

Global dynamics and country-level development in academic economics: An explorative cognitive-bibliometric study

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Abstract

The structure of academic economics has received a fair amount of attention within and beyond the discipline. Less focus has been given the interdependencies of country and global dynamics. Building and advancing this tradition, this explorative study examines geographic variation and country specific developments in research practices in academic economics. More specifically I investigate the interdependencies of global dynamics with country-level developments in the US, Germany, UK, France, Switzerland and Austria. To that purpose the study investigates a large-scale data set using inequality measures and social network analysis. The dataset analysed in this study comprises 453,863 articles published in 477 journals citing each other a total of 3,807,289 times. This exploratory study confirms the high level of concentration and finds similar trends on the country level. Further, an international convergence in the discipline can be observed, possibly limiting the place-specific relevance of knowledge created in academic economics.

Keywords: economic sociology, academic economics, citation analysis, heterodox economics, concentration, geography of economics

JEL: N00, Z1, B3, B5, B00

1. INTRODUCTION

The structure of academic economics has received a fair amount of attention within and beyond the discipline itself, often originating from economists observing the mono-paradigmatic orientation of their discipline as part of their daily research. Already in the 1970s economists started to delimit themselves from neoclassical mainstream economics, developing distinctive thought collectives and research programs (Garnett, Olsen, and Starr 2009). The plurality of heterodox approaches, however, has had to face political repression and exclusion from core economic institutes (Lee 2009). In the 1990s, heterodox scholars argued for plural economics, to relate to and gain from the each other's scientific contribution while acknowledging their distinctive features (Decker, Elsner, and Flechtner 2019). In the 2000s, students called for a less formal mathematical and more real-world oriented economics (Post-Autistic Economics Network 2000), a critique that accelerated after the crisis in 2008 and has been extended to a wide array of civil society movements (International Student Initiative for Pluralism in Economics 2014) including critical appraisal from mainstream economists themselves (Colander et al. 2009) and heterodox scholars (for instance Lavoie 2014). Heterodox scholars have further expanded their theoretical (Dow 2019; Gräbner and Strunk 2020) and social foundation (Decker et al. 2019; Dobusch and Kapeller 2012) to ensure high scientific standards (Gräbner and Strunk 2020) and a lived mutual interest (Dobusch and Kapeller 2012) in heterodox plural economics.

These developments have been complemented by research that has aimed to better understand the structure of the discipline (Ferguson and Johnson 2018), often through the lens of cognitive bibliometrics (Aistleitner, Kapeller, and Steinberger 2017; Arms and Arms 1978; Rip and Cour-tial 1984), i.e. the analysis of citation patterns to reveal latent social structures underlying a

discipline. Building and advancing this tradition, this explorative study examines the geographic variation and country specific developments of research practices in academic economics.¹

In the following, I give a brief overview of the relevance of the geographic dimension of the structure of academic economics followed by a discussion of the methodology, data processing and indicators used in the analysis. Section 4 first discusses trends in global economics and examines the relevance and impact of selected countries on academic economics at large. This is followed by a detailed discussion of country-level dynamics in terms of geographic orientation, concentration, interdisciplinarity as well as diversity, and paradigmatic developments. The results are summarized in section five which also discusses the findings in the light of the literature. Finally, I conclude with possible implications for the place-specific relevance of academic economics given its international convergence and focus on the US.

2. GEOGRAPHY AND THE STRUCTURE OF ACADEMIC ECONOMICS

Geographical aspects of the structure of academic economics have received some interest in economic sociology and beyond. Most commonly studies investigate the concentration of attention (measured with citations) on certain places or countries, or similarly evaluate them in terms of their research performance. Studies that investigate place-specificities in knowledge creation and respective spatial variations, however, have received less attention.

Gibson's (2018) findings on geographic concentration on the zip-code level provide a remarkable entry point to reflect on the role of certain places in economics: three US zip-codes receive

¹ This article is based on calculations and figures also published in [Aigner \(2019a, 2019b, 2019c, 2019d\)](#). However, the focus of the studies was on Germany. Regional variation (the focus of this article) has only been secondary in these German-language publications.

50 percent of all citations, in other disciplines the top three zip-codes receive 12 percent of all citations. Thus, contributions that receive discipline-wide attention take place only in a few places, raising questions about the geographic scope of academic economic knowledge, and hence, its relevance for other places. Barnes (2001) argues, that knowledge production is place-based and economic geography should be cautious about the spatial origin of scholarly contributions. Similar arguments hold for economics at large: places are linked to political conflicts, place-specific cultures and institutions, and regulatory bodies limiting or enabling certain research, and interfering with its evolution. Along these lines, Fourcade (2006, 2009) identifies the emergence of a transnational professional economic ecosystem, as well as emphasising the concurrent stability of nationally-specific economic research programs and knowledge creation. Surveys of the discipline also suggest that academic economics is biased towards certain areas. For instance, Laslier (2018) find that by far the largest share of empirical studies in economics builds on data collected in the US, limiting its relevance for place-specific dynamics outside the US.

Analysis of citation patterns point to a high concentration of attention and research output in economics. Articles published by top-universities in the United States, by authors that have already published articles with a high number of citations and are in a high-ranked orthodox economic journals, commonly receive the most attention. This is not surprising, since they operate at the intersection of the six ‘tops’ on which economics concentrates: top articles, top journals, top institutions, top countries, top paradigms, and top authors (Glötzl and Aigner 2019a). A wide range of research confirms these citation patterns and draws attention to the core-periphery topology (Dobusch and Kapeller 2012), lock-in in neoclassical economics (Dobusch and Kapeller 2009) including related affirmative trade discourses (Aistleitner and Pühringer 2019), and neoclassical-stability – even in the face of a financial crisis that confronted mainstream economics with its shortcoming (Aigner et al. 2018). Further features of global

academic economics are a limited interest in other disciplines (Angrist et al. 2020; Fourcade, Ollion, and Algan 2015; Truc et al. 2020), in contributions by their heterodox colleagues (Kapeller 2010), and in quantitative methods (Angrist et al. 2017).

Spatial aspects of research, also in economics, have been investigated in the context of research evaluation. Spatial scientometrics (Frenken, Hardeman, and Hoekman 2009) has investigated home-bias in citations (Hellmanzik and Kuld 2020), collaboration of researchers across national borders (ibid.) or within (Yuret 2020), or according to spatial distance (Waltman, Tijssen, and Eck 2011). Further, related agglomeration effects (Bosquet and Combes 2013) as well as spatial aspects of editor and author networks (Baccini and Barabesi 2014; Hodgson and Rothman 1999), and possible impact of differing languages between places (Hellmanzik and Kuld 2020) have been studied. Although these studies investigate the spatial distribution and relations of academic economic activities, their conceptualization of knowledge rests on place-independent contributions; only varying in the respective quality and productivity, not in terms of paradigmatic orientation, place-specific value-systems or place-relevance of their contributions.

The role of place-specific histories in academic economics has been studied to a lesser extent. In the case of Germany studies find a strong orientation on ordo-liberalism, that has its roots in the 1970s, and affects academic economics until today (Kapeller, Pühringer, and Grimm 2021). The two-party orientation of academic economists in the US that influences US-based economists (Jelveh, Kogut, and Naidu 2014), is also a country-specific phenomena. Scholars also find impacts of the Anglo-American-driven globalization of the discipline on local research cultures (Maesse 2018), as well as limited theoretical autonomy, due to the subordination to global economics of professional economists in the case of Argentina (Heredia 2018). Further research points to the focus on English-language contribution in research evaluation (Van Leeu-

wen et al. 2001) and the impact of country-specific research regulations on the respective research conducted (D'Ippoliti 2020; Stockhammer, Dammerer, and Kapur 2021) Accordingly, scholars debate about the potentially long-lasting impacts of US-oriented research evaluation on the European economic profession (Colander 2014). Finally, the interdependencies of global geopolitics might be illustrated in the case of the marginalization of heterodox economists in the 1960s; indeed, they have been denied tenure and access to core institutions due to their conceptual compatibility with core figures in communist countries (Lee 2009).

The geography of academic economics has been studied along several directions. Studies have not only investigated the focus of economics on certain places but indicated the place-specificity of knowledge created in academic economics. Further, the effects of the transnationalisation on local research cultures, but also the effects of regional research regulation and geopolitical dynamics have been discussed.

3. METHODOLOGY

In the following I first elaborate on the cognitive bibliometric methodology and the conceptualisation of academic economics pursued in this study. Secondly, I discuss the dataset and the respective robust subsamples analysed in the study. Thirdly, I elaborate on the indicators used to reveal latent structures in global and country-level academic economics.

3.1 Cognitive bibliometrics and 'academic economics'

This research builds on a cognitive bibliometrics methodology to investigate structures in academic economics and their independencies with country-specific developments. More specifically I discuss seven countries: three German-speaking countries; three large European coun-

tries; and the US, the dominant country in global academic economics. To that purpose, I develop indicators that transform the bibliographic dataset so that it is more comprehensible to readers in the field, and gives insight into the disciplines structure (Rip and Courtial 1984). The insights drawn from the indicators depend on the “intuition of the analyst, his knowledge of the field and his assimilation of experts’ knowledge” (Rip and Courtial 1984:395). The interpretations of this study are informed by the discussed literature on geographic place in academic economics, and my personal background in heterodox economics.

The object of interest are structures in academic economics i.e., the scientific discipline that investigates real economic processes (Lee 2009, 2012). The study is confronted with the challenge that academic economics is not a homogenous field. Varying definitions of economics exist that depend on the particular paradigmatic orientation of thought collectives (Dobusch and Kapeller 2012) and authors’ *preanalytical visions* (Schumpeter 1954). To cover all articles vaguely related to economics, the definition of academic economics pursued in this study entails not only research on real economic processes, but also contributions by scholars that self-identify or are identified as economists. To operationalize that broad notion of economics, the study builds on the definition of Clarivate’s Web of Science and includes all articles listed in the research area *economics* published between 1957 and 2017.

To investigate country specific academic economics I developed indicators that built on citation patterns. Citations are thus conceptualized as signifiers of (country-specific) research practices, related research cultures and paradigmatic orientations. This appears reasonable when motivations for citations are considered. The motivation to cite a particular article or other contributions in a scientific article can have multiple dimensions. Cronin (1984) gives an overview on motivations for citations and points out that some scholars list more than 20 different possible motivations. Kapeller (2010) argues that heterodox economists should cite strategically to

strengthen their research community. Hence, citations not necessarily refer to research that is content-wise relevant to a particular article, but also signifies proximity to a certain research tradition, or other constituencies of meaning and decision-making processes of researchers, i.e. their cultures (Wilson 2009). Given that, indicators based on citations are indeed more likely to provide insights in specific research communities and their research cultures than to reveal the quality of a cited article.

3.2 Data and subsamples

The dataset analysed in this study comprises 453,863 articles published in 477 journals citing each other a total of 3,807,289 times.² The citations in the data set therefore represent the internal citation structure of academic economics, covering not only mainstream research programs but also contributions at the periphery of the discipline. For the reliance on Clarivate’s Web of Science, certain geographic and language biases (Van Leeuwen et al. 2001) related to its business practices cannot be avoided.³ For instance, there is a sharp increase between 2006 and 2008 in the number of articles in the data set, during this period Web of Science added more journals to the research area *Economics* (details see Glötzl and Aigner 2019), potentially affecting the indicators.

Compared to other studies on academic economics, the dataset covered here is one of the most comprehensive ones. This is necessary to ensure a full coverage of geographic structures and paradigmatic particularities. As we will see, geographic structures to some extent go hand in

² An in-depth discussion of the data set and generation can be found in Aigner (2019e). The code is available on Github (Aigner [2018] 2018).

³ I expect that also this study overrepresents research from English speaking countries, as 95 percent of all articles are English-language articles, and only 0.76 percent of all articles are German-language. For instance, the majority (69.3 percent) of the German-language articles were published in the *Jahrbuch für Nationalökonomie und Statistik* and the *Zeitschrift für Betriebswirtschaft*. Over the course of the last 20 years, however, the proportion of German-language articles decreases in the dataset.

hand with paradigmatic orientations. Since heterodox research is in the periphery, only a comprehensive dataset allows to also include the respective contributions in a quantitative study like this.

Setting the boundaries of scientometric analysis has led to debates within selected communities (Spash 2013). Implications from limited samples can also be illustrated by two recent large-scale studies published by Angrist et al. (2017, 2020) in the *American Economic Review* and in the *Journal of Economic Literature*. Angrist et al.’s (2020) sampling strategy rests on a top-down approach, defining economics by contributions to journals that have been cited by the most cited journals in the discipline. In total, their sample covers about 50 journals. Similarly, Angrist et al. (2018) only covers mainstream economic journals despite covering a larger sample of 80 journals. Both studies, thus, provide no insights into non-mainstream or “peripheral” economics research.

The full dataset in this study, however, does not cover all dimensions robustly. To avoid selection biases I composed subsamples for the country-level and the paradigmatic analysis. Table 1 gives an overview on all observations and the two subsamples. The *full dataset* covers articles in 477 journals published between 1957 and 2017 but not necessarily each year in the time-period.

The *paradigmatic subsample* covers articles in 429 journals published between 1957 and 2017 with articles also present in the year 2016. As Glötzl and Aigner (2019), I also distinguish between *heterodox journals* i.e., journals that also publish heterodox content and *orthodox journals* i.e., those that only accept mainstream content. I use Kapeller and Springholz (2016) to assign the paradigmatic orientation of journals. Their classification builds on articles published in 2016, hence only journals with articles in that year are considered. The actual content of individual publications is not examined. It follows that the proportion of heterodox publications

is overestimated, since some of the articles in heterodox journals follow an orthodox research program.

The *geographic subsample* of both the full and paradigmatic subsample (see numbers in brackets in table 1) covers only articles published between 1997 and 2017. In that time period robust geographical information (based on author affiliation and contact details) is available (details Aigner 2019). The location of co-authored articles has been split proportionally to the countries of the respective authors. The same approach has been taken for citations.

3.3 Method and indicators

The indicators used in this study draw on inequality research, social network analysis and indicators developed for that study.

To examine the concentration of article-citations I calculate the Gini coefficient (Gini 1912) and country-shares in the most cited articles (Glötzl and Aigner 2019a). To better understand the position of certain countries in global economics, I draw on the social network analysis of a country network. A network where the countries are connected by citations between them. More specifically, I calculate the *betweenness centrality* i.e. the share of shortest paths that cross a certain country in a country citation network. *Betweenness centrality* is a common indicator in social network analysis (Marin and Wellman 2011) and has also been used in scientometrics (Glötzl and Aigner 2018; Leydesdorff 2007). Countries with a high betweenness centrality have a kind of a steering role in the network because a high shares of information flows across them (ibid.). International convergence is investigated by the mean percentile of the most cited articles of a particular country in the global article-citation distribution.

To study interdisciplinarity I calculate the share of citations that do not refer to peer-reviewed economic articles. This includes citations to peer-reviewed articles in other disciplines and grey literature (including books, reports, newspaper articles, working papers, data sources, etc). Changes may indicate an increase in the quality of sources, i.e. an increasing rigidity in the interpretation of what is considered worthy of citation in economics, or a decline in collaboration with other disciplines. Hence to interpret the indicator it is necessary to assume that the share of citations to grey literature remains stable. One reason that is not the case is the higher quality standards in economics and a neglect of grey literature. At the same time an increasing share of citations to working papers would increase interdisciplinarity in these terms. To examine the diversity I calculate the number of cited unique journals relative to all citations for each article.

To study the paradigmatic orientation I calculate the heterodox article share i.e., the share articles published in heterodox journals have in all articles and the heterodox citation share i.e., the share citations to heterodox journals have in all citations. Further, I also examine the share of articles that cite books by four authors that stand for contested positions in academic economics (Aigner et al. 2018; Hicks 1999, 2004; Lindholm-Romantschuk and Warner 1996). More specifically books by (1) Friedman as a representative of the Monetarist Revolution (Mirowski and Plehwe 2009; Screpanti and Zamagni 2005), (2) Marx for his political impact that has been particularly contested during the cold-war period (Lee 2009), (3) Keynes for his contribution in the aftermath of the Global Depression that established alternative concepts at the core of economics for a certain time period (Pasinetti 2007) but later have been integrated into neoclassical economics as part of New Keynesian Economics (Screpanti and Zamagni 2005), and finally (4) Minsky, whose works on financial instability have been particularly foreseeing with regard to the financial crisis 2008 (Palley 2013).

I calculate the respective indicators for the appropriate subsample. In several instances the figures have one scale for the US and one for the other observations. This is necessary to make trends over time visible. Further, all observations have been smoothed with a moving average (the dots in the figures show the uncorrected observations).⁴

4. RESULTS: GLOBAL DYNAMICS AND COUNTRY LEVEL VARIATION

This section outlines the main findings of the analysis of the dataset based on the outlined indicators. In the next subsection I situate the respective countries in global academic economics in terms of their shares of articles, citations, shares in the most cited articles, and their betweenness centrality in the global country network.

Subsection 2 to 6 describe varying patterns of citations in each of the examined countries. More specifically subsection 2 examines the geographic orientation of countries, 3 concentration in countries and international convergence, 4 interdisciplinarity and diversity in countries, 5 country specific paradigmatic developments in terms of heterodox articles and citations, and 6 global and country-level paradigmatic development in terms of books.

4.1 Growth, Concentration and US-Dominance

This subsection gives an overview of articles published and cited in economics, and further examines the position of the respective countries in global academic economics. Publication activity in academic economics has increased from about 2,000 in 1957 to 21,000 in 2017

⁴ The tables and figures have also been published in a German book chapter on academic economics in Germany (Aigner 2019b) and have been adopted to fit the purpose of that paper.

(Glötzl and Aigner 2019). The increasing number of articles is accompanied by an almost exponential growth in citations (*ibid.*). Glötzl and Aigner (2019) give an overview on the concentration in academic economics along six dimensions, finding high levels of concentration in all of them. Also in this study article-citations are unevenly distributed: 37 percent of all articles are not cited a single time. The Gini coefficient of citations to all articles is 0.82 and that of cited articles 0.72 (Table 1). Further, the concentration has increased strongly. The Gini of article-citations in 1960 was still 0.2, compared to 0.5 in 2008. Since then the increase has levelled off and stabilized at that level (Glötzl and Aigner 2019).

Publication activities and incoming citations also vary between countries. Between 1997 and 2017, 28 percent of all articles were written in the US, 9 percent in Germany, 8 percent in the UK and less than 3 percent other European countries (Table 1: values in brackets). Figure 1 (right scale) further shows that the US receives more than half of all citations while the UK, Germany and other European countries receive 8, 5 or less than 3 percent, respectively. Over the past 20 years the articles (figure 2:1) and citation shares (figure 2:2) of the US and the UK have declined continuously. Concurrently shares in continental Europe have increased. The increase is particularly pronounced in Germany, where the share was 6 percent of all articles as well as 3 percent of all citations in 1997, rising respectively to almost 10 percent and 7 percent in 2017. Nevertheless, the respective shares remain considerably higher in the US (22 percent and 45 percent) than in the European countries.

This suggests that the central position of the US in global economics is in decline. However, an examination of the most cited 5 percent of articles and the betweenness centrality in the country network reveals that the US has stabilized its position. Figure 2:3 shows the shares of countries in the most frequently cited 5 percent of articles. Although the US-article shares decline by 10

percentage points, in 2017, 60 percent of the most cited 5 percent of articles are still from authors located in the US and only 15 percent from European authors. Within Europe, UK has a share of about 6 percent, and Germany about 4 percent in 2017. The strong concentration of economics on a few articles implies that the most frequently cited articles are formative for the discipline, and hence, the US is at the academic economics geographic core.

The strong position of the US is also confirmed by an analysis of the country citation network i.e., a network built of countries and the citations that flow between them. This network only entails citations that cross country borders. Figure 3:4 shows the betweenness centrality of each country i.e., the share of shortest links in the country citation network that cross the respective country. Countries with high betweenness centrality can be interpreted as control points in a communication network (Leydesdorff 2007). Almost all shortest paths (90 percent) in the country citation network pass the United States. Indeed, the US could stabilize its position from 1997, when only 80 percent of the shortest paths passed the US. Until 2007, the UK still played a certain role, and Germany became more important for a short period around 2010. Although the UK remains well above the level of the other European countries with about 6 percent, it remains at a low level compared to the US.

It appears fair to conclude that academic economics is dominated by the US, who holds a steering role in global economics. Among the European countries, UK has lost ground while Germany has recently received more attention. France appears to receive less attention in global economics. Indeed, Switzerland, despite being a very small country, receives a similar share of citations. Austria appears almost irrelevant. The US-dominance in academic economics is astonishing. Almost all articles are related with each other via an article published in the US.

4.2 Country specific geographic orientation: Inwards, outwards, westwards...

The role of distance and geographic orientation has received some attention in the study of sciences. Waltman, Tijssen, and Eck (2011) find that economics has one of the highest mean distances of citations in the social sciences, similar to those of natural sciences like physics or astronomy. The geographic orientation of economics has mainly been studied with a focus on research performance. Finding, for instance, a home-bias i.e. higher numbers of citations to countries of origin (Hellmanzik and Kuld 2020). This section examines the varying patterns in the geographic orientation in the seven countries. More specifically the orientation towards domestic research, its import-export relations, and the cardinal direction of its citations.

Figure 3.1 shows the share of domestic citations out of all citations for the respective country. A particularly high inward orientation can be observed in the US, where in 2017 more than every second citation referred to articles published in the US. In the European countries, the UK has the highest share of domestic citations with 15 percent, followed by Germany with 8 percent, and 5 percent in the other countries. In the last 20 years all countries except Germany have reduced their share of domestic citations. Germany almost doubled its domestic citations with an increase of 3 percentage points.

Similar trends can be observed in the import-export ratio of citations i.e. the ratio between incoming to outgoing citations (figure 3:2). Incongruously from the share of domestic citations, this indicator only considers citations that cross country borders. Only the US and the UK receive a higher number of citations from other countries than the articles they cite from other countries. The US receives 3.6 citations for each citation from another country, the UK 1.1 citation. Continental European countries receive less citations from other countries than their citations of other countries. The lowest import-export ratio can be observed for Germany, though it has increased since 2012; a trend that complements the increasing share of domestic

citations in Germany. Together the two trends lead to Germany's increasing share of citations globally.

To analyse the cardinal orientation of academic economics, a detailed examination of citation relations between Germany and other countries is insightful. It reveals not only the often-observed orientations towards spatially closer countries but also an orientation towards the west. The light-bars in figure 4 shows the extent to which Germany cites countries overproportionally (thus more than the share of citations Germany has globally) and the light-bars show the extent to which Germany is cited overproportionally by a country (thus more than the share of citations Germany receives globally). Germany cites all European countries, except for Eastern Europe, more than they are cited on a global average (light-bars) and Germany is cited more by European countries (except the UK), than Germany is cited globally on average (dark-bars). This indicates a westward orientation in economics.

Overall the international orientation appears to increase in the seven countries, with the exception of Germany where the share of domestic citations declines. Despite the increasing outward orientation of the respective countries, they are increasingly cited more from other countries than they cite other countries. Aside from general international relations, we can also observe a westward orientation in the case of Germany.

4.3 Country-level concentration and international convergence

The role of country-specific research traditions has been discussed in several instances in the literature. For instance, Fourcade (2006) argues that concurrent to the transnationalization of economics, country-level research traditions remain pervasive. Further, case studies point to

path-dependencies in local research traditions (Kapeller et al. 2021), the effects of nation-specific regulatory interventions (D'Ippoliti 2020; Stockhammer, Dammerer, and Kapur 2017), and cultural responses to the transnationalization of economics (Maesse 2017). This section investigates first, if concentration is only a global trend, or can also be observed in all of the respective countries, and second, if the respective countries concentrate all on the same most-cited articles, or if countries follow their own research avenues with specific most-cited articles.

Concentration on the country-level also follows global trends. Figure 6:1 shows the share of citations of the respective country that goes to the 5 percent most frequently cited articles from the same countries. Globally, and in the US a 3 percentage point increase to 32 and 28 percent respectively can be observed. In the other countries, the increase varies between 2 and 10 percentage points. A particularly strong increase of 6 percentage points each can be observed in Germany and Switzerland. In all countries, however, the concentration has stabilised since 2012.

The high level goes hand in hand with a convergence in the most cited articles in the respective countries i.e. all countries examined in this article increasingly cite articles that are also globally the most cited articles. Figure 5:2 shows the mean percentile of the 5 percent regionally most frequently cited articles in the global citation distribution. Globally, the five percent most cited articles have a mean percentile of 2.5.⁵ Hence, values nearby or above this value indicate that the articles most cited in a particular country are the same as the globally most cited articles i.e., economics in the respective country mirrors the research focus of global economics.

⁵ The value can be beneath 2.5 since the five percent most cited articles in a particular country can be less than the globally five percent most cited articles and hence, if all the regionally most-cited articles are between the 0th and 5th percentile the mean might decline beneath 2.5.

The value is particularly low (with 2.36) for the US for the whole time-period. This is also to be expected since the US has influence on the percentile position of articles in the global article-citation distribution for its high share of articles and thus citations. In 2017, low levels can also be observed in other countries: 3 for the UK and Germany, and between 5 and 7 for the other countries.

Over the course of the last 20 years, international convergence can also be observed. The percentile declined for all countries, indicating that the most cited articles in the respective countries only recently became the same as those globally most cited. The strongest decline can be observed in Austria from 15 to 7 and France as well as Switzerland from 9 to 6. Germany has also increasingly cited the same globally popular articles. In the UK the level has remained low since 1997.

To sum up, an examination of country-level concentration and most-cited articles shows that article-citation concentration cannot only be observed globally, but in all discussed countries. Concentration also follows the same dynamics in all countries. Differences between the countries in the most cited articles is decreasing over time, suggesting that economics is converging globally.

4.4 Patterns of interdisciplinarity and internal diversity

Scholars also discuss the interdisciplinarity of and internal diversity in academic economics. Comparing economics with other disciplines, scholars find a low level of interest in other disciplines by economists (Aistleitner, Kapeller, and Steinerberger 2019:20; Angrist et al. 2020; Truc et al. 2020), and often, when such an interest is pursued, economic imperialism prevails (Mäki 2009; Mäki, Walsh, and Fernández Pinto 2018). However, not only diversity beyond, but also diversity within academic economics might reveal insights. In particular as scholars

have argued that academics becomes more pluralist within the mainstream, because, as the argument goes, the variety of methodologies has increased in since the early 2000s (Colander, Holt, and Rosser 2004).

To examine the *interdisciplinarity* of economics, figure 6:1 shows the share of citations to non-economic journals. In 2017 globally about 63 percent of all citations refer to sources not listed in economics. High levels can be observed in UK (68 percent) and lower levels in France (60 percent). Between 1997 and 2017, an overall decline of about 8 percentage points can be observed in all countries. In these terms, I cannot confirm the findings of Angrist et al. (2020) or Truc et al. (2020). This is either related to changes in the shares of citations to reports, data sources or newspaper articles, or reflects the fact that their studies do not cover academic economics as a whole. Since the focus of this study lies on country level variation in academic economics, most strikingly, I observe the same trend in all countries.

To better understand the breath of interest within academic economics I calculated the diversity of sources that articles cite. Figure 6:2 shows the number of unique journals cited relative to all citations of an article. The indicator approaches one, when each citation refers to a different journal and declines with a higher number of citations to the same journal. I observe a decline in variety of sources economists draw on in their articles. In 2017 globally 0.53 different economic journals were cited per citation. Slightly fewer were cited in European countries (0.5) and least in the US (0.45). In addition, a decline can be observed in all countries. In 1997 articles cited 0.63 journals per citation globally (and in Germany and in Switzerland), and 0.54 in the US, where the decline is particularly sharp with 10 percentage points.

In terms of interdisciplinarity and diversity I find a decline in all observed countries. Further, the developments in the respective countries run in parallel, suggesting that there are little country specific developments, as also indicated in the last section. Only in the UK are citations to

sources beyond economics more common. In the US, diversity in journal-citations is particularly low. Further, if mainstream pluralism prevails in economics, it takes place in independent hubs that show little interest in each other, at least, if the variety of cited journals is used as an indicator.

4.5 Country specific paradigmatic developments

This section examines country specific developments in terms of the paradigmatic orientation of economics. As already mentioned, economics can be described as having a core-periphery pattern (Dobusch and Kapeller 2012) where academic contributions that deviate from the core principles of neoclassical economics receive less attention (Glötzl and Aigner 2018, 2019a). Knowledge creation is also affected by conflicts and regulations in certain places (Barnes 2001) and the trajectories and histories of heterodox economists vary between countries (Lee 2009). Further, more contemporarily heterodox scholars also face country-specific regulatory constraints through research assessment (D'Ippoliti 2020; Stockhammer et al. 2021).

Figure 7:1 and 7:2 show the share of heterodox articles and citations globally and on the country level. Globally, the share of heterodox articles is about 8 percent, with little change over time. In the observed countries we can also mostly observe the same level and little dynamics over time. In the UK the share is almost twice as much with 15 percent, as an exception. Austria achieves in 2017 almost the same level, after a continuous increase over the observed time-period. Heterodox citation-shares run largely in parallel to these developments, only the heterodox citation is about half of the heterodox article share. This confirms the results of Glötzl and Aigner (2019) on the global level. Further, it shows that paradigmatic concentration is more pronounced in citations than articles not only on the global, but also on the country level.

Figures 7:3 and 7:4 show the share of heterodox citations in orthodox and heterodox journals. They confirm the finding that heterodox journals cite far more heterodox journals than orthodox journals do (Kapeller 2010). Nevertheless, I also find almost a doubling in the share of heterodox citations in orthodox journals, globally and in the countries. The share of heterodox citations in heterodox journals remains stable. Furthermore, in both orthodox and heterodox journals the heterodox citation shares are highest in the countries where heterodox article and citation shares are the highest. This suggests that stronger heterodox traditions in a country is also adopted by scholars that publish in orthodox journals. This does not necessarily imply that heterodox research is indeed cited, to that purpose a detailed analysis would be required that inspects the content of individual articles.

In terms of paradigmatic orientations, country-level dynamics largely mirror global dynamics. Only in the UK and Austria is heterodox research particularly strongly represented. Further, in these countries orthodox research also devotes the most attention to heterodox journals.

4.6 Points of reference: Friedman, Marx, Keynes, and Minsky

The interdependencies of academic economics with geopolitical developments has been discussed in economics sociology in several instances (Fourcade-Gourinchas 2003). One example is the expulsion of heterodox scholars from neoclassical economics institutes as part of the cold war in the 1970s (Lee 2009). Glötzl and Aigner (2019) argue that this shift can also be observed in long-term citation dynamics. To reveal similar long-term dynamics figure 8 shows the share of articles that cite books of authors (Friedman, Keynes, Marx, and Minsky) known to be contested within academic economics.

Among the four authors, Friedman received the most attention over the course of the last 60 years. He was particularly influential in the early 1970s, at a time when heterodox scholars were

being excluded from core economic institutions in the US. Since then, however, citations to Friedman's books have declined continuously. Keynes is the second most influential author and was the most cited at the very beginning (until 1959) and very end (after 2012) of the observed time-period. In a short period in the 1980s he also received more citations than Friedman, at the time when New Keynesian Macroeconomics became prominent in mainstream economics (Screpanti and Zamagni 2005). The most striking dynamics can be observed in citations of Marx. Marx received similar levels of attention to Keynes from the 1970s onwards until the 1990s. He has been hardly cited from then onwards. Like Keynes and Minsky, his books have received more attention in academic economics since 2008.

In terms of citations of books on the country level, Friedman has been overproportionally cited in the US. In France, Keynes received additional attention after the crisis, however, this has not been long-lasting. The same but more lasting trend can be observed in UK: there, the share of articles citing Keynes, Marx or Minsky has risen by 0.5 and 0.8 percentage points respectively since 2008. In Germany and the US, books by Keynes have been cited more frequently since 2012; in the case of Marx and Minsky, a trend reversal can be observed in 2008. In contrast to the authors associated with heterodoxy (Keynes, Marx, and Minsky), Friedman's downward trend continues in all countries despite strong fluctuations.

Overall, the trends in citations to contested books suggests that the cold-war affected academic economics, indicated by the stark decline of citations to Marx in the early nineties, when also the end of history was announced (Fukuyama 1992). A similar trend cannot be observed with Keynes, possibly due to the emergence of New Keynesian Economics. Given the interdependencies of Friedman with neoliberal thought collectives, the fact that he is cited particularly in the US possibly also reflects US' position in the cold war. In these terms, this is the other side of the coin of heterodox marginalisation. Friedman remains the most influential author until

2012, when Keynes becomes the most cited author out of the four. In 2012, a few years after the Occupy movement demanded the end of capitalism (Graeber 2013), also Marx became more influential in economics.

5. DISCUSSION AND CONCLUSION

The role of place in knowledge production has received some attention by scholars that study academic economics. Contributions have been concerned with the concentration of certain places (for instance Glötzl and Aigner 2019), the globalization of the discipline (for instance Fourcade 2006), interdependencies with political economic developments (for instance Lee 2009) and country-specific developments (ibid.).

Globally, this study confirms that academic economics is highly concentrated, and that research is primarily focused on contributions in the US. Similar findings have been made by several other studies (Aistleitner et al. 2019; Glötzl and Aigner 2019a; Hodgson and Rothman 1999). The study also confirms that this dynamic is particularly strong in the case of the most cited articles (Glötzl and Aigner 2019a). Using social network analysis, I further find that almost all relations between articles in economics cross articles published in the US. Subsequently, the US appears to have a *steering function* in global academic economics. Thus, from a geographic perspective, academic economics is concentrated towards the top, as well as towards the US, and hence developments in the US are particularly important for the discipline.

Scholars that conduct detailed studies on histories of scholarly traditions point to place- and country-specific developments (Barnes 2001; Lee 2009). Indeed, they emphasize the context and place-specific political conflicts that affect scholarly work. Given the current state of economics, however, indeed country-specific developments in the US affect the discipline most of all. I observe a few particularities when it comes to US economics. In addition to the highest

share of domestic citations, the US has the highest article-citation concentration, the lowest level of interdisciplinarity and diversity in journal-citations, the lowest share of heterodox articles and heterodox citations, and the strongest orientation on the neoliberal thought collectives measured in terms of citations to Friedman. Overall, this suggests that research in the US is particularly mono-paradigmatic and locked into neoclassical mainstream economics.

Fourcade (2006, 2009) elaborates on the transnationalization of academic economics; country-specific economic orientations persist while an ecosystem of transnational professional economists establish themselves. Along these lines Maesse (2017) identifies an internationalization in academic economics in Switzerland, and moreover, studies its impacts on local research cultures. Similarly, I find an international convergence where country-specific research traditions become secondary compared to global trends. First, since numerous trends we observe in the study run parallel in the examined countries. This is the case for country-level concertation, interdisciplinarity and diversity as well as the share of heterodox articles and heterodox citations. Second, we find a convergence of the most-cited articles in the studied countries to the most-cited articles globally. The globally most cited articles are further the same as the most cited articles in the US. Hence, academic economics in the examined countries converges to research published in the US.

Further, the study also reveals country-specific trends, accentuating that not necessarily all research in a certain country follows the same trend. Two countries, the UK and Austria, can be identified as heterodox hubs where also orthodox journals attribute a certain level of attention to heterodox journals. An examination of citation shares also suggests that a stronger orientation towards heterodox research in selected regions also affects research published in orthodox outlets. This is in line with findings on the department-level where case studies suggest that a

heterodox research tradition in a department also affects orthodox research (Glötzl and Aigner 2018).

Finally, the study also draws attention to global political economic developments and their interdependencies with academic economics paradigmatic orientations. In particular, here the stark decline of citations of Marx in the early 1990s, and the concurrent increase of citations of Marx, Minsky and Keynes after the financial crisis 2008 hint at a reorientation in academic economics, if only on the periphery of the discipline (see Aigner et. al. 2018). However, citations to books also suggest country-specific historical path-dependencies, as indicated by the strong focus in Friedman in the US that can be interpreted as the long-term implication of heterodox exclusion from core institutes.

Although the exclusion of heterodox scholars is not an open practice in today's academic institutions anymore, as it was during the cold war, institutional arrangements in particular in the form of research evaluation stabilize these historical developments (D'Ippoliti 2020; Dobusch and Kapeller 2009; Stockhammer et al. 2021). Indeed, the findings in this study also confirm worries raised by scholars that European economic traditions might lose importance because trends in citation practices indeed show these developments. In addition, the findings suggest that what is published and receives attention is defined by US institutions. Hence, the institutionalization of research assessment based on citation metrics rather evaluates the proximity of research published to current trends in the US, than the inherent quality of research and even less the relevance of the respective contributions to country-specific political economic questions.

5.1 Limitations and future research

Of course, studies that are more specific would be required to reveal the structures and conjunctions that stabilize the respective trends and trajectories identified in this quantitative study. Along these lines, historical research, narrative interviews with scholars that have been part of marginalized traditions in economics, but also those located at core institutes, could be insightful in that regard. Studies investigating the interdependencies of public economic discourses in particular countries and related research practices could also be insightful. A stronger focus on the text of the respective publications could ensure a more accurate depiction and interpretation of paradigmatic developments and ideological orientations, also on the country level. Finally, despite the scope of the study in terms of articles covered, the study focuses geographically only on dynamics in the US and Western Europe. Thus, it neglects economic contributions from most of the world. For instance, with the growing importance of China in global capital accumulation processes, it will also gain impact and relevance in the development of academic economics.

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7. REFERENCES

- Aigner, Ernest. [2018] 2018. *Ernestaigner/Economics*.
- Aigner, Ernest. 2019a. Analyse: Wer in der globalen Forschungslandschaft wen wie oft zitiert. *Makronom*. Retrieved March 5, 2019 (<https://makronom.de/zitationsanalyse-oekonomik-vwl-wer-in-der-globalen-forschungslandschaft-wen-wie-oft-zitiert-29893>).
- Aigner, Ernest. 2019b. Die deutsche Ökonomik im internationalen Vergleich. Globalisierung, Konzentration und Pluralismus. in *Ökonomie in der Krise Analyse - Kritik - Umgestaltung*, edited by G. Grözing, A. Heise, and H. Peukert.
- Aigner, Ernest. 2019c. *Die Ökonomik Deutschlands im globalen Vergleich. Konzentration, Globalisierung und Pluralismus. FGW-Studie*. 07b. Düsseldorf: FGW.
- Aigner, Ernest. 2019d. *Konzentration und Pluralismus der Ökonomik: Publikationszentrierte Sicht des deutschen Sonderweges. FGW-Impuls*. 07b. Düsseldorf: FGW.
- Aigner, Ernest. 2019e. *Netzwerke, Paradigmen, Attitüden. Der Deutsche Sonderweg Im Fokus – Paradigmen Der Ökonomie. Publikationszentrierte Sicht Des Deutschen Sonderweges*.
- Aigner, Ernest, Matthias Aistleitner, Florentin Glötzl, and Jakob Kapeller. 2018. *The Focus of Academic Economics: Before and After the Crisis. INET Working Paper*. 75. New York City: Institute for New Economic Thinking.
- Aistleitner, Matthias, Jakob Kapeller, and Stefan Steinberger. 2017. *The Power of Scientometrics and the Development of Economics*. 46. Linz.
- Aistleitner, Matthias, Jakob Kapeller, and Stefan Steinerberger. 2019. Citation Patterns in Economics and Beyond. *Science in Context* 32(4):361–80. doi: 10.1017/S0269889720000022.
- Aistleitner, Matthias, and Stephan Pühringer. 2019. *Exploring the Trade (Policy) Narratives in Top Economics Journals. SSRN Scholarly Paper*. ID 3425759. Rochester, NY: Social Science Research Network.
- Angrist, Josh, Pierre Azoulay, Glenn Ellison, Ryan Hill, and Susan Feng Lu. 2020. Inside Job or Deep Impact? Extramural Citations and the Influence of Economic Scholarship. *Journal of Economic Literature* 58(1):3–52. doi: 10.1257/jel.20181508.
- Angrist, Joshua, Pierre Azoulay, Glenn Ellison, Ryan Hill, and Susan Feng Lu. 2017. Economic Research Evolves: Fields and Styles. *American Economic Review* 107(5):293–97. doi: 10.1257/aer.p20171117.
- Arms, W. Y., and C. R. Arms. 1978. Cluster Analysis Used on Social Science Journal Citations. *Journal of Documentation* 34(1):1–11. doi: 10.1108/eb026649.
- Baccini, Alberto, and Lucio Barabesi. 2014. Gatekeepers of Economics: The Network of Editorial Boards in Economic Journals. Pp. 104–50 in *The Economics of Economists*, edited by A. Lanteri and J. Vromen. Cambridge: Cambridge University Press.

- Barnes, Trevor J. 2001. 'In the Beginning Was Economic Geography' – a Science Studies Approach to Disciplinary History. *Progress in Human Geography* 25(4):521–44. doi: 10.1191/030913201682688922.
- Bosquet, Clément, and Pierre-Philippe Combes. 2013. Do Large Departments Make Academics More Productive? Agglomeration and Peer Effects in Research. *VoxEU.Org*. Retrieved September 13, 2015 (<http://www.voxeu.org/article/do-large-departments-make-academics-more-productive>).
- Colander, David. 2014. Can European Economics Compete with US Economics? And Should It? Pp. 153–73 in *The Economics of Economists*, edited by A. Lanteri and J. Vromen. Cambridge: Cambridge University Press.
- Colander, David, Michael Goldberg, Armin Haas, Katarina Juselius, Alan Kirman, Thomas Lux, and Brigitte Sloth. 2009. The Financial Crisis and the Systemic Failure of the Economics Profession. *Critical Review* 21(2–3):249–67. doi: 10.1080/08913810902934109.
- Colander, David, Richard Holt, and Barkley Rosser. 2004. The Changing Face of Mainstream Economics. *Review of Political Economy* 16(4):485–99. doi: 10.1080/0953825042000256702.
- Cronin, Blaise. 1984. *The Citation Process: The Role and Significance of Citations in Scientific Communication*. Taylor Graham.
- Decker, Samuel, Wolfram Elsner, and Svenja Flechtner. 2019. A Pluralist Economics Teaching Is Practicable and Illuminating: A Conclusion. in *Advancing Pluralism in Teaching Economics: International Perspectives on a Textbook Science*, edited by S. Decker, W. Elsner, and S. Flechtner. S.l.: Routledge.
- D'Ippoliti, Carlo. 2020. *Democratizing the Economics Debate: Pluralism and Research Evaluation*. London: Routledge.
- Dobusch, Leonhard, and Jakob Kapeller. 2009. 'Why Is Economics Not an Evolutionary Science?' New Answers to Veblen's Old Question. *Journal of Economic Issues* 43(4):867–98. doi: 10.2753/JEI0021-3624430403.
- Dobusch, Leonhard, and Jakob Kapeller. 2012. Heterodox United vs. Mainstream City? Sketching a Framework for Interested Pluralism in Economics. *Journal of Economic Issues* 46(4):1035–58. doi: 10.2753/JEI0021-3624460410.
- Dow, Sheila C. 2019. Pluralist Economics. in *Advancing Pluralism in Teaching Economics: International Perspectives on a Textbook Science*, edited by S. Decker, W. Elsner, and S. Flechtner. S.l.: Routledge.
- Ferguson, Thomas, and Robert Johnson. 2018. Research Evaluation in Economic Theory and Policy: Identifying and Overcoming Institutional Dysfunctions. *G20 Insights*. Retrieved (https://www.g20-insights.org/policy_briefs/research-evaluation-in-economic-theory-and-policy-identifying-and-overcoming-institutional-dysfunctions/).
- Fourcade, Marion. 2006. The Construction of a Global Profession: The Transnationalization of Economics. *American Journal of Sociology* 112(1):145–94. doi: 10.1086/502693.
- Fourcade, Marion. 2009. *Economists and Societies: Discipline and Profession in the United States, Britain, and France, 1890s to 1990s*. Princeton: Princeton University Press.
- Fourcade, Marion, Etienne Ollion, and Yann Algan. 2015. The Superiority of Economists. *Journal of Economic Perspectives* 29(1):89–114.
- Fourcade-Gourinchas, Marion. 2003. Economic Sociology and the Sociology of Economics. 10.

- Frenken, Koen, Sjoerd Hardeman, and Jarno Hoekman. 2009. Spatial Scientometrics: Towards a Cumulative Research Program. *Journal of Informetrics* 3(3):222–32. doi: 10.1016/j.joi.2009.03.005.
- Fukuyama, Francis. 1992. *The End of History and the Last Man*. New York : Toronto : New York: Free Press ; Maxwell Macmillan Canada ; Maxwell Macmillan International.
- Garnett, Robert F., Erik K. Olsen, and Martha A. Starr. 2009. Economic Pluralism for the Twenty-First Century. in *Economic pluralism, Routledge frontiers of political economy*, edited by R. F. Garnett, E. K. Olsen, and M. A. Starr. Abingdon, Oxon ; New York, NY: Routledge.
- Gibson, John. 2018. *The Micro-Geography of Academic Research: How Distinctive Is Economics?*
- Gini, C. 1912. *Variabilità e Mutabilità*.
- Glötzl, Florentin, and Ernest Aigner. 2018. Orthodox Core–Heterodox Periphery? Contrasting Citation Networks of Economics Departments in Vienna. *Review of Political Economy* 30(2):210–40. doi: 10.1080/09538259.2018.1449619.
- Glötzl, Florentin, and Ernest Aigner. 2019a. Six Dimensions of Concentration in Economics: Evidence from a Large-Scale Data Set. *Science in Context* 32(4):381–410. doi: 10.1017/S0269889720000034.
- Glötzl, Florentin, and Ernest Aigner. 2019b. Six Dimensions of Concentration in Economics: Evidence from a Large-Scale Document. *Science in Context*.
- Gräbner, Claudius, and Birte Strunk. 2020. Pluralism in Economics: Its Critiques and Their Lessons. *Journal of Economic Methodology* 27(4):311–29. doi: 10.1080/1350178X.2020.1824076.
- Graeber, David. 2013. *The Democracy Project: A History, a Crisis, a Movement*. 1st ed. New York: Spiegel & Grau.
- Hellmanzik, Christiane, and Lukas Kuld. 2020. No Place like Home: Geography and Culture in the Dissemination of Economic Research Articles. *Empirical Economics*. doi: 10.1007/s00181-020-01860-0.
- Heredia, Mariana. 2018. The International Division of Labor in Economists' Field. Academic Subordination in Exchange for Political Prerogatives in Argentina. <p>*Historical Social Research / Historische Sozialforschung* Vol. 43 No. 3: Volumes per year: 1</p>. doi: 10.12759/HSR.43.2018.3.303-328.
- Hicks, Diana. 1999. The Difficulty of Achieving Full Coverage of International Social Science Literature and the Bibliometric Consequences. *Scientometrics* 44(2):193–215. doi: 10.1007/BF02457380.
- Hicks, Diana. 2004. The Four Literatures of Social Science. Pp. 473–96 in *Handbook of Quantitative Science and Technology Research*. Springer, Dordrecht.
- Hodgson, Geoffrey, and Harry Rothman. 1999. The Editors and Authors of Economics Journals: A Case of Institutional Oligopoly? *The Economic Journal* (109):F165-186.
- International Student Initiative for Pluralism in Economics. 2014. Open Letter - An International Student Call for Pluralism in Economics. *International Student Initiative for Pluralism in Economics*. Retrieved June 11, 2015 (<http://www.isipe.net/open-letter/>).
- Jelveh, Zubin, Bruce Kogut, and Suresh Naidu. 2014. Political Language in Economics. *Columbia Business School Research Paper* (14–57).

- Kapeller, Jakob. 2010. Citation Metrics: Serious Drawbacks, Perverse Incentives, and Strategic Options for Heterodox Economics. *American Journal of Economics and Sociology* 69(5):1376–1408. doi: 10.1111/j.1536-7150.2010.00750.x.
- Kapeller, Jakob, Stephan Pühringer, and Christian Grimm. 2021. Paradigms and Policies: The State of Economics in the German-Speaking Countries. *Review of International Political Economy* 0(0):1–27. doi: 10.1080/09692290.2021.1904269.
- Kapeller, Jakob, and Florian Springholz. 2016. Heterodox Economics Journals. *Heterodox Economics Directory: Your Guide to Heterodox Economics. 6th Edition*. Retrieved January 14, 2017 (<http://heterodoxnews.com/hed/journals.html>).
- Laslier, Jean-François. 2018. The Consequences of Internationalization on Research Topics in Economics. *European Political Science* 17(3):349–57. doi: 10.1057/eps.2016.8.
- Lavoie, Marc. 2014. *An Introduction to Post-Keynesian Economics: [With a New Postface on Subprime Financial Crisis]*. Nachdr. Basingstoke, Hampshire: Palgrave Macmillan.
- Lee, Frederic S. 2009. *A History of Heterodox Economics: Challenging the Mainstream in the Twentieth Century*. London ; New York: Routledge.
- Lee, Frederic S. 2012. Heterodox Economics and Its Critics. *Review of Political Economy* 24(2):337–51. doi: 10.1080/09538259.2012.664360.
- Leydesdorff, Loet. 2007. Betweenness Centrality as an Indicator of the Interdisciplinarity of Scientific Journals. *Journal of the American Society for Information Science and Technology* 58(9):1303–19. doi: 10.1002/asi.20614.
- Lindholm-Romantschuk, Ylva, and Julian Warner. 1996. The Role of Monographs in Scholarly Communication: An Empirical Study of Philosophy, Sociology and Economics. *Journal of Documentation*. doi: 10.1108/eb026972.
- Maesse, Jens. 2017. The Elitism Dispositif: Hierarchization, Discourses of Excellence and Organizational Change in European Economics. *Higher Education* 73(6):909–27. doi: 10.1007/s10734-016-0019-7.
- Maesse, Jens. 2018. Globalisierungsstrategien Und Das Ökonomische Dispositif: Einblicke Aus Deutschland Und Großbritannien Globalization Strategies and the Economics Dispositif: Insights from Germany and the UK. <p>*Historical Social Research / Historische Sozialforschung* Vol. 43 No. 3: Volumes per year: 1</p>. doi: 10.12759/HSR.43.2018.3.120-146.
- Mäki, Uskali. 2009. Economics Imperialism: Concept and Constraints. *Philosophy of the Social Sciences* 351–80.
- Mäki, Uskali, Adrian Walsh, and Manuela Fernández Pinto, eds. 2018. *Scientific Imperialism: Exploring the Boundaries of Interdisciplinarity*. London ; New York: Routledge, Taylor & Francis Group.
- Marin, Alexander, and Barry Wellman. 2011. Social Network Analysis: An Introduction. in *The SAGE Handbook of Social Network Analysis*, edited by J. Scott and P. J. Carrington. SAGE.
- Mirowski, Philip, and Dieter Plehwe, eds. 2009. *The Road from Mont Pèlerin: The Making of the Neoliberal Thought Collective*. Cambridge, Mass: Harvard University Press.
- Palley, Thomas I. 2013. A Theory of Minsky Super-Cycles and Financial Crises. Pp. 126–42 in *Financialization: The Economics of Finance Capital Domination*, edited by T. I. Palley. London: Palgrave Macmillan UK.
- Pasinetti, Luigi L. 2007. *Keynes and the Cambridge Keynesians: A revolution in Economics to Be Accomplished*. Cambridge: Cambridge University Press.

- Post-Autistic Economics Network. 2000. Open Letter from Economic Students to Professors and Others Responsible for the Teaching of This Discipline.
- Rip, A., and J. P. Courtial. 1984. Co-Word Maps of Biotechnology: An Example of Cognitive Scientometrics. *Scientometrics* 6(6):381–400. doi: 10.1007/BF02025827.
- Schumpeter, Joseph A. 1954. *History of Economic Analysis*; New York: Oxford University Press.
- Screpanti, Ernesto, and Stefano Zamagni. 2005. *An Outline of the History of Economic Thought*. 2 edition. Oxford ; New York: Oxford University Press.
- Spash, Clive L. 2013. Influencing the Perception of What and Who Is Important in Ecological Economics. *Ecological Economics* 89:204–9. doi: 10.1016/j.ecolecon.2013.01.028.
- Stockhammer, Engelbert, Quirin Dammerer, and Sukriti Kapur. 2017. *The Research Excellence Framework 2014, Journal Ratings and the Marginalization of Heterodox Economics*. PKWP1715. Post Keynesian Economics Society (PKES).
- Stockhammer, Engelbert, Quirin Dammerer, and Sukriti Kapur. 2021. The Research Excellence Framework 2014, Journal Ratings and the Marginalisation of Heterodox Economics. *Cambridge Journal of Economics* 45(2):243–69. doi: 10.1093/cje/beaa054.
- Truc, Alexandre, Olivier Santerre, Yves Gingras, and François Claveau. 2020. *The Interdisciplinarity of Economics*. SSRN Scholarly Paper. ID 3669335. Rochester, NY: Social Science Research Network. doi: 10.2139/ssrn.3669335.
- Van Leeuwen, Thed N., Henk F. Moed, Robert J. W. Tijssen, Martijn S. Visser, and Anthony F. J. Van Raan. 2001. Language Biases in the Coverage of the Science Citation Index and Its Consequences for International Comparisons of National Research Performance. *Scientometrics* 51(1):335–46. doi: 10.1023/A:1010549719484.
- Waltman, Ludo, Robert J. W. Tijssen, and Nees Jan van Eck. 2011. Globalisation of Science in Kilometres. *Journal of Informetrics* 5(4):574–82. doi: 10.1016/j.joi.2011.05.003.
- Wilson, William J. 2009. *More than Just Race: Being Black and Poor in the Inner City*. 1st ed. New York: Norton & Company.
- Yuret, Tolga. 2020. Co-Worker Network: How Closely Are Researchers Who Published in the Top Five Economics Journals Related? *Scientometrics* 124(3):2301–17. doi: 10.1007/s11192-020-03589-0.

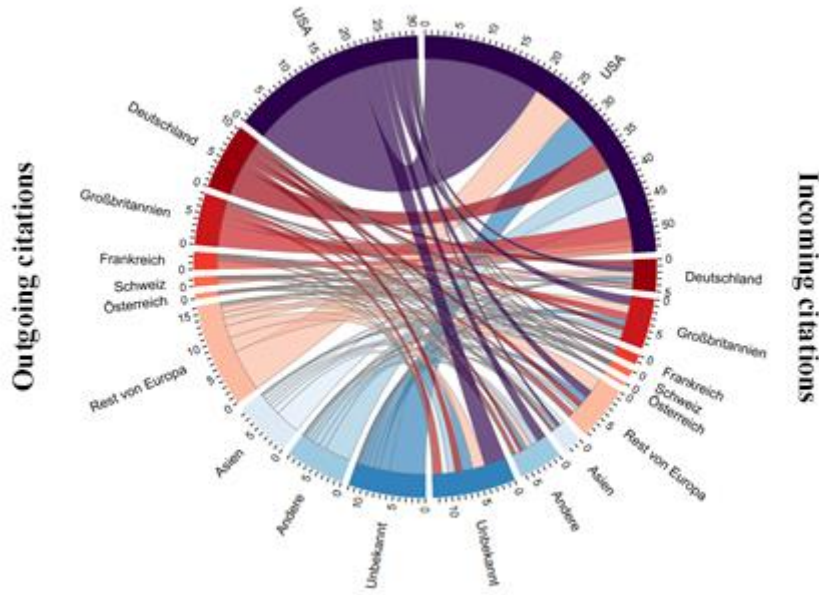
8. TABLES AND FIGURES

Table 1: The full dataset and the paradigmatic as well as geographic subsample.

	Country	Article	Citations	Journals	Gini	Share of un-cited articles
Full dataset	Global	453.863 (265.945)	3.807.289 (3.133.139)	477 (450)	0,72 (0,71)	36,63 (43,78)
	US	142.631 (75.568)	1.306.459 (960.547)	459 (434)	0,71 (0,69)	56,56 (62,67)
	Germany	32.526 (24.639)	357.445 (324.150)	462 (438)	0,6 (0,6)	70,53 (72,8)
	Austria	2.182 (1.684)	24.739 (22.212)	309 (289)	0,44 (0,44)	95,2 (95,56)
	Switzerland	4.361 (2.997)	47.183 (42.923)	347 (327)	0,48 (0,48)	92,04 (92,62)
	UK	33.156 (20.852)	304.288 (250.764)	448 (426)	0,6 (0,59)	73,9 (76,57)
	France	7.124 (5.979)	87.477 (82.670)	383 (370)	0,52 (0,51)	87,52 (87,94)
Paradigmatic subsample	Global	418.473 (259.926)	3.761.858 (3.117.308)	429 (429)	0,72 (0,71)	32,06 (39,21)
	US	136.720 (74.981)	1.291.665 (957.816)	413 (413)	0,71 (0,69)	53,29 (59,61)
	Germany	31.372 (24.475)	353.807 (322.800)	418 (418)	0,6 (0,6)	68,25 (70,55)
	Austria	2.089 (1.678)	24.321 (22.129)	296 (286)	0,44 (0,44)	94,85 (95,2)
	Switzerland	4.243 (2.986)	46.866 (42.842)	328 (322)	0,48 (0,48)	91,4 (92)
	UK	32.536 (20.781)	302.827 (250.286)	409 (409)	0,6 (0,59)	71,78 (74,62)
	France	6.953 (5.943)	87.203 (82.503)	361 (359)	0,52 (0,51)	86,49 (86,94)

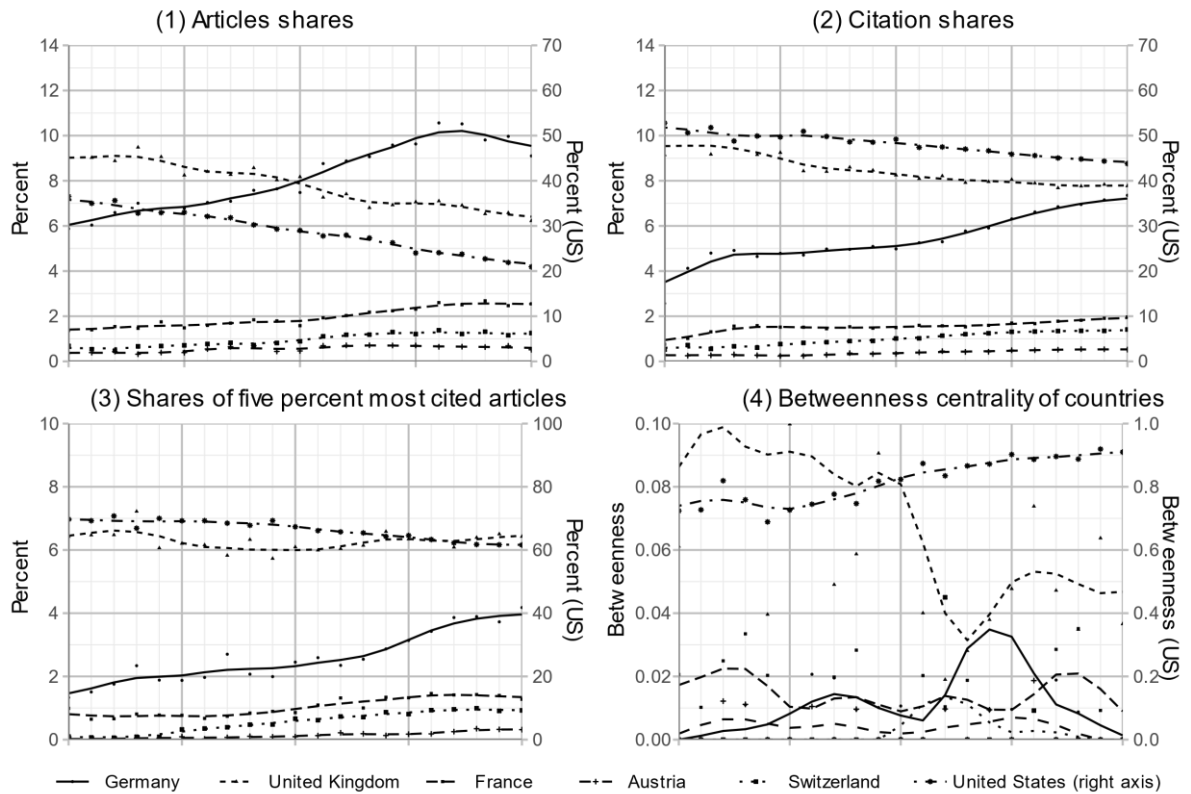
The table gives an overview of the full dataset, the paradigmatic subsample, and the respective geographic subsample (values in brackets). Articles that are not cited are not considered in the Gini calculation. For all countries the share of uncited articles is relative to all articles published globally in the subsample (adapted from Aigner 2019).

Figure 1: Global network of economics.



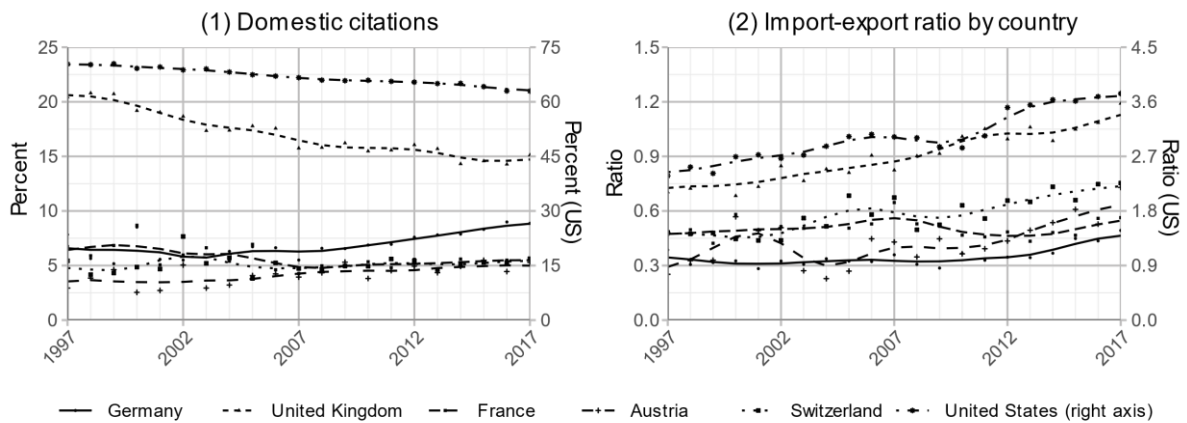
The chart shows the percentage of global outgoing (left scale) and incoming (right scale) citations for each country. All citations from or to articles published between 1997 and 2017 (adapted from Aigner 2019).

Figure 2: International relevance of the selected countries



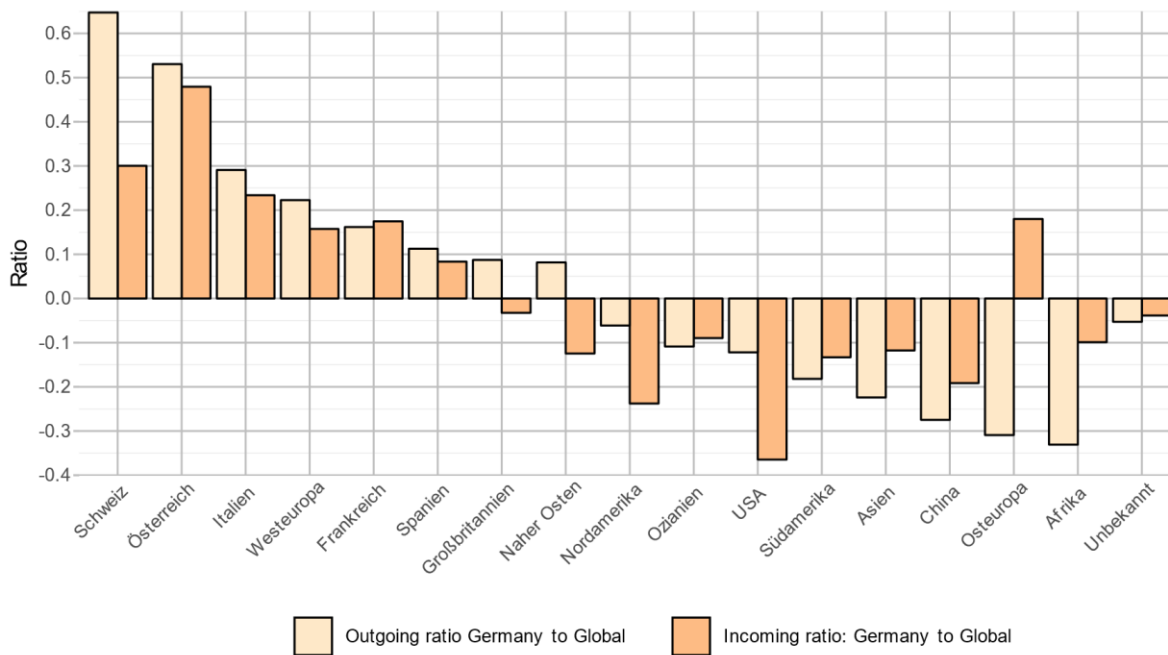
(1) Country shares of all articles. (2) Country shares of all incoming citations. (3) Country shares of the globally 5 percent most cited articles. (4) Betweenness centrality of countries in the global country citation network (adapted from Aigner 2019).

Figure 3: Domestic orientation and import-export ratio of the selected countries



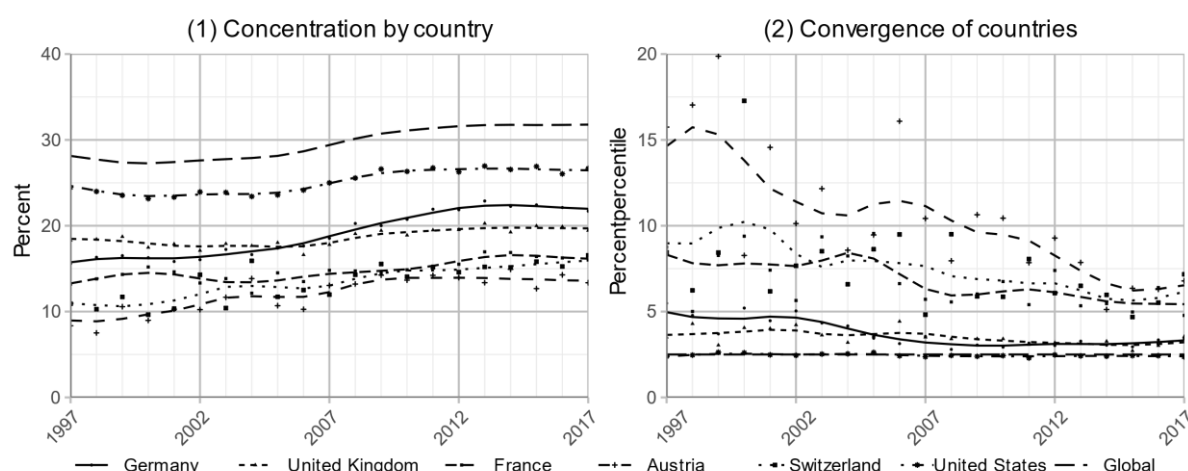
(1) Share of domestic citations out of all citations. (2) Ratio of incoming to outgoing citations (adapted from Aigner 2019).

Figure 4: Germany's geographic orientation.



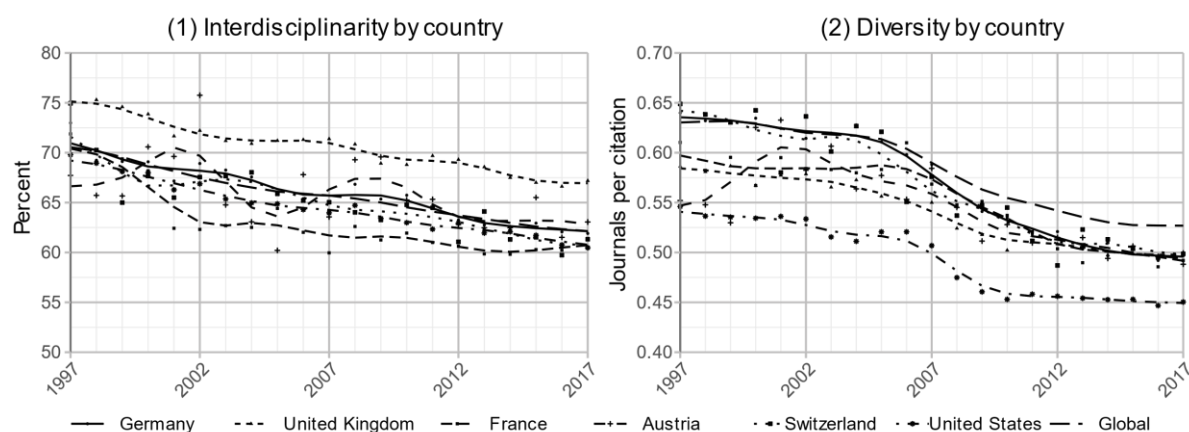
Light: Share of citations to a specific country from Germany relative to the share of citations to that country from economics as a whole. Dark: Share of citations to Germany from a specific country relative to the share of citations to Germany from economics as a whole (adapted from Aigner 2019).

Figure 5: Article-citation concentration by countries and country convergence.



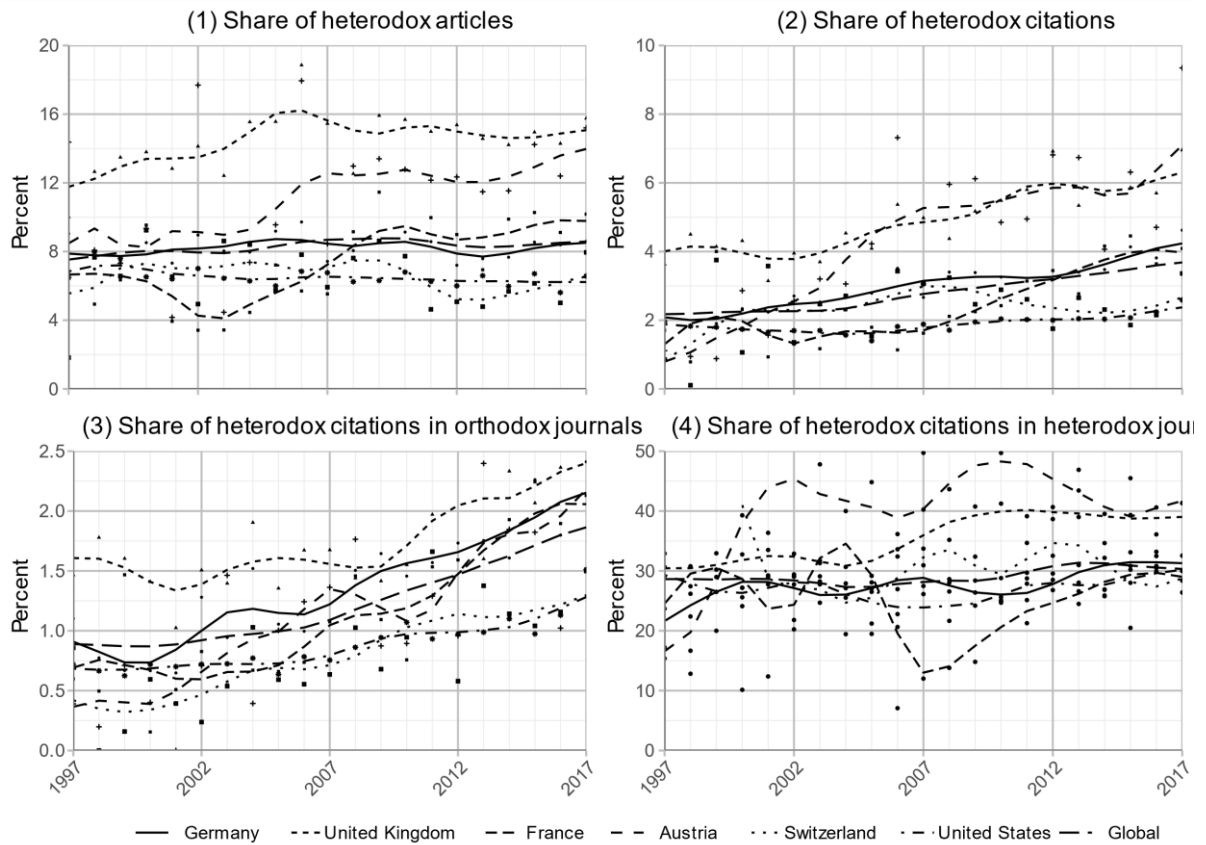
(1) Share of citations to the 5 percent most cited articles in the respective country. (2) Average percentile of the 5 percent most cited articles in the respective country on the global article ranking (adapted from Aigner 2019).

Figure 6: Citation beyond economic journals and diversity in citations by country



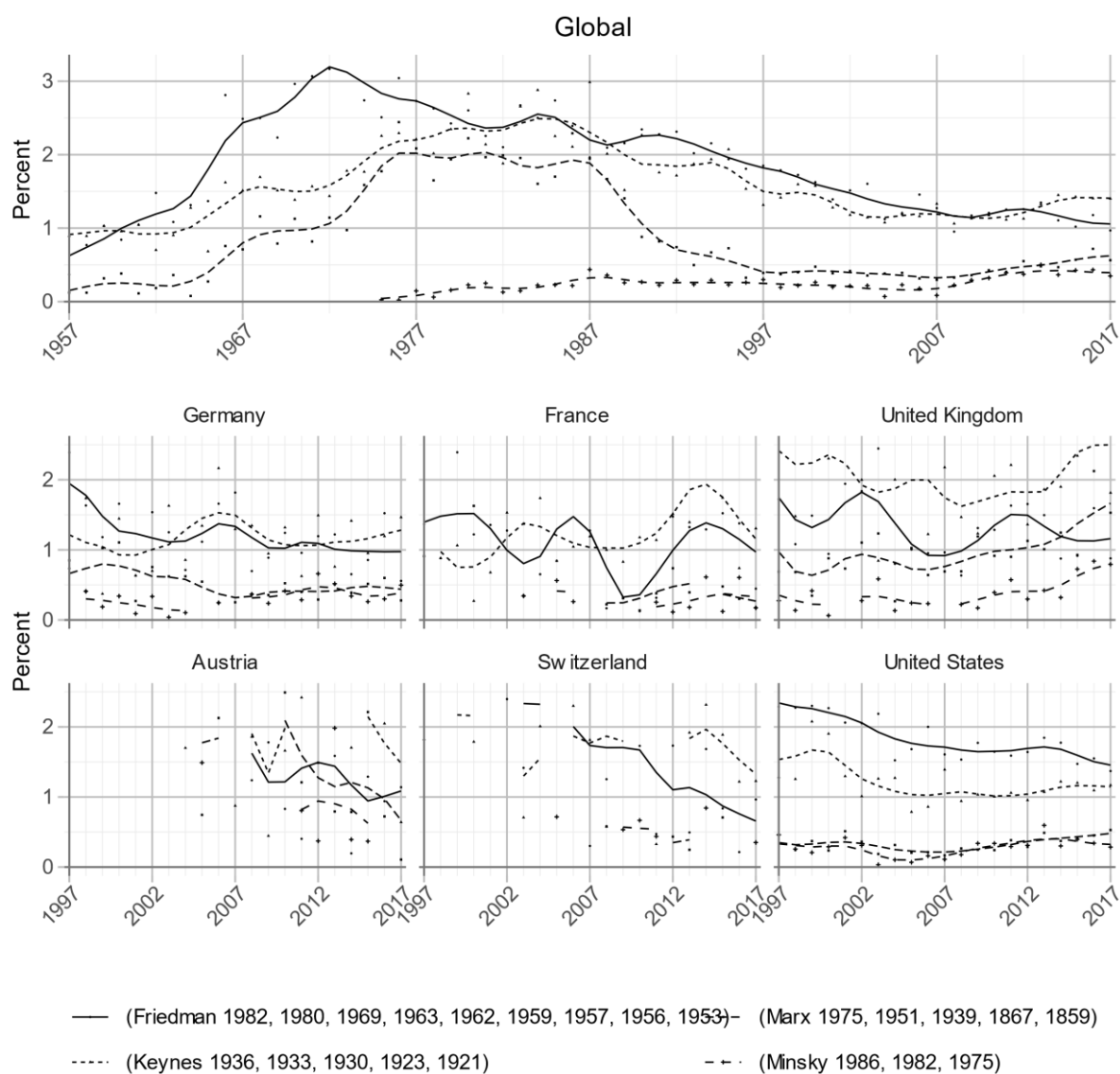
(1) Country share of citations to articles in other disciplines, books, or grey literature. (2) Number of unique journals cited relative to all citations (adapted from Aigner 2019).

Figure 7: Paradigmatic orientation by country



(1) Share of articles in heterodox journals. (2) Share of citations of heterodox journals. (3) Share of citations to heterodox journals in orthodox journals. (4) Share of citations to heterodox journals in heterodox journals
(adapted from Aigner 2019).

Figure 8: Citations to books by country



Share of articles that cite one of the named books by the respective authors (adapted from Aigner 2019).

