

## Quo Vadis regional monetary integration? Major trends in the optimum currency area literature over the last 60 years: A bibliometric approach

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**Abstract** – This study presents a quantitative survey of one of the main theories of regional monetary union: the optimum currency area (OCA) theory. We use a bibliometric approach, with a focus on recent trends in the literature, in the aftermath of the financial crisis starting in 2007. We highlight five major trends in the OCA literature by constructing a database comprising 997 articles for the period 1961-2018. First, although the common view is that the OCA theory originated in the 1960s, we show that it has significantly developed only fairly recently, since the 1990s. We point out that during the 1990s and early 2000s the OCA theory became widely disseminated across a large range of publication types. Secondly, this literature is stimulated by events, mainly occurring in the European region. The recent financial crises, notably the European sovereign debt crisis, are no exception to this rule, boosting the number of articles on OCA. Thirdly, as a consequence, most of these articles are about Europe. Fourth, the evolving dynamics of OCA literature is currently towards more articles being oriented towards macroeconomics and econometrics, contrary to its international economics orientation at the origin. Finally, we identify a recurrent debate between the two paradigms of OCA theory: “divergence” versus “endogeneity” of regional monetary integration. We find that the recent financial crisis was followed by a revival and development of this debate: the “divergence” view à la Krugman of regional monetary integration is becoming more and more accepted. We conclude by drawing lessons in terms of policymaking from our findings.

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## INTRODUCTION

After more than 20 years of existence of the euro, the optimum currency area (OCA) theory remains controversial, representing the main theory underlying European monetary integration. The OCA theory has given rise to a burgeoning literature since the four highly influential papers of Mundell (1961), Ingram (1962), McKinnon (1963) and Kenen (1969). From the outset, the literature on OCA has been part of the field of regional economics, to which these four seminal articles refer.<sup>1</sup> This is reflected in the fact that the OCA theory has been a central concern of regional economics in past history (Rodríguez-Fuentes and Dow, 2003; Costa-I-Font and Tremosa-I-Balcells, 2003; Maza and Moral-Arce, 2006). In more recent times, particularly after the sovereign debt crisis in the European region, OCA theory continues to be part of the corpus of regional science (Lagadec, 2010; Bouvet, 2011, p. 40; Kelejian et al., 2012; Broll et al., 2013; Labondance, 2013; Anagnostou and Papadamou, 2014; Fraser et al., 2014; Fingleton et al., 2015; Détang-Dessendre et al., 2016). Even today, OCA theory remains of interest for regional economics (Furceri et al., 2019; Miles, 2019; Sokol and Patacini, 2022; Cerqua et al., 2023).

The lack of consensus on OCA theory of regional monetary integration is long standing, starting well before the adoption of the euro, and involving two main paradigms about the OCA. The first paradigm comes from the European Commission (1990), and, more recently, the seminal article of Frankel and Rose (1998), leading to the “optimistic” or “endogenous” view of OCA theory. This view defends the hypothesis of a convergence of euro area countries with the adoption of the euro, insisting on the benefits of the single regional currency. They argue that the regional monetary integration raises intra-industry trade in the zone. In turn this “*trade effect*” increases the synchronization of business cycles in the zone, and decreases the risk of asymmetric shock. On the contrary, the “pessimistic”<sup>2</sup>, “specialization” or “divergence” view of the OCA is based on the hypothesis that regional integration could be accompanied by more industrial specialization and more inter-industry trade, leading to less synchronization of business cycles in the region. This would lead to a potential regional divergence of euro area countries, which highlights the costs of the regional monetary union. This “pessimistic” view of the euro area is nearly as old as the OCA theory itself, and was pregnant in the period before the adoption of the euro with the studies of Eichengreen (1992), Maes (1992), Krugman (1993), Goodhart (1995) and Mongelli (2002).

It is commonly considered that the OCA literature is boosted by events in Europe, such as the project of monetary union or the adoption of the euro: “the intensification of efforts in the late 1980s and early 1990s aimed at monetary integration in Europe helped underpin renewed interest in the theory” (Tavlas, 2009, p. 536).<sup>3</sup> The steps of monetary integration in Europe tend to revive the debate over the relevancy of the OCA theory. The recent European sovereign debt

<sup>1</sup> By way of illustration, the term “regional” and its derivatives (interregional, multiregional,...) is used 16 times by Mundell (1961), 13 times by McKinnon (1963), and 52 times by Kenen (1969). The term “regional” is even the first word in the title of Ingram (1962).

<sup>2</sup> Masini (2014; 2018) deals with the history of this “pessimistic” view.

<sup>3</sup> See also Masini (2014, p. 1029): “it was in the 1990s that OCA theories became increasingly popular, especially in policy debates concerning the path to European monetary union”.

crisis starting around 2010 is no exception, potentially stimulating the debate about regional convergence *versus* divergence in the euro area: "In the wake of the eurozone crisis, the implications of the OCA theory have therefore regained relevance" (Jager and Hafner, 2013, p. 315).<sup>4</sup>

Since the founding article of Mundell (1961), the OCA literature has become so vast that the large number of articles and books on this subject make it a challenge to even attempt a qualitative review. Some authors have already carried out a qualitative review of the OCA literature: Ishiyama (1975), Tavlas (1993) and more recently Eichengreen (2018) (see Appendix A for a full list), as well as a textbook treatment of OCA theory (De Grauwe, 2018; Baldwin and Wyplosz, 2019). Nevertheless, to our knowledge, none of these authors present a quantitative analysis of OCA literature, with the exception of Bayoumi and Eichengreen (1998). Our article aims to fill this gap by constructing a database of articles dealing with OCA theory: it comprises 997 articles for the period 1961-2018.

We perform a quantitative analysis of this database, adopting a bibliometric approach which is now routinely applied in economics (Silva and Teixeira, 2008; Silva and Teixeira, 2009; Castro e Silva and Teixeira; 2011; Du and Teixeira, 2012; Teixeira, 2014; Claveau and Gingras, 2016). The use of bibliometric analysis is also becoming standard in regional science, particularly in the period following the 2007 financial crisis (Biscaia and Mota, 2013; Silva et al., 2015; Garcia-Lillo et al., 2018; Cao et al., 2019; Bernard et al., 2021). To our knowledge, our paper would be one of the first to apply bibliometric analysis to OCA theory. The choice to carry out a bibliometric analysis is commonly justified for three main reasons (Merigo et al., 2015; Feng et al., 2017). First, it helps to handle a very large number of articles. Secondly, it offers an easy quantitative visualization of the evolution of a given body of literature, notably in regional economics (Silva et al., 2015). The bibliometric analysis presented here aims to portray the evolution of the OCA literature from 1961 to 2018. Using this bibliometric approach, we are able to map this field of regional economics, identifying its overall structure. This quantitative method also allows us to identify the trends in this literature, the dynamics of its evolution over time, as well as its break points and structural changes. Finally, bibliometric analysis also facilitates the identification of future avenues of research in this field. Thus, while focusing on recent research on the OCA in the aftermath of the 2007 crisis, we present a quantitative description of the state-of-the-art based on the more recent trends in the literature. Hence, beyond compiling a database, our study contributes to the OCA literature by testing if the recent European sovereign debt crisis has caused a regime shift in the OCA literature, as stressed notably by De Grauwe and Ji (2017). These two severe crises may have shifted the pendulum of OCA literature towards Krugman's "pessimistic" view by insisting on the regional divergence effects of a monetary union: "the Euro crisis has given credence to Krugman's (1993) assessment of the likely costs and benefits of the Euro" (Clark, 2015, p. 873).<sup>5</sup> Indeed, some studies find empirical evidence of reduced synchronization in Europe

<sup>4</sup> On this impact of the European sovereign debt crisis on the OCA theory, see also Fingleton et al. (2015, p. 908), and Monteverdi (2016, p. 3): "Since the Eurozone sovereign debt crisis the traditional theory of optimum currency areas, after remaining dormant in Europe for three decades, has been resurrected as a means of analyzing the EMU project".

<sup>5</sup> For more recent studies reporting results explicitly in line with the "Krugman's view", see Arestis and Phelps (2016, p. 541), Ballabriga and Villegas-Sánchez (2017), Beck and Nzimande (2023), and Beck and Okhrimenco (2025, p. 197).

after the 2007 crisis and/or the 2011 European sovereign debt crisis (Ferroni and Klaus, 2015; Grigoras and Stanciu, 2016; Belke et al., 2017; Gadea-Rivas et al., 2019; Alvarez et al., 2021; Beck and Okhrimenko 2025). Other studies present results that support Krugman's "specialization view": "we conclude that a specialization split is visible in Europe" (Ballabriga and Villegas-Sánchez, 2017, p. 1382).

These empirical findings on possible divergence have led to renewed interest in the "core-periphery" analysis of the Eurozone: "the Eurozone debt crisis has revealed a wide heterogeneity between core and periphery, questioning the strength of convergence" (Grigoras and Stanciu, 2016, p. 28).<sup>6</sup> Thus, our goal is to determine whether this recent European crisis has changed the dynamics of OCA literature, triggering new investigations leaning towards the "divergence" view. To study this precise question, we explore our database to find articles citing the two leading articles in this debate: Frankel and Rose (1998) for the "optimistic" view, and Krugman (1993) for the "pessimistic" view. We perform a qualitative analysis of this sub-category of our database to determine whether the included articles tend to be in favour or against Krugman's view. Our results suggest that the recent European crisis has impacted the OCA debate and has been followed by a rise of Krugman's view on regional disparities. We point out a contrast with the pre-crisis period, when the Frankel-Rose view on regional convergence was drawing a large consensus.

Following the introduction, this article is organized as follows. Section 1 presents the methodology used to construct the database. Section 2 provides some descriptive statistics on the database based on five criteria: by year, by geographic area, by JEL code, by our own classification, and finally by academic journal. In section 3, we discuss the Krugman *versus* Frankel-Rose debate on regional monetary union in more qualitative terms, with an emphasis on recent developments in the aftermath of the financial crisis. We conclude by summarizing our main results and their policy implications.

## 1. METHODOLOGY FOR COMPILING THE DATABASE

In this section, we present the sources used to compile our database as well as the choice of methods for searching the literature and cleaning the metadata. This corpus of selected references is then supplemented with our own classification.

We use data from three main sources: EBSCO, SCOPUS and Web of Science (WoS)<sup>7</sup> to download bibliographic data of all publications related to the OCA topic over the period from 1961 to 2018. The first article on this topic in our database is Mundell's (1961) seminal paper.

To select the set of papers for the database, we searched for the following keyword string<sup>8</sup>: "optim\* currency area", which enables us to target "optimum" as well as "optimal currency area".

<sup>6</sup> On the core-periphery distinction in Europe in relation to the OCA theory, see also Belke et al. (2017) and Campos and Macchiarelli (2021).

<sup>7</sup> These data sources are common in Regional Science studies, with Biscaya and Mota (2013) using SCOPUS, while Garcia-Lillo et al. (2018) and Cao et al. (2019) utilize WoS.

<sup>8</sup> In regional economics, it is usual to rely on search keywords in bibliometric analysis. See Silva et al. (2015).

This dataset includes all the research-oriented literature that has been published in English, including articles and books. Entries not included in the dataset editor's notes, conference announcements and programmes, auditor's and reviewer's reports, full-length monographs, full-length book reviews, comments and replies and other similar non-research focused entries.

Given these criteria, the corpus includes 4,227 references (3277 from EBSCO, 577 from SCOPUS and 373 from WoS). We extracted information from each reference about the journal name, the article title, the names of the authors, the date of publication and the abstract. We crossed files in order to avoid double references. We read all the publications in the database to exclude off-topic references and those not written in English (although the title and the abstract are in English for some papers, the core of the paper is in another language). Our final dataset includes 997 references published between 1961 and 2018. Among these references, 19% were cited in Scopus, EBSCO and WoS, while 61.2% were cited only in one of them. EBSCO is the main source as 51.6% of our references are extracted from this literature search database alone.

For each of these 997 references, we added our own classification inspired notably by studies in regional economics (Biscaia and Mota, 2013; Silva et al., 2015; Garcia-Lillo et al., 2018; Cao et al., 2019):

- Geographic area: Africa, America, Asia, Europe and World (for the publications without any specific area or comparing different countries).
- The Journal of Economic Literature (JEL) codes when available.
- Nature (or type) of the publication: fundamental, econometrics and mix. This is a standard classification used by Kim et al. (2006).

The results of these various criteria of analysis are presented in the following section.

## 2. DESCRIPTIVE STATISTICS

In this section, we carry out a statistical analysis of the bibliometric metadata; the general descriptive statistics of the database are presented in Table 1.

**Table 1. General descriptive statistics of the database**

| Zone (in order of importance) | Number of references |
|-------------------------------|----------------------|
| Europe                        | 552                  |
| World                         | 190                  |
| Asia                          | 140                  |
| Africa                        | 67                   |
| America                       | 48                   |
| Total                         | 997                  |

*Source: Authors.*

Most literature reviews on OCAs (see Appendix) are qualitative rather than quantitative. It therefore follows that previous surveys include fewer references than found in quantitative reviews. By way of comparison, previous qualitative reviews (see Appendix) include a maximum of 120 to 130 references in their bibliographies, with the largest number of references, in descending order, in Horvath (2003), Mongelli (2008) and De Grauwe and Mongelli (2005). The bibliography of our article contains 153 references.

One of the few quantitative surveys is due to Bayoumi and Eichengreen (1998), who include a total of 18 articles in their database for the period 1961-1995. By way of comparison, our database includes 66 documents for this period. This difference could be explained by the powerful search engines currently at our disposal on internet.

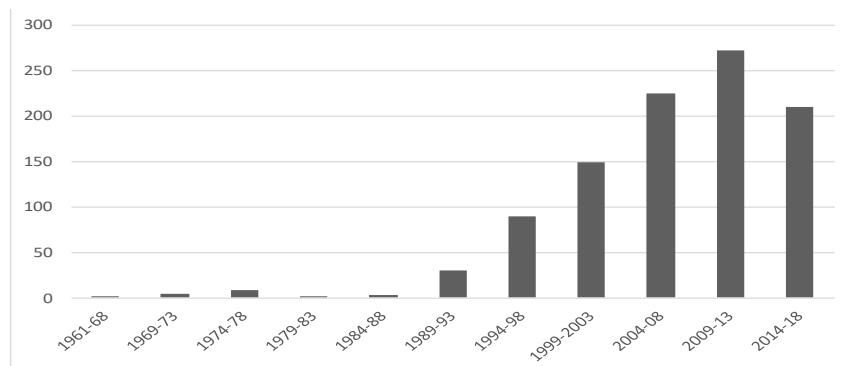
Previous reviews have often focused on the criteria for OCA, the cost-benefit analysis of monetary union and the debate concerning exogenous *versus* endogenous OCA. We follow this line of reasoning, taking up most of these discussions, with the exception of the cost-benefit analysis of monetary union.

Then we proceed to a more specific analysis of the database according to five criteria (year, geographic, JEL code, own classification, academic journal), to identify the main structure of the OCA literature and its evolution.

## 2.1. By year

Following Bayoumi and Eichengreen (1998), we first give the number of articles on OCA in each 5-year period (Figure 1). Next, we give details with the number by year<sup>9</sup> (Figure 2) to be more precise on the evolution and the highlights in this literature. This is particularly interesting when we analyze the recent financial crisis.

**Figure 1. Number of articles published on OCA literature in each five-year period**



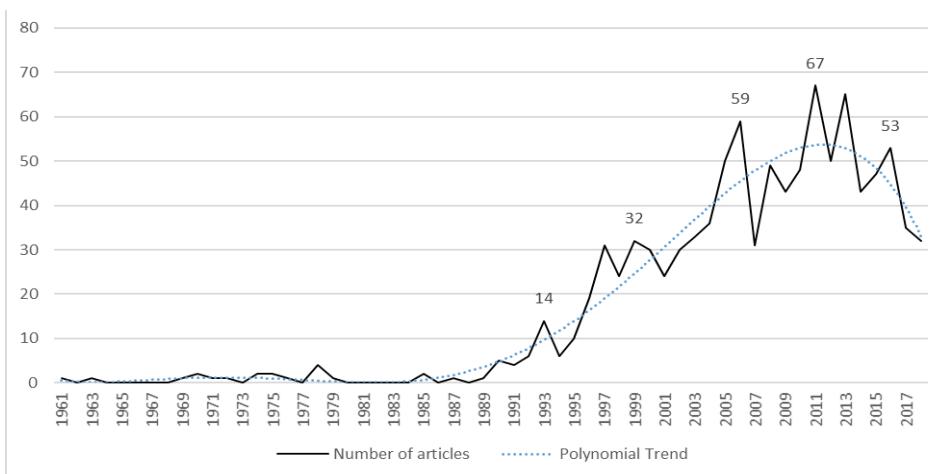
*Source: Authors.*

The initial impulse on the OCA literature was in the 1960s (Mundell, 1961; Ingram, 1962; McKinnon, 1963; Kenen, 1969).<sup>10</sup> These four authors defined various traditional OCA criteria for regional monetary integration as described in Table 2.<sup>11</sup>

<sup>9</sup> This presentation of data by year is common in regional economics. See Biscaia and Mota (2013), and Silva et al. (2015).

<sup>10</sup> According to some authors, the origins of the OCA theory date back to the 1940s with Abba Lerner (Cesarano, 2006), or to the 1950s with Milton Friedman (Dellas and Tavlas, 2009). Masini (2014) also studies the history of the theories on OCA. We have chosen to start our database with the article by Mundell (1961), commonly considered to be the founding article of the OCA theory.

<sup>11</sup> We focus on the first original historical criteria of OCA theory given in the 1960s. Since then, other OCA criteria have been proposed (see in particular Mongelli, 2002).

**Figure 2. Number of articles published on OCA literature per year**

Note: A polynomial trend is used, as in Hoover (2004). Source: Authors.

As shown in Figure 2, few articles were published on this subject in the 1970s and 1980s. This appears to confirm Tavlas's (2009, p. 551) and Makris (2015, p. 60) hypothesis that OCA theory was in "limbo" during these decades.

Most likely, this was due to a disagreement on the different criteria for regional monetary integration or the lack of a practical example of regional monetary unification. Criticisms of the assumptions present in OCA theory and the slowdown in European monetary integration in the 1970s led to less attention being paid to the subject of monetary union, reducing interest in its research until the end of the 1980s.

**Table 2. Traditional criteria for optimum currency area**

| Traditional criterion (chronological order)                       | References      |
|---|-----------------|
| - Mobility of factors of production (Labour)                      | Mundell (1961)  |
| - Price and wage flexibility                                      | Mundell (1961)  |
| - Asymmetric shocks   | Mundell (1961)  |
| - Financial market integration (Adjustment via capital movements) | Ingram (1962)   |
| - Degree of economic openness (Trade)                             | McKinnon (1963) |
| - Fiscal integration  | Kenen (1969)    |
| - Product diversification   | Kenen (1969)    |
| - Similarity of economic structures                               | Kenen (1969)    |
| - Political integration   | Mintz (1970)    |

Source: Authors, based on Tavlas (1993, p. 666; 2009, p. 540), Mongelli (2002; 2008), Broz (2005, p. 72), Baldwin and Wyplosz (2019, p. 370).

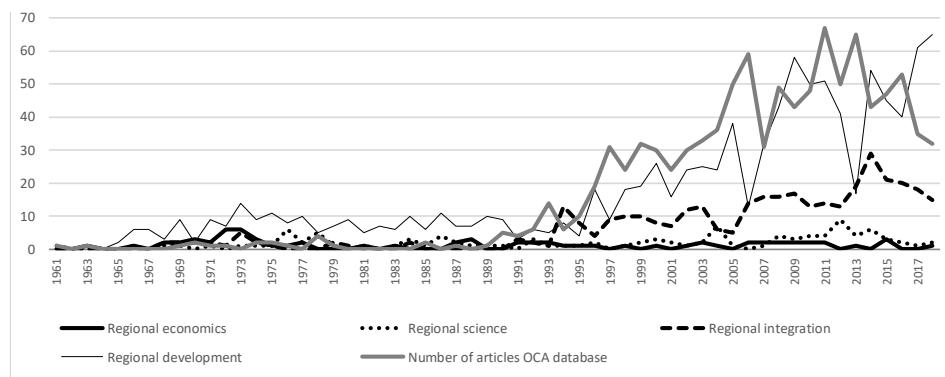
Bayoumi and Eichengreen (1998) reported the number of articles containing the phrase "optimum currency areas" in the title for 5-year periods since 1961 to 1995. According to their conclusion, our results confirm that, in the 1990s, much attention was given to the OCA related to the beginning of European monetary unification. In the early 1990s, the "One Market, One Money" Report (European Commission, 1990) contributed to revitalizing interest in the debate on OCA theory, particularly in the European region. As Mongelli (2002) explains, this report "brought together many strands of theoretical and empirical literature (directly or indirectly related

to the OCA theory), and spurred a vast amount of new research". Our database (Figure 2) reflects the sharp increase in the number of publications from the beginning of the 1990s up to 32 publications in 1999. In the 1990s, the "new" theory of optimum currency areas addressed many issues, including notably correlation and variation of shocks, nature of shocks, synchronization of business cycles, or endogeneity *versus* specialization in OCA that we present in more details in the rest of the article. The other themes, less prevalent, of this renewed OCA literature are effectiveness and credibility of monetary policy, theories regarding the effectiveness of exchange rate adjustments, labour market institutions, and political factors. The studies of Frankel and Rose (1997; 1998) were especially important in the revival of OCA theory. These authors formulated and provided *ex ante* empirical support for the endogeneity hypothesis, claiming that, although a set of candidates did not constitute an OCA before the European Monetary Union (EMU), regional monetary integration would become more justifiable after these candidate countries had entered the EMU.

In the years 2000, more and more researchers became interested in the OCA theory (59 publications in 2005). On the one hand, while many authors focused on empirical evaluations as shown further below, on the other hand, there are still many papers dealing with the theoretical aspects.

This interest in OCA persisted during the 2010s. Firstly, the focus is mostly on Europe because there is now a wealth of data, research and other information available on Europe covering this decade. A wide range of OCA properties are reviewed here in great detail to find out how their interpretation has changed, all the more so because the 2007 crisis has relaunched the question. Secondly, new countries are adopting the euro, which contributes to the debate (67 publications in 2011). Hence, the financial crisis seems to have revived the OCA theory and the debates surrounding it.

**Figure 3. Number of articles with some keywords related to regional economics in their titles**



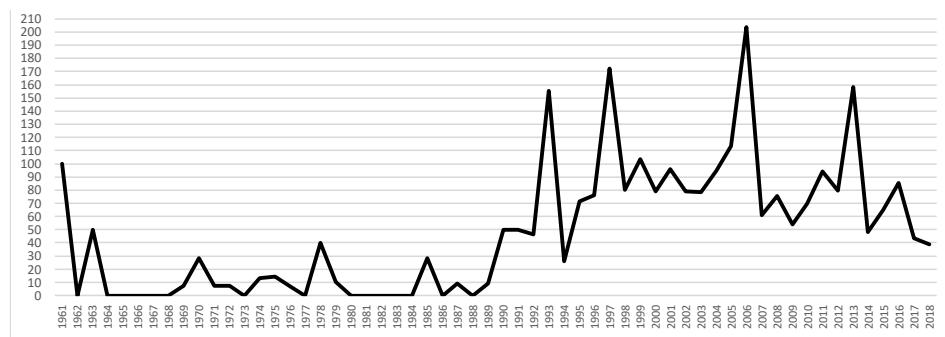
Source: Authors based on EBSCO database.

In contrast, since 2014, the number of publications (see the trend in Figure 2) has slightly decreased, almost returning to the high levels of the late 1990s. One possible explanation of this recent trend is that, as stressed in our article, a key stylized fact is that the OCA literature is developing in reaction to events, notably shocks occurring in Europe. Consequently, the lack of major events in the euro area could explain the lack of a boom of the OCA literature since 2014.

Finally, to inspect the extent to which the upward trend in the number of papers on the OCA theory (Figure 2) is significant, we need to determine whether it is not only *absolute*, but also *relative* to the number of articles in the rest of the economics literature. For that purpose, we relate this increase to the rise in the number of papers in regional economics, a field which is also concerned with OCA theory (Figure 3). In the EBSCO database, we searched for articles whose title contains general terms related to the field of regional economics, namely: regional economics, science, development and regional integration.

Then we calculate the ratio between, on the one hand, the sum of previous articles with 'regional' in the title and, on the other hand, the number of articles on OCAs in our database (Figure 2). The result of this ratio in % (Figure 4) indicates a peak in 2006. It suggests that our previous finding of an upward trend in the number of articles on OCAs in absolute terms also appears to be observed in relative terms.

**Figure 4. Ratio number of articles in our database / sum of articles with titles related to the field of regional economics (%)**



Source: Authors based on EBSCO database.

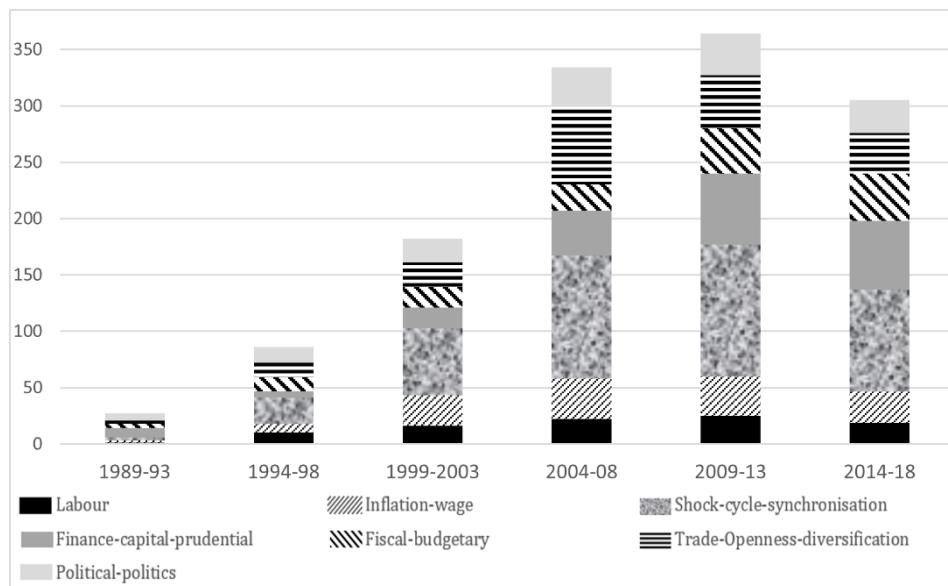
We use our database to analyze the evolution of the OCA criteria as listed in Table 2. For example, for the OCA "Labour" criterion, we search for the keyword "Labour" in the titles and abstracts of all the documents in our database.<sup>12</sup> These keywords and the results of the searches are shown in Figure 5. The scope of these results should be qualified, as they depend on our database.<sup>13</sup>

The evolution of OCA criteria is broken down into five-year periods, following Bayoumi and Eichengreen (1998) and Figure 1. The overall analysis of the evolution of the criteria (in chronological order as in Table 2) over the entire period shows that the first criterion developed in the history of OCA theory (Labour) has never been dominant; it even appears as a non-major criterion in our database. Since 1999, this criterion became and has remained the least represented in our database. This result is unexpected given the importance of this criterion in the history of OCA theory, and given its prevalence today in international economics and European economics textbooks (Santos Silva and Tenreyro, 2010, p. 66). Similarly, the "Inflation-wage" OCA criterion does not become dominant over time.

<sup>12</sup> We would like to thank a referee for suggesting we should explore the evolution of OCA criteria over time in greater detail.

<sup>13</sup> There may be duplicates because the same document in our database may contain keywords that match several OCA criteria.

**Figure 5. Number of articles with keywords related to OCA criteria in our database in each five-year period**



*Source: Authors.*

On the other hand, macroeconomic criteria relating to “Shock-cycle synchronization” emerge as being the most significant from the period 1994-98 until the end of our database covering the period 2014-18. This result confirms the thesis that the literature has evolved from the original criteria towards questions of cycle synchronization (Beck and Okhrimenko, 2025). Surprisingly, this criterion is not very well represented for the period prior to 1994. Our database reveals that this criterion was developed particularly from 1999 onwards with the creation of the Eurozone and studies on shocks (Fontagné and Freudenberg, 1999; Lane, 2000) and cycle synchronization (Caporale et al., 1999).

The *financial* integration criterion of OCA theory, linked to the keywords “Finance-capital-prudential” in our database, shows a trend that is fairly consistent with recent financial crises. This criterion became the second most represented in our database from 2009 onwards, following the 2007 financial crisis. However, according to our database, this reflects less the emergence of a criterion after 2009 than its return: it was the most represented criterion at the beginning of the period concerned, i.e. 1989-93. For Aizenman (2018, p. 374), financial crises not only highlight the importance of the OCA criterion in relation to financial integration, but also, more generally, they are the result of the intensification of financial globalization since the first OCA criteria were introduced in the 1960s. In connection with the phenomena of financial globalization and financial crises, this OCA criterion has become so important that many authors propose adding two additional OCA criteria regarding finance: the presence of a lender of last resort and a banking union (De Grauwe, 2012; De Grauwe and Ji, 2012; Krugman, 2012a; Otero-Iglesias, 2015).

We have combined two OCA criteria to form a single criterion with the keywords "Trade-Openness-diversification" in relation to international trade and the articles by Frankel and Rose (1997; 1998) and their "trade effect". This criterion is particularly well represented in our database for the period 2004-08, just before the financial crisis (Agur et al., 2007). However, this criterion is not among the most prevalent in the database, unlike the macroeconomic criterion relating to shocks. It therefore appears that the macroeconomic criteria of the OCAs ultimately took precedence over the international trade criteria.

The *fiscal* criterion shows a complex pattern of evolution over time. It was one of the three most frequently mentioned criteria in the period 1989-93. This fiscal issue is particularly prominent in Krugman's article (1993). Then, in the following periods 1999-2004 and 2004-08, it became one of the least mentioned criteria in the database. The 2007 financial crisis led to a resurgence of this fiscal criterion, with a peak of mentions in 2011. While we can also speak of a "return" of the fiscal criterion following the 2007 crisis, Krugman (2012a, p. 445) goes so far as to call it a "revenge": "*Kenen has turned out to dominate Mundell: lack of labour mobility has not played a major role in the euro's difficulties, at least so far, but lack of fiscal integration has had an enormous impact, arguably making the difference between the merely bad condition of America's 'sand states', where the housing bubble was concentrated, and the acute crises facing Europe's periphery*".

We do not deal here with the "Economic structures" criterion of OCA, but rather the *political* integration criteria that are clearly evident in the database and have recently been summarized by Masini (2014, p. 1022) and Kunroo (2015, p. 17). Although OCA is primarily an economic theory, it appears that during the periods 1989-93 and 1994-98, the *political* criterion was among the most prevalent in our database, particularly in articles by De Grauwe (1993) and Mussa (1997). This explains the emphasis placed by Tavlas (1993, p. 667) and Mongelli (2002, p. 10) on the political integration criteria of OCAs. Analysis of the database suggests that this could be explained by the fact that, from 1989 to 1998, authors believed that monetary integration, particularly European integration, was as much an economic issue as a political one. This was followed by articles on the political economy of OCAs. The justifications for monetary union were said to be political, as they would bring political benefits. The study of OCAs then focuses on their political rationale and the political and institutional conditions for their implementation. However, after 1999 and the advent of the euro, these political criteria became less important, explaining their absence in Tavlas' review (2009, p. 540).

The theory of OCA criteria therefore presents a fluctuating pattern of development, with a hierarchy of prevalence that can vary over time. Historical criteria such as *Labour* mobility are not as prevalent as other criteria in our database. Furthermore, over time, macroeconomic criteria ("Shock-cycle-synchronization") have become more important than international trade criteria ("Trade openness-diversification"). The contrasting development of criteria related to "Labour" and "Shocks" could partly explain the return of the "Fiscal" criterion: because adjustments to shocks cannot be so easily achieved through labour mobility, so transfers may be required to mitigate asymmetric shocks (see below in the conclusion). Finally, certain criteria that are rarely mentioned during a given period may reappear as a result of shocks such as a financial crisis. This is particularly true of the "Fiscal" criterion and *financial* integration.

In our view, the diversity of fluctuating criteria in OCA theory is not so much due to the theory's weakness as a sign of its ability to evolve and adapt to events such as the creation of the euro, the 2007 financial crisis, and the 2011 sovereign debt crisis. Masini (2014, p. 17) highlights this adaptability: *"Our impression is that the evolution of OCA theories had a much more complex evolution than is usually displayed in the literature, less linked to changing economic paradigms and more to relevant events and policy debates"*.<sup>14</sup> This plasticity of OCA criteria seems to enable it to keep pace with developments and thus remain usable ever since the criteria were first established in 1961. This evolutionary nature of OCA theory is highlighted by Snaith (2014, p. 191): *"The malleability of OCA theory, and the (occasionally contradictory) discourse and debate surrounding currency areas is perhaps part of the reason why it has been so readily bound up with the political process of monetary union in Europe"*.

## 2.2. By geographic area

The OCA theory has recently been discussed in relation to many different geographic areas: Europe in the first place (Eichengreen, 2014; De Grauwe and Ji, 2016; Aizenman, 2018), Asia (Gauchan and Sarin, 2018), Africa (Asongu et al., 2017). Consequently, it is natural to study the OCA literature as a function of the geographic area concerned.

As mentioned above, the number of publications remained very low irrespective of regional geographic area until the early 1990s. The first increase is almost entirely restricted to Europe (Figure 6). The regional European monetary integration which started during this period raised many questions. After a sharp increase in the first decade, many articles continued to be published on Europe. The European sovereign debt crisis seems to have stimulated even more research on OCA in the euro area: according to our database, the peak for Europe was attained in 2014. Taking into account the publication delays, this could correspond to the European debt crisis which started around 2010-2011.

Since the beginning of the years 2000s, more attention has been paid to the Asia region. After the 1997 Asian crisis, the question of an appropriate exchange rate regime became one of the most fundamental policy issues in East Asian region. Monetary integration was seen as a way to bring growth and stability to Asia. However, most of the authors conclude that, even if the Asia region is close to an OCA (at least judging from the classic OCA criteria), this is not enough since a monetary union must be embedded in a political union. Compared with the euro area, the degree of political integration in East Asia is less significant. The most studied zone is the ASEAN (Association of SouthEast Asian Nations), often associated with China, Japan and South Korea, so the ASEAN +3. Another interesting point is some development, since 2005, of studies on the OCA related to the Middle East region, mainly the GCC (Gulf Cooperation Council) countries. As for the OCA literature for Africa, the CFA Franc zone is the most analyzed area, followed by the Southern African Development Community (SADC).

Finally, the number of publications has increased in the aftermath of the 2007 financial crisis, whatever the geographic region.

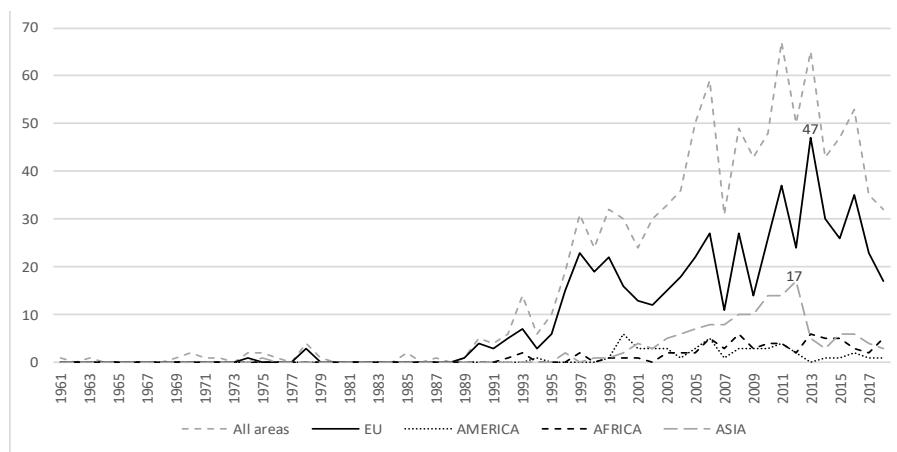
In our view, the fact that OCA theory has developed mainly in Europe compared to the rest of the world may be more a sign of excessive development in Europe

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<sup>14</sup> Taylas (2009, p. 536) also indicates that developments in OCA theory may be linked to events in the real world.

rather than its weak development in the rest of the world. Thus, some of the literature on OCA outside Europe (Africa, Asia) has developed in the wake of events in Europe, such as the adoption of the euro or financial crises. This could explain why a peak occurs in documents found in our database for Africa and Asia in 2013 and 2012, respectively, close to the crisis period. Europe thus serves as a point of comparison for other geographic areas, for example to determine whether a region (Africa, Asia) is closer to being an OCA than Europe, or whether it meets the OCA criteria more than Europe. Another factor in the development of the literature on OCAs (for Africa in particular) is the application of new econometric techniques to OCA theory.

**Figure 6. Number of articles published on OCA literature by geographic area**



Source: Authors.

Studies on OCAs have diversified not only in terms of geographical areas, but also in terms of the aspects of OCA addressed. The JEL classification allows us to highlight this diversity of topics in OCA theory.

### 2.3. By JEL classification

The JEL codes are now routinely used to study the evolution of fields in economics in general (Card and Della Vigna, 2013), and to study the evolution of regional economics in particular (Silva et al., 2015).

Out of the 997 references in our final dataset, almost 50% (479 references) mention JEL codes. This is partly due to the fact that our database starts in 1961, while the JEL classification is stabilized in its current form later, in 1991. Table 3 shows all the JEL codes that are referenced in our database. For each of these codes, we indicate the number of publications and their weight among the 479 references. For instance, 85.4% of the publications refer to International Economics (JEL code *F*), 57.6% to Macroeconomics and Monetary Economics (JEL code *E*) and 17.3% to Econometrics (JEL code *C*). These three JEL codes are by far the most used. Figure 7 represents the evolution of these three JEL codes over time.

As can be seen from Figure 7, *International Economics* (code JEL *F*) is well represented throughout the period with a constant flow of highly cited papers. The

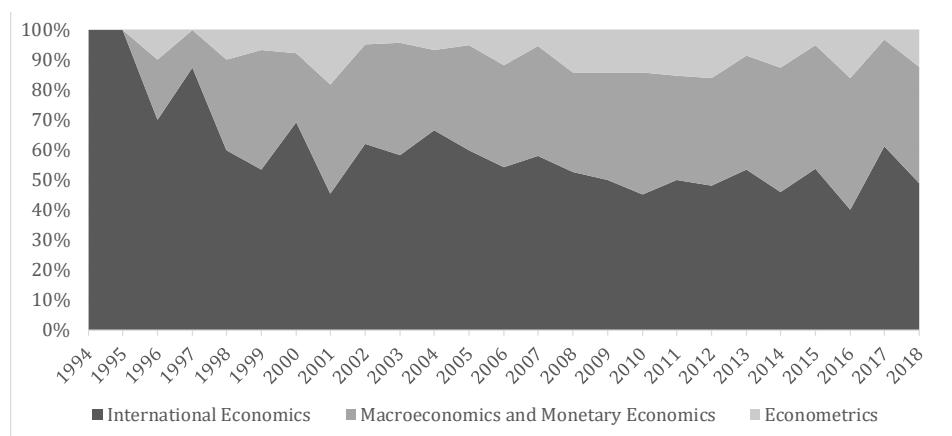
most mentioned JEL codes *F* in our database are *F33* ("International Monetary Arrangements and Institutions"), followed by *F15* ("Economic Integration"), in accordance with the OCA. Even if the percentage share decreases over the period, the general JEL code *F* remains the main JEL code mentioned. One possible explanation for this relative decrease could be that the OCA literature is slightly less focused on trade, and the analysis is more concerned with questions of macroeconomics (cf. *infra*). As Masini (2014) explains: "During the 1970s, it was rather clear that the European countries hardly matched any of the criteria for currency optimality and the OCA theoretical apparatus was often used to challenge the viability of the European monetary integration project (...). As a consequence of this, OCA theories became fundamentally linked to the study of macroeconomic convergence".

**Table 3. JEL codes of articles on OCA**

| JEL Codes |                                       | Number of publications | in % of the publications with a JEL code |
|-----------|---------------------------------------|------------------------|--|
| F         | International Economics               | 409                    | 85.4%                                    |
| E         | Macroeconomics and Monetary Economics | 276                    | 57.6%                                    |
| C         | Econometrics                          | 83                     | 17.3%                                    |
| O         | Development/Innovation                | 41                     | 8.6%                                     |
| H         | Public Economics                      | 25                     | 5.2%                                     |
| G         | Financial Economics                   | 19                     | 4.0%                                     |
| R         | Urban/Regional Economics              | 18                     | 3.8%                                     |
| J         | Labour Economics                      | 16                     | 3.3%                                     |
| N         | Economic History                      | 14                     | 2.9%                                     |
| B         | Methodology                           | 8                      | 1.7%                                     |
| P         | Economic Systems                      | 8                      | 1.7%                                     |
| A         | General Economics                     | 6                      | 1.3%                                     |
| D         | Microeconomics                        | 5                      | 1.0%                                     |
| L         | Industrial Organization               | 2                      | 0.4%                                     |
| Q         | Environmental/Ecological Economics    | 2                      | 0.4%                                     |
| I         | Health/Welfare                        | 1                      | 0.2%                                     |

Source: Authors.

**Figure 7. Evolution of the JEL codes *F*, *E* and *C***



Source: Authors.

This trend can be seen with the *Macroeconomics* field (JEL code *E*) which has gradually become more important, notably in the aftermath of the 2007 financial crisis. This rise in macroeconomics themes is linked notably to "shocks" (asymmetric, symmetric). As an indication, 70 articles of the database have the term "shock" in their title, beginning in the end of the 1990s and with a peak in the aftermath of the financial crisis in 2011. The rise of the "*Macroeconomics*" category can also be explained by the notion of synchronization commonly used in the OCA literature. This concerns mainly the business cycle synchronization, but also output synchronization, wages synchronization, shocks synchronization. This question of business cycle synchronization related to OCA emerges in the content of the studies of our database at the end of the 1990s. It appears in the titles of the studies of our database around 2005, with peaks in the aftermath of the financial crisis (2012, 2013 and 2016).

It is noteworthy that the JEL code *C* (*Econometrics*) was frequently added to publications, especially at the end of the years 2000. This code is never given on its own since econometrics is not the only subject of the publications concerned: it is rather because these publications make use of econometric techniques, as shown in the light of the classification described below. Looking at the studies on OCA in our database, the econometric technique the more commonly used is the Vector autoregression (VAR) and their variants (structural VAR, multivariate structural VAR). This technique is found in the title or abstract of over 70 studies in our database. This VAR technique appears in the content of the studies of our database at least since the beginning of the 1990s, and it emerges in the titles of the studies of our database around the end of the 1990s. Cluster techniques are also present in the content of studies of our database, but it appeared later in the titles or abstracts of these studies, in the late 1990s. In our database, this cluster technique is less used than the VAR technique. Finally, another technique appearing more recently in our database is the GARCH model (EGARCH notably). This technique can be found in the articles of our database from the early 2000s, with the term GARCH explicitly mentioned in the title or abstract of the studies in our database in 2015. Probably because it is more recent, this technique is much less present in our database than the two previous ones.

#### 2.4. By category of approach

To check the robustness of our results based on JEL codes, we use our own classification scheme, inspired from Kim et al. (2006).

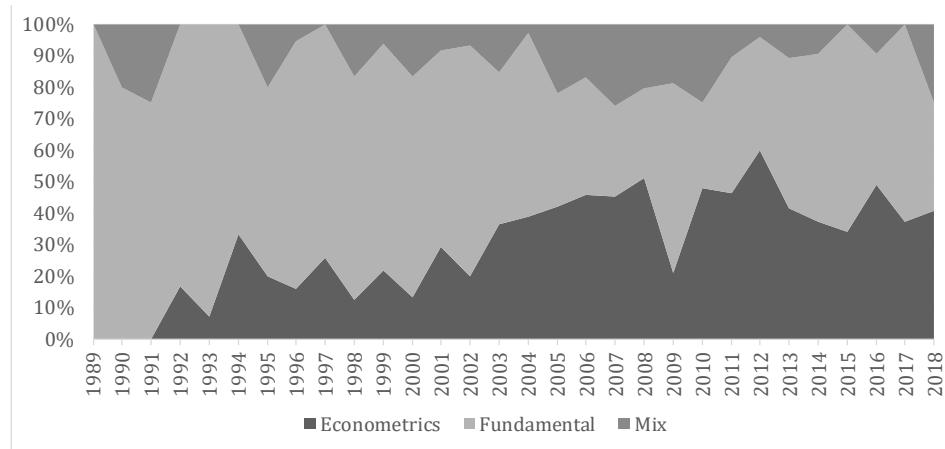
As explained above, we supplement our database with a description of the methodology adopted in the publications (Figure 8). After reading the articles, we classified them by the type of approach: "*Fundamental*" on the one hand, and "*Econometrics*" on the other hand.

*Fundamental* references include surveys, theoretical publications, comments, etc., while all papers with a model description and econometric tests are referenced under *Econometrics*. Some references contain both approaches, which explains why we use a third category (*Mix*). Contrary to the JEL classification, all the 997 references included in our database are classified in terms of these three categories.

At the beginning of the 1990s, most of the references were theoretical studies, accounting for a large percentage of the articles published over this period. At that time, OCA theory was still focused on discussing the various OCA criteria. This is one

of the reasons why for the whole period of the database (1961-2018) the OCA literature is classified in the first place (51,65%) in the category of "Fundamental". The OCA literature on Europe is mainly "Fundamental" oriented. In contrast, the OCA literature on Asia and on Africa are in the first place in the category of "Econometrics".

**Figure 8. Distribution of articles in the categories Econometrics, Fundamental and Mix**



Source: Authors.

Most striking is the increase of econometric papers from the beginning of the years 2000, which can be explained by the aggregation of studies with the various econometric techniques presented before (VAR, Cluster, GARCH), and the availability of data for empirical tests, in particular in Europe. This increase in the number of econometric studies is not specific to the OCA literature alone, but seems to concern economics in general over the past two decades (Rath and Wohlrabe, 2015).

## 2.5. By journal

It is now common in the literature to carry out analyses of the main academic journals in specific fields of economics or dealing with specific topics (Ellison, 2002; Card and Della Vigna, 2013), notably in regional economics (Biscaia and Mota, 2013; Silva et al., 2015; Garcia-Lillo et al., 2018).

Out of the 997 publications included in our study, 874 consist of articles classified in 344 journals (books, conferences and theses excluded), with 27.5% of these publications concentrated in 15 journals, as shown in the Table 4.

Most of these journals are directed by academics from European universities, which is consistent with the previous results showing the influence of the Europe region and European events on the OCA literature. Moreover, many of these journals are specialized in the field of international economics, in accordance with the previous results (Figure 7). In the case of the most represented journal of the database, the *Open Economies Review*, a little more than half of the publications (19 out of 37) concern Europe. This is in accordance with an OCA literature mainly focused on Europe region.

**Table 4. The academic journals most represented in our database of OCA literature**

| Journal Title                               | Number of publications | Distribution among these 15 journals | Journal geographic area | Scope                   |
|---|------------------------|--------------------------------------|-------------------------|-------------------------|
| Open Economies Review                       | 37                     | 15.4%                                | Europe/Canada           | International economics |
| World Economy                               | 28                     | 11.7%                                | Europe                  | International economics |
| Journal of Policy Modeling                  | 18                     | 7.5%                                 | Europe/USA              | Econometrics            |
| European Economic Review                    | 16                     | 6.7%                                 | Europe/USA              | Generalist              |
| Applied Economics                           | 15                     | 6.3%                                 | Europe/USA              | Econometrics            |
| Journal of International Money and Finance  | 15                     | 6.3%                                 | Europe/USA              | International economics |
| Empirica                                    | 14                     | 5.8%                                 | Europe                  | European studies        |
| International Economics and Economic Policy | 14                     | 5.8%                                 | Europe/USA              | International economics |
| Journal of Common Market Studies            | 14                     | 5.8%                                 | Europe                  | European studies        |
| Economic Modelling                          | 13                     | 5.4%                                 | Europe/Asia             | Econometrics            |
| Journal of Asian Economics                  | 13                     | 5.4%                                 | Asia                    | Economies in Asia       |
| Journal of Economic Integration             | 12                     | 5.0%                                 | Asia                    | International economics |
| Cato Journal                                | 11                     | 4.6%                                 | USA                     | Generalist              |
| Intereconomics                              | 10                     | 4.2%                                 | Europe                  | European studies        |
| Journal of International Economics          | 10                     | 4.2%                                 | USA                     | International economics |

*Note: the geographic area of a given journal is based on the university affiliation of the editors in chief or managing editors of the journal at the time of consultation, i.e., August 2022. The "scope" is based on the CNRS list of journals available on line and information from the journal website. Source: Authors.*

The concentration of the articles of our database in these leading journals is decreasing over time (Figure 9). This could indicate that the developments on the OCA question are spreading over various publication supports, which is particularly clear after the 2007 financial crisis. This is consistent with the general development of this literature during this period with more articles in the database.

In our document database, OCA theory was first mentioned in the most prestigious American *general* journals, with articles by Mundell (1961) and McKinnon (1963) published in the *American Economic Review*.<sup>15</sup> In our database, articles were subsequently published in this latter journal only in 1990 and 1997. However, this should not lead to the conclusion that the OCA theory was no longer discussed in renowned journals after the 1990s. In fact, our database shows the

<sup>15</sup> Silva et al. (2015) classify journals by quality. However, we find this type of classification questionable because the ranking of certain journals may vary over time between 1961 and 2018, and some journals may even have disappeared or changed their specialization. In addition, our database contains other types of documents (working papers, book chapters) that are difficult to rate.

opposite: from the 1990s onwards, this theory was present in a growing range of renowned general journals. Our database on OCA theory includes articles published in the *Quarterly Journal of Economics* in 2002, in the *Journal of Economic Literature* in 1993 and 2010, and five articles in *The Economic Journal* in 1971, 1993, 1998, 1999 and 2005, i.e. after 1990. According to our database, OCA theory continues to be discussed in general journals, such as in the *European Economic Review* in 2018. Thus, this theory has gradually spread geographically from American to European general journals. Finally, the journals in our database also indicate the geographical spread of the OCA theory outside Europe. The *Journal of Asian Economics* is one of the 15 most frequently cited journals present in our database (Table 4), with 13 articles from this journal published between 1998 and 2016.

**Figure 9. Number and percentage of articles in the most represented journals**



Source: Authors.

Among journals *specializing* in the theoretical aspects of OCA, particularly international economics, the *Journal of International Economics* has published 10 articles included in our database that deal with OCA theory (Table 4). This theory is therefore well represented in the leading journal in its field, throughout the period covered by our database, with entries between 1978 and 2016. Most of the articles on OCA theory in our database were published in the *Open Economies Review*, a journal dealing with topics in the field of international economics. These articles are spread evenly between 1991 and 2018, with no sign of any decline in the discussion of OCA theory at any given period.

The review of articles on OCA theory in our database also indicates that this topic has spread to other economic fields beyond international economics, being represented by four articles in the *Journal of Development Economics* in 1994, 2001, 2004 and 2008. Particularly since the 2000s, publications in this field have also appeared in interdisciplinary journals combining economics and politics, as suggested by the political criteria of OCAs. In our database, OCA theory is mentioned in articles from political economy journals, notably *New Political Economy*. Finally,

OCA theory has also spread to the fields of money, banking and finance. The *Journal of International Money and Finance* is one of the most prominent journals cited in our OCA database (Table 4), with articles dating back to 1995, but especially with a number of publications in this journal since 2008 and continuing up to the present. Our database also includes six articles in *International Finance* and four in the *Journal of Money, Credit and Banking*, mainly in the 2000s. Thus, according to the journals in our database, and contrary to a commonly held view, the OCA theory does not appear to be in decline. Based on our database, we find that this theory has spread from general to specialized journals, first in the United States, then in Europe and the rest of the world. It has also spread to journals in various fields of economics, starting with international economics and moving on to macroeconomics, and next to political economy and monetary, banking and finance journals.

In the following section, we present a more detailed qualitative analysis of our database to study the recent evolution of the OCA literature, notably in the aftermath of the subprime crisis and the European sovereign debt crisis. Indeed, we stress that bibliometric analysis can be used to identify potential future research topics in a particular corpus of literature. This approach applies in the case of the current debate as discussed in the following section.

### 3. THE SPECIALIZATION *VERSUS* ENDOGENEITY DEBATE IN REGIONAL MONETARY INTEGRATION: KRUGMAN *VERSUS* FRANKEL AND ROSE

The articles included in our database can shed light on a recurrent debate in the OCA literature: specialization *versus* endogeneity. The terms of this debate have been frequently explored, notably by Mongelli (2002) and Masini (2014), and in textbooks (De Grauwe, 2018; Benassy-Quéré et al., 2019). More precisely, by examining the titles of the documents in our database, the key concepts that emerge are regional “convergence/divergence”, and regional “core/periphery” countries. In our analysis, we study the evolution and dynamics of this debate, notably in the aftermath of the 2007 crisis.

Based on the articles of our database, we observe that this debate revolves around two main articles: Krugman (1993) representing the specialization hypothesis, and Frankel and Rose (1998) representing the endogeneity hypothesis. This discussion between Krugman and Frankel-Rose is also present in the regional science literature (Costa-I-Font and Tremosa-I-Balcells, 2003; Labondance, 2013; Clark, 2015; Fingleton et al., 2015).

We focus here on the article of Krugman (1993) because the recent financial crisis has had the effect of reviving interest in his work. Hence, we searched in the database for articles citing Krugman (1993), obtaining a subsample of 173 articles for the period 1993-2018. The quantitative and qualitative results of this analysis are presented in the following section: we first examine the Krugman *versus* Frankel-Rose debate on regional monetary integration and OCA for the period before and after the 2007 financial crisis. Finally, we show that this literature comes to the conclusion that, following Krugman, the divergence among EMU countries can lead to distinguish a regional “core” and “periphery”.

#### 3.1. A brief synthesis of the evolution of the debate

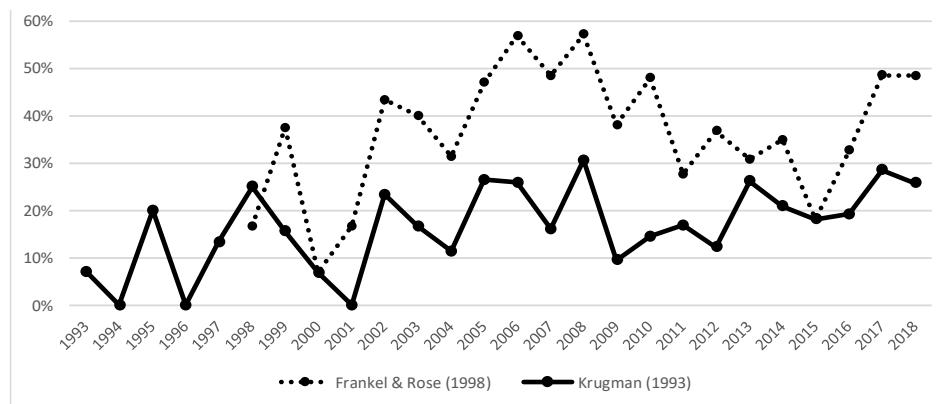
We can observe three stages in the Krugman *versus* Frankel-Rose debate (Figure 10). The first stage is from 1993 to the outset of the introduction of the euro. At the end of this period, the *endogeneity* hypothesis is formalized and backed up

empirically by Frankel and Rose (1998). This hypothesis becomes more and more consensual with the apparent success of the introduction of the euro. However, at the very beginning of the years 2000, there is still no complete consensus on the Frankel-Rose hypothesis.

Then, we see a second stage when the debate is crystallized, ending with a consensus on the endogeneity hypothesis just before the crisis in 2007.

Finally, we can recognize a third stage showing a comeback of Krugman's view, notably because of the regional heterogeneity among euro-area countries after the 2007 financial crisis and the European sovereign debt crisis starting around 2010. We focus on this recent trend in the aftermath of the crisis.

**Figure 10. Percentage of articles from our database on OCA mentioning two keys articles of the OCA literature**



Source: Authors.

### 3.2. State of the debate in the aftermath of the crisis

In the aftermath of the 2007 crisis, the literature on OCA appears to be still divided between the Krugman and Frankel-Rose hypotheses. To some extent, this reflects a return to the period before the years 2000 when the literature had no clear view of the dominant hypothesis: specialization or endogeneity. For instance, some authors (Santos Silva and Tenreyro, 2010; Imre, 2011; Beck and Janus, 2014; Masini, 2014) consider there is no clear consensus involving the dominance of the endogeneity hypothesis. From an historical perspective, this implies at least that the endogeneity view is less dominant compared to the pre-crisis era.

For other authors, to use a term of Krugman (2012a), the financial crisis is the "Revenge" of Krugman. These post-2007 crisis articles following the Krugman's view use different approaches, notably the standard view of OCA based on the "shocks" perspective analyzed before. According to Krugman (2012b), in 2007–2008 the European economy faced "*the mother of all asymmetric shocks*". This suggests that the financial crisis was a global shock, which was followed by regional asymmetric rather than symmetric effects in the euro area, contrary to the hypothesis of Kenen and Meade (2007) on global shocks. This issue of persistent asymmetric shocks in the Eurozone is even mentioned by some authors who share the Frankel-Rose "optimistic" view (Frankel, 2015). They acknowledge that the

Eurozone would not have become an OCA endogenously as strongly as expected because the “trade effect” would be weaker than expected in this region (Frankel, 2010). Furthermore, some recent historical empirical studies provide evidence in favour of Krugman’s hypothesis<sup>16</sup>: for example, based on the Italian and German monetary integration at the beginning in the 19<sup>th</sup> century, Vicquery (2017) stresses the potential role of monetary integration in the divergence of Southern Italy from Northern Italy.

More generally, these recent developments, based on Krugman’s ideas, put forward the regional “divergence” approach of the OCA theory. For this group of authors, the divergence of business cycles in the euro area increased in the aftermath of the crisis (Radulescu, 2012). Some authors find no convergence (GDP per capita) among European Union members over the period of the financial crisis (Hajek et al., 2016). Trade integration in the euro area could have led to a regional specialization of industries, instead of diversification. That is why several authors defend the specialization hypothesis *à la* Krugman (Gibson et al., 2014; Mongelli et al., 2017). Precisely with regard to the European sovereign debt crisis (and not the subprime crisis), Verde (2011, p. 149) was one of the first to use Krugman’s hypothesis (1993) to explain the structural cause of this crisis. This has led some authors to consider that the endogeneity hypothesis is called into question in the aftermath of the European sovereign debt crisis (Pisani-Ferry, 2013, p. 7; Coco and Silvestrini, 2017; Vicquery, 2017). Thus, Masini (2018, p. 78) concludes that: “The endogenous theory of optimum currency area’s criteria proved wrong”.

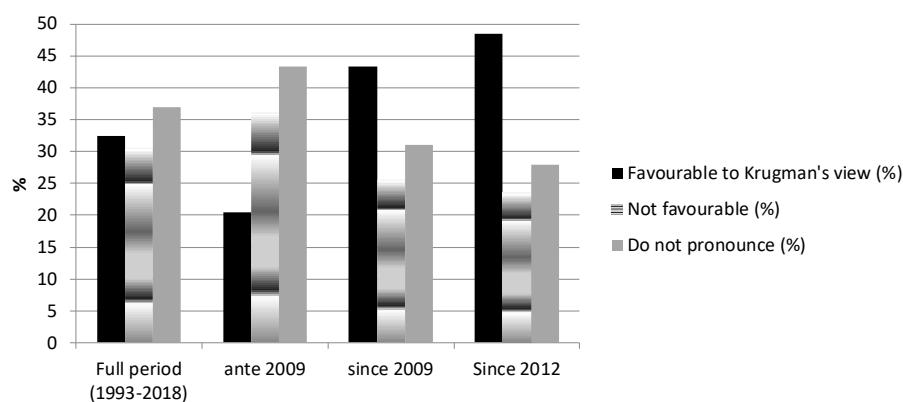
However, there is no unanimity against the endogeneity hypothesis. A minority of studies continue to find results in favour of this latter view, on the basis of the “trade effect” argument from A. Rose, which they consider to remain empirically significant (Rose, 2009; Gächter and Riedl, 2014; Glick and Rose, 2016; Campos et al., 2019).

To obtain a clear vision of this debate, we conducted a qualitative-quantitative analysis of our database, leading to the results that are presented in Figure 11. To produce Figure 11, we proceed in three stages. First, we searched the sub-sample of our database containing articles that mention Krugman (1993) (173 articles). Next, we examined each of these 173 articles to determine the authors’ views on Krugman’s (1993) arguments. We then classified each article into one of three categories: favourable to Krugman, unfavourable to Krugman, or neutral in the sense that they do not express an opinion but merely explain his ideas. Each article is classified into only one of the three categories. Finally, we divide the number of articles in each category by the total number of articles mentioning Krugman (1993) to obtain a percentage (of the total number of articles mentioning Krugman). This method has at least two limitations. First, this classification is based on our analysis of the document’s content and is therefore subject to a degree of subjectivity. This subjectivity bias is considered as surmountable in some studies (Rosa and Verga, 2007, pp. 149-150; Reid and Du Plessis, 2010, p. 272). Although this problem may be considered limited in scope, we have attempted to reduce the bias by using several authors to produce a consensus ranking (Reid and Du Plessis, 2010, p. 273).

<sup>16</sup> There is a tradition of historical analysis of OCA, notably following Bordo and Jonung (1999), Rockoff (2000), Flandreau and Maurel (2005), or Ryan and Loughlin (2018). Note also some recent reviews of the history of OCA literature by Masini (2014), Dyson and Maes (2016).

The second limitation is that the categorization is ternary. A ternary classification is commonly adopted in certain fields, such as in central bank communication, where it consists of coding content (Rosa and Verga, 2007, p. 151; Montes et al., 2016, p. 596; Bennani et al., 2020). Although it would also be possible to make use of more categories such as “very favourable”, “favourable” and “slightly favourable”, and thus give more detail (Blinder et al., 2008, p. 926; Reid and Du Plessis, 2010, p. 273), we nevertheless chose to use the simplest form of ternary categorization.

**Figure 11. Breakdown of articles expressing opinions on Krugman's view about OCA theory**



*Source: Authors.*

This qualitative analysis of our database (Figure 11) shows that Krugman's view on regional monetary integration tends to be dominant in the aftermath of the crisis, notably in the aftermath of the European sovereign debt crisis after 2012.

One particular development of the post-2012 literature on OCA, which is supported by Krugman's view on regional divergence, is the resulting dichotomy between core and periphery countries in Europe that we study in the next subsection 3.3.

### 3.3. The financial crisis in relation to the distinction between a regional core and periphery in the euro area: is there a return to Krugman's view?

The basic idea of the core-periphery approach is that any shock would reinforce regional divergences to the point of causing a split between the “core” and the “periphery” of the EMU. It appears in the OCA literature that this core-periphery hypothesis has been renewed following the recent financial crises of 2007 and 2011. Following Krugman (2012b), some authors believe that these recent crises were also shocks that have highlighted a “two-speed” euro area composed of core and periphery countries.

In our database, for the period 1961-2007, 13 publications have the words “core” or “periphery” in the title. This increases to 32 publications for the recent period 2008-2018. A closer analysis of the content of all the studies in our database reveals that around 12% of them (58 studies) use minimum twice the term “periphery” for the period 1961-2007, compared to more than 20% (108 studies) for the period 2008-2018.

The recent OCA literature on core-periphery focuses on two issues:

- i) the effect of the shock induced by the euro adoption on the core-periphery question,
- ii) the effect of the shocks of the recent financial crises on the core and periphery countries of the EMU.

With regard to the point i), some authors reaffirm Krugman's idea that the European monetary union could be an asymmetric shock leading to regional divergence among EMU members (Pisani-Ferry, 2013; Whelan, 2013; Fingleton et al., 2015). Empirically, a number of studies point to this split between core and periphery countries in the euro area. It is shown that business cycle synchronization increases with adoption of the euro in the core countries, but decreases in periphery countries (Lehwald, 2013). This regional heterogeneity could be reflected in the evolving structure of production of euro area members following the introduction of the euro. The core countries diversified, while "periphery" countries specialized leading to regional agglomeration effects *à la* Krugman (Imbs et al., 2012; Kapounek, 2016). Another possible explanation of the divergence is that *core* countries would be more specialized in intra-industry trade, contrary to *periphery* countries which would become specialized in inter-industry trade (Arestis and Phelps, 2016).

Secondly, the studies on point ii), inspired by Krugman (2012b), highlight a desynchronization of the business cycle between some periphery and core countries of the euro area (Ahmed et al., 2018). It also appears that *output* synchronization is unstable in periphery countries (Arestis and Phelps, 2016). Using a plot combining per capita GDP and gross fixed capital formation, Kapounek (2016) also sheds light on the core-periphery situation in the euro area in the aftermath of the subprime crisis. Some authors claim that, in the aftermath of the financial crisis, we can distinguish two "eurolands" in terms of *productivity* (Fingleton et al., 2015). These analyses suggest at least that euro-area countries can converge, but not at the same speed, so that heterogeneity persists in the euro area.

In contrast to Krugman's view, few authors still consider that the existence of core-periphery divergences is not necessarily incompatible with the endogeneity hypothesis. The basic idea is that the endogeneity hypothesis remains valid since business cycle synchronization continues to progress in the euro area countries, simply because these countries do not converge at the same speed (Campos et al., 2019).

The current literature does not clearly address the question of whether the impact of the *subprime* crisis on euro area convergence (or divergence) is different or similar to the impact of the European sovereign debt crisis. A fruitful avenue for future research would be to discriminate between these two shocks when studying the core-periphery question in the euro area. This is a crucial issue for future developments of OCA theory and regional economics.

## CONCLUSION AND POLICY IMPLICATIONS

Five main points emerge from our quantitative survey of the OCA literature.

Firstly, this literature has developed only quite recently, in the 1990s, as stressed by Bayoumi and Eichengreen (1998). Nevertheless, we show that articles on this subject are spreading over a range of publications, with a decreasing concentration of papers published in the major journals.

Secondly, the OCA literature is stimulated by events. The recent financial crisis makes no exception: it has boosted the number of articles on this subject. Among the events that impact the development of the OCA literature, European events seem to be the more important. The periods before the launch of the euro in 1999 and the European sovereign debt crisis correspond to periods of acceleration of research on OCA.

Thirdly, in accordance with the above point, most articles of the OCA literature are about the Europe region.

Fourthly, the dynamics of the OCA literature shows a recent trend towards more articles in macroeconomics and econometrics-oriented fields. The subjects treated have evolved from theoretical discussions on the OCA criteria to the empirical testing of macroeconomic related questions (shocks, business cycle synchronization, convergence of macroeconomic variables, regional core and periphery), with empirical econometric investigations notably applying to the euro area.

Finally, ever since the beginning of the path towards the euro, from the early 1990s and right up to the present, the OCA has remained a subject of much debate. A major recurrent debate is between the two paradigms of regional "divergence" and "endogeneity", a debate that was revived during the recent European sovereign debt crisis. Based on our database, we suggest that the recent crises (including the subprime crisis) have been followed by a shift in this debate: the regional "divergence" view à la Krugman is becoming more accepted. These changes in the regional specialization *versus* endogeneity debate could be investigated further in future research.

Turning to policymaking, our findings can suggest some lessons. Beyond this return of the "pessimistic" view of OCA in the aftermath of the Greek sovereign debt crisis, sceptics like Krugman are making policy suggestions to improve the "optimal" character of the European monetary union. Krugman (2012a-b) emphasizes that reforms in the euro zone should move towards more flexibility and adjustment capacities of euro area member countries. Thus, European countries could cope with the persistent asymmetric shocks within the euro zone, which does not appear to have become an endogenous OCA. They call for a deepening of the European construction through fiscal integration towards a "fiscal union". The European sovereign debt crisis re-opened the old debate on fiscal integration in Europe. Hence in terms of OCA criteria (Table 2), Krugman (2011; 2012b; 2015) recommends to rely on Kenen's fiscal integration criterion rather than on the mobility of the labour factor of Mundell. In terms of policy implementation, this implies that interregional transfers and redistribution between member countries would be stabilisation mechanisms of region-specific asymmetric shocks (Anagnostou and Papadamou, 2014; Fingleton et al., 2015). The degree of fiscal integration under discussion can vary substantially, with the notion of "fiscal union" having different meanings in the literature (Bargain et al., 2013). The proposals range from limited federal risk-sharing schemes, such as central fiscal capacity or insurance scheme (Burriel et al., 2020; Beetsma et al., 2024), to full fiscal union with a significant federal budget (Bordo et al., 2013; Acharya and Steffen, 2016; De Grauwe, 2016; Farhi and Werning, 2017; Berger et al., 2019). This idea of fiscal integration à la Kenen raises research questions about its effectiveness in reducing the persistent heterogeneity of the EMU, which tends to split between a core and a periphery (Bilbiie et al., 2021).

Moreover, as has happened many times in the history of the European construction, and in the history of OCA theory, there is no full consensus on this agenda of fiscal integration. Some authors do not recommend a fiscal union in Europe because of the risk of moral hazard, the risk of lack of fiscal discipline, or because of insufficient political support (Bargain et al., 2013; Frankel, 2015; de Haan and Kosterink, 2018).

*In fine*, this policy debate on fiscal union in Europe suggests that, after more than 60 years of existence, the OCA theory, and in particular Kenen's fiscal criterion, still remains a subject for future research for regional economics.

## REFERENCES

**Acharya, V., Steffen, S.**, 2016, Capital Markets Union in Europe: Why other Unions Must Lead the Way, *Swiss Journal of Economics and Statistics*, 152, 4, 319-329.

**Agur, I., Dorruci, E., Mongelli, F.**, 2007, Testing the Links between Institutional Integration and Trade Deepening: Clues from Europe, *Open Economies Review*, 18, 5, 599-612.

**Ahmed, J., Chaudhry, S., Straetmans, S.**, 2018, Business and Financial Cycles in the Eurozone: Synchronization or Decoupling, *Manchester School*, 86, 3, 358-389.

**Aizenman, J.**, 2018, Optimal Currency Area: A Twentieth Century Idea for the Twenty-First Century? *Open Economies Review*, 29, 2, 373-382.

**Alvarez, L., Gadea, D., Gomez Loscos, A.**, 2021, Cyclical Patterns of the Spanish Economy in Europe, Banco de Espana Working Paper No. 2103.

**Anagnostou, A., Papadamou, S.**, 2014, The Impact of Monetary Shocks on Regional Output: Evidence from Four South Eurozone Countries, *Région et Développement*, 39, 105-130.

**Arexis P., Phelps, P.**, 2016, Endogeneity Analysis of Output Synchronization in the Current and Prospective EMU, *Journal of Common Market Studies*, 54, 3, 525-543.

**Asongu, S., Nwachukwu, J., Tchamyou, V.**, 2017, A Literature Survey on Proposed African Monetary Unions, *Journal of Economic Surveys*, 31, 3, 878-902.

**Baldwin, R., Wyplosz, C.**, 2019, *The Economics of European Integration*, 6<sup>th</sup> ed., Maidenhead, McGraw-Hill.

**Ballabriga, F., Villegas-Sánchez, C.**, 2017, Specialization, Risk Sharing and the Euro, *Journal of Common Market Studies*, 55, 6, 1380-1397.

**Bargain, O., Dolls, M., Fuest, C., Neumann, D., Peichl, A., Pestel, N., Siegloch, S., Conconi, P., Plantin, G.**, 2013, Fiscal Union in Europe? Redistributive and Stabilizing Effects of a European Tax-Benefit System and Fiscal Equalization Mechanism, *Economic Policy*, 45, 2, 376-422.

**Bayoumi, T., Eichengreen, B.**, 1998, Exchange Rate Volatility and Intervention: Implications of the Theory of Optimum Currency Areas, *Journal of International Economics*, 45, 2, 191-209.

**Beck, K., Janus, J.**, 2014, Synchronization of Economic Shocks in the Visegrad Group: An Empirical Assessment, *Studia UBB Negotia*, LVIX, 2, 35-56.

**Beck, K., Nzimande, N.**, 2023, Labor Mobility and Business Cycle Synchronization in Southern Africa, *Economic Change and Restructuring*, 56, 1, 159-179.

**Beck, K., Okhrimenko, I.**, 2025, Optimum Currency Area in the Eurozone. The Regional Origins of the European Business Cycle, *Open Economies Review*, 36, 197-219.

**Beetsma, R., Cimadomo, J., Van Spronsen, J.**, 2024, One Scheme Fits All: A Central Fiscal Capacity for the EMU Targeting Eurozone, National and Regional Shocks, *European Economic Review*, 165, 104721.

**Belke, A., Domnick, C., Gros, D.**, 2017, Business Cycle Synchronization in the EMU: Core vs. Periphery, *Open Economies Review*, 28, 5, 863-892.

**Benassy-Quéré, A., Coeuré, B., Jacquet, P., Pisani-Ferry, J.**, 2019, *Economic Policy*, 2<sup>nd</sup> ed., Oxford, Oxford University Press.

**Bennani, H., Fanta, N., Gertler, P., Horvath, R.**, 2020, Does Central Bank Communication Signal Future Monetary Policy in a (Post)-Crisis Era? The Case of the ECB, *Journal of International Money and Finance*, 104, 102167.

**Berger, H., Dell'Ariccia, G., Obstfeld, M.**, 2019, Revisiting the Economic Case for Fiscal Union in the Euro Area, *IMF Economic Review*, 67, 3, 657-683.

**Bernard, M., Bernela, B., Ferru, M.**, 2021, Does the Geographical Mobility of Scientists Shape Their Collaboration Network? A Panel Approach of Chemists' Careers, *Papers in Regional Science*, 100, 1, 79-99.

**Bilbiie, F., Monacelli, T., Perotti, R.**, 2021, Fiscal Policy in Europe: Controversies over Rules, Mutual Insurance, and Centralization, *Journal of Economic Perspectives*, 35, 2, 77-100.

**Biscaia, R., Mota, I.**, 2013, Models of Spatial Competition: A Critical Review, *Papers in Regional Science*, 92, 4, 851-871.

**Blinder, A., Ehrmann, M., Fratzscher, M., De Haan, J., Jansen, D.**, 2008, Central Bank Communication and Monetary Policy: a Survey of Theory and Evidence, *Journal of Economic Literature*, 46, 4, 910-945.

**Bordo, M., Jonung, L.**, 1999, The Future of EMU: What Does the History of Monetary Unions Tell Us? National Bureau of Economic Research, Working Paper No. 7365.

**Bordo, M., Jonung, L., Markiewicz, A.**, 2013, A Fiscal Union for the Euro: Some Lessons from History, *Cesifo Economic Studies*, 59, 3, 449-488.

**Bouvet, F.**, 2011, What Does Greater Economic Integration Mean for Interregional Income Inequality? An Analysis of OECD Countries and Regions, *Région et Développement*, 33, 39-58.

**Broll, U., Roldán-Ponce, A., Wahl, J.**, 2013, Regional Investment Under Uncertain Costs of Location, *The Annals of Regional Science*, 51, 3, 645-657.

**Broz, T.**, 2005, The Theory of Optimum Currency Areas: A Literature Review, *Privredna Kretanja I Ekonomска Politika*, 15, 104, 53-78.

**Burriel, P., Chronis, P., Freier, M., Hauptmeier, S., Reiss, L., Stegarescu, D., Van Parys, S.**, 2020, A Fiscal Capacity for the Euro Area: Lessons from Existing Fiscal-Federal Systems, European Central Bank Working Paper No. 239.

**Campos, N., Fidrmuc, J., Korhonen, I.**, 2019, Business Cycle Synchronisation and Currency Unions: A Review of the Econometric Evidence Using Meta-Analysis, *International Review of Financial Analysis*, 61, 274-283.

**Campos, N., Macchiarelli, C.**, 2021, The Dynamics of Core and Periphery in the European Monetary Union: A New Approach, *Journal of International Money and Finance*, 112, 102325.

**Cao, Z., Derudder, B., Peng, Z.**, 2019, Interaction Between Different Forms of Proximity in Inter-Organizational Scientific Collaboration: The Case of Medical Sciences Research Network in the Yangtze River Delta Region, *Papers in Regional Science*, 98, 5, 1903-1924.

**Caporale, G., Pittis, N., Prodromidis, K.**, 1999, Is Europe an Optimum Currency Area? Business Cycles in the EU, *Journal of Economic Integration*, 14, 2, 169-202.

**Card, D., Della Vigna, S.**, 2013, Nine Facts about Top Journals in Economics, *Journal of Economic Literature*, 51, 1, 144-161.

**Castro e Silva, M., Teixeira, A.**, 2011, A Bibliometric Account of the Evolution of EE in the Last Two Decades: Is Ecological Economics Becoming a Post-Normal Science? *Ecological Economics*, 70, 5, 849-862.

**Cerqua, A., Di Stefano, R., Pellegrini, G.**, 2023, What Kind of Region Reaps the Benefits of a Currency Union? *Journal of Regional Science*, 63, 3, 552-582.

**Cesarano, F.**, 2006, The Origins of the Theory of Optimum Currency Areas, *History of Political Economy*, 38, 4, 711-731.

**Clark, G.**, 2015, The Geography of the European Central Bank: Form, Functions and Legitimacy, *Journal of Economic Geography*, 15, 5, 855-881.

**Claveau, F., Gingras, Y.**, 2016, Macrodynamics of Economics: A Bibliometric History, *History of Political Economy*, 48, 4, 551-592.

**Coco, A., Silvestrini, A.**, 2017, The Nature and Propagation of Shocks in the Euro Area: A Comparative SVAR Analysis, *International Journal of Computational Economics and Econometrics*, 7, 1/2, 95-114.

**Corsetti, G.**, 2008, A Modern Reconsideration of the Theory of Optimal Currency Areas, European Commission, Economic Papers No. 308, March.

**Costa-I-Font, J., Tremosa-I-Balcells, R.**, 2003, Spanish Regions and the Macroeconomic Benefits of the European Monetary Union. *Regional Studies*, 37, 3, 217-226.

**De Grauwe, P.**, 1993, The Political Economy of Monetary Union in Europe, *The World Economy*, 16, 6, 653-661.

**De Grauwe, P.**, 2012, The Governance of a Fragile Eurozone, *Australian Economic Review*, 45, 3, 255-268.

**De Grauwe, P.**, 2016, European Monetary Unification: A Few Lessons for East Asia, *Scottish Journal of Political Economy*, 63, 1, 7-17.

**De Grauwe, P.**, 2018, *Economics of Monetary Union*, 12<sup>th</sup> ed., Oxford, Oxford University Press.

**De Grauwe, P., Ji, Y.**, 2012, Economic and Monetary Union in Europe, in: Bergsten, F., Henning, R. (eds.), *Global Economics in Extraordinary Times. Essays in Honor of John Williamson*, Washington D.C., Peterson Institute for International Economics, 53-82.

**De Grauwe, P., Ji, Y.**, 2016, How to Reboot the Eurozone and Ensure Its Long-Term Survival, in: Baldwin, R., Giavazzi, F. (eds.), *How to Fix Europe's Monetary Union: Views of Leading Economists*, London, CEPR Press, 136-149.

**De Grauwe, P., Ji, Y.**, 2017, Governing a Sustainable Eurozone, *Rivista Internazionale Di Scienze Sociali*, Anno 125, 2, 173-194.

**De Grauwe, P., Mongelli, F.**, 2005, Endogeneities of Optimum Currency Areas: What Brings Countries Sharing a Single Currency Closer Together? European Central Bank Working Paper No. 468.

**De Haan, J., Kosterink, P.**, 2018, The Case for More Fiscal Risk Sharing and Coordination of Fiscal and Monetary Policy, In: N. Campos, N., and Sturm, J.-E. (eds.), *Bretton Woods, Brussels and Beyond: Redesigning the Institutions of Europe*, London, CEPR, 107-116.

**Dellas, H., Tavlas, G.**, 2009, An Optimum-Currency-Area Odyssey, *Journal of International Money and Finance*, 28, 7, 1117-1137.

**Détang-Dessendre, C., Partridge, M., Piguet, V.**, 2016, Local Labor Market Flexibility in a Perceived Low Migration Country: The Case of French Labor Markets, *Regional Science and Urban Economics*, 58, 89-103.

**Du, Y., Teixeira, A.**, 2012, A Bibliometric Account of Chinese Economics Research Through the Lens of the China Economic Review, *China Economic Review*, 23, 4, 743-762.

**Dyson, K., Maes, I.**, 2016, *Architects of the Euro. Intellectuals in the Making of European Monetary Union*, Oxford, Oxford University Press.

**Eichengreen, B.**, 1992, Should the Maastricht Treaty Be Saved? *Princeton Studies in International Finance*, No. 74, International Finance Section, Princeton University, December.

**Eichengreen, B.**, 2014, The Eurozone Crisis: The Theory of Optimum Currency Areas Bites Back, Notenstein Academy White Paper, March.

**Eichengreen, B.**, 2018, Optimum Currency Areas Past and Future, Oxford, *Oxford Research Encyclopedia of Economics and Finance*.

**Ellison, G.**, 2002, The Slowdown of the Economics Publishing Process, *Journal of Political Economy*, 110, 5, 947-993.

**European Commission**, 1990, One Market, One Money. An Evaluation of the Potential Benefits and Costs of Forming an Economic and Monetary Union, *European Economy*, 44.

**Farhi, E., Werning, I.**, 2017, Fiscal Unions, *American Economic Review*, 107, 12, 3788-3834.

**Feng, Y., Zhu, Q., Lai, K.**, 2017, Corporate Social Responsibility for Supply Chain Management: A Literature Review and Bibliometric Analysis, *Journal of Cleaner Production*, 158, 296-307.

**Ferroni, F., Klaus, B.**, 2015, Euro Area Business Cycles in Turbulent Times: Convergence or Decoupling?, *Applied Economics*, 47, 34-35, 3791-3815.

**Fingleton, B., Garretson, H., Martin, R.**, 2015, Shocking Aspects of Monetary Union: The Vulnerability of Regions in Euroland, *Journal of Economic Geography*, 15, 5, 907-934.

**Flandreau, M., Maurel, M.**, 2005, Monetary Union, Trade Integration, and Business Cycles in 19th Century Europe, *Open Economies Review*, 16, 2, 135-152.

**Fontagné, L., Freudenberg, M.**, 1999, Endogenous Symmetry of Shocks in a Monetary Union, *Open Economies Review*, 10, 3, 263-287.

**Frankel, J.**, 2010, The Estimated Trade Effects of the Euro: Why Are They Below Those from Historical Monetary Unions among Smaller Countries? In: Alesina, A., Giavazzi, F. (eds.), *Europe and the Euro*, Chicago, University of Chicago Press, 169-212.

**Frankel, J.**, 2015, The Euro Crisis: Where to from Here? *Journal of Policy Modeling* 37, 3, 428-444.

**Frankel, J., Rose, A.**, 1997, Is EMU More Justifiable Ex Post than Ex Ante? *European Economic Review*, 41, 3-5, 753-760.

**Frankel, J., Rose, A.**, 1998, The Endogeneity of the Optimum Currency Area Criteria, *Economic Journal*, 108, 449, 1009-1025.

**Fraser, P., Macdonald, G., Mullineux, A.**, 2014, Regional Monetary Policy: An Australian Perspective, *Regional Studies*, 48, 8, 1419-1433.

**Furceri, D., Mazzola, F., Pizzuto, P.**, 2019, Asymmetric Effects of Monetary Policy Shocks Across US States, *Papers in Regional Science*, 98, 5, 1861-1891.

**Gächter, M., Riedl, A.**, 2014, One Money, One Cycle? The EMU Experience, *Journal of Macroeconomics*, 42, 141-155.

**Gadea-Rivas, M., Gómez-Loscos, A., Leiva-Leon, D.**, 2019, Increasing Linkages among European Regions. The Role of Sectoral Composition, *Economic Modelling*, 80, 222-243.

**García-Lillo, F., Claver-Cortés, E., Marco-Lajara, B., Úbeda-García, M., Seva-Larrosa, P.**, 2018, On Clusters and Industrial Districts: A Literature Review Using Bibliometrics Methods, 2000-2015, *Papers in Regional Science*, 97, 4, 835-861.

**Gauchan, B., Sarin, V.**, 2018, Is South Asia an Optimum Currency Area? *Journal of Economic Integration*, 33, 3, 572-603.

**Gibson, H., Palivos, T., Tavlas, G.**, 2014, The Crisis in the Euro Area: An Analytic Overview, *Journal of Macroeconomics*, 39B, 233-239.

**Glick, R., Rose, A.**, 2016, Currency Unions and Trade: A Post-EMU Reassessment, *European Economic Review*, 87, 78-91.

**Goodhart, C.**, 1995, The Political Economy of Monetary Union, in: Kenen, P. (ed.), *Understanding Interdependence: The Macroeconomics of the Open Economy*, Princeton, Princeton University Press, 450-505.

**Grigoras, V., Stanciu, I.**, 2016, New Evidence on the (De)synchronisation of Business Cycles: Reshaping the European Business Cycle, *International Economics*, 147, 27-52.

**Hajek, J., Hoeschle, F., Bilan, Y., Strielkowski, V.**, 2016, Economic Performance and Convergence in the Eurozone, *Marketing and Management of Innovations*, 1, 206-223.

**Hoover, K.**, 2004, Lost Causes, *Journal of The History of Economic Thought*, 26, 2, 149-164.

**Horvath, J.**, 2003, Optimum Currency Areas Theory: A Selective Review, Discussion Paper No. 15, Institute for Economies in Transition, Bank of Finland.

**Imbs, J., Montenegro, C., Wacziarg, R.**, 2012, Economic Integration and Structural Change, Working Paper, June.

**Imre, O.**, 2011, EMU: An Evaluation of the Asymmetric Shock Problem, *Marmara Journal of European Studies*, 19, 2, 73-91.

**Ingram, J.**, 1962, *Regional Payments Mechanisms: The Case of Puerto Rico*, Chapell Hill, University of North Carolina Press.

**Ishiyama, Y.**, 1975, The Theory of Optimum Currency Areas: A Survey, *Staff Papers-International Monetary Fund*, 22, 2, 344-383.

**Jager, J., Hafner, K.**, 2013, The Optimum Currency Area Theory and the EMU. An Assessment in the Context of the Eurozone Crisis, *Intereconomics*, 48, 5, 315-322.

**Kapounek, S.**, 2016, Long-Run Heterogeneity across the EU Countries, in: Huber, P., Nerudova, D., Rozmahel, P. (eds.), *Competitiveness, Social Inclusion and Sustainability in a Diverse European Union*, Cham, Springer, 37-46.

**Kappel, S.**, 2015, An Evaluation of Selected Economic Areas According to Similarity of Supply and Demand Shocks, *Review of Economic Perspectives*, 15, 2, 221-240.

**Kawai, M.**, 1987, Optimum Currency Areas, in: Newman, P., Milgate, M., Eatwell, J. (eds.), *The New Palgrave: A Dictionary of Economics*, Vol. 3, London, Macmillan, 740-743.

**Kelejian, H., Tavlas, G., Petroulas, P.**, 2012, In the Neighborhood: The Trade Effects of the Euro in a Spatial Framework, *Regional Science and Urban Economics*, 42, 1-2, 314-322.

**Kenen, P.**, 1969, The Theory of Optimum Currency Areas: An Eclectic View, in: Mundell, R., Swoboda, A. (eds.), *Monetary Problems in the International Economy*, Chicago, University of Chicago Press, 41-60.

**Kenen, P.**, 2003, What We Can Learn from the Theory of Optimum Currency Areas, in: *Submissions on EMU from Leading Academics*. HM Treasury.

**Kenen, P., Meade, E.**, 2007, *Regional Monetary Integration*, Cambridge, Cambridge University Press.

**Kim, H., Morse, A., Zingales, L.**, 2006, What Has Mattered to Economics Since 1970, *Journal of Economic Perspectives*, 20, 4, 189–202.

**Krugman, P.**, 1993, Lessons of Massachusetts for EMU, in: Torres, F., Giavazzi, F. (eds.), *Adjustment and Growth in the European Monetary Union*, Cambridge, Cambridge University Press, 241-266.

**Krugman, P.**, 2011, Kenen, Mundell, and Europe, *The New York Times*, January 14.

**Krugman, P.**, 2012a, Revenge of the Optimum Currency Area, In: Acemoglu, D., Parker, J., Woodford, M. (eds.), *NBER Macroeconomics Annual 2012*, Chicago, University of Chicago Press, 439-448.

**Krugman, P.**, 2012b, *End this Depression Now!* New York, WW Norton & Co.

**Krugman, P.**, 2015, The Downside of Labor Mobility, *The New York Times*, August 14.

**Kunroo, M.**, 2015, Theory of Optimum Currency Areas: A Literature Survey, *Review of Market Integration*, 7, 2, 87–116.

**Labondance, F.**, 2013, Synchronisation des Cycles Régionaux dans la Zone Euro, *Revue d'Économie Régionale et Urbaine*, 2013/2, 269-296.

**Lafrance, R., St-Amant, P.**, 1999, Optimal Currency Areas: A Review of the Recent Literature, Bank of Canada, Working Paper, No. 1999-06.

**Lagadec, G.**, 2010, Nouvelle-Calédonie : Entre émancipation, passage à l'euro et recherche de ressources nouvelles, *Région et Développement*, 31, 143–167.

**Lane, P.**, 2000, Asymmetric Shocks and Monetary Policy in a Currency Union, *Scandinavian Journal of Economics*, 102, 4, 585–604.

**Lehwald, S.**, 2013, Has the Euro Changed Business Cycle Synchronization? Evidence from the Core and The Periphery, IFO Working Paper, No. 122.

**Maes, I.**, 1992, Optimum Currency Area Theory and European Monetary Integration, *Tijdschrift voor Economie en Management*, 37, 2, 137-152.

**Makris, G.**, 2015, Optimum Currency Area Theory, Nominal and Real Convergence Controversies and the European Experience After the Recent Global Economic Crisis, in: Karasavvoglou, A., Ongan, S., Polychronidou, P. (eds.), *EU Crisis and the Role of the Periphery*, Cham, Springer, 57-73.

**Masini, F.**, 2014, A History of the Theories on Optimum Currency Areas, *European Journal of The History of Economic Thought*, 21, 6, 1015-1038.

**Masini, F.**, 2018, "It Can't Happen, It's a Bad Idea, It Won't Last". US Economists and the Euro; A Reappraisal, *On-Line Journal Modelling the New Europe*, 25, 60-86.

**Masson, P., Taylor, M.**, 1993, Currency Unions: A Survey of the Issues, in: Masson, P., Taylor, M. (eds.), *Policy Issues in the Operation of Currency Unions*, Cambridge, Cambridge University Press, 3-54.

**Maza, A., Moral-Arce, I.**, 2006, An Analysis of Wage Flexibility: Evidence from The Spanish Regions, *The Annals of Regional Science*, 40, 3, 621–637.

**Mckinnon, R.**, 1963, Optimum Currency Area, *American Economic Review*, 53, 4, 717-725.

**Mckinnon, R.**, 2004, Optimum Currency Areas and Key Currencies: Mundell I Versus Mundell II, *Journal of Common Market Studies*, 42, 4, 689-715.

**Melitz, F.**, 1995, The Current Impasse in Research on Optimum Currency Areas, *European Economic Review*, 39, 3-4, 492-500.

**Merigo, J., Mas-Tur, A., Roig-Tierno, N., Ribeiro-Soriano, D.**, 2015, A Bibliometric Overview of the Journal of Business Research Between 1973 and 2014, *Journal of Business Research*, 68, 12, 2645-2653.

**Miles, W.**, 2019, Has the Euro Sustainably Increased Home Price Co-Movement? *Journal of Regional Science*, 59, 5, 931-961.

**Mintz, N.**, 1970, *Monetary Union and Economic Integration*, New York, New York University Press.

**Mongelli, F.**, 2002, "New" Views on the Optimum Currency Area Theory: What Is EMU Telling Us? European Central Bank, Working Paper No. 138.

**Mongelli, F.**, 2008, European Economic and Monetary Integration and the Optimum Currency Area Theory, European Commission, DG ECFIN, European Economic Papers No. 302.

**Mongelli, F., Papadopoulos, G., Reinhold, E.**, 2017, Are Euro Area Economic Structures Changing? in: Da Costa Cabral, N., Renato Goncalves, J., Cunha Rodrigues, N., (eds.), *The Euro and the Crisis. Perspectives for the Eurozone as a Monetary and Budgetary Union*, Cham, Springer, 47-72.

**Montes, G., Oliveira, L., Curi, A., Nicolay, R.**, 2016, Effects of Transparency, Monetary Policy Signalling and Clarity of Central Bank Communication on Disagreement about Inflation Expectations, *Applied Economics*, 48, 7, 590–607.

**Monteverdi, A.**, 2016, Optimum Currency Area Theory and EMU: Lessons from the Euro Crisis, CROIE Working Papers CROIE-WP/2/2016, December.

**Mundell, R.**, 1961, A Theory of Optimum Currency Areas, *American Economic Review*, 51, 4, 509–517.

**Mussa, M.**, 1997, Political and Institutional Commitment to a Common Currency, *American Economic Review*, 87, 2, 217–220.

**Otero-Iglesias, M.**, 2015, Stateless Euro: The Euro Crisis and the Revenge of the Chartalist Theory of Money, *Journal of Common Market Studies*, 53, 2, 349–364.

**Pisani-Ferry, J.**, 2013, The Known Unknowns and Unknown Unknowns of European Monetary Union, *Journal of International Money and Finance*, 34, 6–14.

**Radulescu, A.**, 2012, The Convergence of the Business Cycles in the Euro Area. *Romanian Economic and Business Review*, 7, 4, 97–104.

**Rath, K., Wohlrabe, K.**, 2016, Trends in Economics Publications Represented by JEL Categories between 2007 and 2013, *Applied Economics Letters*, 23, 9, 660–663.

**Reid, M., Du Plessis, S.**, 2010, Loud and Clear? Can We Hear When the SARB Speaks?, *South African Journal of Economics*, 78, 3, 269–286.

**Rockoff, H.**, 2000, How Long Did It Take the United States to Become an Optimal Currency Area? NBER Historical Working Paper No. 124.

**Rodríguez-Fuentes, C., Dow, S.**, 2003, EMU and the Regional Impact of Monetary Policy, *Regional Studies*, 37, 9, 969–980.

**Rosa, C., Verga, G.**, 2007, On the Consistency and Effectiveness of Central Bank Communication: Evidence from the ECB, *European Journal of Political Economy*, 23, 1, 146–175.

**Rose, A.**, 2009, Panel Statement. In: Maćkowiak, B., Mongelli, F., Noblet, G., Smets, F. (eds.), *The Euro at Ten – Lessons and Challenges*, Frankfurt, European Central Bank, 251–262.

**Ryan, J., Loughlin, J.**, 2018, Lessons from Historical Monetary Unions - Is the European Monetary Union Making the Same Mistakes? *International Economics and Economic Policy*, 15, 4, 709–725.

**Santos Silva, J., Tenreyro, S.**, 2010, Currency Unions in Prospect and Retrospect, *The Annual Review of Economics*, 2, 51–74.

**Silva, E. G., Teixeira, A.**, 2008, Surveying Structural Change: Seminal Contributions and a Bibliometric Account, *Structural Change and Economic Dynamics*, 19, 4, 273–300.

**Silva, S.T., Mota, I., Grilo, F.**, 2015, The Use of Game Theory in Regional Economics: A Quantitative Retrospective, *Papers in Regional Science*, 94, 2, 421–441.

**Silva, S.T., Teixeira, A.**, 2009, On the Divergence of Evolutionary Research Paths in the Past 50 Years: A Comprehensive Bibliometric Account, *Journal of Evolutionary Economics*, 19, 5, 605–642.

**Snaith, H.**, 2014, Narratives of Optimum Currency Area Theory and Eurozone Governance, *New Political Economy*, 19, 2, 183–200.

**Sokol, M., Patacini, L.**, 2022, Financialisation, Regional Economic Development and the Coronavirus Crisis: A Time for Spatial Monetary Policy? *Cambridge Journal of Regions, Economy and Society*, 15, 1, 75–92.

**Tavlas, G.**, 1993, The 'New' Theory of Optimum Currency Areas, *The World Economy*, 16, 6, 663–685.

**Tavlas, G.**, 2009, Optimum-Currency-Area Paradoxes, *Review of International Economics*, 17, 3, 536–551.

**Teixeira, A.**, 2014, Evolution, Roots and Influence of the Literature on National Systems of Innovation: A Bibliometric Account, *Cambridge Journal of Economics*, 38, 1, 181–214.

**Verde, A.**, 2011, The Greek Debt Crisis: Causes, Policy Responses and Consequences, in: Della Posta, P., Talani, L. (eds.), *Europe and the Financial Crisis*, New York, Palgrave, 143–164.

**Vicquery, R.**, 2017, Optimum Currency Areas and European Monetary Integration: Evidence from the Italian and German Unifications, Working Paper, London School of Economics, November.

**Whelan, K.**, 2013, Sovereign Default and the Euro, *Oxford Review of Economic Policy*, 29, 3, 478–501.

## APPENDIX

### Appendix A. Main surveys on OCA

|                                  | Publication   | Krugman (1993) mentioned | Frankel and Rose (1998) mentioned |
|----------------------------------|---|--------------------------|-----------------------------------|
| Ishiyama (1975)                  | IMF Staff Papers                                      | Not relevant             | Not relevant                      |
| Kawai (1987)                     | Palgrave Dictionary of Economics                      | Not relevant             | Not relevant                      |
| Maes (1992)                      | Tijdschrift voor Economie en Management               | Not relevant             | Not relevant                      |
| Masson and Taylor (1993)         | Policy Issues in the Operation of Currency Unions     | No                       | Not relevant                      |
| Tavlas (1993)                    | The World Economy                                     | No                       | Not relevant                      |
| Melitz (1995)                    | European Economic Review                              | No                       | Not relevant                      |
| Lafrance and St-Amant (1999)     | Bank of Canada Working Paper                          | Yes                      | Yes                               |
| Mongelli (2002)                  | ECB WP 138  | Yes                      | Yes                               |
| Horvath (2003)                   | Bank of Finland working paper No.15.                  | Yes                      | Yes                               |
| Kenen (2003)                     | HM Treasury   | Yes                      | Yes                               |
| McKinnon (2004)                  | Journal of Common Market Studies                      | Yes                      | Yes                               |
| Broz (2005)                      | Privredna Kretanja I Ekonomска Politika               | Yes                      | No                                |
| De Grauwe and Mongelli (2005)    | ECB WP 468  | No                       | Yes                               |
| Cesarano (2006)                  | History of Political Economy                          | No                       | Yes                               |
| Corsetti (2008)                  | European Commission Economic Papers                   | No                       | Yes                               |
| Mongelli (2008)                  | European Commission, European Economy Economic Papers | Yes                      | Yes                               |
| Tavlas (2009)                    | Review of International Economics                     | No                       | Yes                               |
| Santos Silva and Tenreyro (2010) | Annual Review of Economics                            | Yes                      | Yes                               |
| Masini (2014)                    | European Journal of the History of Economic Thought   | Yes                      | Yes                               |
| Kunroo (2015)                    | Review of Market Integration                          | No                       | Yes                               |
| Aizenman (2018)                  | Open Economies Review                                 | No                       | Yes                               |
| Eichengreen (2018)               | Oxford Research Encyclopedia                          | Yes                      | Yes                               |
| Beck and Okhrimenko (2025)       | Open Economies Review                                 | Yes                      | Yes                               |

Source: Authors.

## **Quid de l'intégration monétaire régionale ? Les grandes tendances de la littérature sur les zones monétaires optimales sur les 60 dernières années : une perspective bibliométrique**

**Résumé** – Dans cet article nous réalisons une étude quantitative d'une des principales théories des unions monétaires régionales : la théorie des zones monétaires optimales (ZMO). Nous utilisons une approche bibliométrique, en nous focalisant sur les grandes tendances récentes de cette théorie à la suite de la crise financière de 2007. Nous mettons en exergue cinq tendances clefs dans cette littérature en construisant une base de données comprenant 997 articles sur la période entre 1961 et 2018. En premier lieu, bien qu'une idée commune soit que cette théorie des ZMO aurait débuté dans les années 1960, nous montrons qu'en réalité elle ne commence à se développer de manière marquante que depuis la période relativement récente des années 1990. Deuxièmement, cette théorie apparaît comme étant stimulée par des événements majeurs, ayant lieu principalement dans la région européenne. Les crises financières récentes post-2007, notamment la crise des dettes souveraines européennes, ne font pas exception à cette règle, puisqu'elles ont été suivies d'un surcroit de publications sur les ZMO. Troisièmement, suivant le fait stylisé précédent, il s'ensuit que la plupart des articles sur les ZMO portent sur la région de l'Europe. Quatrièmement, la dynamique évolutive de cette littérature semble actuellement s'orienter vers des thématiques de macroéconomie et d'économétrie, à la différence de son origine plutôt en économie internationale. Enfin, nous mettons en lumière un débat récurrent entre deux paradigmes structurants de la théorie des ZMO : « divergence » *versus* « endogénéité » de l'intégration monétaire régionale. Nous soulignons que la crise financière récente a conduit au retour de ce débat : la thèse de la « divergence » accompagnant l'intégration régionale, promue par Krugman, paraît de plus en plus reprise. Nous concluons en tirant de nos résultats des enseignements pour l'élaboration des politiques économiques.

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### **Mots-clés**

Zone monétaire optimale  
Intégration monétaire régionale  
Convergence et divergence régionale

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