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Reinforcing Europe's core: The EU's new industrial policy and the case of semiconductors

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Abstract
The idea that European capitalism is divided between an export-led northern 'core' and a debt-led southern 'periphery' became a dominant theme in the political economy literature in the wake of the Eurozone crisis. Over the past decade, European elites have embraced a range of industrial policy instruments that seek to shore up the position of European industry in high-tech sectors. To what extent does this new EU industrial policy disrupt or reinforce long-standing core-periphery relations in Europe? In this paper, we focus on two flagship industrial policy instruments which seek to channel subsidies to the EU's semiconductor sector. Advancing new quantitative data on state aid and private investment associated with these instruments, we show that the EU's subsidy regime for semiconductors has reinforced long-standing core-periphery relations in Europe but in a new form and under a new set of international conditions.

Keywords
Industrial policy, European Union, economic geography, semiconductors, important projects of common European interest, core-periphery relations, world systems theory

Introduction

In the wake of the Eurozone crisis, the idea that the EU was underpinned by a deeply divided economic geography became a central theme within the European political economy literature (Dooley, 2018; Johnston, 2016; Stadheim, 2023; Stockhammer, 2016). At the 'core' of the Eurozone lay the export-led states, led most notably by Germany, with their competitive labour market regimes, low inflation, and large current account surpluses (Flassbeck and Lapavitsas,

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2015). Semi-peripheral states within Central and Eastern Europe were subordinately integrated into this German-centred production platform, specializing in low value-added tasks for large multinationals (Bohle and Greskovits, 2012; Pavlinek, 2024). In Southern Europe, a range of member states – particularly Portugal, Ireland, Italy, Greece, and Spain – were classified as the Eurozone's debt-led 'periphery', dependent upon easy access to credit and consumption-led growth (Brustz and Vukov, 2024). For many scholars, the EU's 'core-periphery' structure was likely to persist and intensify in the period following the Eurozone crisis (Offe, 2015; Streeck, 2014).

One of the key features of the core-periphery perspective is its emphasis on the internal drivers of economic divergence within Europe. Rather than generating convergence on one model of capitalism, the EU's macroeconomic framework – the euro, tight fiscal rules, and the competitive rigours of the Single Market – would relentlessly generate divergences between distinct national growth models (Baccaro and Pontusson, 2016; Streeck, 2014). The question of how external factors – in particular wider shifts in the global economy and international state system – might interact with the Eurozone's 'internal' divergences slipped into the background. In the present context, this lacuna is wider than ever. The world economy has undergone a period of sustained turbulence over the past decade, exemplified by the ongoing rise of China, protectionist turns in the US, as well as escalating pressures on the neoliberal model of globalization that dominated in the 1990s and 2000s (Ryner and Cafruny, 2016). This changed global context has provoked interventionist responses on the part of EU policymakers, notably in the form of attempts by EU officials to develop trade and industrial policies that insulate European capitalism from international competition (Lavery, 2024; McNamara, 2024).

The centrepiece of the EU's response has been the development of a new industrial policy, which involves the relaxation of state aid regulations, support for large-scale subsidies, and the creation of new pan-European industrial policy instruments such as 'Important Projects of Common European Interest' (IPCEIs) (Bulfone et al., 2024; Di Carlo and Schmitz, 2023; Lepont and Thiemann, 2024). While EU officials argue that these shifts are crucial to sustaining the EU's competitiveness in the face of external challenges, the plethora of instruments associated with the EU's new industrial policy have the potential to exacerbate internal asymmetries within European capitalism. Member states at the 'core' of the European economy, with higher levels of prior technological development, greater fiscal firepower, and more sophisticated state capacity, could leverage the EU's new industrial policy to reinforce their already dominant positions, while peripheral member states lower down the value chain run the risk of exclusion (Lopes-Valença, 2024; Wigger, 2023). In this paper, we engage this issue directly, by seeking to answer the following research question: 'to what extent does the EU's new industrial policy disrupt or reinforce old core-periphery relations in Europe'?

Our empirical analysis focuses on a sector that has become a central focus of new industrial policy efforts in the EU and beyond: the semiconductor or 'chips' sector. Semiconductors embody a critical technology in the contemporary world economy. The so-called 'chip wars' have become one of the principal axes in the technological and geopolitical rivalry between the US and China (Malkin and He, 2024; Miller, 2023). Europe, too, has become deeply entangled in this conflict (Germann et al., 2024; Schmitz et al., 2025). We focus on two flagship EU industrial policy instruments that seek to channel subsidies to Europe's semiconductor base: the 'Important Projects of Common European Interest' in microelectronics (IPCEI-ME) and the 'first-of-a-kind' state aid subsidies enabled by the EU Chips Act. Originally buried as a provision in the 1957 Treaty of Rome, the IPCEI framework became re-mobilized in 2014, as Commission officials sought to encourage pan-European collaboration in key strategic sectors. Focussing on the IPCEI-ME, launched in 2018, we assess the distributional allocation of state aid and private investment associated with this instrument across member states. We then examine the state aids and private investments directed at the

semiconductor sector under the 'first-of-a-kind' framework that took shape under the 2022 EU Chips Act.

Our findings reveal a triadic economic geography that underpins the EU's new industrial policy in the sphere of semiconductors, encompassing a reinforcement of the EU's northern core, an exclusion of wide swathes of the EU's southern periphery, and a partial but subordinate participation of selected semi-peripheral central eastern European (CEE) states that are integrated into German supply chains. The ability to subsidize 'strategic' high-technology sectors, such as semiconductors, is not evenly distributed across the EU's member states. On the contrary, 'core' states with pre-existing competitive advantages are more able to participate in the new subsidy regime. Thus, drawing together two previously unconnected literature – the 'core-periphery' perspective and the emerging literature on the EU's new industrial policy – we argue that EU industrial policy interventions reinforce old European divergences but in a new form and under a new set of international conditions.

The paper proceeds as follows. The first section revisits the original core-periphery literature, identifying four mechanisms – stratification, relationality, path dependence, and hegemony – that have reproduced an uneven economic geography in the EU historically. The second section introduces the EU's new industrial policy in the field of semiconductors, which emerged in response to a series of external shifts in the wider world economy that have compelled European elites to embrace new forms of state interventionism. The third section outlines our methodology, in particular the quantitative indicators we build to map the geographical distribution of state aid and total investment associated with these new industrial policy instruments. The fourth and fifth sections advance our key empirical data, applying these quantitative indicators to the IPCEI-ME and the more recent 'first-of-a-kind' instrument associated with the EU Chips Act. The sixth section then draws the empirical and theoretical sections together, making the case that the EU's new industrial policy in the field of semiconductors reinforces old divergences within European capitalism but in a new form and under a novel set of international conditions.

Europe's 'core' and 'periphery' revisited

The idea that European integration would support an upwards convergence between member states has been an enduring theme within EU policymaking circles. Upon signing the Maastricht Treaty, member states resolved 'to achieve the strengthening and the convergence of their economies', by securing a 'high degree of convergence of economic performance' (TEU, 1992). The competitive rigours of the Single Market, combined with EU structural funds and other forms of regional aid, would facilitate the catch-up of laggard member states with the advanced European economies. During the boom years of the late 1990s and 2000s, there did appear to be considerable progress in this regard. Some commentators even described the EU as a 'convergence machine', presenting an image of an economic bloc which, because of extensive trade and financial liberalization, had successfully driven up the per capita incomes of its laggard regions to a greater degree than any other region of the world economy (Gill and Raiser, 2012). However, in the wake of the 2008 financial crash and the Eurozone crisis, it became apparent that the long upwards convergence between member states rested upon shaky foundations. Intra-European credit lines dried up, asset bubbles burst, and public debt levels spiked, generating new patterns of divergence within the Eurozone (Dauderstadt, 2014). Unemployment in Italy and Spain rose; Greek debt spiralled; Portugal, Ireland, and other member states were placed on strict conditionality programmes (Flassbeck and Lapavitsas, 2015). Germany, on the other hand, consolidated its position as the export-led

powerhouse of the EU (Kundnani, 2015). The EU's 'convergence machine' appeared to have gone into reverse, as stark new stratifications crystallized within European capitalism.

In this context, a new literature took shape that foregrounded sharpening divergences within the EU: the 'core-periphery' perspective (Becker et al., 2015; Dooley, 2018; Flassbeck and Lapavitsas, 2015; Johnston, 2016; Parker and Tsarouhas, 2018; Stadheim, 2023; Streeck, 2014). Although this literature encompasses a range of approaches, the central concept which it is built around – the distinction between a European 'core' and 'periphery' – draws, albeit often implicitly, on the work of Immanuel Wallerstein and others in the world systems theory (WST) tradition (Parker and Tsarouhas, 2018; Silver, 1995; Wallerstein, 2011). It is worth briefly rehearsing some of the key principles of WST before considering how these have been applied to the European context. WST is underpinned by four key observations. First, the world economy is stratified along three key levels. An advanced 'core' is characterized by concentration of firms that specialize in high-end economic activities, producing high barriers to entry to rival competitors. A subordinate 'periphery' focuses on lower-value added economic activities which complements the dominant position of the core. A hybrid 'semi-periphery' sits somewhere between the two, encompassing some limited islands of high-end economic activity but within a wider context of lower-value added production (Wallerstein, 1976). Second, WST adopts a relational perspective that insists that the component elements of the world economy do not operate in isolation from each other but are mutually dependent: the 'core' sources key inputs such as raw materials and cheap labour inputs from the 'periphery' while key social forces within the periphery become entangled within this relation of mutual dependency. Third, these complementary relations tend to endure over time, meaning there is a marked path dependence in the underlying relations between the component parts of the world economy. Fourth, social and political forces concentrated within the 'core' of the world economy perform a key function in maintaining and extending this asymmetric system, exercising a form of hegemony over the world system (Arrighi, 1994).

The four mechanisms of WST align closely with various applications of the 'core-periphery' lens to the European context. In terms of stratification, core-periphery scholars argue that European capitalism is marked by a series of stark internal divergences. The 'growth model' perspective, for example, focuses on the structural differences between export-led and debt-led growth models within the Eurozone's northern 'core' and southern 'periphery', respectively (Baccaro and Pontusson, 2016; Stockhammer, 2016). In terms of relationality, core-periphery perspectives draw attention to how economies at the 'core' of European capitalism directly benefit from deflationary measures in the Eurozone's periphery, for example, via access to cheap production platforms and an under-valued euro (Germann, 2018; Offe, 2015). In terms of path dependence, core-periphery scholars emphasize how the EU's macroeconomic regime entrenches the power of the core whilst foreclosing key pathways for development for the Eurozone's periphery, for example, through restricting the scope for fiscal activism and alternative economic strategies (Becker et al., 2015; Streeck, 2014). In terms of the question of hegemony, core-periphery scholars illuminate the critical role of the German state and capital in maintaining the disciplinary macroeconomic conditions of the Eurozone whilst exporting a wider logic of austerity to neighbouring countries (Flassbeck and Lapavitsas, 2015; Kundnani, 2015).

While the core-periphery perspective within European political economy generates key insights, the perspective also adopts an internalist lens that potentially limits its explanatory potential in the present context. This works on two levels. First, the core-periphery lens within European political economy attaches a methodological primacy to the national level, emphasizing how domestic institutional contexts and economic structures give rise to divergent developmental outcomes over time (Bulmer and Joseph, 2016). Second, the core-periphery lens takes European

integration – particularly the Single Market, the euro, and attendant processes of 'Europeanisation' – as the critical background condition that foments divergences between the Eurozone's 'core' and 'periphery' (Dooley, 2018). In this picture, the wider global context within which both member state growth models and European integration are embedded often recedes into the background. This raises a series of analytical challenges in the present context. In particular, this 'internalist' lens runs this risk of missing the ways in which 'external' global shifts *interact* with the 'internal' dynamics of European core-periphery relations. Bridging this analytical gap is critical in the present context.

Over the past decade, numerous states across the world economy have re-discovered the tools of industrial policy, exemplified by new patterns of interventionism in the US, China, and further afield (Aiginger and Rodrik, 2020; Bulfone, 2023). Europe too has become entangled in this industrial policy renaissance at both the member state and supranational levels (Babic et al., 2022). Since 2019, German industry and politicians have pushed for more defensive industrial and trade policy instruments, in response to both a rising China and the protectionist turn in the US (Schneider, 2023). At the EU level, Commission officials have embraced a range of instruments designed to shore up Europe's 'strategic autonomy', particularly in key strategic sectors such as hydrogen technologies, e-mobility, digital, and semiconductors (Abels, 2024). The EU's new industrial policy has involved a series of reconfigurations, including the relaxation of competition policy, new restrictions on foreign investments, and the channelling of subsidies to key strategic sectors (Lavery, 2024). These externally induced developments change the context within which the EU's long-standing core-periphery relations take shape. While the original core-periphery perspective emphasizes the ways in which the EU constrains national-level growth models, the new EU industrial policy has the potential to enable new patterns of state interventionism and economic development. In this respect, this paper seeks to answer the following research question: to what extent does the EU's new industrial policy disrupt or reinforce old core-periphery relations in Europe? To answer this question, the paper focuses on the case of semiconductors, which have become a central focus of industrial policy interventions within Europe and further afield.

Semiconductors and the EU's new industrial policy

Semiconductors or 'chips' embody a critical technology in the contemporary world economy. Semiconductors are tiny chips that are composed of millions of microscopic transistors. These transistors are bundled together and 'etched' onto integrated circuits on a semiconductive material, often composed of silicon. These integrated circuits transmit the electrical signals that underpin modern digital technologies. Smartphones, cars, artificial intelligence, data centres, modern weapons systems, ICT, home appliances, and telecommunications networks depend upon semiconductors. Semiconductors form the material infrastructure that underpins all modern forms of digitalization and computing. They are not only a critical technology in the modern world economy, but they are also rapidly forming as one of the key terrains of inter-state conflict (Miller, 2023).

The evolution of the semiconductor supply chain gave rise to a distinctive form of interdependence, linking together numerous states and regions in the world economy. High-end chips are produced in Taiwan; chip design and intellectual property remain concentrated in the US; critical machine tools such as extreme UV photolithography equipment are manufactured exclusively in the Netherlands; chemical compounds essential to the 'doping' of wafers come from Japan and Germany; low value-added assembly of chips and their integration into electrical components takes place in Malaysia and other East Asian states (Miller, 2023). While semiconductors have therefore

been held up as a 'globalised' industry par excellence, the complex interdependencies at the heart of this supply chain are being increasingly weaponized in the present conjuncture, particularly in the context of US–China rivalry, supply chain shortages, and the escalating 'chip wars' (Bown, 2020; Malkin and He, 2024; Miller, 2023).

The publication of 'A Chips Act for Europe' marks the flagship EU response to the US–China 'chip wars' and associated chip shortages. In this communication, the European Commission outlines a strategy that aims to bolster the EU's strong R&D capacities while also, crucially, seeking to reshore the EU's manufacturing capacity in the semiconductor sector to secure a 20% share of global semiconductor production (European Commission, 2022b). However, chip production had already been identified as a priority sector for a new EU industrial policy and similar targets had already been set before the chip wars broke out. Back in 2013, the European Commission released a 'strategy' for the microelectronics sector which set the goal of doubling the EU's share of global semiconductor production to 20% and similarly stressed the need for a more comprehensive approach to this sector that would 'address the whole innovation chain' and 'attract higher investment in advanced manufacturing' instead of only focussing on the 'early phases' of R&D while 'leav[ing] the next steps… up to industry' (European Commission 2013: 7-8; Electronic Leaders Group 2014). Against the backdrop of the 2013 strategy, a new policy instrument, the IPCEI state aid framework, began to be deployed to channel state subsidies into the microelectronics sector. The recent European Chips Act does not break but instead adds to these policy developments and introduces a new proviso in state aid regulation tailor-made for 'first-of-a-kind' chip production facilities.

The IPCEI framework was introduced with a communication from the European Commission (2014) which formally established the 'Criteria for the analysis of the compatibility with the internal market of State aid to promote the execution of important projects of common European interest'. The IPCEI framework explicitly specifies that 'important projects of common European interest' can be large and technologically innovative industrial projects composed of two main stages to which EU member states could award subsidies: an R&D&I stage and a subsequent stage of 'first industrial deployment' to 'allow for the development of a new product or service with high research and innovation content and/or the deployment of a fundamentally innovative production process' (European Commission, 2014, 2021a: paragraphs 23 and 24).

The creation of the IPCEI framework within the domain of EU state aid regulation effectively expands the opportunities available for member states to engage in industrial policy practice beyond what was already contemplated in other state aid frameworks in two major ways. First, in relation to the R&D&I framework, the IPCEI framework expands the list of activities and costs of a project that are eligible to be covered by state aid beyond the earlier stages of R&D&I with the explicit reference made to the later 'first industrial deployment' stage. Second, in contrast not only to the R&D&I framework but also to the regional aid guidelines, the IPCEI framework does not impose maximum ceilings on the amount of aid which may be awarded as a percentage of an investment project's eligible costs. Instead, it stipulates that state aid may cover up to 100% of the eligible costs of a project, at least insofar as that aid intensity is deemed necessary to overcome the 'funding gap' faced by the private firms (which makes investing on that project commercially unviable without the aid).

However, to retain a link to the 'common European interest', the additional opportunities for industrial policy afforded by the IPCEI framework are conditional upon IPCEIs 'ordinarily involv[ing] at least four Member States and its benefits must not be confined to the financing Member States' (European Commission, 2021a: paragraph 16). This is why, while the IPCEI framework is not a formal 'convergence' policy, European officials have been keen to underline the 'pan-European' character of this new framework. Former Competition Commissioner Margrethe

Vestager, for example, made the case that 'IPCEIs are an example of truly ambitious European cooperation' (European Commission, 2023b).

IPCEIs have been at the centre of the EU's new industrial policy (Di Carlo and Schmitz, 2023; Lopes-Valença, 2024; McNamara, 2024; Schmitz et al., 2025). Since the introduction of the IPCEI framework into EU state aid regulation in 2014, ten IPCEIs have been launched across five key strategic sectors: batteries, cloud, health, hydrogen, and microelectronics. However, the semiconductor industry stands out for its continuously close relationship with this policy instrument. Even before its creation, representatives from the sector participated in EU-level discussions where the idea for such an instrument was set in motion such as the High-Level Expert Group on Key Enabling Technologies. Since its creation, the microelectronics sector has benefited from two IPCEIs (henceforth, IPCEI-ME), not least the first ever IPCEI in 2018 (henceforth, IPCEI-ME1) and the largest IPCEI to date in 2023 (henceforth, IPCEI-ME2) (European Commission, 2018a, 2021b, 2023a).

The two IPCEI-ME have been complemented by state aid initiatives pursued under the EU Chips Act. The Chips Act aims to build up production of the most advanced chips (not currently manufactured in Europe at all) and, in the process, to turn the EU into an 'industrial leader' in this sector (European Commission, 2022b: 2, 3, 10). To reshore chip fabrication, the Chips Act communication offers a new legal basis on which subsidies awarded by member states to the construction of 'first-of-a-kind' production facilities, which go beyond the existing state-of-the-art of chip production in Europe, may be deemed compatible with state aid regulation – on the top of the possibilities already opened up by the IPCEI framework since 2014. Under the 'first-of-a-kind' proviso, new fabrication facilities may benefit from state aid to cover 'up to 100% of a proven funding gap, if such facilities would otherwise not exist in Europe' (European Commission, 2022b: 16).

In what follows, we take each the IPCEI and 'first-of-a-kind' state aid instruments in turn, exploring the extent to which each new form of subsidization of the semiconductor sector generates uneven geographical outcomes.

Methodology

A qualitative analysis of official policy documents was carried out to provide a comprehensive description of the two new instruments in the EU's semiconductor industrial policy. In the remainder of the paper, we synthesize this qualitative analysis with a quantitative approach to answering the paper's central research question. We gather quantitative data on the volume of both state aid and private investments associated these instruments to date and map their actual economic geographies. To do so in a way that is sensitive to size differences among EU member states, we build a simple quantitative indicator that captures how over- or under-represented (relative to its economic size) a given member state is in the deployment of these instruments. This is done by dividing a member state's participation share in these instruments by its share of total EU gross domestic product (GDP). If the value of this indicator is greater than 1, then that member state is over-represented in the deployment of these instruments relative to its economic size; if the value of the indicator is less than 1, then that member is under-represented.

Two different variations of the same indicator are built by using two different types of flows in the numerator. First, we build an *aid-share ratio* by using state aid data that allows us to calculate the contribution of each financing member state to the overall state aid pledged under these instruments. Second, we build an *investment-share ratio* by using information on private investment flows – that is, how much of the total private spending mobilized in response to the aid

takes place in each member state. In the case of IPCEI-ME, we map this visually using colour-intensity maps. Due to its very small size and its outlier position in IPCEI-ME (discussed below), we have excluded data from Malta from the maps to avoid losing granularity in the colour scheme. In addition, we calculate supplementary aid-to-investment coverage ratios for each country by dividing the volume of state aid awarded by that government by the volume of expected investments by beneficiary firms.

Data on each member state's share of total EU GDP is obtained from Eurostat. Data on IPCEI-ME and 'first-of-a-kind' flows are retrieved from the European Commission's detailed decision letters, which are published as part of the Commission's mandate to ensure Treaty obligations are met with respect to state aid provision. These documents are publicly available via the online competition case register (European Commission, 2018, 2021, 2022, 2023a, 2023, 2024a, 2024b). Decision letters disclose how much state aid each financing member state pledged to each participating company and how much each participating company is investing in return in that country. We use this nationally disaggregated data to calculate each member state's aid-share ratio and investment-share ratio, respectively.

There is a slight difference in how investment flows are reported in IPCEI-ME and 'first-of-a-kind' decision letters. Whereas in the latter the total investment reported always coincides with the project's 'eligible costs', that is not the case in the former. IPCEI-ME 'eligible costs' may not entirely correspond to the total investment figures associated with these projects insofar as the overall investment package negotiated under the auspices of the IPCEI-ME encompasses activities which are integral to the project but nonetheless fall outside of the scope of the IPCEI framework's more strictly defined eligible activities (i.e. R&D&I and first industrial deployment only). Moreover, only 'eligible costs', as opposed to total investments, are disclosed on a country-by-country basis in IPCEI-ME decision letters. However, 'eligible costs' are still a good proxy for total investment. Across both IPCEI-ME packages, which collectively amount to €30 billion in total investment, the vast bulk of this figure – €25 billion – are considered 'eligible costs' European Commission, 2018a, 2021, 2022a, 2023a, 2023c, 2024a, 2024b, n.d.). As such, in the case of IPCEI-ME, when we refer to national investment-share ratios we are using 'eligible costs' as a reliable proxy for investment flows.

Mapping the IPCEI-ME instrument

IPCEI-ME1, approved in 2018, originally included France, Germany, Italy, and the United Kingdom – with Austria joining in 2021. It involved €1.9b of state aid within a total investment of €8.4b. IPCEI-ME2, approved in 2023, gathered 14 member states (Austria, Czechia, Finland, France, Germany, Greece, Ireland, Italy, Malta, the Netherlands, Poland, Romania, Slovakia, and Spain) and a combined aid budget of €8.1b to unlock a total investment of €21.8b (European Commission, n.d). On a national basis, no member state has channelled more state aid through IPCEI-ME than Germany. Alone it accounts for 53.4% of all IPCEI-ME aid. Germany is of course the largest economy in the EU, so we might expect its participation in the IPCEI-ME to be higher than in smaller member states. But its share of IPCEI-ME is disproportionate after we correct for its share of EU GDP (24.2% in 2023). Germany's aid-share ratio is 2.2, which means its over-representation in IPCEI-ME is more than double than what we would expect based on the size of its economy. Other over-represented member states – that is, member states whose aid-share ratio is higher than one – include Malta (5.3), Slovakia (1.9), Austria (1.4), Italy (1.2), and, only marginally, Romania (1.0). France is slightly underrepresented (0.8). Out of all other member states, 13 do not participate in funding IPCEI-ME at all and the remaining are involved to a degree that is less than

half of what could be expected given the size of their economies. This applies not only to Southern peripheries but also the Baltic states and the Nordic states. Among those participating, aid-share ratios are as low as 0.5 in Spain, 0.4 in the Netherlands, 0.3 in Czechia, Finland, and Ireland, 0.2 in Poland, and 0.1 in Greece. Figure 1 maps the geographies of IPCEI-ME participation based on the aid-share ratio calculated for each member state.

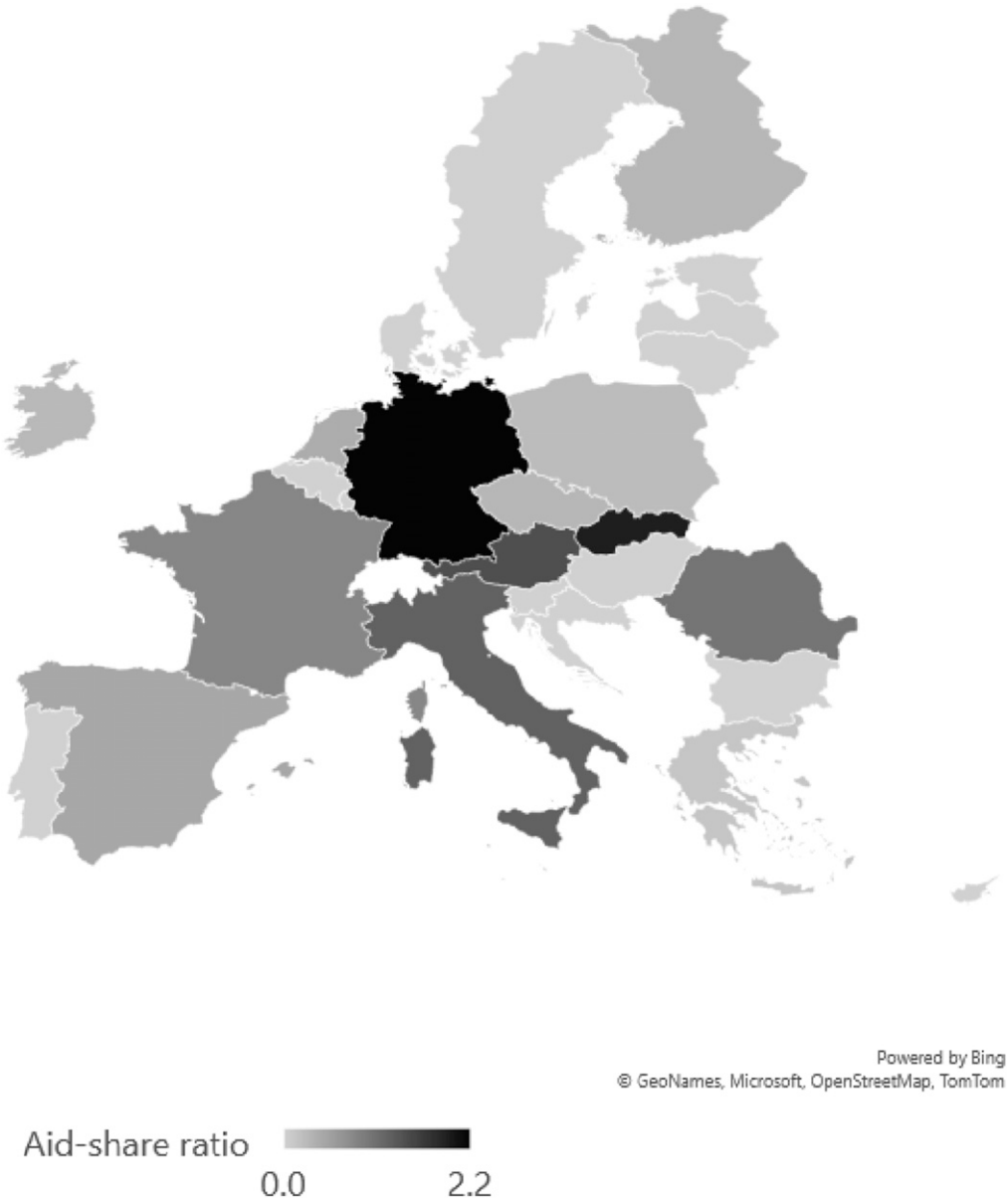


Figure 1. IPCEI-ME geographies based on national aid-share ratios. Source: Authors' calculations based on European Commission, 2018a, 2021b, 2023a and Eurostat data.

In promoting the IPCEI framework, the Commission has been keen to foreground the 'pan-European' character of the approach, emphasizing the ways in which this new state aid regime brings benefits to the Single Market as whole without distorting competition. In 2018, Executive Vice-President of the Commission Margrethe Vestager insisted that IPCEI-ME1 would 'help the whole of Europe leap ahead in innovation… ensuring that its benefits are shared widely and do not distort the level playing field in Europe' (European Commission, 2018b). Upon launching the much larger IPCEI-ME2 in 2023, Vestager again highlighted that the programme would allow Europe to 'pool resources and cooperate across borders', specifically emphasizing that IPCEI-ME2 would encompass state aids from 14 member states (European Commission, 2023b). Internal Market Commissioner Thierry Bretton also lauded the preparatory work for IPCEI-ME2 as 'a clear sign that Europe as a whole is putting its money where its mouth is' (Bretton, 2021).

Considering the above data, it is important to qualify these claims. While it is true that numerous member states have participated in both microelectronic IPCEIs, it is the large member states who account for by the far largest proportion of state aid granted under this schema. In the larger IPCEI-ME2, for example, the three largest member states of Germany, France, and Italy account for over 80% of the state aid granted, with Germany accounting for over 55% of the total state aid granted under the framework. As shown above, when adjusting for the size of these economies, these figures underline the point that the IPCEIs in microelectronics exhibit a strong tendency to unleash state aid within the central European export-led 'core' whilst leading to far less participation from amongst peripheral countries.

Another question which can be posed is which member states are benefiting the most from the volume of private investments unlocked by the IPCEI-ME? There are likely to be overlaps between the places where more aid is awarded and where more investments take place because aid is calculated in relation to investment commitments. However, there does not need to be a perfect correlation between the two: there might be member states where coverage rates are higher (i.e. where aid covers a higher percentage of private investments) than others; therefore, these member states might be more over-represented in IPCEI-ME if we look at their aid-share ratios than if we look at their investment-share ratios.

The total 'eligible costs' reported by participating firms across the IPCEI-ME add up to around €25b. Again, Germany stands out as the member state where most of this investment is supposed to take place, representing 44% of total expected private spending. France and Italy follow with a share of 22.7% and 15.1%, respectively. This means that just three member states account for over 80% of all private spending on R&D&I and first industrial deployment activities in the IPCEI-ME. Because these are the three largest economies in the EU, perhaps it is not surprising that they are also the places where most of the IPCEI-ME investments are supposed to take place. However, these three economies are over-represented even after we account for their relative size – that is, their investment-share ratios are all larger than 1, with figures of 1.8 in Germany, 1.5 in Italy, and 1.4 in France. This suggests that large member states are disproportionately benefitting from the IPCEI-ME investments. Austria (1.1) is also over-represented in the IPCEI-ME investment relative to its size. Finally, investment-share ratios are around 1.0 for both Slovakia and Romania. The small economy of Malta stands out as a clear outlier (5.4). In all other countries, investment-share ratios are equal to or lower than 0.5. It is 0.5 in Ireland, 0.4 in Finland, 0.3 in Spain and the Netherlands, 0.2 in Poland and Czechia, and 0.1 in Greece. Similar to Figure 1, Figure 2 maps the geographies of IPCEI-ME investments based on national investment-share ratios.

The high values registered by Malta in terms of both its aid-share ratio (5.3) and investment-share ratio (5.4) can be attributed to the small size of its economy: a comparatively small €150m investment and a €60m subsidy are big enough for Malta to be five times over-represented in the

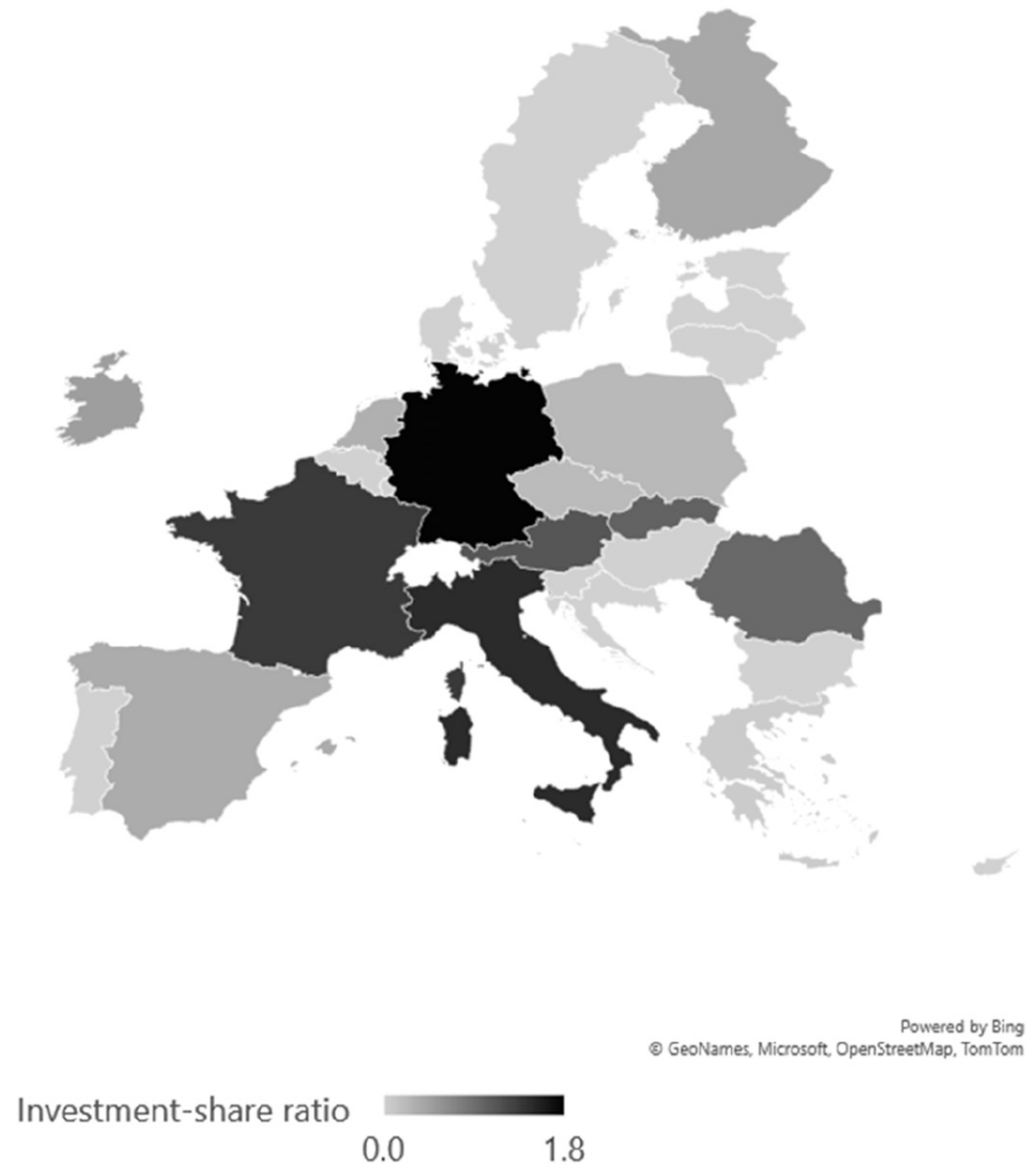


Figure 2. IPCEI-ME geographies based on national investment-share ratios. Source: Authors' calculations based on European Commission, 2018a, 2021b, 2023a and Eurostat data.

composition of IPCEI-ME relative to the size of its economy. More interesting than the scale of Malta's participation is its nature. The involvement of Malta in IPCEI-ME is linked to the activities of one firm alone: ST Microelectronics, a French-Italian multinational corporation which also participates in the IPCEI-ME as a beneficiary of French and Italian aid – and whose facility in Malta specializes in assembly and testing (ST Microelectronics Malta, 2021), tasks which are traditionally situated at the lower end of the semiconductor value chain and, thus, are more commonly offshored

from the core towards low-cost peripheries (Bown, 2020). Thus, the nature of Malta's participation in IPCEI-ME is consistent with conventional core-periphery relations, insofar as it relies exclusively on foreign direct investment and reflects a subordinate positioning within the international division of labour in the sector (Becker et al., 2020).

In terms of the investment-share ratios, Slovakia and Romania's figure of 1.0 is striking when we consider that other EU peripheries – from Southern Europe to the Baltics – are severely underrepresented in IPCEI-ME investments. How should we account for these two outliers? The dominant comparative political economy (CPE) literature conceptualizes CEE as 'dependent market economies', marked by high levels of FDI-dependence and foreign ownership, a low productivity 'domestic' economic base, with only limited capacity for spillovers and upgrading potential (Becker et al., 2020; Nölke and Vliegenthart, 2009; Pavlinek, 2022). In the case of their participation in the IPCEI-MEs, we might expect the Romanian and Slovak cases to replicate this pattern. However, the empirical data requires a more nuanced perspective. The Romanian case seems to confirm the expectations of the CPE literature, insofar as all three 'Romanian' firms participating in the IPCEI-ME are in fact domestic subsidiaries of foreign multinational corporations: Bosch (German), Continental (German), and NXP Semiconductors (Dutch). In the case of Slovakia, however, three out of four firms participating in the IPCEI-ME are 'domestic', which seems to break with established patterns (Pavlinek, 2024). Might the high participation of domestic Slovak firms in the IPCEI-ME embody a possible pathway through which to break with the established model of Slovakia as an 'integrated periphery' (Pavlinek, 2022)? According to the dominant CPE literature, there are grounds for caution here. Dependency can come about through multiple mechanisms, including reliance on foreign-owned lead firms for orders and technology, for example (Bair and Mahutga, 2016). In addition, there are grounds for viewing the Slovak domestic firms as significant but very small islands of high-tech innovation with very limited linkages and spillover effects to the wider Slovak economy. The Slovak firms in question are heavily linked into wider trans-European and trans-national networks of high-tech firms via the IPCEI-ME rather than with other Slovak entities. Finally, it is interesting that the coverage rate between the state aid and eligible costs is also much higher in the case of Slovakia (78%) than in Romania (44%). This, in turn, raises questions about the viability of a less FDI-dependent model of participation without a correspondingly higher role for the state: to what extent is state finance critical in sustaining a model of participation in high-tech niches which is less FDI-dependent? And to what extent may future fiscal pressures limit future models of participation which, being less FDI-dependent, require more state finance?

Mapping the 'first-of-a-kind' instrument

Although the 'first-of-a-kind' proviso was only incorporated into EU state aid law 8 years after the IPCEI instrument, the deployment of this instrument quickly caught up with the scale of IPCEI-ME. Moreover, this new state aid proviso seems to replicate the pattern we identified above for IPCEI-ME but with even greater concentration. So far, only three member states have awarded state aid to the construction of 'first-of-a-kind' chip facilities: France, Germany, and Italy (Table 1). Italy awarded €2.3b in aid, across two measures, to a total €5.7b investment by ST Microelectronics (European Commission, 2022a; 2024b). France awarded €2.9b in aid to a joint investment of €7.4b by ST Microelectronics and GlobalFoundries (European Commission, 2023). Germany awarded €5b to an investment which has been reported to be between €10b and €20b by the newly formed 'European Semiconductor Manufacturing Company' – a joint venture between the Taiwan Semiconductor Manufacturing Company (TSMC), with a 70% equity share, and

Table 1. State aid measures approved under the Chips Act to 'first-of-a-kind' facilities.

Member state	Companies	Aid (€ b)	Total investment (€ b)	Date approved
France	ST Microelectronics GlobalFoundries	2.9	7.4	April 2023
Germany	European Semiconductor Manufacturing Company	5	[10–20]	August 2024
Italy	ST Microelectronics	2	5	May 2024
		0.3	0.7	October 2022

Source: European Commission, 2022, 2023, 2024a, 2024b.

Bosch, Infineon, and NXP Semiconductors, with a 10% share each (European Commission, 2024a). It has also been widely reported that Germany has negotiated a €10b subsidy to a €30b investment by Intel in the construction of a new chip manufacturing plant in Magdeburg but this subsidy has yet to receive green light by the European Commission and Intel has in the meantime announced that the construction of the plant will be postponed by at least 2 years (Euronews, 2024).

In the case of France or Italy, the amount of state aid disbursed under the Chips Act already dwarfs their participation in IPCEI-ME (€2.9b v. €1.4b for France and €2.3b v. €1.5b for Italy). While for Germany this is not the case yet, the subsidies awarded under these two different instruments are already close in size (€5b v. €5.3b). In terms of aid-share ratios, Germany stands out with 2.0, followed by Italy with 1.8, and France with 1.7, while all other EU member states have yet to make any use of the 'first-of-a-kind' instrument. Because of the significant margin of error implied by the scale of the interval reported for the total investment in the case of the German aid measure – ranging from €10b to €20b – it is not possible to calculate meaningful investment-share ratios. In any case, the narrowly confined geographical destinations of the investments which have been leveraged by 'first-of-a-kind' subsidies are evident.

The EU's new industrial policy and core-periphery relations

European leaders have justified the EU's new industrial policy on the grounds that it is a necessary response to an increasingly competitive and hostile international environment. As a 2019 joint statement by the French and German governments puts it, the choice is either to 'unite our forces or allow our industrial base and capacity to gradually disappear' (BMWi and Ministère de l'Économie et des Finances, 2019). The new state aid regimes encapsulated in both the IPCEI-ME instrument and the relaxation of state law under the auspices of the EU Chips Act exemplify this logic. Crucially, although these instruments are not formal 'convergence' instruments, European elites have insisted that this new industrial policy framework will not distort the Single Market whilst also delivering pan-European benefits. Our analysis of the IPCEI-ME and the 'first-of-a-kind' EU Chips Act subsidies suggests that these claims need to be qualified considering the evidence. Whilst there is genuine novelty in the EU's new industrial policy, in the case of the semiconductor sector, there is evidence that a reinforcement of old asymmetries within European capitalism is taking place. As shown earlier, the original core-periphery literature emphasized four key mechanisms that have reproduced the EU's uneven economic geography historically: stratification, relationality, path dependence, and hegemony. In this penultimate section, we outline how our empirical findings play out across these four axes, arguing that the EU's 'new' industrial strategy in the sphere of

semiconductors is reinforcing old core-periphery relations but in a new form and under new international conditions.

The first insight of the original 'core-periphery' literature is that the EU's economic geography is highly 'stratified', in terms of a northern export-led 'core' and a southern debt-led 'periphery' (Stockhammer, 2016). Our empirical analysis suggests that the EU's new industrial policy for semiconductors is reinforcing the dominant tendencies here. In this regard, the role of Germany as the exemplar export-led 'core' economy is critical. As we have seen, Germany alone accounts for 53% and 49% of the state aid granted under the IPCEI-ME instrument and the 'first-of-a-kind' subsidies of the EU Chips Act, respectively. This far outstrips state aid provided by any other member state, suggesting that the EU's new industrial policy in the sphere of semiconductors reinforces the position of Europe's export-led 'core'. In contrast, large chunks of Europe's southern periphery are excluded from the new subsidy regime for semiconductors. The proportion of state aid granted by Spain under the IPCEI-ME framework, for example, is half what we might expect given the size of its economy. Greece accounts for an insignificant 0.2% of state aid granted, whilst Portugal has not participated at all.

Italy is an obvious outlier here within the classic Eurozone southern 'periphery', being one of only three states along with France and Germany to grant state aid under the 'first-of-a-kind' regime while securing more total investment under the IPCEI-ME (at a ratio of 1.5) than we might expect given the size of its economy. Two points are worth noting, though, in relation to the Italian question. First, Italy is widely recognized as a 'deviant' model of capitalism, characterized by the coexistence of two distinct production models within the same country (Di Carlo et al., 2024; Simonazzi et al., 2009). Thus, we should not be surprised by Italy's ability to sustain 'pockets' of high-tech manufacturing, although the wider picture remains one in which successful export-led growth has been difficult to generalize across the Italian growth model (Baccaro and Bulfone, 2022; Baccaro and Pontusson, 2016). Second, Italian participation remains dwarfed by the relative position of Germany, with Italy receiving less than one-third of the private investments that are being channelled towards Germany's semiconductor base. Overall, then, we can identify a clear logic whereby the EU's new industrial policy reinforces the primacy of Germany as the pre-eminent export-led 'core' of the European economy, whilst broad swathes of Europe's southern periphery are marginalized or excluded altogether.

The second insight of the original 'core-periphery' literature was to stress the question of 'relationality', by emphasizing how 'core' states within the EU directly benefited from the continued subordination of 'peripheral' and 'semi-peripheral' member states, whether through access to cheap production platforms (Germann, 2018), a devalued euro (Offe, 2015), or through the dominance of 'core' banks within peripheral economies (Thompson, 2015). In terms of the EU's semiconductor strategy, we can again see this relational core-periphery dynamic taking shape but in a new form. The relatively high Romanian participation in IPCEI-ME2, for example, occludes the fact that the bulk of participating firms are foreign (two German and one Dutch), underlining the importance of an integrated technological supply chain across the Single Market with the lead firms concentrated in the export-led northern core. The outlier of Malta – with an apparently high participation in the IPCEI-ME, given the small economy – underlines again the significance of 'core' firms from the large member states outsourcing lower value-added assembly and testing activities to the European (semi)periphery. In this way, the operation of the EU's new industrial policy – and particularly the appearance of cross-member state participation – enables new forms of subsidization to firms which remain concentrated within the traditional 'core' economies, whilst integrating non-core economies but in a classic form of subordinate integration (Pavlinek, 2022). The bifurcated character of non-core states' participation in the new semi-conductor subsidy regime reflects the WST concept of

'semi-peripheralization' (Arrighi and Drangel, 1986; Wallerstein, 1976). As the cases of Romania and Malta show, despite an increase in investments under the auspices of the EU's new semiconductor subsidy regime, the participation of these states is limited to the lower end of the value chain and takes place against a backdrop of enduring patterns of foreign ownership and control.

The third insight of the 'core-periphery' literature is the importance of path dependence, the central claim being that under the constraints of a common European framework, basic divergences between the EU's 'core' and 'peripheral' member states are likely to persist over time (Offe, 2015). For the original core-periphery perspective, the common framework of the EU – particularly the single currency, tight fiscal constraints, and the deregulatory pressures of the Single Market – operated as a constraint on the viable growth strategies of peripheral economies (Streeck, 2014). The EU's new industrial policy embodies a possible shift in this supranational configuration, insofar as it potentially sanctions new forms of state interventionism that break with the straitjacket of the neoliberal status quo (Alami et al., 2024; McNamara 2024). Our empirical data on the IPCEI-ME and the Chips for Europe Act, however, show that the EU's new industrial policy in the sphere of semiconductors reinforces old divergences between 'core' and 'periphery' but in a new form. The ability to subsidize 'high technology' sectors via the new state aid regime is not distributed equally across the EU's member states. On the contrary, 'core' states with pre-existing high technology clusters and greater fiscal firepower are more able to participate in the new subsidy regime, reinforcing old spatial divergences within European capitalism. In this sense, the path dependency identified by the original core-periphery literature endures not because of formal constraints on the peripheral economies but because it implicitly enables new forms of interventionism which are open only to a select number of member states at the 'global technology frontier' (Landesmann and Stöllinger, 2019; Wigger, 2023). While the EU's semiconductor regime does not formally aim to secure 'convergence' between member-states, EU elites have been keen to emphasize how the approach does not distort the Single Market, involves multiple firms and states across the EU, and should yield 'pan-European' benefits. Nevertheless, our analysis shows that the new EU semiconductor subsidy regime has the effect of reinforcing old core-periphery relations, but in a new form and under a novel set of international conditions.

The final strand of the 'core-periphery' literature focuses on the question of hegemony, specifically on how the EU framework reflects the interests of dominant member states and associated fractions of capital (Bulmer and Joseph, 2016; Germann, 2018). On this reading, while the institutional structure of the EU is crucial in producing divergent outcomes between the EU's 'core' and 'periphery' (Scharpf, 1998), the agency of key social forces within powerful member states and the EU institutions is critical in defending and maintaining the status quo (Kundnani, 2015; Flassbeck and Lapavitsas, 2015). In this regard, the pivot towards the EU's new industrial strategy has been the result not only of 'functional' integration logics but also of determined efforts by key players within Germany and France to 'upload' a new institutional framework to the European level that aligns with their domestic political preferences (Bora and Schramm, 2024). German and French officials, frustrated by the limits that EU competition policy imposed on their ability to respond to novel international challenges, in particular hostile acquisitions by China, successfully pushed for a relaxation to state aid restrictions that laid the basis for new EU industrial policy interventions (Lavery and Schmid, 2021; Schneider, 2023). Exploring the role of Franco-German actors in the formulation of the IPCEI and 'first-of-a-kind' instruments is beyond the scope of this article. Nevertheless, in line with other research into equivalent dimensions of the new EU industrial policy (Schneider, 2023; Bora and Schramm, 2024), we would expect to find evidence of an activist Franco-German axis in relation to the formulation of these semiconductor industrial policy instruments. Investigating the relation between the EU's semiconductor subsidy regime, the role of

'core' member-states in the formulation of this policy framework, and wider conceptualizations of power asymmetries and hegemony within EU economic governance would be a productive line of enquiry for future research.

Conclusion

European elites have advanced a new EU industrial policy which aims to bolster European industry in a context of intensifying international competition. A central element of this approach is to channel subsidies to key strategic sectors through the creation of new instruments for pan-European industrial policy interventions and the relaxation of EU state aid laws. While this new EU industrial policy has been justified as an essential tool in Europe's efforts to protect its industrial base from external challenges, it also has potentially far-reaching implications for the internal economic geography of European capitalism. In this paper, focussing on the sphere of semiconductors, we have argued that the EU's new industrial policy for this sector is markedly uneven in its economic geography. The IPCEI-ME and the 'first-of-a-kind' interventions under the auspices of the EU Chips Act are giving rise to three inter-related processes that compound existing divergences within the EU: a reinforcement of the EU's industrial 'core', particularly around Germany; the ongoing exclusion of large sections of Europe's southern periphery; and partial support for select states and firms within the 'integrated peripheries' of CEE but in a subordinate form. Our central argument, then, is that the EU's new industrial policy in the sphere of semiconductors reinforces old core-periphery divisions but in a novel form and under a new set of international conditions.

The analysis has several implications for future research. First, in this paper, we have drawn together two distinct literature: the earlier 'core-periphery' approach within European political economy and work on the industrial policy renaissance at the global scale. In so doing, we aim to move beyond the disciplinary divide that animates much analysis of the EU, with 'European studies' focussing on the 'internal' dimensions of the EU and International Political Economy (IPE) focussing on wider 'external' reconfigurations in the global economy. Bridging this divide requires an analytical toolkit that goes beyond the traditional scope of European integration theory whilst also encompassing an account of the EU as a distinct, multi-layered polity. Further studies on the interaction between the EU and ongoing shifts in the global order would be welcome.

Second, in this paper, we have focussed exclusively on the strategically significant sector of semiconductors. Since this sector has become a key locus of the EU's new industrial policy, it may be inductively hypothesized that, despite being framed as a series of pan-European initiatives, the EU's new industrial policy as a whole is markedly uneven in its geographical reach. However, confirmation of this hypothesis demands additional empirical work. So, in terms of future research, a productive line of enquiry would be to extend the analysis to encompass other areas of the new EU industrial policy, including the various other IPCEIs in batteries, cloud, health, and hydrogen as well as new state aid interventions that have taken place under the EU's reformed competition regime.

Third, our analysis has taken an aggregate approach, interrogating state aid and private investment allocation at the member state level. Further qualitative work following up on select cases – in particular the IPCEI-ME investments in Romania, Slovakia, and Malta – as well as the internal distribution of funds within member states would be most welcome. Finally, EU interventions into the semiconductor sector are paralleled by corresponding initiatives in other regions of the world economy, particularly within the US and China. Comparative analysis of these respective programmes and their uneven geographical effects would help to clarify the extent to which the EU programme is part of a wider international tendency or a function of the peculiarities of the EU as a novel model of regional integration.

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