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STRUCTURAL CHANGE IN TIMES OF INCREASING OPENNESS: ASSESSING PATH DEPENDENCY IN EUROPEAN ECONOMIC INTEGRATION

Claudius Gräbner[1], Philipp Heimberger[2], Jakob Kapeller[3], Bernhard Schütz[4]

ABSTRACT

This paper analyzes the dynamics of structural polarization and macroeconomic divergence in the context of European integration, where the latter is understood primarily as an increase in economic and financial openness. In the process of estimating the dynamic effects of such an openness shock on 26 EU countries, we develop a taxonomy of European economies that consists of core, periphery and catching-up countries, as well as financial hubs. We show that these four country groups have responded in a distinct way to the openness shock imposed by European integration and argue that the latter should be seen as an evolutionary process that has given rise to different path-dependent developmental trajectories. These trajectories relate to the sectoral development of European economies and the evolution of their technological capabilities. We propose a set of interrelated policy measures to counteract structural polarization and to promote macroeconomic convergence in Europe.

[1] Institute for Comprehensive Analysis of the Economy (ICAE), Johannes Kepler University Linz; and ZOE -Institute for Future-Fit Economies.
[2] The Vienna Institute for International Economic Studies; and Institute for Comprehensive Analysis of the Economy (ICAE), Johannes Kepler University Linz.
[3] Institute for Comprehensive Analysis of the Economy (ICAE) and Department of Economics, Johannes Kepler University Linz, jakob.kapeller@jku.at; FMM Fellow.
[4] Institute for Comprehensive Analysis of the Economy (ICAE) and Department of Economics, Johannes Kepler University Linz.

Structural change in times of increasing openness: assessing path dependency in European economic integration*

Claudius Gräbner†, Philipp Heimberger‡, Jakob Kapeller§, Bernhard Schütz¶

Abstract

This paper analyzes the dynamics of structural polarization and macroeconomic divergence in the context of European integration, where the latter is understood primarily as an increase in economic and financial openness. In the process of estimating the dynamic effects of such an openness shock on 26 EU countries, we develop a taxonomy of European economies that consists of core, periphery and catching-up countries, as well as financial hubs. We show that these four country groups have responded in a distinct way to the openness shock imposed by European integration and argue that the latter should be seen as an evolutionary process that has given rise to different path-dependent developmental trajectories. These trajectories relate to the sectoral development of European economies and the evolution of their technological capabilities. We propose a set of interrelated policy measures to counteract structural polarization and to promote macroeconomic convergence in Europe.

Keywords: Europe, path dependency, European integration, economic openness, competitiveness

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†Institute for Comprehensive Analysis of the Economy (ICAE), Johannes Kepler University Linz; and ZOE - Institute for Future-Fit Economies, claudius@claudius-graebner.com

‡The Vienna Institute for International Economic Studies; and Institute for Comprehensive Analysis of the Economy (ICAE), Johannes Kepler University Linz, heimberger@wiiw.ac.at

§Institute for Comprehensive Analysis of the Economy (ICAE) and Department of Economics, Johannes Kepler University Linz, jakob.kapeller@jku.at

¶Institute for Comprehensive Analysis of the Economy (ICAE) and Department of Economics, Johannes Kepler University Linz, bernhard.schuetz@jku.at

1 Europe between convergence and divergence

Once upon a time, the perspective of deepened economic integration on the European continent seemed to provide a route to successive economic and political convergence of the European nation states. Especially the establishment of the European Monetary Union (EMU) and the introduction of the Euro had raised high hopes for rapid convergence among member states (e.g. Blanchard and Giavazzi, 2002). And indeed, in retrospect, a series of empirical patterns were pointing into this direction: a coordinated monetary policy reduced the differences in official inflation rates across countries, increasing integration in terms of trade and investment resulted in a catch-up process of Eastern European countries (Goedemé and Collado, 2016), the integration of financial markets has reached unexpected heights (Baldwin *et al.*, 2015; Hale and Obstfeld, 2016) and the successive harmonization of environmental legislation, labor standards and consumer protection regulation had contributed to a partial unification of regulatory environments within Europe. Correspondingly, until the advent of the financial crisis, the Eurozone as well as the wider part of the European Union were said to witness a phase of widespread convergence. This belief was strengthened by the fact that major macroeconomic indicators, like unemployment, growth and per-capita-income or interest rates, were converging in pre-crisis times (Gräbner *et al.*, 2017), which was widely interpreted as evidence for progress in terms of an overall economic convergence within Europe (Giavazzi and Spaventa, 2010).

Yet, the simultaneous divergence of current account balances already indicated before the crisis that the convergence of certain macroeconomic indicators did not reflect long-term structural changes to the benefit of all Eurozone countries (Simonazzi *et al.*, 2013; Storm and Naastepad, 2015b; Gräbner *et al.*, 2017). Rather, the observed catch-up process of peripheral countries was in large parts driven by expansions of private indebtedness and the corresponding emergence of large-scale housing bubbles in some countries (e.g. Storm and Naastepad, 2016; Heimberger and Kapeller, 2017). These developments were enabled by the harmonization of interest rates across countries and the corresponding regulatory integration of financial markets (Baldwin *et al.*, 2015; Celi *et al.*, 2018). However, after the financial crisis, the debt-driven growth-model of peripheral Eurozone countries quickly turned out to be unsustainable and the underlying structural polarization between core and periphery countries within the EMU became apparent (Gräbner *et al.*, 2017): the catch-up tendencies observed after the turn of the century merely masked the emerging structural polarization among European countries, and the alleged convergence eventually proved to be unsustainable.

In this paper, we aim to rationalize the complex dynamics of convergence, divergence and polarization in Europe with reference to theories of path-dependency in international trade (Myrdal, 1958; Krugman, 1991), where past "success breeds further success and failure begets more failure", leading "to a 'polarization process' which inhibits the growth of such activities in some areas and concentrates them on others" (Kaldor, 1980, p. 88). Theoretically, we argue that European countries exhibit specific development paths, i.e. they follow different developmental trajectories. These trajectories are shaped by mechanisms that give rise to path-dependency (Dobusch and Kapeller, 2013), such as the presence of increasing returns to scale (in manufacturing) or network externalities, which arise from differences in technological capabilities Arthur (1989) or rules and standards which can only be changed at high costs (Heinrich, 2014).

By analyzing path dependent trajectories in Europe, we take the increase in economic and financial openness and international economic integration as a conceptual starting point for exploring convergence and divergence in Europe's more recent past. We employ a data set for 26 EU countries covering the time period between 1960 and 2016 and use the local projections method proposed by Jordà (2005) to estimate how several macroeconomic variables have responded to the openness shock caused by European integration. This econometric approach allows us to study the impact of increasing openness on macroeconomic performance and devel-

opmental trajectories. In this empirical context, we also check whether we are able to identify systematic structural differences in the response of EU economies to increasing economic and financial openness. Based on our regression results, we use a hierarchical cluster analysis that points us toward a taxonomy of developmental trajectories across European countries.

We can preview the results as follows: our findings suggest the existence of four structurally different developmental trajectories prevailing in the European Union. While large parts of the debate so far have focused on the different developments in Eurozone core countries (callen 'northern export-oriented capitalisms' in the political economy literature, see e.g. Iversen *et al.*, 2016) and Eurozone periphery countries (Johnston and Regan, 2016; Behringer and van Treeck, 2017, debt-led Southern European capitalisms, e.g.), we broaden the debate by proposing a typology of four country groups. This typology consists of core and periphery countries, financial hubs and catching-up countries. Our findings stress that – due to different growth models operating within the EU(e.g. Stockhammer, 2015; Gräbner *et al.*, 2017) – we can neither expect convergence to occur endogenously, nor can we hope to develop adequate policy conclusions without taking the structural differences between these four country groups seriously (Peneder, 2017). By developing our typology of European countries, we contribute to various streams of literature that make use of such typologies. First, the debate in macroeconomics focuses on whether country groups that vary in terms of their growth models have been affected differently by European (monetary) integration (e.g. Stockhammer (2015), Stockhammer and Wildauer (2016) or Gräbner *et al.* (2017)). Second, the comparative political economy literature analyzes whether different varieties of European capitalism and their specific sets of institutions have been equally able to cope with increasing trade and financial openness (e.g. Iversen *et al.* (2016), Bohle (2017); Vermeiren (2017); Johnston and Regan (2018)). Third, structualist scholars have studied how the uneven distribution of income and technologies, as well as the asymmetric power relations between core an peripheries reinforce existing inequalities (e.g. Simonazzi *et al.*, 2013; Cimoli and Porcile, 2016; Celi *et al.*, 2018). Fourth, the innovation literature engages with the relevance of technological capabilities for path dependent trajectories of European countries by focusing on the relevance of non-price competitiveness and sectoral composition (e.g. Dosi *et al.* (2015), Storm and Naastepad (2015b); Baccaro and Benassi (2017)). In our analysis, we bring together these four strands of the literature by studying the effects of increasing openness on macroeconomic developments as well as by inspecting trends and changes in the sectoral composition of exports in EU countries in the process of European integration.

The remainder of the paper proceeds as follows: the next section aligns our contribution with the existing literature. Then we study the impact of increasing economic integration on macroeconomic developments in the European Union (section 3). Our results suggest that country-specific characteristics in the response to the openness shock variable have to be accounted for. Section 4 builds upon this observation and provides both empirical and theoretical arguments for the co-existence of currently diverging developmental trajectories in Europe. Section 5 exploits this taxonomy and shows that the four country groups identified indeed respond differently to the openness shock of European integration. Section 6 builds upon these insights to suggest policies that take the various developmental trajectories into account and are geared towards achieving structural convergence in Europe. Finally, section 7 summarizes and concludes the paper.

2 Literature review and theoretical starting point

This section aligns our contribution with the existing literature by elaborating on its theoretical origins in structuralist and evolutionary theory.

While our analytical approach is informed by a pluralism of theoretical perspectives (Dobusch and Kapeller, 2012), it has close ties with the work of Latin American economists whose contributions have later become known under the label of 'structuralism' (for an overview see Chen

and Venkatachalam, 2017). This literature has been characterized by a focus on income inequality and technological change as well as by a critical view on the concept of comparative advantage. Structuralists consider development as a path dependent process, which is why they tend to delineate groups of countries according to their structural features and developmental trajectories. In its simplest form, this approach postulates the existence of 'core' and 'periphery' countries with political and economic power being distributed strongly in favour of the former. Thus, to understand the developmental dynamics of a country, its place in the core-periphery nexus is essential. Given the interest of evolutionary economists in technological change and self-reinforcing learning activities, they have a natural affinity to the classical structuralist idea according to which the uneven distribution of technological capabilities is essential for understanding the emergence of the core-periphery duality in the first place (see e.g. Dosi *et al.*, 1990, 2015; Caldentey, 2016; Cimoli and Porcile, 2016).

In this paper, we will argue that the structural distinction between core and periphery is indeed highly relevant for understanding the effects of European integration. Yet, our empirical analysis on how openness shocks have affected macroeconomic developments in different countries goes beyond the existing structuralist literature by arguing that existing classifications of EU countries along core and periphery lines need to be enriched by two additional country groups: one, in which the financial sector plays an outstanding role, and another for economies that are currently catching up. By doing so, we apply structuralist thought to the analysis of the euro area, which has become increasingly popular in recent years (e.g. Simonazzi *et al.*, 2013; Storm and Naastepad, 2015c; Stockhammer, 2015; Celi *et al.*, 2018).[1] Given this theoretical starting point, our main hypothesis is that European economic integration has impacted differently on EU countries, and has reinforced initial differences in technological endowments.

To this end, we build on the following insights of the existing literature: Stockhammer (2015) identifies the major source for divergence in the EMU in a rise of inequality and the resulting decrease of aggregate demand. For the EU member states, this resulted in the emergence of either an export-led or a debt-led growth model, where the latter was rendered infeasible after the crisis (see also Gräbner *et al.*, 2017). This argument is closely tied to structuralist thought due to the resulting polarization in core (i.e. export-oriented) and periphery (i.e. debt-oriented) countries. When elaborating on the reasons why some countries have seen the emergence of a debt-led rather than an export-led growth model to compensate for decreasing demand, Gräbner *et al.* (2017) stress the relevance of non-price competitiveness, which is essential for being successful on international markets: many periphery countries simply were not able to successfully substitute domestic demand with exports because their export destinations either did not grow, or they were lacking technological capabilities to ensure non-price competitiveness. This argument relates to the work of Storm and Naastepad (2015b) as well as Dosi *et al.* (2015), and stresses – in a structuralist spirit – the relevance of technology gaps, i.e. the uneven distribution of technological capabilities between core and periphery regions. We will provide more ample evidence for this channel in section 4.3. In addition to inequality, Stockhammer (2015) also highlights the role of financial deregulation, which allowed for the accumulation of large current account imbalances, as well as increased speculation of very rich households.

Furthermore, financial liberalization policies since the late 1980s have also hampered the development of Southern peripheries by amplifying the risk of speculation and by dismantling their national control mechanisms (see Celi *et al.*, 2018, p. 234-240) .

Finally, institutional factors contribute to the divergence within the EMU. Aside from highlighting the absence of an adequate political and fiscal governance structure (see also De Grauwe, 2012), Celi *et al.* (2018) criticize the lack of directed industrial policies in the EU. After Southern

[1] Current investigations are predated by early European dependency theorists such as Musto (1981), who predicted more than 30 years ago that the unequal structures of EU member states, in particular in terms of technological capabilities, will lead to structural crisis, which can only be prevented by active industrial and structural policies. Our conclusions presented in section 6 align very well with his policy suggestions drawn more than 30 years ago.

countries entered the EU, they lost ability to foster industrial development, but were obliged to implement liberalization policies, in particular when it comes to financial regulation. As a consequence, these countries were unable to catch up in terms of their productive capabilities, and the technological gaps to the core widened further. This negative development was further amplified by the establishment of the EMU: the absence of flexible exchange rates lead to an over-valuation of the Euro for technologically lagging countries, which harmed their export performance and prevented technological upgrading (see also Bagnai and Mongeau Ospina, 2017).

In this context, Simonazzi *et al.* (2013) stress the dependency of periphery countries to the core, particularly Germany. They argue that current-account imbalances in the EMU can only be understood by looking at the German economic model, which is characterized by domestic wage restraint and a change of main import destinations from the South to the East, both mainly at the expense of Southern peripheries. In consequence, without Germany adjusting its own economic model, policies implemented in periphery countries alone cannot remedy the institutional shortcomings leading to polarization and crisis in the EMU.

Summing up, these results cast doubt on the conventional interpretation of the European Monetary Union as a 'convergence machine' (e.g. Goedemé and Collado, 2016), and lead us to the following three conjectures, which will guide the empirical exercises to come.

Based on this review, we would expect that, first, EU countries can be clustered into heterogeneous country groups based on their reaction to increasing European economic integration. Second, given the multitude of explanations for the polarization patterns surveyed above we are skeptical as to whether a dichotomous classification into core and periphery countries is sufficient to describe polarization patterns. Third, we follow the classical structuralist focus on technological gaps in explaining polarization patterns. Therefore, we hypothesize that the dynamic distribution of technological capabilities in the EMU is important for explaining polarization.

3 The macroeconomic effects of openness shocks in the EU: local projections on the aggregate level

To provide an empirical analysis of convergence and polarization dynamics across the member countries of the European Union, we first take a broad look at the macroeconomic effects of increasing trade and financial openness. We do so by estimating the dynamic response of several key variables to increasing economic openness. A large literature is concerned with measuring economic openness in terms of trade openness and financial openness, leading to a broad range of available openness indicators (for a review see Gräbner *et al.*, 2018). In this paper, we are particularly interested in the effects of European economic and monetary integration. European monetary integration lowered transaction costs and led to a harmonization of several institutional aspects (e.g. De Grauwe, 2012)). In effect, in pre-crisis times it also led to the harmonization of interest rates across, and increased capital flows between countries, which fuelled lending from the EMU core to the periphery (e.g. Lane and Wälti, 2007; Hale and Obstfeld, 2016; Fuller, 2018). Against this backdrop we construct a dummy variable that represents entering the Eurozone as an openness shock. Hence, the dummy variable is set to 1 after the respective country entered the Eurozone. For EU countries that are currently not part of the Eurozone, we set the dummy to 1 when the respective country entered the EU or pegged its currency to the Euro. For the reasons explicated above, this dummy variable captures more dimensions of economic integration than only its monetary aspect: being part of the same currency area also decreased general transaction costs, reduced exchange rate uncertainty between Eurozone countries and increased price transparency (for a thorough exposition see e.g. De Grauwe, 2012). In the appendix, we provide more information about this indicator and we replicate all estimations with a continuous measure for economic globalization. The results remain qualitatively unchanged.

We estimate the effect of the openness shock dummy variable on eight variables: GDP growth; the unemployment rate; the current account balance in percent of GDP; capital accumulation (defined as real gross fixed capital formation/real net capital stock times 100); the public debt to GDP ratio; the Gini index of disposable income (as a measure for income inequality); the share of the financial sector in gross output of all sectors (in percent); and the exports to GDP ratio. We chose this set of variables — whose response to the openness shock variable we want to estimate — as they play a prominent role in discussions on European macroeconomic developments.

We compose a data set for 26 EU countries (all current EU member countries excluding Great Britain and Croatia for reasons of data availability) covering the time period 1960-2016. Data were obtained from AMECO (GDP growth, unemployment, public debt, capital accumulation), the Standardized World Income Inequality database (Gini); the World Bank (exports to GDP); and the KLEMS database (share of finance in value added). The panel data are unbalanced.

In order to estimate the effects of openness shocks, we use the 'local projections' method of Jordà (2005) for constructing impulse-response functions, which has recently been employed in several papers in the macroeconometric literature (e.g. Jordà and Taylor, 2016; Romer and Romer, 2017; Nakamura and Steinsson, 2018). The basic idea of the local projections method — translated into the research framework of this paper — is to separately estimate the dynamic effects of the openness shock variable that we introduced above on the eight variables of interest based on the following regression equation:

$$y_{i,t+k} - y_{i,t} = \beta^k OS_{i,t} + \delta^k Z_{i,t} + \zeta_i^k + \eta_t^k + \epsilon_{i,t}^k \tag{1}$$

In this equation, y represents the respective 'shock-dependent' macroeconomic variable of interest (i.e. GDP growth, unemployment, current account, capital accumulation, public debt, income inequality, share of finance in value added of all sectors, exports to GDP, respectively) which is expressed in terms of its projected future change $y_{i,t+k} - y_{i,t}$ in country i from year t to year $t+k$. β^k is the estimated coefficient that represents the effect of the openness shock variable ($OS_{i,t}$) on the shock-dependent variable y. $Z_{i,t}$ represents a vector of additional control variables that should be understood as "pre-treatment variables" (i.e. controls determined before the 'treatment' of the openness shock takes place, see Nakamura and Steinsson, 2018). ζ_i^k are fixed effects at the country level which are included to control for country-specific characteristics. η_t^k are fixed effects related to time which allow to control for global shocks that hit all countries equally; finally, $\epsilon_{i,t}^k$ represents the error term.

The 'local projections' method relies on estimating a series of k (fixed effects) regressions based on equation (1); the regressions are then used to construct the effect of the 'openness shock' on the shock-dependent variable of interest by plotting the estimated openness shock coefficients β^k for each time period k (k=1, ..., k=8). Setting the time horizon at eight years ($k = 8$) allows for assessing the dynamic effect of the openness shock on the shock-dependent variable during the eight years following the shock. Jordà (2005) shows that the standard linear projection is a direct estimate of the typical impulse response, as derived from a traditional vector autoregression (VAR) model. The uncertainty around the impulse-response-functions can be directly inferred from the standard errors of the estimated coefficients without any need for Monte Carlo simulations.

Figure 1 shows the results. The local projections are performed from year zero, with the first impact of the openness shock felt in the first year. The path of the local projection is then constructed to year eight, where Figure 1 shows the deviations from the levels in year zero (Jordà and Taylor, 2016). Gray areas indicate the confidence bands of the impulse response functions. For all the estimations in Figure 1, we use the panel-corrected standard error estimator (PCSE). [2]

[2] Beck and Katz (1995) argue that the OLS-PCSE estimator is well-suited for time-series cross-section models such as ours and allows us to avoid biased standard errors due to cross-section heteroskedasticity and

We first consider the response of the unemployment rate. As pre-treatment control variables in the unemployment panel, we control for GDP growth and capital accumulation; we also include a lag in the shock-dependent variable as well as lags of the pre-treatment control variables, since these variables might also have an effect on (future) changes in the unemployment rate (see vector $Z_{i,t}$ in equation (1)). Details on pre-treatment controls for estimating the response of the unemployment rate and the other six variables to the openness shock are available in the supplementary appendix. Unemployment falls slightly by about 0.2 percentage points in the first two years after the openness shock but then increases in response to rising openness (+1.2 percentage points in year 6), before the response reverts back towards zero. In this context, the results of the openness shock on the GDP growth rate in our sample of 26 EU countries complement the unemployment results: GDP growth does not respond strongly within the first two years; but from year 2 to year 4, the response is markedly negative (-1.4 percentage points in year 4), before it reverts back to (above) zero over the next years.

The impulse-response functions in Figure 1 suggest the following: First, the dynamic effects of increasing openness on capital accumulation (as a measure for investment in the capital stock) are negative; i.e., on average, capital accumulation is pushed downwards by the openness shock. Second, the current account balance in % of GDP is pushed upwards by several percentage points within the first years before the response reverts back to zero. However, as noted above, this estimated increase in competitiveness did not consistently translate into more favorable macroeconomic conditions. Third, the response of public debt is basically indistinguishable from zero. Fourth, income inequality (measured in terms of changes in the Gini of disposable income) starts to increase in response to the openness shock in the medium-term. Fifth, the share of the financial sector in the gross output of all sectors does not change much in response to the openness shock if one considers that the corresponding standard errors make it difficult to judge whether the effect is actually different from zero. Finally, exports to GDP are pushed upwards in the short-term (by about 1.4 percentage points in year 5), but the effect then declines. Notably, we have investigated the robustness of the results discussed here by using a different openness shock variable, namely changes in the KOF economic globalization index (Gygli *et al.*, 2018), which is a composite index that measures economic globalization along de facto (such as trade to GDP) and de jure criterions (such as hidden import barriers). While the KOF-variable has less of a clear-cut interpretation compared to our dummy-variable approach, its main advantage is that it offers a continuous instead of binary measure of openness taking different facets of the latter into account. Against this backdrop, it is important to note that the results for the impulse-response functions are qualitatively similar for most parts of our sample, as can be verified in the supplementary appendix.

It is crucial to point out that the results presented so far portray the *average effect* of the openness shock variable on the respective shock-dependent variable. However, based on our theoretical considerations in section 2 we would expect the effects to be heterogeneous across EU member countries. To test this conjecture we take a closer look at the country fixed effect estimates (ζ_i^k in equation 1).

In doing so, we exploit the fact that the country-fixed effects may be seen as a catch-all variable for country characteristics such as geography, size and, above all, institutions of the respective country (e.g. Wooldridge, 2010). In other words, similar country-fixed effects point to a similarity in underlying and unobserved country-characteristics, while a broad divergence between the estimated country-specific intercepts would suggest the presence of a sizeable amount of heterogeneity among the units of observation. Figure 2 plots the fixed-effects estimates as acquired in our local projection setup and shows that differences in fixed-effect estimates are large and increasing over the projection period. While the first outcome suggests that unobserved individual country characteristics matter for how countries are affected by openness shocks, the increasing variation in the estimated country fixed effects over time implies that the increase in

autocorrelation in the residuals.

Figure 1: The effect of openness shocks in a sample of 26 EU countries. Data: AMECO, KLEMS, SWIID, WID (see data appendix for details); own calculations. The country sample consists of 26 EU countries. Impulse-response functions were derived from local projections (see equation (1) and details on pre-treatment controls in the supplementary appendix). Standard errors are PCSE-corrected (Beck and Katz, 1995) and, hence, robust to cross-section heteroskedasticity and autocorrelation in the residuals.

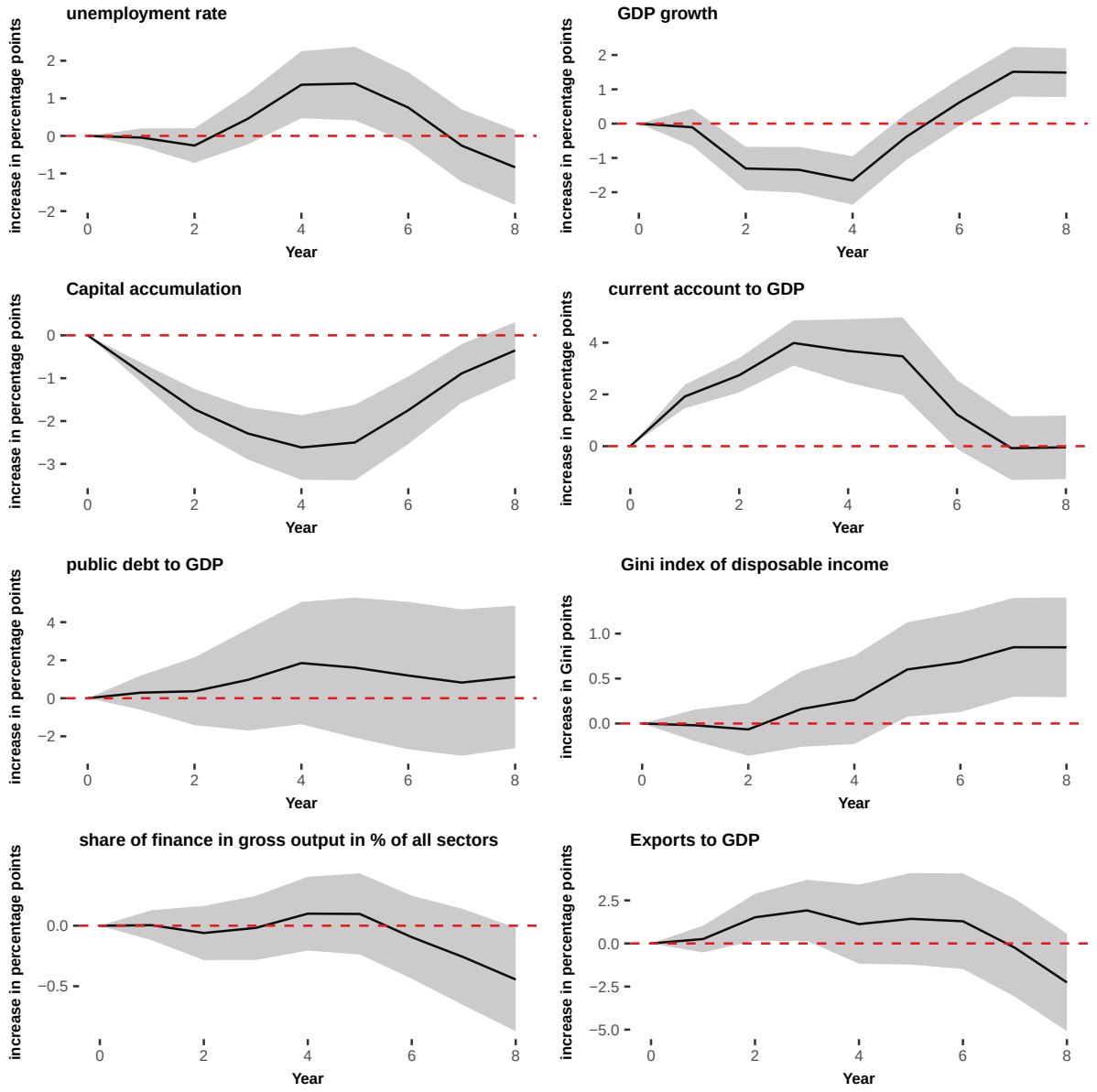
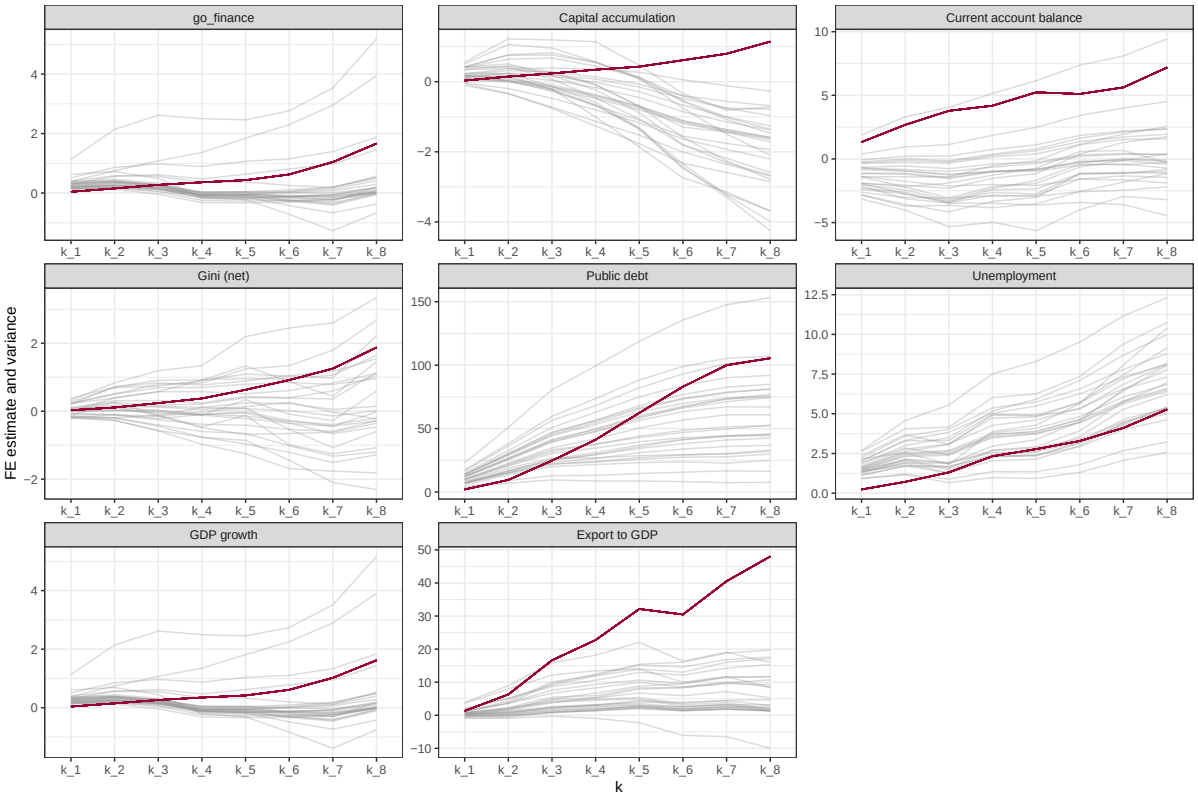


Figure 2: The evolution of the estimated country fixed effects estimates over the local projections horizon (k=1, ..., k=8). The grey lines represent the obtained country fixed effects for each country. The read line illustrates how the heterogeneity of the estimates increases over time by representing the variance of the estimates. For the sake of visibility the variance of public debt estimates was divided by 10.



openness coincided with an increase in structural heterogeneits among the units of observation. In the next section, we will investigate whether a more in-depth analysis of the country-fixed effects points to similarities on how certain subgroups of European countries have been affected by openness shocks of European integration.

4 Openness shocks and path dependent developments in Europe: a typology for countries

The country fixed effects estimates from the previous section suggest that the increase in economic openness in Europe has amplified the structural differences among European economies due to the heterogeneous effect of openness on different countries. We now aim for gaining a clearer understanding of this observed heterogeneity. To this end, we start with an inductive approach and analyze the country fixed effect estimates obtained in the previous section by using a hierarchical cluster analysis. This way we hope to identify suitable subgroups of the European countries in our data set. In a next step, we use sectoral export data to study structural change in European countries. Finally, we enrich these more inductive approaches with theoretical considerations. This will help us to come up with a robust taxonomy of countries in the final part of this section.

4.1 Hierarchical clustering of country fixed effects

In order to identify potential clusters of countries that react similarly to increasing openness we analyze the country fixed effects obtained in the previous section by using hierarchical cluster analysis (HCA, Tan *et al.*, 2005, p. 515ff)). The general idea behind HCA is to separate a set of objects into disjunctive groups, called clusters, where members of the same cluster are similar to each other, but distinct to members of other clusters. In contrast to partitional clustering, hierarchical clustering produces a set of nested clusters that are organized as a tree, usually represented as a dendogram or a factor map (see figure 3 below), which also allow for tracking the relation between clusters (see also Tan *et al.*, 2005, p. 526).[3]

The results are presented in Figure 3. Obviously, two countries are very distinct from the rest: Luxembourg and Malta – which supports our intuition of separating particularly financialized countries into a proper sub-group.[4] The remaining countries can be separated into four further groups. The cluster on the bottom consists of Austria, Denmark, Sweden, the Netherlands, Finland, and Germany. These are the typical "core countries". The cluster on top, consisting of Spain, Cyprus, Portugal, Greece, Italy, France and Belgium corresponds — with the exception of Belgium – to the classic conception of a European periphery. The remaining two clusters include the Eastern European catch-up countries as well as Ireland. Interestingly, these countries are separated into two clusters, of which the smaller one consists of Romania, Latvia, and Bulgaria, while the other comprises all other Eastern European countries as well as Ireland. This result is consistent with recent findings that highlight the presence of different sub-groups in the Eastern European countries (see e.g. Bohle, 2017), which exhibit different degrees and intensities in the overall catch-up process observable in Eastern Europe.

All these results are robust, not only with regard to different cluster algorithms, but also regarding the exclusion of smaller economies, such as Malta, Luxembourg, and Cyprus. An extensive robustness analysis exploring all these avenues is presented in the appendix.

In summary, although hierarchical clustering is a purely inductive way of analyzing data that does not exploit theoretical insights other than that involved in variable selection, the results are largely consistent with most classifications used in the previous literature.

4.2 A country taxonomy for the EU: delineating clusters with theory and descriptive statistics

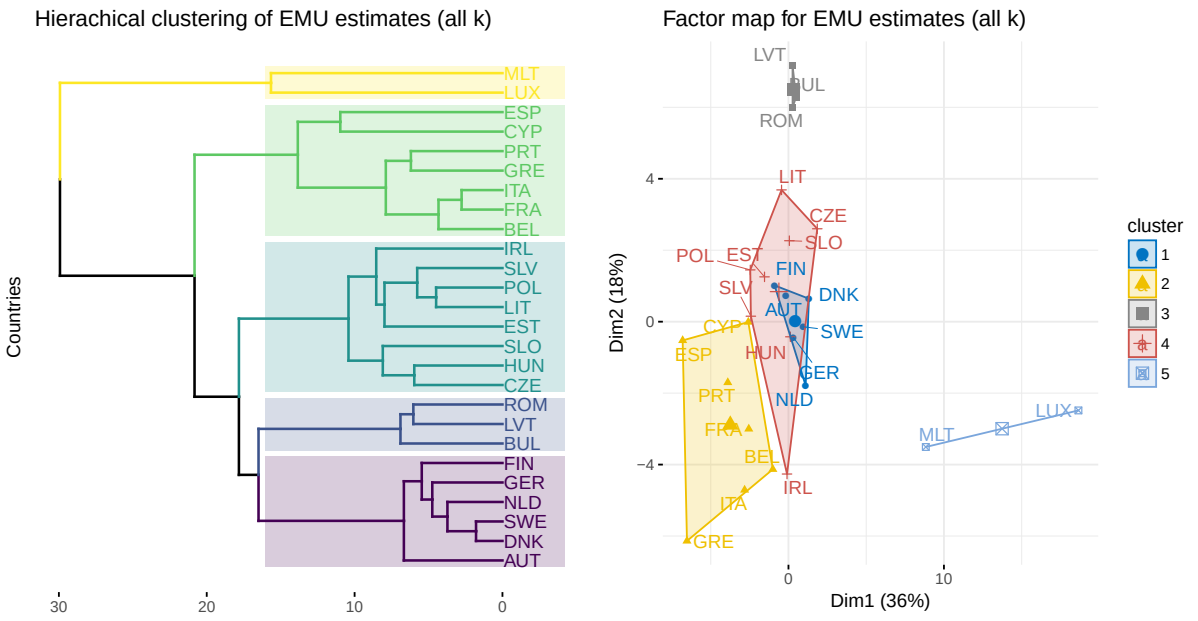
Previous taxonomies usually focused on particular subsets of the EU member countries. The most common distinction is that of a Eurozone core and a Eurozone periphery (e.g. Simonazzi *et al.*, 2013; Iversen *et al.*, 2016). Since the Eastern European countries are difficult to accommodate in this dichotomous classification, they are – if they are considered at all – usually treated as a third category (Bohle, 2017). Here, we go beyond previous classifications and suggest categorizing the European Union's members into four categories: core, periphery, and catching-up countries, as well as financial hubs.

Thereby we depart slightly from the results of our clustering analysis because although its overall results are intuitive, the focus on the country fixed effects estimates as inputs for the clustering may still understate important differences with regard to the policies followed by some European countries. We add a proper group for financial hubs in the EU because the overall size of the financial sector in Luxembourg, the Netherlands, Malta and Ireland is markedly outsized compared to other European countries (e.g. Karwowski *et al.*, 2017; European Central Bank, 2016; Schwan, 2017, note that the UK is not part of our EU country sample). These

[3] Specifically, we apply Ward's minimum variance method . More details on the method selection process are given in the appendix.

[4] We thereby relate to the definition of Epstein (2005, p. 3) who sees 'financialization' as "the increasing role of financial motives, financial markets, financial actors, and financial institutions in the operation of the domestic and international economies." On financializaton, see also Hein *et al.* (2008), Palley (2013) and Celi *et al.* (2018), and section 4.2 below.

Figure 3: The resulting clusters of countries. Panel (a) illustrates the entire result using a dendogram, panel (b) illustrates how close the countries are to each other by using a factor plot. A factor plot only considers the two most distinguishing dimensions, which together account for about 61.7 % of total distance.



four countries also feature a large 'shadow banking sector' ((Beyer and Bräutigam, 2016), and chart 2 in European Central Bank (2016)), where 'shadow banking' is understood as the non-banking part of the financial system, characterized by looser regulations and thinner public safety nets for financial institutions (Ban and Gabor, 2017). Moreover, Luxembourg, Ireland, the Netherlands and Malta have followed particularly liberal and finance-friendly policies geared towards attracting foreign capital and the associated rents and profits from other (European) countries: the Netherlands have a very prominent role as a hub in the 'shadow banking system' (Bakk-Simon *et al.*, 2012; Broos *et al.*, 2012; Beyer and Bräutigam, 2016). And Ireland has been using a low-tax and low-financial-regulation regime to attract multinational companies as well as leading global financial services firms, and these low-regulation policies have played an essential part in the Irish export-led growth model (e.g. Barry and Bergin, 2012; Zucman, 2014). Malta implemented finance-friendly policies that have led to an exceptional growth of its banking sector over the last two decades. Notably, a majority of the banking-sector's total assets are foreign-owned (e.g. European Central Bank, 2016). Finally, Luxembourg is a financial centre with favorable tax policies for high-net worth individuals and institutional investors, leading to an outsized role of finance in the overall economy (Johannesen and Zucman, 2014; Zucman, 2015, e.g.). These considerations (in combination with the data characteristics that will be presented below) leads us to classify these countries as financial centres, rather than as core or periphery countries.

Hence, our country group classification builds on the hierarchical clustering analysis but also accounts for additional considerations regarding the role of the financial sector and key comparative country data. We start our discussion of the classification with the group of core countries, which we consider to be Austria, Belgium, Denmark, Finland, Germany and Sweden. These countries are usually associated with high standards of living and a modern, competitive production sector. This classification is reflected in the data in Figure 4a, which depicts the mean of several relevant variables for the time period 2000-2015: core countries are characterized by relatively high levels of GDP per capita (measured in PPP), by low unemployment rates (in comparison to other European countries) and by a strong manufacturing sector that is able to

produce and export particularly complex products.

Second, the periphery countries, which we consider to be Greece, Italy, Portugal, France, Spain and Cyprus, are usually said to have a large pool of firms that are less competitive; in addition, they show higher unemployment rates and especially burdensome levels of debt. These properties are also manifest in the data as periphery countries are coined by pronounced current account deficits, a relatively low export share, relatively high levels of public debt and a comparatively high unemployment rate (see figure 4b). While the empirical analysis on how macroeconomic developments in EU countries have responded to increased European integration suggests that France is currently part of the periphery (see chapters 2 and 3), the country remains on the edge and might also be loosely considered as part of the core (e.g. Artis and Zhang, 2001; Campos and Macchiarelli, 2018). Categorizing France remains controversial since the country is an intermediate case between core and periphery; also, its economic position is not necessarily in line with its important political role in the EU, which is also determined by its size and its historically close relation to Germany (Gräbner *et al.*, 2017).

Third, the Eastern European countries are often termed catching-up countries, and consist of Bulgaria, Romania, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovenia and Slovakia. While they still display lower levels of income, at least some of them are catching up in terms of productive capabilities. This catch-up process is, however, accompanied by relatively lower levels of wages and employment standards. Furthermore, the Eastern countries are characterized by large capital inflows. In the data, we see a weak foreign ownership position of the Eastern countries (captured in a negative difference between foreign assets and foreign liabilities of more than 75%). The catch-up economies' GDP per capita levels and their wage share are relatively low (on average). In contrast, their share of the industry sector in terms of employment is large in comparison to the other countries in our data set (see figure 4d).

Finally, as we already argued above, we include Luxembourg, the Netherlands, Malta, and Ireland in a separate category of financial hubs, in which the financial sector plays a particularly outsized role (e.g. Karwowski *et al.*, 2017; Schwan, 2017). In our data, we can see a disproportionate amount of foreign investments for the financial hub countries as well as high levels of private sector debt, an exceptional size of the finance sector in terms of gross output and relatively large incomes derived from the taxation of wealth (see figure 4c).[5]

Table 1 summarizes our country groups. Comparing our taxonomy with the results of the cluster analysis suggests that neither the results of the cluster analysis nor the taxonomy we have discussed here are accidental. To the contrary: their similarity indicates that certain structural mechanisms lead to path dependencies that require the attention of anybody interested in counteracting polarization patterns in the EU.

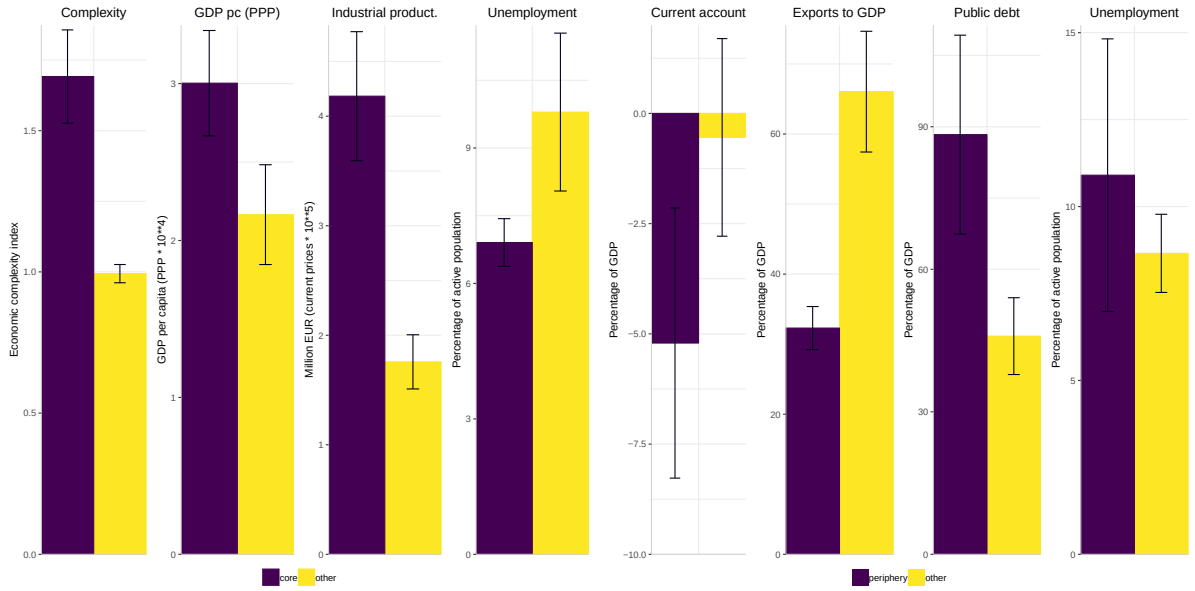
4.3 Structural change and the sectoral development of nations: assessing the directedness of technological change

While the previous sections focused primarily on macroeconomic indicators, we now focus on the mechanisms underlying macroeconomic convergence and divergence. As suggested by the structualist literature surveyed in section 2 we focus on analyzing the dynamic distribution of technological capabilities in Europe. To this end we use data on trade and economic complexity (Hidalgo and Hausmann, 2009) to construct a measure for the direction of technological change relative to the rest of the world.

In particular, we compare trade volumes of all countries on the SITC-V2 4-digit product level over the two time periods 1995-1999 (pre-Eurozone and pre-crisis) and 2010-2014 (post-Eurozone and post -crisis) to assess the changes in a country's export basket. For each country

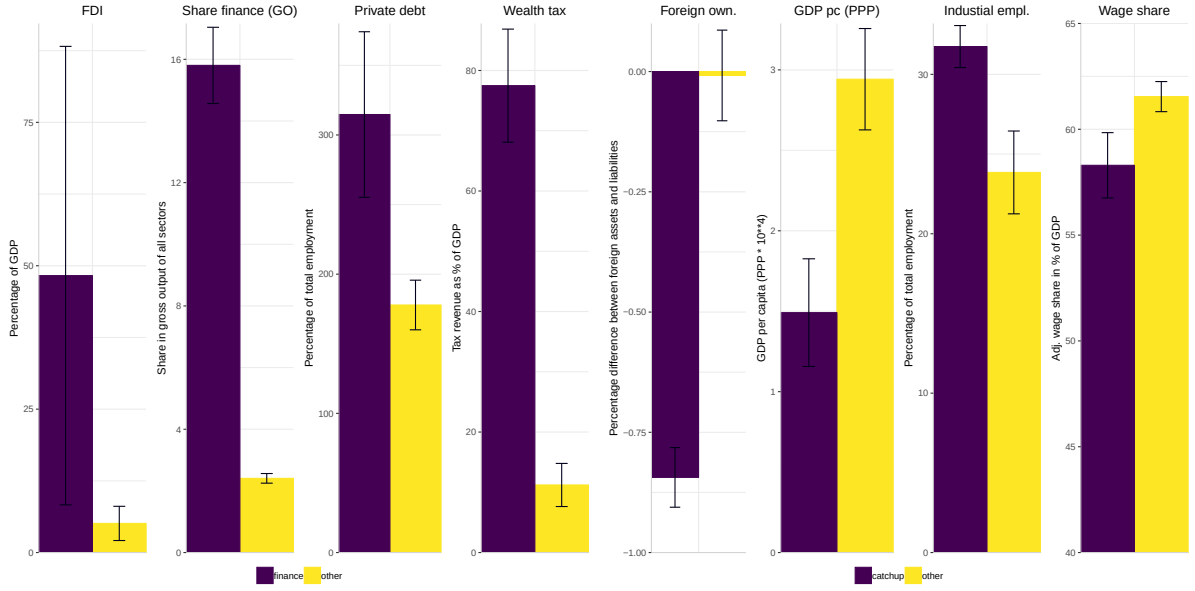
[5]The existence of a proper group of 'financial hubs' should not eschew the fact that (i) Europe as a whole is more financialized than most other World regions and (ii) financialization has played an important role for the development in the Southern periphery countries, e.g. by facilitating speculative bubbles (for more details see p. 234ff in Celi *et al.*, 2018).

Figure 4: A comparison of our four country groups with the rest of our sample. The averages refer to the period 2000-2015 and are unweighted. In the appendix, we show the population-weighted data, which do not differ markedly. Whiskers indicate the variation of the variables over time and correspond to the temporal mean +/- one standard deviation.



(a) Core countries compared to the rest.

(b) Periphery countries compared to the rest.



(c) Financialized countries and the rest.

(d) Catch-up countries and the rest.

Table 1: Country taxonomy for 26 EU countries. Own illustration.

Category	**Distinguishing characteristics**	**Members**
Core	High GDP per capita levels Importance of industrial production Production of complex products Relatively low unemployment	Austria, Belgium, Denmark, Finland, Germany and Sweden
Periphery	Lower export shares Relatively high public debt Tendency to current account deficits Relatively high unemployment	Cyprus, France, Greece, Italy, Portugal, and Spain
Catch-Up	Relatively low levels of wages and GDP per capita High degree of foreign ownership in these countries Small service sector, but important manufacturing sector	Bulgaria, Romania, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovenia, Slovakia
Finance	High debt levels of private firms Important share of finance in terms of gross output High foreign investment inflows Large incomes from wealth taxes	Luxembourg, Netherlands, Malta, and Ireland

we regress the average product complexity (PCI, see Hidalgo and Hausmann, 2009) on the log of the positive and negative difference in the value of exports, and weight the observations according to the share of the product in the country's export basket in 2012-2014. By doing so, we can understand for a given country whether export values change more drastically for more or less complex products. The weights ensure that we pay more attention to products that have more recently played an important role in the country's exports.

Define P_c^+ as the set of products for which country c has increased its exports in 2010-2014 as compared to 1995-1999 and $\phi_{c,i} = 1$ if $i \in P_c^+$ and zero otherwise. We then estimate the following two equations for each country:

$$\log\left(\sum_{t=2010}^{2014} \phi_{c,i}\pi_{c,i,t} - \sum_{t=1995}^{1999} \phi_{c,i}\pi_{c,i,t}\right) = \beta_c^+ \bar{PCI}_{c,i} + \epsilon_{c,i} \quad \forall i \in P_c^+ \tag{2}$$

and

$$\log\left(\sum_{t=1995}^{1999} (1-\phi_{c,i})\pi_{c,i,t} - \sum_{t=2010}^{2014} (1-\phi_{c,i})\pi_{c,i,t}\right) = \beta_c^- \bar{PCI}_{c,i} + \epsilon_{c,i} \quad \forall i \notin P_c^+ \tag{3}$$

In both equations $\pi_{c,i,t}$ is the total export of product i by country c in period $t \in (\{1995, ..., 1999\}, \{2010, ..., 20$ and $\bar{PCI}_{c,i} = \sum_t \left[\frac{\pi_{c,i,t}}{\sum_t \pi_{c,i,t}} PCI_{i,t}\right]$, where $PCI_{i,t}$ is the product complexity of product i in year t as defined in Hidalgo and Hausmann (2009). The weights $\omega_{c,i}$ for the WLS estimation are given by $\omega_{c,i} = \frac{\sum_t \pi_{c,i,t}}{\sum_i \sum_t \pi_{c,i,t}}$, i.e. the share of product i in the country's export basket in 2012-2014. This way, we obtain two estimates for each country, $\hat{\beta}_c^+$ and $\hat{\beta}_c^-$, one for the products for which the country has increased it's export value, and one for the remaining products.

By calculating a weighted average of these two coefficients, one arrives at a final estimate for

Figure 5: The directedness of technological change in Greece and Germany. While export expansions in Germany are positively correlated with product complexity, the inverse holds for Greece. The size and color of the points represent the average share of the products in the countries' export basket in 2012-2014. The regression line stems from the WLS estimation as described above. Dashed lines illustrate the estimation errors. Data: Atlas of Economic Complexity in its 12-2017 version (see data appendix for details); own calculations.

the direction of technological change in the countries under investigation. To this end define

$$\gamma_c^+ = \sum_{t=2010}^{2014} \phi_{c,i}\pi_{c,i,t} - \sum_{t=1995}^{1999} \phi_{c,i}\pi_{c,i,t} \tag{4}$$

as the sum of increases in exports of country c and

$$\gamma_c^- = \sum_{t=1995}^{1999} (1-\phi_{c,i})\pi_{c,i,t} - \sum_{t=2010}^{2014} (1-\phi_{c,i})\pi_{c,i,t} \tag{5}$$

as the sum of all the absolute values of the losses in exports of country c. Then the final estimate for the direction of technological change in country c is defined as follows:

$$\theta_c = \frac{\gamma_c^+}{\gamma_c^+ + \gamma_c^-}\hat{\beta}_c^+ + \frac{\gamma_c^-}{\gamma_c^+ + \gamma_c^-}\hat{\beta}_c^- \tag{6}$$

A $\theta_c > 0$ indicates a relative increase in exports of more complex products for this country. In other words, if $\theta_c > 0$, more complex products become relatively more important for this country's export-basket and vice versa. Figure 5 provides an illustration of the results. It shows the respective regression lines as well as the composition of the underlying data for the cases of Greece and Germany with regard to expanding products (i.e. $i \in P_c^+$). It indicates that greater expansions of exports in Germany (right panel) are associated with higher product complexity, while greater expansion of exports in Greece (left panel) are associated with a lower technological complexity, partially driven by a reversal towards being a producer of primary inputs (such as refined oil).

Although our results do not always show such clear trends as in the examples given in Figure 5 (for details see the appendix), in sum they point to a clear pattern of the sectoral developments across Europe from the perspective of international competitiveness: we find that higher levels

of overall complexity before the onset of the Eurozone (in 1999) are, on average, associated with stronger gains of complexity measured in terms of the expansion and decline of individual sectors for the larger part of the observed countries (Figure 6, upper panel). While this result is broadly consistent with the Kaldorian prediction that "success breeds success" (Kaldor, 1980), a more nuanced interpretation of this overall quadratic relationship is given in the lower panel of figure 6: although the catching-up of Eastern Europe has an imprint on overall developments, patterns consistent with Kaldorian effects can be identified within the Eastern European countries, where they are rather pronounced, as well as (with a weaker intensity) among all the remaining EU countries. Thereby, large parts of the variety in the results for the Eastern European catch-up economies seem to be moderated by its closeness to Europe's industrial core (Stöllinger, 2016).

The patterns of technological change as depicted in Figure 6 also allow us to emphasize four further observations. First, there is still considerable heterogeneity within the typically proposed country-groups: core countries differ in their development mirroring the fact that some of these countries struggle to hold on to their position, while others, mostly Germany, have managed to expand their technological dominance (e.g. Storm and Naastepad (2015a)). In fact, Germany is the only example of the core countries that finds itself above the value predicted by a quadratic model fitted to the data. Second, the upper panel of Figure 6 shows that we currently cannot find a single periphery country with a decidedly positive technological development: of all periphery countries only Portugal manages to surpass the predicted value, albeit this country starts from a very low level of complexity. Third, we find that while most Eastern catch-up countries are located above the predicted value, two exceptions find themselves below their prediction. This indicates that the economic catch-up process of Eastern European countries is not necessarily tied to a technological catch-up process, as evidenced most forcefully by the outliers Bulgaria and Lithuania. Fourth, the heterogeneity among financialized countries is particularly large, but can be explained by their different financialization strategies: Ireland's role of a corporate tax haven manifests itself in a massive technological upgrading (e.g. Regan and Brazys, 2018), while the more asset-based strategies of the Netherlands and Malta are associated with a tendency for deindustrialization (e.g. Visser *et al.*, 2016).

As international competitiveness and technological capabilities are of prime importance for assessing the future developmental trajectories within given political and institutional constraints (Hidalgo and Hausmann, 2009; Cristelli *et al.*, 2015), it is important to note that we cannot observe convergence in terms of technological capabilities in the current European framework. Quite on the contrary, our results point to the possibility that some countries in Eastern Europe will indeed manage to slowly catch-up to the core (like the Czech Republic, Hungary or Slovakia), while others (like Bulgaria or the Baltic countries) are much more likely to join the European periphery (Stöllinger, 2016).

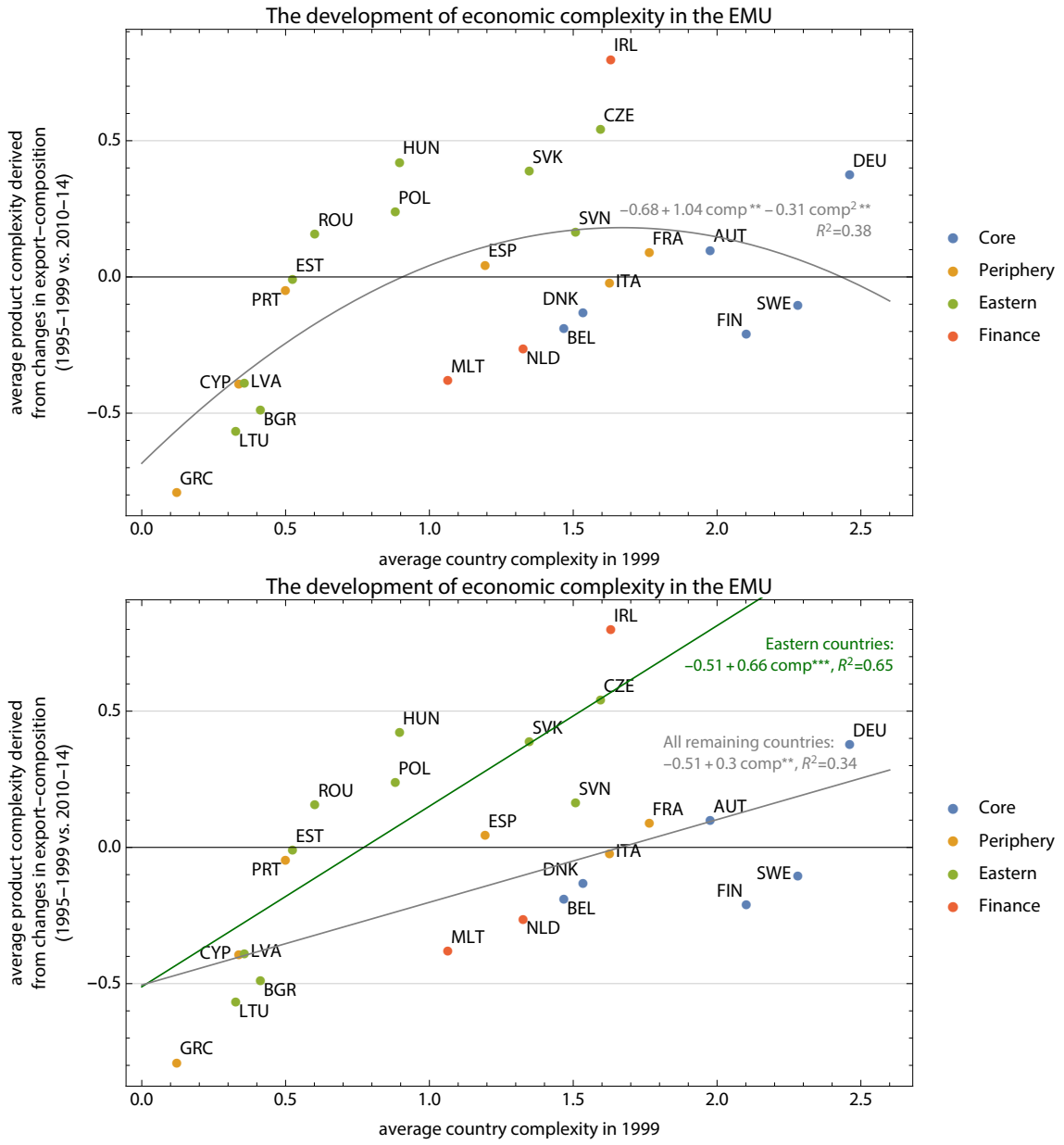
5 The accentuation of polarization through openness shocks: local projections on the disaggregated level

On the basis of the taxonomy of countries developed in the previous section, we proceed by further corroborating our intuition that the four country groups – core, periphery, and catching up countries, as well as financial hubs – respond differently to openness shocks. In order to estimate the dynamic response of eight key variables to an impulse of increasing openness we again make use of the econometric framework introduced in section 3: we estimate impulse-response functions based on regression equation (1), but this time separately for each of the four country groups.

Figure 7 shows the dynamic effects of the openness shock variable on our four main shock-dependent variables (with four additional variables covered in Figure 8).[6] The first column

[6]Note that while the standard errors in Figure 1 are panel-corrected standard errors (Beck and Katz, 1995) and,

Figure 6: Technological capabilities and structural change. Data: Eurostat; Atlas of Economic Complexity in its 12-2017 version; own calculations.



is based on the subsample for the six EU core countries; the second column for the six EU periphery countries; the third column for the four financial hubs; and the fourth column for the ten catch-up countries (see the taxonomy in table 1 for details on the country groups).

We find support for our hypothesis from section 2: on average, unemployment rates in the four country groups have responded differently to the openness shock. While the response of unemployment in the core subgroup is basically indistinguishable from zero, unemployment has been strongly pushed upwards in the Southern periphery (by more than 3 percentage points in the medium-term). And while the particular developmental model in the financialized countries has allowed their economies to respond with a slight decline in the unemployment rate in the years after the openness shock, the Eastern European countries have, on average, seen a decrease in the unemployment rates in the first two years after the shock, followed by a medium-term increase in unemployment that only dissipates several years after the shock. The results for GDP growth basically correspond to the results regarding unemployment: we do not see much of an effect in the core and in the financialized countries, but there is clearly a negative response in the periphery, and a phased response in Eastern Europe. The openness shock variable has clearly pushed capital accumulation down in the periphery, without much of a change in the financial hubs. Furthermore, Figure 7 shows that openness shocks, on average, have slightly worsened the current account balance in the EU periphery. For the EU core, the effect slightly points into the direction of an improvement in the current account balance (although the standard error band is substantial). In the financial hubs, the current account has strongly been pushed upwards, while for the Eastern European countries the current account tended to improve over the first years after the openness shock before it deteriorated.

From Figure 8, we can see the response of four additional variables to an impulse of increasing openness. We again find pronounced differences in the dynamic effects across our four country groups: while public debt goes down in response to the shock in the financial hubs and does not change markedly in the Eastern European countries, it increases strongly in the core but even more so in the periphery countries, with the effect increasing over time. Income inequality does not respond vigorously in the core countries: it increases most in the financial hubs, but we also find positive responses over time in the periphery and in the catch-up economies, although the standard error bands suggest that there is substantial uncertainty around the estimates. In terms of the effect of openness on the share of the financial sector in gross output, we find that there is an upward pushing response in the periphery and in the financial hubs (although the effect reverts to below zero after several years in the latter group); in the core the average effect on the size of finance is less pronounced, while the share of the financial sector even goes down in the Eastern European countries. Finally, in terms of the effect of increasing openness on exports to GDP, we find that the average response of the core and of the periphery group is difficult to distinguish from zero. For the Eastern European countries, the response is on the positive side, while the financial hubs tend to see a strong boost in exports to GDP in the short-term, followed by a reversal in the years to follow. It should be mentioned that, such as in section 3, we have again checked the robustness of the results discussed here by using the KOF economic globalization index (Gygli *et al.*, 2018) as an alternative openness shock variable. *Grosso modo*, the results for the impulse-response functions of the four country groups are qualitatively similar (see the supplementary appendix).

Summing up, the four country groups on which we elaborate in this paper have responded to openness shocks in a distinct way. The results indicate that the complex dynamics of macroe-

hence, robust to heteroskedasticity and autocorrelation in the residuals, we have not been able to perform the same adjustment for the country subgroups in Figures 7 and 8. The reason is that the PCSE-correction requires that the number of years covered is not too much larger than the number of countries in the cross-sectional dimension of the data. When we subset the full country sample into our four groups this requirement is not fulfilled because the number of countries in the regressions drops markedly. As a consequence, the gray standard error bands depicted in Figures 7 and 8 might be too small, i.e. we might somewhat underestimate the degree of uncertainty around the point estimates in the impulse-response function.

conomic convergence structural polarization in Europe can only be understood if one takes into account how the response of these country groups to increasing trade and financial openness has shaped their developmental paths. In fact, European (monetary) integration should be seen as an evolutionary process that has given rise to path-dependency. Notably, the results discussed in this section portray the average response of the relevant shock-dependent variable to the openness shock variable in the respective country group. In other words: while the analysis in this paper has shown that there are strong reasons for distinguishing core, periphery, and catching-up countries, as well as financial hubs, it is still important keep in mind that although member countries of a particular group share important features, the experiences of the individual members within those country groups have not been completely homogenous. Bohle (2017), for example, points to differences in the growth regimes and configurations of Eastern European capitalisms, as she distinguishes between a dependent export-driven regime in the Visegrad countries and a dependent debt-driven regime in the Baltic States. Similarly, one could argue that within the group of core countries, Germany – with its superior (non-price) competitiveness and strong export sector, its size and political power – is of particular relevance for understanding current developmental trajectories (e.g. Simonazzi *et al.*, 2013). Nonetheless, our results in this paper suggest that important insights into the complexity of path dependent trajectories in Europe can be gained by distinguishing country clusters with distinctive features that separate them from other country groups. In the next section, we will elaborate on the policy implications of this finding.

6 Implications for European policy and institutions

The observed polarization in Europe provides a rationale to reconsider current economic policies and institutions (see also Celi *et al.*, 2018). We argue that our typology of country groups allows for developing an integrated set of policy conclusions that might help in moving towards a political compromise and macroeconomic convergence. We proceed by, first, discussing existing EU-level initiatives and the recent academic literature on the role of the state in engineering sustainable policies. Second, we propose a coordinated policy strategy across the four country groups based on the results of the previous sections.

Current EU-level initiatives can be found in the Europe 2020 strategy approved in 2010 (European Commission, 2010). Its goals include making European economies more knowledge and innovation intensive, and to render them more sustainable in environmental and social matters. In order to reach these targets, the Commission has focused on a horizontal industrial policy approach by proposing commonly shared development aims and by trying to ensure framework conditions that are favorable to industrial competitiveness, as opposed to a more targeted (vertical) industrial policy anchored in the consideration of national specificities and targets specific sectors and firms (Pianta, 2015; Peneder, 2017). Another policy initiative concerned with industrial policy was launched in 2014 and is referred to as the Industrial Compact (European Commission, 2014). It is mainly concerned with reviving industrial activities in Europe and shows some similarity to the Europe 2020 strategy (Pianta, 2015). Furthermore, the Commission President Jean-Claude Juncker came up with the so-called Investment Plan for Europe later in 2014. It sets up the European Fund for Strategic Investment (EFSI), which consists of funds both from the EU and the European Investment Bank. The aim of the fund is to provide finance to private initiatives and thereby to mobilize a multiple of private sector funds. As of December 2017, €51 billion of funding were approved, to which €257 billion private funds were related (European Commission, 2017).

Recently, several authors have questioned the current practice of industrial policy at the EU-level, calling for a more targeted industrial policy, where the public sector takes an active stance in developing key industries and technologies. Cimoli *et al.* (2015) point to the fact that none of the leading economic powers managed to develop without using some form of industry

Figure 7: Response of four key variables to openness shocks. Data: AMECO, KLEMS, SWIID, WID (see data appendix for details); own calculations. Impulse-response functions were derived from local projections (see equation (1) and details on pre-treatment controls in the supplementary appendix). Variables: UNEM: unemployment rate; GDPgr: GDP growth; CUR: current account to GDP; CAP: capital accumulation. _core in column 1 refers to the subgroup of six core countries; _periph in column 2 refers to the subgroup of six periphery countries; _finance in column 3 refers to the subgroup of four financial hubs; _Eastern in column 4 refers to the subgroup of ten Eastern European countries. See table 1 for the exact taxonomy of countries.

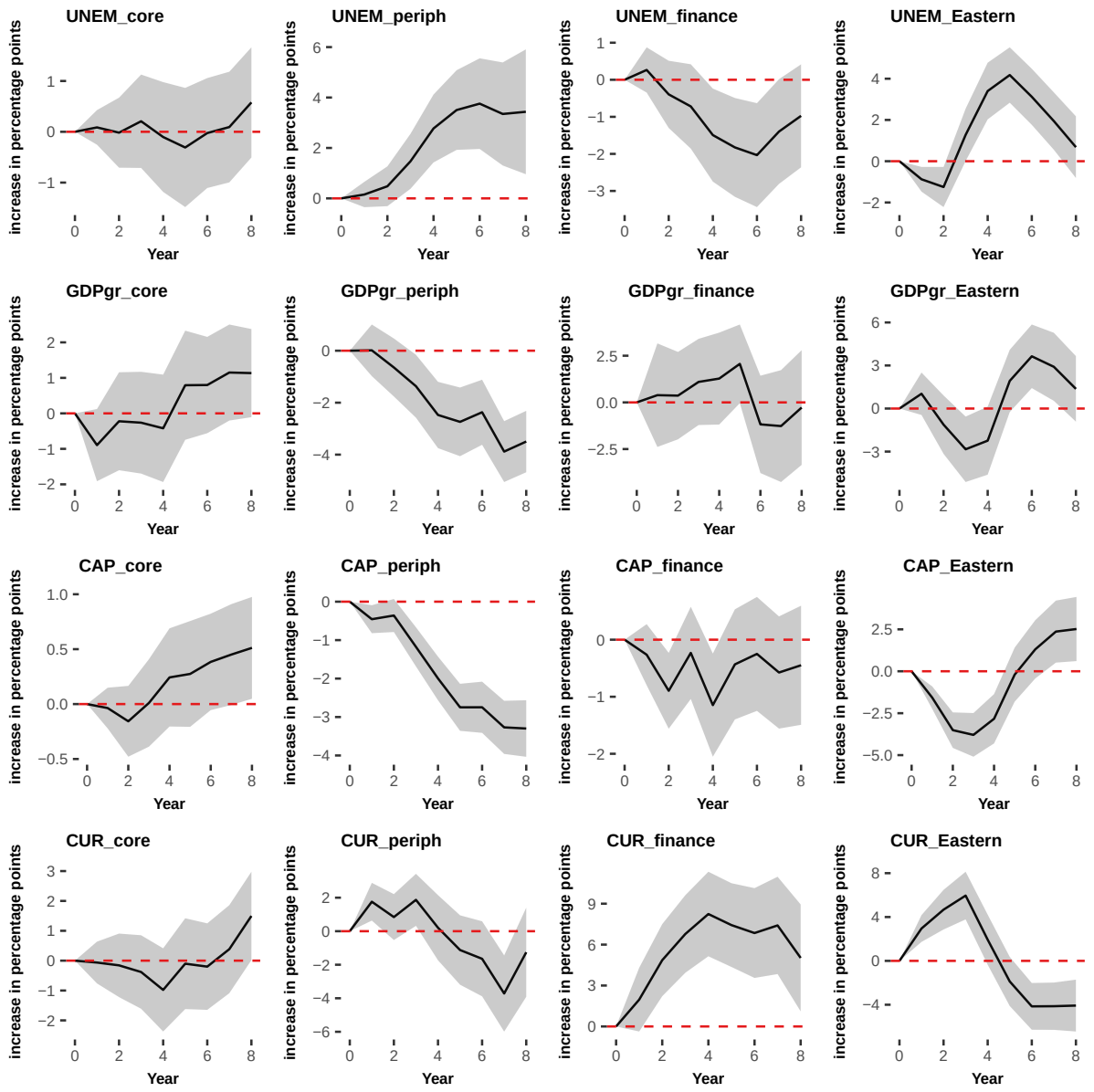
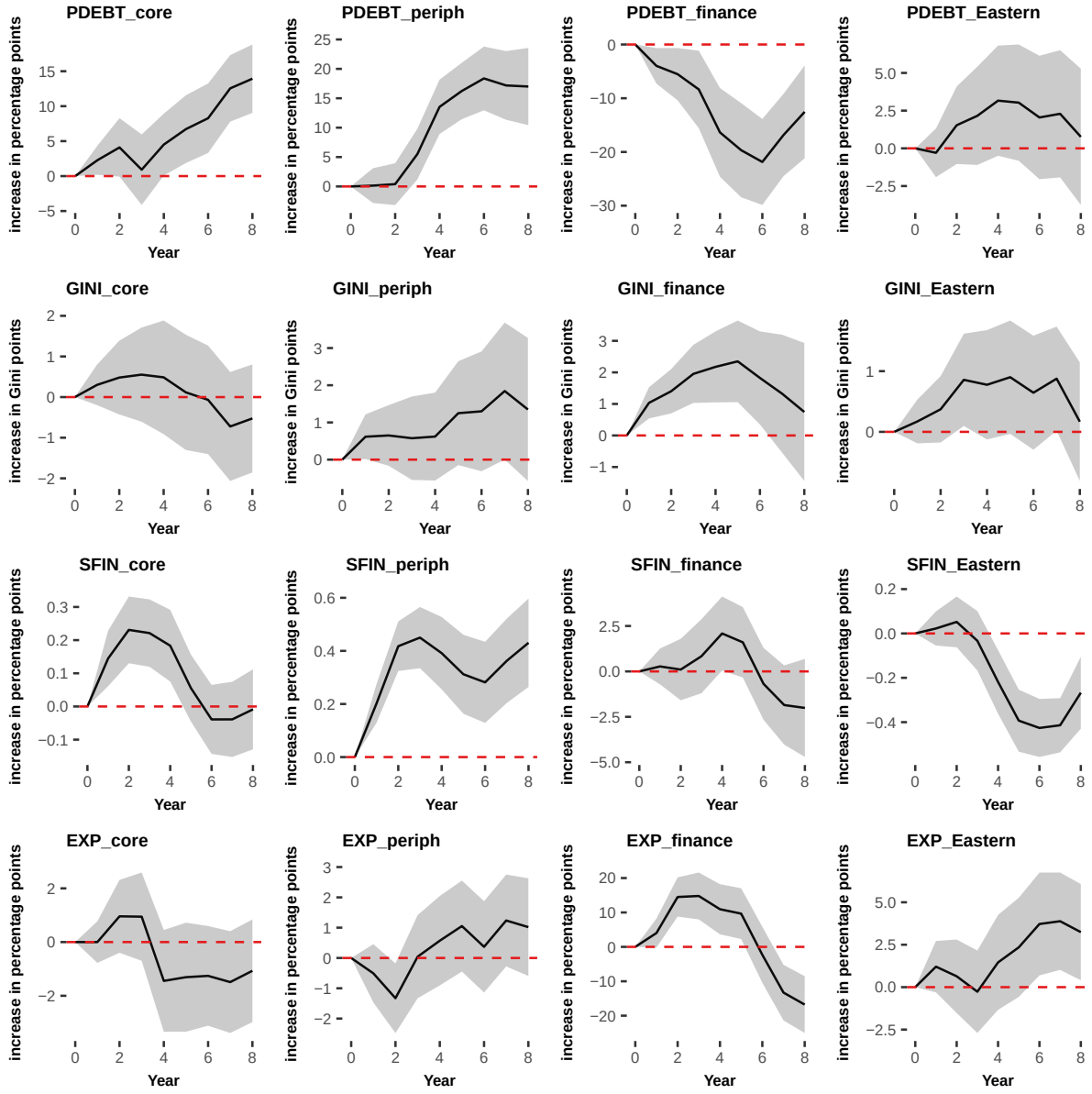


Figure 8: Response of four key variables to openness shocks. Data: AMECO, KLEMS, SWIID, WID (see data appendix for details); own calculations. Variables: PDEBT: public debt to GDP; GINI: Gini index of disposable income; SFIN: share of financial sector in gross output of all sectors (in %); EXP: Exports to GDP. Abbreviations are as in figure 8.



protection as well as direct and indirect subsidies (see also Chang, 2003; Celi *et al.*, 2018). These policies are necessary for a convergence process since "endogenous market mechanisms tend to behave in a 'virtuous' manner for those countries that happen to be on the frontier" (Cimoli *et al.*, 2015, p. 128), but not for those falling behind. This phenomenon is due to path dependency as "future capabilities build upon, refine and modify incumbent ones" (Cimoli *et al.*, 2015, p. 128). The aim of government policies therefore should be to support "good path dependencies" as opposed to leaving it to the 'free market', assuming an alleged 'level playing field' (Celi *et al.*, 2018). They stress, however, that such policies must be accompanied by measures to contain inertia and rent-seeking within protected industries.

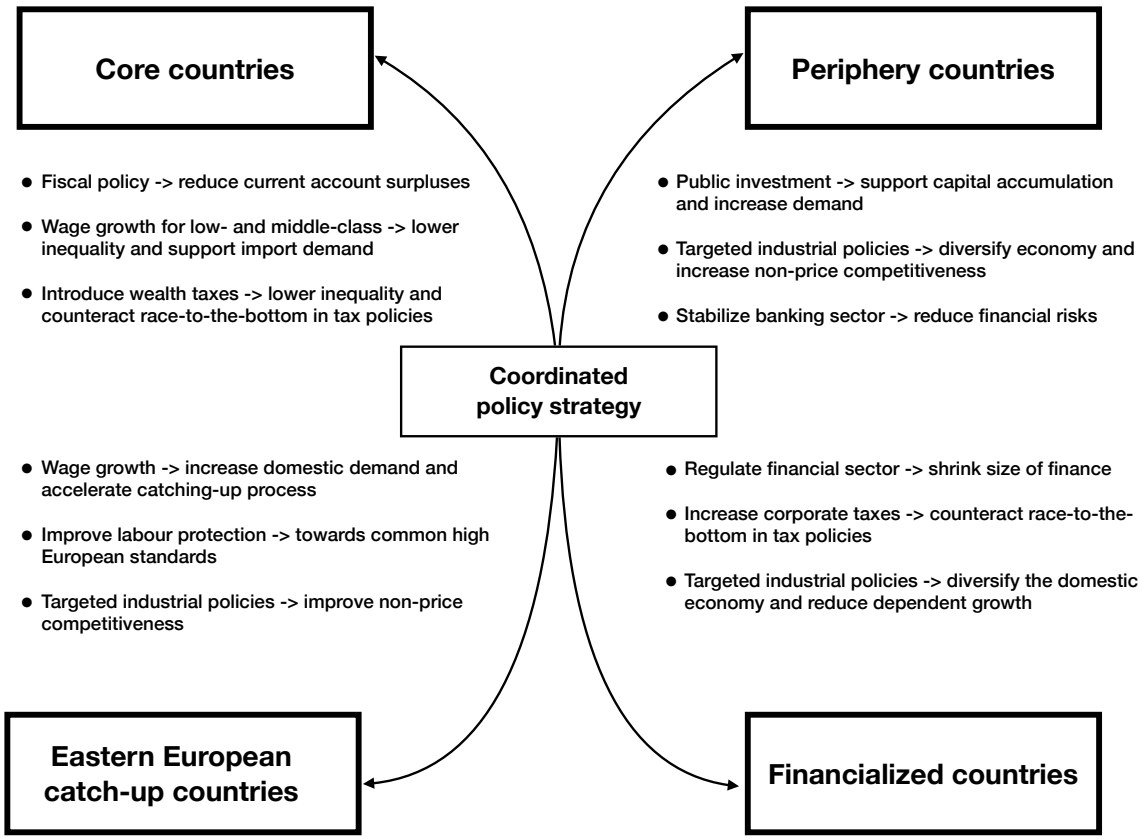
Mazzucato (2015) emphasizes that one must question the idea of government intervention being justified only in case of existing market failure. Major technologies of our time (e.g. the Internet, smart phones, wind and solar power) are based on publicly funded innovations and have drawn on various types of public financial support during their development. Mazzucato (2015, p. 122) emphasizes that policy makers should focus on "understanding how particular directions and routes can be chosen and determining how to mobilize and manage activities that can lead to the achievement of dynamic social and technological challenges." She also emphasizes the importance of the public sector receiving a fair share of the returns in those cases when it takes such an active approach. Possibilities to assure the latter are income-contingent loans and grants (repayment will be required if profits exceed a certain threshold) as well as the state retaining equity in the companies that it supports (Mazzucato, 2013, 2015).

Pianta (2015) argues that in the context of a globalized economy such a targeted industrial policy can only be executed at the European level, since individual countries are too small to do that effectively. The corresponding funds should come from EU-wide sources to reduce pressure on national budgets. The most viable way according to Pianta (2015) would be the emission of European Investment Bank bonds that could then be bought by the ECB. Another possibility would be the emission of Eurobonds, where the proceeds would be used to finance EU-wide industrial policy or to establish a new European Public Investment Bank that can borrow funds directly from the ECB. Finally, additional funds can be obtained through a European tax reform that includes an EU-wide tax on corporations. This step would come with the benefit of eradicating ongoing tax competition among EU members. Other possibilities consist in a financial transaction tax or a European wealth tax (e.g. Piketty, 2014). In order to fight ongoing polarization processes, Pianta (2015) suggests that the majority of these funds should go to activities in the periphery countries, where at least half of it should go to the poorer regions of these countries. What remains should go to the poorer regions of the core countries.

In line with these propositions for alternative economic policies from the existing literature, our results also suggest a targeted approach to industrial policy. Figure 9 summarizes our policy proposals. Specifically, in light of the increasing polarization, it will be necessary to enhance economic capabilities in the European periphery and to increase non-price competitiveness in these countries. This will involve substantial public sector investment, which should be seen as a European project. A public investment strategy would not only modernize and diversify existing economic structures; it would also provide the necessary demand stimulus to lift major parts of Europe out of stagnation. Such an initiative could be financed through additional revenues or through external financing. While the former could consist of a European corporate tax or a European wealth tax, the latter might come from the European Investment Bank or the ECB. In exchange, the expansion of balance sheets in the periphery's banking sector needs to be constrained to avoid future doom-loops between bank risks and sovereign risks that push up public debt (e.g. Beck, 2012).

Making Europe more equitable must involve a continuation of the catch-up process in Eastern European countries in terms of living standards, which involves assuring that wages grow faster than in the rest of Europe and labour standards be adjusted to the higher levels prevalent in other European countries. Yet, convergence policies would not only increase living standards,

Figure 9: Coordinated policy strategy for supporting convergence and stability in Europe. Own illustration.



but also provide a stimulus to aggregate demand and reduce inner-European tensions related to migration and job displacement. In order to make sure that the respective countries retain and further improve their competitiveness, such a policy has to be accompanied by targeted (vertical) industrial policies along the lines described above.

The core countries (especially Germany) have been running significant current account surpluses for several years (e.g. Gräbner *et al.*, 2017). This means that they possess considerable resources to improve the social cohesion of their societies by reducing unemployment and tackling social inequality through policies that tend to support the domestic economy and reduce the current account. One of these policies consists of increased spending on public infrastructure in order to create more equality of opportunity while at the same time reducing unemployment by adding to aggregate demand. Another possibility is to pursue policies that lead to higher wage growth for the low- and middle-class (e.g. by minimum wage laws, centralized wage bargaining and labor protection legislation).

Finally, in terms of moving towards more sustainability in Europe, we argue in favor of a re-regulation of the financial sector, especially in the financial hubs. Here, the goal must be to shrink and restrict the financial sector in order to effectively dampen the impact of destabilizing speculation, tax evasion and the relocation of assets. Moreover, particularly low corporate taxes in the financial hubs (which attract corporate profits through tax incentives) make it clear that a European initiative leading to a substantial increase in the corporate tax rate is required to counteract the existing race-to-the-bottom in regulatory standards (e.g. Egger *et al.*, 2016). Increasing corporate (as well as wealth and inheritance) taxes would also provide the public sector with the necessary resources to pursue targeted industrial and social policies.

7 Conclusions

This paper has analyzed the effects of increasing economic and financial openness on macroeconomic performance in the context of European integration. With a data set of 26 EU countries, we have shown that country-specific characteristics have to be accounted for in order to understand how openness shocks have shaped path dependent developmental trajectories. Our results suggest that the focus on a dichotomy of core and periphery countries in the existing literature might fall short of explaining the nuances of current developmental trajectories in Europe. Indeed, we find that a taxonomy consisting of core and periphery countries, as well as financial hubs and catching-up economies is more suitable when it comes to understanding the evolutionary process that has been triggered by European integration – a process that has given rise to different path-dependent trajectories, partly by shaping new paths and opportunities, partly by reinforcing pre-existing tendencies. By using sectoral export data to study structural change, we illustrate that Europe is currently characterized by non-convergence in terms of technological capabilities, which are of prime importance for prospects of future economic development (e.g. Hidalgo and Hausmann, 2009; Dosi *et al.*, 2015). In light of the goal of achieving convergence and stability in Europe's future, we have provided a discussion of a coordinated policy strategy that would allow for counteracting current polarization tendencies. On the policy front, the taxonomy of four country groups drawn from our analysis – consisting of core and periphery countries as well as financial hubs and Eastern-European catch-up economies – proves useful in terms of thinking systematically about what needs to be done to avoid further European disintegration.

References

Arthur, W. B. (1989). Competing Technologies, Increasing Returns, and Lock-In by Historical Events. *The Economic Journal*, **99** (394), 116–131.

Artis, M. and Zhang, W. (2001). Core and Periphery in EMU: A Cluster Analysis. *Economic Issues*, **6** (2), 47–58.

Atlas of Economic Complexity (2001). The Atlas of Economic Complexity at Harvard CID. Center for International Development at Harvard University.

Baccaro, L. and Benassi, C. (2017). Throwing out the ballast: growth models and the liberalization of German industrial relations. *Socio-Economic Review*, **54**, mww036.

Bagnai, A. and Mongeau Ospina, C. A. (2017). Monetary integration vs. real disintegration: single currency and productivity divergence in the euro area. *Journal of Economic Policy Reform*, **7** (2), 1–15.

Bakk-Simon, K., Borgioli, S., Giron, C., Hempell, H., Maddaloni, A., Recine, F. and Rosati, S. (2012). Shadow banking in the euro area. An overview. *ECB Occasional Paper Series*, **133**.

Baldwin, R., Beck, T., Bénassy-Quéré, A., Blanchard, O., Corsetti, G., De Grauwe, P., den Haan, W., Giavazzi, F., Gros, D., Kalemli-Ozcan, S., Micossi, S., Papaioannou, E., Pesenti, P., Pissarides, C., Tabellini, G. and di Mauro, B. W. (2015). *Rebooting the Eurozone: Step 1 – agreeing a crisis narrative*. *CEPR Policy Insight*, **85** (5), 1142–1158.

Ban, C. and Gabor, D. (2017). The political economy of shadow banking. *Review of International Political Economy*, **23** (6), 901–914.

Barry, F. and Bergin, A. (2012). Inward Investment and Irish Exports over the Recession and Beyond. *The World Economy*, **35** (10), 1291–1304.

Beck, N. and Katz, J. N. (1995). What To Do (and Not to Do) with Time-Series Cross-Section Data. *American Political Science Review*, **89** (03), 634–647.

Beck, T. (ed.) (2012). *Banking Union for Europe - Risks and Challenges*. London: CEPR.

Behringer, J. and van Treeck, T. (2017). Varieties of Capitalism and Growth Regimes: The role of income distribution. *FMM Working Paper*, **9**.

Beyer, K. M. and Bräutigam, L. (2016). Das europäische Schattenbankensystem. *ICAE Working Paper*, **56**.

Blanchard, O. and Giavazzi, F. (2002). Current Account Deficits in the Euro Area: The End of the Feldstein-Horioka Puzzle? *Brookings Papers on Economic Activity*, **33** (2), 147–210.

Bohle, D. (2017). European Integration, Capitalist Diversity and Crises Trajectories on Europe's Eastern Periphery. *New Political Economy*, **33** (1), 1–15.

Broos, M., Carlier, K., Kakes, J. and Klaaijsen, E. (2012). Shadow Banking: An exploratory study for the Netherlands. *DNB Occasional Studies*, **10/5**.

Caldentey, E. P. (2016). A time to reflect on opportunities for debate and dialogue between (neo)structualism and heterodox schools of thought. In A. Bárcena and A. Prado (eds.), *Agent-based modelling as a foundation for big data*, Santiago: ECLAC Books, pp. 32–83.

Campos, N. F. and Macchiarelli, C. (2018). Symmetry and Convergence in Monetary Unions. *LSE Discussion Paper Series*, **131/2018**.

Celi, G., Ginzburg, A., Guarascio, D. and Simonazzi, A. (2018). *Crisis in the European Monetary Union*. A Core-Periphery Perspective, London: Routledge.

Chang, H.-J. (2003). *Kicking Away the Ladder: Development Strategy in Historical Perspective*. London: Anthem Press.

Chen, S.-H. and Venkatachalam, R. (2017). Agent-based modelling as a foundation for big data. *Journal of Economic Methodology*, **24** (4), 362–383.

Cimoli, M., Dosi, G. and Stiglitz, J. E. (2015). The Rationale for Industrial and Innovation Policy. *Intereconomics*, pp. 126–132.

— and Porcile, G. (2016). Productivity and structural change: structuralism and its dialogue with other heterodox currents. In A. Bárcena and A. Prado (eds.), *Agent-based modelling as a foundation for big data*, Santiago: ECLAC Books, pp. 205–221.

Cristelli, M., Tacchella, A. and Pietronero, L. (2015). The Heterogeneous Dynamics of Economic Complexity. *PLoS ONE*, **10** (2), e0117174.

De Grauwe, P. (2012). *Economics of Monetary Union*. Oxford: Oxford University Press.

Dobusch, L. and Kapeller, J. (2012). Heterodox United vs. Mainstream City? Sketching a Framework for Interested Pluralism in Economics. *Journal of Economic Issues*, **46** (4), 1035–1058.

— and — (2013). Breaking New Paths: Theory and Method in Path Dependence Research. *Schmalenbach Business Review*, **65** (3), 288–311.

Dosi, G., Grazzi, M. and Moschella, D. (2015). Technology and costs in international competitiveness: From countries and sectors to firms. *Research Policy*, **44**, 1795–1814.

—, Pavitt, K. and Soete, L. (1990). *The Economics of Technical Change and International Trade*. New York, NY: New York University Press.

Egger, P., Nigai, S. and Strecker, N. M. (2016). The Taxing Deed of Globalization. *Cesifo Working paper*.

Epstein, G. A. (ed.) (2005). *Financialization in the world economy*. Cheltenham: Edward Elgar.

European Central Bank (2016). *Report on financial structures* . Tech. rep.

European Commission (2010). *Europe 2020. A strategy for smart, sustainable and inclusive growth*. Brussels: Communication from the Commission.

European Commission (2014). *For a European Industrial Renaissance* . Brussels: Communication from the Commission.

European Commission (2017). EIB Group figures as of 31/12/17 Online: [8.2.2018] .

Fuller, G. W. (2018). Exporting Assets: EMU and the Financial Drivers of European Macroeconomic Imbalances. *New Political Economy*, **23** (2), 174–191.

Giavazzi, F. and Spaventa, L. (2010). Why the Current Account Matters in a Monetary Union: Lessons from the Financial Crisis in the Euro Area. *CEPR Discussion Paper*, **8008**.

Goedemé, T. and Collado, D. (2016). The EU Convergence Machine at Work. To the Benefit of the EU's Poorest Citizens? *JCMS: Journal of Common Market Studies*, **54** (5), 1142–1158.

Gräbner, C., Heimberger, P., Kapeller, J. and Schütz, B. (2017). Is Europe disintegrating? Macroeconomic divergence, structural polarization, trade and fragility. *ICAE Working Paper*, (64).

—, —, — and Springholz, F. (2018). Measuring Economic Openness: A review of existing measurements and empirical practices. *ICAE Working Paper*, **82**.

Gygli, S., Haelg, F. and Sturm, J. E. (2018). The KOF Globalisation Index – Revisited. *KOF Working Papers*, **439**.

Hale, G. and Obstfeld, M. (2016). The Euro and the Geography of International Debt Flows. *Journal of the European Economic Association*, **14** (1), 115–144.

Heimberger, P. and Kapeller, J. (2017). The performativity of potential output: Procyclicality and path dependency in coordinating European fiscal policies. *Review of International Political Economy*, **24** (5), 904–928.

Hein, E., Niechoj, T., Spahn, P. and Truger, A. (eds.) (2008). *Finance-led Capitalism? Macroeconomic Effects of Changes in the Financial Sector*. Marburg: Metropolis.

Heinrich, T. (2014). Standard wars, tied standards, and network externality induced path dependence in the ICT sector. *Technological Forecasting Social Change*, **81**, 309–320.

Hidalgo, C. A. and Hausmann, R. (2009). The building blocks of economic complexity. *Proceedings of the National Academy of Sciences*, **106** (26), 10570–10575.

Iversen, T., Soskice, D. and Hope, D. (2016). The Eurozone and Political Economic Institutions. *Annual Review of Political Science*, **19** (1), 163–185.

Johannesen, N. and Zucman, G. (2014). The End of Bank Secrecy? An Evaluation of the G20 Tax Haven Crackdown. *American Economic Journal: Economic Policy*, **6** (1), 65–91.

Johnston, A. and Regan, A. (2016). European Monetary Integration and the Incompatibility of National Varieties of Capitalism. *JCMS: Journal of Common Market Studies*, **54** (2), 318–336.

— and — (2018). Introduction: Is the European Union Capable of Integrating Diverse Models of Capitalism? *New Political Economy*, **23** (2), 145–159.

Jordà, Ò. (2005). Estimation and Inference of Impulse Responses by Local Projections. *American Economic Review*, **95** (1), 161–182.

Jordà, Ò. and Taylor, A. M. (2016). The Time for Austerity: Estimating the Average Treatment Effect of Fiscal Policy. *The Economic Journal*, **126** (590), 219–255.

Kaldor, N. (1980). The Foundations of Free Trade Theory and their Implications for the Current World Recession. In E. Malinvaud and J.-P. Fitoussi (eds.), *Unemployment in Western Countries*, London, pp. 85–100.

Karwowski, E., Shabani, M. and Stockhammer, E. (2017). Financialization: Dimensions and Determinants. A Cross-Country Study. *Kingston University London Discussion Paper*, **2017/1**.

Krugman, P. (1991). Increasing Returns and Economic Geography. *Journal of Political Economy*, **99** (3), 483–499.

Lane, P. and Wälti, S. (2007). The Euro and Financial Integration. In D. Cobham (ed.), *The Travails of the Eurozone*, Munich, pp. 208–232.

Mazzucato, M. (2013). *The Entrepreneurial State: Debunking the Public vs. Private Myth in Risk and Innovation* . London: Anthem Press.

— (2015). Innovation Systems: From Fixing Market Failures to Creating Markets. *Intereconomics*, **3**, 120–125.

Musto, S. A. (1981). Die Süderweiterung der Europäischen Gemeinschaft. *Kyklos*, **34** (2), 242–273.

Myrdal, G. (1958). *Economic Theory and Underdeveloped Regions*. Bombay, India: Vora & Co Publishers.

Nakamura, E. and Steinsson, J. (2018). Identification in Macroeconomics. *Journal of Economic Perspectives*, **forthcoming**.

Palley, T. (2013). *Financialization: the economics of finance capital domination*. New York: Palgrave Macmillan.

Peneder, M. (2017). Competitiveness and industrial policy: from rationalities of failure towards the ability to evolve. *Cambridge Journal of Economics*, **41** (2), 829–858.

Pianta, M. (2015). What Is to Be Produced? The Case for Industrial Policy. *Intereconomics*, pp. 139–145.

Piketty, T. (2014). *Capital in the Twenty-First Century*. Cambridge, MA, London, UK: Belknap Press.

Regan, A. and Brazys, S. (2018). Celtic Phoenix or Leprechaun Economics? The Politics of an FDI-led Growth Model in Europe. *New Political Economy*, **23** (2), 223–238.

Romer, C. D. and Romer, D. H. (2017). New Evidence on the Aftermath of Financial Crises in Advanced Countries. *American Economic Review*, **107** (10), 3072–3118.

Schwan, M. (2017). Which roads lead to Wall Street? The financialization of regions in the European Union. *Comparative European Politics*, **15** (4), 661–683.

Simonazzi, A., Ginzburg, A. and Nocella, G. (2013). Economic Relations Between Germany and Southern Europe. *Cambridge Journal of Economics*, **37** (3), 653–675.

Stockhammer, E. (2015). Rising inequality as a cause of the present crisis. *Cambridge Journal of Economics*, **39** (3), 935–958.

— and Wildauer, R. (2016). Debt-driven growth? Wealth, distribution and demand in OECD countries. *Cambridge Journal of Economics*, **40** (6), 1609–1634.

Stöllinger, R. (2016). Structural change and global value chains. *Empirica*, **43** (4), 801–829.

Storm, S. and Naastepad, C. W. M. (2015a). Crisis and recovery in the German economy: The real lessons. *Structural Change and Economic Dynamics*, **32**, 11–24.

— and — (2015b). Europe's Hunger Games: Income Distribution, Cost Competitiveness and Crisis. *Cambridge Journal of Economics*, **39** (3), 959–986.

— and — (2015c). NAIRU economics and the Eurozone crisis. *International Review of Applied Economics*, **29** (6), 843–877.

— and — (2016). Myths, Mix-ups, and Mishandlings: Understanding the Eurozone Crisis. *International Journal of Political Economy*, **45** (1), 46–71.

Tan, P.-N., Steinbach, M. and Kumar, V. (2005). *Introduction to Data Mining*. Boston, MA: Pearson.

Vermeiren, M. (2017). One-size-fits-some! Capitalist diversity, sectoral interests and monetary policy in the euro area. *Review of International Political Economy*, **24** (6), 929–957.

Visser, M., Gesthuizen, M., Kraaykamp, G. and Wolbers, M. (2016). Trends in labour force participation of older men: Examining the influence of policy reforms, normative change and deindustrialization in the Netherlands, 1992-2009. *Economic and Industrial Democracy*, **37** (3), 425–447.

Wooldridge, J. (2010). *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: The MIT Press, 2nd edn.

Zucman, G. (2014). Taxing across Borders: Tracking Personal Wealth and Corporate Profits. *Journal of Economic Perspectives*, **28** (4), 121–148.

— (2015). *The Hidden Wealth of National: The Scourge of Tax Havens*. Chicago: Chicago University Press.

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