								
Bulgaria	0.81	0.83	0.95	1.34	1.39	1.30	1.43	1.43	1.58	1.74	1.59	1.75	1.62	1.85	1.75	1.83	1.85	1.91	1.86	1.80	1.92	1.96	1.89	
Croatia	3.50	3.43	4.84	4.44	5.05	6.08	4.93	6.35	6.06	7.45	6.06	5.44	5.33	5.16	4.79	5.13	5.50	6.81	6.50	6.36	6.95	6.49	6.28	
Czechia	5.20	5.17	5.56	5.47	5.32	5.50	4.95	5.87	4.88	4.41	4.66	4.61	3.97	4.21	4.17	4.53	4.37	4.81	4.67	4.51	4.33	4.34	4.50	
Estonia	0.23	0.19	0.24	0.36	0.39	0.38	0.42	0.41	0.39	0.34	0.39	0.44	0.56	0.40	0.35	0.37	0.38	0.35	0.29	0.31	0.36	0.34	0.36	
Hungary	7.77	6.67	9.68	8.51	7.87	7.98	6.82	6.00	6.33	5.70	4.68	4.29	3.92	4.37	4.01	4.71	5.38	5.96	5.77	5.86	5.20	4.94	4.93	
Latvia	0.22	0.33	0.27	0.49	0.51	0.59	0.52	0.51	0.39	0.39	0.35	0.38	0.47	0.35	0.60	0.30	0.30	0.26	0.35	0.39	0.53	0.40	0.42	
Lithuania	0.40	0.43	0.48	0.55	0.75	0.37	0.23	0.18	0.24	0.24	0.20	0.25	0.37	0.27	0.33	0.33	0.28	0.29	0.34	0.35	0.40	0.46	0.50	
Poland	1.69	1.59	1.61	1.59	1.66	1.81	1.71	1.52	1.30	1.53	1.76	1.63	1.63	1.76	1.68	1.83	1.84	1.91	1.81	1.72	1.84	1.76	1.87	
Romania	1.55	1.68	1.82	2.44	2.34	2.22	2.58	2.58	2.51	2.46	2.63	2.37	2.23	2.03	2.10	2.23	2.13	2.39	2.45	2.48	2.68	2.44	2.39	
Slovakia	3.82	4.49	6.21	6.06	6.50	7.75	7.01	6.57	5.84	6.25	6.03	5.43	5.02	5.03	5.20	6.50	6.63	6.82	6.36	6.32	6.41	5.88	6.11	
Slovenia	5.02	5.35	5.79	5.52	6.30	7.62	7.18	6.83	6.68	6.97	6.04	6.72	6.40	6.64	6.64	7.52	7.68	8.55	8.53	8.77	8.55	8.33	7.94	

IMPORTER: AUSTRIA

Source: own study based on UNCTAD data accessed on 10.07.2018.

Table 3.6. The values of the FDI intensity indices

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
HOST COUNTRY																								
Bulgaria	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Croatia	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Czechia	n/a	n/a	2.67	2.54	4.60	3.93	3.16	n/a	2.66	2.90	3.05	3.17	2.34	1.94	1.99	2.11	2.30	2.04						
Estonia	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.33	0.28	0.34	0.30	0.34	0.30	0.22	0.40	0.35	0.30						
Hungary	n/a	n/a	n/a	3.06	6.46	4.94	3.61	3.36	3.27	3.70	3.68	4.14	3.71	3.04	3.17	3.55	4.37	3.56						
Latvia	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Lithuania	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Poland	1.53	1.72	1.86	1.84	3.57	2.99	2.52	2.20	2.40	2.39	2.62	2.72	2.58	2.33	2.60	2.32	2.51	2.59						
Romania	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	

HOME COUNTRY: GERMANY

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
Slovakia	n/a	n/a	n/a	n/a	n/a	2.29	2.07	2.60	2.08	2.31	2.31	2.51	1.80	1.87	1.55	1.86	1.65	1.71	
Slovenia	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.24	1.24	0.99	1.14	1.20	1.23	1.22	
HOME COUNTRY: FINLAND																			
Bulgaria	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Croatia	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Czechia	n/a	n/a	0.07	0.11	0.11	0.87	0.66	n/a	0.19	0.21	0.13	0.11	0.13	0.12	0.16	0.21	0.30	0.27	
Estonia	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	30.22	28.68	35.60	40.88	39.44	34.08	33.27	36.55	39.14	36.32	
Hungary	n/a	n/a	n/a	0.38	0.57	1.27	1.66	1.53	1.94	2.21	2.69	1.44	1.53	1.23	1.79	2.06	0.46	0.28	
Latvia	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lithuania	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Poland	1.44	1.58	1.49	1.17	1.19	0.94	0.91	0.87	1.19	1.07	1.92	1.70	1.85	1.78	1.57	1.42	1.71	1.68	
Romania	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Slovakia	n/a	n/a	n/a	n/a	n/a	0.15	0.13	0.13	0.10	0.19	0.17	0.09	0.09	0.17	0.26	0.51	0.55	0.56	
Slovenia	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.00	0.47	0.43	0.45	0.47	0.55	0.50	
HOME COUNTRY: AUSTRIA																			
Bulgaria	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Croatia	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Czechia	n/a	n/a	35.18	41.22	37.84	33.46	25.54	n/a	20.15	18.06	18.39	16.11	13.29	13.12	13.61	14.92	14.65	14.08	
Estonia	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2.97	2.16	2.11	1.67	1.34	0.98	1.26	1.45	1.56	1.63	
Hungary	n/a	n/a	n/a	27.71	25.26	22.85	22.65	16.60	16.57	16.37	16.01	16.59	17.50	15.77	15.38	14.81	13.19	12.39	
Latvia	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lithuania	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Poland	17.15	14.05	14.03	11.07	11.95	9.88	8.68	6.55	6.74	8.34	8.51	5.54	4.82	4.24	4.58	4.18	4.59	4.38	
Romania	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Slovakia	n/a	n/a	n/a	n/a	n/a	30.27	33.26	11.41	22.66	21.04	19.65	17.62	15.25	16.48	19.48	19.35	18.73	17.37	
Slovenia	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	46.61	72.14	64.82	73.60	75.33	71.41	65.84	

Source: own study based on UNCTAD and OECD data; access: 10.07.2018.

Table 3.7. The values of GCI in the pairs: Czechia – Germany, Estonia – Finland, Slovenia – Austria

GCR edition	2006–2007	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013	2013–2014	2014–2015	2015–2016	2016–2017	2017–2018
Czechia	4.67	4.58	4.62	4.67	4.57	4.52	4.51	4.43	4.53	4.69	4.72	4.77
Germany	5.23	5.28	5.22	5.12	5.11	5.18	5.27	5.31	5.28	5.31	5.40	5.53
Estonia	4.82	4.74	4.67	4.56	4.61	4.62	4.64	4.65	4.71	4.74	4.78	4.85
Finland	5.25	5.19	5.21	5.17	5.09	5.19	5.30	5.30	5.27	5.22	5.26	5.30
Slovenia	4.48	4.48	4.50	4.55	4.42	4.30	4.34	4.25	4.22	4.28	4.39	4.48
Austria	4.98	5.02	5.03	4.98	4.93	4.94	5.01	4.97	4.96	4.89	5.00	5.03

Source: own study based on the World Economic Forum 2007–2018.

Despite the uniqueness of the trade and investment relations between Czechia and Germany, Estonia and Finland, and Slovenia and Austria, the gap in the GCI values between the NMS and EU-15 remains quite stable – see Table 3.7. In 2006–2007, the value of the GCI index for Germany was 0.56 higher than the value of the GCI index for Czechia. In 2017–2018, the difference became even greater (0.76). The difference in the GCI values between Estonia and Finland in 2006–2007 was 0.43 and in 2017–2018 was almost the same (0.45). The analogical numbers for Slovenia and Austria were: 0.5 and 0.55. So, the values of GCI for Czechia, Estonia and Slovenia were significantly higher than the GCI values for other NMS, but still much lower than the values of the GCI for Germany, Finland and Austria.

3.1.2. Changes of the competitive position of Poland against the other NMS

In this section, we use the GCI again but this time we evaluate the competitive position of Poland in comparison with the other NMS. In section 3.1.1, we do not focus only on the GCI values but also on the positions in the rankings.

As follows from the data presented in Tables 3.8 and 3.9 (in all tables and figures in this section ISO 2 country codes are used), in the post-accession period (2004–2017)⁴, Poland's position widely varied. Whereas in 2004, the Polish economy was ranked as low as 60th in terms of competitiveness (a score of 3.98), in the following two years its competitiveness was evaluated much higher – ranking it 51st and 45th (with scores of 4.00 and 4.39, respectively). During the global crisis, Poland's performance was the most disadvantageous in 2008 (a score of 4.28), when it was ranked 53rd. The following two

⁴ The mentioned period covered by the analysis results from the availability of data. The data from 2004 (and earlier) are not comparable to those prepared after 2004.

years saw significant improvements in rank – 46th and 39th place, respectively (with scores of 4.33 and 4.51). Between 2011 and 2015, the competitiveness of the Polish economy remained relatively stable. In 2011–2012, Poland ranked 41st (4.46), whereas in 2013–2014, it dropped one spot every year. Between 2015 and 2016, its position improved again, to 41st and 36th place respectively (with scores of 4.49 and 4.56). The 36th place earned in 2016 was the highest rank throughout the post-accession period, as in 2017, Poland's position deteriorated again (39th, 4.59).

Table 3.8. Positions of Poland and the other NMS in the competitiveness ranking according to the World Economic Forum in 2004–2017

Year	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK	EU-10 ^a
2004	59	40	20	39	36	44	60	63	33	43	44
2005	58	38	20	39	43	44	51	67	32	41	43
2006	74	31	26	38	39	44	45	73	40	36	45
2007	79	33	27	47	38	45	51	74	39	41	47
2008	76	33	32	62	44	54	53	68	42	46	51
2009	76	31	35	58	53	68	46	64	37	47	52
2010	71	36	33	52	47	70	39	67	45	60	52
2011	74	38	33	48	44	64	41	77	57	69	55
2012	62	39	34	60	45	55	41	78	56	71	54
2013	57	46	32	63	48	52	42	76	62	78	56
2014	54	37	29	60	41	42	43	59	70	75	51
2015	54	31	30	63	36	44	41	53	59	67	48
2016	50	31	30	69	35	49	36	62	56	65	48
2017	49	31	29	60	41	54	39	68	48	59	48
Change											
2017/2004	10	9	-9	-21	-5	-10	21	-5	-15	-16	-4
2009/2006	-2	0	-9	-20	-14	-24	-1	9	3	-11	-7
2017/2009	27	0	6	-2	12	14	7	-4	-11	-12	4

^a the arithmetic mean for the countries in the year concerned

BG – Bulgaria
 CZ – Czechia
 EE – Estonia
 HU – Hungary
 LT – Lithuania
 LV – Latvia
 PL – Poland
 RO – Romania
 SI – Slovenia
 SL – Slovakia

Source: own study based on WEF 2005a, 2005b, 2006, 2015, 2016, 2017.

As a result, in the period in question, Poland improved its rank by as many as 21 spots (0.61). No other country from the NMS-group noted such an impressive improvement in rank.

Table 3.9. Competitive positions of Poland and the other NMS in terms of GCI in 2004–2017

Year	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK	EU-10 ^a
2004	3.98	4.55	5.08	4.56	4.57	4.43	3.98	3.86	4.75	4.43	4.42
2005	3.83	4.42	4.95	4.38	4.30	4.29	4.00	3.67	4.59	4.31	4.27
2006	3.98	4.67	4.82	4.49	4.49	4.47	4.39	3.98	4.48	4.54	4.43
2007	3.93	4.58	4.74	4.35	4.49	4.41	4.28	3.97	4.48	4.45	4.37
2008	4.03	4.62	4.67	4.22	4.45	4.26	4.28	4.10	4.50	4.40	4.35
2009	4.02	4.67	4.56	4.22	4.30	4.06	4.33	4.11	4.55	4.31	4.31
2010	4.13	4.57	4.61	4.33	4.38	4.14	4.51	4.16	4.42	4.25	4.35
2011	4.16	4.52	4.62	4.36	4.41	4.24	4.46	4.08	4.30	4.19	4.33
2012	4.27	4.51	4.64	4.30	4.41	4.35	4.46	4.07	4.34	4.14	4.35
2013	4.31	4.43	4.65	4.25	4.41	4.40	4.46	4.13	4.25	4.10	4.34
2014	4.37	4.53	4.71	4.28	4.51	4.50	4.48	4.30	4.22	4.15	4.40
2015	4.32	4.69	4.74	4.25	4.55	4.45	4.49	4.32	4.28	4.22	4.43
2016	4.44	4.72	4.78	4.20	4.60	4.45	4.56	4.30	4.39	4.28	4.47
2017	4.46	4.77	4.85	4.33	4.58	4.40	4.59	4.28	4.48	4.33	4.51
Change											
2017/2004	0.48	0.22	-0.23	-0.23	0.01	-0.03	0.61	0.42	-0.27	-0.10	0.09
2009/2006	0.04	0.00	-0.26	-0.28	-0.19	-0.41	-0.06	0.12	0.07	-0.23	-0.12
2017/2009	0.44	0.11	0.29	0.11	0.29	0.34	0.27	0.17	-0.08	0.02	0.20

^a the arithmetic mean for the countries in the year concerned.
Abbreviations as under Table 3.8.

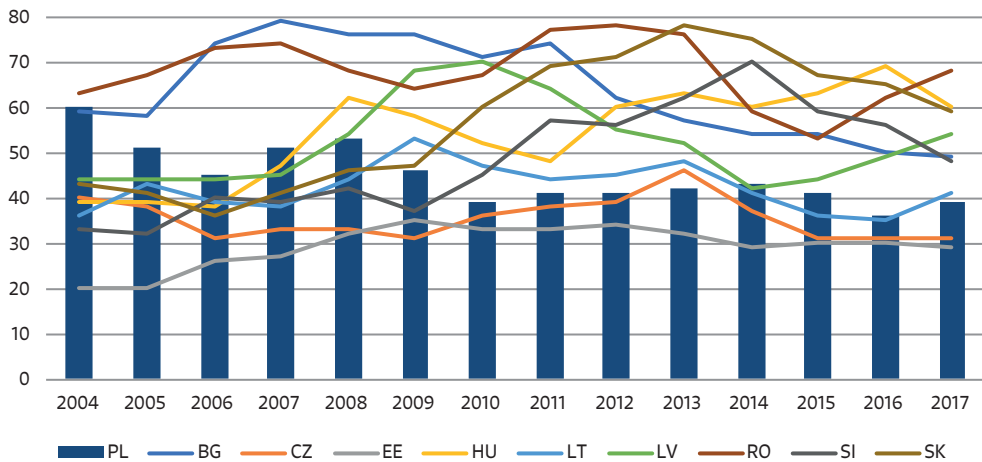
Source: own study based on: WEF 2005a, 2005b, 2006, 2015, 2016, 2017.

Figures 3.1 and 3.2 illustrate changes in the competitive position of Poland against the other EU-10 countries in the competitiveness studies conducted by the WEF in 2004–2017. As data presented in both figures show, the competitive position of the Polish economy improved from 2010 in comparison with the period 2004–2009. After 2009 Poland's competitive position became more stable than before.

A further element of the analysis is the comparison of Poland's results with those achieved by the other new member states (Tables 3.8 and 3.9; Figures 3.1 and 3.2). At the beginning of the period covered, Poland was ranked relatively low (60th place) in terms of competitiveness. It was only ahead of Romania (63rd) and next to Bulgaria (59th). Poland's position was significantly worse than those of other Visegrad Group countries. At that time, Czechia, Hungary and Slovakia ranked much higher (40th, 39th and 43rd

respectively). The Baltic States were considerably ahead of Poland as well (Estonia, Latvia and Lithuania were ranked 20th, 36th and 44th respectively). In the following years, until 2007, Poland continued to rank lower than other countries from both groups in question, even though its GCI considerably improved after 2005.

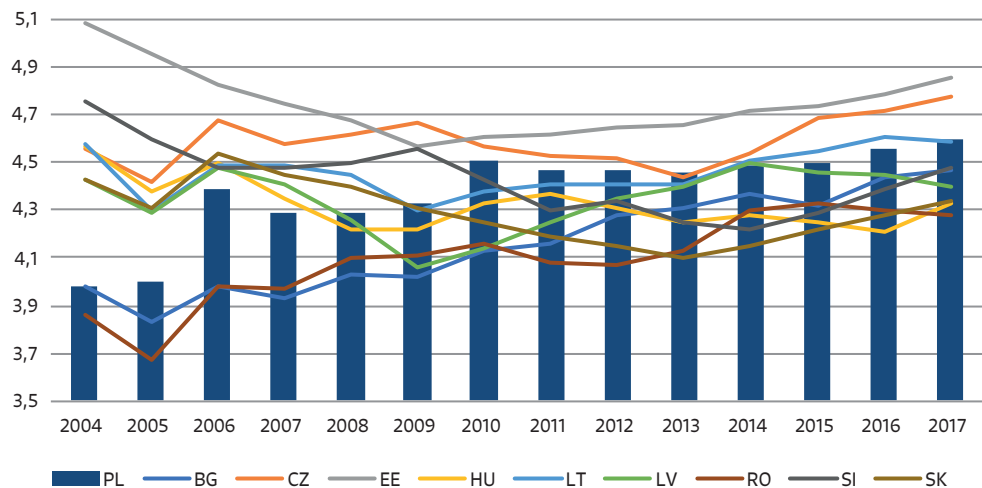
Figure 3.1. Changes in the competitive position of Poland against the backdrop of the EU-10 in the competitiveness studies conducted by the World Economic Forum in 2004–2017



Abbreviations as under Table 3.8.

Source: own study based on WEF 2005a, 2005b, 2006, 2015, 2016, 2017.

Figure 3.2. Changes in Poland's GCI against the backdrop of the EU-10 in 2004–2017



Abbreviations as under Table 3.8.

Source: own study based on WEF 2005a, 2005b, 2006, 2015, 2016, 2017.

However, in 2008, Hungary fell below Poland's place, joined by Slovakia, Latvia and Lithuania in 2009. In 2010–2012, Poland moved up in the ranking, ahead of 7 out of the 10 NMS, and maintained a relatively stable position until 2016. In 2017, only Estonia and Czechia ranked higher than Poland (29th and 30th respectively). As a consequence, ranked 39th, Poland noted the most significant improvement in position (in comparison with the other NMS). Apart from Poland, only Czechia and Bulgaria moved up in the ranking.

It is worth emphasising that the analysis of the data presented in Tables 3.9 and 3.10 and in Figures 3.2 and 3.3 show that – against the backdrop of the other NMS – between 2004 and 2017, Poland noted the most significant improvement in its international competitive position. Whereas Poland's WEF rank improved by as many as 21 spots (by 0.61 GCI points), the Bulgarian and Czech advancement was 10 and 9 positions respectively (0.48 points for Bulgaria and 0.22 for Czechia). Simultaneously, 8 countries dropped in the ranking. The most abrupt fall was noted by Hungary, down by 21 spots. Slovakia and Slovenia fell 16 and 15 places respectively. As a result, Poland, placed among the lowest ranking NMS in 2004, gained a much more advantageous position than those of its two partners from the Visegrad Group (Slovakia and Hungary), two of the Baltic States (Latvia and Lithuania) as well as of Bulgaria, Romania and Slovenia⁵.

Poland's significant advancement described in the WEF reports is attributable to a robust GDP growth, especially during the global economic crisis. In the post-accession period, Poland was characterised by the highest GDP growth rate among the NMS (Molendowski 2016; Molendowski 2017). Therefore, in spite of deteriorated public finance, it was ranked among the most stable economies in Europe. The advantageous change in Poland's position is also associated with a relatively good education system and a large internal market. Other benefits resulted from the improved functioning of public administration (WEF, 2017).

3.2. Changes in the NMS welfare

In this subchapter, we focus on the changes in welfare of the NMS. We begin with definitions of welfare and then we analyse changes in Human Development Index (HDI) as a measure of welfare. Finally, we scrutinise changes in GDP per capita treating it also as an imperfect approximation of welfare.

Smith (1776) did not use the term welfare but concentrated on wealth. He emphasised only the production and growth of wealth as the subject matter of economics. In his

⁵ For more on the subject of Poland's competitive position in the WEF international competitiveness ranking in 2017, see: Boguszewski, Mirowska 2017.

setting, wealth takes into account material and tangible goods. Smith gave emphasis only to wealth and reduced man to secondary place. Contrary to Smith, Marshall (1890) used the term welfare. He stated that economics is a study of mankind in the ordinary business of life. It examines this part of individual and social actions which is most closely connected with the attainment and with the use of material requisites of wellbeing. In his opinion, economics stays on one side in a study of wealth. On the other side, there is a study of human welfare based on wealth. However, Marshall's welfare concentrates only on material welfare i.e. human welfare which is related to wealth.

Welfare in contemporary economics is used both in macro- and in microeconomics. In macroeconomics there have been various attempts to identify an appropriate set of adjustments to GDP to provide a suitable measure of overall welfare in an economy. In microeconomics, the focus is on welfare in a single market or in a few related markets (Koo, Kennedy 2005, p. 104; Mankiv, Taylor 2005, pp. 172–173; Johansson 1991, pp. 42–52). The term “welfare” is used also in international economics and often measured by the utility (satisfaction) derived by a country/nation from consumption of goods and services (both domestically produced and imported, and illustrated by community indifference curve – Salvatore 2013, pp. 56–57).

According to the consumer and producer theory, consumer surplus and producer surplus measure how much consumers and producers gain from buying and selling in the market. The larger these two surpluses are, the better off people are in the society. The amount of consumer surplus plus producer surplus is a measure of economic well-being (Taylor 1998, pp. 186–189).

Samuelson and Nordhaus (2004, p. 40) state that economic welfare is the level of prosperity and standard of living of an individual or a group of persons. In economics, it specifically refers to utility gained through the achievement of material goods and services. In other words, it refers to this part of social welfare that can be fulfilled through economic activity. The definition of welfare by the cited Samuelson and Nordhaus corresponds with the opinion of Burda and Wyplosz (2000, p. 39) that GDP is a bad measure of welfare⁶, because it does not account for social conditions (e.g. good pavements or playgrounds), environmental conditions, equality of incomes etc.

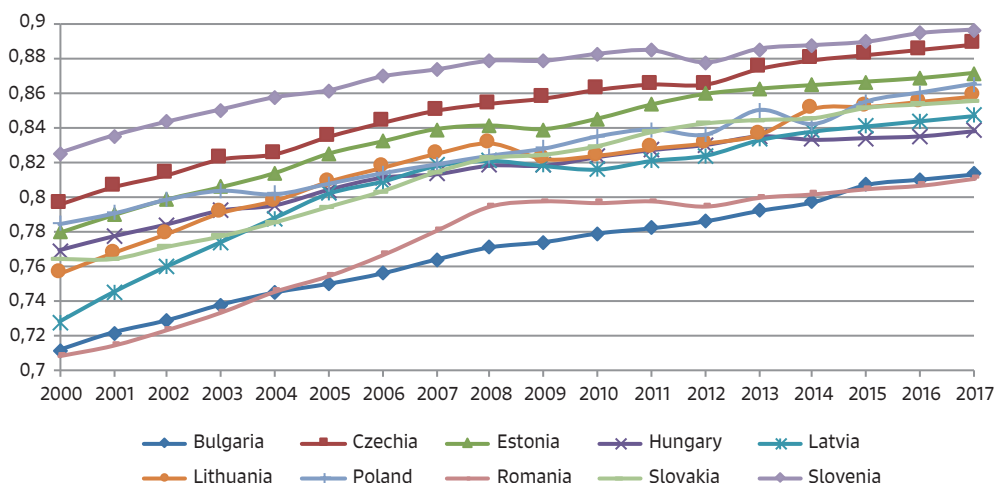
The analysis of welfare shaped a sector of economics – welfare economics – which is concerned with how well-off individuals and groups are. Welfare economics is used to see how the welfare, or well-being of individuals and groups changes with a change in policies, programs, or current events (Barkley 2016, p. 39). Welfare economics distinguishes the British approach (à la Kaldor-Hicks) from the American approach (à la Bergson-Samuelson) to new welfare economics and happiness economics – more see Baujard 2013.

⁶ About GDP as a measure of welfare see also Dynan, Shainer 2018.

According to the previous considerations, firstly we focus on intangible aspects of welfare, thus we choose Human Development Index as a measure of welfare. The HDI was created in the framework of United Nations Development Programme (UNDP) to emphasise that people and their capabilities should be the ultimate criteria for assessing the development of a country, not the economic growth alone. The HDI can also be used to question national policy choices, asking how two countries with the same level of GNI per capita can end up with different human development outcomes. These contrasts can stimulate debate about government policy priorities. HDI is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living. The HDI is the geometric mean of normalised indices for each of the three dimensions⁷.

The health dimension is assessed by life expectancy at birth, the education dimension is measured by the mean of years of schooling for adults aged 25 years and more as well as by expected years of schooling for children of school entering age. The standard of living dimension is measured by gross national income per capita. The HDI uses the logarithm of income, to reflect the diminishing importance of income with increasing GNI. The scores for the three HDI dimension indices are then aggregated into a composite index with the use of geometric mean⁸.

Figure 3.3. The values of Human Development Index for NMS in 2000–2017



Source: own study based on HDI database, <http://hdr.undp.org/en/data>; access: 6.07.2019.

⁷ HDI, <http://hdr.undp.org/en/content/human-development-index-hdi>; access: 6.07.2019.

⁸ HDI, <http://hdr.undp.org/en/content/human-development-index-hdi>; access: 6.07.2019.

In Figure 3.3, we present the HDI values of the NMS. Supplementing the data from this figure, we add that the highest (more than 0.9) values of HDI are achieved traditionally by the Nordic countries (in the case of Norway the value is currently higher than 0.95) and countries such as: Switzerland, Canada, the United States, Japan, Australia and New Zealand⁹. In the case of NMS during last two decades, progress is visible – see Figure 3.4. At the end of the 20th century, the values of HDI belonged in this group to interval 0.7–0.8. Recently these countries increased their values to 0.8–0.9. Bulgaria and Romania achieved noticeably lower indices, and Slovenia, Czechia and Estonia higher than the rest of NMS.

Although we begin an empirical study of changes in welfare with HDI, we do not want to ignore the material aspect of welfare. Consequently, we take GDP per capita as a measure of welfare. It is a much better measure of welfare than GDP because it focuses on citizens' wealth instead of concentrating on the economic potential of a country.

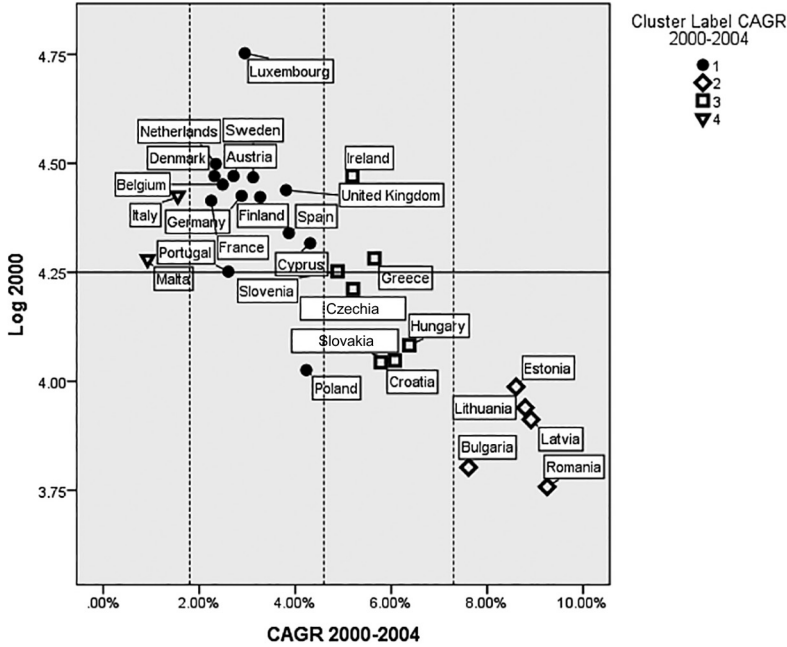
Figures 3.4–3.6 represent matrixes, plotting on the horizontal axes the compound annual growth rates (CAGR)¹⁰ of GDP per capita in the analysed period against the initial GDP per capita level on the vertical axis. The EU countries in the sample were categorised into four different clusters (homogenous groups), using the hierarchical clustering procedure with the agglomeration schedule and proximity matrix. This is how 4 clusters emerged, graphically divided with the vertical dashed lines. The solid horizontal line represents the sample average GDP per capita level in each of the analysed periods. Quadrants are based on Fagerberg (2005). In the top right quadrant, we find countries with a high initial GDP per capita level that continue to grow fast – thus these countries are labelled as “moving ahead”. On the contrary, the countries in the top left matrix corner are characterised by a high initial GDP per capita level but the pace of their growth was relatively slow – these countries are “losing momentum”. The countries in the bottom left quadrant initially have low GDP per capita levels and show a relatively slow growth – they are thus “falling behind”. Finally, in the bottom right matrix quadrant, we find countries successfully “catching-up”.

In order to illustrate the dynamics within the strategic groups, we selected three 5-year periods: 1. 2000–2004: 5 years before the CEE EU enlargement 3. 2005–2009: first 5 years of the EU membership for the CEE countries 4. 2010–2014: 5 years after the financial crisis. At the second stage of the analysis, by comparing the positioning of each of the CEE countries in each of the convergence clusters, we identified four convergence patterns.

⁹ HDI database, <http://hdr.undp.org/en/data>; access: 6.07.2019.

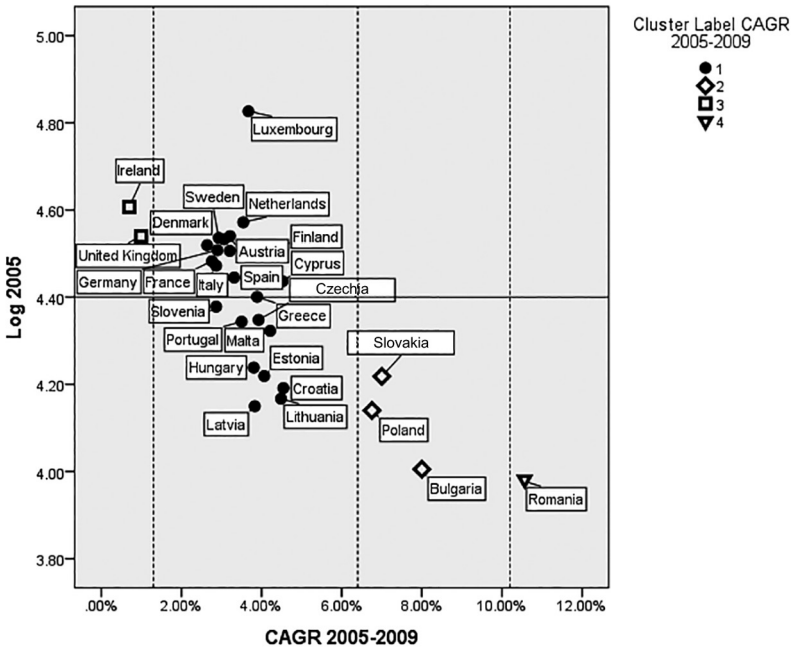
¹⁰ CAGR: Compound Annual Growth Rate can be used for evaluating the performance of different peer groups over time to “smoothen” the YoY growth volatility in the identical period under analysis.

Figure 3.4. Clusters based on the GDP per capita over 2000–2004



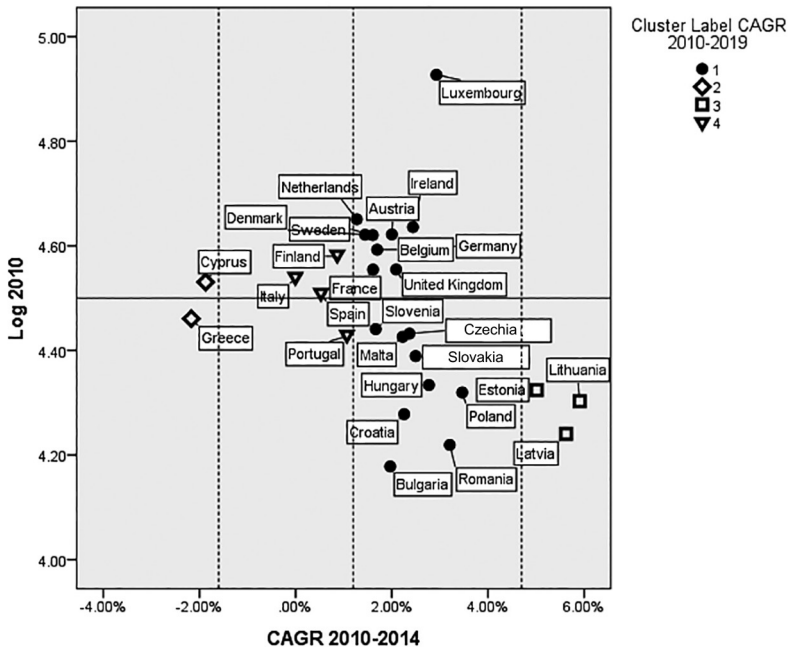
Source: own study based on World Development Indicators by the World Bank.

Figure 3.5. Clusters based on the GDP per capita over 2005–2009



Source: own study based on World Development Indicators by the World Bank.

Figure 3.6. Clusters based on the GDP per capita over 2010–2014



Source: own study based on World Development Indicators by the World Bank.

At the second stage of our analysis, concentrating on 10 selected NMS, we distinguished four convergence patterns (see Table 3.10):

- first pattern: absolute catchers – countries catching-up in all the analysed periods can be observed among the “poorest” and the least developed countries (Bulgaria, Romania and Slovakia);
- second pattern: troubled catchers: countries catching-up in the pre-accession period, falling behind in the first 5 years of the EU membership and catching-up again after the financial crisis (Czechia, Hungary, Estonia, Latvia, Lithuania);
- third pattern: opportunity catchers: falling behind before the EU accession and catching-up in the whole period of the EU membership (Poland);
- fourth pattern: troubled performers: moving ahead before the accession, falling behind in the first 5 years of the EU membership and catching-up after the financial crisis (Slovenia).

To sum up, similarly, to changes in competitiveness (Subchapter 3.1) also in the case of changes in welfare, generally we can point out three leaders (Czechia, Estonia and Slovenia) among the NMS. However, even these three countries outstand significantly from Germany and other EU-15 countries.

Table 3.10. EU European convergence patterns for the EU strategic groups in years 2000–2004, 2005–2009 and 2010–2014

Country name	2000-2004	2005-2009	2010-2014
Austria	Losing momentum (1)	Losing momentum (1)	Moving ahead (2)
Belgium	Losing momentum (1)	Losing momentum (1)	Moving ahead (2)
Bulgaria	Catching up (3)	Catching up (3)	Catching up (3)
Croatia	Catching up (3)	Falling behind (4)	Catching up (3)
Cyprus	Losing momentum (1)	Losing momentum (1)	Losing momentum (1)
Czechia	Catching up (3)	Falling behind (4)	Catching up (3)
Denmark	Losing momentum (1)	Losing momentum (1)	Moving ahead (2)
Estonia	Catching up (3)	Falling behind (4)	Catching up (3)
Finland	Losing momentum (1)	Losing momentum (1)	Losing momentum (1)
France	Losing momentum (1)	Losing momentum (1)	Losing momentum (1)
Germany	Losing momentum (1)	Losing momentum (1)	Moving ahead (2)
Greece	Moving ahead (2)	Falling behind (4)	Falling behind (4)
Hungary	Catching up (3)	Falling behind (4)	Catching up (3)
Ireland	Moving ahead (2)	Losing momentum (1)	Moving ahead (2)
Italy	Losing momentum (1)	Losing momentum (1)	Losing momentum (1)
Latvia	Catching up (3)	Falling behind (4)	Catching up (2)
Lithuania	Catching up (3)	Falling behind (4)	Catching up (3)
Luxembourg	Losing momentum (1)	Losing momentum (1)	Moving ahead (2)
Malta	Losing momentum (1)	Falling behind (4)	Catching up (3)
Netherlands	Losing momentum (1)	Losing momentum (1)	Moving ahead (2)
Poland	Falling behind (4)	Catching up (3)	Catching up (3)
Portugal	Falling behind (4)	Falling behind (4)	Falling behind (4)
Romania	Catching up (3)	Catching up (3)	Catching up (3)
Slovakia	Catching up (3)	Catching up (3)	Catching up (3)
Slovenia	Moving ahead (2)	Falling behind (4)	Catching up (3)
Spain	Losing momentum (1)	Losing momentum (1)	Losing momentum (1)
Sweden	Losing momentum (1)	Losing momentum (1)	Moving ahead (2)
United Kingdom	Losing momentum (1)	Losing momentum (1)	Moving ahead (2)

Source: own study based on World Development Indicators by the World Bank.

3.3. Changes in the NMS exports

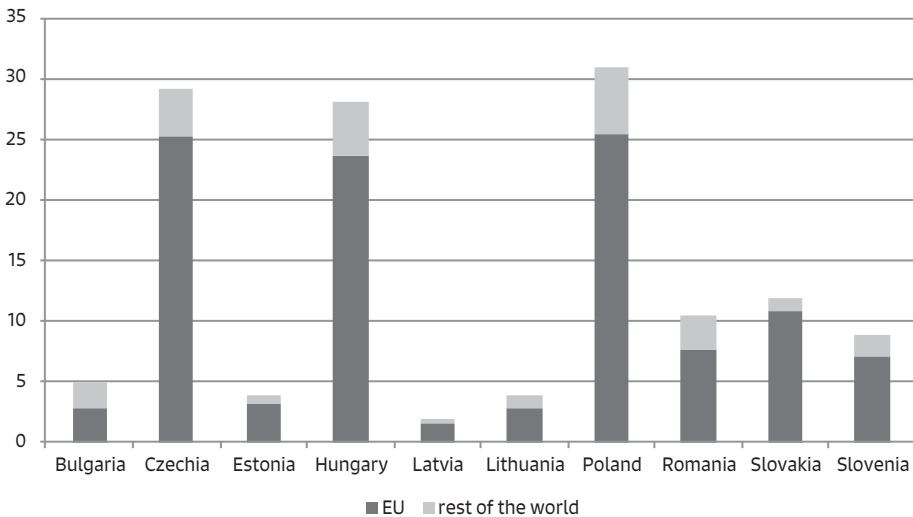
In this subchapter, we present the results of analysis of changes in the NMS exports. We treat the NMS as catching-up economies that aim at reaching the developmental level of the leading EU-countries. In our analysis, we set Germany – a longtime leader of the world exports – as a benchmark.

We begin with investigating the evolution in value and the main directions of NMS exports in the years 2000–2018. Further, we analyse the structure of their export and its changes over time in relation to the German exports competitiveness. We use the revealed comparative advantage as a measure of export competitiveness. We investigate exports of factors- and technology-intensive goods and indicate in how far the NMS develop towards knowledge-based economy and improve their competitive position in exports of technology-intensive goods. In the last part, we conduct an analysis of NMS participation in global value chains.

3.3.1. Changes in the NMS geographic exports structure

The value of NMS exports in the year 2018 was approximately ten times higher than the respective value in the year 2000 (comparison of Figures 3.4 and 3.5). In both years the biggest exporters were Poland, Czechia and Hungary but the difference between the value of exports of these countries was more noticeable in 2018 than in 2000.

Figure 3.7. The value of exports in year 2000 (USD, billions)



Source: own study based on UNCTAD's database; access: 25.08.2019.

In the year 2000, the highest share of the EU (EU-28 less exporting country) as the trading partner was for Slovakian exports (90%) and the lowest share was in the case of Bulgarian exports (56%). The respective shares for the other NMS were: Czechia – 86%, Estonia – 81%, Hungary – 84%, Latvia – 81%, Lithuania – 72%, Poland – 82%, Romania – 73% and Slovenia – 80%.

In the year 2000, top 5 recipients of the NMS exports were:

- Bulgaria – Turkey, Germany, Greece, Serbia and Belgium;
- Czechia – Germany, Slovakia, Austria, Poland and France;
- Estonia – Finland, Sweden, Germany, Latvia and Russia;
- Hungary – Germany, Austria, US, France and the Netherlands;
- Latvia – Lithuania, UK, Germany, Denmark and Estonia;
- Lithuania – Latvia, Germany, UK, Russia and Poland;
- Poland – Germany, Italy, France, the Netherlands and UK;
- Romania – Italy, Germany, France, Turkey and UK;
- Slovakia – Germany, Czechia, Italy, Austria and Poland;
- Slovenia – Germany, Italy, Croatia, Austria and France.

In the year 2000, the most important recipient of the NMS exports was Germany, placed by all ten NMS among three biggest partners. France was mentioned among top partners of 5 NMS and Austria – of 4. The biggest in the NMS group, Poland belonged to top 5 partners of 3 other EU-10 countries.

In year 2018, the majority of shares of the EU in the NMS exports decreased. The highest share of EU (EU-28 less exporting country) as the export partner was again for Slovakian exports (85%), but the dependency decreased by 5 p.p. The lowest share was then in the case of Lithuanian exports (59%), which was 3 p.p. higher than in the case of Bulgaria in the year 2000. The respective shares for other countries were: Czechia – 84%, Estonia – 63%, Hungary – 81%, Latvia – 71%, Lithuania – 72%, Poland – 80%, Romania – 77% and Slovenia – 63%. Lithuania's share didn't change, shares of Romania and Slovenia increased and all other mentioned shares decreased.

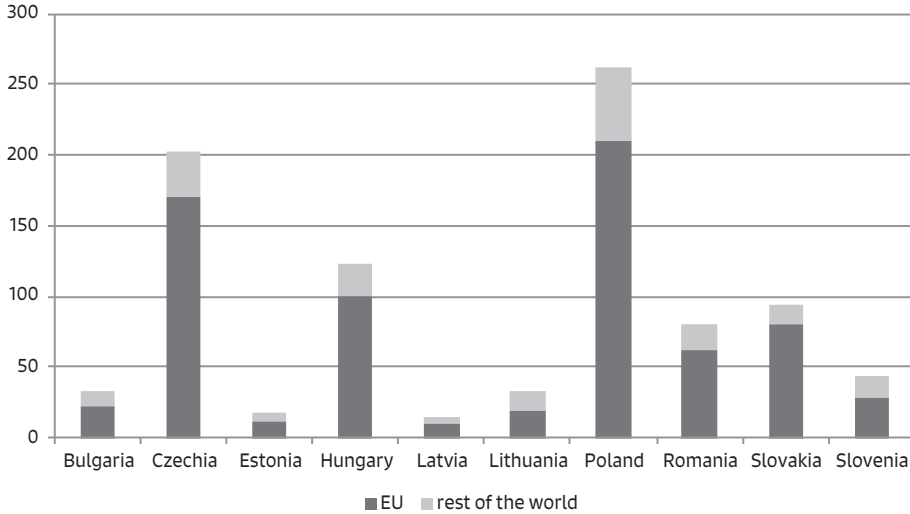
Top 5 recipients of NMS exports in 2018:

- Bulgaria – Germany, Romania, Turkey, Greece and France;
- Czechia – Germany, Slovakia, Poland, France and UK;
- Estonia – Finland, Sweden, Russia, Latvia and Germany;
- Hungary – Germany, Austria, Slovakia, Czechia and France;
- Latvia – Lithuania, Estonia, Germany, UK and Denmark;
- Lithuania – Russia, Latvia, Poland, Germany and US;
- Poland – Germany, Czechia, UK, France and Italy;
- Romania – Germany, Italy, France, Hungary, UK;
- Slovakia – Germany, Czechia, Poland, Italy and Austria;
- Slovenia – Germany, Italy, Croatia, Austria and France.

Also in 2018, Germany was the most important recipient of the NMS exports. It was the biggest recipient of exports from 7 NMS, whereas it was number 1 for 5 NMS. The dominance of the EU partners was bigger than in 2000. In 2018, only three countries from outside the EU were mentioned among the top 5 (Russia, US and Turkey). In 2018

as well as in 2000, UK belonged to the important recipients of NMS exports (in top 5 of 4 of them). It shows possible negative consequences of Brexit for these countries.

Figure 3.8. The value of exports in year 2018 (USD, billions)



Source: own study based on UNCTAD's database; access: 25.08.2019.

The analysis of the main exports partners of NMS shows that in many cases they are neighbouring countries. Among them the dominant group are the EU members, especially other NMS, Germany and Austria. Also the UK still plays an important role as a buyer of goods from the NMS, which may have a negative impact on exports of some NMS in the case of Brexit. Intensive trade with other NMS is of special interest. Old ties from the socialist past may play some role, but it seems more important that new contacts are concluded after transition, during the EU-adjustments and the pre-membership CEECs integration in the framework of the Visegrad Group.

3.3.2. The NMS exports structure and its convergence to the German pattern

Understanding competitiveness as a set of characteristics of a country which enable structural adjustments to global technological trends, and as a consequence, a rise of living standard of its citizens, we set GDP convergence towards leading world economies as the ultimate goal for catching-up economies. Its achievement relies upon the ability to shift production and exports structure towards a specialisation based on knowledge and innovation.

In this section, the long-term ability to develop is evaluated through the structural adjustments of exports. Under this definition, export competitiveness is a relative, qualitative category which relies on the specification of benchmark indicators together with a set of characteristics of a “competitive economy” as a pattern. In this sense, for catching-up economies (here: the NMS or the EU-10 countries), competitiveness may be understood as the ability to close the structural gap to the strongest economy amongst the EU members: Germany¹¹.

We analyse the evolution of the NMS exports specialisation in the years 2000–2014, examining whether the convergence trend towards the German exports pattern can be observed and which of the NMS shows the best ability to shift its exports structure towards the high-tech specialisation. We divide the analysed period into four subperiods and present data for the years: 2000, 2004, 2009 and 2014. This division allows us to show the changes occurring before the EU accession (2000), in the year of the accession of eight out of EU-10 states (2004), in the year of international trade collapse (2009) and in the last year of analysis determined by the data availability (2014).

The analysis is based on a measure of exports specialisation – Revealed Comparative Advantage (RCA) by Balassa (1965) – frequently used for evaluating exports competitiveness. It allows us to determine whether and to what extent the export share of commodity group j in the exports of country i differs from those of commodity group j in global exports.

To calculate RCA we use the Balassa’s formula:

$$RCA = E_{ij}/E_{it} / (E_{nj}/E_{nt})$$

where:

E : exports,

i : country index,

n : set of countries,

j : commodity index,

t : set of commodities.

The RCA index exceeding 1 proves competitive advantage¹² of country i in commodity group j . Using the RCA as a measure of comparative advantage, we assume that the specialisation in exports of goods from high tech commodity groups (characterised by high technological intensity) is a determinant of the competitiveness of the national

¹¹ Original discussion on the evolution of the NMS exports structure can be found in the research paper by Czarny and Zmuda (2018).

¹² In fact, RCA is a measure of comparative advantage. However, when we recognise that comparative advantage is a source of competitive advantage in comparison to trade partners, we can speak about “competitive” advantage in this context as well. In this section we use both terms as equivalent.

economy (Bieńkowski et al. 2008, p. 21). In dynamic terms, the RCA can be used to show the evolution of exports towards specialisation based on knowledge and innovation.

Table 3.11. Exports classification system by technology intensities

Products grouped by technology-intensities	Product categories	SITC (Rev. 3)
Resource-intensive goods	Food, live animals Inedible resources (except textile fibres) Mineral fuels (except electric current) Animal and vegetable oils Fertilisers	0 2–26 3–35 4 56
Labour-intensive goods	Textile fibres Manufactured good classified by material (except rubber, steel and iron and non-metallic products) Miscellaneous manufactured articles (except scientific instruments and optical goods)	26 6–62–67–68 8–87–88
Capital-intensive goods	Beverages and tobacco Electric current Dyeing, tanning and colouring materials Essential oils and perfume materials Rubber products Steel and iron Non-metallic goods Road vehicles	1 35 53 55 62 67 68 78
Technology-intensive goods easy to imitate	Organic and inorganic chemicals Pharmaceuticals Plastics in non-primary forms Chemical materials and products (except explosive materials) Office and automatic data-processing machines Telecommunications and sound-recording and reproducing apparatus	51,52 54 58 59–593 75 76
Technology-intensive goods difficult to imitate	Explosive materials Plastics in primary forms Machinery and transport equipment (except office and automatic data-processing machines, telecommunications and sound-recording and reproducing apparatus, road vehicles) Professional scientific and controlling instruments and apparatus Photographic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks	593 57 7–75–76–78 87 88

Source: Wysokińska, Witkowska 1999, p. 307.

In this analysis, we use the UN Trade statistics in the International Trade Classification (SITC), Rev. 3, according to the exports classification system by Wysokińska and Witkowska (1999) – Table 3.11. Following this classification, the exported goods are grouped along the factor-intensities into: resource-intensive, labour-intensive, capital-intensive, technology-intensive easy to imitate and technology-intensive difficult to imitate. In this section, we call technology-intensive goods “technologically advanced” as well. We label the resource-intensive and labour-intensive products as the least technologically advanced (in this section they are also referred to as “less technologically advanced”). The other groups are considered technology-intensive, with technology-intensive difficult-to-imitate products being most advanced.

We begin the analysis in the year 2000 as none of the EU-10 states was in the European Union then. In order to evaluate how 8 out of 10 NMS responded to the EU accession (Bulgaria and Rumania joined the EU in 2007), we added year 2004 (the “year of accession”), comparing the data with those of 2000. To be able to analyse the effects of global trade collapse during the recent global crisis (Czarny, Śledziwska 2012, pp. 20–38), relevant data from 2009 served as the foundation for analysis as well.

Germany is set as a benchmark due to its superior position on the EU economic arena as a result of a stable and highly developed economy. Therefore, we expect that its comparative advantages are concentrated on high-tech products, especially these difficult to imitate. Furthermore, Germany was the world’s largest exporter for years (rivaling for the leading position with China).

Starting point: the year 2000

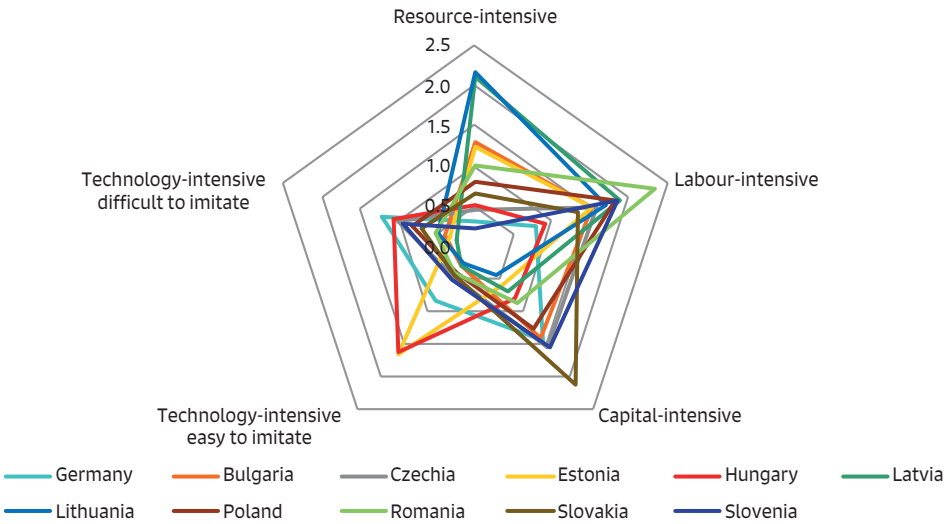
In the year 2000, which marks the beginning of the analysed period, Germany had a different specialisation structure than the EU-10 (Figure 3.9). At this time (as in all analysed years), the highest German RCA was in the area of capital-intensive goods ($RCA=1.43$). The second category, in which Germany had a strong comparative advantage, were technology-intensive difficult-to-imitate goods ($RCA=1.22$). Thus, German advantages concentrated on the exports of two out of three commodity groups at the high levels of technological advancement (exception: technology-intensive easy-to-imitate goods).

Except for Hungary, the NMS had then comparative advantages in exports of labour-intensive goods (the highest in Romania with $RCA=2.35$, and the lowest in Slovakia with $RCA=1.35$). Hence, as many as 90% of the NMS showed comparative advantages in the exports of labour-intensive goods, which were categorised as less technologically advanced. In addition, the Baltic states and Bulgaria had comparative advantages in the exports of resource-intensive goods, which were less technologically advanced as well.

As far as high-tech industries are concerned, Slovakia, Slovenia, Czechia, Bulgaria, and Poland had a comparative advantage in exporting capital-intensive goods, while Estonia and Hungary specialised in high-tech easy-to-imitate goods. Additionally, Hungary and Czechia recorded a comparative advantage in exporting technology-intensive difficult-to-imitate products (Czechia’s advantage was however very small – $RCA=1.01$). Thus, $RCA>1$ in the exports of capital-intensive goods has been displayed by 5 out of 10 NMS. Amongst them were three states (Slovakia, Slovenia, and Czechia) with a greater advantage in this export category than Germany. Specialisation in exports of technologically advanced easy-to-imitate goods has been represented by two countries (20% of NMS). It is worth noting that while the comparative advantages in exporting easy-to-imitate goods were quite high ($RCA=1.65$ for Estonia and 1.63 for Hungary), specialisation in exports of

goods difficult to imitate was significantly lower. In this time Hungary, as the only country in the NMS group, did not specialise in exporting either group of less technologically advanced (labour- and resource-intensive) or capital-intensive goods. Instead, it had comparative advantage in both groups of most technologically advanced goods (easy and difficult to imitate).

Figure 3.9. RCA of the NMS and Germany in 2000



Source: own analysis based on UN COMTRADE data; access: 20.01.2017.

Before their EU accession, all the NMS group members could therefore be considered as catching-up economies, less developed than Germany. However, among this group one can point out the group leaders, and the states lagging behind. The first group is composed by Hungary, Czechia and Estonia, and the latter by Lithuania, Latvia, and Romania, which have comparative advantages only in the exports of labour- and resource-intensive goods, thus these relatively unprocessed and at the low level of technological advancement – which are usually the specialisation domain of developing countries.

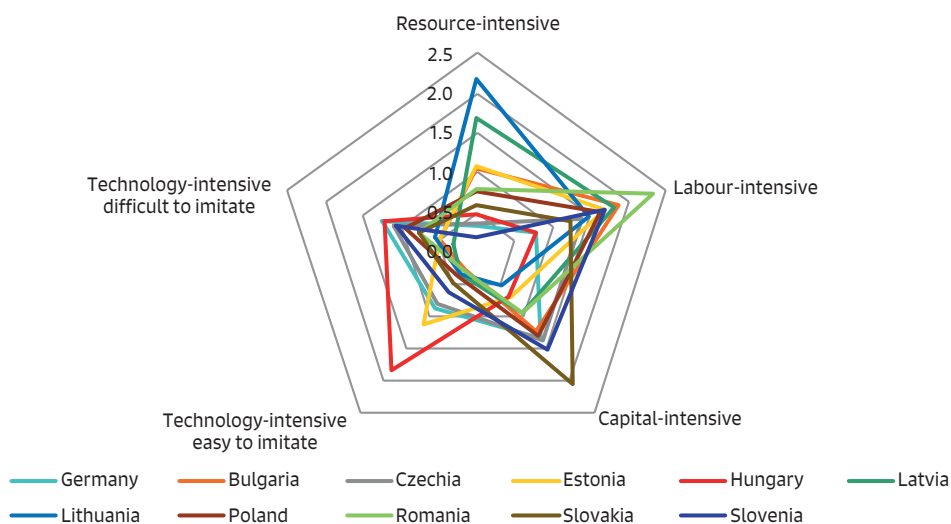
The accession year: 2004

In 2004, eight NMS became members of the EU. Thus, they fulfilled the accession conditions and made the necessary institutional adjustments. It could be expected that their economies should be modernised what would lead to the convergence to the German specialisation pattern.

The NMS technological development should be reflected in the improvement of their RCA structure, when compared to year 2000. In fact, both Czechia and Hungary had increased their comparative advantages in exports of technologically advanced difficult-to-imitate products (Figure 3.10). Slovenia had also gained an advantage in the exports of this goods category. Moreover, Hungary had increased its comparative advantage in the exports of technologically advanced easy-to-imitate goods.

In the exports of capital-intensive goods, five countries which had comparative advantages in 2000 retained it; however, Poland was the only country able to increase its comparative advantage in this product category. Czechia and Slovenia had shifted to the higher level of exports specialisation, as Czechia increased, and Slovenia gained advantage in exporting technologically advanced easy-to-imitate goods. The development of Slovakia was also positive, as despite of a slight RCA decrease, it maintained the highest level of specialisation in capital-intensive goods among the whole group.

Figure 3.10. RCA of the NMS and Germany in 2004



Source: own analysis based on UN COMTRADE data; access: 20.01.2017.

The remaining NMS did not conquer foreign markets with the high-tech products. Furthermore, the vast majority of them recorded decreased levels of comparative advantages in exports of less technologically advanced products, which in 2000, constituted the major strength of their export position. This indicates that the EU-accession of eight states and the accession adjustments of Bulgaria and Romania did not bring them any technological impetus, despite the indisputable modernisation of their economies (e.g. due to the introduction of EU standards and the inflow of foreign capital). In 2004, most

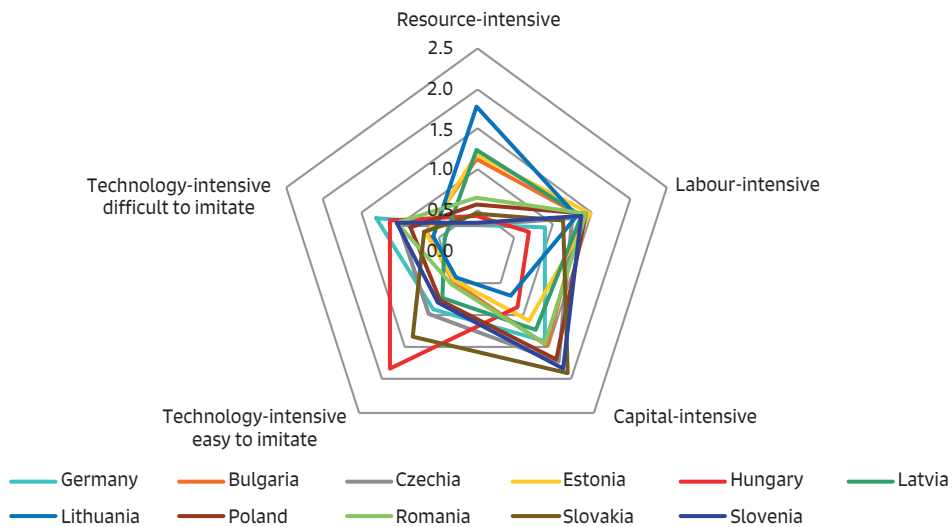
of the NMS reduced their comparative advantages in exports of goods at the lower level of technological advancement but without gaining strength in the exports of more technologically advanced goods.

Collapse of the global trade: year 2009

The economic crisis did not harm German exports, able to maintain their comparative advantages in 2009 in both key export categories (capital-intensive and technology-intensive difficult-to-imitate goods – Figure 3.11). Moreover, its RCA had increased in the exports of difficult-to-imitate goods, which are being considered as the most technologically advanced (from RCA=1.24 in 2004 to RCA=1.3 in 2009).

The NMS also survived the crisis relatively unharmed. The Czech and Hungarian RCAs recorded declining levels in exports of technology-intensive difficult-to-imitate goods, but they still managed to maintain their comparative advantages. Slovenia’s RCA index for exports of these goods did change. In addition, Romania with a RCA of 1.05 emerged amongst the countries with a comparative advantage in exporting these most technologically advanced goods. In this context, the situation in Poland was troubled: in 2004, it was one step away from gaining an advantage in the export of these goods (RCA = 0.95), while in 2009 (RCA = 0.86), it drifted away from the perspective of a quick catch-up with the leading EU countries.

Figure 3.11. RCA of the NMS and Germany in 2009



Source: own analysis based on UN COMTRADE data; access: 20.10.2017.

In the exports of capital-intensive goods, the situation of the NMS looked better. The number of countries with comparative advantages had increased, as Estonia, Latvia and Romania joined the group composed of Bulgaria, Czechia, Poland, Slovakia, and Slovenia. Hence, in 2009 in the category of capital-intensive goods, already 80% of the NMS showed comparative advantages. Especially Slovakia improved its competitive position, as it not only maintained a strong specialisation in the capital-intensive goods, but additionally gained a comparative advantage in the technologically advanced easy-to-imitate goods.

In the export of technologically advanced easy-to-imitate goods, invariably only two NMS showed comparative advantages, but only Hungary defended its position. While in 2004, $RCA > 1$ was recorded by Estonia ($RCA = 1.12$), in 2009 Slovakia overtook Estonia's competitive position in this product category with $RCA = 1.35$.

The technological advancement of the NMS group is also reflected in the analysis of their RCA in the category of labour-intensive goods. None of the NMS that had a comparative advantage in 2004 lost it; however, all of them showed a slight decrease in the RCA levels in this product category.

Despite the collapse in the world trade, the NMS not only maintained but also improved their positions in exports of high-tech goods. This may be, on the one hand, an evidence of progress in catching up with the strongest economies, and, on the other, the usage of relatively high quality-price relation allowing to maintain a strong export position even in difficult times.

The final year: 2014

In the last year of the analysed period, most of the comparative advantages that the NMS recorded in 2009 were maintained, but the RCA only increased in a few cases (Figure 3.12). This means that the NMS discontinued in the process of catching up with Germany.

Hungary confirmed its position as the undisputed innovation leader amongst the NMS. Firstly, its comparative advantage in exports of the most technologically advanced difficult-to-imitate products grew to reach the German level ($RCA = 1.3$). Secondly, for the first time, it also obtained a comparative advantage in the exports of capital-intensive goods, combining advantages in the sale of goods from all three high-tech industries. Czechia had a similar range of specialisation, but Hungary showed higher RCA levels in the exports of the most technologically advanced goods – both easy and difficult to imitate – while maintaining a dominant competitive position in the exports of capital-intensive goods.

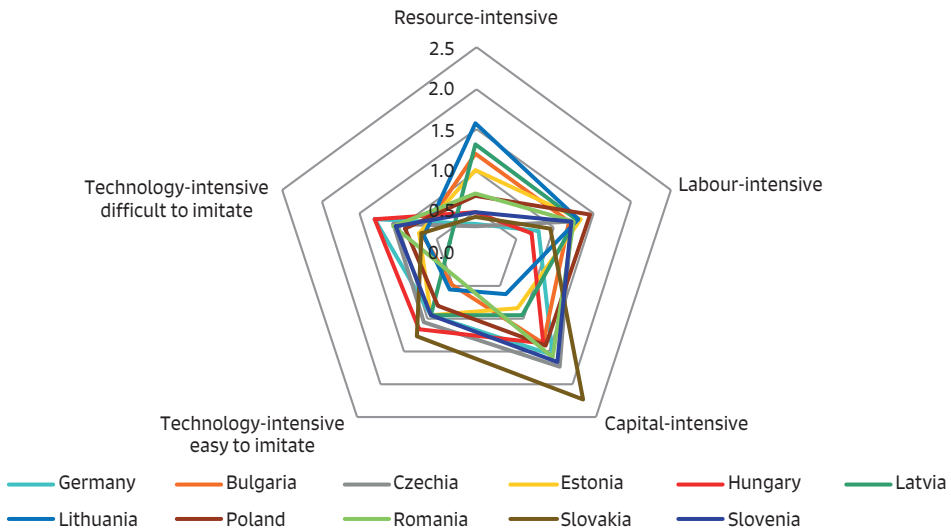
In the case of Czechia and Slovakia a catching-up process is clearly visible. Czechia is the most versatile exporter among the NMS, as it maintained comparative advantages in the exports of various goods: labour- and capital-intensive, as well as both groups of the most technologically advanced ones. Slovakia, despite not yet achieving comparative

advantage in exports of technology-intensive difficult-to-imitate goods, already went through the process of adjustments within the European Monetary Union (EMU). This did not prevent the Slovak ability to maintain comparative advantages in exports of capital-intensive and technology-intensive easy-to-imitate products.

In the whole NMS group, more countries (three in 2014 compared to two in 2009) had comparative advantages in exports of technologically advanced easy-to-imitate goods, and two further countries recorded RCA levels equal or close to 1.

While contrasting the comparative advantages listed in 2000 and 2014, it becomes evident that countries belonging to the NMS group increased their advantages in the exports of resource-, labour- and capital-intensive goods. Interestingly, even though more countries could sustain advantages in the technology-intensive easy-to-imitate category, the countries recording these advantages in 2000 decreased them. Hungary and Estonia intensified their advantages in the technologically advanced difficult-to-imitate goods category, while other countries merely sustained their advantages. It may be concluded that the direction of development of NMS seems right, convergence is evident, and export specialisation gets closer to the German pattern.

Figure 3.12. RCA of the NMS and Germany in 2014



Source: own analysis based on UN COMTRADE data; access: 20.01.2017.

In 2014, Czechia further appears to be the “master of exports diversity”, due to its comparative advantages in all categories except for resource-intensive goods. The Hungarian economy remains the innovation leader, maintaining comparative advantages in all three categories of the most technologically advanced products, with higher RCA levels than

Czechia. Poland looks rather pale – even worse off than Romania. It is worth noting that the countries listed as the leaders of the NMS group have not yet entered the EMU. This means, that they might face an uncertain future with difficult adjustment processes. In this context, a relative competitive success of Slovakia and Slovenia is more evident, as these countries have already adopted the common currency, and continue to do well.

The analysis shows that prior to the EU-accession, the NMS could have been undoubtedly regarded as catching-up economies, considerably less developed than Germany. As much as 90% of the NMS group members recorded comparative advantages in the exports of labour-intensive goods. In 2000, the group leaders were Hungary, Czechia and Estonia, whereas among the states lagging behind were Lithuania, Latvia, and Romania.

During the period 2000–2014, the EU-10 countries evolved towards the knowledge-based economies, but not all of them did it with the same intensity and for the same commodity groups. The competitive position of NMS in the exports of low-tech goods (i.e. resource- and labour-intensive) did not change. The number of countries recording advantages in these product categories did not change and the advantage-holders were able to keep them.

In 2004, most NMS decreased levels of their specialisation in the exports of relatively less technologically advanced goods, but without gaining advantages in the exports of more advanced products.

The analysis shows that the exports structure of the EU-10 has been on the evolutionary path since 2000, however the timing, pace and scale of adjustment differ across the studied economies. The general trend can be observed that the countries most lagging behind Germany at the beginning of the analysed period (Bulgaria, Romania, Latvia, Lithuania) underwent a continuous and the largest adjustment, which supports the exports specialisation convergence. The evolution of the exports specialisation of four Visegrad countries was on the evolutionary track until 2009 but afterwards the structure froze and no further changes could be observed.

3.3.3. NMS in global value chains

Research into the participation of countries in the global value chains becomes more important as more and more goods are produced internationally (more see Folfas 2016). The aim of this research is to investigate intensity of NMS participation in GVCs.

The domestic value added (DVA) share of gross exports, is a percentage of total gross exports. This “DVA intensity measure” informs how much value added (VA), generated anywhere in the domestic economy, is embodied in a unit of total gross exports.

In the United States and Japan, DVA accounts for ca. 85–90% of gross exports and these two countries are leaders among developed economies. The similar domestic

value-added shares of gross exports characterise suppliers of raw materials such as: Australia, Norway, Argentina, Chile, Brazil, Kazakhstan, Russia and Saudi Arabia. In the United Kingdom, the respective share fluctuates around 82–85% and in countries like Germany, France, Italy and Spain around 75–80%. In some newly industrialised countries (e.g. in India and China) the DVA shares are similar to these in Germany, in the others much lower (Mexico: about 65%).

Table 3.12. Domestic value-added shares of gross exports in selected countries in the years 2000–2015, in percentages

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bulgaria	66.0	64.4	68.0	65.0	62.2	67.6	62.9	60.0	59.3	68.3	65.9	62.8	62.1	62.0	62.7	63.8
Czechia	61.4	60.3	61.5	60.2	58.6	65.6	64.4	63.7	64.5	66.7	62.8	61.3	60.7	61.1	60.3	60.7
Estonia	55.5	56.1	58.3	60.4	58.9	69.6	69.7	69.2	68.2	72.2	66.1	61.6	61.4	62.1	63.1	65.2
Hungary	48.5	50.8	53.8	52.8	52.6	56.0	53.8	54.1	53.3	56.5	52.5	52.2	53.0	53.9	54.0	56.9
Latvia	73.2	75.3	76.4	75.6	75.6	78.6	76.6	76.6	79.6	81.3	78.2	76.8	75.2	76.0	77.8	77.6
Lithuania	77.9	79.0	80.8	82.1	81.5	70.5	70.2	74.8	66.5	73.2	67.2	64.5	65.2	64.5	67.4	68.4
Poland	76.2	76.8	75.9	73.3	71.6	75.3	72.8	72.4	72.2	75.6	73.1	71.6	72.7	72.7	72.5	73.4
Romania	77.1	76.0	77.9	76.8	73.6	72.4	72.7	74.3	77.3	80.2	78.9	76.3	75.7	76.8	76.4	77.1
Slovakia	55.9	52.9	54.1	51.7	53.1	57.0	53.5	53.9	55.0	58.1	56.1	53.3	53.4	53.2	54.1	55.2
Slovenia	63.5	63.1	63.8	64.7	61.9	66.7	65.0	64.0	64.8	69.4	66.1	64.5	64.9	65.8	66.1	67.5

Source: own study based on OECD databases: <https://stats.oecd.org/index.aspx?queryid=75537> and https://stats.oecd.org/Index.aspx?datasetcode=TIVA_2018_C1; access: 15.05.2017.

The content of domestic value added in the NMS gross exports varies. In the years 2000–2015, the highest percentage content was 82.1% (Lithuania, 2003) and the lowest percentage content was 48.5% (Hungary, 2000) – see Table 3.11. Therefore, we can identify groups of NMS with different average percentage content of domestic value added in gross exports in the analysed years.

The first group is made up of countries where this percentage content exceeds 70% (Latvia, Poland, Romania). The second group includes: Bulgaria, Czechia, Estonia, Lithuania and Slovenia, and their average content of domestic value added in gross exports in the years 2000–2015 is less than 70% but more than 60%. The third group consists of countries with the average content of domestic value added in gross exports not higher than 60% (Hungary and Slovakia). Thus, some NMS are in this respect similar to Germany or China, whereas the others rather to Mexico. Interestingly, even if Poland is located in the group with the highest DVA shares among all the NMS, it is its weakest member. Its share was in the first year of investigation (2000) higher than the Latvia's share and lower than the Romania's one. Then in 2002, it was overtaken by Latvia. After a few years of dominance over Romania, it was overtaken in 2007 by this country as well.

Fragmentation and internationalisation of production leads to the creation of cross-border systems called global production networks (GPN) and global value chains. Some NMS, like Poland, also participate in these cross-border production systems. The global value chains participation index is the total of participation as a recipient of foreign components (intermediaries, semi – finished products) used in domestic production (backward participation in GVC index) and as a supplier (manufacturer) of semi – finished products for the manufacture of final products abroad (forward participation in GVC index). The GVCback index is the total of the participation of foreign inputs in gross domestic exports. Simplifying, this index can be considered as a participation in the downstream parts of GVCs. On the contrary, the GVCfor index allows for measuring the participation of domestically produced inputs used in third countries' production in the domestic gross exports and it may be considered as the participation in the upstream parts of GVCs.

A relatively high value of the GVCback index with a relatively low value of the GVCfor index usually means that the country imports foreign semi – finished products and converts them into final goods (through assembling, packing, etc.) and then exports them. It is reasonable to assume that such a country is internationally competitive in terms of wages and therefore assembly plants are located there. Simultaneously, such a country is not a leader in innovation and it buys technologically advanced intermediaries abroad. Such a country is usually not the home country of the large MNCs, but hosts their foreign subsidiaries (e.g. China or India).

A high value of the GVCfor index with a relatively low value of the GVCback index means that the country is an important supplier of components used in international production. Such a situation is characteristic mainly of relatively technologically advanced countries, which produce semi-finished products or services for foreign assembly plants (e.g. the USA), and are home countries of the largest MNCs, carrying out most of the world's research and development (R&D) activities.

Generally, the NMS GVCback indices are higher than the GVCfor indices. In Latvia, Poland, Romania backward participation accounts for ca. 55% (average 2000–2015) and in Lithuania for about 60% of total participation in GVC. In other EU-10 countries, the ratio of GVCback index to total GVC index is even higher – about two third in case of Czechia, Estonia and Slovenia and more than 70% for Bulgaria, Hungary and Slovakia. These statistics suggest that the NMS are mainly assembly countries.

It is worth to notice that in the years 2000–2008 (before the economic crisis) Estonia was the only country with the visible growth in GVCfor index (from 17 to almost 20%). In other countries the GVCfor index was falling or stagnating. It means that Estonia used the time of good economic performance to improve its position in global value chains – more see Czarny, Folfas (2017). Unfortunately, after the world crisis the forward participation

of Estonia in GVC fell noticeable. Post-crisis period (after 2012) brought some visible growth in GVCfor index in the cases of Czechia, Slovakia and Slovenia.

Table 3.13. Participation of NMS (B – backward, F – forward, T – total) in the global value chains in the years 2000–2015, in percentages

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bulgaria	B	34.0	35.6	32.0	35.0	37.8	32.4	37.1	40.0	40.7	31.7	34.1	37.2	38.0	38.0	37.3	36.2
	F	16.7	15.8	16.1	14.7	15.0	13.3	15.2	14.0	13.7	13.2	14.1	15.0	14.6	14.5	15.3	16.0
	T	50.7	51.4	48.1	49.7	52.8	45.7	52.3	54.0	54.4	44.9	48.2	52.2	52.6	52.5	52.6	52.2
Czechia	B	38.7	39.7	38.5	39.8	41.4	34.4	35.6	36.3	35.5	33.3	37.2	38.7	39.3	38.9	39.7	39.3
	F	18.7	19.2	19.2	19.1	19.3	18.0	18.1	18.0	18.4	16.7	17.7	18.2	18.3	18.8	18.8	19.4
	T	57.4	58.9	57.7	58.9	60.7	52.4	53.7	54.3	53.9	50.0	54.9	56.9	57.6	57.7	58.5	58.7
Estonia	B	44.5	44.0	41.7	39.6	41.1	30.4	30.3	30.8	31.8	27.8	33.9	38.4	38.6	37.9	36.9	34.8
	F	17.0	16.9	16.9	17.7	17.5	17.8	18.5	19.2	19.7	18.2	18.0	17.1	16.6	16.5	16.6	16.8
	T	61.5	60.9	58.6	57.3	58.6	48.2	48.8	50.0	51.5	46.0	51.9	55.5	55.2	54.4	53.5	51.6
Hungary	B	51.5	49.2	46.2	47.2	47.4	44.0	46.2	45.9	46.7	43.5	47.5	47.8	47.0	46.1	46.0	43.1
	F	12.2	12.7	13.8	14.4	15.1	14.1	14.1	14.0	13.5	12.6	13.2	13.9	14.7	15.3	15.4	16.2
	T	63.7	61.9	60.0	61.6	62.5	58.1	60.3	59.9	60.2	56.1	60.7	61.7	61.7	61.4	61.4	59.3
Latvia	B	26.8	24.7	23.6	24.4	24.4	21.4	23.5	23.4	20.4	18.8	21.8	23.2	24.8	24.0	22.2	22.4
	F	23.2	24.3	23.7	24.2	24.3	20.4	20.0	20.4	21.9	19.3	20.1	20.5	19.4	19.0	19.4	19.0
	T	50.0	49.0	47.3	48.6	48.7	41.8	43.5	43.8	42.3	38.1	41.9	43.7	44.2	43.0	41.6	41.4
Lithuania	B	22.1	21.0	19.2	17.9	18.5	29.5	29.8	25.2	33.5	26.8	32.8	35.5	34.8	35.5	32.6	31.6
	F	22.1	21.8	21.0	21.3	21.8	15.1	15.5	17.7	16.4	15.5	15.4	16.0	16.3	15.8	15.9	16.8
	T	44.2	42.8	40.2	39.2	40.3	44.6	45.3	42.9	49.9	42.3	48.2	51.5	51.1	51.3	48.5	48.4
Poland	B	23.8	23.2	24.1	26.7	28.4	24.7	27.2	27.7	27.8	24.4	26.9	28.4	27.3	27.3	27.5	26.6
	F	20.7	22.0	21.5	21.1	21.5	20.0	20.1	19.9	20.3	18.7	20.3	21.1	21.1	20.9	21.3	21.5
	T	44.5	45.2	45.6	47.8	49.9	44.7	47.3	47.6	48.1	43.1	47.2	49.5	48.4	48.2	48.8	48.1
Romania	B	22.9	24.0	22.1	23.2	26.4	27.6	27.3	25.7	22.7	19.8	21.1	23.7	24.3	23.2	23.6	22.9
	F	22.7	22.3	22.3	21.9	21.5	16.4	17.7	18.1	20.3	18.5	20.0	20.5	20.7	21.0	21.2	21.3
	T	45.6	46.3	44.4	45.1	47.9	44.0	45.0	43.8	43.0	38.3	41.1	44.2	45.0	44.2	44.8	44.2
Slovakia	B	44.1	47.1	45.9	48.3	46.9	43.0	46.5	46.1	45.1	41.9	43.9	46.7	46.6	46.8	45.9	44.8
	F	19.3	18.5	18.1	18.0	19.9	17.3	16.9	16.5	16.7	15.4	17.0	16.8	17.2	17.0	17.8	18.8
	T	63.4	65.6	64.0	66.3	66.8	60.3	63.4	62.6	61.8	57.3	60.9	63.5	63.8	63.8	63.7	63.6
Slovenia	B	36.5	36.9	36.2	35.4	38.1	33.3	35.0	36.0	35.2	30.6	33.9	35.5	35.1	34.2	33.9	32.5
	F	17.7	18.2	17.8	17.9	18.1	15.9	16.5	16.4	17.0	15.3	16.9	18.0	18.7	19.0	19.6	20.0
	T	54.2	55.1	54.0	53.3	56.2	49.2	51.5	52.4	52.2	45.9	50.8	53.5	53.8	53.2	53.5	52.5

Source: Own study based on OECD databases: <https://stats.oecd.org/index.aspx?queryid=75537> and https://stats.oecd.org/Index.aspx?datasetcode=TIVA_2018_C1; access: 15.05.2017.

Figure 3.13. The role of selected countries in global production networks and global value chains in the years 2000 and 2015

horizontal axes: average share of intermediate goods and services in gross exports
 vertical axes: average share of intermediate goods and services in gross imports
 additional lines indicate the average global shares

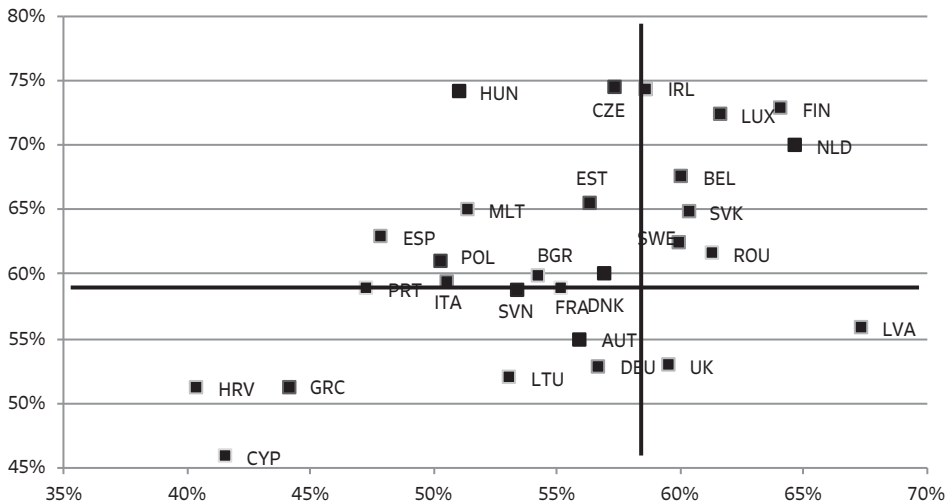
assembly countries – the share of intermediate goods and services in gross exports is lower than the world average, and the share in gross imports is higher than the world average

very open economies – shares of intermediate goods and services in gross exports and imports higher than the world average shares

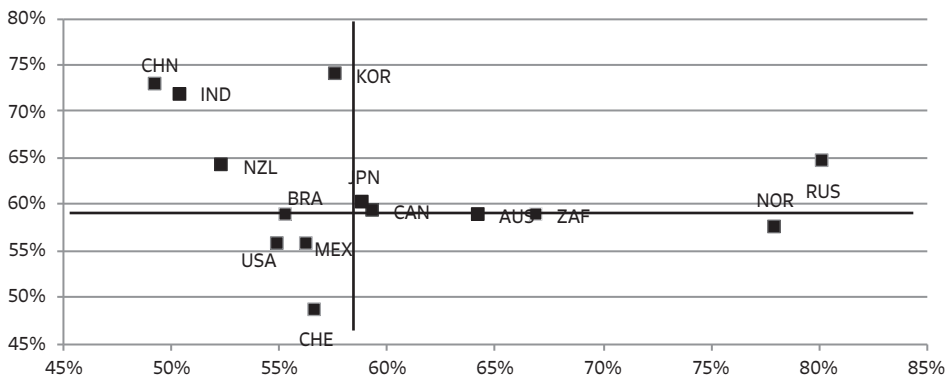
countries focused on the internal (or regional) market – shares of intermediate goods and services in gross exports and imports lower than world averages

exporters of unprocessed goods (suppliers of raw materials) – the share of intermediate goods and services in gross exports higher than the world average and the share in imports lower than the world average

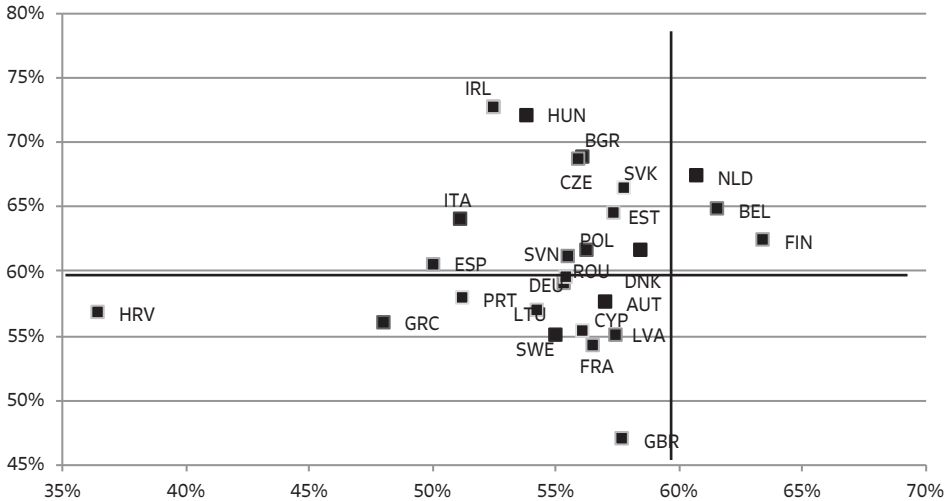
The year 2000
 EU Member States



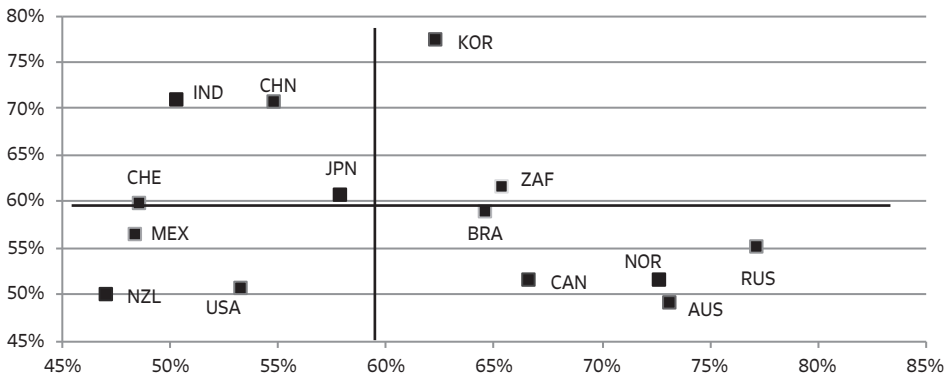
Other countries



The year 2015
EU Member States



Other countries



Source: Own study based on OECD databases: <https://stats.oecd.org/index.aspx?queryid=75537> and https://stats.oecd.org/Index.aspx?datasetcode=TIVA_2018_C1; access: 15.05.2017.

Figure 3.13 presents the results of an empirical survey of trade in intermediate goods and services for the years 2000 and 2014 that allow determining the role of selected countries in GPN/GVC and its changes. In this figure ISO 3 country codes are used.

The majority (8 out of 10) of the NMS were assembly countries in the year 2000 as well as in the year 2015. However, they differ from China and India – the biggest world assembly countries. The NMS are located much closer to very open economies or countries oriented toward internal markets than China and India, which seems to stuck on the position of assembly countries.

3.4. Role of institutions in shaping inventive activity in the NMS

In this subchapter, we present the results of a comparative study of the role of institutions in shaping inventive activity in the European catching-up economies.¹³ Among the 59 countries included in the study¹⁴, we pay special attention to the NMS.

3.4.1. Institutions and invention

Both institutions and innovation are credited to prompt economic growth. A supportive institutional setting enables technological development that leads to the socio-economic progress. The role of institutions in promoting technical change has been discussed in the economic and political economy literature, but the question of building a national innovation base is still relevant. The geopolitical changes in the last two decades, with the collapse of the centrally planned economies and the EU membership of CEE countries highlight the continued importance of addressing this question. A more empirical, cross-country research is needed to examine the effects of institutions on technical change (Tebaldi, Elmslie 2013, p. 887).

Following the footsteps of scholars investigating the relationship between institutions and innovation (Huang, Xu 1999; van Waarden 2001; Tebaldi, Elmslie 2008; Taylor 2009; Cvetanovic, Sredojevic 2012), in this subchapter, we look at the effects of institutions on patent data as a measure of inventive activity. Emerging and catching-up economies offer a conceptually different institutional environment than developed economies¹⁵. For example, the CEE economies, undergoing systemic transformation in order to meet the requirements of the EU-membership, are the products of institutional experimentation and promise valuable insights into the link between institutions and invention.

Innovation is described in Subchapter 2.2 as a process with three overlapping stages: invention, innovation, and diffusion. Invention implies creating a new idea.

¹³ Original discussion on the role of institutions in shaping inventive activity can be found in the research paper by Ervits, Žmuda (2016).

¹⁴ Analysed countries, based on the selection criteria suggested in Hoskisson et al. (2013): Albania, Argentina, Armenia, Azerbaijan, Bangladesh, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Chile, China, Colombia, Cote d'Ivoire, Croatia, Czechia, Ecuador, Egypt, Estonia, Georgia, Ghana, Greece, Hungary, India, Indonesia, Israel, Jamaica, Jordan, Kazakhstan, Kenya, South Korea, Kyrgyzstan, Latvia, Lithuania, Macedonia, Malaysia, Mauritius, Mexico, Moldova, Morocco, Nigeria, Pakistan, Peru, Philippines, Poland, Portugal, Romania, Russia, Saudi Arabia, Slovakia, Slovenia, South Africa, Sri Lanka, Tajikistan, Thailand, Trinidad and Tobago, Tunisia, Turkey, Ukraine, Venezuela.

¹⁵ We use the term "transitional economy" as applied to the former Soviet Union and the former socialist satellites in Eastern Europe, as well as China; the broader terms "emerging" or "developing" economies, which encompass transitional economies, are used interchangeably.

Then through the process of innovation, the idea acquires a usable form, for example, of a new product. Diffusion means producing and marketing this product (King et al. 1994, p. 140). Patents are usually associated with the first stage of innovation. However, as Lamoreaux and Sokoloff (1996) comment, the establishment of a patent system not only encouraged inventive activity in countries like the USA, but also promoted the spread of technological knowledge and increased productivity. Thus, patenting is an integral part of technological development.

Schumpeter (1952) stressed the importance of technological development for economic competition. Abramovitz (1956), Kendrick (1956), and Solow (1957) exposed the effect of “technical change”, as a source of productivity. Higher levels of productivity, “the value of the output produced by a unit of labour or capital,” result in higher levels of national competitiveness (Porter 1990). A number of scholars focus on the relationship between country competitiveness and patent statistics as a measure of technical change (Pavitt, Soete 1980, 1990; Dosi et al. 1990; Scherer 1992; Sood, DuBois 1995; Jaffe, Trajtenberg 2002). Thus, inventive activity by domestic firms is part of the efforts to increase national competitiveness. Economists, operating at the macro-level, treat patent data as an indicator of inventive output¹⁶.

Discrepancies in national economic performances were attributed not only to technology advances, but also to the role of domestic institutions. The insights of North (1990, 1991; North, Thomas 1973) on formal and informal institutions (a comprehensive definition of institutions see in Sala-i-Martin (2001, p. 17)) determining the pace of economic development inspire many scientists. Econometric models and empirical studies acknowledge the relationship between institutions and economic growth (Knack, Keefer 1995; Barro 1996; Hall, Jones 1999; Acemoglu et al. 2001; Glaeser et al. 2004;). Chong and Calderon (2000) as well as Gradstein (2003) stress the two-way relations: good institutions promote growth, which in turn leads to a better quality of institutions. The developmental state model discussed in Subchapter 2.3 as well as its implementation success stories in Ireland and Singapore show how far coherent bureaucratic machinery may contribute to an innovation-driven industrial upgrade. In this context, Davis (2010) stressed that institutional flexibility plays a critical role in boosting economic development and increasing levels of competitiveness.

In the case of many catching-up economies their social and normative institutions are not supportive of entrepreneurship (Ahlstrom, Bruton 2010; Shirokova, McDougall-Covin 2012; Shirokova, Tzukanova 2012). Zhu et al. (2012), Wittmann and Peng (2012), investigating institutional barriers to innovation by SMEs in China, call for more research

¹⁶ The use of patent statistics as a proxy for inventive activity (including the problems associated with this data source) was extensively discussed in Kuznets 1962; Schmookler, Brownlee 1962; Mueller 1966; Schmookler 1966; Comanor, Scherer 1969 and Griliches 1990.

on the factors affecting innovation in emerging and catching-up economies. Since SMEs are small and suffer from lacking resources, their engagement in innovation is inherently risky and they require more nurturing in the form of “market-supporting, entrepreneur-friendly institutions” (Zhu et al. 2012, p. 1140). Thus, a poor institutional infrastructure like the lack of intellectual property (IP) rights protection or high level of corruption should lead to the decline of invention.

Institutional perspective has been a logical choice for many entrepreneurship scholars who are interested in the internationalisation strategies of SMEs from transitional economies in Eastern European catching-up economies. Because of an abrupt change in the regulatory framework, a new environment emerged and led to the birth of millions of new internationally active businesses (Cieslik, Kaciak 2009, p. 383). This new regulatory environment discouraged innovation because of high levels of uncertainty, an accompanying feature of the transition process (Sára et al. 2013, p. 49). Nevertheless, the NMS from CEE made significant progress economically and politically in catching up with the rest of the EU. Admittedly, at the beginning of the century, the upcoming EU membership was a key determinant shaping the national approaches to innovation systems in the CEE countries (Dolinšek, Poglajen 2009). Based on the logic that improvements in the quality of institutions lead to the increase in the patenting activity, the CEE countries present a unique opportunity to look at invention in the context of catching-up economies.

We look at the association between patent statistics from the World International Patent Organization (WIPO) Statistics Database and measures of institutional quality. The purpose of this cross-country comparison is to gain empirical insights into the relationship between institutions and patent statistics as a proxy for inventive activity.

3.4.2. Institutional quality and patenting

There is a diversity of measurable indicators of institutional quality, which are publicly available and regularly updated¹⁷. Gradstein (2003), for instance, looked at the relationship between income per capita and different measures of governance quality, operationalised by the Worldwide Governance Indicators (WGIs). We use the WGI percentile ranks and the Distance to Frontier (DTF) scores of the Doing Business Index by the World Bank. The choice of these two sources of institutional measurements is dictated by their popularity in economic literature, as well as convenience of use, comprehensiveness, and comparable ranking results.

¹⁷ See an exhaustive list of institutional and IP indices at Taylor Wessing: http://www.taylorwessing.com/ipindex/instrumental_factors.html; access: 10.03.2015.

The WGIs consist of six composite indicators of institutional quality covering over 200 countries¹⁸. Data sources include perceptions-based surveys of firms and households, as well as non-governmental organisations, international governmental organisations, country experts, and government agencies like the U.S. Department of State (Kaufmann et al. 2010). The WGI report evaluation outcomes as a percentile rank on a scale from 0 to 100, where 0 stands for the lowest level of institutional quality. We use an averaged WGI rank of 182 countries for the period of four years (2010-2013).

The World Bank Doing Business index ranks economies on the ease of doing business.¹⁹ The DTF score reflects the quality of regulatory environment and its improvement over time and shows the distance of each economy to the “frontier” or best performance across economies. A country’s distance to frontier is reported on a scale from 0 to 100, where 0 represents the lowest performance. “When compared across years, the distance to frontier score shows how much the regulatory environment changed over time in absolute terms” (The World Bank, Distance to Frontier 2015, p. 146). We use an averaged Distance to Frontier (DTF) score of 178 countries for the period of four years (2010-2013).

The WIPO, a specialised agency of the United Nations, compiles patent statistics from national and regional IP offices and makes these data available on <http://www.wipo.int/ipstats>. A patent is a set of exclusive rights granted to applicants for “inventions that are new, non-obvious and commercially applicable” for a period of 20 years (<http://www.wipo.int/ipstats/en/statistics/glossary.html>; access: 1.03.2015). In the WIPO, the origin of the application is determined by the country of residence of the first-named applicant on an IP application. We use the total number of applications granted by a national IP office to resident applicants and grants offered by foreign IP offices to resident applicants (“application abroad”) between 2010 and 2013.²⁰ Because patent data are subject to random fluctuations, Mueller (1966, p. 36) recommends using averaged patent figures over a span of 3–5 years. The number of patents granted over a four-year period was averaged, adjusted for population (per million) as well as for GDP (per billion US dollars), and correlated with averages of two sets of institutional factors: the World Governance Indicators developed

¹⁸ The indicators include “voice and accountability; political stability and absence of violence and terrorism; government effectiveness; regulatory quality; rule of law; and control of corruption.” The WGI cross-country data, as well as detailed description of methodology, can be found on the World Bank website at <http://info.worldbank.org/governance/wgi/index.aspx#doc>

¹⁹ The rankings cover ten topics: “starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts, and resolving insolvency.” The World Bank DTF score cross-country data, as well as detailed description of methodology, can be found on the World Bank Group website at <http://www.doingbusiness.org/data/distance-to-frontier>

²⁰ For exact definitions of “resident application” and “application abroad,” please see WIPO Glossary at <http://www.wipo.int/ipstats/en/help/>; access: 7.03.2015.

by Kaufmann et al (2010) and the Distance to Frontier score of the World Bank Doing Business Index.²¹

The average number of applications (adjusted for population and GDP) granted to residents from WIPO member-countries between 2010 and 2013 was correlated with two sets of institutional factors: WGI and DTF. The Pearson correlation coefficients in Table 3.15 point to a moderately strong relationship between institutions and inventive activity²². These results support the findings in Tebaldi and Elmslie (2013, p. 892).

Table 3.14. Association between institutional indices and granted patents in the years 2010–2013

Institutional measures 2010–13	Pearson Correlation	
	Number of granted patents, 2010–13	
	Total Average per million of population	Total Average per billion \$ of GDP
Average WGI Percentile Rank, 182 countries	0.50**	0.48**
Average Total DTF Score, 178 countries	0.43**	0.43**

** Correlation is significant at the 0.01 level (2-tailed)

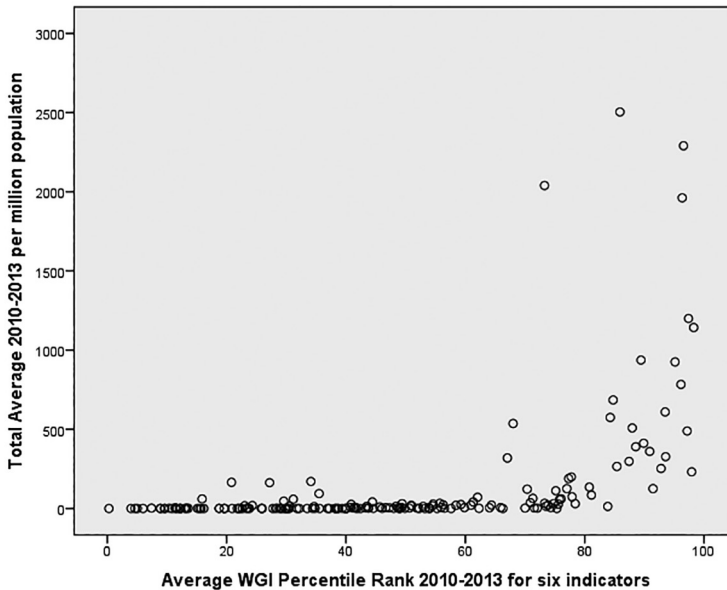
Source: WIPO Statistics Database for patent data at <http://www.wipo.int/ipstats/en/>, the World Bank for the WGIs at <http://info.worldbank.org/governance/wgi/index.aspx#doc>, and the DTF scores of the Bank Doing Business Index at <http://www.doingbusiness.org/data/distance-to-frontier>; access: 30.04.2015.

The scatter plot in Figure 3.14 shows that there is a steep increase in the number of patents per million of population at the point where the WGI rank is at about 70%. We can assume that invention “blossoms” after a country steps over this threshold of institutional quality. Scatter plots for the WGI rank and the number of patents per billion US dollars of GDP, as well as for the DTF score, demonstrate the same dynamics of the inventive activity threshold. As already noted, both the WGI rank and the DTF score are broad indicators of institutional quality reflecting a general institutional climate. The acknowledgment of the existence of this threshold indicating a certain level of institutional development after which invention spikes is noteworthy and has implications for the analysis of catching-up economies.

²¹ We looked at detailed patent statistics (number of patents granted to residents domestically and abroad from 2003 to 2013 in 188 countries, WIPO Statistics Database) and identified no discernable pattern with respect to the annual growth rate in the numbers of granted patents being affected by the world financial crisis (2007-2009) or its aftermath (2010-2013). In some countries like China, the number of granted patents per year increased consistently, including the period 2007–2013.

²² Correlation coefficients can have values from –1 to +1. A correlation coefficient of 0 indicates that there is no linear relationship between the two variables. In social sciences, the value of a correlation coefficient above 0.40 usually indicates a strong relationship (Sweet, Grace-Martin 2008, p. 106–107).

Figure 3.14. Granted patents per million of population in 182 countries and averaged WGI percentile ranks in the years 2010–2013



Source: WIPO Statistics Database for patent data at <http://www.wipo.int/ipstats/en/> and the World Bank for the WGIs at <http://info.worldbank.org/governance/wgi/index.aspx#doc>; access: 30.04.2015.

Hoskisson et al. (2013) argue that emerging and catching-up economies are not homogenous. Their level of development varies along institutional and economic infrastructure axes. The so-called “mid-range” economies, which progress from an emerging/catching-up economy status to a developed economy, grow in economic significance and promise interesting theoretical insights into the process of transition (Hoskisson et al. 2013, p. 1305). Hoskisson et al. (2013, p. 1303) make a list of 60 mid-range economies that, according to their methodology, fit the profile and rate them based on the level of institutional and infrastructure development. We ran simple correlations between the number of patents granted (adjusted for population and GDP) in this group of countries between 2010 and 2013 and institutional quality indices. The results are reported in Table 3.15.

Table 3.15 indicates a weak linear association between patent statistics and institutional indices in mid-range economies. There is, however, empirical evidence discussed in Lu et al. (2008), which points to the association between inventive activity and institutions. In fact, this is an argument professed by the “developmental state” literature that economic and technological catch-up strategies in developing economies (often executed by private firms) are assisted and supervised by state institutions. The answer to this puzzle may lie in the limitations of our data: four years is a comparatively short time span. Longitudinal

studies might be more appropriate for looking at the relationship between different institutional arrangements and inventive activity expressed as patents. We also did not account for the possible time lag, the delay in the effects of institutional factors on inventive activity.

Table 3.15. 59 mid-range economies and institutional indices

Institutional measures 2010–13	Pearson Correlation	
	Number of granted patents 2010–13	
	Total Average per million of population	Total Average per billion \$ of GDP
Average WGI Percentile Rank, 59 mid-range economies	Correlation is not significant	Correlation is not significant
Average Total DTF Score, 59 mid-range economies	0.33*	0.32*

* Correlation is significant at the 0.05 level (2-tailed)

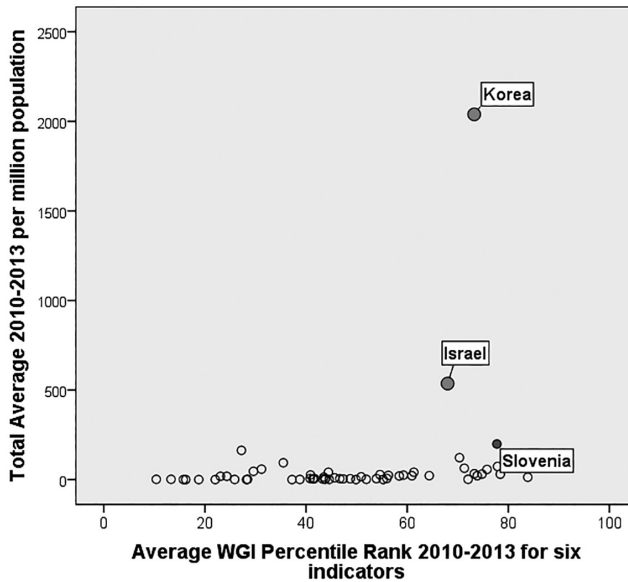
Source: WIPO Statistics Database for patent data at <http://www.wipo.int/ipstats/en/>, the World Bank for the WGIs at <http://info.worldbank.org/governance/wgi/index.aspx#doc>, and the DTF scores at <http://www.doingbusiness.org/data/distance-to-frontier>; access: 30.04.2015.

Another explanation lies in the choice of the institutional indices. Both the WGI rank and the DTF score assess institutional quality based on composite indicators like political stability, rule of law, control of corruption, etc. These broad indicators pertain to all companies and industries. They reveal institutional conditions, an ecosystem, where inventive activity can flourish or fade, but as in every intricate ecosystem with its networks and spillovers, it is hard to identify cause-and-effect relationships. We can, however, get a glimpse of the threshold of inventive activity, which is a certain point (different for different institutional indices) after which the number of generated patents increases dramatically.

Figure 3.15 is a scatter plot for the relationship between the number of granted patents per million of population in 59 mid-range economies over four years (2010–2013) and the WGI ranks for the same period. Most of these countries have a WGI ranks of 40–60%. These countries did not reach the threshold of inventive activity, which becomes visible at about 70% demonstrated by a steep increase in the number of patents. The results confirm the reasoning behind classifying developing economies based on the level of general institutional development and infrastructure/factor market development in Hoskisson et al. (2013). The so-called mid-range economies are in the invention “limbo” floating in the range between 0 and 250 patents per million of population with Israel and South Korea being obvious exceptions. The success of Israel and South Korea in building national systems of innovation, where a combination of public and private efforts culminated in creating an innovation-friendly environment encouraging knowledge accumulation, technology development and diffusion, is well documented (Sung, Carlsson 2003; Breznitz

2007). Slovenia is also separating itself from the group of other emerging and catching-up economies in respect to the invention rate and institutional progress.

Figure 3.15. Granted patents per million of population in 59 mid-range economies and WGI ranks 2010–2013



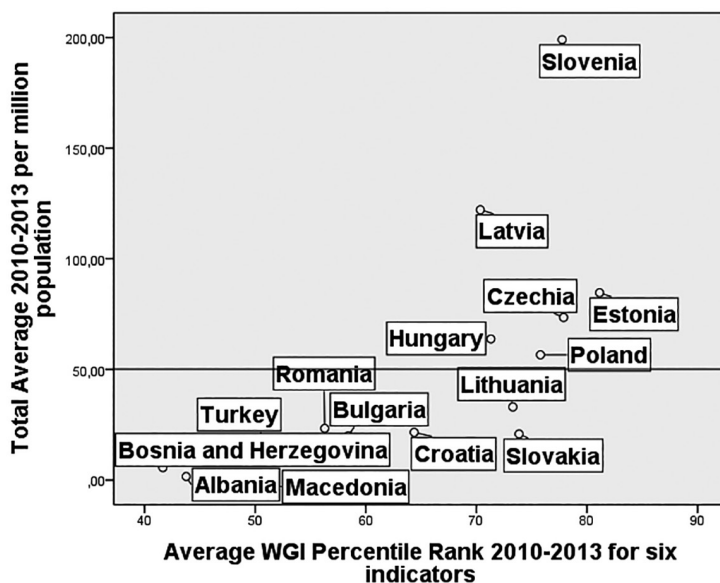
Source: WIPO Statistics Database for patent data at <http://www.wipo.int/ipstats/en/> and the World Bank for the WGIs at <http://info.worldbank.org/governance/wgi/index.aspx#doc>; access: 30.04.2015.

Our findings might be alluding to a complex interplay between at least three factors. The first factor is a strategic effort on behalf of innovation exercised by the network of public and private institutions (national innovation system). The other two factors include the general institutional context expressed by the WGIs and the fundamental business infrastructure measured by the DTF score. The two indices of institutional quality used in this report (WGI and DFT) are not directly related to innovation or invention, but they create a fertile soil for inventive activity. Our results confirm the theoretical conclusions drawn in North and Thomas (1973) on the importance of property rights protection for the economic rise of the West. Rosenberg and Birdzell (1987) emphasised the role of political and economic freedoms in boosting technological and economic development. The countries that score highly on both indices of institutional quality used in this research also file the highest number of patent applications per million of population and per billion US dollars of GDP.

At the last stage of our analysis, we looked at the patenting activity in the NMS of the CEE. The relationship between the number of granted patents per million of population

and per billion US dollars of GDP for the years 2010–2013 in fourteen CEE countries from the list of 59 and the WGI ranks for the same period is plotted in Figures 3.16 and 3.17. Six states, namely Slovenia, Latvia, Estonia, Czechia, Hungary, and Poland are invention leaders in this geographical category with Slovenia having moved significantly ahead of its neighbours along both axes: institutional quality and the number of granted patents. In fact, according to the Innovation Union Scoreboard 2015 (an innovation index, which evaluates innovation performance of the EU member states) Slovenia moved in 2015 into the category of “innovation followers,” whose performances approach the EU average (European Commission 2015, p. 10). Slovenia is the only post-socialist country in this grouping.

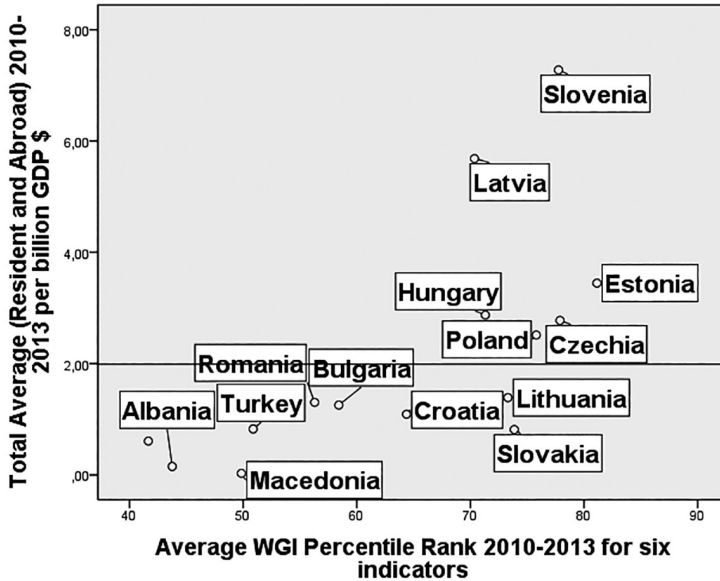
Figure 3.16. Granted patents per million of population in fourteen CEE countries and WGI ranks in the years 2010–13



Source: WIPO Statistics Database for patent data at <http://www.wipo.int/ipstats/en/> and the World Bank for the WGIs at <http://info.worldbank.org/governance/wgi/index.aspx#doc>; access: 30.04.2015.

Based on our data, the six CEE countries invention leaders (Slovenia, Latvia, Hungary, Estonia, Czechia and Poland), with the WGI rank at about 70 percent, are in the group of catching-up countries closest to the threshold of inventive activity. The fact that these countries entered the European Union in 2004 and went through a rigorous harmonisation process of converging with the EU regulatory and institutional standards should have contributed to their leading position vis-à-vis their counterparts which either had not entered the EU yet or became members later.

Figure 3.17. Granted patents per billion US dollars of GDP in fourteen CEE countries and WGI ranks in the years 2010–13



Source: WIPO Statistics Database for patent data at <http://www.wipo.int/ipstats/en/> and the World Bank for the WGIs at <http://info.worldbank.org/governance/wgi/index.aspx#doc>; access: 30.04.2015.

3.5. Determinants of the NMS competitive position

As already mentioned in Subchapters 1.2 and 3.1, the comparative analysis of conditions of the economic development of countries conducted on an annual basis by the World Economic Forum results in a ranking of international economic competitiveness presented in GCR. In this subchapter, we focus on the determinants of the competitive position.

The data concerning the effects of particular factors on the competitive positions of the NMS, the Visegrad Group (V4) and individual V4 countries in 2006–2017 are presented in Table 3.16. In this subchapter in tables and figures ISO 2 country codes are used.

It follows from the data presented in Table 3.16 that in 2006 the competitive positions of the V4 countries were mostly determined by basic requirements. The category in question accounted for the highest relative GCI score (4.76), as compared to the overall GCI score of 4.52. A similar situation (the highest relative GCI scores) was observed in individual V4 countries as well as in the NMS as a whole. Basic requirements were followed by efficiency enhancers (4.48 in the V4 countries and 4.35 in the NMS). Innovation and sophistication factors played the least important role (with the GCI scores of 4.0 and

3.83 respectively). The significance of basic requirements is also reflected in the fact that – with regard to the sub-index concerned – the V4 countries then ranked 48th, similarly to all the NMS (49th place).

Table 3.16. Determinants of the competitive positions (index values and ranks) of the V4, the NMS and four members of the V4 in 2006 and 2017

Specification	GCI score					
	2006					
	CZ	HU	PL	SK	V4a	NMSa
Overall GCI score	4.67	4.49	4.39	4.54	4.52	4.43
Basic requirements	4.94	4.71	4.62	4.76	4.76	4.77
Efficiency enhancers	4.59	4.48	4.33	4.5	4.48	4.35
Innovation and sophistication factors	4.39	4.06	3.73	3.82	4	3.83
	2017					
Overall GCI score	4.77	4.33	4.59	4.33	4.51	4.51
Basic requirements	5.35	4.65	4.99	4.83	4.96	5.01
Efficiency enhancers	4.86	4.44	4.65	4.46	4.6	4.54
Innovation and sophistication factors	4.24	3.52	3.75	3.76	3.82	3.82
	Change 2017/2006					
Overall GCI score	0.10	-0.16	0.20	-0.21	-0.01	0.08
Basic requirements	0.41	-0.06	0.37	0.07	0.20	0.24
Efficiency enhancers	0.27	-0.04	0.32	-0.04	0.12	0.19
Innovation and sophistication factors	-0.15	-0.54	0.02	-0.06	-0.18	-0.01
	WEF rank					
	2006					
Overall GCI score	31	38	45	36	38	45
Basic requirements	39	50	54	47	48	49
Efficiency enhancers	28	32	40	31	33	40
Innovation and sophistication factors	27	33	48	43	38	47
	2017					
Overall GCI score	31	60	39	59	47	48
Basic requirements	30	64	45	52	48	46
Efficiency enhancers	29	45	34	44	38	43
Innovation and sophistication factors	32	79	59	56	57	59
	Change 2017/2006					
Overall GCI score	0	-22	6	-23	-9	-3
Basic requirements	9	-14	9	-5	0	3
Efficiency enhancers	-1	-13	6	-13	-5	-3
Innovation and sophistication factors	-5	-46	-11	-13	-19	-12

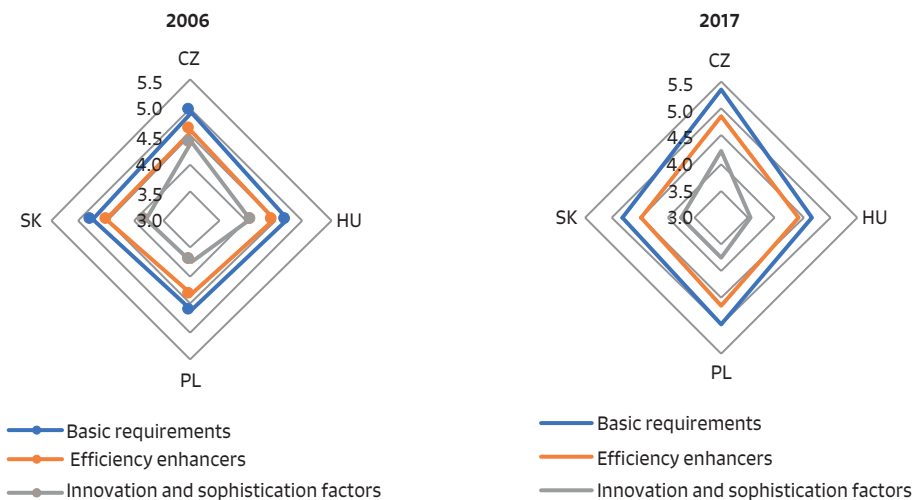
^a The arithmetic mean for the whole group of the V4 countries or the NMS. Abb. as under Table 3.8.

Source: own preparation on the basis of WEF 2015; WEF 2017.

Until 2017, there was no significant improvement. On the contrary, the V4 countries as a whole even deteriorated their competitive position by as many as 9 spots in the WEF ranking, mainly due to significantly worse ranks of Hungary (down 22 places) and Slovakia (down 21 places). Basic requirements continued to mostly shape the competitive position of the countries in question. The average GCI score went up by 0.20 percentage points (p.p.) for the V4 and by 0.24 p.p. for the EU-10. Simultaneously, efficiency enhancers showed an insignificant improvement, up by 0.12 p.p. and 0.19 p.p. respectively. In contrast, a fall in the GCI score was noted for innovation and sophistication factors (by 0.18 p.p. and 0.01 p.p. respectively). It is also worth adding that with regard to basic requirements the V4 countries maintained their 2006 position, whereas the NMS even showed an improvement (up 3 spots). As far as efficiency enhancers are concerned, the countries in question deteriorated their positions – by 5 and 3 places respectively. In terms of innovation and sophistication factors, the respective positions of the countries under analysis dropped by as many as 19 and 12 places.

Those changes must be regarded as definitely unfavourable. According to the authors of the WEF reports, the V4 countries and the NMS whose GDP per capita ranged from USD 3000 to USD 17000 in the period covered should have built their competitive positions on efficiency enhancers and largely on innovation and sophistication factors rather than on basic requirements. Unfortunately, neither the V4 countries nor the NMS as a group managed to achieve that.

Figure 3.18. Determinants of the competitive positions of the V4 countries in the years 2006 and 2017



Source: own presentation based on WEF 2015; WEF 2017.

At the same time, it is worth emphasising that Poland's situation was relatively good. Although basic requirements still played the greatest role in determining its competitive position in both 2006 and 2017 (the respective GCI scores even augmented from 4.62 to 4.99), there was an improvement with regard to efficiency enhancers. The GCI score rose from 4.33 to 4.65, even if the increase was less distinct than in the case of basic requirements. Unfortunately, the Polish economy still makes no use of innovation and sophistication factors. The GCI score for that sub-index remained virtually unchanged (at 3.73 and 3.75 respectively). Neither the other V4 countries nor the NMS managed to improve the role of efficiency enhancers or of innovation and sophistication factors in determining their competitive positions (Figure 3.18).

For the purpose of verifying the trends described above, the study presented was divided into several stages as in Molendowski and Snarska (2018). The first step was to establish the revealed comparative advantage indices for the countries covered, i.e. the contributions of the 12 pillars assigned to the three sub-indices to the GCI score, according to the following formula derived from: Amendola et al. 1993 and Buckley et al. 1988:

$$RCI_{it} = \frac{F_{it}^j}{GCI_t}$$

where: RCI_{it} – the comparative advantage index for country i in year t ; F_{it}^j – the score for factor j in country i in year t ; the factors covered include 4 basic requirements, 6 efficiency enhancers and 2 innovation and sophistication factors; GCI_t – the overall GCI score in year t . The next stage was to replace the scores for individual factors with average scores for each of the three groups (sub-indices) and to estimate the so-called inter-group comparative advantage indices according to the formula presented in: Amendola et al. 1993 and Akben-Selcuk 2016:

$$GRCI_{it} = \frac{\bar{F}_{it}^g}{GCI_t}$$

where: $GRCI_{it}$ – the inter-group comparative advantage index for country i in year t , for factor group g ; \bar{F}_{it}^g – the score for factor group g in country i in year t , with $g \in \{\text{basic requirements, efficiency enhancers, innovation and sophistication factors}\}$.

The determination of whether significant changes occurred between individual V4 countries in terms of competitiveness relative to the group of reference, i.e. the mean calculated for all the NMS, is based on Welch's t-test for two equal means where the samples are paired and the variances are unequal. In this case, the test statistic is written as in Reiczigel et al. (2005) and Staudte and Sheather (2011):

$$t \sim t(v)$$

where: T_1, T_2 are sample sizes, β_1^1, β_1^2 denote the means of the competitiveness index concerned for the relevant country from the V4 or NMS group, whereas $D^2(\beta_1^1), D^2(\beta_1^2)$ denote the sample variances. The degrees of freedom v are approximated using the Welch – Satterthwaite equation for unequal variances. The calculation results are presented in Table 3.18.

Table 3.18. Effects of the factors determining the competitiveness of the V4 countries against the backdrop of the NMS in 2006–2017

Factors/ pillars	EU-10 average	Czechia			Poland		
		Mean	Student's t-test	p-value	Mean	Student's t-test	p-value
Basic requirements	1.0939	1.0822	-1.1044	0.2833	1.0523	-4.2070	0.0004
1	0.8895	0.8412	-5.8572	0.0000	0.8854	-0.35941	0.7243
2	0.9449	0.9944	1.8041	0.0850	0.8426	-2.5041	0.0227
3	1.1744	1.1711	-0.1400	0.8904	1.1079	-3.2305	0.0046
4	1.3666	1.3220	-4.6958	0.0001	1.3732	0.5835	0.5669
Efficiency enhancers	1.0050	1.0144	1.8448	0.0788	1.0258	3.2639	0.0042
5	1.0970	1.0887	-1.0657	0.2982	1.1003	0.4407	0.6638
6	1.0088	1.0042	-0.78562	0.4410	0.9856	-4.1782	0.0004
7	1.0077	0.9849	-1.4228	0.1690	0.9779	-1.5478	0.1381
8	0.9768	0.9787	0.1204	0.9055	0.9945	0.8786	0.3891
9	1.0381	1.0576	0.5187	0.6091	0.9518	-2.1893	0.0395
10	0.9015	0.9724	8.2065	0.0000	1.1447	35.3110	<0.0001
Innovation and sophistication factors	0.8552	0.9147	7.3355	0.0000	0.8352	-2.6527	0.0169
12	0.9314	0.9930	5.4524	0.0000	0.9270	-0.3538	0.7272
13	0.7790	0.8364	8.1427	0.0000	0.7434	-6.1195	<0.0001
Factors/ pillars	EU-10 average	Slovakia			Hungary		
		Mean	Student's t-test	p-value	Mean	Student's t-test	p-value
Basic requirements	1.0939	1.0954	0.1492	0.8830	1.0764	-2.0211	0.0558
1	0.8895	0.8392	-4.8130	0.0002	0.8708	-1.1955	0.2532
2	0.9449	0.9522	0.2413	0.8116	0.9888	1.5902	0.1261
3	1.1744	1.2039	1.8382	0.0797	1.0948	-3.0337	0.0082
4	1.3666	1.3865	1.0723	0.3028	1.3511	-1.7461	0.0953
Efficiency enhancers	1.0050	1.0309	4.1139	0.0006	1.0123	1.4901	0.1504
5	1.0970	1.0516	-3.2722	0.0050	1.0751	-2.0450	0.0553
6	1.0088	1.0452	5.4678	<0.0001	0.9990	-1.3652	0.1893
7	1.0077	1.0189	0.4940	0.6277	0.9977	-0.7929	0.4378
8	0.9768	1.0868	6.6402	<0.0001	0.9741	-0.1317	0.8964

cont. Table 3.18

Factors/ pillars	EU-10 average	Slovakia			Hungary		
		Mean	Student's t-test	p-value	Mean	Student's t-test	p-value
9	1.0381	1.0465	0.2408	0.8120	1.0266	-0.3266	0.7472
10	0.9015	0.9366	3.0891	0.0068	1.0011	13.5900	<0.0001
Innovation and sophistication factors	0.8552	0.8544	-0.1375	0.8919	0.8582	0.2868	0.7785
12	0.9314	0.9644	3.7537	0.0014	0.9006	-1.8044	0.0903
13	0.7790	0.7445	-3.8101	0.0023	0.8158	5.7477	0.0001

Pillar indications as in Subchapter 1.3.

Source: own presentation based on WEF 2015; WEF 2017.

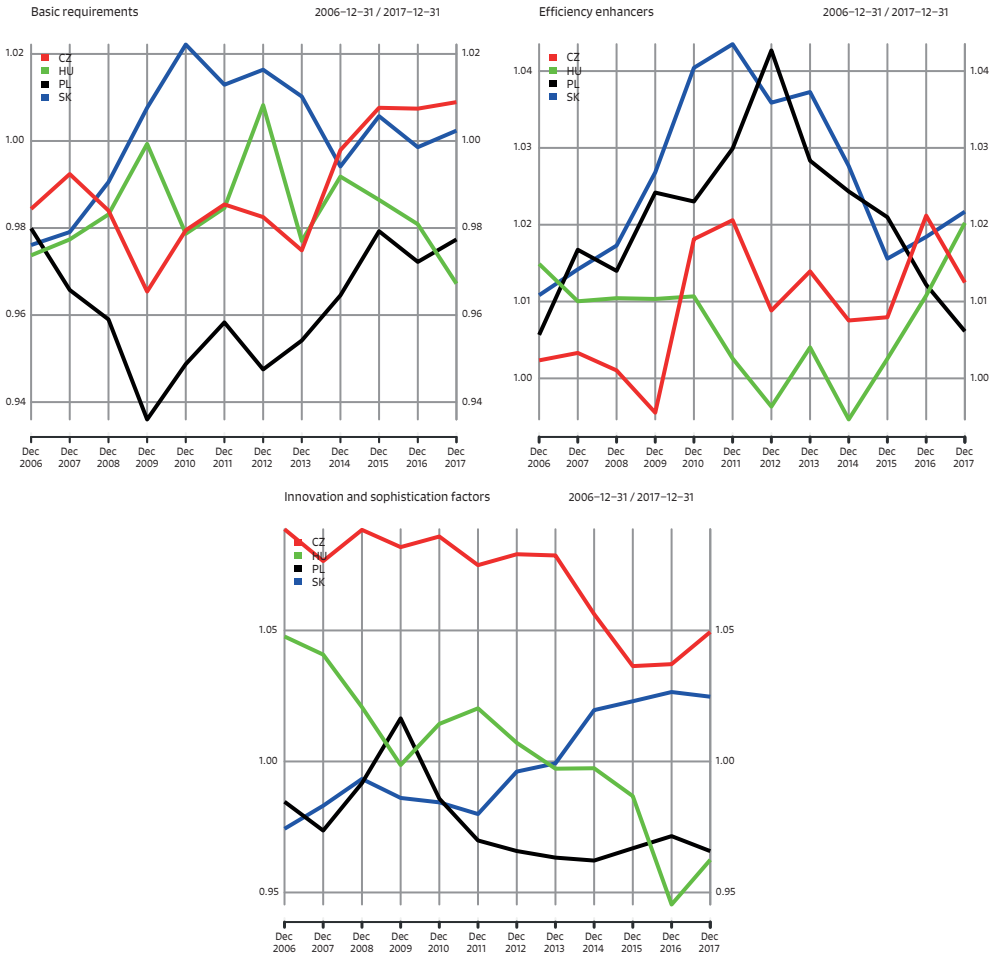
The calculation results summarised in Table 3.18 allow to conclude that in the period under examination the contribution of basic requirements was statistically significantly greater than the EU-10 mean for Czechia and Slovakia, whereas it was significantly below the NMS mean both in Poland and in Hungary. As regards efficiency enhancers, their share was above the EU-10 mean in Poland, Czechia and Slovakia. That effect could not be corroborated for the Hungarian economy. The contribution of innovation and sophistication factors to the GCI was only significantly greater in the case of Czechia, whereas in Poland it was significantly lower than the NMS mean. Neither Slovakia nor Hungary significantly deviated from the EU-10 mean.

For the purpose of examining the effect of each of the 12 determinants of the competitive positions of Czechia, Poland, Slovakia and Hungary against the backdrop of the EU-10, group and individual competitiveness indices were computed on the basis of the following formula (Amendola et al. 1993, Akben-Selcuk 2016):

$$LCI_t^k = \begin{cases} \frac{RCI_{kt}}{\frac{1}{N} \sum_{i=1}^N RCI_{it}} & \text{-- for specific factors} \\ \frac{GRCI_{kt}}{\frac{1}{N} \sum_{i=1}^N GRCI_{it}} & \text{-- for factor group } g \end{cases}$$

If $LCI_t^k = 1$, in year t there are no significant differences between the value calculated for the country concerned and the NMS mean. In contrast, where $LC > 1$ ($LC < 1$), the contribution of the pillar to the GCI is greater (lesser) in the country concerned than in the NMS mean as a whole in the same year t . Figures 3.25 to 3.28 show the results obtained.

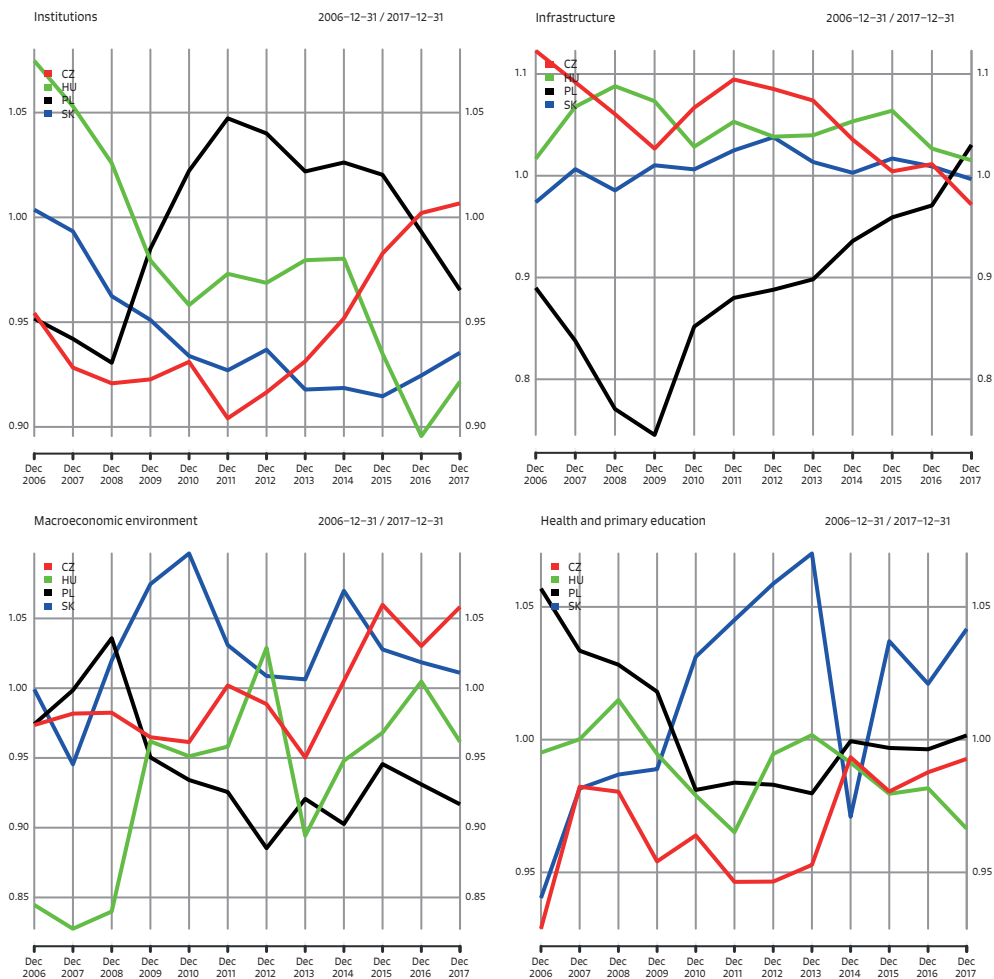
Figure 3.19. Effects of basic requirements, efficiency enhancers as well as of innovation and sophistication factors on the competitiveness of the V4 economies against the backdrop of the NMS in the years 2006–2017



Source: own presentation based on WEF 2015; WEF 2017.

The most important conclusions from the data in Figure 3.19 are as follows: firstly, in 2006–2009 the role of basic requirements in Poland and in Czechia, as compared to the NMS mean, steadily diminished, but the trend reversed in Poland after 2012 and in Czechia after 2013. As a result, in 2017 the contribution of those factors to the competitiveness of Czechia was above the NMS mean, whereas it remained below the EU-10 average in the case of Poland. In the period in question, those pillars played a much greater role in Slovakia than in the NMS, whereas in Hungary their importance varied widely: in 2017 their share was below the 2006 figure.

Figure 3.20. Effects of specific basic requirements on the competitiveness of the V4 economies against the backdrop of the NMS in the years 2006–2017



Source: own presentation based on WEF 2015; WEF 2017.

Secondly, in 2011–2012 Poland and Slovakia recorded a steady increase in the share of efficiency enhancers. It was on the decline in the following years. As a result, in 2017, efficiency enhancers played roughly the same role as in 2006 in Poland, whereas they were only slightly more important in Slovakia. As regards Czechia, before 2009, the factors under examination were the least significant among all the V4 countries, but they steadily gained in importance afterwards. With the exception of 2006–2008, Hungary experienced a gradual decrease in the share of those factors, but their contribution soared after 2014. At the end of 2017, they played a more important role than in 2006. It is also

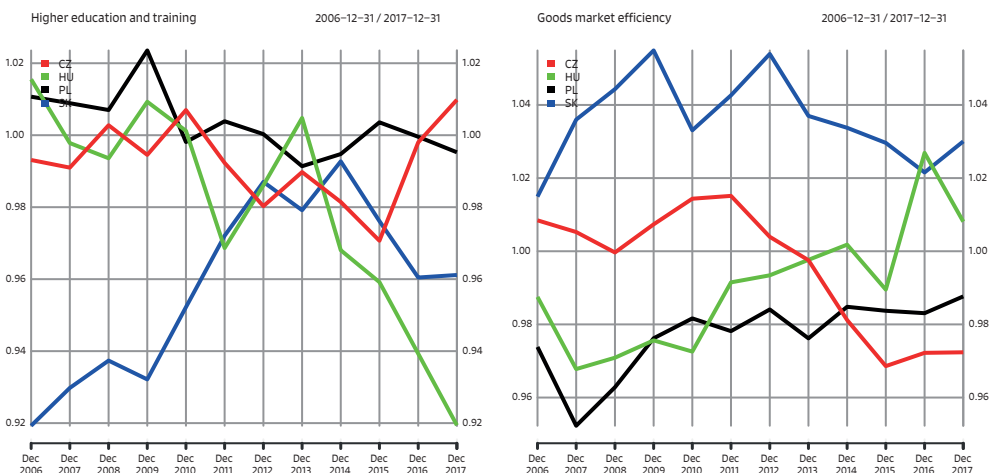
worth emphasising that throughout the analysed period the V4 countries were generally characterised by an above-average share of efficiency enhancers in the GCI among the NMS.

Thirdly, innovation and sophistication factors played the greatest role in shaping the competitiveness of the Czech and Slovakian economies, whereas they were least important to Poland and Hungary. Overall, Czechia remained above the NMS average throughout the period under analysis, whereas it only occurred in Poland in 2009.

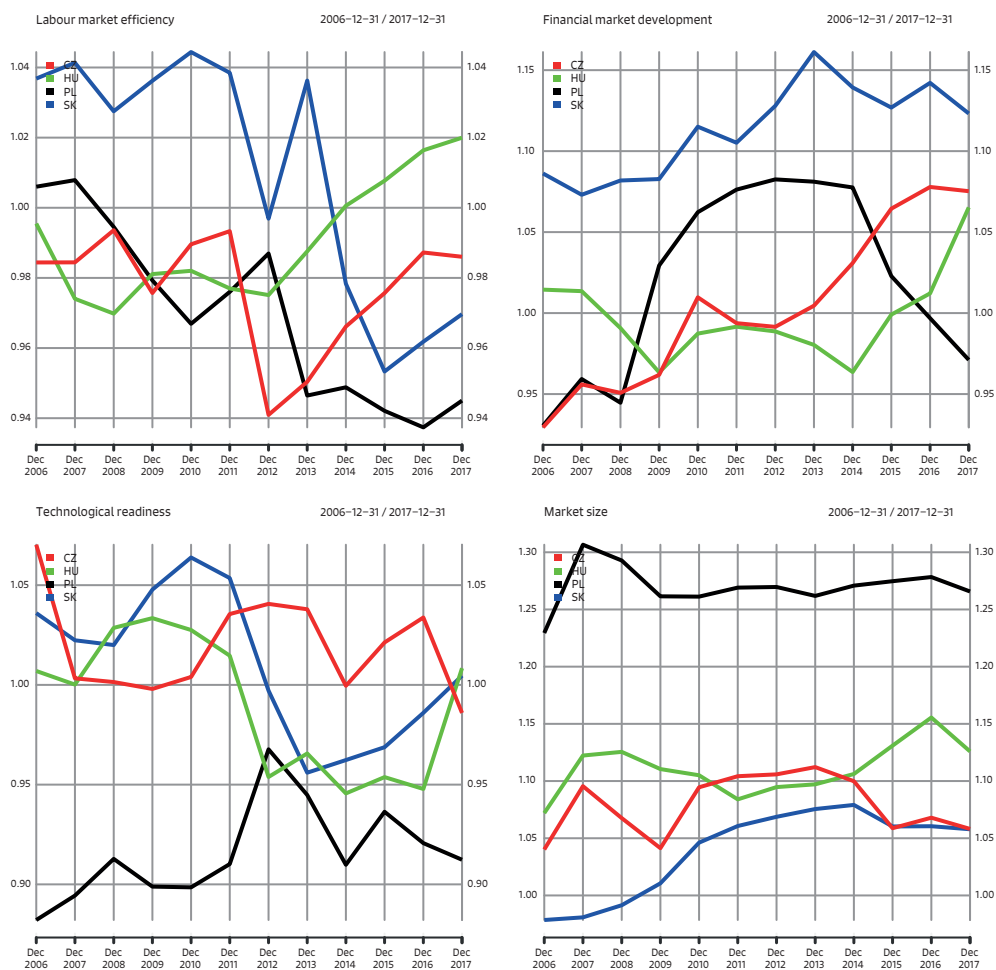
It follows from the data presented in Figure 3.20 that institutions gradually diminished in importance among basic requirements in the V4. In the case of Czechia, the role of that factor remained around the NMS mean, whereas the other countries noted below-average scores. There was also a marked fall in the share of macroeconomic environment in the GCI of the Polish economy and a rise for Hungary. In Czechia and Slovakia, the contribution of the factor in question remained close to the NMS average. Similar conclusions could be drawn with regard to the effects of infrastructure, health and primary education. The most distinct change for the infrastructure pillar, namely a significant increase, was noted in Poland, whereas the macroeconomic environment showed the greatest improvement in Hungary. It was also characteristic of Hungary to record diminished importance of institutions. At the same time, Slovakia experienced a marked rise in the share of the health and primary education factors.

It follows from the data presented in Figure 3.21 that in the case of efficiency enhancers Poland differed from the other V4 countries and from all the NMS in terms of market size. The most significant improvement in labour market efficiency was observed in Hungary, whereas it deteriorated in Slovakia.

Figure 3.21. Effects of specific efficiency enhancers on the competitiveness of the V4 economies against the backdrop of the NMS in the years 2006–2017



cont. Figure 3.21

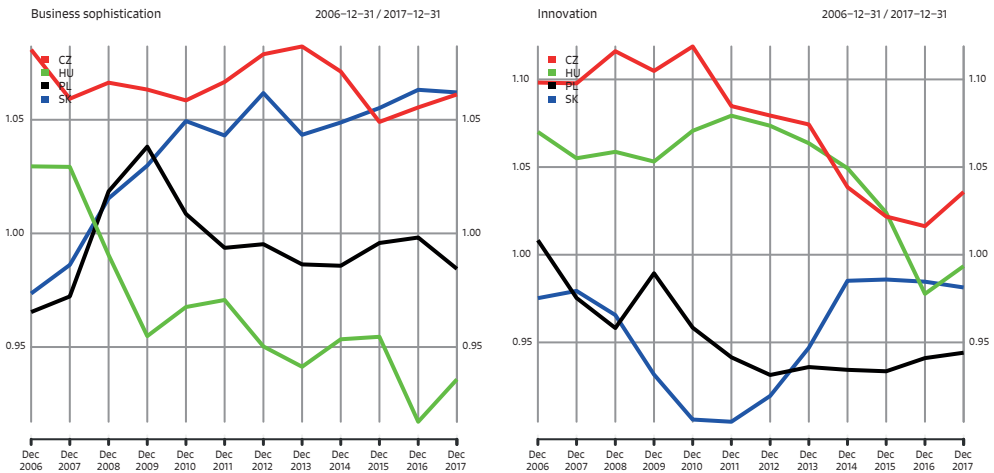


Source: own presentation by the authors based on WEF 2015; WEF 2017.

The role of technological readiness in building the global competitive advantages of the countries under examination was close to the NMS average, slightly above it in Czechia and Slovakia and below that level in Poland.

In the case of business sophistication (Figure 3.22), the situation was significantly worse in Poland than in Czechia and Slovakia and slightly worse than in Hungary. However, 2017 showed a minor improvement in comparison with 2006. In terms of innovation, Poland definitely ranked lowest among the V4 countries. A similarly low share of innovation was observed in Slovakia. At the same time, Hungary and Czechia used innovation to a greater degree than all the NMS. Czechia was also the top performer in the utilisation of business sophistication and innovation (Molendowski, Snarska 2018).

Figure 3.22. Effects of specific innovation and sophistication factors on the competitiveness of the V4 economies against the backdrop of the NMS in the years 2006–2017



Source: own presentation based on WEF 2015, WEF 2017.

3.6. Summary

The EU accession allowed the V4 countries to experience a rapid economic growth, accompanied by restructuring and modernisation, which considerably improved the international competitive positions of their economies. In 2006–2017, Poland was the most successful among the V4 countries and the NMS. In this period, Poland and the other analysed countries built their competitive positions on the basic production factors. However, taking under consideration the levels of economic development (measured by GDP per capita), those countries should rely rather on efficiency enhancers or on innovation and sophistication factors. From the comparison of the Global Competitiveness Index scores of the V4 countries with the NMS average and from the analysis of changes in the structure of their competitiveness based on local sub-indices follows that in the period covered the competitive positions of Poland, Czechia and Hungary primarily relied on basic requirements. They were characterised by slightly greater contributions of efficiency enhancers than the NMS as a whole, but the influence of innovation and sophistication factors was only significantly above the NMS average in Czechia.

Before and after accession to the EU, all the NMS could be considered as catching-up economies, considerably less developed than Germany (seen as a developed benchmark); however, after the accession their distance to Germany slightly decreased. As much as 90% of the NMS group members recorded comparative advantages in the exports of labour-

intensive goods. However, among this group, there were leaders as well as states lagging behind. The first group was composed by Hungary, Czechia and Estonia, and the second by Lithuania, Latvia, and Romania, which recorded comparative advantages only in the exports of labour- and resource-intensive goods; thus, these relatively unprocessed and at the low level of technological advancement, which are usually the specialisation domain of developing countries.

Our analysis of changes in the NMS exports structures reveals that the exports of these countries have been on an evolutionary path since 2000, however the timing, pace and scale of adjustments differ across the studied economies. The general trend observed is that countries most lagging behind Germany at the beginning of the analysed period (Romania, Latvia, Lithuania and Bulgaria), underwent the largest structural adjustments, which supports the exports specialisation convergence hypothesis.

In 2004, most NMS countries reduced their comparative advantages in exports of goods at the low-tech specialisation, but without gaining advantages in the exports of more advanced products.

Despite the collapse in world trade in the year 2009, the NMS not only maintained but even improved their positions in the exports of high-tech goods. This may be the evidence, on the one hand, of progress in catching up with the strongest economies, and, on the other hand, of relatively high quality-price relationships which made it possible to maintain strong export position even in difficult times. However, the evolution of the exports specialisation of the V4 countries was on the evolutionary track until 2009 but afterwards no further changes could be observed.

During the analysed period (2000-2014), EU-10 countries evolved towards knowledge-based economies, but not all of them with the same intensity and for the same commodity groups. The competitive position of the NMS in the exports of low-tech goods (i.e. resource- and labour-intensive) did not change. The number of countries recording advantages in these product categories did not change and the advantage-holders were able to keep them.

Further, we analysed the relationship between the institutions and innovation. We looked at the average number of patent applications (adjusted for population and GDP) granted to residents in the WIPO member states between 2010 and 2013 and two sets of institutional factors: the World Governance Indicators and the Distance to Frontier (DTF) score. The Pearson correlation coefficients for the relationships between the number of patents and both institutional indices showed a moderately strong, statistically significant relationship. The results also revealed an interesting pattern: there is a steep increase in the number of granted patents per million of population and per billion US dollars of GDP at the point where the WGI rank is at about 70%, and DTF score – at 60%. This is the so-called “threshold of inventive activity”. At some point (depending on the institutional index

being used), the overall institutional climate stimulates an invention boom, a dramatic rise in the number of patents, the boiling point of inventive activity.

The economies in CEE reveal the heterogeneity of developmental effects concerning both inventive activity and institutional quality. The leaders in both categories are the countries which entered the European Union back in 2004. These six leaders (Slovenia, Latvia, Estonia, Czechia, Hungary, and Poland), reached the 70-percent point on the WGI axis, but did not cross the threshold of invention activity. Slovenia was close to it, with about 200 patents per million of population.

FDI AND COMPETITIVENESS OF THE NMS IN THE YEARS 2000–2014

In this chapter, we analyse the role of FDI in shaping competitiveness of the NMS treated as catching-up economies. We look at various aspects of this relation, using diverse methods. In Subchapter 4.1, we show the NMS competitive position and analyse its correlation with the value of FDI flowing into these countries. In Subchapter 4.2, following the generalised double diamond model, we evaluate to which extent, integration within the network of international interconnections shaped sources of competitive advantage of companies from catching-up economies, exemplified by the V4 countries (Czechia, Poland, Slovakia and Hungary) in the years 2006–2014. In Subchapter 4.3, basing on the model of competitiveness of a catching-up economy presented in Chapter 2, we assess the progress of the EU-10 states in building their global competitive position. Subchapter 4.4 contains game theoretic studies on tax evasion as a reason of FDI location in catching-up economies and these economies decisions on participation in bilateral investment treaties (BITs). The next subchapter (4.5) shows Poland as an example of a catching-up economy. We study there the impact of FDI inflow on the modernisation of the host country's economic structure and industrial competitiveness, exemplified by the Polish automotive industry. We finish this subchapter with an analysis of the rationale for creation of export processing zones and special economic zones.

4.1. The stock of foreign direct investment in the EU-10 economies and the development of their international competitive position

Drawing conclusions in the previous chapters, we stated that the success of a small catching-up economy is based not only on the development of domestic firms but also relates to the ability to integrate within the network of international interconnections. We stressed the particular role of building relations with multinational enterprises and attracting their foreign direct investments as a strategic option for enhancing competitiveness of a catching-up economy, offering a real opportunity for bridging its developmental gap. The role of FDI in shaping the competitive position of the host country was described in detail in Subchapter 2.2. In this subchapter we present the outcomes of the analysis of the role of foreign direct investment (measured by the inward FDI stock based on UNCTAD data) in the development of the international competitiveness of the EU-10 (measured by the Global Competitiveness Index)¹.

4.1.1. Econometric analysis as a method for the measurement of the impact of foreign direct investment on the competitiveness of an economy

The literature describes at least three types of methods for studying the relationships between FDI and changes in the competitive position of the host country: econometric methods, descriptive statistics and the verification of econometric models².

This study bases on the econometric analysis (correlation analysis). Correlation is a measure of a linear relationship between two variables and must not be mistaken for a causal connection. The correlation coefficient shows the direction and strength of a relationship between two variables. A positive coefficient indicates that as the value of one variable increases, the value of the other is likely to increase as well. A negative coefficient means that the variables may move in the opposite directions. One limitation in the use of linear correlation is the frequent existence of interrelationships between data, which only allows to determine whether there is a relationship between the variables under analysis; however, an examination of causal relationships requires the application of more advanced methods (e.g. Granger causality). Furthermore, the phenomenon can be shaped by various factors other than FDI, whereas this analysis covers only FDI.

¹ An original discussion on the taxonomy of international competitiveness is presented in the research paper by Żmuda, Molendowski and Remer (2018).

² Referring to the *World Investment Report 1999. Foreign Direct Investment and Challenge of Development*, Weresa (2002, p. 11) noted the existence in the literature of at least two approaches to the assessment of the impact of foreign investment on the economic growth of the host country: descriptive analysis and econometric analysis. The empirical verification of an econometric model, indicated by Nytko (2009), can be regarded as the third method.

Our analysis uses regression. Simple linear regression is an equation describing how dependent variable Y is determined by the value of the independent variable and a statistical error:

$$E(Y) = \beta_0 + \beta_1 x$$

The graph of a regression equation is a straight line where 0 is the y-intercept of the regression line, 1 is the slope of the regression line and $E(Y)$ is the predicted value of Y for a given value of X .

The main problems in using the linear regression method are its complexity in connection with the multidimensional influence of FDI on competitiveness and that the relationship described is based on interdependences. First of all, some difficulties can arise from the existence of the autocorrelation of random errors in subsequent measurements and from the multicollinearity of the explained variables (Ambroziak 2013, p. 144). What is more, a regression analysis does not allow to predict turning points or to indicate periods of deceleration and slowing down of the changes described (Wojtyna 2009, p. 194). Therefore, due to the high level of the abstraction of econometric methods, analysis results may lead to ambiguous conclusions. Nevertheless, they constitute an interesting starting point for further considerations.

4.1.2. The stock of FDI and changes in the Global Competitiveness Index scores for the NMS

The results of the competitiveness studies conducted by the World Economic Forum indicate that in the early 21st century the international position and competitiveness of the NMS differ considerably. In Figure 3.1 (in the previous chapter) we presented the changes in the competitive position of the NMS in the WEF research from 2004–2016.

The NMS were the most successful economies in transition (after 1990) among all the CEE countries. Joining the EU triggered building stable foundations for their further development. However, they varied widely in terms of GCI scores (Figure 3.1). At the beginning of the analysed period, Poland was ranked very low (60th). It was only ahead of Romania (63rd) and next to Bulgaria (59th). Poland's position significantly differed from those of other Visegrad Group (V4) countries. At that time, Czechia, Slovakia and Hungary ranked much higher (40th, 43rd and 39th respectively). The Baltic States were significantly ahead of Poland as well. The WEF ranked Estonia, Lithuania and Latvia 20th, 44th and 36th respectively.

The data presented in Figure 3.1 reflect that in 2004–2016 Poland noted the most significant improvement in its international competitive position (up by 24 spots) in its reference group. Bulgaria, Czechia and Latvia improved their ranks by 9 spots. Simultaneously,

5 NMS dropped in the ranking. The most abrupt declines in score were noted by Slovakia (down 32 spots), Hungary (down 30 spots), Lithuania and Slovenia – down 13 spots each and Estonia (down 10 spots). As a result, Poland – among the lowest-ranking NMS in 2004 – significantly advanced in comparison with its two V4 partner countries (Slovakia, Hungary), one Baltic State (Lithuania) as well as Bulgaria, Romania and Slovenia.

In order to increase the reliability of the study, we performed a T-test to check for the differences between the mean values of the FDI stock in the countries under examination. The T-test included statistical data on the stock of FDI in specific national economies, a t-distribution and the degrees of freedom, which allowed to determine the probability of the existence of differences between the variables under analysis (Table 4.1). It appears that in the period covered (2004–2016) Poland had a much higher mean value of the inward FDI stock. At the same time, it ranked as low as fifth (among the NMS) in GCI terms (Table 4.2).

Table 4.1. Arithmetic mean test for the FDI stock in the NMS in 2004–2016

	Mean	P (T<=t)	Observations	Hypothesised mean difference
Poland	163575.9		13	0
Bulgaria	38493.59861	1.044838E-08		
Czechia	109397.34	1.481E-06		
Estonia	16317.32	2.25E-08		
Hungary	87349.375	2.447E-06		
Lithuania	11335.043	1.535E-08		
Latvia	13226.6744	2.076E-08		
Romania	61407.569	1.18E-08		
Slovakia	45962.4724	8.5636E-08		
Slovenia	10895.52424	2.3774E-08		

Source: own elaboration based on UNCTAD statistics available at: www.unctad.org/fdistatistics; access: 17.08.17.

Table 4.2. Average GCI scores for the NMS in 2004–2016

Country	GCI score
Estonia	4.74
Czechia	4.57
Latvia	4.44
Slovakia	4.42
Poland	4.36
Lithuania	4.35
Hungary	4.32
Slovenia	4.30

Country	GCI score
Bulgaria	4.14
Romania	4.08

Source: own elaboration based on The Global Competitiveness Report (WEF).

Table 4.3. Evolution of Poland's GCI score against the backdrop of the rest of the EU-10

Year	GCI score	Rank within the NMS
2004	3.98	8
2005	4.00	8
2006	4.39	8
2007	4.28	8
2008	4.28	6
2009	4.33	4
2010	4.51	3
2011	4.46	3
2012	4.46	3
2013	4.46	2
2014	4.48	5
2015	4.49	4
2016	4.56	4

Source: own elaboration based on The Global Competitiveness Report (WEF).

Table 4.4. Evolution of the FDI stock in the Polish economy

Year	FDI stock	Rank in terms of FDI stock
2013	229166.8327	1
2014	211483.9473	2
2012	198953.3166	3
2010	187602.1904	4
2016	185902.8785	5
2015	182527.5691	6
2009	167399.0324	7
2011	164424.4162	8
2007	164370.0640	9
2008	148417.3195	10
2006	115791.8334	11
2005	86345.48192	12
2004	84102.12294	13

Source: own elaboration based on UNCTAD statistics, available at: www.unctad.org/fdistatistics; access: 17.08.2017.

The data presented in Table 4.3 show that at the beginning of the period covered – in 2004 – Poland ranked eighth among the ten countries in terms of GCI. By 2013, however, it elevated to the second place and subsequently dropped to the fourth place in 2015 and 2016. Table 4.4 demonstrates that the FDI stock in the Polish economy peaked in 2013. It may, at least partially, explain the second-best GCI score in the year concerned. But in 2014, the stock of inward FDI was very similar to the 2013 figure, whereas Poland only ranked 5th. Therefore, in order to examine in more detail the relationships between the categories covered for all the NMS, we performed a correlation analysis (Table 4.5).

Table 4.5 presents the relationship between the Global Competitiveness Index score and the FDI stock in each of the countries under examination. Estonia, Hungary, Slovakia and Slovenia showed strong negative correlations between their GCI scores and the stock of inward FDI. Positive correlations were found for the other countries, i.e. Bulgaria, Czechia, Romania and Poland; the relationship was very strong for Bulgaria, Poland and Romania and weak for Czechia, Lithuania and Latvia.

Table 4.5. Pearson correlation coefficients for the FDI stock and the GCI score

Countries	PCC
Bulgaria	0.64
Czechia	0.10
Estonia	-0.64
Hungary	-0.58
Latvia	0.05
Lithuania	0.05
Romania	0.80
Slovakia	-0.64
Slovenia	-0.50
Poland	0.84

Source: own elaboration based on The Global Competitiveness Report (WEF) and UNCTAD statistics, available at: www.unctad.org/fdistatistics; access: 17.08.2017.

The next stage of the study was a regression analysis. Table 4.6 shows the results, with FDI as the independent variable and the Global Competitiveness Index score as the dependent variable (due to a small number of observations for particular countries (13), the results must be interpreted with caution).

The data in Table 4.6 suggest the following: firstly, the initial value (i.e. the y-intercept point of the regression line), indicating the GCI score of a country with zero foreign capital, is statistically significant and positive for all the countries covered. It means that the countries could obtain positive GCI scores without inward FDI. Secondly, Bulgaria, Estonia, Poland, Slovakia, Slovenia and Hungary showed a strong correlation between the inward

FDI stock and their GCI scores. In the case of Estonia, Slovakia, Slovenia and Hungary (at a low significance level for Slovenia), as the FDI stock increased, the GCI score declined. Therefore, only in the case of Bulgaria, Romania and Poland (at a low significance level) inward FDI was related to improved competitiveness. Thirdly, Czechia, Slovakia, Latvia and Lithuania showed no relationship between the stock of inward FDI and their GCI scores.

Table 4.6. The explained variable: the Global Competitiveness Index score

Country	Initial value	Regression coefficient	R ²
Bulgaria	3.789***	0.0000090**	0.415
Czechia	4.536***	0.00000035	0.010
Estonia	5.154***	-0.000026**	0.408
Latvia	4.424***	0.0000012	0.003
Lithuania	4.321***	0.0000024	0.002
Romania	3.611***	0.0000076***	0.644
Slovakia	4.916***	-0.000011**	0.405
Slovenia	4.679***	-0.000035*	0.253
Poland	3.778***	0.0000035*	0.710
Hungary	4.694***	-0.0000042**	0.333
*** Significance 1%; ** Significance 5%; * Significance 10%		Number of observations =13	

Source: own elaboration.

To recapitulate, we find that Poland noted the most significant improvement in its international competitive position among the NMS, whereas Estonia, Lithuania, Slovakia, Slovenia and Hungary dropped in the ranking.

Since we treat the NMS as catching-up economies, the relationship between inward FDI and changes in the host country's competitive position is of particular interest. Our correlation analysis and regression analysis concern the FDI stock in the EU-10 economies and changes in their Global Competitiveness Index scores for 2004–2016.

The correlation analysis suggests a positive relationship between the two variables in the case of Bulgaria, Czechia, Lithuania, Latvia, Romania and Poland, very strong for Bulgaria, Poland and Romania. The other four countries – Estonia, Slovakia, Slovenia and Hungary – showed a strong negative correlation between their GCI scores and the inward FDI stock.

At the same time, the regression analysis indicates that all the NMS covered could obtain positive GCI scores even without inward FDI. Three countries (Czechia, Latvia and Lithuania) showed no relationship between the inward FDI stock and their GCI scores. In the case of seven countries (Bulgaria, Estonia, Romania, Slovakia, Slovenia, Poland and Hungary), there was a relationship between the inward FDI stock and their Global

Competitiveness Index scores. For Estonia, Slovakia, Slovenia and Hungary, as the stock of FDI increased, the GCI score went down. Only in three countries (Bulgaria, Romania and Poland), the inflow of foreign direct investment was accompanied by improved competitiveness.

We believe it is necessary to perform more detailed analyses of those relationships, e.g. using causality tests. For example, it is worth conducting an in-depth analysis of the evolution of the sub-indices (pillars) of the GCI and their relationships with the FDI stock in the economies of the New Member States of the EU (Molendowski et al. 2017, pp. 3–14).

4.2. Internationalisation of the V4 countries and sources of their competitive advantage

In this subchapter³, we follow the conceptual footsteps of the frequently used competitiveness model: Porter's diamond of competitive advantage and its most complex extension: generalised double diamond model (internationalisation of Porter's diamond, suggested by Moon et al. 1998 – for more see Chapter 2).

We focus on the catching-up economies, defined through their limited economic potential, rooted in a relatively small size and low sophistication of domestic demand, limited geographic potential, and often underdeveloped supporting industries (as discussed in detail in point 2.2.1). Following the logic of Porter's diamond, due to these constraints, basing solely on domestic conditions, companies operating within the catching-up economies have limited chances to build a strong position within the global economy. However, if their competitive advantage is based not only on the domestic but also on the foreign conditions, it can improve significantly.

We apply the generalised double diamond model to the V4 countries (Czechia, Hungary, Poland, Slovakia) to indicate sources of the competitive advantage of companies operating within them, and to assess their evolution within the period 2006–2014.

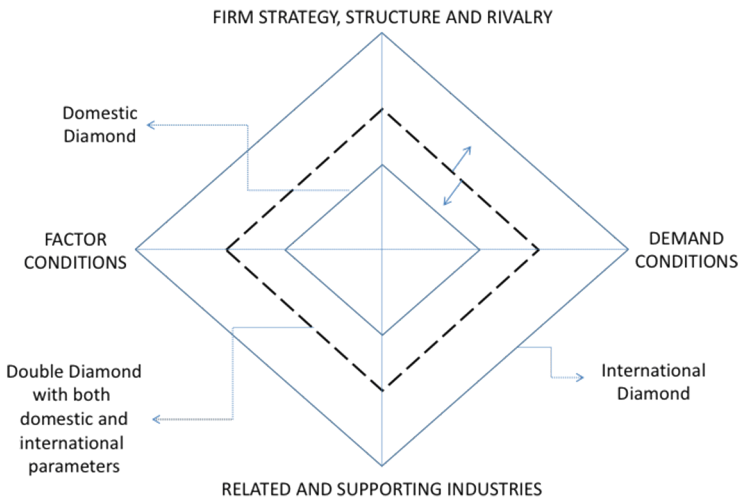
4.2.1. Generalised double diamond model and data sources

The integration of the catching-up economies within the global networks offers new opportunities for these economies, neutralising their domestic demand and supply limitations, and thus expanding the country's economic potential. In the generalised double diamond by Moon et al. (1998), the competitiveness of a small (catching-up) economy is created by both domestic companies and subsidiaries of multinational

³ We present here the update of the analysis by Źmuda and Molendowski (2013).

corporations, operating within its territory. The competitive advantage of both domestic and international companies is rooted in the national conditions but also enabled by the integration within the network of international relations. Thus, as presented in Figure 4.1, in the analysis of catching-up economies' competitiveness, both dimensions are considered: the internal (domestic diamond), as well as the external ones (international diamond). The double diamond (diamond of dotted lines) represents the competitiveness of a country, determined by both domestic and international factors, reflecting the fact that the companies from catching-up economies build their competitiveness not only on internal factors, but also on the relations with the outside world. The difference in the size of the national and the double diamonds represents the extent to which the international context affects the competitiveness of the economy (Moon et al. 1998, pp. 116–117).

Figure 4.1. Generalised double diamond of competitive advantage



Source: Moon et al. 2000.

Generalised double diamond model as a method for measuring competitiveness awakes some controversy due to difficulties in selection of the appropriate independent variables and their proxies – both in the national and international perspectives. To ensure the highest credibility, in the proxy selection, we followed a three-step procedure. Firstly, we were inspired by the previous studies, conducted with the use of the double diamond method (Moon et al. 1998; Liu, Hsu 2009; Ban, Postelnicu 2010, as well as the analyses of the Visegrad countries by Molendowski, Żmuda 2013). Secondly, we screened the availability of data in the major global databanks enabling cross-national benchmarking (Global Competitiveness Report, World Development Indicators, Heritage Foundation

Database, OECD, Eurostat, UNCTAD) to select the most appropriate proxies along the diamond dimensions. Thirdly, we consulted our variables' selection at several seminars and workshops. All this led us to the choice of proxies shortly presented below and in detail in Appendix A1. We divided these factors according to Porter's diamond concept into: factor conditions, demand conditions, related and supporting industries, as well as firm strategy, structure and rivalry. We used indices constructed by e.g. Heritage Foundation or Global Competitiveness Report as well as data extracted from database.

The factor conditions are divided into the basic and advanced. To measure the domestic basic factors, we consider: activity rate of workers, gross domestic product (GDP) per person employed in the industry, average annual wage, ease of access to loans (capital availability), and employment in industry. Domestic advanced factors include: total R&D personnel per thousand employees, expenditures on R&D, local capacity of innovation, total number of patents by residents, and published science and engineering articles. As international basic factors we consider FDI outward stock and merchandise imports. International advanced factors include FDI inward stock and the total number of patents by non-residents.

Demand conditions are split into demand size and demand quality. Domestic demand size is a combination of factors such as population size, gross domestic product (GDP) per capita, and domestic market size index. Domestic demand quality consists of factors such as tertiary education enrolment and buyer sophistication index. International demand size is measured by total exports and foreign market size index. International demand quality comprises of percentage of exports to developed countries and diversification of exports market.

Domestic related and supporting industries are measured by the local supplier quality, state of cluster development, ease of doing business, index of economic freedom, number of mobile phone subscribers per capita, quality of roads, services (value added), and quality of maths and science education. International related and supporting industries comprise of percentage share of service imports to total imports, quality of air transport infrastructure, control of international distribution, and fixed broadband internet subscription.

Domestic firm strategy, structure, and rivalry comprises the intensity of local competition and total ISO certifications per capita. International firm strategy, structure, and rivalry is determined by the prevalence of trade barriers, foreign ownership, and investor protection.

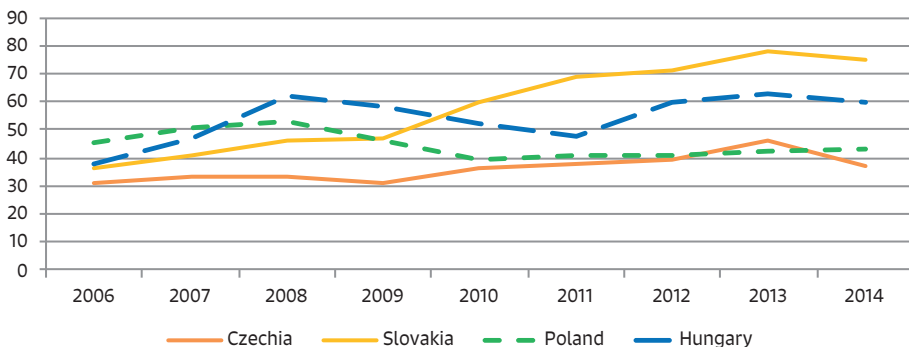
To normalise the variables, a competitiveness index is computed for each of the domestic, as well as the international variables. The competitiveness index is calculated by giving 100 points for the country with the highest value of the indicator. The other countries' values are estimated as a percentage of the highest evaluated country. For

example, Activity Rate for Czechia is the highest in the sample in 2006, therefore it gets 100 points. Slovakia has activity rate of 68.6, which is 97.6% of Czechia score. The only exception is made for average wage, where the lowest value is given the highest weightage of 100 points and the highest value is given the lowest weightage. Once the index for each variable is computed, an average is calculated for all the determinants of the domestic and international diamonds.

4.2.2. Benchmarking sources of competitive advantage in V4 countries in 2006 and 2014

The V4 constitutes a group of economies that after 1990 achieved a remarkable transition success, outpacing the growth rates of other Central and Eastern European countries. Despite generally good economic performance, when benchmarking the V4 countries to one another according to the Global Competitiveness Report, differences in their performance are visible (see Figure 4.2). At the beginning of the analysed period (2004), Poland’s competitiveness (45th position) was assessed as the worst among the V4, much lower than the position occupied by Czechia, Slovakia and Hungary (31st, 36 rd and 38th respectively). However, when evaluating these data in the dynamic perspective, it can be stated that in the years 2006–2014, Poland significantly improved its competitive position. Czechia remained the most competitive economy in the group, whereas the competitive position of Hungary and Slovakia deteriorated.

Figure 4.2. The V4 countries’ competitive positions in the Global Competitiveness Report in the years 2006–2014



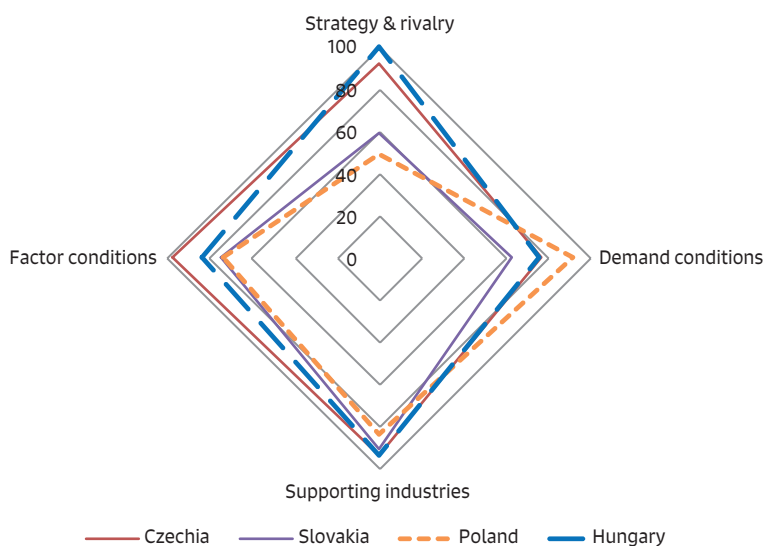
Source: own elaboration based on the Global Competitiveness Index, 2006–2014.

Considering competitiveness of V4 countries we use Porter’s diamond to examine the domestic sources of their competitive advantage. Since V4 countries are relatively small catching-up economies, we assume that internationalisation (mainly through

the EU membership) constitutes an important factor, shaping the ability of companies operating within the V4 to achieve competitive advantage. Following the generalised double diamond approach, we investigate in how far these countries managed to use international interconnections to boost their competitiveness in the period 2006–2014.

We begin with the analysis of the domestic determinants of the V4 competitiveness. In 2006 (see Figure 4.3), the Czech economy offered the best basis for development of competitive companies within the V4 economies. The Czech domestic diamond was the largest in the group, with particularly strong supply-side factors. At that time, Hungary recorded slightly worse domestic conditions, as compared to Czechia, with the competition between domestic companies being the strongest element. Poland offered a significantly weaker basis for the development of competitive companies at the time; however, with a strong advantage resulting from the largest domestic demand in the V4. Slovakia was characterised by the weakest domestic competitive conditions reflected in the smallest size of its domestic diamond. At that time however, Slovakia already recorded greater advantages than Poland in relation to the intensity of local competition and development of the supporting industries.

Figure 4.3. Domestic diamonds of the V4 countries in 2006



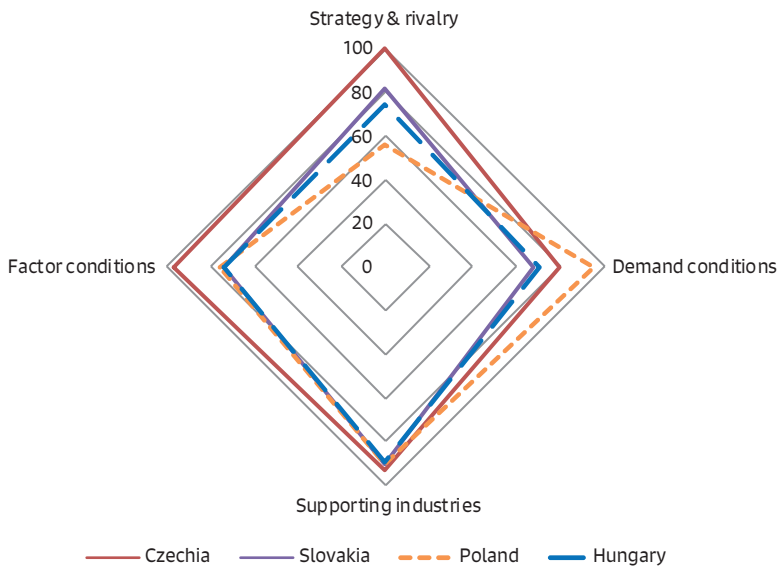
Source: own elaboration.

In 2014 (see Figure 4.4), Czechia remained the most competitive among the V4 economies. Its strength resulted from the most developed domestic factor conditions (especially the advanced ones), supported by a strong rivalry between the companies, and further development of a network of supporting industries. Although, the Polish

domestic diamond expanded between 2006 and 2014, the old problem with weak (despite the slight increase from 2006) business rivalry remained.

Supporting industries were developed in all the V4 economies, reflecting their progress in the integration within the international division of labour. In general, in 2014, the V4 countries showed a similarly high level of development of domestic supporting industries. Poland was still distinguished by better demand conditions as compared to the other V4 countries due to the largest domestic market. The highest increase in domestic competitiveness factors was recorded by Slovakia. In 2006, its domestic diamond was the smallest among the V4 countries, while in 2014, it became the second largest, led mainly by the intensification of domestic rivalry. In this context, a significant decrease is visible in the size of the Hungarian domestic diamond, reflecting a declined competitiveness of its economy.

Figure 4.4. Domestic diamonds of the V4 countries in 2014



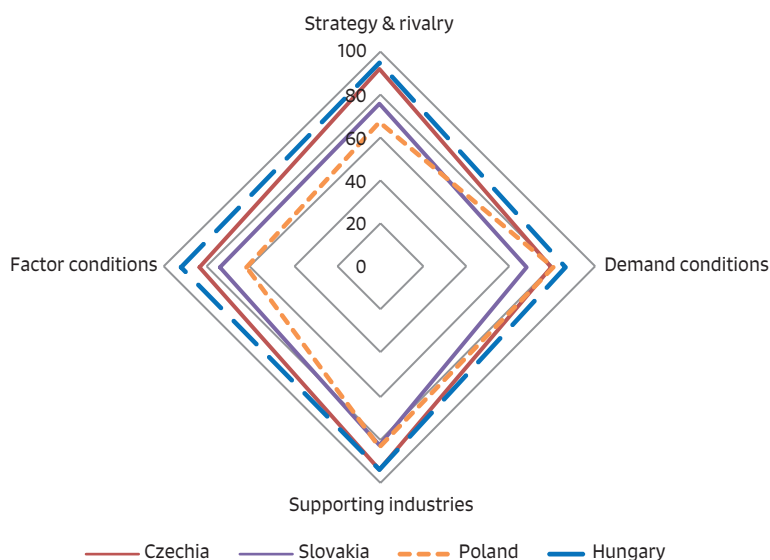
Source: own elaboration.

At the second stage of our analysis, we take into consideration both domestic and international factors behind the competitiveness of analysed countries. We use double diamonds of the V4 economies.

Hungary recorded the highest level of integration within the global economy in 2006 – keeping it till 2014 (evaluated on the basis of international sources of competitive advantage). Thus, Hungary, among the V4 countries, showed the greatest ability to expand the sources of competitive advantage through international cooperation (the double

diamond was larger than the domestic one for both years: 2006 and 2014). The ability to integrate within the global economy combined with the strong domestic base, enabled Hungary to record the largest double diamond among in the analysed group in 2006 (see Figure 4.5). In turn, Poland out of all the V4 countries remained the least-integrated within the global economy. It still does not support its weak supply factors by international sourcing, although it has learned to make a better use of foreign demand (through exports) and connection to international supporting industries.

Figure 4.5. Double diamonds of the V4 countries in 2006



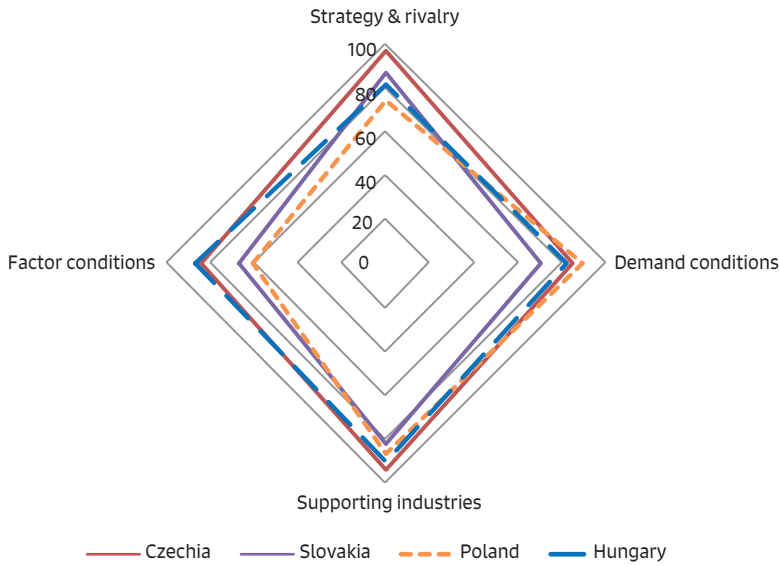
Source: own elaboration.

As a consequence, although in 2014, Hungary remained the most integrated within the global economy, the increased internationalisation of the Czech economy, combined with its strong domestic base, enabled Czechia to have the largest double diamond in the V4 group (reflecting its highest competitiveness), as presented in Figure 4.6. There is an interesting case of Slovakia, which between 2006 and 2014 built up the domestic sources of competitive advantage, but still did not fully use the potential to integrate with the global economy. Therefore, despite the expansion of the domestic diamond, its double diamond remained the smallest in the sample.

Summing up, we can state that the V4 as a group of catching-up economies, according to Porter's diamond, has limited chances for building a strong international position. Nevertheless, as reflected by the results scored in the Global Competitiveness Report, some of the V4 countries continuously perform well (Czechia) or are able to improve

its position (Poland). However, it may also occur that successful catching-up economies deteriorate, losing their strong competitive position (Hungary and Slovakia). Following this observation, basing on the generalised double diamond approach, we looked at the sources of competitive (dis) advantage of the analysed V4 economies.

Figure 4.6. Double diamonds of the V4 countries in 2014



Source: own elaboration.

In line with the GCR, our results indicate that Czechia was the most competitive economy among the V4 in 2014. It is reflected in the largest size of its both domestic and double diamonds. At the beginning of the analysed period (2006: less than two years after the EU accession of the V4), when assessing competitiveness through the domestic lens, the Czech economy was the strongest in the group, with its competitiveness driven mainly by the supply side factors. Well-developed advanced factors of production constituted a strong base for sustainable competitive advantage in the long term. Thus, in 2014, the Czech economy became the most competitive among the V4 economies, adding rivalry between the companies active within its territories and further development of a network of supporting industries to strong domestic supply base. What is more, Czechia showed the best ability among the V4 countries to connect a strong domestic base with the ability to integrate within the global economy. This was reflected in the enlargement of the Czech international sources of competitive advantage. It was achieved mainly due to the increased international demand (export intensification), supported by the development of advanced factors of production. Our results confirm the findings made in other studies

(Czarny, Żmuda 2017, 2018), indicating that the Czech economy is the strongest among the V4 group to integrate into the high-end of the international division of labour (exports specialisation in technologically advanced goods).

Poland was the only country in the sample that improved its competitive position (both in relation to the domestic and international sources of competitive advantage). Since Poland is the largest economy in the V4, its domestic advantage resulted mainly from the large domestic demand (and growing from 2006). As a relatively large economy, Poland could build its competitiveness on the domestic factors to a greater extent than the other V4 countries. The competitive potential of Poland increased in the period under investigation, although the scope of strengths and weaknesses of its economy did not change significantly. In 2014, Poland still failed to build a strong supply-side base for competitive companies, especially in relation to the advanced production factors. However, a major improvement was recorded in the sphere of domestic supporting industries and intensity of local competition. During the analysed period, Poland managed to strengthen the international sources of its competitive advantage as well. It is conspicuous, especially in relation to international demand conditions (significant exports intensification). Unfortunately, due to the scarcity of advanced factors of production, Polish exports specialisation is recorded mainly in less technologically advanced goods (Czarny, Żmuda 2017, 2018).

Hungary deteriorated most in its competitiveness. It recorded a significant weakening of the domestic competitive base; however, with still strong integration within the international markets. In 2006, Hungary noted the highest level of integration within the global economy among all the V4 economies. It is hardly surprising, as Hungary, being the smallest country in the group cannot rely solely on its own economic potential – especially in the case of industries with increasing returns to scale. This is the case of virtually the entire manufacturing industry. The Hungarian domestic diamond shrank in every dimension, with the greatest losses recorded in the intensity of domestic rivalry, factor conditions and demand conditions. The international sources of competitive advantage remained unchanged, but because of the deteriorating domestic competitive potential, the Hungarian competitiveness evaluated through the double diamond decreased significantly.

Slovakia, on the contrary, managed to improve its domestic sources of competitive advantage but still did not fully exploit the potential of building strong linkages with the global economy. It recorded the highest increase in domestic competitiveness factors among the V4 countries in the analysed period. It was possible mainly due to the intensification of the domestic rivalry and increased domestic demand. However, over the analysed period, Slovakia decreased its ability to benefit from integration within the international division of labour by failing to develop sourcing of advanced production factors from abroad.

The results of our analysis, like in every empirical study, are strongly dependent on the period under investigation. Our selection of proxies for the economic variables can be considered suboptimal. Firstly, it is limited by the availability of statistical data. Secondly, ready competitiveness indicators even if they are prepared by reliable international institutions and research centres are imperfect due to the fact that they are largely based on survey results. Thirdly, the chosen statistical variables imperfectly approximate the categories described in theory as determinants of the national competitiveness.

4.3. Factors determining the NMS ability to achieve developmental goals

The remarks on national competitiveness in Chapter 1 and on the specificity of the competitiveness of catching-up economy in Chapter 2 build a base for the analysis of factors changing the NMS position in the global economy.

In our considerations in Chapter 1, we show that national competitiveness can be defined as ability to achieve developmental goals. We defined two sets of goals: fundamental (increasing the standard of living for its citizens) and instrumental (evolution of the position within the international division of labour). In this logic, the competitiveness of a catching-up economy can be reflected through its convergence (in the GDP per capita terms) to the leading world economies (or to the regional leaders at least). As the national growth factors in the catching-up economies are often underdeveloped, the pace of convergence can be accelerated by the ability to establish long-term relations to global actors – both other countries and multinational enterprises. Thus, openness is of particular importance for shaping competitiveness of economies at lower levels of development. These theoretical considerations discussed in Section 2.4.2 are concluded with the competitiveness pyramid of a catching-up economy in Figure 2.5.

In this subchapter⁴, we supplement theoretical considerations and empirical investigations conducted by other authors with our own results in the area. We use direct and indirect methods of analysis. We begin with the analysis of factors determining the evolution of NMS positions within the international division of labour in the years 2000–2014 (4.3.1). In the next section (4.3.2), we use factor scores to develop key composite variables: Knowledge, Openness, Financial System, Governance and Democracy. The composite factors are then regressed on the GDP growth and RCA indexes.

⁴ This subchapter is based on an unpublished paper “Evaluating competitiveness of a catching-up economy: EU-10 countries in the process of building global position” by W. Bienkowski, L. Remer and M. Żmuda presented at the International Atlantic Economic Society Conference in London on 17 March 2018.

4.3.1. Methods to analyse factors determining the evolution of NMS positions within the international division of labour

We follow Fagerberg and Srholec (2005). The annual data for 16 years were collected for Bulgaria, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia for the period 2000 to 2015. As in the cited Fagerberg and Srholec, we took into consideration the total number of twenty-nine indicators (excluding indicators related to geography, nature, and history). These annual data are weighted with the factor score coefficients provided by Fagerberg and Srholec (2005) to create 5 composite variables: Knowledge, Openness, Financial System, Governance, and Democracy (as in their framework and method). A detailed composition of variables can be found in Appendix A2. However, Fagerberg and Srholec (2005) use 135 countries to conduct the factor analysis, and we conduct the analysis and present the results for 10 countries. This may lead to biased results. Despite this risk, the results presented herewith are similar to those of Fagerberg and Srholec (2005). We conduct a two-step analysis.

In the first step, we concentrate on the fundamental goal of the competitive economy: GDP growth. The composite factors are regressed on GDP growth. The composite factors are independent variables whilst growth in GDP is an dependent variable. Log GDP per capita is also included as an independent variable to measure catching up possibilities in a country. The OLS method of regression is chosen in line with Fagerberg (2005). A backward elimination stepwise method of choosing the significant factors was conducted for robustness.

At the second stage of the analysis, the composite factors, which form the independent variables are then regressed on RCA indexes, split by factor intensities into: capital-intensive (in Figure 4.18: CI), technology-intensive easy to imitate (Figure 4.19: TIE) and technology-intensive difficult to imitate (Figure 4.20: TID) – which in turn are the dependent variables⁵. The OLS method of regression is chosen.

4.3.2. Catching-up in the NMS in the years 2000–2016

Across our sample, the average GDP growth for all countries for all years, which is an annual percentage, is 3.437% (Table A3 – Appendix 3). However, the average year on year change in GDP is negative (Table A4 – Appendix 4). Table 4.7 provides a country wise breakup of the change in the GDP growth for the period from 2000 to 2016. Six out the ten

⁵ We exclude two “basic” specialisations: in the resource-intensive and labour-intensive goods. In Chapter 3, we indicate that the analysed NMS show RCA in these categories of goods – however, their developmental goal is to shift specialisation to the industries at higher levels of technological advancement. Thus, in this chapter we aim to indicate which factors support the RCA shift.

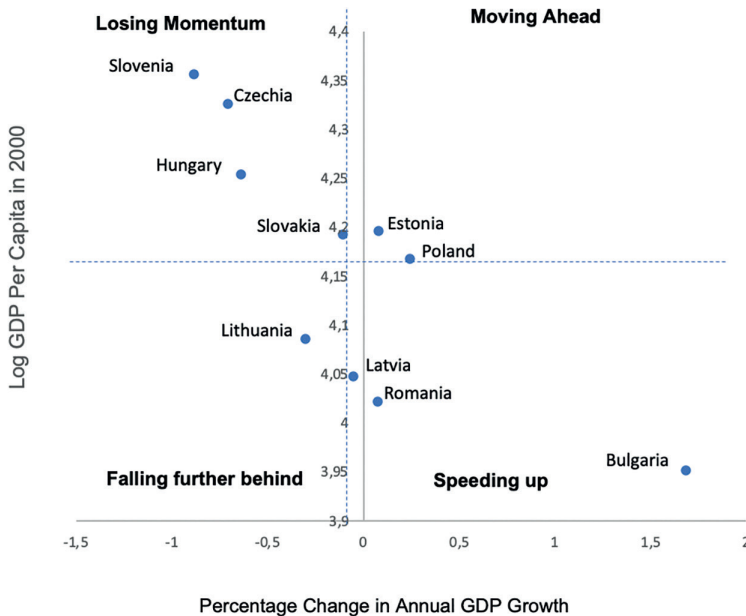
countries in our sample, namely, Czechia, Hungary, Latvia, Lithuania, Slovakia and Slovenia have a negative average GDP growth. The countries that do show a positive change in the GDP growth also show a relatively small positive change. This is an interesting finding which has a bearing on the regression results.

Table 4.7. Average percentage change in GDP growth in the period 2000–2016

Country	Average % change in GDP Growth
Bulgaria	1.685
Czechia	-0.709
Estonia	0.080
Hungary	-0.640
Latvia	-0.052
Lithuania	-0.304
Poland	0.244
Romania	0.076
Slovakia	-0.106
Slovenia	-0.885

Source: own calculations based on World Development Indicators by the World Bank, access: 30.11.2017.

Figure 4.7. Convergence versus divergence in GDP per capita in the EU-10 in the years 2000–2015



Source: own calculations based on World Development Indicators by the World Bank, access: 30.11.2017.

Following Fagerberg and Srholec (2005, pp. 10–11), Figure 4.7 plots the level of GDP per capita in 2000 (vertical axis) against the annual average growth of GDP per capita over the period 2000–2015 (horizontal axis). The dashed lines represent sample averages (level and growth). The countries in the top left quadrant have a high initial GDP per capita level but grow slower than the remaining countries in the sample – these countries are “losing momentum”. The countries in the top right quadrant continue to grow fast despite having a relatively high level of GDP per capita at the outset, these countries are “moving ahead”. In the bottom right quadrant, we see countries that also grow faster than the average in the EU-10 but started from a lower GDP level, hence these are the countries that succeed in “catching up”. Finally, in the bottom left quadrant, we find countries with initially relatively low GDP levels, which grew slowest in the sample and thus “fell behind”.

The benchmark of the EU-10 performance in the years 2000–2015 presented in Figure 4.8 reveals a substantial diversity in the performance of these transition countries. Despite the fact that each of the quadrants is populated, there is a visible tendency of the countries clustering in the top left corner. We see that the most developed countries in the EU-10 (Slovenia and all the Visegrad group countries except Poland) are losing momentum: having the highest initial GDP per capita levels, they grew relatively slowly in the years 2000–2015. Interestingly, of the countries which accessed the EU in 2004, only Estonia and Poland moved ahead. Lithuania was visibly falling further behind the rest of EU-10. Latvia as well as the countries which joined EU later than the other analysed countries, in 2007, (Bulgaria and Romania), starting with the lowest GDP per capita levels, grew relatively fast. These results clearly support the convergence hypothesis.

4.3.3. Selected stylised facts on the factors for catching up of the NMS

Knowledge is presented in levels and as a percentage change in the initial average knowledge. The average initial knowledge is the average of knowledge for the years 2000–2002 whilst the final average knowledge is the average of knowledge for the years 2013–2015. The same logic applies to the other composite factors: Openness, Financial System, Governance and Democracy.

An interesting fact following from Fagerberg (2005) is that there is a barely existent actual correlation between knowledge and income levels (Table 4.8): countries with high and low income seem to show similar levels of knowledge.

It can be seen in Figure 4.8 that a percentage change in final knowledge as compared to initial average in 6 countries (Slovenia, Slovakia, Romania, Poland, Estonia and Bulgaria) is actually negative. These groups of countries can safely be considered to be laggards in terms of knowledge and therefore face severe problems in terms of catching up with the rest of the developed economies. This inference is based on the theory of knowledge-

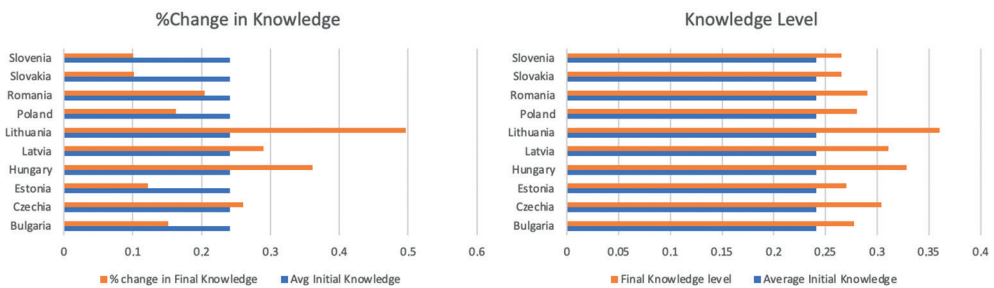
based approach as outlined in Fagerberg 2005. However, based on this theory, “countries facing a knowledge gap may get an extra bonus from the possibility to imitate more advanced knowledge already in place elsewhere” (Fagerberg 2005, p. 31). Lithuania and to some extent Hungary are the only countries which show a remarkable positive change in knowledge from initial to final levels.

Table 4.8. Correlation of Income levels and Knowledge

	Knowledge level	Log GDP/Capita
Knowledge level	1	
Log GDP/Capita	0.0355	1

Source: own calculations based on World Development Indicators by the World Bank, access: 30.11.2017.

Figure 4.8. Knowledge by countries



Source: own calculations based on sources indicated in the appendices, access: 30.11.2017. The average initial knowledge is the average of knowledge for the years 2000–2002, while the final average knowledge is the average of knowledge for the years 2013–2015.

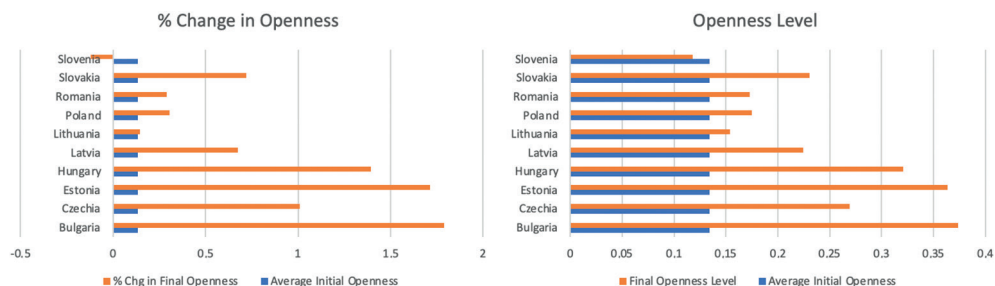
In terms of Openness, countries with lower income show a higher degree of openness (Figure 4.9). Following Fagerberg (2005), this high degree of Openness is driven to a large extent by increasing FDI. These are also transition countries which were least open initially and hence the change is dramatic. The negative correlation simply implies that higher openness is associated with lower income levels as discussed before. Slovenia is the only country which moves in the other direction in terms of Openness (Figure 4.9).

Table 4.9. Correlation of income levels and Openness

	Openness level	Log GDP/Capita
Openness level	1	
Log GDP/Capita	-0.3137	1

Source: own calculations based on World Development Indicators by the World Bank, access: 30.11.2017.

Figure 4.9. Openness by countries



Source: own calculations based on sources indicated in the appendices, access: 30.11.2017. The average initial openness is the average of openness for the years 2000–2002, while the final average openness is the average of openness for the years 2013–2015.

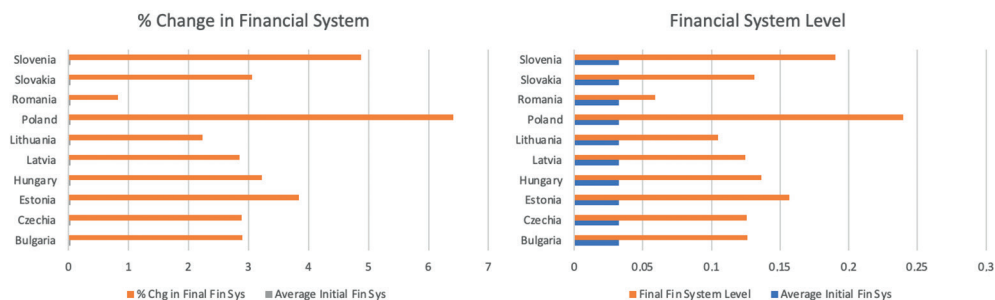
Financial System shows a relatively higher correlation of 34.4% with income levels (Table 4.10).

Table 4.10. Correlation of Income levels and Financial System

	Financial System level	Log GDP/Capita
Financial System level	1	
Log GDP/Capita	0.3442	1

Source: own calculations based on World Development Indicators by the World Bank, access: 30.11.2017.

Figure 4.10. Financial System by countries



Source: own calculations based on sources indicated in the appendices, access: 30.11.2017. The average initial financial system is the average of financial system for the years 2000–2002, while the final average financial system is the average of financial system for the years 2013–2015.

Countries with higher income levels are also those with better financial capabilities, namely interest rate spreads, capital markets and credits to private sector. This finding also ties in neatly with the finding in Openness which implies higher FDI. Poland leads the pack with the best Financial System followed by Slovenia. Slovenia is once again

interesting in this context as this finding taken in conjunction with Openness suggests that despite having a relatively advanced own Financial System, the country is lagging behind in terms of Openness. However, Poland, despite its strong Financial System shows relatively lower prosperity as compared to Czechia, Slovakia, Estonia, Lithuania and Slovenia. Though there is progress, there is still very little catching up going on in this dimension.

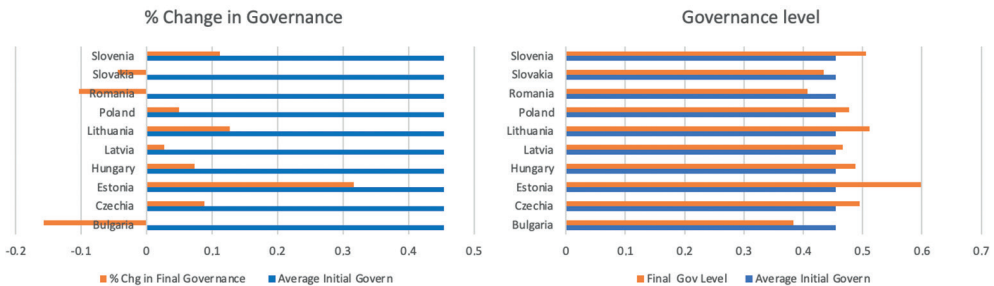
Governance is very closely related to development (Figure 4.11). High income countries like Czechia and Slovenia tend to score better than Bulgaria (which essentially falls behind in almost every metric) and Romania. Latvia, Hungary, Lithuania and Estonia show good governance but lower income levels. In other words, governance, as proved in previous research (Fagerberg 2005), is a necessary but not a sufficient condition for prosperity.

Table 4.11. Correlation of Income level and Governance

	Governance level	Log GDP/Capita
Governance level	1	
Log GDP/Capita	0.7116	1

Source: own calculations based on World Development Indicators by the World Bank, access: 30.11.2017.

Figure 4.11. Governance by countries



Source: own calculations based on sources indicated in the appendices; access: 30.11.2017. The average initial governance is the average of governance for the years 2000–2002, while the final average governance is the average of governance for the years 2013–2015.

Finally, the state of democracy confirms previous findings in Glaeser et al. 2004 and Fagerberg 2005. There seems to be barely any relationship between income levels and democracy (Table 4.12). Many of the countries here show a negative change in terms of democracy from the initial levels (Figure 4.12). This cannot be conducive to catching up.

To sum up, there is a very strong relation between growth and governance and to some extent between growth and financial system. In contrast knowledge, openness, and democracy do not seem to be strongly related to GDP growth in this particular case. Apart from the factor knowledge, the other factors are in line with previous findings (Fagerberg

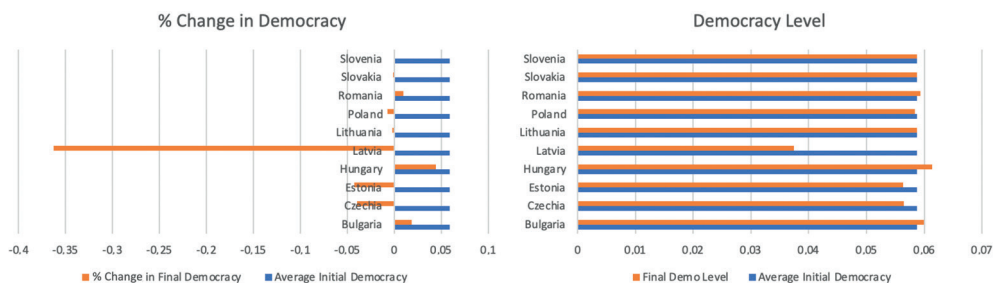
2005). However, this needs to be further tested and we conduct the OLS regression analysis to establish deeper relationships amongst factors and development, i.e. catching up.

Table 4.12. Correlation of Income level and Democracy

	Democracy level	Log GDP/Capita
Democracy level	1	
Log GDP/Capita	0.0398	1

Source: own calculations based on World Development Indicators by the World Bank, access: 30.11.2017.

Figure 4.12. Democracy by countries



Source: own calculations based on sources indicated in the appendices, access: 30.11.2017. The average initial democracy is the average of democracy for the years 2000–2002, while the final average democracy is the average of democracy for the years 2013–2015.

4.3.4. Factors supporting GDP growth as a fundamental goal of a competitive catching-up economy

In this part, we present the two significant regression models (Table 4.13). Four models were run for robustness purposes and the combined results are presented in Appendix A5. The composite factors, namely Knowledge, Openness, Financial System, Governance and Democracy are regressed on the GDP growth (annual %) to establish factors assisting ability to achieve the fundamental goal of the catching-up economy (pace of convergence).

In model 1, one factor (in levels) at a time is regressed on GDP Growth. When the factors in levels are regressed one at a time on the Growth of GDP, each of them apart from Democracy has a significant causal impact. Unlike in Fagerberg (2005), it is the levels during the period of investigation that matter for the growth. Knowledge as a significant negative coefficient implies that these countries have a significant catching up capacity in terms of knowledge. One cannot look at these results in terms of causality given the nature of synthetic composite factors. Instead, the negative sign implies potential for the factor to assist in the development. The 10 countries in our sample would therefore

be considered the right candidates that need to focus on knowledge. The negative sign also captures the fact that the change in GDP growth is inherently negative for the given period and as such the negative sign on knowledge once again implies that knowledge is a factor that positively impacts the pace of convergence for catching up economies. In other words, knowledge here presents a higher scope of its need and use in the catching up of an economy. The interpretation is the same for statistically significant factors Openness, Financial system and Governance. Democracy in levels is not a significant variable and this is a finding in line with Fagerberg (2005). According to Fagerberg (2005, p. 61): “Economic growth should be positively correlated with a growing level of knowledge but not necessarily with the initial level of this variable. In fact, since the latter may be seen as measuring the potential for catch up in knowledge (just as GDP per capita), the correlation with economic growth may well be negative.” When all the variables are included in the regression Knowledge and Financial system with the same negative signs as before are significant, reiterating and corroborating the findings.

Table 4.13. Regression analysis

	Model 1	Model 2
	Levels	Levels
	COEFFICIENT	COEFFICIENT
Log GDP/Capita	-7.33***	2.01
(t stat)	(-2.6145)	(-0.4444)
KNOWLEDGE	-0.13**	-0.13*
(t stat)	(-2.1586)	(-1.9495)
OPENNESS	-0.076**	-0.05
(t stat)	(-1.9825)	(-1.2841)
FINANCIAL SYSTEM	-0.12**	-0.09**
(t stat)	(-3.1303)	(-1.9741)
GOVERNANCE	-0.12**	-0.071
(t stat)	(-2.3125)	(-1.0173)
DEMOCRACY	0.13	-0.22
(t stat)	(0.1435)	(-0.2441)
R sq		0.099
Obs	160	160
Dependent Variable: GDP Growth (PPP constant 2011 USD)		
Model 1: One factor at a time in levels		
Model 2: In levels – all factors, countries and periods		
* **, and *** sig at 10%, 5% and 1% respectively		

Source: own calculations based on the World Development Indicators by the World Bank, access: 30.11.2017.

Log of GDP/Capita does exactly what it does in the Fagerberg's paper – it proxies scope for catching up in knowledge. “The expectation is that the less developed the country, the greater this scope will be, so the estimated coefficient of the Log GDP/Capita variable is expected to be negative (implying slower growth in frontier countries than in technological laggards)” (Fagerberg 2005, p. 60).

4.3.5. Factors supporting evolution within the international division of labour as the instrumental goal of a competitive catching-up economy

In this part of analysis, we use the revealed comparative advantage method (RCA) to catch factors improving the NMS position in exports of the most advanced goods (capital- and technology-intensive).

Convergence factors supporting improved RCA in capital-intensive goods

As catching-up economies are characterised by limited domestic capital and not sufficient financial reserves to enable long-term investment, inflows of foreign capital may support the process of catching-up. This is particularly visible for capital-intensive industries. Together with the decreasing quality of the domestic financial systems, the importance of the foreign investment increases, as openness proves to be a significant element supporting increase in capital-intensive RCA. In order to ensure the return on invested capital, governance system in the hosting catching-up economy needs to be in place and stable. To prove this point, our data show that improved governance over longer periods supports specialisation in capital-intensive goods; however, the mean of actual governance for some years does not destroy the ability of the analysed NMS countries to achieve RCA in capital-intensive goods. Interestingly, improved specialisation in capital-intensive goods is driven by decreasing democracy (Figure 4.14).

Convergence factors supporting improved RCA in technology-intensive easy-to-imitate goods

None of the factors (Table 4.15) has any impact on the RCA levels in the area of technology-intensive easy-to-imitate goods. This may mean that foreign investors were not particularly active in these sectors, focusing rather on the capital-intensive industries.

Convergence factors supporting improved RCA in technology-intensive difficult-to-imitate goods

Knowledge, Openness and Governance remain important exports specialisation determinants, also in high-tech, knowledge intensive goods. However, the data show that there is potential in both openness and knowledge levels. To increase the levels of

specialisation in the technology-intensive difficult-to-imitate goods, the NMS countries should build-up their knowledge stock and skilled human resources to stimulate the inflows of research-intensive investments (Table 4.16).

In the analysed countries, decreasing levels of RCA in resource-intensive goods (basic specialisation) and increasing levels of RCA in technology-intensive difficult-to-imitate goods (the most advanced specialisation) were driving the GDP growth (data in Table 4.17). This finding supports the competitiveness pyramid model: the evolution in the position within the international division of labour (progress from resource-intensive towards technology-intensive difficult-to imitate goods, progress from basic specialisation towards specialisation based on knowledge and innovation) was driving the EU-10 countries convergence, enabling it to increase the levels of GDP per capita. Interestingly, neither changes in capital-intensive specialisation (where majority of the EU-10 countries has RCA) nor changes in technology-intensive easy to imitate had an impact on the GDP growth.

Table 4.14. Impact of Competitiveness Inputs on % change in RCA Factor CI

	<i>Coefficients</i>
Intercept	1.1960*** (32.8859)
Change in Knowledge	0.02500 (0.1266)
Change in Openness	0.1562*** (3.1149)
Change in Fin Sys	-0.0061** (-2.1125)
Change in Governance	0.8580*** (4,7890)
Change in Democracy	-0.5183** (-2.3964)
R Square	21.30%
Adjusted R Square	18.57%
Significance F	0.0000
Observations	150
Dependent Var CI	
Independent Variables in % Change	
***, ** significant at 10%, 5% and 1% respectively, t statistics in brackets	

Source: own elaboration.

Table 4.15. Impact of Competitiveness Inputs on % change in RCA Factor TIE

	<i>Coefficients</i>
Intercept	0.7749*** (20.1662)
Change in Knowledge	-0.0098 (-0.0472)
Change in Openness	-0.0959 (-1.8116)
Change in Fin Sys	0.0023 0.7651
Change in Governance	(0.1733) 0.9156
Change in Democracy	(-0.1592) (-0.6966)
R Square	4.45%
Adjusted R Square	1.13%
Significance F	0.2502
Observations	150
Dependent Var TIE	
Independent Variables in % Change	
***, ** significant at 10%, 5% and 1% respectively, t statistics in brackets	

Source: own elaboration.

Table 4.16. Impact of Competitiveness Inputs on % change in RCA Factor TID

	<i>Coefficients</i>
Intercept	0.8091*** (33.3279)
Change in Knowledge	-0.2809** (-2.1316)
Change in Openness	-0.0952*** (-2.8429)
Change in Fin Sys	-0.0028 (-1.4665)
Change in Governance	0.3301*** (2.7606)
Change in Democracy	0.1715 (1.1881)
R Square	12.13%
Adjusted R Square	9.08%
Significance F	0.0021
Observations	150
Dependent Var TID	
Independent Variables in % Change	
*** ** significant at 10%, 5% and 1% respectively, t statistics in brackets	

Source: own elaboration.

Table 4.17. Impact of RCA Factors on GDP Growth

	<i>Coefficients</i>
Intercept	2.6098*** (5.9099)
Change in RI	-13.5672*** (-2.7125)
Change in LI	-9.8553 (-1.3307)
Change in CI	-0.3059 (-0.0713)
Change in TIE	2.0427 (0.7440)
Change in TID	14.2756*** (2.6924)
R Square	17.44%
Adjusted R Square	14.36%
F	5.6604
Significance F	0.0001
Observations	140
Dependent Variable: GDP Growth	
*** ** significant at 10%, 5% and 1% respectively, t statistics in brackets	

Source: own elaboration.

For catching-up economies, internationalisation may constitute a powerful developmental driver. Outcomes of our research prove that for the EU-10 countries, the ability to shift the specialisation structure from resource-intensive towards the technology-intensive difficult-to-imitate goods was a factor driving the process of their catching-up in the GDP per capita levels.

A particular proof of the impact of the economic openness on the exports specialisation can be found in exports of capital-intensive goods (category of goods, where majority of the EU-10 countries have comparative advantages). The data revealed that insufficient domestic capital reserves and decreasing quality of domestic financial system, were driving the specialisation in the capital-intensive goods, pointing out that the capital had to come from abroad, for example in the form of FDI.

On the contrary, openness did not play a significant role in the technology-intensive (easy-to-imitate) specialisation category. The data show that there is still potential in the EU-10 countries in relation to use both local knowledge and foreign ideas in stimulating the exports structure shifts towards technology-intensive specialisation, which will enable further boosting of the living standards, and thus enable escaping the middle-income trap.

4.4. Game theoretic studies on FDI location in catching-up economies

In this subchapter, we look at the FDI inflow into catching-up economies from the game theoretic point of view. We begin with an analysis of tax evasion as a potential reason for FDI location in catching-up economy (4.4.1). Next, we consider the decision of a catching-up economy of participating in bilateral investment treaty (4.4.2).

4.4.1. Possibility of tax evasion as a reason behind FDI in catching-up economies

Transfers of goods, production factors and cash within the MNCs differ as to their nature from the transactions concluded at the arm's length between independent parties. Some intra-company transfers are aimed at optimising the MNCs activity. Those transfers are not always legal and also unlawful acts of tax evasion may be used. Such operations cause lower tax income of the MNC hosting country and bring financial benefits to the respective firms.

It is obvious, the countries counteract tax evasions committed by large companies. They charge the firms evading tax payment with pecuniary fines. Strict observance of tax regulations and application of fines contribute to the increase of budget income (more taxes paid, fines) on the one hand, but, it generates additional costs (audits, training of tax inspectors, court fees) on the other hand⁶.

Here we analyse the game simulating the relation between effects and costs of enforcement of tax regulation observance by the MNCs⁷. It is a single player game with simultaneous movements of the players. Two players: an MNC and the State participate in the game. The MNC has two strategy options to select: *{obey the law}* or *{break the law}*. The latter option is equal to tax evasion. Simultaneously, the State has also two options to select: *{enforce the law}*, which means to control all MNCs or *{not enforce the law}*, which means to disregard the control.

If the MNC follows the strategy of *{obeying the law}*, it is not charged with the fines and the payoff under this item is 0. The costs of tax payment by the MNC are disregarded as one of many (also disregarded) costs of business activity. In case the MNC *{breaks the law}*, its payoffs depend on the State position and are: 2 (the State strictly *{enforces the law}*)

⁶ Economic efficiency of the tax system may be understood as maximising the budget income or minimising the losses (the concept of optimum taxation) or maximising the balance between the budget income and the income generating costs. We assume the latter meaning of economic tax system efficiency to the presented game.

⁷ The game presented in this part is developed based on the analysis of the strategic behaviour of the players in response for the traffic law enforcement by using tickets (Samuelson, Marks 1998, p. 598).

and charges the tax evading MNC with a fine) or 1 (the State *{does not enforce the law}* and the MNC benefits from tax evasion).

The payoff of the State bearing the costs of strict *{enforcement of the law}* is either -1 or -2. The payoff is -1 if the State bears the costs of controlling the MNC, which observes the tax regulations, and -2, if the MNC *{breaks the law}*, and the costs of control and possible legal suits are relatively high (even though they are covered to some extent by incomes generated by the fines charged to the MNC). In case the State *{does not enforce the law}*, its payoff is 0, if the company *{obeys the law}*. In such a case, no law enforcement costs are incurred by the State as the MNC *{obeys the law}* and no losses from tax evasion occur. The payoff is -1 in case the MNC *{breaks the law}* and the States suffers losses from tax evasion. The strategic position of so described game is given in Table 4.18.

Although the payoffs we present are hypothetical and do not correspond to any specific economy situation, their relative values seem to reflect the reality. Particularly, we do believe that in the case of a single player, the State bears higher costs (suffers larger losses), when it carries out the controls even though it obtains the evidence of evasion and charges the MNC with a fine than in the case of disregarding the control and bearing the costs of tax evasion.

Table 4.18. Strategic game between MNC and State

		State	
		enforces the law	does not enforce the law
MNC	obeys the law	(0; -1)	(0; 0)
	breaks the law	(-2; -2)	(1; -1)

Source: own deliberation.

A strictly dominating strategy of the State in this game is *{non – enforcement of the law}*. Strict enforcement of the law i.e. the control of all MNCs is too expensive and does not constitute the optimum strategy of the State (the strategy of *{law enforcement}* is strictly dominated). Once the strategy of *{law enforcement}* has been eliminated, it is obvious the MNC will benefit more from the *{breaking the law}*. The Nash equilibrium (for pure and strictly mixed strategy⁸) occurs only in combination of two strategies of *{break the law}* and *{not enforce of the law}*.

⁸ The strategy of *{law enforcement}* is strictly dominated. As a result, neither the strategy of *{law enforcement}* nor any other mixed strategy, which would assign a positive probability to the strategy of *{law enforcement}* may not be used by the State in the Nash equilibrium conditions. Once the foregoing dominated strategy has been eliminated, the strategy of *{obeying the law}* becomes the dominated strategy. It means it cannot be used by the MNC in the Nash equilibrium conditions. No other mixed strategy assigning positive probability to use the strategy of *{obeying the law}* may be adopted by the MNC. As a result, no Nash equilibrium occurs in strictly mixed

The Nash equilibrium does not reflect the real conditions well as no country entirely waives to enforce the tax regulations. Therefore, in the analysed game, non-equilibrium conditions, which reflect better the reality should be considered. We believe the most realistic scenario to assume is the State enforces the law with certain positive probability i.e. it controls only the selected MNCs. The strategy assumed in this case is a strictly mixed strategy with the probability p of *{law enforcement}* and $(1 - p)$ of *{non - enforcement of the law}*. As a result, the payoff for the MNC depends on the probability p and amounts to 0 or to $(-2p+1 - p)$ if the MNC *{obeys the law}* and *{breaks the law}*, respectively. For $1 - 3p > 0$ (i.e. $p < 1/3$), the optimum MNC strategy is *{breaking the law}*. In a such a case tax evasion brings a positive payoff to the MNC. On the other hand, for $1 - 3p < 0$ (i.e. $p > 1/3$), better strategy for MNC is *{obey the law}*. The State, performing random controls of companies, is in position to make the MNCs observe the tax regulations without bearing excessive costs. The conditions are to keep sufficiently high probability of the control ($> 1/3$ in the analysed game). The percentage of the MNCs actually controlled is a common measure of this probability.

For some countries (particularly of catching-up economies we focus our further study on), the probability (%) of tax auditing the MNC is even lower than $1/3$. There are several reasons of such a behaviour. (1) Catching – up countries may not have sufficiently developed tax administration. One of the weak points of those countries is underdeveloped business environment, including the institutional infrastructure. (2) Those countries may fear restrictive and thorough tax audits, which may discourage MNCs to establish subsidiaries in the respective country. It is even more justified by the fact that currently, at the time of economy liberalisation not only of the developed, but also developing and catching – up countries⁹, all countries compete to attract the FDI. (3) The MNCs may perform activities promoting liberal tax policy of the hosting country.

As a result, catching – up countries for which $p < 1/3$ may be more competitive and more attractive for foreign investors than the other economies of this type. If the conditions essential for the business conducted by a new subsidiary are identical or similar in a few hosting countries, then the location, which offers the best benefits from tax evasion may be selected. Let us look at the example of such a situation (Table 4.19).

The best location for a new foreign affiliate of the MNC is sought with assumption that access to cheap manpower and raw material (S) is of key importance. The parent company has to select one of the following countries: M, N, V, X, Y and Z – see Table 4.19. The best location for the subsidiary is M. M has almost identical conditions as X, but tax audit probability is in the former country 10% lower than in the latter. So, potential

strategies. The equilibrium conditions occur only for the pure strategies. It is a typical game with odd number of Nash equilibriums.

⁹ E.g. economies of NMS from CEE were deregulated as a result of transition “from plan to market”.

benefits from tax evasion in M are bigger than in X, which allows to compensate slightly higher manpower costs. As a result, similar characteristics of both, M and X country make the tax issues decisive for the selection of the location and attenuate advantages of the other hosting countries.

Table 4.19. Features of potential host economies

Host country	Probability (per cent) of tax audit in the MNC (p)	Other features
M (catching – up economy)	20%	endowment with important raw material (S) average salary: 1220
N	38%	average salary: 2500
V (catching – up economy)	20%	average salary: 900
X (catching – up economy)	30%	endowment with important raw material (S) average salary: 1200
Y	40%	endowment with important raw material (S) average salary: 1900
Z (catching – up economy)	24%	developed road infrastructure average salary: 1000

M, N, O, V, X, Y, Z – hypothetical locations for MNC.

Source: own deliberation.

Potential tax evasion may be deemed one of the factors determining FDI location, particularly in catching – up countries. Particularly, if the conditions essential for the business conducted by a new subsidiary are identical or similar in a few hosting countries, then the location, which offers the best benefits from tax evasion may be selected.

In Chapter 2, we mention that multinational corporations often are not interested in improving the competitiveness of catching-up economies as host countries. They sometimes try to transfer the money or resources out of host economies, which can be seen as harmful strategy, aimed at host countries, especially in the case of catching-up economies. This harmful strategy sometimes becomes a fundamental reason for FDI in selected countries. One of this reason can be the possibility of tax evasion. Consequently, the catching-up countries can be overexploited, and they can lose a lot of money. An example of measure of losing money is the VAT gap.

The VAT gap is defined as the difference between the VAT total tax liability (VTTL), sometimes also known as VAT total theoretical liability) and the amount of VAT actually collected (European Commission 2018, p. 30). Apart from Greece and Italy, the VAT gap in the EU-15 countries did not exceed 20%. In the case of EU-10 countries, it achieved even 40% (see Table 4.20). A bigger tax gap means bigger benefits from tax evasion – what can make NMS more attractive location for FDI.

Table 4.20. VAT gap in the EU-25 countries as a percentage of VTTL in the years 2012–2016

	2012	2013	2014	2015	2016
Austria	9	10	9	8	7
Belgium	14	13	9	11	10
Bulgaria	21	16	24	21	14
Czechia	20	19	17	17	14
Denmark	11	12	11	11	9
Estonia	13	14	10	6	7
Finland	5	6	6	7	8
France	14	12	13	12	12
Germany	11	12	12	10	9
Greece	30	33	27	29	29
Hungary	22	21	18	15	13
Ireland	16	11	9	11	11
Italy	29	30	28	26	26
Latvia	24	25	19	17	11
Lithuania	28	28	28	26	25
Luxembourg	2	3	4	2	1
Netherlands	9	10	10	9	4
Poland	27	27	24	24	21
Portugal	16	16	14	13	10
Romania	39	39	40	34	36
Slovakia	37	31	31	29	26
Slovenia	9	6	9	8	8
Spain	10	12	9	4	3
Sweden	7	3	3	4	1
United Kingdom	12	11	11	11	12

Source: own study based on European Commission 2018.

Table 4.21. The level of the tax gap (% of GDP) in the EU-25 countries in 2014

Austria	3.9
Belgium	9.5
Bulgaria	8.4
Czechia	7.5
Denmark	3.4
Estonia	13.6
Finland	5.2
France	6.6
Germany	6.3
Greece	11.8

cont. Table 4.21

Hungary	10.6
Ireland	3.2
Italy	13.8
Latvia	8.9
Lithuania	11.9
Luxembourg	1.6
Netherlands	3.5
Poland	9.2
Portugal	8.1
Romania	12.3
Slovakia	7.3
Slovenia	7.4
Spain	10.8
Sweden	6.9
United Kingdom	3.3

Source: Raczkowski 2015, p. 67.

Another measure of losing money by host countries is the total tax gap (Table 4.21). However, the calculations of total tax gap are much more difficult than estimating the VAT gap. Apart from Greece, Italy and Spain, the tax gap in the EU-15 countries did not exceed 10% of GDP. In the case of the NMS, the tax gap is higher or close to 10% of GDP. So again, the NMS treated as catching-up economies appear to be more vulnerable to tax evasion than the EU-15 (developed countries). Naturally, not the whole VAT gap or total tax gap is caused by activities of multinational corporations but still these gaps give some picture of overexploitation of host countries by MNCs.

4.4.2. Participation of catching-up a economy in bilateral investment treaties as a factor attracting the FDI inflows

Bilateral investment treaties (BITs) have been a usual way of attracting investors and investments, as specialised instrument of international law focused on investment protection issues for over five decades. Unlike traditional, wide scoped Friendship, Commerce and Navigations (FCN) treaties, BITs were traditionally concluded between developed and catching-up countries.

“Early” BITs were simple, relatively easy to negotiate with plain clauses granting e.g. general most-favoured nation and national treatment or fair and equitable treatment, without any further explanations. They also established very general rules of investor-state dispute settlement (Folfas, Słok-Wódkowska 2018). Such a pattern is clearly visible in BITs of many catching-up countries. They concluded BITs with many developed states,

mainly on the basis of a developed BIT partner model. Their main goal was to attract foreign investors by convincing them, that their rights during transition period and beyond would be respected. Generally, the governments of catching-up states faced the prisoner’s dilemma game with the conclusion of BIT as a strictly dominant strategy. The sovereignty cost of concluding a BIT used to be smaller than the loss resulting from discouraging the foreign investors – see Table 4.22.

Table 4.22. “Early” BIT of catching-up economies with developed country (a standard prisoner’s dilemma)

A one-period game with the simultaneous movements
 Player 1 (rows): catching-up economy
 Player 2 (columns): other catching-up economy
 $v > 0$
 $y > z$

	not to conclude a BIT	to conclude a BIT
not to conclude a BIT	0,0	z,v
to conclude a BIT	v,z	y,y

Source: own study based on Engel 2008 and Folfas, Słok-Wódkowska 2018.

If one country concludes a BIT, and the countries competing with it for foreign capital do not, it attracts more capital. Due to this outcome, its economy does better than the average of countries to which it is compared. It gains from concluding the treaty. However, it has to bear the costs (sovereignty cost, costs connected with negotiations etc.). Thus, v (payoff) equals the benefits from alluring more foreign capital than other countries minus the costs of concluding a BIT. Payoff v can be positive, negative or zero.

The payoff is equal to zero, if no country concludes a BIT. There are no benefits and no costs. The payoff is y , if all countries conclude BITs. They still have to pay costs, but they do not get anything in return as every country can attract a similar amount of foreign capital. Thus, y equals zero minus the costs. Payoff y is always negative. Payoff z appears, if the others conclude investment treaties and one country does not. Foreign capital is likely to stay outside the country without a BIT. Compared to its peers, its economic performance deteriorates, but the country does not bear the costs. Thus, z equals the losses from alluring less foreign capital than other countries. Payoff z is always negative.

Due to the scarcity of capital, the governments of catching-up countries assume that the benefits from alluring more foreign capital than other countries which do not conclude a BIT with a developed economy are much higher than the costs of concluding a BIT. It means that $v > 0$.

Therefore, the governments of catching-up countries assume that the costs of concluding a BIT is lower than the absolute value of the losses stemming from alluring less foreign capital than other countries in terms of lack of a BIT (foreign investors may

perceive the transition economies as insecure host countries, thus the lack of BIT has a significant negative effect) $\Rightarrow y > z$.

The NMS, the majority of which are former communist states began to conclude “early” BITs relatively late – in the early 1990s. Their main goal was clearly to attract much needed investments, preferably from developed countries. Therefore, their position in negotiations was relatively weak. On the one hand, they had very scarce experience in negotiating investment treaties. On the other hand, during the transition, their economies needed to supplement lacking domestic capital with foreign capital.

For example, Poland concluded 63 BITs and all of them were signed before the year 2000 and majority even before 1995. Only a few NMS decided to renegotiate their BITs afterwards, among them were Czechia and Slovakia. Among 93 BITs ever concluded by Czechia only 14 were signed later than 2000 (among them, there were only a few that replaced previous agreements). A similar situation concerns Slovakia. Among 64 BITs signed, only 20 were concluded after the year 2000. These examples show not only time of signing (and negotiating) agreements. They also prove that majority of BITs concluded by the NMS are obsolete and stem from previous generations of BITs. Therefore, it would be favorable for them to conclude BITs on the EU level. However, even nowadays, they have a worse bargaining position than the European Commission, which could negotiate BITs on the behalf of the whole EU (Folfas, Słok-Wódkowska 2018).

4.5. FDI impact on modernisation of the economic structure of the Polish catching-up economy

In this subchapter, we present a detailed analysis of FDI inward stock in the Polish economy divided into sectors/industries (4.5.1) and of foreign investors active in the Polish automobile industry (4.5.3). Additionally, in Section 4.5.2, we analyse the rationale for the creation of export processing zones (EPZs) and special economic zones (SEZs). We chose Poland as a subject of this study as the biggest of the analysed countries and the one having a relatively obsolete economic structure (with a large share of agriculture and labour-intensive production) at the beginning of transition process. EPZs and SEZs are worth analysing as a method used by countries in transition to attract foreign capital. For the sector analysis, we chose the automobile industry acknowledging its position in the Polish economy, exports and close ties with the foreign MNCs.

4.5.1. FDI inward stocks in Poland and Polish exports – sector/industry analysis

In this part, we check whether the FDI inflows to Poland affect the industry structure of Polish gross exports of goods and services. In the research, we use the panel econometric models illustrating a possible dependence between the industry structure of the FDI inward stocks in Poland and the industry structure of the Polish gross exports:

$$\ln \frac{X_{b,t}}{X_t} = a_0 + a_1 \ln \frac{X_{b,t-1}}{X_{t-1}} + a_2 \ln \frac{FDI_{b,t}}{FDI_t} + a_3 \ln \frac{FDI_{b,t-1}}{FDI_{t-1}} + a_4 \ln \frac{FDI_{b,t-2}}{FDI_{t-2}} + \varepsilon_t$$

where:

$X_{b,t}$ – the value of Polish gross exports of goods or services produced in industry b in year t ,

X_t – the value of the total Polish gross exports in year t ,

$FDI_{b,t}$ – the value of FDI inward stock in Poland in industry b in year t ,

FDI_t – the value of total FDI inward stock in Poland in year t ,

ε_t – error term,

$b = 1, 2, \dots, 16$,

$t = 1996, 1997, \dots, 2011$.

There are 16 industries included in the research:

- 1 – agriculture, forestry, hunting and fishing,
- 2 – mining and quarrying,
- 3 – food products, beverages and tobacco,
- 4 – textile, textile products, leather and footwear,
- 5 – wood, paper, paper products, printing and publishing,
- 6 – chemicals and non-metallic mineral products,
- 7 – basic metals and fabricated metal products, machinery,
- 8 – electrical and optical equipment,
- 9 – transport equipment,
- 10 – electricity, gas and water supply,
- 11 – construction,
- 12 – wholesale and retail trade, repairs,
- 13 – hotels and restaurants,
- 14 – transport and storage, post and telecommunication,
- 15 – financial intermediation,
- 16 – real estate, renting and business activities.

Table 4.23. The estimation results of the model explaining the gross exports

	Model with random effects	Fixed-effects model	Arellano-Bover/Blundell-Bond model
a_0	-0.03	-0.63***	-0.22*
a_1	0.98***	0.83***	0.97***
a_2	0.01	-0.00	-0.02
a_3	-0.04	-0.04	-0.06
a_4	0.04	0.03	0.05

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: own study based on the computations made in STATA.

We estimate the models explaining the gross exports using three methods: a model with random effects, a fixed-effects model¹⁰ and an Arellano-Bover/Blundell-Bond model¹¹. The first two methods belong to the standard estimation procedures used for panel models. The third method is usually applied for the estimation of the dynamic models. Because of limited data availability, the econometric analysis covers the period 1996–2011 and it is based on the OECD statistics (FDI data extracted from: http://stats.oecd.org/Index.aspx?DatasetCode=FDI_FLOW_INDUSTRY; data on gross and value-added exports: <https://stats.oecd.org/index.aspx?queryid=75537>). Both values of FDI inward stocks¹² and the values of exports are in current prices and exchange rates (in USD).

In the model explaining the value of the Polish gross exports, all independent variables illustrating the FDI inward stocks in Poland, regardless of the estimation method, are not statistically significant (see Table 4.23). Consequently, the estimation results inform that there is no dependence between the industry structure of FDI in Poland and the industry structure of the Polish gross exports.

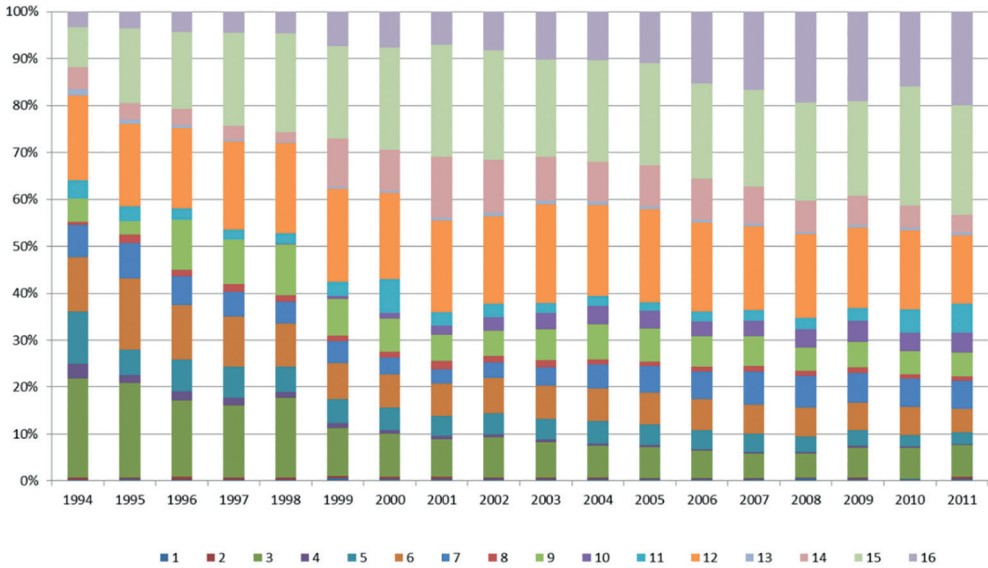
There are many possible reasons for the lack of the dependencies. Firstly, the level of data disaggregation is relatively low and can prohibit to fish out the possible dependency between the industry structure of the FDI and the industry structure of exports. If we included more disaggregated statistics (like COMTRADE data), the estimation results might be different. Unfortunately, more disaggregated FDI data are not available. Secondly, we consider the total values of FDI inward stocks in Poland which include not only the greenfield projects, M&A but also intercompany loans and the reinvestments of profits (losses) as there are no separate statistics for the greenfield projects and M&A in industries. The loans and the reinvestments are often motivated by the tax avoidance or even by the tax evasion, thus they have a very small impact on exports.

¹⁰ For more see Stock and Watson 2015, pp. 400–413 and Czarny et al. 2010, pp. 70–75.

¹¹ For more see Arellano, Bover 1995 and Blundell, Bond 1998.

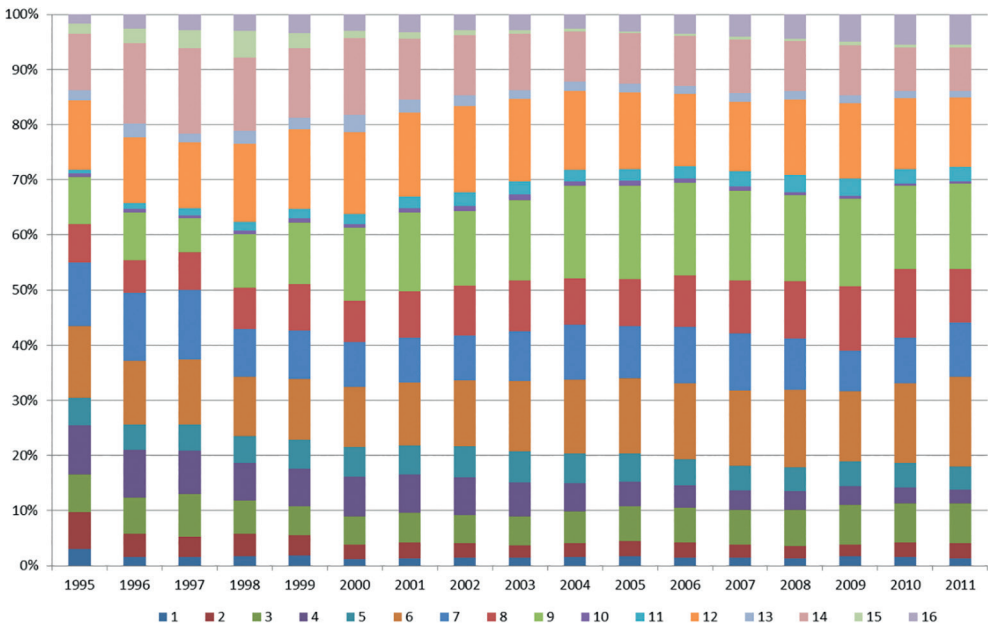
¹² In the econometric models, we include FDI stocks, not FDI flows, to avoid the negative values of FDI inflows and also due to the long-term feature of the study.

Figure 4.13. The industry structure of the FDI inward stocks in Poland (1994-2011)



Source: own study based on the OECD statistics, https://stats.oecd.org/Index.aspx?DataSetCode=FDI_FLOW_INDUSTRY; access: 15.06.2018.

Figure 4.14. The industry structure of the Polish gross exports in the years 1994–2011



Source: own study based on the OECD statistics, https://stats.oecd.org/Index.aspx?DataSetCode=TIVA_2018_C1; access: 15.06.2018.

Thirdly, in the covered, period two different tendencies for the industry structure of exports and the structure of FDI are noticeable. The shares of sectors I and II (industries 1–9) in the FDI inward stocks diminished systematically (from 64% in 1995 to 31–33% in the years 2006–2011 – see Figure 4.13). In the case of exports, the role of these two sectors remained quite stable (about 70% for the gross exports– see Figure 4.14). Consequently, the role of FDI in the service sector significantly grew during the period 1995–2011, but the share of the service exports was stable.

4.5.2. Export processing zones and special economic zones

This part describes how multinational corporations use export processing zones and special economic zones¹³ for tax optimisation. Taxes in EPZs and SEZs tend to be lower than in the rest of the host country. Thus, EPZs and SEZs can be a crucial reason for the location of FDI by MNCs, especially in catching-up host economies. Those types of inward FDI do not usually enhance the competitiveness of the host country.

Newly industrialised countries typically use unskilled labour and imported inputs in production, especially in export-oriented production of final goods. Such industries use internationally mobile ('footloose') production factors. Some governments support industries employing footloose factors of production. Such sectors tend to be export-oriented. Their location follows the principles of efficient use of the world's natural resources. An important role is also played by the aforementioned economic policy. An instrument used by newly industrialised countries to attract industries employing footloose factors is the creation of export processing zones. They combine sets of instruments allowing manufacturers to operate within them to cut production costs in comparison to pre-zone levels. EPZs are created in order to assemble imported components and to subsequently export final goods. Elements brought from abroad are duty-free (in accordance with the idea of effective protection), whereas governments frequently contribute financially to zonal infrastructures. Such zones use simplified administrative procedures. Businesses are also granted various financial incentives and subsidies.

As another form of promoting foreign investments, undertakings enjoy the so-called tax holidays, allowing them (mostly MNCs) not to pay income taxes for a certain period (usually 5 to 20 years). Due to the existence of zones, local factors of production move to industries located there. Privileged sectors tend to employ unskilled labour and limited capital. All or the vast majority of output is sold abroad. The workforce employed is characterised by relatively low alternative cost in less developed countries. From the point of view of the world economy, the existence of EPZs increases competition between

¹³ More about SEZs, see also UNCTAD 2019, pp. 128–206.

countries for the location of footloose industries. It may take the form of manifest solicitation for MNCs, undertakings very flexible in their business location decisions (Caves et al. 1998, pp. 218–220).

From the point of view of MNCs, it is profitable to relocate as much profit before tax as possible to such export processing zones. The use of EPZs is exemplified by *maquiladoras* in north Mexico. On account of tax incentives, low labour costs and the proximity to the U.S. market, MNCs locate their assembly plants in that area. They import components and export final products (mostly to the USA) (Caves et al. 1998, p. 220; Gonzalez-Bendiksen 2009, pp. 263–265).

Similar practices concern special economic zones, i.e. designated parts of countries where economic activities can be pursued on preferential terms and conditions. Enterprises authorised to operate in SEZs are entitled to state aid in the form of tax exemptions. In Poland, the most important advantage of investing there was tax relief applicable for 10 to 12 years. Investors operating in SEZs benefited from income tax exemptions of up to 50% of eligible costs or to as much as 65% of the amount in the case of small and medium-sized enterprises. It was possible to obtain tax exemption in a SEZ on account of the size of the investment project concerned or due to job creation. For example, where someone invested 10 million USD, they could pursue profitable economic activity and be exempt from income tax until the amount of unpaid taxes exceeded USD 5 million. The condition for benefiting from tax exemption was to obtain an authorisation to operate within the SEZ. Such an authorisation was issued in a tendering procedure or as a result of negotiations conducted by the zone management. An undertaking wishing to benefit from SEZ incentives could also apply for the extension or modification of the current limits of the SEZ concerned in order to include a selected investment area, provided that the investment project involved the creation of at least 500 new jobs or the investment value was a minimum of EUR 40 million. Furthermore, in March 2005, in addition to information technology (IT) and R&D activities, tax relief also began to apply to accounting and financial services as well as to services provided directly to external customers. As a result, such zones increasingly hosted modern entities of outsourced services: accounting, IT, research and development services as well as call centres. The zones also attracted a growing number of logistic investment projects, distribution centres and logistic hubs (*Biznes w zonie* 2005). Due to tax savings, MNCs sought to demonstrate as much profit (income) as that earned in the SEZ concerned. Some activities were located outside the SEZ, whereas other operations were carried out within the zone, every item of revenue, expense and income needed to be assigned to SEZ or non-SEZ activity. It created certain room for fraud on the part of corporations (Kobak 2009).

The year 2018 saw an amendment to the instrument of exemption from income tax (CIT or PIT) for undertakings, representing one form of regional state aid. The new act

(creating the Polish Investment Zone, PIZ) allows firms implementing new investment projects in either public or private areas to benefit from tax exemptions on the whole territory of Poland. At the same time, the existing authorisations to operate in SEZs remained valid for a maximum period until the end of 2026. As in the case of SEZs, investment projects implemented in specific economic sectors will be excluded from the support scheme. A detailed list of exclusions is set out in the ordinance on state aid granted to certain undertakings for the implementation of new investment projects. The amount of state aid in the form of exemption from corporate or personal income tax varies between regions (voivodships). Such a relief can solely apply to income earned from economic activities carried out within the investment projects covered by the decision granting assistance. Therefore, where an undertaking simultaneously pursues non-assisted activities, assisted activities must be separated in organisational terms and the amount of tax exemption is determined on the basis of data (revenue and expenses) for such separated activities (PAIH 2019).

The creation of the PIZs is the Polish government's response to the misuse of SEZs by foreign investors, which seems to confirm prior statements on the specific characteristics of FDI in SEZs. It is premature to say whether it is an effective protection against harmful practices of MNCs.

4.5.3. The role of FDI in shaping industry competitiveness – a case study of the Polish automotive industry

This section contains considerations about the Polish automotive industry and is based on the information available on company websites. The list of the companies and their websites is presented in Table 4.24. Statistics from international databases were also employed to analyse the economic performance and competitiveness of the Polish automotive industry (see sources below the tables and figure).

Table 4.24. Sources of information about companies operating in the Polish automotive industry

Company Name	Website and date of access
FCA Poland	http://fcagroup.pl/fca-w-polsce/zaklady-grupy-fca-w-polsce/ (21.08.2017)
General Motors Poland	http://www.opel.pl/poznaj-opla/gmmp-gliwice/fabryka-opla-w-gliwicach/start.html (21.08.2017)
Volkswagen Group Polska	http://www.volkswagen-poznan.pl/pl (21.08.2017)
MAN Truck& Bus Polska and MAN Trucks	https://www.truck.man.eu/pl/pl/man-na-swiecie/man-w-polsce/lokalizacje/starachowice/Starachowice.html and https://www.truck.man.eu/pl/pl/man-na-swiecie/man-w-polsce/lokalizacje/krakow/Krakow.html (21.08.2017).

Company Name	Website and date of access
Volvo Polska	http://www.volvobuses.pl/pl-pl/home.html (21.08.2017)
Scania Polska	https://www.scania.com/productionunitslupsk/pl/home.html (21.08.2017)
Toyota Motor Poland	http://www.toyotapl.com/walbrzych/ (21.08.2017)
Mercedes-Benz Jawor	http://mercedes-benz-jawor.com.pl/fabryka-w-jaworze/ (21.08.2017)
Kirchoff Automotive	http://www.kirchoff-automotive.com/pl/firma/lokalizacje-na-swiecie/europa/polska/ (22.08.2017)
Valeo	http://valeo-poland.com/pl/valeo-in (22.08.2017)
Lear	http://www.lear.pl/lear_w_polsce/lear_w_pl.html (22.08.2017)
ZF	https://www.zf.com/poland/pl_pl/corporate/meta_folder/contact_corporate/contact_overview.html (22.08.2017)
Brembo	http://www.brembo.com/pl/grupa/about/brembo-na-%C5%9Bwiecie#europa (22.08.2017)
Kapena	https://www.kapena.com.pl/O-firmie (22.08.2017)
Grupa Boryszew	http://www.boryszew.com.pl/O_Grupie (22.08.2017)
Solaris	https://www.solarisbus.com/ (22.08.2017)
Jelcz	http://www.jelcz.com.pl/ (22.08.2017)
Autosan	http://www.autosan.pl/ (22.08.2017)
Wielton	http://wielton.com.pl/ (22.08.2017)
Mega	http://www.mega-nysa.pl/ (22.08.2017)
AMZ	http://www.amz.pl/ (22.08.2017)
EM-TECH	https://emtech.org.pl/ (22.08.2017)

Source: own deliberation.

The automotive industry is of considerable importance to the Polish economy (especially exports), which is why we chose it as a subject of the analysis. Due to availability of data concerning foreign direct investments and global value chains the analysis covers the period 2005–2015.

In the years 2005–2015, the automotive industry (manufacture of motor vehicles, trailers and semi-trailers¹⁴) produced goods representing approximately 1.6–2.1% of Poland's GDP. As far as employment is concerned, 1.4–1.6% of all employees belonged to the automotive industry in the years 2005–2015 (Eurostat database, <http://ec.europa.eu/eurostat> (12.02.2020)). The share of automotive industry products in the total exports of Polish goods and services in 2005–2015 was around 10% (UNCTAD database, <http://unctad.org/en/Pages/statistics.aspx> (12.02.2020)). The fundamental factors shaping the functioning of the automotive industry in Poland is FDI. In 2015, the value of the FDI inward stock in the Polish automotive industry accounted for over 5% of the total

¹⁴ According to the Statistical Classification of Economic Activities in the European Community, Rev. 2 (NACE Rev. 2).

value of the FDI inward stock in Poland (OECD database, [https://stats.oecd.org/Index.aspx?DataSetCode=FDI_FLOW_INDUSTRY\(06.08.2017\)](https://stats.oecd.org/Index.aspx?DataSetCode=FDI_FLOW_INDUSTRY(06.08.2017))). The facts about exports and FDI encourage to study the Polish automotive industry in the international context.

In Poland, there are production plants of many leading multinational corporations (coming from, for example, Japan, Germany, Sweden, USA or Italy) in the automotive industry. Currently, the most important automotive industry plants operating in Poland include: Fiat Chrysler Automobiles (factory in Tychy – manufacture of cars Fiat 500, Abarth 500, Lancia Ypsilon, Ford Ka; factory of engines in Bielsko-Biała; Magnetti Marelli plants in Sosnowiec and Bielsko-Biała producing car lighting, exhaust systems, suspensions, shock-absorbers, fuel supply systems, dashboards and bumpers; the Teksid Iron Poland factory that manufactures cast iron castings in Skoczów), General Motors (Opel car factory in Gliwice), Volkswagen Group (production plants VW Caddy and VW Transporter as well as a cast plant manufacturing engine heads in Poznań; in Września a new factory is being built), MAN (assembly of trucks from the TGS and TGX series in Niepołomice; factory of MAN city buses and tourist NEOPLAN in Starachowice), Volvo (production plant (integrated chassis and body assembly) of Volvo buses in Wrocław), Scania (production of city buses Scania City Wide and bus chassis in a factory in Słupsk), Toyota (production of engines, gearbox, crankshafts and connecting rods in Wałbrzych) and Daimler (the Mercedes-Benz engine factory in Jawor).

In addition, three factories are located in Poland (Mielec, Gliwice, Gniezno) belonging to Kirchoff Automotive, in which metal constructions and metal aluminum connections are made in the body and chassis. On the other hand, Valeo has four production plants in Poland: the engine systems production plant in Skawina, the wiper systems production plant also in Skawina, the lighting systems production plant in Chrzanów and the plant for the production and regeneration of drive systems in Czechowice-Dziedzice. Automotive parts are also produced at five plants owned by Lear Corporation (Tychy JIT – headrests, armrests, bolsters, plating and foam of car seats; Lear Tychy Structures – car seat constructions, Lear Jarosław – car seat covers; Legnica Metals – steel constructions, guides and mechanisms of car seats. Lear Mielec – electric wire harnesses for cars). In addition, ZF concern produces safety seat belts and air bags in Poland (plant in Częstochowa), steering systems (plant in Bielsko-Biała), control systems (plants in Czechowice-Dziedzice and Pruszków) and braking systems (plant in Gliwice). Brembo also has three production plants in Poland. Brake systems are produced in Częstochowa and Dąbrowa Górnicza, while specialised steel casings are manufactured in Niepołomice. At the end of the review of the most important, though not all, FDI in Poland, it is worth mentioning Kapena producing e.g. buses (factory in Włynkówka), whose main shareholder is Cacciamali.

In the years 2005–2015, the value of the FDI inward stock in the Polish automotive industry accounted for about 4–6% of the total value of the FDI inward stock in Poland

– see Table 4.25. These numbers, together with the presence of leading global automotive concerns in Poland, confirm that the FDI is crucial for the Polish automotive industry.

Table 4.25. FDI coming into the Polish automotive industry during 2005–2015

Year	Value of FDI inward stock in the Polish automotive industry (US dollars at current prices in millions)	Share in total FDI inward stock in Poland	Value of FDI inflows to the Polish automotive industry (US dollars at current prices in millions)	Share in total FDI inflows into Poland
2005	5 594.7	6.2%	391.0	3.8%
2006	6 990.8	5.6%	601.2	3.1%
2007	9 421.7	5.3%	948.2	4.0%
2008	6 715.0	4.1%	-527.7	-
2009	8 385.2	4.5%	624.1	4.6%
2010	8 654.8	4.0%	1 005.5	7.2%
2011	8 435.9	4.2%	-129.8	-
2012	10 537.8	4.5%	1 680.2	27.7%
2013	9 586.4	4.1%	1 024.5	41.0%
2014	9 228.8	4.4%	1 112.7	8.1%
2015	9 465.5	5.1%	1 045.0	7.2%

Source: Own study based on the OECD data, <https://stats.oecd.org>; access: 12.02.2020.

As for the value of the FDI inflows into the Polish automotive industry, they are subject to greater fluctuations than the value of the FDI stock (this is not due to the specificity of the automotive industry, but because the FDI flows usually fluctuate more strongly than the value of the FDI stock). In particular, the two years in which there were the so-called divestments (negative stream value) are worth noting. It is about the years 2008 and 2011, in which divestments were probably related to the beginning and duration of the global economic crisis. In 2014, the highest value of the FDI inflows to the Polish automotive industry was recorded.

The values of the FDI outward stock and FDI outflows from the Polish automotive industry are much lower than the value of the FDI inward stock and FDI inflows into the Polish automotive industry – see Table 4.26. An example of a Polish company from the automotive industry that has invested abroad is the Boryszew Group. It is a producer of various automotive components. The plant in Tychy manufactures air-conditioning ducts, whereas the Chelmek plant produces rubber for air-conditioning ducts as well as wires. From 2014, the Boryszew Group also includes Tensho Poland in Ostaszewo dealing with the production of plastic parts for the automotive industry (e.g. dashboards, storage compartment elements and car seats, engine covers). In 2010, the Boryszew Group began international expansion taking over assets of the Italian Marlow Group in Italy, France, Spain, Brazil and China.

Table 4.26. FDI flowing out of the Polish automotive industry in the years 1995–2012

Year	The value of FDI outward stock from the Polish automotive industry (US dollars at current prices in millions)	Share in total FDI outward stock from Poland	The value of FDI outflows from the Polish automotive industry (US dollars at current prices in millions)	Share in total FDI outflows from Poland
2005	139.4	2.2%	47.4	1.4%
2006	157.8	1.1%	29.6	0.3%
2007	181.0	0.9%	27.5	0.5%
2008	134.7	0.6%	180.6	4.0%
2009	228.5	0.8%	133.1	2.6%
2010	1 308.0	2.9%	22.3	0.3%
2011	2 280.3	4.3%	641.5	7.9%
2012	2 663.1	4.6%	202.8	28.3%
2013	835.0	2.7%	130.0	-
2014	750.0	2.5%	168,5	5.5%
2015	556.2	2.0%	43.1	1.0%

Source: own study based on the OECD data, <https://stats.oecd.org>; access: 12.02.2020.

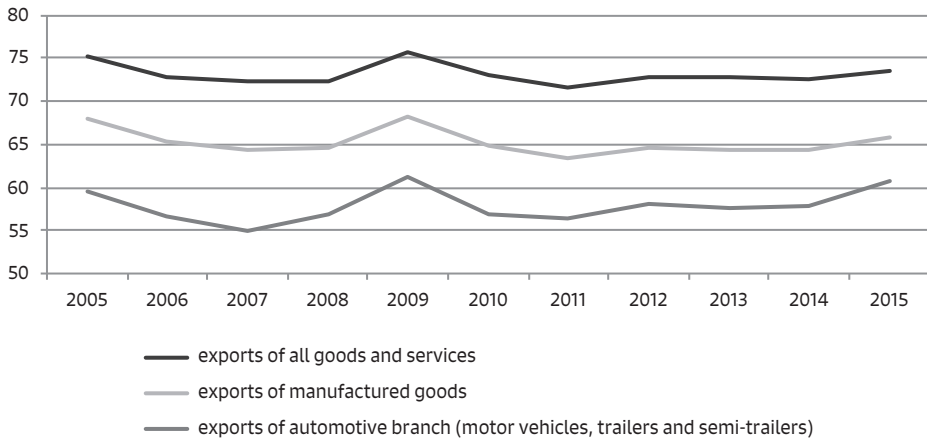
Other Polish companies from the automotive industry are worth mentioning here. Perhaps some of them in the future will decide to start production abroad. These are: Solaris Bus & Coach (bus manufacturer), Jelcz (currently the production of heavy-loaded trucks, until 2008 also buses), Autosan (production of buses), Wielton (production of semitrailers, trailers and body), Mega (production of semitrailers and axles for semitrailers and trailers), AMZ (production of special vehicle bodies), EM-TECH (production of semitrailers and trailers).

In summary, most of the production in Poland takes place in the branches of foreign MNCs operating in the automotive industry. In the years 2008–2014, the share of the production of foreign branches of MNC in total production was respectively: 87.26%; 87.18%; 90.40%; 92.29%; 89.67%; 89.48% and 88.51% (Eurostat, <http://ec.europa.eu/eurostat> (10.09.2017)).

Considerations regarding trade in automotive products begin with the analysis of the percentage of the domestic value added in Poland's gross exports – see Figure 4.15. It is one of the key indicators allowing to determine the position of Poland in the international production networks of the automotive industry. During 2005–2015 except for the years 2009 and 2015, the mentioned percentage in the automotive industry is lower than 60. This means that together with the intensification of the FDI inflows to Poland, foreign components play quite an important (more or less 40%), but not overwhelming, role in the production of goods exported from Poland. However, the importance of foreign

components in the automotive industry is on average higher than overall in the industry (about 35%) and in the entire economy (about 20–25%).

Figure 4.15. Percentage of domestic value added (generated anywhere in the Polish economy) in Poland's gross exports during 2005–2015



Source: Own study on the basis of the OECD data, https://stats.oecd.org/Index.aspx?datasetcode=TIVA_2018_C1; access: 14.02.2020.

The next step is to check the share of final and intermediate goods in the Polish gross exports and imports of automotive products – see Table 4.27. While in all years of the period 2005–2015, the value of gross exports of final goods exceeded the value of gross exports of intermediate goods, in some years the dominance of the export value of final goods over the value of exports of intermediate goods is not large. In the case of gross imports, there is even weaker dominance of the value of imported final goods over the value of imported intermediaries.

It is probably a consequence of the fact that some foreign branches of automotive concerns operating in Poland are assemblies of final goods, and some produce intermediate goods. The same applies to domestic enterprises. The examples of both have already been mentioned. As a result, the average (2005–2015) percentage of the domestic (about 60%) and foreign (about 40%) value added in the Polish gross exports of automotive goods is similar. There is no clear advantage of either of them.

To sum up, the role of Poland in international automotive networks is diverse. On the one hand, it would be too simplistic to say that due to relatively low labour costs, Poland is only an assembly plant for products manufactured by the leading global automotive concerns. On the other hand, the activities of foreign branches of MNCs form the vast majority of the automotive industry in Poland. Poland is a producer and exporter as well as an importer of both intermediate and final goods.

Table 4.27. Gross exports and imports of automotive industry products (motor vehicles, trailers and semi-trailers) from/to Poland in the years 2005–2015

Year	Gross exports of final products (US dollars at current prices in millions)	Gross exports of intermediate products (US dollars at current prices in millions)	Share of final goods in gross exports	Share of intermediate goods in gross exports	Gross imports of final products (US dollars at current prices in millions)	Gross imports of intermediate products (US dollars at current prices in millions)	Share of final goods in gross imports	Share of intermediate goods in gross imports
2005	6563.7	3 878.2	62.9%	37.1%	3 563.4	3 429.2	51.0%	49.0%
2006	8 461.8	4 848.8	63.6%	36.4%	4 727.2	4 468.2	51.4%	48.6%
2007	10 524.7	6 166.0	63.1%	36.9%	7 776.4	5 490.5	58.6%	41.4%
2008	13949.9	7 377.6	65.4%	34.6%	11 080.2	8 415.9	56.8%	43.2%
2009	9967.9	5 334.0	65.1%	34.9%	6 077.7	4 811.1	55.8%	44.2%
2010	11 183.5	7 586.9	59.6%	40.4%	8 302.1	6 021.7	58.0%	42.0%
2011	13897.7	8 449.5	62.2%	37.8%	9 364.9	7 031.9	57.1%	42.9%
2012	12089.1	7 925.3	60.4%	39.6%	7 952.0	5 964.0	57.1%	42.9%
2013	12957.1	8 970.1	59.1%	40.9%	8 285.2	6 911.2	54.5%	45.5%
2014	12704.6	9 580.3	57.0%	43.0%	9 563.1	7 108.2	57.4%	42.6%
2015	9040.8	8 835.4	50.6%	49.4%	7 305.1	7 416.3	49.6%	51.4%

Source: own study on the basis of the OECD data, https://stats.oecd.org/Index.aspx?datasetcode=TIVA_2018_C1; access: 14.02.2020.

4.6. Summary

In this chapter we focus on the evolution of the NMS competitiveness and the role that the broadly understood internationalisation played in this process.

In the first step of analysis, we investigated the relationship between the GCI score and FDI stock in the NMS. The results of analysis indicate a positive correlation for Bulgaria, Czechia, Lithuania, Latvia, Romania and Poland, whereas the other countries – Estonia, Slovakia, Slovenia and Hungary – showed a strong negative correlation. At the same time, the regression analysis results indicate that Czechia, Latvia and Lithuania showed no relationship between the inward FDI stock and their GCI scores. As the stock of FDI increased, the GCI score went down for Estonia, Slovakia, Slovenia and Hungary. Only in three countries (Bulgaria, Romania and Poland), the inflow of foreign direct investment was accompanied by improved competitiveness, measured by the GCI score.

At the second stage of the analysis, following the generalised double diamond approach, we investigated in how far the V4 countries managed to use international interconnections to improve their competitiveness in the period 2006–2014. The outcomes of our analysis

are in line with the results scored by the V4 in the Global Competitiveness Report: Czechia continuously performed well, Poland managed to significantly improve its position, whereas Slovakia and Hungary lost their strong competitive positions. In our analysis, we found the reasons for this diversified performance by investigating sources of competitive (dis) advantage of the analysed economies. Czechia remained the most competitive economy among the V4 – reflected in the largest size of the double diamonds – through both strong domestic conditions, as well as effective international integration. Poland was the only country in our analysis that improved its competitive position – in relation to the domestic as well as international sources of competitive advantage. Hungary deteriorated in its competitiveness most, recording a significant weakening of the domestic competitive base – but with still strong integration within the international markets. Slovakia, on the contrary, managed to improve its domestic sources of competitive advantage but still not fully exploited the potential of integration within the global economy. Thus, we concluded that strong international position of a catching-up economy has to be based on two pillars: solid domestic competitive base and the ability to strategically integrate within the network of international interconnections.

Thirdly, basing on the pyramid model discussed in Chapter 2, we presented the outcomes of the analysis of factors determining the NMS ability to achieve their developmental goals in years 2000–2015. We used factor scores to develop key composite variables (Knowledge, Openness, Financial System, Governance and Democracy) and regressed them on GDP growth and RCA indices. The results of analysis indicate a very strong relation between GDP growth and governance and to some extent between the GDP growth and the quality of financial system. We found a significant catching-up capacity in terms of knowledge in the analysed NMS. In our conceptual model, we argue that for catching-up economies, limited by their own economic potential of the supply and demand, internationalisation may constitute a powerful developmental driver. The results of our research proved that for the EU-10 countries, the ability to shift the exports specialisation structure from resource-intensive goods towards the technology-intensive difficult-to-imitate goods was a factor driving the process of their catching-up in GDP per capita levels. We showed that in the analysed countries, decreasing levels of RCA in resource-intensive goods (basic specialisation) and increasing levels of RCA in technology-intensive difficult-to-imitate goods (the most advanced specialisation) were driving the GDP growth. We found that the economic openness had a particular impact on the specialisation in the exports of capital-intensive goods.

Fourthly, using the game-theoretic approach, we analysed the game simulating the relation between effects and costs of the enforcement of tax regulation observance by the MNCs. We showed that the NMS appeared to be more vulnerable for tax evasion than the developed EU-15 economies.

At the final stage of the analysis, we investigated the impact of FDI on the industry competitiveness. The analysis outcomes of the model explaining the value of the Polish gross exports indicated no dependence between the industry structure of FDI in Poland and the industry structure of the Polish gross exports. In the further analytical deep-dive, we exemplified the impact of FDI on the industry competitiveness in the NMS by investigating the Polish automotive industry – being an export category of major importance for the whole Polish economy, and at the same time, an important location of FDIs. We showed that the automotive production in Poland was dominated by the foreign multinational corporations. What is more, with 40% share, foreign components play an important role in the Polish automotive exports (almost double the share for entire economy at about 20–25% of total foreign inputs).

To sum up, we have confirmed an important role of FDI for the NMS. However, we proved a different scale of changes – both in relation to the analysed countries and the selected competitiveness dimensions. We also showed that none of the NMS filled the gap between them and the most developed EU member states.

CONCLUSIONS

The scope of this monograph is defined by the research objectives set in the introduction, with the main goal to assess the role of the internationalisation of a catching-up economy in shaping its competitiveness. In the first two chapters, we discussed the problem from the theoretical perspective, and in the following chapters, we concentrated on the experiences of the NMS, presenting the results of statistical and econometric analyses, as well as an empirical verification of the generalised double diamond model.

In the conceptual part of the monograph, based on the in-depth literature research, we systematically categorised numerous definitions of competitiveness and suggested a taxonomy for navigating through the main approaches. Addressing the controversies around the concept of national competitiveness, we drew a number of conclusions.

The competitiveness of a nation should be evaluated in a dynamic perspective and refer to the evolution of the relative position of individual economies within the international division of labour. Departing from a narrow trade perspective, we concluded that competitiveness analysis refers to the assessment of the nation's ability to develop within the global economy.

In this context, we defined competitiveness as the national ability to reach developmental goals, further divided into instrumental and fundamental. We concluded that socio-economic development is a fundamental goal of every competitive economy. In order to reach it, the instrumental goal needs to be achieved through upgrading the positioning within the global economy.

We linked the national competitiveness with the ability to increase the profits from domestic and foreign production factors and their exchange in the open economy conditions. We laid emphasis on the structural features of the long-term competitiveness, acknowledging that the development of technological capacity in a supportive institutional environment is of particular importance for enhancing national competitiveness. This drives a gradual shift of export specialisation from low technology towards knowledge-intensive categories, reflected in the evolution of comparative advantage and in consequence in an increasing share of technologically advanced sectors of the economy in the global trade. Structural transformations enable achieving a fundamental goal, i.e. socio-economic development.

We extended the debate on the long-term competitiveness to the interconnections between national competitiveness and sustainability, showing that these concepts do not necessarily have to be “foes”. We stressed that in the competitiveness debate, emphasis should not only be placed on the linkages between economic, social, and ecological goals but additionally, it should concentrate on the national strategies to reach these goals.

We concluded that competitiveness should be considered in a comparative perspective, within a group of comparable entities. Here, we defined strategic groups, making distinction between large developed countries, possessing a considerable bargaining power in the world markets and smaller catching-up economies. We ascertained that due to varying developmental conditions, the countries from these two groups begin their competitive struggle from diverse starting positions and follow different strategies to reach their goals.

We defined the catching-up economy by a range of conditions related to the demand and supply constraints in development. According to Porter’s diamond, these limitations determine relatively poor opportunities for companies operating in the catching-up economies to gain international competitive advantage. As a result – perceiving the competitiveness of the economy through the cumulative ability of domestic companies to achieve international success – these limitations determine the weaker competitiveness of entire national economies.

We anchored our analysis in the context of globalisation as it creates a new context for analysis of the competitiveness of national economies – particularly those catching-up. Globalisation with its main manifestations – the liberalisation of trade and the flow of production factors, the intensification and evolution of international trade, and the development of international value chains – creates opportunities to overcome developmental barriers for catching-up economies. Hence, we identified integration within the international division of labour as a most suitable strategy to overcome these constraints and to reach developmental goals of a catching-up economy.

Concluding the conceptual findings, we developed a model, which is a multidimensional view on the competitiveness of a catching-up economy. In our model, the ability to improve the socio-economic positioning measured by the pace of convergence constitutes a fundamental goal of a catching-up economy. The ability to reach the fundamental goal is enabled by reaching the instrumental objective: evolution of position within international division of labour. Achieving both goals is driven by the ability of companies operating within its territory to achieve an international competitive advantage. The creation of an environment supportive of the development of globally competitive companies – both domestic and foreign – depends on the set of interrelated social, institutional, economic and technological determinants of convergence.

From a broad range of theoretical studies on the dependencies between flows of FDI and the capability of host economies to meet their developmental objectives, we selected

approaches that place a particular emphasis on the role of foreign companies in fostering the evolution of export specialisation by serving as a source of modern know-how and technology. The analysis of the existing channels and mechanisms of the relations between FDI and national competitiveness of a host economy resulted in the identification of interdependencies. Theoretical considerations were supported with the case studies of the evolution of competitiveness of two small catching-up economies (Ireland and Singapore) that can be seen as best-in-class examples of successful integration within the global economy.

In the empirical part of the monograph, basing on the presented methods and models, we illustrated the changes in competitiveness of the NMS within the period of 1999–2014. The suggested pyramid model serves here as a framework for the analysis.

During the period 1999–2014 (and generally for over a dozen years after the economic and political transformation began), the NMS became more open and competitive economies than before. With no doubt, the NMS do not play an insignificant role in the global value chains and in the global production networks. We cannot say that they play a major role not only in the “Factory World” but also in the “Factory Europe”. They are somewhere in the middle of the peloton – as relatively developed but still catching-up economies.

The results of our research prove that for the EU-10 countries, the ability to shift the exports specialisation structure from resource- and labour-intensive towards the technology-intensive difficult-to-imitate goods was a factor driving the process of their catching-up in GDP per capita terms.

However, we found that in the case of the NMS, being more competitive does not mean being more innovative. Firstly, the backward participation in GVCs is outstripping the forward participation. Secondly, the share of hi-tech manufactures in total exports remains low. Thirdly, the production specialisation is sometimes random and stems from FDI in special economic zones (FDI aimed at tax benefits) or from resource-seeking investments. Fourthly, the level of human capital in the NMS is still not satisfactory.

We also proved that NMS are not a uniform group. Czechia, Estonia and Slovenia appear to be the leaders in majority of the analysed categories – mostly in regard to innovativeness and quality of human capital. However, the success of these three countries is strongly dependent on the economic performance of Germany, Finland and Austria, respectively. Thus, the other NMS can use their experience only up to a certain extent.

Based on the outcomes of the generalised double diamond analysis, we concluded that strong international position of a catching-up economy (exemplified in our study by the V4) should be based on two pillars: solid domestic competitive base and ability to integrate within the network of international interconnections.

Therefore, we recommend industrial policy aimed at increasing the share of domestic value added in exports of the NMS. This policy should be accompanied by the investments in physical and human capital. Not only is a significant increase in expenditures on R&D needed, but also measures reducing the harmful MNCs' practices of transferring of R&D funds to the home countries. Additionally, it is essential to limit the possibilities of tax avoidance. Even though it might seem difficult, it is needed to attract investors who do not only seek tax benefits. Special governmental agencies/departments can play a vital role in addressing FDI, valuable for the host economy.

In addition, our theoretical considerations and empirical studies revealed the complexity of measuring the competitiveness, which relies upon a number of concepts and indicators. Consequently, we decided to use only selected measurements of competitiveness, which is certainly the most fundamental limitation of our studies. On the contrary, our monograph includes a number of more detailed analyses (for example the sectoral studies) in order to illustrate the specifics of the NMS.

We are also aware of the fact that the time frame of our analysis can be perceived as a serious limitation of our monograph. We focused on the periods before (approx. 5 years) and after (approx. 10 years) the biggest enlargement in the EU history. However, we realise that recent years have brought serious changes (trade wars, slowbalisation, Brexit, pandemic) which have influenced the role of the NMS in GVCs. This is why, we believe, that further studies on this subject are necessary.

To sum up, about a decade after the accession to the EU (2014), the NMS enhanced their competitiveness and significantly intensified foreign economic relations, but they are still more of assembly countries than innovators. As this kind of role in the GVCs seems not to be satisfactory, some crucial changes in their economic policy are necessary.

Appendices

Table A1. Indicators and data sources for the generalised double diamond analysis

Indicator and Definition		Source
<p>Population size Total population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship.</p>	Demand conditions – Domestic – Demand size	World Development Indicator (WDI)
<p>GDP per capita, PPP (constant 2011 international \$) GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates.</p>	Demand conditions – Domestic – Demand size	World Development Indicator (WDI)
<p>Domestic market size index, 1–7 (best) Sum of gross domestic product plus value of imports of goods and services, minus value of exports of goods and services, normalised on a 1–7 (best) scale</p>	Demand conditions – Domestic – Demand size	Global Competitive Report (GCR)
<p>Tertiary education enrolment, gross % Gross tertiary education enrolment rate, calculated as the ratio of total tertiary enrolment, regardless of age, to the population of the age group that officially corresponds to the tertiary education level. Tertiary education, whether or not leading to an advanced research qualification, normally requires the successful completion of education at the secondary level.</p>	Demand conditions – Domestic – Demand quality	Global Competitive Report (GCR)
<p>Buyer Sophistication Index, (1-7) best World Economic Forum, Executive Opinion Survey. In your country, on what basis do buyers make purchasing decisions? [1 = based solely on the lowest price; 7 = based on sophisticated performance attributes]</p>	Demand conditions – Domestic – Demand quality	Global Competitive Report (GCR)
<p>Exports (% of GDP) Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees, investment income and transfer payments.</p>	Demand conditions – International – Demand size	World Development Indicator (WDI)
<p>Foreign Market Size Index, 1–7 (best) The size of the foreign market is estimated as the natural log of the total value (PPP estimates) of exports of goods and services, normalised on a 1–7 scale. PPP estimates of exports are obtained by taking the product of exports as a percentage of GDP and GDP valued at PPP.</p>	Demand conditions – International – Demand size	Global Competitive Report (GCR)
<p>Exports to developed countries (%) Total exports to WTO recognised highly developed countries divided by the total exports to the whole world.</p>	Demand conditions – International – Demand quality	UNCOMTRADE

cont. Table A1

Indicator and Definition		Source
Diversification of exports market Total export market share by high technology sectors such as pharmaceutical industry, computer, electronic and optical industry, and aerospace industry.	Demand conditions – International – Demand quality	Organisation for Economic Co-operation and Development (OECD)
Activity rate (% of population) The activity rate is the percentage of economically active population aged 15–64 in the total population of the same age.	Factor conditions – Domestic – Basic Factor	Eurostat
GDP per person employed in the industry GDP per person employed is gross domestic product (GDP) divided by total employment in the economy. Purchasing power parity (PPP) GDP is GDP converted to 2011 constant international dollars using PPP rates.	Factor conditions – Domestic – Basic Factor	World Development Indicator (WDI)
Average wage (Annual, Total US \$) Total average annual wages paid to an employee.	Factor conditions – Domestic – Basic Factor	Organisation for Economic Co-operation and Development (OECD)
Ease of access to loans, 1–7 (best) World Economic Forum, Executive Opinion Survey. In your country, how easy is it for businesses to obtain a bank loan? [1 = extremely difficult; 7 = extremely easy]	Factor conditions – Domestic – Basic Factor	Global Competitive Report (GCR)
Employment in industry (% of total employment) Employment is defined as persons of working age who were engaged in any activity to produce goods or provide services for pay or profit, whether at work during the reference period or not at work due to temporary absence from a job, or to working-time arrangement.	Factor conditions – Domestic – Basic Factor	World Development Indicator (WDI)
Total R&D personnel per thousand employees Number of personnel working in R&D.	Factor conditions – Domestic – Advanced Factor	Organisation for Economic Co-operation and Development (OECD)
Expenditure on R&D (% of GDP) Total expenditure on R&D activities as a percentage of gross domestic product.	Factor conditions – Domestic – Advanced Factor	Organisation for Economic Co-operation and Development (OECD)
Local capacity of innovation, 1–7 (best) World Economic Forum, Executive Opinion Survey. In your country, to what extent do companies have the capacity to innovate? [1 = not at all; 7 = to a great extent]	Factor conditions – Domestic – Advanced Factor	Global Competitive Report (GCR)
Patents by residents (per capita) Patent applications are worldwide patent applications filed through the Patent Cooperation Treaty procedure or with a national patent office for exclusive rights for an invention—a product or process that provides a new way of doing something or offers a new technical solution to a problem.	Factor conditions – Domestic – Advanced Factor	World Development Indicator (WDI)
Science and engineering articles (per capita) Scientific and technical journal articles refer to the number of scientific and engineering articles published in the following fields: physics, biology, chemistry, mathematics, clinical medicine, biomedical research, engineering and technology, and earth and space sciences.	Factor conditions – Domestic – Advanced Factor	World Development Indicator (WDI)
FDI outward Stock (% of GDP) FDI stocks are the accumulated value held at the end of the reference period (typically year or quarter).	Factor conditions – International – Basic Factor	United Nations Conference on Trade and Development (UNCTAD)

Indicator and Definition		Source
<p>Merchandise imports (% of GDP) Merchandise imports show the c.i.f. value of goods received from the rest of the world valued in current U.S. dollars divided by the gross domestic product.</p>	<p>Factor conditions - International - Basic Factor</p>	<p>World Development Indicator (WDI)</p>
<p>FDI inward stock (% of GDP) It refers to an investment made to acquire lasting interest in enterprises operating outside of the economy of the investor.</p>	<p>Factor conditions - International - Advanced Factor</p>	<p>United Nations Conference on Trade and Development (UNCTAD)</p>
<p>Patents by non-residents per capita Patent applications are worldwide patent applications filed through the Patent Cooperation Treaty procedure or with a national patent office for exclusive rights for an invention - a product or process that provides a new way of doing something or offers a new technical solution to a problem.</p>	<p>Factor conditions - International - Advanced Factor</p>	<p>World Development Indicator (WDI)</p>
<p>Local supplier quality, 1-7 (best) World Economic Forum, Executive Opinion Survey. In your country, how numerous are local suppliers? [1 = largely non-existent; 7 = extremely numerous]</p>	<p>Supporting industries - Domestic</p>	<p>Global Competitive Report (GCR)</p>
<p>State of cluster development, 1-7 (best) World Economic Forum, Executive Opinion Survey. In your country, how widespread are well-developed and deep clusters (geographic concentrations of firms, suppliers, producers of related products and services, and specialized institutions in a particular field)? [1 = non-existent; 7 = widespread in many fields]</p>	<p>Supporting industries - Domestic</p>	<p>Global Competitive Report (GCR)</p>
<p>Ease of doing business – business freedom, 1-100 (best) The business freedom component measures the extent to which the regulatory and infrastructure environments constrain the efficient operation of businesses. The quantitative score is derived from an array of factors that affect the ease of starting, operating, and closing a business.</p>	<p>Supporting industries - Domestic</p>	<p>Heritage Foundation</p>
<p>Index of economic freedom, 1-100 (best) The Index of Economic Freedom focuses on four key aspects of the economic environment over which governments typically exercise policy control: rule of law, government size, regulatory efficiency, and market openness.</p>	<p>Supporting industries - Domestic</p>	<p>Heritage Foundation</p>
<p>Mobile phone subscribers per capita Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provides access to the PSTN using cellular technology.</p>	<p>Supporting industries - Domestic</p>	<p>World Development Indicator (WDI)</p>
<p>Quality of roads, 1-7 (best) World Economic Forum, Executive Opinion Survey. In your country, how is the quality (extensiveness and condition) of road infrastructure [1 = extremely poor – among the worst in the world; 7 = extremely good – among the best in the world]</p>	<p>Supporting industries - Domestic</p>	<p>Global Competitive Report (GCR)</p>
<p>Services, etc., value added (% of GDP) Services correspond to ISIC divisions 50-99 and they include value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care and real estate services.</p>	<p>Supporting industries - Domestic</p>	<p>World Development Indicator (WDI)</p>
<p>Quality of math and science education, 1-7 (best) World Economic Forum, Executive Opinion Survey. In your country, how do you assess the quality of math and science education? [1 = extremely poor – among the worst in the world; 7 = excellent – among the best in the world]</p>	<p>Supporting industries - Domestic</p>	<p>Global Competitive Report (GCR)</p>

cont. Table A1

Indicator and Definition		Source
Share of service imports to total imports (%) Services refer to economic output of intangible commodities that may be produced, transferred, and consumed at the same time divided by the total imports.	Supporting industries – International	World Development Indicator (WDI)
Quality of air transport infrastructure, 1–7 (best) In your country, how is the quality (extensiveness and condition) of airports [1 = extremely poor – among the worst in the world; 7 = extremely good – among the best in the world]	Supporting industries – International	Global Competitive Report (GCR)
Control of international distribution, 1–7 (best) In your country, to what extent do domestic companies control the international distribution of their products? [1 = not at all; 7 = to a great extent]	Supporting industries – International	Global Competitive Report (GCR)
Fixed broadband internet subscription/100 pp Fixed broadband subscriptions refers to fixed subscriptions to high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This includes cable modem, DSL, fiber-to-the-home/building, other fixed (wired) – broadband subscriptions, satellite broadband and terrestrial fixed wireless broadband.	Supporting industries – International	World Development Indicator (WDI)
Intensity of local competition, 1–7 (best) In your country, how intense is competition in the local markets? [1 = not intense at all; 7 = extremely intense]	Strategy – Domestic	Global Competitive Report (GCR)
ISO certifications per capita This standard is based on quality management principles such as strong customer focus, the motivation and implication of top management, the process approach and continual improvement, divided by the total population.	Strategy – Domestic	ISO database
Prevalence of trade barriers, 1–7 (best) In your country, to what extent do non-tariff barriers (e.g., health and product standards, technical and labelling requirements, etc.) limit the ability of imported goods to compete in the domestic market? [1 = strongly limit; 7 = do not limit at all]	Strategy – International	Global Competitive Report (GCR)
Prevalence of foreign ownership, 1–7 (best) In your country, how prevalent is foreign ownership of companies? [1 = extremely rare; 7 = extremely prevalent]	Strategy – International	Global Competitive Report (GCR)
Investor Protection, 1–10 (best) This variable is a combination of the Extent of disclosure index (transparency of transactions), the Extent of director liability index (liability for self-dealing), and the Ease of shareholder suit index (shareholders' ability to sue officers and directors for misconduct).	Strategy – International	Global Competitive Report (GCR)

Table A2. Factor Score Coefficients – as in Fagerberg et al 2005

Knowledge (individual variables)	Factor Score
Average years of total schooling, age 25+	0.19
Educational attainment, completed post-secondary, age 25+, total	0.2
Internet users	0.04
ISO 9001 certifications	0.02
Life expectancy, Total	0.16
Mobile phone subscribers	0.13
Patents count/inventions	0.05

Knowledge (individual variables)	Factor Score
Pupil-teacher ratio in primary education	0.19
R&D expenditure (Input)	0.13
Science and engineering articles	0.08
Tertiary education enrolment, Total	0.19
Openness (individual variables)	Factor Score
Merchandise imports	0.46
Stock of inward Foreign Direct investment (FDI)	0.43
Financial System (individual variables)	Factor Score
Spread of interest rate (lending rate minus deposit rate)	-0.37
Market capitalisation of listed companies	0.33
Domestic credit to private sector	0.25
Governance (individual variables)	Factor Score
Human rights	0.31
Impartial courts	0.18
Law and order (Government integrity)	0.16
Property rights protection	0.23
Regulation (Business freedom)	0.22
Informal market, overall score	0.14
Democracy (Individual variables)	Factor Score
Civil liberties	0.17
Executive Index of electoral competitiveness (EIEC)	0.22
Index of democracy and autocracy	0.24
Legislative Index of electoral competitiveness (LIEC)	0.21
Political constraint	0.2
Political rights	0.19

Table A3. GDP growth rates

<i>GDP Growth</i>	<i>All countries all years</i>
Mean	3.437
Standard Error	0.341
Median	3.838
Mode	#N/A
Standard Deviation	4.318
Sample Variance	18.649
Kurtosis	4.839
Skewness	-1.585

cont. Table A3

<i>GDP Growth</i>	<i>All countries all years</i>
Range	26.704
Minimum	-14.814
Maximum	11.889
Sum	549.962
Count	160
Confidence Level (95.0%)	0.674

Source: own calculations based on the World Development Indicators by the World Bank, access date: November 2017.

Table A4. Year on year change in GDP growth

Year on Year Change in GDP Growth	All countries all years
Mean	-0.0721
Standard Error	0.2062
Median	-0.0765
Mode	#N/A
Standard Deviation	2.608
Sample Variance	6.804
Kurtosis	72.735
Skewness	6.536
Range	35.575
Minimum	-8.715
Maximum	26.860
Sum	-11.534
Count	160
Confidence Level (95.0%)	0.407

Source: own calculations based on the World Development Indicators by the World Bank, access date: November 2017.

Table A5. Regression analysis

	Model 1	Model 2	Model 3	Model 4
	Levels	% Change	Levels	% Change
	COEFFICIENT	COEFFICIENT	COEFFICIENT	COEFFICIENT
(% change in) Log GDP/Capita	-7.33***	-5.78	2.01	2.01
(t stat)	(-2.6145)	(-0.6067)	(-0.4444)	(-0.4444)
(% change in) KNOWLEDGE	-0.13**	-0.78	-0.13*	-0.12*
(t stat)	(-2.1586)	(-0.5472)	(-1.9495)	(-1.9495)
(% change in) OPENNESS	-0.076**	0.14	-0.05	-0.053
(t stat)	(-1.9825)	(0.3238)	(-1.2841)	(-1.2841)
(% change in) FINANCIAL SYSTEM	-0.12***	-0.018	-0.09**	-0.093**

	Model 1	Model 2	Model 3	Model 4
	Levels	% Change	Levels	% Change
	COEFFICIENT	COEFFICIENT	COEFFICIENT	COEFFICIENT
(t stat)	(-3.1303)	(-0.6073)	(-1.9741)	(-1.9741)
(% change in) GOVERNANCE	-0.12**	-1.10	-0.071	-0.07
(t stat)	(-2.3125)	(-0.6154)	(-1.0173)	(-1.0173)
(% change in) DEMOCRACY	0.13	-0.13	-0.22	-0.22
(t stat)	(0.1435)	(-0.0565)	(-0.2441)	(-0.2441)
R sq			0.099	0.055
Obs	160	160	160	160
Dependent Variable: GDP Growth (PPP constant 2011 USD)				
Model 1: One factor at a time in levels				
Model 2: One factor at a time in percent change				
Model 3: In levels – all factors, countries and periods				
Model 4: In % change – all factors, countries and periods				
*, ** and *** sig at 10%, 5% and 1% respectively				

Source: own calculations based on the World Development Indicators by the World Bank, access date: November 2017.

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This monograph focuses on the national competitiveness and sustainable integration of catching-up economies within the global networks. The authors provide a comprehensive trade perspective and define national competitiveness as the ability to reach developmental goals in the era of globalisation. They stress that for catching-up economies, which have a limited economic and technological potential, internationalisation plays a particularly important role in developing long-term competitiveness.

The authors exemplify catching-up economies with the New EU Member States, which joined the EU in the years 2004 and 2007. These countries began the journey to market economy with ineffective institutions, relatively outdated economic structures, tendency to autarky and constrained economic relations determined by central planning rather than the actual economic interests. The authors investigate whether 15 years after the accession, the NMS made progress on the developmental pathway to converge to the most advanced EU states. Many methods of analysis are used in this monograph, e.g. a generalised double diamond model or game theoretic approach. Based on conceptual considerations, the authors conduct an empirical investigation into the experiences of NMS in building long-term competitiveness.

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