TWO MANIFESTATIONS OF THE MIDDLE-INCOME TRAP IN EAST-CENTRAL EUROPE

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Abstract: The paper attempts to reinterpret the concept of the middle-income trap and develops the theory of participation and self-effort. On this basis, the paper distinguishes two different types of middle-income traps. The exclusion trap, which is the result of a one-sided focus on the self-effort, and the vulnerability trap, which is the result of a one-sided focus on participation. The model argues that catching-up can be achieved when the participation and the self-effort are in harmony. The paper also uses this approach to analyse the middle-income trap in East-Central European countries, demonstrating the empirical validity of the theory. It associates socialist planned economies with the exclusion trap, while identifying the dependent market economy model that emerged after regime change with the vulnerability trap.

Keywords: middle-income trap, East-Central Europe, dependent market economy
JEL Classification: *O14, O52, P52*

1 Introduction

The middle-income trap (MIT), a common term in the economic literature, is mainly used to describe the situation of middle-income regions that get stuck in the catching-up process (Gill & Kharas, 2007; Kharas & Kohli, 2011; Eichengreen et al., 2013; Agénor, 2017). In this discourse, one of the most important examples is represented by the East Central European countries (Myant, 2018; Sőreg, 2018; Győrffy, 2022). However, the theoretical underpinnings of the middle-income trap concept have been the subject of considerable debate (see: Doner & Schneider, 2016; Bresser-Pereira et al., 2020; Csath, 2022).

This paper aims to contribute to this theoretical debate by approaching the middle-income trap from a new direction, thereby broadening the conceptual framework. In contrast to empirical views of the middle-income trap that focus on simple growth processes, this paper views MIT as a situation that arises from a disharmony between participation in the global division of labour and self-effort (a term that expresses the effort to create a country's own value-creating capabilities), and argues that an upward exit from the middle-income trap can be achieved through a harmony of participation and self-effort. Based on a delineation between participation and self-effort, the paper distinguishes two distinct types of middle-income traps - the exclusion trap and the vulnerability trap - thereby further developing the theoretical underpinnings of the concept.

An important motivation for redefining the middle-income trap is to make it more applicable for describing the challenges facing the East-Central European region. Consequently, post-socialist experiences play an important role in the model developed in this study. Moreover, the approach of participation and self-effort are used to analyse the situation in the post-socialist countries of East-Central Europe (Czechia, Hungary, Poland, Romania and Slovakia), thus proving the empirical validity of the theory formulated in the study.

The paper is divided into four parts. The first part reinterprets the middle-income trap and outlines the model of participation and self-effort. The second part describes the methodology. In the third part, the theoretical model is used to illustrate the situation of East-Central European countries. The paper ends with a conclusion.

2 The Middle-income Trap: A Reinterpretation and Brief Literature Review

The concept of the middle-income trap is far from old in the literature, the first mention of it being associated with the study by Gill and Kharas (2007). Their main message was that middle-income countries face distinct challenges that cannot be solved by growth theories developed on the basis of low-income countries (Gill & Kharas, 2015). The main problem of middle-income countries is that they are no longer able to compete with low-income countries where wages are low, but they are not yet able to compete with developed countries either,

because they cannot switch from resource-based growth (relying on low labour costs) to productivity-based growth in time (Kharas & Kohli, 2011).

In this growth-focused approach, the middle-income trap is a sudden slowdown in growth following a period of stable catching-up (Agénor, 2017). Studies of the middle-income trap typically take two approaches: absolute and relative income analyses. Absolute approaches use absolute income data to assess a country's stagnation. For example, Eichengreen et al. (2013) and Ayiar et al. (2013) define the trap as a prolonged growth slowdown affecting middle-income countries, with Eichengreen et al. (2013) identifying a slowdown to a seven-year average growth of less than 3.5%. Relative studies, such as those by Agénor et al. (2012) and Im and Rosenblatt (2013), measure income convergence against a benchmark (usually the US) and are more appropriate for assessing convergence dynamics. While the studies by Im and Rosenblatt (2013) and Bulman et al. (2014) find no evidence of a trap, Robertson and Ye (2013) report that almost half of the 46 middle-income countries in their study remain trapped, suggesting mixed results across methodologies.

Nevertheless, there are many critics of this growth-oriented concept of the middle-income trap. Glawe and Wagner (2016) point out that empirical definitions are highly data-dependent and therefore difficult to compare, as different results can be obtained based on different datasets. However, the theoretical basis of the concept is also not adequate. Doner and Schneider (2016) consider the institutional and political economy foundations of the middle-income trap to be missing. They point out that moving beyond the middle-income status is only possible through intensive institution building, but the political conditions that facilitated the move to middle-income status hinder this institutional development. Moreover, Bresser-Pereira et al (2020) even question the theoretical validity of the middle-income trap concept. Using Latin America as an example, they show that it is not the middle-income trap but the liberalisation process that has plagued these countries since the 1980s.

Based on these critics, we undertake to reinterpret the mainstream growth-based approach to the middle-income trap. The starting point of our approach is an arbitrary middle-income country, which participates in the global division of labour, which includes factors to facilitate and hinder catch-up. These facilitating and hindering factors are grouped into production, consumption and institutional categories.

The most visible advantages of participation that facilitate catching-up are economic benefits on the production side. According to Milanovic (2019), specialisation along the global value chain (GVC) encourages developed countries to involve emerging economies in modern technologies. In addition, Mudambi (2008) points out that, due to increasing competition, developed countries standardise various upstream and downstream activities and outsource them to emerging economies. This process creates knowledge spillovers, which may help emerging countries catch up. Therefore, the economic benefits of the production side take the form of inflows of capital, technology and knowledge. In addition, participation in the global division of labour creates the opportunity for producers to compete internationally, which is essential to increase productivity.

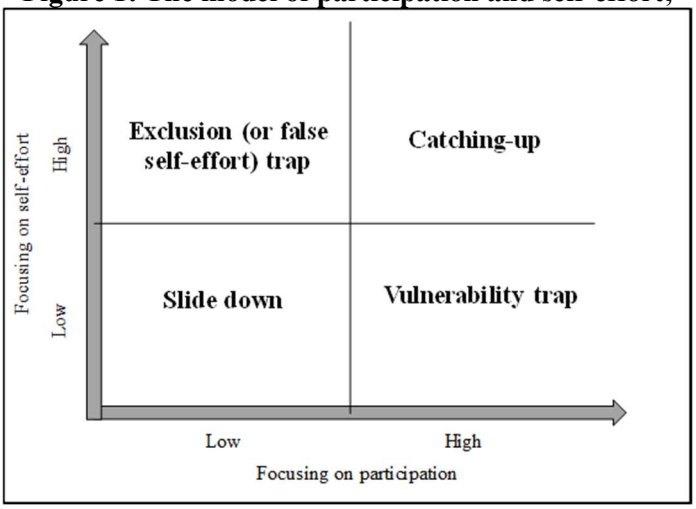
On the consumption side, the benefits of participating in the global division of labour should be sought in increased demand. As Kharas and Kohli (2011) point out, demand factors become important for development at the middle-income level. Participation will boost demand through capital inflows and new investments. While most domestic firms are unable to pay higher wages, foreign factories can (Doner & Schneider, 2016), which in turn helps to increase demand.

In addition, there are institutional benefits associated with participating in the global division of labour. An important reason for the middle-income trap is the weakness of institutions (Pruchnik & Zowczak, 2017). Poorly functioning institutions do not promote human capital growth and can exacerbate the middle-income trap. Participation creates opportunities for institutional development, as middle-income countries can adopt advanced institutional systems.

It is important to stress, however, that participation in the global division of labour also involves factors that act as barriers to catching up. The production aspects that hinder catching up can be divided into two main parts: unilateral relocation of the factors of production and unequal position in the global value chain. The first one represents the relocation of capital, labour and human capital, which mainly covers capital flight, emigration and brain drain, in the modern age (Arrighi, 1990). The second is equivalent to having a disadvantaged position in global value chains. Following Mudambi (2008) the manufacturing position of middle-income countries in the global value chain may become a hindering factor to their catching up. First, it represents a disincentive to investing in human capital, as relatively low skill levels are sufficient in production lines where high wages are paid (Agénor & Canuto, 2015). Secondly, it does not stimulate innovation either, as manufacturing positions are dominated by assembly, while R&D remains in headquarters (Mudambi, 2008). Thirdly, domestic firms become dependent and if the arrival of foreign capital does not lead to organic economic links between the domestic and foreign economies, a dual economic structure will be created (Hirschmann, 1957).

On the consumption side, an important factor hindering catching-up is a dualism in consumption patterns (Furtado, 1971). This is due to the fact that, as a result of the demonstration effect discussed in post-Keynesian development economics, groups in society empowered by participation will copy advanced consumption patterns, while traditional consumption patterns persist in lower segments of society, reinforcing a duality. (Szentes, 2005). This could also have a negative impact on the trade balance.

Figure 1: The model of participation and self-effort;



Source: own elaboration

There are also institutional disadvantages. Participation can have a significant disadvantage if formal institutions are adopted without taking into account local specificities. The literature on institutional economics suggests that the adoption of formal institutions is not an easy task due to path dependency. The contradiction between formal and informal institutions can hinder the catching-up process (Rosta, 2022). Following Doner and Schneider (2016), it is also clear that the necessary institutional reforms are hindered by tensions between interest groups arising from the dualism of production and consumption.

Without aiming to provide an exhaustive list, the following are the most important factors that facilitate and hinder the catching-up of a middle-income country in the global division of labour. Facilitating factors include technology, capital and knowledge transfer; increasing demand; political stability and institutional development; and the potential for competition and export markets. Hindering factors include: an unequal value chain position; emigration and capital flight; dualism in production and consumption; and institutional hindrances that may perpetuate the position.

In our view, middle-income countries should focus on two strategies simultaneously. On the one hand, they should continue to strengthen their participation in the international division of labour in order to achieve factors that facilitate their catching-up. This involves increasing their benefits from the international division of labour, which can be achieved through economic openness, integration into value chains, promotion of foreign capital and institutional convergence. On the other hand, they should neutralise any constraining factors, this is the self-effort strategy as it is called in this paper. Self-effort is the totality of efforts that a country needs to make to reduce the effects of emigration and brain drain and to be able to increase the economy's capacity to create value, thus paving the way for breaking out of the manufacturing position.

Putting together the elements discussed so far, we can say that a one-sided focus on participation or self-effort will not lead to catch-up. This is because, when only the strategy of participation is in the focus, facilitating factors will appear, but also hindering ones will inevitably emerge. This is called the vulnerability trap. At the same time, when only the strategy of self-effort is in the focus, hindering factors can be avoided, but the country will be completely void of facilitating factors; this is called the exclusion trap. We can also call it a false self-effort trap because real self-effort exists only in the case of participation, since the real extent of self-effort may only be revealed in the global division of labour, so self-effort without participation may prove to be an illusion. In these two cases, therefore, what you gain by focusing on one of the strategies is lost by the absence of the other.

We argue that a well-functioning industrial policy can find a harmony between participation and self-effort. In that case, a country is able to achieve the facilitating factors and avoid the hindering ones at the same time, therefore, it will be able to catch up. Moreover, there is also a fourth case, where a country is unable to focus on

any of the strategies, which, in our view, represents a slide-down to the periphery. The model is explained in Figure 1.

3 Methodology

Our paper presented a novel theoretical model for understanding the middle-income trap by distinguishing between the strategy of participation and self-effort. Using this model, we identified two distinct forms of the trap: the exclusion trap and the vulnerability trap. The main motivation for developing this model was to better capture the unique challenges faced by post-socialist countries. Therefore, in the next section we apply it to East-Central Europe, specifically examining the cases of Czechia, Hungary, Poland, Romania and Slovakia.

Our approach is a mixed-methods analysis, combining both qualitative and quantitative methods. We conduct a historical review, tracing regional development since the socialist period and using relevant literature to frame the trajectory of the middle income trap. We also conduct a descriptive statistical analysis using 13 selected indicators to provide a comprehensive overview of the region's position within the trap.

In line with our theoretical model, the participation strategy focuses on optimising the benefits of global integration, which can be achieved through openness to trade, integration into global value chains and the promotion of foreign direct investment. We measure participation strategy by tracking economic openness (trade as a share of GDP), FDI stocks, the share of global value chain trade and the contribution of foreign firms to value added. The self-effort strategy focuses on a country's ability to increase its value creating capabilities, mainly by increasing human capital, innovation and productivity growth of domestic firms. We measure this using R&D and education expenditure, the share of tertiary educated in the population, the Brain Dain Index, the share of science and technology workers, EIC innovation scores, patent applications, the share of innovative firms and the productivity gap between foreign and domestic firms. We calculated regional averages for these indicators, which are presented in the next section. We used 2018 as the end point, as this was the year available for each indicator. Germany, Austria and Sweden were used as reference countries. The indicators and their sources used to measure participation and effort are presented in Table 1 in the annexes.

4 Participation and Self-effort in East-Central Europe

Before the change of regime, the countries of East-Central Europe were part of the socialist bloc. The refusal to participate in the global division of labour and the pursuit of autarky were essential elements of the socialist system. In a region of small economies, total self-sufficiency was not possible, but a shift towards it was clearly visible in the Stalinist industrialisation programme (Berend, 1996). The need for autarky necessarily followed from the institutional mechanisms of a planned economy, because planning authorities determined needs together with production capacities, therefore, the emergence of some external capacity would have undermined the omnipotence of planning (Türei, 1997). The rejection of participation was also ideologically necessary, as socialist systems sought to break away from the world capitalist market, which they considered hostile, and to replace it with their own internal systems of division of labour. Although it is important to note, following Böröcz (1992), that socialist countries always remained economically dependent on the Western bloc and thus did not completely dismantled their economic ties; they nevertheless embodied a large-scale example of withdrawal from the global division of labour. This separation was further reinforced by the Western bloc's significant restrictions on access to technology in the region (Berend, 2009).

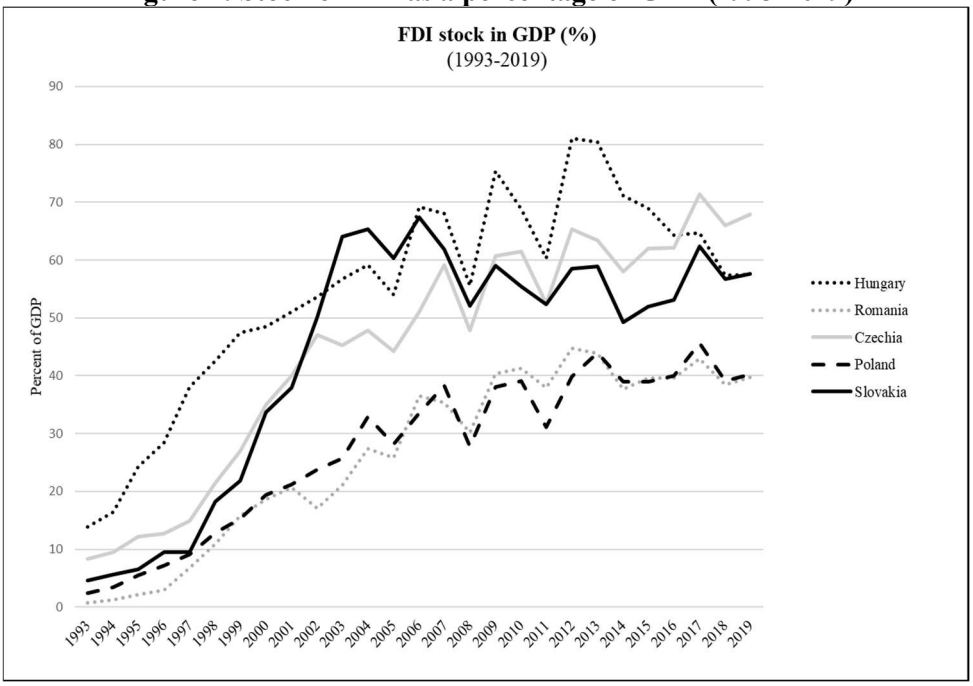
According to Milanovic (2019), the system of 'existing socialism' was an interim phenomenon that dismantled feudalism and laid the foundations for capitalism in peripheral states. Socialism was an alternative route to achieving capitalism, because semi-periphery states could not follow the Western path of development. In this perspective, socialism can be interpreted as a one-sided strategy of self-effort, which attempted to catch up by using instruments of a planned economy. However, the socialist attempt at modernisation was not successful, since, as Kornai (1992) describes, the inefficient mechanisms of the planned economy produced a chronic shortage economy, which clearly underperformed the Western economic system. In that period, therefore, post-socialist countries one-sidedly focused on self-effort by rejecting to participate; therefore, the middle-income trap can be interpreted as an extreme case of the exclusion (i.e. false self-effort) trap. This also means that the results achieved through the planned economy have in fact proved to be uncompetitive in the long run, the main reason for which, according to Kornai (2013), is the lack of innovation, which resulted from the institutional characteristics of the socialist system. Thus, the middle-income trap in this period mainly manifested in a lack of participation and the strategy of self-effort pursued to compensate for the lack of participation by relying on inefficient mechanisms of the planned economy.

However, from the 1970s, the gradual unwinding of the exclusion trap began, culminating in the change of regime, resulting in the final dismantling of the inefficient system of the planned economy. A full participation of post-socialist countries in the global division of labour could be launched. An important element of participation, the economic openness, and thus the unwinding of autarky, had already begun before the change of regime. According to Our World in Data (2023), economic openness (export plus import in GDP) in Romania increased from 5.29% in 1970 to around 39.45% in 1990. And the change of regime further accelerated this process: the average economic openness in the region was around 50.36% in 1990, rising to 96.16% in 2000, 118.63% in 2010, and reaching 139.1% in 2018. This growth was particularly strong in Slovakia, bringing the economic openness to 190.54% in 2018.

However, the transition from a planned economy was not smooth economically, as it led to a transformation crisis in the 1990s, albeit to varying degrees (Kornai, 1994), which triggered a major deindustrialisation process (Lux, 2017). The crisis was accompanied by a huge increase in unemployment and a significant fall in GDP (Kornai, 1994). Therefore, due to these effects, post-socialist countries were put into a difficult situation, which threatened social and economic disaster. Thus, a recovery from the crisis became a key priority for the region. The saviour of the region appeared in the form of foreign direct investment (FDI). For foreign capital, post-socialist countries proved to be an excellent field, owing to their good geographical location and relatively high skill levels, in addition to low wages (Berend, 2009). As Figure 2, based on UNCTAD (2023) data, shows, this process led to a significant increase in the stock of FDI in the region, which can be categorised as part of the participation strategy. While the regional average of FDI stock was around 6% of GDP in 1993, it increased to 51.5% of GDP in 2018. Since the mid-1990s, the stock of FDI has grown particularly fast in Hungary, reaching 81% of GDP in 2011. This level was followed, somewhat later, by an increase in the stock of FDI in the Czech Republic and Slovakia. Thus, the years following the change of regime witnessed a significant inflow of foreign capital into the region, which enabled a significant reindustrialisation from 1995 onwards (Lux, 2017).

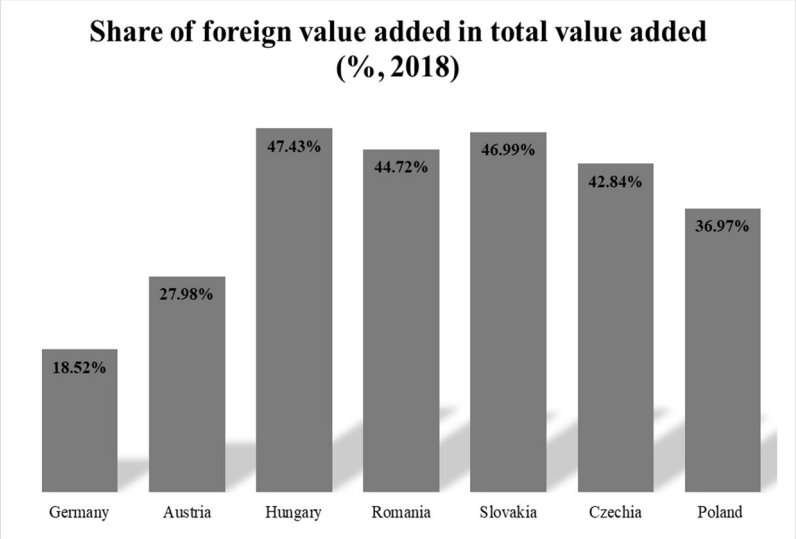
The growth in the stock of FDI in the region has been accompanied by a gradual increase in participation in global value chains. Based on World Bank data (2023), the share of GVC-related trade in the region's total trade volume averaged less than 40% in 1995 (37,02%), but rose to more than 55% in 2018 (55,16%). Of course, there were significant regional differences, with the share in Hungary reaching 60.25% in 2018 and in Romania increasing from 31.41% in 1995 to 43.16% in 2018. Thus, the strengthening of the participation strategy provided an opportunity for the countries of the region to become involved in global value chains as a result of the globalisation process that unfolded in the 1990s. As a result, there has been a specialisation in manufacturing activities (Lux, 2017). Studies on global value chains confirm this specialisation in manufacturing, with Kordalska and Olczyk (2023) arguing that Central and Eastern European countries have become 'factory economies' as opposed to Western European 'headquarters economies'.

Figure 2: Stock of FDI as a percentage of GDP (1993-2019)



Source: UNCTAD (2023)

Figure 3: Share of foreign value added (2018)

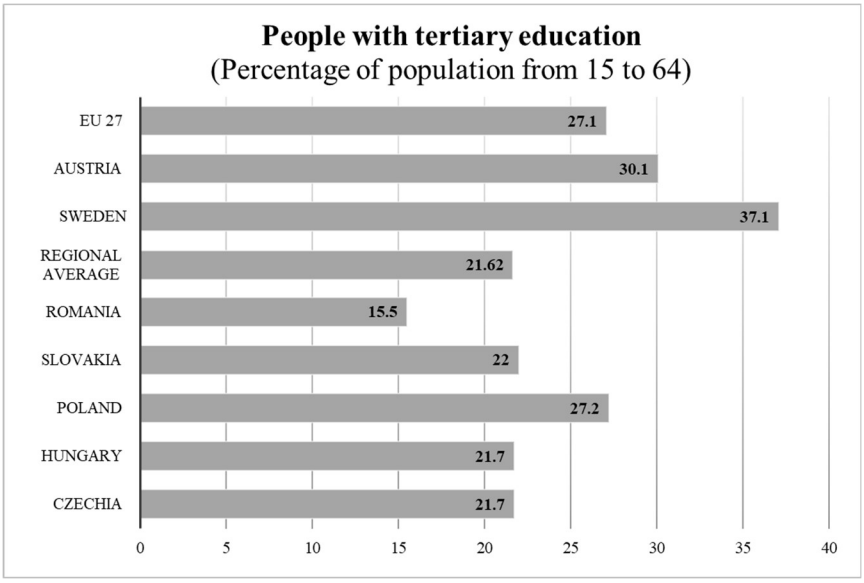


Source: Eurostat (2023a)

After the change of regime, the success of the participation strategy led to the emergence of a new economic model in post-socialist countries, which replaced the former socialist planned economy and is called in literature, following an influential article by Nölke and Vliegenthart (2009), the dependent market economy. Under this economic model, the comparative institutional advantage lies in carrying out assembly and manufacturing work and attracting foreign capital related to it. The dependent model is about increasing the benefits of participation, and, therefore, relies heavily on the technologies and knowledge of foreign companies. This is illustrated by the fact that, by 2018, foreign companies produced 44% of the total added value, on average, in the region, and this proportion was particularly high (around 47%) in some countries such as Hungary and Slovakia (Eurostat, 2023a). This reflects an extremely extensive presence of foreign companies in the region, as the proportion is much lower in countries such as Germany and Austria (Figure 3). Despite the emergence of nationalist rhetoric against FDI dependence after the 2008 crisis, economic nationalist governments in East-Central Europe have continued to promote FDI-led growth through EU regional investment aid (Medve-Bálint & Éltető, 2024).

The dependent market economy model is based on a one-sided participation and the neglect of self-effort, and is thus strongly exposed to the middle-income trap (Myant, 2018). The region is built on low-added-value, low-knowledge assembly and standardised tasks (Boda, 2021), and is structured according to the interests of foreign direct investments (FDI) that secure them (Nölke & Vliegenthart, 2009). The model is essentially about attracting foreign capital investments, which leads to the emergence of a competition state. This means that countries compete with each other to create even better conditions for capital inflows, a process resulting in low wages, low taxes and flexible regulations (Drahokoupil & Piasna, 2019). But a negative tax competition makes it difficult to increase government spending on education and R&D, which is an important element of self-effort strategy. The level of funding for these two sub-systems in the region is below that of developed countries based on Eurostat (2023b). In the case of education, the regional average is 4.32% of GDP in 2018, compared to 6.9% in Sweden and 4.8% in Austria. The gap is particularly large in Romania, where only 3.1% of GDP was spent on education in 2018. The gap for R&D is even more dramatic, with the regional average at 0.62% of GDP in 2018, around a third of the level in Sweden and Austria (1.8%).

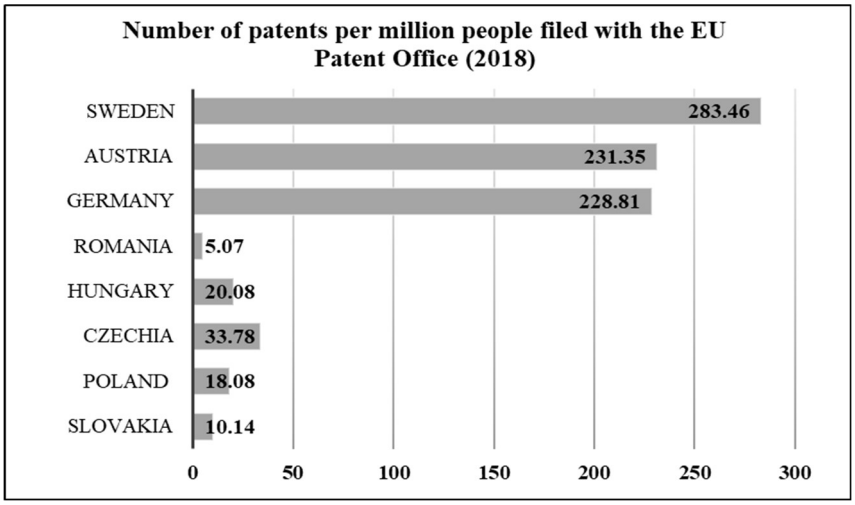
Figure 4: People with tertiary education (2018)



Source: Eurostat (2023c)

The underfunding of education in a competition state leads to skills levels of human capital lagging behind those of developed countries. This is further reinforced by the subordination of education to foreign capital, resulting in a shift towards vocational training to serve assembly factories (Nölke & Vliegenthart, 2009). Furthermore, specialisation in manufacturing does not make citizens interested in developing their human capital, as the sectors dominated by the highest paying foreign capital do not require such high skills. All this leads to a significant gap in terms of human capital in the region. This is shown by the fact that in 2018, the proportion of people with tertiary education in the population was 21.62% on average, with these countries positioned below the EU27 average and well below Sweden's level of over 37% (Eurostat, 2023c). The EU average is exceeded only in Poland as shown in Figure 4. The gap in terms of human capital is also reflected in the fact that in 2018, on average, 17.74% of the employed worked in the most skill-critical technology and science sectors, well below the rates of 24.2% in Austria and 32.3% in Sweden (Eurostat, 2023d). The development of human capital is made even more difficult by the problem of brain drain. The emigration of high-skilled people is reinforced by a dependent market economy model that is based on low wages. Based on the FS brain-drain and emigration index (2023), the region is significantly exposed to brain-drain. In 2018, the region had an average score of 3.6, higher than the score of 1.2 for Austria or Sweden. The Czech Republic is the least exposed to emigration (2.5), while Romania is the most exposed to it (4.2).

Figure 5: Number of patents per million people filed with the EU Patent Office (2018)



Source: Eurostat (2023e)

In a dependent market economy, funding innovation, as well as education, becomes more difficult. This is also attributable to a harmful tax competition, but the phenomenon of duality in economy also plays a role. Foreign companies have their innovation centres in their home countries, so innovation comes from outside. And it is much more profitable for domestic companies to become suppliers to foreign companies, rather than undertaking risky innovation processes by themselves. As a result, the proportion of innovative companies lags significantly behind that of developed countries, with 28.86% of companies, on average, in the region being considered innovative between 2016 and 2018, compared to 62.6% in Austria and 67.8% in Germany (Eurostat, 2023f). The low proportion of innovative firms and economic duality make innovation difficult, and domestic innovation processes become imitating in nature (Nölke & Vliegenthart, 2009). It is no coincidence that the region is among the worst performing Member States in the European Union, according to the European Innovation Framework (2023), which summarises a number of innovation-related indicators (the scale is: 0-1). The region scored an average of 0.3 points in 2018, less than half of Austria's score of 0.64 and Sweden's 0.69. The Czech Republic is the only country where innovation reaches a score of 0.4 The innovation gap is also clearly visible from the number of patents filed with the European Patent Office (Eurostat, 2023e). In 2018, the average number of patents per million people in the region was 17.43, compared to 231.4 in Austria (Figure 5).

Economic duality is also an important phenomenon in the region, which also negatively affects innovation. This duality is reflected in the large labour productivity gap between domestic and foreign firms, which shows the weakness of the domestic economy. Of course, large foreign companies are also more efficient than small domestic companies in developed countries, but this duality is prominent in the region, with foreign companies being 2.17 times more productive, on average, than domestic ones in 2018 (Eurostat, 2023a).[1] This duality was strongest in Hungary (2.58), while the ratio was only 1.46 in Austria.

In summary, the dependent market economy model, which evolved after the change of regime, has achieved significant successes in terms of participation strategy, which is reflected in economic openness, large inflows of foreign capital and integration into global value chains. However, the success of the participation strategy does not remedy the fact that the region is lagging behind in terms of self-effort, which is also cemented by the institutional characteristics of the dependent market economy model and the structural characteristics of an economy specialised in assembly positions. Based on the model of participation and self-effort, we thus identify the dependent market economy with the vulnerability trap.

5 Conclusion

This study has attempted to reform the mainstream approach to the middle-income trap. By identifying the strategy of participation and self-effort, we have been able to distinguish two distinct types of middle-income traps: the vulnerability trap and the exclusion trap. Our approach provides the missing theoretical foundations of the middle-income trap, and thus goes beyond empirical views of the concept. The model draws attention to the fact that it is not enough to rely on self-effort or participation to catch up, but that it is the consistency of internal efforts and external opportunities that counts, meaning that the model can capture both global circumstances and domestic economic policies. It distinguishes between two types of trap and shows that there is no universal middle-income trap. It also points out that the middle-income trap can manifest itself differently in different historical periods.

The empirical validity of our theoretical model was tested on the case of the East-Central European region. In our analysis, we found that the region has historically been caught in a persistent middle-income trap of varying manifestations. The socialist planned economy was identified as an extreme example of the exclusion trap, which was gradually dismantled from the 1970s onwards. The success of the participation strategy, however, masked the fact that in the meantime sufficient self-effort had not been developed, so that after the regime change the dependent market economy model emerged, which was considered as a form of the vulnerability trap. The main message of this study for the region is that, in order to promote catching-up, it should go beyond the one-sided strategy of participation and find a more harmonious cooperation between participation and self-effort. The critical challenge is how the region can strengthen its strategy of self-effort while maintaining and building on the benefits of the high level of participation achieved. We argue that the key to meeting this challenge is to develop human capital, stimulate innovation, reduce economic duality and create a successful state industrial policy (Ricz, Sallai & Sass, 2023; Trautmann & Vida, 2021).

[1] Here, the regional average excludes Poland. Data for Poland could distort the results because of the difference in methodology.

Our study offers many opportunities for further research. The application of the model of participation and self-effort is justified in regions other than East Central Europe, and it may also be worthwhile to link it to historical phases in the world economy. Furthermore, East-Central Europe is worthy of further analysis, including the mapping of regional diversity in terms of participation and self-effort.

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Annexes - Table 1: Indicators of participation and self-effort, description of indicators, and sources of data

	Related	Indicator	Description	Source
Participation	Economic opennes	**Trade Opennes**	The sum of a country's exports and imports as a share of that country's GDP (in %).	Our World in Data. (2023) Trade openness (1950-2019). available at: https://ourworldindata.org/grapher/trade-openness?time=earliest, accessed 27 April 2023.
	Integration into the global value chains	**GVC related trade**	GVC related trade in total trade (%)	World Bank. (2023) GVC related trade % gross trade (calculated based on Tiva). GVC Trade Table. World Integrated Trade Solution. available at: https://wits.worldbank.org/gvc/gvc-trade-table.html, accessed 28 April 2023.
	Inflows of foreign capital	**FDI Stock**	FDI Stock in % of GDP	UNCTAD. (2023) Foreign direct investment: Inward and outward flows and stock, annual. available at: https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx, accessed 28 April 2023.
		Foreign value added	Share of foreign value added in total value added (%)	Eurostat. (2023a) Foreign control of enterprises by economic activity and a selection of controlling countries (from 2008 onwards). available at: https://ec.europa.eu/eurostat/databrowser/view/FATS_G1A_08/default/table?lang=en, accessed 28 April 2023.
Self-effort	Human capital and innovation	**Education and R+D expenditures**	Expenditure as a percentage of GDP	Eurostat. (2023b) General government expenditure by function (COFOG). available at: https://ec.europa.eu/eurostat/databrowser/view/GOV_10A_EXP/default/table?lang=en, accessed 28 April 2023.
	Human capital	**People with tertiary education**	Percentage of total population (15-64)	Eurostat. (2023c) Population by educational attainment level, sex and age (%) - main indicators. available at: https://ec.europa.eu/eurostat/databrowser/view/EDAT_LFSE_03/default/table?lang=en, accessed 28 April 2023.
		Persons employed in science and technology	Percentage of total population (15-74)	Eurostat. (2023d) HRST by category, sex and age. available at: https://ec.europa.eu/eurostat/databrowser/view/HRST_ST_NCAT/default/table?lang=en , accessed 28 April 2023.
		Human Flight and Brain Drain Index	Index point (the lower the better)	Fragile State Index (2023)
	Innovation	**EU Innovation Scoreboard**	Summary Innovation Index	EIS. (2023) European innovation scoreboard. available at: https://research-and-innovation.ec.europa.eu/statistics/performance-indicators/european-innovation-scoreboard_en , accessed 18 March 2023.
		Patent applications to the EPO	Per million inhabitants	Eurostat. (2023e) Patent applications to the EPO by country of applicants and inventors (2004 and onwards; source: EPO) available at: https://ec.europa.eu/eurostat/databrowser/view/PAT_EP_TOT/default/table?lang=en, accessed 28 April 2023.
		Enterprises with innovation activities	Percentage of all enterprises	Eurostat. (2023f) Enterprises with innovation activities during 2016 and 2018 by NACE Rev. 2 activity and size class. Community innovation survey. available at: https://ec.europa.eu/eurostat/databrowser/view/INN_CIS11_INACT/default/table?lang=en, 29 April 2023.
	Economic duality	**Economic duality**	Labour productivity of foreign companies compared to domestic companies	Eurostat. (2023a) Foreign control of enterprises by economic activity and a selection of controlling countries (from 2008 onwards). available at: https://ec.europa.eu/eurostat/databrowser/view/FATS_G1A_08/default/table?lang=en, accessed 28 April 2023.

Source: own elaboration