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EU industrial policy and convergent development in EU peripheries: an assessment of the IPCEI template

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Abstract

Industrial policy has been enjoying a significant comeback. In the European Union (EU), ‘important projects of common European interest’ (IPCEIs) have become a template for a new, value chain-oriented EU industrial policy. But what does this mean for convergence between ‘peripheral’ and ‘core’ member states? Based on the understanding that convergent development requires opportunities for ‘learning in production’ to accumulate the technological capabilities which are necessary for economic upgrading within value chains, this paper advances an in-depth analysis of the implementation of this EU industrial policy template. It argues that IPCEIs have so far offered peripheral countries and their firms few opportunities for learning in production within value chains. In this light, there is a risk that IPCEIs might have limited or even detrimental effects on the prospects for convergence within the EU. The paper concludes by considering how this template could be made more conducive to convergent development.

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Introduction

Industrial policy has been enjoying a significant comeback internationally over the last decade (UNCTAD 2018; Juhász et al. 2022; Alami and Dixon 2023). The European Union (EU) is no exception to this wider trend. Not long ago the supranational infrastructure of the EU was regarded mostly a source of constraints on national governments' ability to conduct industrial policy, especially because of EU state aid rules (Buch-Hansen and Wigger 2010, 2011; Clift 2013; Thatcher 2013). In stark contrast, the EU is now increasingly regarded as a locus of industrial policy (Wigger 2023). There has been a shift, as Di Carlo and Schmitz (2023: 2066) put it, 'from industrial policy in the EU to EU industrial policy'. One of central features of this shift has been the emergence of 'important projects of common European interest' (henceforth, IPCEIs) as a new template for EU industrial policy (Di Carlo and Schmitz 2023; McNamara 2023; Lavery 2024).

Although references to IPCEIs in EU state aid rules can be traced back to the 1957 Treaty of Rome, in practice they remained dormant for the first six decades of European integration. Since 2018, however, eight IPCEIs have been launched across four industrial sectors (electric-vehicle batteries, cloud and edge computing, hydrogen, and microelectronics), involving almost €35 billion of subsidies from 22 different EU member states and an additional private investment of over €55 billion from 224 participating firms (see Table 1). In the last five years especially, IPCEIs have consolidated their position as a template for a value chain-oriented EU industrial policy (European Commission 2017, 2018a, 2021d; Strategic Forum for Important Projects of Common European Interest 2019). This has concomitantly turned them into a source of contestation among EU member states. Some national governments have raised concerns that a 'proliferation of IPCEIs' might risk 'widening the economic disparities between Member States', 'increasing national debt levels', or 'lead to a less dynamic and less competitive economy' (Czech Republic et al. 2021).

In the literature, IPCEIs have just begun to attract the attention of political economists (Schneider 2023; Lavery 2024) and EU scholars (Di Carlo and Schmitz 2023; McNamara 2023). The focus so far has been either on explaining these policy changes or unpacking their implications for our understanding of the position of the EU as a regional bloc in a turbulent world economy. There has been no work yet looking at the ways in which IPCEIs interact with the prospects for convergent development in EU peripheries. This seems particularly relevant – not only in light of the aforementioned criticisms, but especially because of the EU's mixed record in this domain over the last two decades (see, e.g., Reinert 2013; Johnston

and Regan 2016; Bohle 2018; Vukov 2023). This paper contributes to fill this gap by assessing the potential implications of IPCEIs for convergent development in the EU peripheries. For the sake of clarity and to avoid drawing arbitrary boundaries, the term ‘EU peripheries’ is used here to refer to the fifteen member states which belong to the ‘Cohesion Group’¹: Bulgaria, Croatia, Cyprus, Czechia, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia, and Slovenia.

This paper argues that IPCEIs have so far offered peripheral countries and their firms few opportunities for learning in production within the prioritised value chains and that this can be attributed at least in part to the nature of IPCEIs, particularly the high degree of innovativeness which have come to define them. The implication is that, if current patterns continue to hold, there is a risk that IPCEIs might have a limited or even detrimental effect on the prospects for convergent development in EU peripheries. Admittedly, peripheral countries may also benefit from IPCEIs, even *in absentia*, through potential spillover effects. However, these are likely to be unevenly distributed too.

This paper is structured as follows. The first section offers a theoretical discussion of the prospects for, and exigencies of, convergent development. The second section outlines the main characteristics of IPCEIs as a template for EU industrial policy. The third section maps the uneven geographies of national participation in IPCEIs. The fourth section discusses the potential implications of this template for the development prospects of EU peripheries. The last section summarises the argument and considers possible improvements to the IPCEI template.

Theorising convergent development

The consequences of European integration for the developmental prospects of the different participating countries began to attract scholarly attention as soon as the integration process expanded beyond its six founders (Landesmann 2019; Simonazzi 2020). However, in the decade that followed the outbreak of the euro crisis, these discussions were forcefully reinvigorated. The euro crisis offered evidence of the development of a profound chasm between a Northern core (typified by Germany) and a Southern periphery (typified by Greece and Portugal, and sometimes Spain and Italy too), with the latter group experiencing lower productivity growth, premature deindustrialisation, and foreign indebtedness (Flassbeck and Lapavistas 2015; Johnston and Regan 2016; Simonazzi 2020). In turn, in the EU’s eastern

¹ https://ec.europa.eu/regional_policy/funding/cohesion-fund_en (accessed: 28/12/2023)

peripheries, despite the association between European integration and fast income growth (Medve-Bálint and Šćepanović 2020; Vukov 2023), the developmental prospects of these countries beyond a ‘middle-income trap’ and the long-term viability of their respective growth models also became a matter of debate in the literature (Nölke and Vliegenthart 2009; Bohle 2018; Pavlínek 2018; Bohle and Regan 2022).

Economic development is a process of structural transformation. Although it can be quantitatively captured as income and productivity growth, it fundamentally involves a qualitative shift towards the growing incorporation of knowledge and technology into production. Whereas low-productivity activities are associated with unskilled labour, rudimentary machinery, and simple products, high-productivity ones are associated with skilled labour, technological sophistication, and complex products (Amsden 2001; Reinert 2007; Kozul-Wright and Fortunato 2020). Historically, for most countries but especially for catching-up developers, this process of structural transformation has been far from automatic, requiring proactive industrial policies to channel resources to new activities and to nurture knowledge generation, skill formation, and technological upgrading (Amsden 2001; Chang 2003; Reinert 2007). The convergent development of EU peripheries is, thus, by no means a foregone conclusion.

Crucially, although economic development involves the growing incorporation of knowledge and technology into production, technological innovation and knowledge generation are materially embedded in concrete and activity-specific production processes (Reinert 2007; Chang and Andreoni 2020). This means that the accumulation of technological capabilities cannot outpace the very process of structural transformation. Countries whose productive structures are characterised by a lower prevalence of high-technology industries and knowledge-intensive services can also be expected to display lower technological capabilities as measured by conventional proxies such as research and development (R&D) spending or patent applications. Yet, unless productive structures are transformed, the accumulation of technological capabilities is likely to falter (Mamede 2017). Productive capacity in high-technology industries and knowledge-intensive services needs to be built before technological capabilities can be further developed (Reinert 2007, 2013). In other words, convergent development requires ‘learning in production’ (Chang and Andreoni 2020).

Owing to profound transformations in the geographical structure of industrial production over the last four decades or so (Gereffi 2014), it is within global value chains (or global production networks) that the prospects for convergent development and learning in

production must be understood today. Indeed, as Milberg and Winkler (2013: 278-279) note, ‘economic development is now closely tied to a nation’s industries’ ability to successfully enter these networks, to become a supplier in the supply chain, and then to “move up” into higher value added activities within the chain’. On the one hand, participation in global value chains exposes domestic firms to the demanding standards of global clients and suppliers and, therefore, offers them an opportunity to learn in production (Kozul-Wright and Fortunato 2020). On the other hand, the hierarchical structure of global value chains, particularly the dominant position of core countries’ lead firms therein, entails that the process of upgrading in the peripheries is unlikely to happen spontaneously (Milberg and Winkler 2013; Chang and Andreoni 2020). Moreover, without the prospect of upgrading, the developmental benefits of participating in global value chains may wear off relatively soon (Milberg and Winkler 2013; Kaplinsky and Morris 2016).

Against this background, convergent development in peripheral economies requires state action to facilitate participation in global value chains but also to support upgrading – namely, adopting more sophisticated production processes, developing differentiated products, or assuming harder-to-replicate functions within the same value chain, typically in the intangible areas of design, marketing, and branding – so as to enable domestic firms to capture a growing share of the value added along the chain (Gereffi and Sturgeon 2013; Kaplinsky and Morris 2016; Yeung 2016; Kozul-Wright and Fortunato 2020). Similarly important for convergent development is the ‘thickening’ of domestic linkages around the firms which are connected to global value chains in order to ensure that the learning in production that occurs from participating in them (whether in the form of new know-how or in the form of foreign technology transfer) is not circumscribed to export-processing enclaves but, instead, is widely shared across the whole economy (Kaplinsky and Morris 2016; Kozul-Wright and Fortunato 2020). In sum, in the context of fragmented international production, the prospects for convergent development in peripheral countries depend on their ability to adopt industrial policies that promote value chain participation, thickening, and upgrading to, respectively, enable, disseminate, and capitalise on the process of learning in production.

IPCEI as state aid framework and industrial policy template

Within the EU, the practice of industrial policy by national governments is constrained by EU competition rules and, in particular, state aid control (Buch-Hansen and Wigger 2011; Clift 2013; Kassim and Lyons 2013). EU state aid rules have been a central feature of European integration since the Treaty of Rome. Yet, the relationship between industrial

policy practice and state aid control in the EU is nuanced and evolving (Blauberger 2009; Buch-Hansen and Wigger 2010, 2011; Kassim and Lyons 2013; Schneider 2023). EU treaties prohibit state aid but also identify a series of possible exemptions from that general prohibition – for instance, ‘aid to promote the economic development of areas where the standard of living is abnormally low or where there is serious underemployment’, ‘aid to promote the execution of an important project of common European interest or to remedy a serious disturbance in the economy of a Member State’, or ‘aid to facilitate the development of certain economic activities or of certain economic areas’ (Davies 2013; Thatcher 2013). The conditions under which subsidies may actually qualify for any of these possible exemptions are not defined in the treaties, however. They are defined by the European Commission through the publication (and periodic revision) of state aid ‘frameworks’ or ‘guidelines’, such as those for research and development and innovation (R&D&I), regional aid or, more recently, IPCEIs.

These frameworks provide a list of activities to which governments may award aid, set ceilings on aid intensities (that is, the maximum share of the costs which may be covered by aid), and define a few additional requirements that member states need to observe to persuade the Commission that the subsidy is necessary and proportional and that its effects on market competition are minimised (Davies 2013). Industrial policies which comply with the operational requirements of the frameworks are deemed compatible with state aid rules. Ultimately, these frameworks reflect the Commission’s (evolving) understanding of what constitutes a ‘good subsidy’ (Blauberger 2009) – and, by extension, what constitutes ‘good’ industrial policy. So, state aid control does not preclude industrial policy in the EU, but it creates a series of different possible templates for ‘good’ industrial policy and demands that national policies conform to the parameters of those templates.

The IPCEI state aid framework operationalised a new template for EU industrial policy. The context behind its creation in 2014 was marked by discussions about the EU’s (in)ability to match the financial incentives that were offered in other regions of the world economy to private investments in building industrial capacity in ‘key enabling technologies’ such as microelectronics (High-Level Expert Group on Key Enabling Technologies 2011: 18, 36-37; European Commission 2014b: 10-12). The framework clarifies the meaning of the concept of ‘important projects of common European interest’ found in EU treaties, enumerates the activities to which member states should be allowed to give aid, and sets additional requirements that these aid measures must observe to be deemed lawful (European Commission 2014a, 2021a).

The framework defines IPCEIs broadly as large, pluri-national investment projects in industry and infrastructure. When it comes to industry, IPCEIs encompass two main activities to which state aid may be offered: R&D&I and the subsequent industrial deployment of new product or process technologies. In turn, the pluri-national dimension of IPCEIs is underscored by three of the framework's requirements. First, for a given project to qualify as an IPCEI, it must involve financing from multiple member states. In the original formulation of the framework, this meant 'normally... more than one' (European Commission 2014a: paragraph 16). After the 2021 revision, this was tightened to 'ordinarily... at least four' (European Commission 2021a: paragraph 16). Second, participating firms are expected to develop collaborations across national borders with other participating firms. Third, IPCEIs are required to generate positive spillovers beyond the participating firms and the financing member states (usually in the form of knowledge spillovers).

In contrast to most state aid frameworks, the IPCEI framework does not impose any aid intensity ceilings. IPCEI aid may cover the full costs of eligible investment projects as long as that is deemed proportional to the 'funding gap' which prevents firms from carrying out the investment without aid (European Commission 2014a, 2021a). Furthermore, because of their pluri-national composition, the expectation of cross-border collaborations between participating firms, and the requirement of wider spillovers, IPCEIs quickly became more than just another state aid framework. They came to be regarded as an instrument tailored to supporting the development of EU value chains in key industrial sectors (European Commission 2017, 2018a, 2021d; Strategic Forum for Important Projects of Common European Interest 2019). Between 2018 and 2023, eight IPCEIs were approved by the European Commission in four different value chains: electric-vehicle batteries, cloud and edge computing, hydrogen, and microelectronics. Overall, they combine €34.8 billion of state aid – mostly in the form of direct grants (European Commission 2018b: 75; 2019a: 45; 2021c: 89; 2023b: 67) – from 22 financing member states (including a small participation from the United Kingdom in 2018) with an additional private investment of €56.8 billion from 224 aid beneficiaries² (Table 1)³.

² The total number of participating firms is lower than the sum of the number of participating firms across the eight IPCEIs because some firms have participated in more than one IPCEI. The same applies to the total number of financing member states.

³ The Commission's IPCEI website (https://competition-policy.ec.europa.eu/state-aid/ipcei/approved-ipceis_en, accessed: 26/3/2024) offers a similar summary table. However, the number of participating firms in Microelectronics I on this table (= 27) is lower than that on the website (= 29). Two participants have been excluded from Table 1 in accordance with the Commission's decision letter on this IPCEI which indicates that

Table 1. Approved IPCEIs

	Year	State aid (€ billion)	Additional private investment (€ billion)	Financing member states	Participating firms
Microelectronics I	2018/2021	1.9	6.5	5	27
Battery I	2019	3.2	5	7	17
Battery II	2021	2.9	9	12	42
Hydrogen I	2022	5.4	8.8	15	35
Hydrogen II	2022	5.2	7	13	29
Microelectronics II	2023	8.1	13.7	14	56
Cloud	2023	1.2	1.4	7	19
Hydrogen III	2024	6.9	5.4	7	32
Total		34.8	56.8	22	224

Source: Author's calculations based on European Commission (2018c, 2019b, 2021f, 2021g, 2022b, 2022c, 2023a, 2023c, 2024).

While still relatively small (but not negligible) in fiscal terms, the consolidation of IPCEIs a template for a new, value chain-oriented EU industrial policy has been accelerating. In the first five years of the framework, it mobilised around €5 billion in aid (for an additional private investment of €12 billion). In the five years that followed, it mobilised almost €30 billion in aid (for an additional private investment of €45 billion). So, an assessment of its potential implications for the possibility of convergent development in the EU peripheries is warranted. Yet, before this assessment can be made, one question must be addressed: going beyond the aggregate figures, how (un)evenly are EU member states and their companies represented in existing IPCEIs?

Mapping the geographies of IPCEIs

The exercise of mapping the geographies of participation in IPCEIs involves a few methodological choices. Each approved IPCEI is accompanied by a press release and a decision letter from the European Commission. In these documents, there is information about participating firms and financing member states as well as about which firms are receiving aid from which member state. Based on this information, it is possible to compile and analyse data about the national geographies of IPCEI participation. First, it is possible to gauge *how often* firms operating in each member state participate in IPCEIs by looking at the total and relative number of aid awards to firms made by that member state across

CEA-LETI in France and Fondazione Bruno Kessler in Italy are 'research organisations' not firms (nor aid beneficiaries) (European Commission 2018b: paragraphs 244, 249).

existing IPCEIs – for short, that member state’s *participation frequency*. Second, it should be possible to also gauge *how deeply* each member state participates in IPCEIs by looking at the total and relative amount of aid awarded to firms by that member state across IPCEIs – for short, that member state’s *participation depth*.

However, while participation frequency can be calculated based on available information, the analysis of participation depth is limited by some (temporary) data confidentiality issues. The Commission’s press releases stopped disaggregating the total IPCEI aid by financing member after Battery I in 2019. Decision letters disclose this information⁴ but, unlike press releases, are only made available quite some time after the approval of that IPCEI. Currently, decision letters are available for only four out of the total eight IPCEIs: Microelectronics I, Battery I, Battery II, and Cloud. This is not exactly a random sample: these happen to be the four smallest IPCEIs so far in terms of state aid involved, accounting for 26.4% of all IPCEI aid (Table 1). Acknowledging this limitation, this four-IPCEI sample may still be used to obtain information about *subtotal* participation depth.

Table 2. IPCEI participation among EU27 member states

	Total participation frequency		Subtotal participation depth		<i>For reference:</i> Subtotal award share (%)
	Awards to firms	Total award share (%)	Aid amount (€ million)	Subtotal aid share (%)	
Austria	20	7.0	319	2.7	8.0
Belgium	10	3.5	203	1.7	4.4
Bulgaria	-	-	-	-	-
Croatia	1	0.4	123	1.1	0.9
Cyprus	-	-	-	-	-
Czechia	3	1.1	-	-	-
Denmark	2	0.7	-	-	-
Estonia	2	0.7	-	-	-
Finland	11	3.9	45	0.4	6.2
France	38	13.3	1478	12.6	10.6
Germany	85	29.8	6197	53.0	31.0
Greece	6	2.1	123	1.1	0.9
Hungary	2	0.7	67	0.6	1.8
Ireland	1	0.4	-	-	-
Italy	40	14.0	2266	19.4	20.4
Latvia	-	-	-	-	-

⁴ In the Battery II letter, the total aid amount is given as an exact figure but the disaggregated aid amounts by member state are given in the form of intervals (European Commission 2021c: 83). To attribute an exact amount to each member state, interval midpoints were used to estimate the distribution key for the total aid amount.

Lithuania	-	-	-	-	-
Luxembourg	-	-	-	-	-
Malta	1	0.4	-	-	-
Netherlands	14	4.9	61	0.5	0.9
Poland	11	3.9	301	2.6	6.2
Portugal	4	1.4	-	-	-
Romania	3	1.1	-	-	-
Slovakia	10	3.5	172	1.5	2.7
Slovenia	-	-	-	-	-
Spain	18	6.3	202	1.7	4.4
Sweden	3	1.1	134	1.1	1.8
Peripheries	43	15.1	786	6.7	12.4

Source: Author's calculations based on European Commission (2018b, 2018c, 2019a, 2019b, 2021c, 2021f, 2021g, 2022b, 2022c, 2023a, 2023b, 2023c, 2024).

Table 2 shows the results of these calculations⁵. The subtotal award share in the four-IPCEI sample was also included in the last column to show that there might be differences between participation frequency and participation depth and, thus, no indicator can be subsumed under the other. Six EU27 member states have not participated in any IPCEI so far. One member state alone (Germany) accounts for 29.8% of all awards made to firms (total participation frequency) and 53% of all aid awarded within the sample of four IPCEIs for which disaggregated data is available (subtotal participation depth). The fifteen countries of the EU peripheries have a total frequency share of 15.1% and subtotal depth share of 6.7%. Still, EU member states also differ significantly in size and, therefore, different participation shares should be expected based on size differences alone. If Germany represents a sizeable portion of the EU business demography, then it should also be expected to represent a sizeable portion of IPCEI awards. Similarly, if Germany represents a significant portion of total EU nominal gross domestic product (GDP), then it should also be expected to represent a significant portion of IPCEI aid.

Hence, to gauge whether different participation shares signal actual participation imbalances, Table 3 compares each member state's frequency share with their share in the total EU enterprise population and each member state's depth share with their share in total EU GDP. A ratio is calculated to express these imbalances. This ratio helps to clarify that Germany's paramount position within IPCEIs is not just a reflection of the size of its economy. Its

⁵ A small participation from the United Kingdom in Microelectronics I (four awards totalling €48 million in aid) was removed to calculate the award and aid shares for EU27 member states only.

participation frequency share is three times its EU enterprise population share and its subtotal participation depth share is more than twice its EU nominal GDP share. EU peripheries, in turn, are significantly underrepresented in relation to their size: both their frequency and depth ratios are equal to, or lower than, 0.5. Moreover, this underrepresentation in participation frequency and depth applies to all subgroupings within the EU peripheries. Admittedly, underrepresentation is not exclusive to EU peripheries. Spain also appears clearly underrepresented in terms of both total frequency and subtotal depth – but, although it is not part of the Cohesion Group, Spain is often regarded as an EU periphery in the literature too (Vukov 2023; Wigger 2023). There is also evidence of underrepresentation in other non-peripheries when it comes to (subtotal) participation depth (Nordic countries, Benelux, and Ireland)⁶ but not in terms of (total) participation frequency. Unlike these countries, however, EU peripheries appear particularly underrepresented whether one looks at participation frequency or participation depth. This raises concerns about the potential contribution of IPCEIs as an EU industrial policy template to the possibility of convergent development in EU peripheries.

Table 3. Gauging IPCEI participation imbalances

	Total awards share (%)	EU enterprise population share (%)	Total participation frequency ratio	Subtotal aid share (%)	EU GDP share (%)	Subtotal participation depth ratio
Germany	29.8	10.0	3.0	53.0	24.3	2.2
Peripheries	15.1	31.8	0.5	6.7	15.4	0.4
Baltics	0.7	1.8	0.4	0.0	0.9	0.0
CEE	9.1	17.9	0.5	4.6	8.5	0.5
SEE	1.4	4.9	0.3	1.1	2.9	0.4
South	3.9	7.1	0.5	1.1	3.2	0.3
Other (11)	55.1	58.2	0.9	40.3	60.3	0.7
Austria	7.0	1.9	3.7	2.7	2.8	1.0
BNL+IE	8.8	10.5	0.8	2.3	13.0	0.2
France	13.3	15.3	0.9	12.6	16.5	0.8
Italy	14.0	14.2	1.0	19.4	12.3	1.6
Nordics	5.6	5.6	1.0	1.5	8.8	0.2
Spain	6.3	10.8	0.6	1.7	8.6	0.2

Source: Author's calculations based on European Commission (2018b, 2018c, 2019a, 2019b, 2021c, 2021f, 2021g, 2022b, 2022c, 2023a, 2023b, 2023c, 2024) for IPCEI awards and aid

⁶ Note that Ireland, the Netherlands, Spain and the three Nordic countries signed the 'non-paper' raising concerns about the 'proliferation of IPCEIs' alongside five peripheries: Czechia, Latvia, Lithuania, Poland, and Slovakia (Czech Republic et al. 2021).

and Eurostat data for enterprise population [business demography indicators, year: 2021] and nominal gross domestic product (GDP) [year: 2023].

Note: Baltics = Estonia, Latvia, Lithuania; BNL+IE = Belgium, Netherlands, Luxembourg, Ireland; CEE (Central Eastern Europe) = Czechia, Hungary, Poland, Slovakia, Slovenia; Nordics = Denmark, Finland, Sweden; SEE (Southeastern Europe) = Bulgaria, Croatia, Romania; South = Cyprus, Greece, Malta, Portugal.

IPCEIs and EU peripheries

Why are EU peripheries underrepresented in IPCEIs? To be sure, participation in IPCEIs is voluntary and, ultimately, depends on the willingness of the national government of each member state to join any given IPCEI. However, because of the way their very nature is defined in the IPCEI framework, IPCEIs seem less attuned to the technological characteristics of EU peripheries than EU core countries such as Germany. So, part of the reason why EU peripheries are consistently underrepresented in IPCEIs might be attributed to the IPCEI framework. Notably, the framework mostly defines IPCEIs as large and technologically innovative industrial projects comprised of two main activities: R&D&I and the first industrial deployment of new product or process technologies. By explicitly including the first industrial deployment stage in the definition of IPCEIs, this framework does go beyond the R&D&I framework and avoids fully separating innovation from production. However, it places a very strong emphasis on the degree of technological innovation involved. According to the framework, R&D&I activities ‘must be of a major innovative nature or constitute an important added value... in the light of the state of the art in the sector’. First industrial deployment activities must ‘[follow] on from an R&D&I activity’ and ‘allow for the development of a new product or service with high research and innovation content or the deployment of a fundamentally innovative production process’. By contrast, ‘mass production or commercial activities’, ‘regular upgrades... of existing facilities’ or ‘the development of newer versions of existing products’ are explicitly excluded (European Commission 2014a; 2021a: paragraphs 22-24).

Peripheral countries might thus have fewer incentives as well as fewer opportunities to participate in IPCEIs. During the consultation on the revision of the IPCEI framework in 2021, Polish authorities proposed that projects from ‘less developed regions’ should ‘be assessed more favourably’ to ‘ensure the balance of IPCEI participants’, thus ‘better addressing the issue of pan-European interests’. They also requested a clarification of the Commission’s notion of ‘mass production’ in the delimitation of the scope of IPCEIs (Government of Poland 2021). Similarly, the Portuguese authorities noted that the separation

between ‘first industrial deployment’ and ‘mass production’ should be clearly detailed since the exclusion of ‘mass production and commercial activities’ has ‘possible anti-cohesion effects’ (Government of Portugal 2021). On the whole, setting a very high bar for the fundamental innovativeness of the activities which may be funded under an IPCEI generates an intrinsic tendency for peripheral underrepresentation in IPCEIs and, therefore, for IPCEIs having only a limited or even detrimental contribution to convergent development in the peripheries.

To be clear, this does not mean, however, that EU peripheries cannot benefit, *in absentia*, from this new EU industrial policy template in one way or another. The IPCEI framework states that, in order for an investment project to qualify as an IPCEI, its benefits must extend beyond the participating firms and the financing member states. In other words, IPCEIs are required to generate positive spillover effects. In practice, this requirement typically entails commitments by recipient firms to share some of the knowledge generated in the context of the project through publications and conferences, license their newly generated intellectual property (under conventional ‘fair, reasonable, and non-discriminatory conditions’), and grant access to pilot lines to research organisations and small and medium-sized enterprises (under normal commercial conditions) (European Commission 2014a, 2018b, 2019a, 2021a). Although these knowledge-sharing requirements may be relatively soft (and thus relatively weak as an in-built mechanism for convergence), they do open up the possibility of non-participating firms located in non-financing member states also benefiting from IPCEIs indirectly by gaining access to new knowledge outputs which would not have been generated otherwise.

In addition, in more recent IPCEIs, the European Commission began to identify the wider ‘ecosystem’ of firms and research organisations that would be involved in collaborations with participating firms, thus ensuring knowledge spillovers through collaboration. In the context of the Cloud IPCEI, it is expected that ninety ‘indirect participants’ will be involved in collaborations with the nineteen participating (and aid-receiving) firms. Sixteen out of these ninety ‘indirect participants’ are located in peripheries which have not funded this IPCEI: Croatia (1), Latvia (5), and Slovenia (10) (European Commission 2023b: 119-120). Similarly, six out of the thirty-one ‘associated participants’ identified for Microelectronics II are located in non-financing peripheries: Hungary (1), Latvia (1), Portugal (2), and Slovenia (2) (European Commission 2023c). So, there is some scope for outward knowledge spillovers through collaboration too, although (with the exception of Latvia and Slovenia) these subtotal ‘indirect participation’ shares still seem relatively thin.

Besides the knowledge spillovers demanded by the IPCEI framework, IPCEIs might also be claimed to generate benefits beyond those directly involved in them through potential investment spillover effects. If IPCEIs contribute to ‘the development of a new product... or the deployment of a fundamentally innovative production process’ (European Commission 2021a), perhaps new opportunities may then arise for investments along the supply chain. For example, investments in new ‘mass production’ facilities or in ‘regular upgrades’ of the new product and process technologies – which are explicitly kept outside of the list of activities to which state aid may be awarded under an IPCEI but might still be subsequently induced by it. Owing to the cross-border nature of supply chains, the geographical distribution of these investment spillover effects may differ from the national composition of actual IPCEIs. So, a member state that does not participate in IPCEIs might still host subsequent investments from participating firms, their suppliers, or customers, especially when it has strong trade and investment links with participating countries.

Still, when EU peripheries do not participate in IPCEIs themselves, the direction of potential spillovers will depend on the structure of existing trade and investment links between participating and non-participating countries. As seen in the previous section, a significant share of IPCEI activity so far has been concentrated in Germany. Assuming this pattern continues to hold, the likelihood and magnitude of investment spillovers will be higher in peripheral economies which are more closely integrated into the production networks of German firms. In other words, peripheral growth models which are more integrated into German production productive networks are more adaptive to a Germany-led EU industrial policy. More than in any other EU periphery, integration into German value chains has become a distinctive feature of the growth model of the four Visegrád countries – Czechia, Hungary, Poland, and Slovakia (Nölke and Vliegenthart 2009; Bohle 2018). The foreign direct investment and intra-value chain trade networks formed between these four countries and Germany (and sometimes Austria and Slovenia too) have been described as the ‘Central European manufacturing core’ (Stehrer and Stöllinger 2015). Moreover, the two industries which stand out in this relationship – the transport equipment industry and the electronic equipment industry (Stehrer and Stöllinger 2015) – have both been supported by IPCEIs – the two Battery IPCEIs and the two Microelectronics IPCEIs, respectively.

So, while it might still be early to track and measure spillovers stemming from IPCEIs systematically, it is not unreasonable to infer that if there are any potential investment spillovers accruing to EU peripheries from IPCEIs where Germany predominates and peripheral countries are underrepresented, these spillovers seem more likely to occur through

already-existing trade and investment channels. That is, they are more likely to occur in the Visegrád countries than in other EU peripheries. For example, despite not having participated as a financing member state in any of the two Battery IPCEIs, Hungary has recently attracted – sometimes with aid awarded under the regional aid guidelines – several investments from South Korean manufacturers (namely, Samsung and the SK group) that supply batteries to German lead firms in the automotive sector such as BMW or Volkswagen (European Commission 2019c, 2021e, 2022a; Reuters 2019; electrive.com 2021; InnoEnergy 2021)⁷. Furthermore, BMW, which joined the two Battery IPCEIs as a beneficiary of German state aid in 2019 and 2021 (European Commission 2019b, 2021f), announced in 2022 an investment in a new battery assembly plant in Hungary (BMW 2022). Unless the uneven participation of EU peripheries in IPCEIs is remedied (or compensated by other policy instruments), the potential contribution of this new EU industrial policy template to convergent development will be indirect, at best, and will likely reflect and reinforce existing trade and investment links between Germany and some EU peripheries.

Conclusion

It is increasingly recognised in the literature that a changing geopolitical and geoeconomic context – characterised, not least, by the reinvigoration of industrial policy in the United States and China – has been driving contemporary policy shifts in the EU (Lavery 2024). IPCEIs are a clear example of these shifts. Dormant in EU treaties for the first sixty years of European integration, they have now been quickly establishing themselves as a template for a new, value chain-oriented EU industrial policy in a changing global political economy. The looming, but still largely neglected question is what are the implications of these shifts for the economic asymmetries that persist among EU member states?

Motivated by this question, this paper has advanced an in-depth analysis of IPCEIs. It argues that this new EU industrial policy template has so far offered peripheral countries and their firms few opportunities for learning in production. Although it could offer firms in peripheral economies an entry point into EU value chains, the demanding requirements it imposes on investment projects in terms of their fundamental innovativeness act as a deterrent to a greater participation of peripheral countries in IPCEIs. In this light, there is a risk that IPCEIs might have limited or even detrimental effects on the prospects for

⁷ As this brief illustration suggests, there is scope for a comparative political economy research agenda into the relative costs and benefits of participating in or, instead, free riding on IPCEIs across different EU member states.

convergence within the EU. The potential benefits of IPCEIs to the peripheries are mostly indirect and deferred, taking the form of knowledge or investment spillovers, and dependent on pre-existing productive integration into Germany-centred value chains. Deploying the analytical tools of comparative political economy and economic geography, future research could complement the analysis of this paper by exploring in more detail these dynamics of IPCEI participation and spillovers along the different sectoral value chains prioritised by IPCEIs and across different geographies, growth models, and institutional varieties of capitalism.

Different policy avenues might be pursued to make IPCEIs more conducive to the development of EU peripheries. One possibility would be for the IPCEI framework to borrow some inspiration from the regional aid guidelines. In the latter, aid ceilings vary according to the relative income level of the subnational regions where aid-supported investments take place (European Commission 2021b). A similar logic could be imported into the IPCEI framework without lowering existing ceilings. For example, the list of activities to which aid could be awarded under an IPCEI could vary according to the income level of the (sub)national region where that investment will take place. Investments in mass production facilities or commercial activities would remain outside the scope of IPCEI aid in the richest regions but not in relatively poorer ones.

An alternative possibility would be to preserve the demanding innovativeness requirements of the IPCEI framework but improve the articulation between this template and EU cohesion policy. In this case, instead of relying on an expanded instrument to address the whole value chain, IPCEIs would remain a tool to support developments at the technological frontier and cohesion policy would start where IPCEI aid ends – thus ensuring a continuum of variegated policy interventions across the value chains prioritised by IPCEIs⁸. There is some evidence of progress in this direction with growing references to the wider ‘IPCEI ecosystems’ that extend beyond their ‘direct participants’ (European Commission 2023a, 2023c).

EU industrial policies should be attentive and adaptive to the different needs of member states at different stages of their development processes. Either through an expanded framework or through better articulation with cohesion policy, additional opportunities can be created for EU peripheries to learn in production within EU value chains and build up

⁸ I am thankful to one anonymous reviewer for this suggestion.

the necessary technological capabilities to upgrade their positions within those value chains over time.

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