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Pedro G. Lima
U. Porto

Sandra T. Silva
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Pedro N. Teixeira
U. Porto, CIPES and IZA

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IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Major Streams in the Economics of Inequality: A Qualitative and Quantitative Analysis of the Literature since 1950s*

Since the late twentieth century there has been a growing interest in academic and political circles on inequality. In this paper, we develop a systematic analysis of the literature on this topic published in economic journals since the 1950s. This is done through an innovative approach that presents (i) an identification and characterization of the main streams of research about Inequality since the 1950s; (ii) the development of a new method of analysis that combines (ii-a) a quantitative bibliometric analysis using the VOSviewer software, which maps them into different clusters, (ii-b) a qualitative analysis, where we determine the main streams of research, based, not only on the content of each reference, but also on the context where they are cited, and provide context to the development of each cluster by analysing the most important journals, authors, and institutions. The analysis leads to the identification of seven clusters, each of them with several streams of research. Each of the clusters is characterized according to several aspects such as the journals where the contributions were published, the alma matres and academic affiliations of the authors, and the countries in which those authors are based. The leading journals and the dominant academic institutions are the same as found in economics broadly considered, but they vary from cluster to cluster. Among the authors that have had major influence in the development of this field of economic research, stand out Anthony Atkinson, Simon Kuznets, Michael Kalecki, and Thomas Piketty.

JEL Classification: B2, D31, E24

Keywords: inequality, distribution of income, wealth, bibliometrics, Kuznets, Atkinson, Piketty, Kalecki

Corresponding author:
Pedro Teixeira
University of Porto
Praça de Gomes Teixeira
4099-002 Porto
Portugal

E-mail: pedrotx@fep.up.pt

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"When the first volume of the Handbook of Income Distribution was published in 2000, the subject of income inequality was not in the mainstream of economic debate—despite the long history of engagement with this issue by earlier leading economists. Fifteen years later, inequality has become very much center stage. Rising income inequality has attracted the attention of the U.S. President, of international bodies such as the IMF and the OECD, and of participants in the Davos meeting". (Atkinson and Bourguignon, 2015, pp. xvii)

1. Introduction

In recent years the topic of inequality has attracted the attention of many economists and policymakers, as the epigraph points out. Following the success of the work by Piketty and others, several economists have been arguing that such renewed attention was taking place among the profession after years of neglect (Alacevich and Soci, 2017; Cook, 2019). The topic of inequality has been a major issue in modern economic thought (and during most of the twentieth century), though its academic visibility has often been shaped by the broader political and social context and the attention that these circles have been willing to devote to inequality. After a period, in the latter part of the twentieth century, when inequality was less visible in policy debates, the beginning of the twentieth-first century has showed a growing interest in academic and political circles on the topic, which has clearly intensified since the last great recession. Despite the importance of this literature, to the best of our knowledge, there has not been a systematic attempt to identify the main streams of research in this field and to explain how they evolved over time.

Bearing this in mind, in this paper we conduct a systematic analysis of the literature on inequality, with a special focus on the period after 1950. Such objective can be accomplished by conducting traditional types of qualitative analysis (*e.g.*, textual analysis) or quantitative methods, namely bibliometric analysis, though the literature has increasingly been relying upon the latter. One of the main reasons is the massive increase in the number of publications over the years that make the former not only increasingly unfeasible but prone to biases of researchers (Claveau and Gringas, 2016). Moreover, quantitative methods are also particularly relevant when the emphasis is on magnitudes of interactions and dissemination or when it comes to the study of the organizations producing, circulating and applying economic ideas (Claveau and Dion, 2018). Thus, several recent studies have used bibliometric tools to study the evolution of subject areas in economics (Kelly and Bruestle, 2011), and mapping developments on fields such as finance (Borokhovich *et al.*, 1994, 1995, 1998, and 2000); risk, insurance, and actuarial studies (Colquitt, 1997 and 2003); health economics (Rubin and Chang, 2003); agricultural economics (Hilmer and Lusk, 2009); national systems of innovation (Teixeira, 2014); structural change (Silva and Teixeira, 2008); evolutionary economics (Silva and Teixeira, 2009); industrial relations (Casey and McMillan, 2008); environmental economics (Kube *et al.*, 2018); and behavioural economics (Geiger, 2018). These studies have illustrated the relevance of bibliometric tools in characterising the intellectual and institutional networks and the dissemination flows established in several important areas of research in economics.

Despite the attractiveness of quantitative methods over traditional ones when analysing large bibliographic data sets, several authors have emphasized the importance of combining bibliometric and analytical approaches to understand major developments in economics (see Cherrier and Svorencik, 2018; De Vroey, 2016; Jovanovic, 2018). Hence, we adopt an approach that combines both quantitative and qualitative analysis of the most cited works in the inequality literature since 1950s. The quantitative exercise

consists of identifying groups of references whose similarity is based on the degree to which they appear simultaneously in the bibliographies of the same documents. The qualitative analysis consists in the categorization of the streams of research to which each of such references belongs to, based not only on the thematic content of each reference but also on the context in which they are cited, and a contextualization of the development of each cluster based on the top authors, affiliations, *Alma Maters,* and corresponding countries of each cluster. Although there have been quantitative analyses of the literature on inequality (e.g., Korom 2019), we believe our approach provides a significant and innovative contribution since it combines those bibliometric approaches with a more qualitative analysis. The remainder structure of this article is as follows: Section 2 presents briefly an overview of the main debates about inequality up to the 1960s; Section 3 describes the methodology used in more detail; Section 4 characterizes the network we have obtained and each individual cluster of research on inequality; finally, Section 5 presents the main concluding remarks and some limitations and suggestions of further work to our study.

2. Waves of Interest in Inequality in the Twentieth Century Economics

Inequality has been a major topic of interest for economics throughout the twentieth century, though the attention it has received has been uneven. The debates about inequality have often oscillated between theoretical discussions about the importance of inequality as an economic phenomenon and empirical controversies about how to measure inequality, its magnitude, and the factors underlying it. Since the early twentieth century, following the debates about the so-called Pareto's Law, one major issue has been how stable (or changeable) inequality was and how effective could different policy approaches be in tackling inequality. Moreover, these debates about policy and social changes have tended to interact with academic research on the topic, being nurtured by economists' contributions and also stimulating further research on the topic of inequality.

The topic of personal income distribution attracted significant attention since the early twentieth century due to the so-called Pareto's law (1896a and 1896b). This analysis indicated a stability of the distribution of wealth in different historical and geographical contexts, which caused great perplexity and controversy as it suggested that the attempts to redress inequality were doomed to fail. Hence, a large part of research on income distribution in the early decades of the twentieth century focused on testing the applicability of Pareto's law in different geographical and historical contexts (*e.g.*, Bresciani-Turroni, 1905; Stamp, 1914). Although the initial results indicated that Pareto's views seemed to provide some empirical support, subsequent research produced more ambiguous results and pointed out to the fragility of the data (Bresciani-Turroni, 1939; Crum, 1935; Johnson, 1937; Macgregor, 1936; Shirras, 1935). With time, Pareto's law was increasingly regarded mainly as an empirical regularity, without sound analytical foundations.

This evolution strengthened the view among many economists of the early twentieth century that social and economic policies could have a significant impact in changing inequality. This view was prominent among many important British economists who had been investigating the factors underlying the distribution of personal income and wealth (see, among others, Cannan 1917 and 1924; Dalton 1920; Edgeworth, 1926; Stamp, 1926). Notable among these was Pigou (1920), who considered that the current distribution of income could be changed either by policies that changed the proportion

between earned income and other (inherited) income or that created opportunities of social mobility (especially through education and training).

If in Britain Pareto's approach was criticized mainly due to its implications regarding inequality, in the other side of the Atlantic it was criticized due to its empirical and statistical shortcomings. Moreover, this would coincide with a growing concern among American economists about data limitations, encouraging efforts to obtain more and better data. This would be particularly visible within the scientific contexts with a stronger empirical tradition or interest on the topic such as the so-called old institutionalism (Rutherford, 2011). With the creation of the NBER in the early twenties, the statistics related to inequality received a significant boost. It is noteworthy that the first study developed by the NBER was devoted to the quantification of American income and its distribution (Mitchell *et al.*, 1921 and 1922), which was followed by several others in the 1920s and 1930s (Ingalls, 1923; King, 1930; Leven *et al.*, 1934). Another important step to promote empirical research was the establishment by the NBER in 1936 of the Conference on Research in Income and Wealth, which aimed at stimulating cooperative research on these topics in order to contribute to a consensus in terms of concepts, terminology, and methods of exposition.[1]

The growth in empirical studies about income and wealth distribution brought other problems. The available studies presented significant heterogeneity in terms of methods and data, which raised problems of comparability, reliability, and continuity of sources and types of income distribution data. There were also specific problems with the concepts used (especially income), the recipient units, the coverage of income groups, geographic dispersion, class intervals, and accessibility of data. Moreover, the lack of an extensive socioeconomic characterization of the income recipients, in particular the omission of the education factor, was seen as one of the most serious gaps affecting the generality of the studies. It was the scarcity of this information that prevented the discovery of the determinants of the distribution of income (such as education, age, gender, religion, or ethnicity) and the assessment of their impact, thus requiring further work.

The significant improvements in data, especially in the postwar period, created new possibilities for empirical work and the idea of modeling the main forces connected to income distribution gained ground.[2] By the late fifties, in a context of expanding statistical evidence and stronger theoretical emphasis, the exploration of socioeconomic characteristics associated with inequality (*e.g.*, education and training) gained increasing visibility and this was crucial for the emergence of human capital theory in the later part of the decade (as in Jacob Mincer's Ph.D. dissertation, 1957). Henceforth, education and training became increasingly regarded as major forces shaping personal distribution of income and wealth and dominated a lot of inequality debates in the 1960s and 1970s.

Whereas human capital research emerged in a period characterized by great hopes in the potential role of public policies in promoting social mobility, notably in improving the traditionally disadvantaged groups such as women or ethnic minorities, by the end

[1] These meetings would gather many economists that would provide important contributions such as Simon Kuznets, Morris Copeland, Milton Friedman, Dorothy Brady, and Margaret Reid.

[2] However, two possibilities still remained, either to explore the links between income inequality and macroeconomic variables or to focus on the possible factors determining the existing distribution, hence making it possible to change that distribution. On the one hand, in his quest to identify the forces determining personal income inequality, Milton Friedman (1953) emphasized the role of individual decisions and challenged both the exogenous hypothesis of ability and the quasi-exogenous hypothesis of institutional arrangements (such as inheritance rules). On the other hand, Simon Kuznets (1955) took a more macroeconomic approach (as in his presidential address at the 1954 meeting of the AEA) and focused on the relationship between economic growth and income inequality.

of the 1970s these hopes had given way to serious skepticism. Propelled by poor results in terms of social mobility and economic growth, many started to question the real economic effect of schooling and other policies aiming at reducing inequality (Jencks *et al.*, 1972). Together with the retrenchment of the role of the state in several policy areas, this has led to a declining attention in academic and policy circles to inequality in the last quarter of the twentieth century.

In recent decades, inequality has again come to the forefront of economic debates. This revival of interest is the result of a complex web of factors. One major factor has been the impact of technology on the labour market and the changing structure of employment (Card and Dinardo, 2002; Autor et al, 2008; Goldin and Katz, 2004). Another important issue in recent decades has been the growing attention to issues of intergenerational transmission of inequality (Bowles and Gintis, 2002; Piketty, 2001a). Finally, the debates about globalization has also gave particular visibility to issues of inequality in the work of many economists (Piketty, 2014; Milanovic, 2016; Bourguignon, 2015; Atkinson, 2014).

In the following sections we will analyse this large body of literature through a bibliometric approach. This will allow us to identify major clusters of themes, authors and publications in economics devoted to the study of inequality.

3. Methodology

In this section, we explain the methodology employed to achieve the main goal of this paper: identify, characterize and contextualize the main streams of research in the inequality literature since the 1950s. Our methodology involves two important dimensions, the choice of the type of analysis to be conducted and the selection process of references to which apply such analysis. We now explain in detail each one.

Type of Analysis. In order to accomplish the objective of this paper, we must conduct an analysis that employs a suitable method to determine the degree of similarity between the various references. As explained by Claveau and Gringas (2016), this can be done using informal inside knowledge, which is based on the knowledge of the authors of the field, or by using bibliometric methods. The former has the disadvantage of leading to biases and being increasingly unfeasible, considering the exponential growth of the literature in general. Therefore, we consider that a bibliometric approach is more appropriate.

The bibliometric literature has developed different types of analysis based on different measures to assess the degree of similarity between references. Some of the most popular are co-citations analyses, which are based on the number of times references are cited in the same documents (*e.g.*, Korom 2019), bibliographic coupling analysis, which groups references based on the overlap degree of bibliographic references between documents (*e.g.*, Claveau and Gringas, 2016), and co-authorship analysis, which consists in a network of authors and/or the corresponding countries or organizations that are grouped according to the number of times the authors (in the case of the first) and/or the corresponding authors (in the case of second and third) co-authored a document (*e.g.*, Park *et al.*, 2016). By focusing on bibliographic references, we can analyze in more detail the authors that are most commonly co-cited together,

which could be accomplished with a co-authorship analysis, and also to determine the publications and, therefore, the particular context where such citations appear.[3]

We conduct this bibliometric analysis by using the software VOSviewer, which allows to construct a network of references and grouping them by clusters according to the strength of the association between them. The clustering process of this software is based on a unified approach[4] which optimally assigns a cluster number to the references under analysis based on a semi-endogenous process that depends on two elements: The first is the association strength between different references, which is a variable calculated automatically based on the number of links of the references and their strength. The other is the distance between references, which is determined by the resolution parameter that is set by the user. The higher this parameter, the larger the number of clusters that are obtained.[5]

This process allows to combine a quantitative analysis with a qualitative one, which we consider important in order to complement the potential disadvantages of each approach. On the one hand, as aforementioned, a qualitative analysis of the literature is vulnerable to the biases of the researcher that conducts it and is unfeasible considering the ever-increasing number of articles published every year (Claveau and Gringas, 2016). On the other hand, a quantitative bibliometric exercise cannot consider the full complexity of the literature under analysis. Bearing this in mind, we determine the cluster to each reference belongs by an interactive process.

The categorization process consists of the following steps: (i) division of the network into different clusters using VOSviewer software considering a given resolution parameter; (ii) categorization of each reference (following the process described below); (iii) analysis of the similarity of the different streams of research within each clusters; (iv) if at least one cluster contains very different streams of research, increase the resolution parameter by a discretionary value and repeat the process from steps (i) to (iv). Otherwise, the categorization process is finalized. In the first iteration of this process, we considered the default resolution parameter, 1, which resulted in 5 clusters. The process was repeated until we reached the resolution parameter of 1.17, which resulted in a network with 7 clusters.

Since we were interested in determining the main streams of research, we categorized each reference by analyzing both the summary and the context in which they were cited. In this regard, we gave particular attention to the reasons that justified the citation and that were also congruent with other papers included in the same cluster.[6] Finally, we also contextualized the emergence and development of each cluster. To do so, we also conducted an analysis of the profile of the most important authors, including aspects such as the journals in which they have published, their academic affiliations, their *alma matres* and their countries. These elements will help us to characterize each of the clusters in more detail. In doing so, we have also considered relevant literature

[3] Similar arguments can be made when comparing this type of analysis with others.

[4] This approach was developed by authors that include van Eck *et al.* 2010, Waltman *et al.*, 2010, Waltman and Van Eck (2013), and Van Eck and Waltman (2014).

[5] For more technical details please consult the aforementioned references.

[6] We must make a few notes. Firstly, this implies that in some cases the theme of the paper might not be directly connected to the streams of research where a specific reference is inserted into. Secondly, we consider that many references belong to more than one stream of research because they are cited for multiple reasons. Thirdly, although each reference is assigned a specific cluster, as can be readily seen by the map produced by VOSviewer, there is a close connection between many references belonging to different clusters. Therefore, we should not interpret the clusters as mutually exclusive groups where one reference whether belongs or not because the reality is more complex.

that provided additional personal, economic, political and academic explanations for the evolution of the various streams of research.[7]

Dataset. Having chosen and characterized the type of analysis we intended to carry out, we constructed the dataset of suitable references to which such analysis had to be applied. We first obtained 2510 references from a search on the Web of Science of English on the 5th April 2021 written articles published since 1950 and using the following search terms:

> TI = ("income inequality" OR "inequality in income" OR "income distribution" OR "distribution of income" OR "wealth inequality" OR "inequality in wealth" OR "wealth distribution" OR "distribution of wealth") AND TS = ("income inequality" OR "inequality in income" OR "income distribution" OR "distribution of income" OR "wealth inequality" OR "inequality in wealth" OR "wealth distribution" OR "distribution of wealth") AND WC = economics,

where TI, TS and WC stand for "Title", "Topic" and Web of Science Category, respectively. With this search strategy we intended to retrieve articles that contained in their title and topic a combination of words specifically related to the type of inequality we are studying, income/wealth inequality. We consider that this approach minimized the risk of including references that were not related to inequality which was an important aspect of any bibliometric analysis and of particular relevance in a co-citation analysis. As we described earlier, a co-citation analysis is focused on the universe of bibliographic references of a group of initial documents. Therefore, the risk of including references not related to the theme under analysis is enhanced by the risk of including multiple bibliographic references of the corresponding references that might not be related at all with the subject at hand which, as a result, might distort the analysis. Moreover, even if as a result of this search strategy some inequality references are excluded from this sample, they can appear as part of the bibliographic references.

Finally, we also did not impose any restriction in terms of citations to the initial results we obtained in order to avoid excluding important references that may not yet garnered sufficient citations by the literature due to their recent publication and, thus, avoiding to introduce additional difficulties in discerning more recent lines of research in the literature. This step does not jeopardize the quality of the references we have included in our analysis because the quality of the articles we retrieved was already assured by the fact that Web of Science collects articles from the main academic journals in economics (Claveau and Gringas, 2016).

The articles retrieved in the previous step contained among them a total of 52730 unique references that included not only journal articles but also other types of references, such as books. Using the VOSviewer software, we determined how many times each of these references were cited in the initial group of 2510 retrieved documents and, following previous studies (*e.g.*, Korom, 2019), we retrieved a sample

[7] We provide in an appendix the main details of the network references, including the authors, the corresponding affiliations and *almae matres* and countries, and the Line of Thought as well as the elements we used to make such categorization. In another appendix, we also provide a list of the references from the overall dataset of 2510 references retrieved from Web of Science that cited each of the references in the network.

of the most cited references, which we considered those with at least 15 citations. This resulted in a sample of 311 references.[8]

4. The clusters: a quantitative and a qualitative analysis

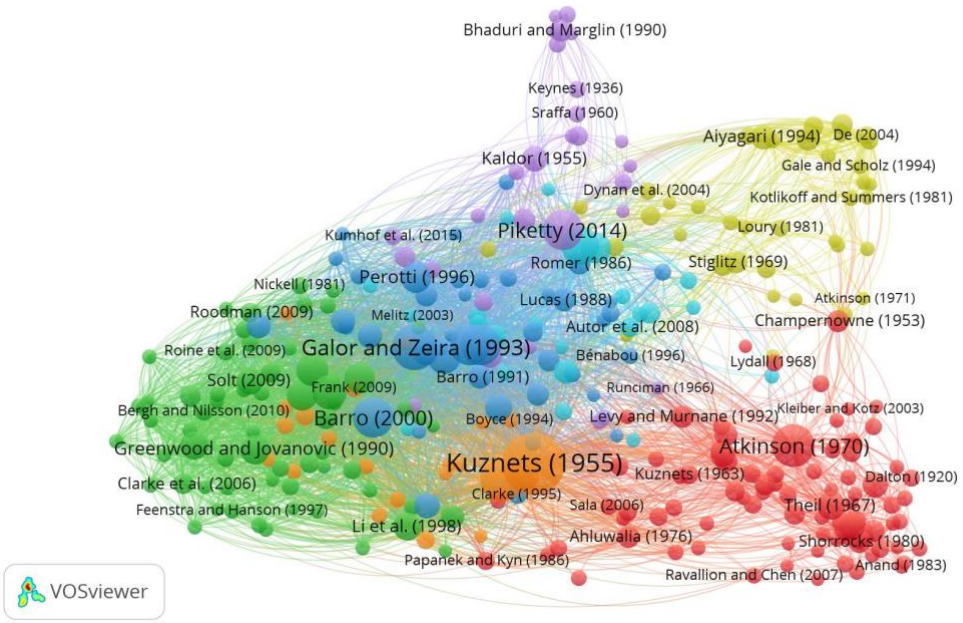
In this section, we characterize in general terms the network as whole and then proceed to analyze with more detail each of the corresponding clusters.

4.1 A generalized analysis of the network

Using the VOSviewer software, we obtained the network with seven different clusters which is represented visually in figure 1 in a manner that summarizes some of the most important aspects of the references of the network namely the following: the individual importance of each reference (measured by the number of citations and represented by the size of the corresponding circle); the distance between references in each pair of references, which is closer the stronger the association between different them (measured by the number of documents where each pair is cited simultaneously); the links between different references, which represent pairs that appear in the same documents. Bearing this in mind, from the analysis of the figure we can see that there are very distinct clusters that, nonetheless, are quite close to each other, especially in the case of the clusters represented in blue, green, orange and light blue. Moreover, in some cases, references from one cluster appear in the middle of others belonging to different clusters. As we will explain in more detail below, this reflects the presence of similar lines of research in the various references belonging to each cluster.

[8] We provide in appendix the main details of each of the 2510 references retrieved from the Web of Science.

Figure 1 – Network of 311 references obtained using VOSviewer software



Notes: This network contains 311 references, with more than 15 citations from the universe of 52730 cited references in 2510 journal articles published since 1950 and focused on wealth and/or income inequality/distribution that were retrieved from the Web of Science on 5th April 2021. These references were selected and sorted into 7 different clusters which are identified by the following number and color: 1 ■, 2 ■, 3 ■, 4 ■, 5 ■, 6 ■, 7 ■. This was accomplished using the VOSviewer software that groups references based on the strength of their association, which is measured by the number of times each pair appears in the same document, and a resolution parameter, which determines the level of detail of the network, which was set to 1.17.

In Table 1, we provide more details regarding each cluster. The number of each cluster is provided by the VOSviewer software and reflects their relative importance in terms of number of references, with cluster 1 being the largest and 7 the smallest. This is also reflected in the number of total citations of the references of each cluster. However, when analysing the average number of citations *per* reference, the most important ones are clusters 3 and 7, in spite of the fact that the latter is the smallest. The number of links of a reference, in the case of a co-citation analysis, represents the number of other unique references that were cited together with said reference, with link strength representing the number of documents in which these links appear. In the context of our analysis, we can interpret such measures as indicators of not only the similarity of the references in terms of stream of research but also their influence. Bearing this in mind, we can conclude that references included in clusters 3 and 7 were also the most influential.

Table 1 - Characterization of the number of references, number of citations and their strength in each and all clusters.

Cl.	**1** ■	**2** ■	**3** ■	**4** ■	**5** ■	**6** ■	**7** ■	**All**
N. Ref.	88	65	43	39	29	24	23	311
Cit.	2383	1784	1795	896	819	699	914	9290
(*per* Ref.)	(27)	(27)	(42)	(23)	(28)	(29)	(40)	(30)
Links	6432	7710	5798	2629	2126	2597	2690	29982
(*per* Ref.)	(73)	(119)	(135)	(67)	(73)	(108)	(117)	(96)
Str.	12623	21988	21991	5830	4730	5568	8574	81304
(*per* Ref.)	(143)	(338)	(511)	(149)	(163)	(232)	(373)	(261)

Notes: We identify each cluster by the corresponding number and colour produced by VOSviewer software.

Legend: Cit. - Number of times each individual reference was cited. Links – The number of references that were cited together with all the references of the cluster/network. Str. – The number of times each link is cited. For example, if reference R1 is cited in document D1 with reference R2 and in document D2 with references R2, R3 and R4, this implies the existence of three links that include R1, R1-R2, R1-R3, R1-R4, that are cited 2 times, 1 time and 1 time, respectively, implying that the total strength of R1 is 2*1+1*1+1*1=4.

In Table 2 we present the most important journals, *almae matres*, affiliations, and corresponding countries of the last two of the entire network, measured by the number of citations of the corresponding references.[9] The top 5 journals account for over 40% of the citations and they are *The American Economic Review, Econometrica, the Journal of Political Economy, the Quarterly Journal of Economics,* and *the Review of Economic Studies*, which also are the top 5 journals in economics in general (Heckman and Moktan, 2018).

Table 2 – Most important journals, authors and their *Almae Matres*, affiliations and corresponding countries in terms of number of citations of the corresponding References of the Entire Network

Top 5 journals	46.11%: The American Economic Review (13.04%); The Quarterly Journal of Economics (9.41%); The Review of Economic Studies (8.25%); Journal of Political Economy (8.22%); Econometrica (7.19%)
Top 10 authors	20.18%: Atkinson A. (3.07%); Piketty T. (3.05%); Kuznets S. (2.43%); Saez E. (2.06%); Barro R. (1.97%); Squire L. (1.96%); Galor O. (1.58%); Alesina A. (1.41%); Deininger K. (1.36%); Shorrocks A. (1.29%)
Top 5 *Almae Matres*	49%: Harvard University (13.61%); MIT (12.11%); LSE (9.74%); University of Cambridge (8.14%); Columbia University (5.4%)
Top 5 *Almae Matres* Countries	93.24%: US (68.3%); UK (19.25%); Israel (2.43%); Sweden (1.65%); France (1.61%)
Top 10 affiliations	42.26%: NBER (8.37%); World Bank (7.21%); CEPR (6.36%); Harvard University (5.83%); LSE (2.92%); The Hebrew University (2.77%); University of Chicago (2.37%); University of Pennsylvania (2.31%); MIT (2.19%); Nuffield College, University of Oxford (1.93%)
Top 5 affiliations Countries	85.92%: US (54.82%); UK (18.82%); France (6.43%); Israel (3.53%); Canada (2.32%)

Notes: The percentage of citations associated with each of these attributes is the sum of the citations of the references that with have the corresponding attribute divided by the sum of total citations of all valid references in the entire network. In turn the latter only includes references for which such attributes exist and were identified, excluding all others. We must note that some affiliations (*e.g.*, NBER, CEPR) do not have a permanent staff but are actually networks of researchers belonging to different institutions. Therefore, in most papers the connection of authors to these institutions is not comparable to others as it is only mentioned to give recognition to the institutions. The *Almae Matres* are the institutions where the authors obtained their highest academic degree, and were determined whenever possible using official personal webpages of each author or of an employer. Finally, the country corresponding to each institution is determined based on the corresponding official headquarters.

In terms of authors, we can see that 1 in 5 citations concerns 10 authors, with the most important being Anthony Atkinson, Thomas Piketty and Simon Kuznets. As it will be detailed below, this is due to their seminal contributions for certain lines of research on inequality. In what concerns institutional and country affiliations, we find an even higher degree of concentration. Almost half of citations are from references whose authors graduated at MIT, Harvard University, LSE, Cambridge University or the University of Chicago. In terms of affiliations, there is a less degree of concentration mostly due to the prominence of non-academic institutions such as the World Bank or NBER and CEPR which feature in the third top places.[10] Nonetheless, we can also find at the top some of the same institutions that dominate the top 5 *Almae Matres*. Finally, when analyzing the countries of these institutions, we notice a prevalence of US

[9] We also measured the relative importance of the attributes using the number of references instead of citations and the results are quite similar. Nonetheless, in some aspects, we consider that this better reflect the actual importance of the different journals by allowing to distinguish references with many citations from those with few, which is especially important in the case of authors.

[10] This is justified, for instance, by the fact that some of these institutions are actually network of researchers that belong to different institutions that, as a result, are cumulative with other affiliations.

institutions followed by the UK, which is not surprising given the dominance of academic institutions of these two countries in economics research (Fourcade, 2006; Colander, 2005).

4.2 An individual analysis of each cluster

We have then conducted an individual analysis of each cluster, whose results are now presented in more detail.

Cluster 1 ■ The streams of research of this cluster are described in Table 10 which, as a result of being the largest, are also of varied nature. The most important ones are characterized by a substantial focus on the theoretical properties of measures of inequality and their desirability. Many were discussed extensively such as the Pigou-Dalton Transfer Principle, according to which a transfer of income from the poor to the rich should increase inequality and decrease welfare. However, the most important by a wide margin was the decomposability property, which is the possibility of a measure being decomposable into inequality of several subgroups, weighted by their relative importance. In particular, the most important stream of research of this cluster consists of works that have developed specific techniques to decompose inequality, with the contribution of Anthony Shorrocks (1982) being one of the most seminal and influential to this field. Another very closely related line of research referred to empirical analyses that decomposed inequality either by subgroups or factor components. Such interest in decomposing inequality was motivated by the need for more rigor in the analysis of this topic and the interest in better understanding inequality trends. Thus, this was substantially influenced by the seminal contributions of Simon Kuznets and Arthur Lewis, who focused on how the development process affected inequality.

Other groups of research in this cluster centered their attention in issues related to the measurement of inequality, such as the choice of unit of analysis, and the development and estimation of appropriate functional forms to model the income distribution, for similar reasons. A group of authors proposed new measures of inequality such as the *Theil Index* (Theil, 1967), *Atkinson Index* (Atkinson, 1970), or the improvement of existing measures of inequality. The emergence of this last group was greatly influenced by many of the aforementioned theoretical discussions and, in some cases, such as in the case of the Atkinson Index, were influenced by normative analysis focused on the ideal level of inequality in a society.

Other important groups in this cluster include those that followed the studies of Simon Kuznets and Arthur Lewis regarding the relation between development and inequality, and another that contains authors that either constructed important databases subsequently used by other authors or analyzed issues related to data. The issue of the lack of appropriate data had a tremendous influence in shaping the development of many research lines in this cluster (*e.g.*, Kuznets and Jenks 1953, Kuznets 1963, Paukert 1973, Atkinson 1975). Data related problems only saw significant answers in the 1990s with the emergence of databases such as LIS, which resulted from the Luxembourg Income Studies (Buhmann *et al.*, 1988), Penn World Tables (Summers and Heston, 1991), and the dataset from Klaus Deininguer and Lyn Squire (1996). This is also reflected, for instance, in a series of contributions that documented the evolution of inequality in some advanced economies, mainly from the 1990s.

We also find some research centered on the relationship between inequality and other variables, namely education and macroeconomic variables, such as unemployment and inflation. We consider that one possible justification for the emergence of such studies

and also, in part, the ones that specifically analyze the connection between the development process and inequality was growing importance given to other variables other than income to measure the well-being and the necessity to "identify redistributive mechanisms which aid poverty reduction without hampering growth" (Shorrocks and van der Hoeven, 2003, p. 1). Tightly connected with this line of research are smaller streams that are dedicated to theoretical or practical issues connected with the measurement of poverty, of which we highlight authors such as Sen and Foster.

Table 3 - Top journals, authors and their *Almae Matres*, affiliations and corresponding countries by number of citations of the References of cluster 1 ■.

Top 5 journals	59.41%: Econometrica (21.86%); The Economic Journal (12.38%); Journal of Economic Theory (10.64%); The American Economic Review (7.5%); The Review of Economics and Statistics (7.03%)
Top 10 authors	29.08%: Atkinson A. (7.8%); Shorrocks A. (5.82%); Sen A. (2.69%); Yitzhaki S. (2.16%); Theil H. (1.9%); Bourguignon F. (1.87%); Smeeding T. (1.84%); Kakwani N. (1.69%); Ahluwalia M. (1.67%); Milanovic B. (1.64%)
Top 5 *Almae Matres*	48.89%: University of Cambridge (18.07%); LSE (10.58%); Yale University (7.89%); Princeton University (6.77%); MIT (5.58%)
Top 5 *Almae Matres* Countries	93.83%: US (47.98%); UK (36.05%); Canada (4.04%); Netherlands (3.02%); India (2.74%)
Top 10 affiliations	46.96%: LSE (9.42%); World Bank (8.85%); University of Cambridge (4.58%); Harvard University (4.14%); Cornell University (4.08%); Queen's University (3.63%); Yale University (3.35%); Université de Montréal (3.22%); Nuffield College, University of Oxford (2.94%); Princeton University (2.75%)
Top 5 affiliations Countries	91.05%: US (52.97%); UK (19.75%); Canada (8.44%); France (5.21%); Israel (4.68%)

Notes: See Table 2.

We identify a small group of authors dedicated to document the evolution of inequality in Transition Economies, such as China and former members of the USSR. These papers started in the 1990s due to the interest in determining the impact of the collapse of Communism on income distribution and the disclosure of information in such countries (Milanovic, 1998). Another interesting and relatively more recent stream of research is focused on the World Distribution of Income. Although this topic had already been addressed by Atkinson (1975), it gained prominence in the late 1990s and 2000s due to the development of some of the aforementioned databases.

The main characteristics in this cluster are summarized in Table 3. Firstly, the most important journal, with one fifth of total citations, is *Econometrica*, which reflects the interest in the theoretical issues related to the measurement of inequality in this cluster, namely those belonging to the most important streams of research. In terms of the countries of affiliations and *almae matres*, although US institutions continue to occupy the first place in both rankings, UK also ranks very high, especially in the case of the former. This the result of the contributions to the field of inequality by Atkinson and Shorrocks, who had strong ties to the University of Cambridge and LSE, respectively. Moreover, we can also see that the World Bank is a significant affiliation in this cluster. This is justified mostly by the various researchers from this institution that analyzed the relation between development and inequality, especially in 1970s, when the focus of the World Bank in such issues was substantial (Babb, 2009).

Cluster 2 ■ The Lines of thought of cluster 2 are characterized in Table 11. The central theme of this cluster is the relation between the development process and inequality. This can be seen by the presence of a cluster dedicated specifically to analyze the relationship between growth and inequality or the inverted U hypothesis proposed by Simon Kuznets (1955), according to which, during the process of development

inequality rises in the earlier stages and decreases afterwards.[11] Yet, the most important lines of research of this cluster are dedicated to analyze the impact of specific aspects of the process of development in inequality.

One line is mainly focused in determining and characterizing the relation between the Financial Development of a country and inequality. In this group, the most cited reference is the work by Abhijit Banerjee and Andrew Newman (1993) with their theoretical model where the existence of credit market imperfections can lead to a replication or worsening of the initial wealth distributions. Many authors subsequently cited references such as this one to justify a negative theoretical relationship between financial development and inequality (*e.g.*, Clarke *et al.*, 2006). Nonetheless, one of the first references to formalize a relationship between financial development and inequality was the work by Jeremy Greenwood and Boyan Jovanovic (1990). Moreover, this group has also a strong connection with a smaller one represented by Raghuram Rajan and Luigi Zingales (2003), who have specifically focused on explaining theoretically the financial development process of a country.

Another group focuses on the effects of trade openness and globalization on inequality. As countries developed opened their frontiers to international trade, authors began to be interested in how such developments would affect the income distribution. Wofgang Stolper and Paul Samuelson's article of 1941 is often cited in this context because the corresponding theorem offered one of several answers to this question, i.e., that trade would increase the relative earnings of the owners of the more relatively abundant factors. The interest in this theme started with a contribution by François Bourguignon and Christian Morrison (1990), who considered that the literature dedicated to the Kuznets hypothesis neglected the effect of trade factors. The acceleration of globalization contributed to the development of interest in this issue which was also extended to openness in other areas as well, such as financial markets. As a result, there was a confluence between this cluster and the previous, which is reflected in the common presence of several references, especially more recent ones (*e.g.*, Jaumotte *et al.*, 2013).

Two significant groups that are also present in this cluster refer to research that has either developed econometric databases or specific databases that were subsequently used by other countries. Their importance suggests that such novelties also contributed significantly to many of the empirical analyses conducted in the lines of research of this cluster. Finally, we can also find smaller lines of research dedicated to either explore the determinants of inequality in general or the role of specific variables, such as contribution, education or redistribution.

Table 4 - Top journals, authors and their *Almae Matres*, affiliations and corresponding countries by number of citations of the References of cluster 2

Top 5 journals	39.78%: Journal of Econometrics (10.42%); Journal of Political Economy (8.07%); The Review of Economic Studies (7.84%); Journal of Economic Growth (7.27%); The Economic Journal (6.18%)
Top 10 authors	29.87%: Bond S. (5.01%); Arellano M. (4.68%); Levine R. (3.22%); Zou H. (2.86%); Squire L. (2.6%); Solt F. (2.46%); Blundell R. (2.38%); Demirgüç-Kunt A. (2.35%); Beck T. (2.27%); Banerjee A. (2.04%)
Top 5 *Almae Matres*	46.2%: Harvard University (18.64%); LSE (11.94%); MIT (8.64%); University of California LA (3.65%); University of Rochester (3.33%)
Top 5 *Almae Matres* Countries	93.25%: US (69.53%); UK (15.75%); Netherlands (3.59%); Sweden (2.38%); Italy (2%)
Top 10 affiliations	42.41%: World Bank (13.94%); IMF (4.86%); Institute for Fiscal Studies (4.21%); NBER (3.99%); LSE (3.41%); Harvard University (3.13%); CEPR (3.13%); University of Oxford (2.04%); Nuffield College, University of Oxford (1.85%); University College London (1.85%)

[11] However, the original reference, Kuznets (1955), is in cluster 7, which we explain with more detail in the corresponding section further ahead.

Top 5 affiliations Countries	79.66%: US (47.73%); UK (19.57%); Netherlands (4.27%); France (4.08%); Spain (4.01%)

Notes: See Table 2.

The main characteristics of this cluster are presented in Table 4, where we can see most authors are affiliated with the World Bank. We consider this as reflecting the increased interest of this institution on inequality and development issues which contributed significantly to the lines of research exploring the Kuznets hypothesis, in general, and the financial-inequality link, in particular. As explained in detail in Babb (2009), this interest was brought about by a change in the political and academic landscape during this period and the growing criticisms to the so-called Washington Consensus,[12] with the government being increasingly considered a necessary factor for developing countries to prosper. Joseph Stiglitz, senior vice-president and chief-economist of the World Bank from 1997 to 2000, was the representative of this perspective according to which markets are imperfect in the absence of perfect information. This problem was even more severe in the case of developing countries due to the lack of strong institutions and, therefore, this approach argued that governments had a particular important role in providing them to compensate for this problem. Amartya Sen, who won the Nobel Prize in 1998, was another strong advocate of the idea that development economists should expand their scope beyond the analysis of GNP growth and contributed to a stronger focus on poverty related issues which were already receiving attention by the World Bank in the early 1990's due to the pressure of the Civil Society (Babb, 2009).

The focus on poverty was accompanied by an equal interest in inequality which was evidenced in several episodes at that time. One occurred when The World Development Report of 2000 entitled "Attacking Poverty" was published. According to Babb (2009), at the time, it was deemed by the U.S. Treasury as paying "too little attention to economic growth, too much to income inequality" which lead to an increased pressure on the then director Ravi Kanbur, who had been appointed by Stiglitz, to revise it in line with these concerns. However, this only resulted in the Kanbur's resignation in protest and to a revision that was "remarkably faithful to the original message". Another example was the appointment in 2003 of François Bourguignon as chief economist of the Bank, who was deeply interested in inequality related issues. This was facilitated by the passive attitude of the Bush Administration in relation to the research output of the World Bank. Despite being ideologically conservative, there was less concern with the research output of the World Bank in comparison with the previous presidency, much because of the focus at the time on other issues such as the so-called the "War on Terror" (Babb, 2009).

Cluster 3 ■ The Streams of Research of this cluster are characterized in Table 12 and in general they have in common the fact that are dedicated to the analysis of the relationship between inequality and growth. The most important group both in terms of citations and references consists in studies that conduct empirical analysis of this relationship. Most initial works consisted in cross-section analysis that reported a negative relationship between inequality and growth. This contradicted a tenet in

[12] This designated a set of market-liberalization recommendations for developing countries from financial institutions such as the World Bank and IMF. It was not only motivated by shifts in the dominant political and ideological contexts, but also by empirical evidence that was critical of the magnitude of government intervention and its effects, especially in Latin America.

economic theory, represented by Arthur Okun (1975), of a tradeoff between equality and efficiency. Such results contributed to increase interest in this subject, and it was not long before two researchers of the World Bank, Klaus Deininger and Lyn Squire (1996), developed a new and more complete database that prompted the development of new studies that conducted more sophisticated and rigorous analysis of this relationship. These new studies (*e.g.*, Forbes, 2000) developed a panel analysis and their conclusions diverged from those of the previous authors, stimulating additional interest to this topic.

Closely related to this group is a strand dedicated to analyze the rate of convergence of income *per capita* between different countries, with Robert Barro (1990) being one of the most significant authors in this respect. The connection between this group and the former is justified by the fact that, when analyzing this topic, researchers soon realized that inequality had an important role in determining rates of convergence due to its relationship with growth (Partridge, 1997). Moreover, many of the cross-section analysis of the previous group adopted frameworks that were initially designed to analyse the topic of convergence (Thewissen, 2014).

In this cluster, we also see streams of research focused on theoretical issues that distinguished themselves essentially by the mechanisms through which inequality affected growth. One of the most important ones analysed how inequality could affect growth by leading to more intense redistribution policies due to greater pressure from society. The development of this perspective was directly influenced by the development of the second most cited stream of this cluster, which focused on the development of Political-Economy Models, where economic and political outputs are endogenously determined. Another contribution established a connection between inequality and growth through the negative effects of an increase of the former in human capital accumulation when the poorest are kept access from the credit market. The nature of this channel strongly related to those focused on the development of economic models where agents face borrowing constraints, with this stream of research being originated by the seminal contribution of Oded Galor and Joseph Zeira (1993).

Moreover, there is also one group which is tightly connected to both of these groups. This consists group comprises authors that compared the economic effects of different systems of educations (Public vs. Private). Many of these authors employ Political-Economy Models where redistribution takes the form of public education instead of taxes.

One important strand of literature within this cluster consists of the pioneering works on endogenous growth theory by Robert Lucas and Paul Romer. In the late 1980s, they developed models where the growth of the economy was the outcome of internal decisions of their agents and not the result of exogenous factors, as it was, for instance, in the case of the seminal Solow model. Their development had a great impact in the development of the aforementioned models. For instance, endogenous growth attributed a great importance to the accumulation of human capital to generate growth which prompted the appearance of works such as the aforementioned by Galor and Zeira (1993) which analyzed how inequality can affect this process and economic growth.

Finally, the remaining lines of research are mostly connected to other perspectives on this relation. One stream focused on exploring mechanisms whereby inequality can have a positive effect on growth, for instance, through improvements of technological progress by reward risk (Inequality-Technological Progress-Growth) or the saving rate (Classical approach). The relative unimportance of these channels relative to others can be justified by consecutive empirical results of the literature that consolidated the idea that inequality was detrimental to growth. Moreover, we also include in this group a more recent transmission channel that predicted a negative effect though the effects of

inequality on fertility and another whereby the relationship was dependent on structural conditions.

The Main Attributes of these cluster are described in Table 5. In what concerns journals, it can be underlined the presence of *The Journal of Economic Growth* in this group, which is expected considering the themes of this cluster. In terms of authors, it shows one of the largest concentrations, with Robert Barro being the most important followed closely by Oded Galor. Most of the authors included in this cluster were trained at the Harvard University or MIT, which reflect the influence of new growth theories in this cluster. This is also reflected in the presence of these two academic institutions in the top 10 affiliations. In terms of non-academic institutions, we only find 3 in this ranking but, despite being relatively fewer, they occupy prominent places, especially at CEPR and NBER.

Table 5 - Top journals, authors and their *Almae Matres*, affiliations and corresponding countries by number of citations of the References of cluster 3 ■.

Top 5 journals	75.58%: The Review of Economic Studies (19.97%); The American Economic Review (19.33%); Journal of Economic Growth (16.08%); The Quarterly Journal of Economics (13.29%); Journal of Political Economy (6.91%)
Top 10 authors	55.09%: Barro R. (8.43%); Galor O. (8.23%); Alesina A. (6.24%); Zeira J. (5.67%); Perotti R. (5.4%); Aghion P. (4.82%); Persson T. (4.42%); Tabellini G. (4.42%); Rodrik D. (4.39%); Forbes K. (3.07%)
Top 5 *Almae Matres*	69.41%: Harvard University (27.82%); MIT (19.78%); Columbia University (9.79%); The Hebrew University (7.52%); University of California LA (4.5%)
Top 5 *Almae Matres* Countries	99.43%: US (79.07%); Israel (7.78%); Sweden (4.66%); UK (4.44%); France (3.48%)
Top 10 affiliations	67.89%: CEPR (14.72%); Harvard University (11.64%); NBER (9.93%); The Hebrew University (9.68%); Brown University (5.89%); MIT (3.62%); University of Chicago (3.34%); Columbia University (3.34%); European Bank for Reconstruction and Development (2.99%); Stockholm University (2.74%)
Top 5 affiliations Countries	91.37%: US (46.66%); UK (21.3%); Israel (10.72%); France (7.21%); Italy (5.48%)

Notes: See Table 2.

Cluster 4 ■ The main lines of research of this cluster are described in Table 13, with the most important focus being the development of macroeconomic models of the distribution of wealth, especially across generations. Various lines of research were developed that sought to develop general equilibrium models with different characteristics. In the first case, it was assumed that markets were incomplete and, as a result, agents faced uninsurable risks. In the second case, authors assumed the existence of several and possibly overlapping generations with links between them, namely the possibility of transmission of wealth and valuation of utility of future generations. In the third case, agents were assumed to be heterogeneous in some respects. Finally, in the fourth and more recent one, it was assumed agents faced borrowing constraints due to the existence of imperfections in the credit market.[13] The development of these lines of research owes much to the seminal contribution by Joseph Stiglitz (1969), who focused on wealth inequality among individuals, rather than on the distribution among factors.

Another stream of research consisted in authors focused on conducting empirical analysis of the Wealth Distribution which in similarity to the previous ones, also developed in great part due to particular seminal contributions. One of the most important and oldest was the one by Anthony Atkinson (1971) who analyzed the implications for the wealth distribution of the Life-Cycle Hypothesis, which was

[13] We also found a small group of authors that analyzed the adequacy of statistical distributions, namely Pareto, to fit the upper tail of the wealth distribution.

introduced in the 1950s by Franco Modigliani and Richard Brumberg. According to their hypothesis, individuals choose optimally how to spend resources at each age. Therefore, Atkinson considered that wealth inequality in a society at any time could simply reflect a greater proportion of older individuals who, naturally, saved more during their lifetime. Therefore, the most adequate method of measuring wealth inequality would be to consider the distribution of inherited wealth since this, unlike measurements taken at specific times, were not affected by life-cycle factors. Another important work in this line was Lawrence Kotlikoff and Larry Summers (1981). Using historical Data from the US in the 1960s and 1970s, they estimated the role of inheritances relative to life-cycle savings in capital formation and concluded that the former had a much more important role than the latter. This result directly contradicted previous work done decades before by Modigliani (1966) and, as a result, it enhanced the interest on this topic.

Finally, a strand of the literature compared the evolution income inequality with consumption inequality and attempted to conduct both empirical and theoretical analysis of their relationship. This topic is also connected to the Permanent and Transitory components of income. The reason is the fact that when faced with uncertain incomes, consumers procure to smooth consumption patterns by investing in assets and contracting debt (*e.g.*, Iacoviello, 2008) which affects their wealth position.

Table 6 - Top journals, authors and their *Almae Matres*, affiliations and corresponding countries by number of citations of the References of cluster 4

Top 5 journals	71.05%: Journal of Political Economy (31.68%); The Quarterly Journal of Economics (13.24%); Econometrica (10.17%); The Review of Economic Studies (8.04%); The American Economic Review (7.92%)
Top 10 authors	38.12%: Becker G. (4.89%); Díaz-Giménez J. (4.56%); Ríos-Rull J. (4.56%); Quadrini V. (4.17%); Tomes N. (3.91%); Huggett M. (3.45%); De Nardi M. (3.39%); Aiyagari S. (3.13%); Perri F. (3.06%); Saez E. (3%)
Top 5 *Almae Matres*	67.35%: University of Minnesota (22.02%); University of Chicago (11.73%); MIT (11.66%); University of Pennsylvania (11.45%); Harvard University (10.49%)
Top 5 *Almae Matres* Countries	99.99%: US (89.12%); UK (4.94%); Spain (3.74%); France (2.19%); Netherlands (0%)
Top 10 affiliations	65.44%: NBER (18.16%); CEPR (11.99%); FED (10.13%); University of Chicago (4.75%); New York University (4.71%); University of Pennsylvania (3.52%); Universidad Carlos III de Madrid (3.44%); University of Minnesota (3.16%); University of California at Berkeley (3.05%); Yale University (2.53%)
Top 5 affiliations Countries	97.03%: US (72.75%); UK (13.92%); Spain (6.21%); Canada (2.37%); Sweden (1.78%)

Notes: See Table 2.

The main characteristics of this cluster are described in Table 6. Five journals account for about 70% of the citations, with the most important being the *Journal of Political Economy*. In what concerns authors, the top 10 authors correspond to around 40% of the citations, with some of the most important being Becker, Díaz-Giménez, and Ríos-Rull J., among others. The majority graduated from American Universities, with the University of Minnesota being of particular importance. A similar pattern is observed in terms of institutional affiliations, where the University of Chicago is the most important academic institution, with other types of institutions, namely NBER, CEPR and the Federal Reserve Bank, ranking even higher.

From this analysis, it is clear that this cluster is strongly influenced by the University of Chicago. This can be seen both by the direct presence of this University in the data but also by indirect connections such the relevance of the *Journal of Political Economy*, which is connected with the University, and the fact that many of the most important authors of this cluster graduated in the University of Minnesota had been supervised by Edward Prescott (Nobel recipient in 2004) and by Neil Wallace. Both had been colleagues of Robert Lucas at this University and were committed in providing

microeconomic foundations to macroeconomic theories which is consistent with the nature of the theoretical models of this cluster.[14]

Cluster 5 ■ The Streams of Research of this cluster are described in Table 14, most being focused on more heterodox approaches to the study of the topic of Inequality. The most important streams of research analyze the effects and determinants of inequality and their importance is driven by the seminal contribution of Thomas Piketty in 2014, *Capital in the Twenty-First Century*, who offered a fresh perspective on this subject.

The current of thought that mostly defines this cluster is one discussing the impacts of changes in the income distribution on the various components of aggregate demand and/or growth. Many authors analyzed the demand regime of certain economies, which is considered wage-led if aggregate demand increases given an increase of the wages/labor share and profit-led otherwise (*e.g.*, Stockhammer *et al.*, 2009). In turn the determination of the demand regime had important implications for growth. For instance, a favorable redistribution of income towards workers was expected to have a positive impact on consumption due to the assumption that they have a higher propensity to consume then capitalists, and negative impact on investment, due to the dependence of the latter on profits (Onaran and Obst, 2016). In a wage-led Demand regime, the first effect was expected to surpass the former, which implied that a favorable redistribution towards workers led to higher growth rates of the output by stimulating aggregate demand. These analyses have been largely inspired by the theoretical contributions of Michael Kalecki, who is the oldest reference from this stream of research and that considered the existence of two classes, workers and capitalists, where only the former consumes, and the existence of an independent investment function. This was in line with the analysis of J. M. Keynes (1936) regarding the determination of aggregate demand.[15]

Another important group of this cluster is dedicated to the role of income inequality in causing financial crises. This was triggered in the wake of the Global Financial Crisis of 2007-2008 and is congruent with some of previous works that draw from the work of Kalecki, according to whom, crises in capitalist systems were inevitable because their avoidance would require a stable level of investment over time, which was not feasible. Investment, by its definition, led to capital accumulation and, for Kalecki, it was inevitable that at some point the new machines were not completed absorbed due to depreciation, leading to excess capacity and falling profits and, in turn, a downward spiral of investment (Dixon and Toporowski, 2013).

Many of the remaining contributions are also connected to this topic. For instance, we notice streams of research that established a connection between inequality and savings. This is naturally connected to the aforementioned cluster due to one of the key assumptions of *Kaleckian* models being that workers and capitalists have different saving propensities. We also find a strand of the literature dedicated to exploring the hypothesis that consumers' utility depends on their condition, in terms of income or wealth, in relation to their peers, and their consequences. Specifically, some authors explored the extent to which consumers emulate consumption patterns of those at the

[14] Moreover, the interest in such topics was also prevalent in MIT and Harvard, where some authors also graduated in. An example that we consider to attest the general interest of these institutions was the joint Harvard-M.I.T. Seminar held in 1971 dedicated to the topic of income distribution in which Alan Blinder, a MIT *alumni*, had the opportunity to present his paper "A Model of Inherited Wealth".

[15] Therefore, much of these works belong to the group of the Cambridge growth models which makes uses of the theories developed by Keynes but apply them, instead, to the analyses of long-run outcomes, namely economic growth.

top of the distribution. We consider that this group is deeply connected to the one focused on the aggregate demand due to its implications of a change in distribution in aggregate demand.

The main attributes of this cluster are summarized in Table 7, notably the influence of the University of Cambridge, which is reflected both in the importance of the *Cambridge Journal of Economics*, and also by the fact that this institution is the most important affiliation and second most important *Alma Mater*, surpassed only by LSE in the case of the latter. The most important author of this cluster is Thomas Piketty, followed by Nicholas Kaldor, Allan Melzer and Scott Richard, which is justified by the corresponding seminal contributions.

Table 7 - Top journals, authors and their *Almae Matres*, affiliations and corresponding countries by number of citations of the References of cluster 5 ■

Top 5 journals	76.87%: Cambridge Journal of Economics (21.2%); The Review of Economic Studies (18.42%); Journal of Political Economy (13.7%); The Quarterly Journal of Economics (11.99%); The American Economic Review (11.56%)
Top 10 authors	49.07%: Piketty T. (12.41%); Kaldor N. (7.04%); Meltzer A. (4.35%); Richard S. (4.35%); Solow R. (3.8%); Bhaduri A. (3.7%); Marglin S. (3.7%); Dutt A. (3.52%); Rajan R. (3.24%); Pasinetti L. (2.96%)
Top 5 *Almae Matres*	65.67%: LSE (20.49%); University of Cambridge (12.78%); EHESS (11.73%); MIT (10.95%); Harvard University (9.72%)
Top 5 *Almae Matres* Countries	93.94%: US (54.58%); UK (31.58%); France (2.86%); Poland (2.63%); Turkey (2.29%)
Top 10 affiliations	70.04%: University of Cambridge (12.84%); Carnegie-Mellon University (11.18%); Harvard University (8.32%); Institut für Geld u. Fiskalpolitik Vienna (7.13%); Paris School of Economics (5.95%); NBER (5.23%); CEPR (5.23%); MIT (4.88%); Indian Institute of Management Calcuta India (4.76%); Cornell University (4.52%)
Top 5 affiliations Countries	95.84%: US (53.27%); UK (22.95%); France (7.73%); Vienna (7.13%); India (4.76%)

Notes: See Table 2.

Cluster 6 ■ This cluster aggregates some of the most recent trends of research in inequality, with the largest share of papers published since 2000. The most important topic is the evolution of inequality, especially in advanced economies, namely the US, since 1980s, which attracted increasing interest as the positive trend became more and more evident over time. This led to the development of research devoted to analyze the role of particular factors in shaping inequality, such as tax policy, monetary policy or trade. Others place their attention on the opposite side of the spectrum and analyzed the consequences of such increasing inequality trends in several variables such as intergenerational mobility.

There are three strands of research in this cluster that have particular importance by offering different perspectives about the evolution of inequality. One of the most important (and the oldest) pointed out to the relationship between the rise in inequality and the increase of the relative wage of individuals with a college degree over those with secondary education – the so-called skill premium. The authors in this group have developed theoretical explanations for this phenomenon, with some of the most important contributions being made by Lawrence Katz, Kevin Murphy and Daron Acemoglu. The most popular explanation is the *Skill Biased Technological Change* hypothesis, according to which the relative increase in the labor supply of skilled workers increased the market size for technologies complementary to such type of workers, therefore contributing to increase its relative demand and, thus their relative wage.

Table 8 - Top journals, authors and their *Almae Matres*, affiliations and corresponding countries of the References of cluster 6 ■.

Top 5 journals	83.77%: The Quarterly Journal of Economics (40.75%); Journal of Economic Literature (19.43%); The American Economic Review (13.21%); The Review of Economics and Statistics (5.85%); Journal of Political Economy (4.53%)
Top 10 authors	76.76%: Piketty T. (22.83%); Saez E. (19.71%); Atkinson A. (8.41%); OECD (6.67%); Katz L. (5.94%); Murphy K. (3.7%); Acemoglu D. (3.33%); Autor D. (2.25%); Kearney M. (2.25%); Bound J. (1.67%)
Top 5 *Almae Matres*	84.09%: MIT (26.45%); LSE (22.79%); EHESS (19.89%); University of Cambridge (8.46%); Harvard University (6.5%)
Top 5 *Almae Matres* Countries	100%: US (75.37%); UK (18.87%); France (3.77%); Serbia (1.99%); Netherlands (0%)
Top 10 affiliations	86.05%: NBER (21.07%); Harvard University (10.95%); University of California at Berkeley (10.85%); Paris School of Economics (9.13%); EHESS (7.16%); Nuffield College, University of Oxford (5.97%); CEPREMAP (5.92%); LSE (5.76%); MIT (4.83%); University of Chicago (4.41%)
Top 5 affiliations Countries	100%: US (62.07%); France (23.25%); UK (13.75%); Canada (0.93%); India (0%)

Notes: See Table 2.

A second more recent group documented an increasing concentration of income and wealth at the top shares of the corresponding distributions. Dissatisfied with the available databases, a group of authors, namely Anthony Atkinson, Thomas Piketty, Emmanuel Saez, Facundo Alvaredo, Michael Veall, began to revive and improve the work pioneered by Simon Kuznets half a century ago by making use of income tax and other data to build much longer time series for several countries (Aktinson and Piketty, 2007). The data showed an extraordinary evolution of the income share of the top 1%, which, according to the authors, could not be explained adequately by theories aimed at explaining the skill premium. Its origins can be traced back to the publication of Piketty's paper of 2001 (Piketty, 2001b), which was focused on France. This played a prominent role in stimulating other authors to pursue similar analysis in other countries, namely Atkinson for England and Saez for the United States, and also to the development of the *WID.world* database. Finally, another strand, here only represented by Loukas Karabarbounis and Brent Neiman (2014), has also noticed that this upward trend was also reflected in a decline of the labor share of income.

In Table 8, we present the main characteristics of this cluster. In terms of journals, there is a very high degree of concentration of articles published in 5 economic journals, which account for over 80% of the citations, with about half being of articles published in *The Quarterly Journal of Economics.* The documents in this cluster are also represented by a small group of authors for the reasons explained above. Most graduated in mostly American and British Universities, such as MIT, LSE, with some, such as Piketty also attended EHESS in France. This pattern is also visible in the affiliations but we also see the prevalence of non-academic institutions, namely the NBER.

Cluster 7 ■ The main streams of research of cluster 7 are described in Table 16. This cluster contains the smallest amount of references though, as can be seen in Table 1, is the cluster with the second largest number of citations and strength per reference. This result is mostly explained by the presence of the work of Kuznets (1955). All the remaining lines of research in this cluster are closely connected to the relationship between inequality and particular aspects relevant to the development process, which makes it closer to cluster 2. However, there are some important differences. Firstly, the references in cluster 7 are much more focused on the relation between inequality and education through the development process. Secondly, one stream of research that is only present here relates to the relationship between inequality and environment during this process.

Although cluster 2 is focused on such issues, Kuznets appears here due to the stronger connection between these topics and the topic of development. For instance, education has been considered as having a significant role in the reduction of inequality at later stages of the process of development by contributing to the equalization of the distribution of skills (Ahluwalia, 1976). In the case of the environment, the literature developed the so-called *environmental Kuznets curve*, according to which during the development process, pollution increases at earlier stages only to decrease afterwards, in similarity to trajectory of inequality that was the subject of the original work (*e.g.*, Torras and Boyce, 1998).

The main characteristics of this cluster are summarized in Table 9. In line with other clusters, there is a high concentration of journals, notably the *American Economic Review*. This is expected considering the great importance of Kuznets as an individual author, which accounts for one-fifth of the total citations in this cluster. Moreover, the importance of this author is also reflected on both the Top *Almae Matres* and affiliations in which Columbia University and the University of Pennsylvania, both connected with him, appear at top places. Another important group of authors are the aforementioned Klaus Deininger and Lyn Squire due to their contribution with a new database that supported the work of many authors. Their importance is also reflected in the presence of the University of Minnesota in the Top 5 *Almae Matres* and the World Bank as the most important affiliation.

Table 9 - Top journals, authors and their *Almae Matres*, affiliations and corresponding countries of the References of cluster 7

Top 5 journals	73.2%: The American Economic Review (37.64%); World Bank Economic Review (16.96%); Journal of Econometrics (7.77%); Journal of Economic Literature (5.69%); Journal of Applied Econometrics (5.14%)
Top 10 authors	66.6%: Kuznets S. (20.94%); Deininger K. (10.61%); Squire L. (10.61%); Pesaran M. (6.57%); Atkinson A. (3.56%); Brandolini A. (3.56%); Shin Y. (3.56%); Smith R. (2.67%); Boyce J. (2.4%); Im K. (2.12%)
Top 5 *Almae Matres*	68.7%: Columbia University (27.56%); University of Cambridge (16.83%); University of Minnesota (12.6%); University of Oxford (7.4%); University of Chicago (4.31%)
Top 5 *Almae Matres* Countries	100%: US (68.12%); UK (30.56%); Denmark (1.32%); Netherlands (0%); India (0%)
Top 10 affiliations	68.99%: World Bank (23.13%); University of Pennsylvania (19.77%); University of Cambridge (5.04%); Nuffield College, University of Oxford (3.36%); Bank of Italy (3.36%); University of Edinburgh (3.36%); University of Massachusetts Amherst (3.29%); National Taiwan University (2.84%); University of California San Diego (2.71%); NBER (2.13%)
Top 5 affiliations Countries	95.28%: US (67.44%); UK (19.06%); Italy (3.36%); Taiwan (2.84%); Chile (2.58%)

Notes: See Table 2.

Table 10 - Main Streams of Research of References in cluster 1

Streams of Research	Description	Tot. Cit.	N. Ref.	Most cited Ref.	Ref.
Inequality decomposing techniques	Analyses/develops techniques that allow to decompose inequality by different subgroups or factor components/sources.	446	15	Shorrocks (1982)	Rao (1969); Pyatt (1976); Fei *et al.* (1978); Bourguignon (1979); Cowell (1980); Fields (1980) (*); Pyatt *et al.* (1980); Shorrocks (1980); Mookherjee and Shorrocks (1982); Shorrocks (1982); Shorrocks (1983); Shorrocks (1984); Lerman and Yitzhaki (1985); Juhn *et al.* (1993); Morduch and Sicular (2002)
Inequality Measures	Proposes, corrects or characterizes one or various inequality measures	430	10	Atkinson (1970)	Theil (1967) (*); Atkinson (1970); Sen (1973) (*); Atkinson (1975) (*); Paglin (1975); Kolm (1976); Pyatt (1976); Kakwani (1980) (*); Anand (1983) (*); Atkinson (1983) (*)
Properties of Inequality Measures	Discusses the properties of inequality measures and/or their desirability.	361	8	Atkinson (1970)	Dalton (1920); Atkinson (1970); Gastwirth (1972); Dasgupta *et al.* (1973); Sen (1973) (*); Kolm (1976); Kakwani (1980) (*); Cowell (1995) (*)
Data	Constructs a database that is used by the citing reference and/or describes or discusses issues related to data.	308	13	Paukert (1973)	Kuznets (1963); Lydall (1968) (*); Paukert (1973); Atkinson (1975) (*); Jain (1975) (*); Kuznets (1976); Fields (1980) (*); Buhmann *et al.* (1988); Summers and Heston (1991); Atkinson and Mickelwright (1992) (*); Khan and Riskin (1998); Milanovic (1998) (*); Bourguignon and Morrisson (2002)
Income Distribution Model	Develops, estimates and/or characterizes a functional form (or several) used to model the income distribution.	277	13	Champernowne (1953)	Gibrat (1931) (*); Champernowne (1953); Aitchison and Brown (1957) (*); Lydall (1968) (*); Thurow (1970); Salem and Mount (1974); Kakwani and Podder (1976); Singh and Maddala (1976); Adelman and Robinson (1978) (*); McDonald (1984); Buhmann *et al.* (1988); Deaton (1997) (*); Kleiber and Kotz (2003) (*)
Growth-Inequality/Kuznets Hypothesis	Analyses the relationship between growth and inequality, in general, or the Kuznets hypothesis, in particular.	270	10	Paukert (1973)	Lewis (1954); Kuznets (1963); Harris and Todaro (1970); Paukert (1973); Chenery (1974) (*); Ahluwalia (1976); Ahluwalia (1976); Robinson (1976); Adelman and Robinson (1978) (*); Papanek and Kyn (1986)
Empirical Decomposition of Inequality	Conducts an empirical analysis where inequality is decomposed by subgroups and/or factor components.	268	12	DiNardo *et al.* (1996)	Lydall (1968) (*); Blinder (1973); Oaxaca (1973); Stark *et al.* (1986); Rozelle (1994); Jenkins (1995); Karoly and Burtless (1995); DiNardo *et al.* (1996); Kanbur and Zhang (1999); Milanovic (1999); Gustafsson and Shi (2002); Benjamin *et al.* (2005)
Determinants of Inequality	Procures to determine what factors determine inequality.	165	6	Gottschalk and Smeeding (1997)	Thurow (1970); Tinbergen (1975) (*); Papanek and Kyn (1986); Wood (1994) (*); Atkinson (1997); Gottschalk and Smeeding (1997)
Measurement of Inequality	Analyses/discusses issues related to the measurement of inequality.	158	7	Atkinson (1995) (*)	Kuznets (1976); Shorrocks (1983); Buhmann *et al.* (1988); Atkinson and Mickelwright (1992) (*); Atkinson (1995) (*); Deaton (1997) (*); Bourguignon and Morrisson (2002)
Evolution of Inequality in Advanced Economies	Documents the evolution of Inequality in Advanced Economies (*e.g.*, USA, UK).	124	4	Levy and Murnane (1992)	Tinbergen (1975) (*); Levy and Murnane (1992); Jenkins (1995); Atkinson (1997)
Global Inequality	Describes and/or analyses the inequality of the World Distribution of Income.	88	4	Bourguignon and Morrisson (2002)	Atkinson (1975) (*); Bourguignon and Morrisson (2002); Milanovic (2002); Sala i Martin (2006)

Evolution of Inequality in Transition Economies	Documents the evolution of Inequality in Transition Economies (*e.g.*, former members of the USSR, China).	86	5	Ravallion and Chen (2007)	Milanovic (1998) (*); Milanovic (1999); Gustafsson and Shi (2002); Benjamin *et al.* (2005); Ravallion and Chen (2007)
Education-Inequality	Analyses the relation between education related variables and Inequality.	70	3	Adelman and Morris (1973) (*)	Adelman and Morris (1973) (*); Mincer (1974) (*); Ahluwalia (1976)
Macroeconomic Variables-Inequality	Analyses the relationship between inequality and a or various macroeconomic variables (*e.g.*, inflation, unemployment) and inequality.	67	3	Blinder and Esaki (1978)	Salem and Mount (1974); Beach (1977); Blinder and Esaki (1978)
Normative Analysis	Conducts a normative analysis of the level of inequality in a society.	45	2	Rawls (1971) (*)	Rawls (1971) (*); Shorrocks (1983)
Poverty Measures	Develops a measure of poverty.	41	2	Foster *et al.* (1984)	Sen (1976); Foster *et al.* (1984)
Econometric Techniques	Develops econometric techniques that are used by the citing reference.	37	2	Heckman (1979)	Heckman (1979); White (1980)
Poverty decomposing techniques	Analyses or develops techniques that allow to decompose poverty by different subgroups or factor components/sources.	25	1	Foster *et al.* (1984)	Foster *et al.* (1984)
Comparative analysis of Inequality	Compares the levels of inequality of different countries.	23	1	Lydall (1968) (*)	Lydall (1968) (*)
Statistical Techniques	Develops statistical techniques that are used by the citing reference.	21	1	Silverman (1986) (*)	Silverman (1986) (*)

Notes: (*) non-article reference

Table 11 - Main Streams of Research of References in cluster 2

Streams of Research	Description	Tot. Cit.	N. Ref.	Most cited Ref.	Ref.
Finance-Inequality	Analyses the relationship between financial development and/or financial liberalization and inequality.	553	19	Banerjee and Newman (1993)	Greenwood and Jovanovic (1990); Banerjee and Newman (1993); King and Levine (1993); Mookherjee and Ray (2003); Clarke *et al.* (2006); Beck *et al.* (2007); Claessens and Perotti (2007); Chong and Gradstein (2007); Roine *et al.* (2009); Demirgüç Kunt and Levine (2009); Ang (2010); Beck *et al.* (2010); Gimet and Lagoarde Segot (2011); Kim and Lin (2011); Agnello *et al.* (2012); Jaumotte *et al.* (2013); Delis *et al.* (2014); Jauch and Watzka (2016); De Haan and Sturm (2017)
Econometric Techniques	Develops econometric techniques that are used by the citing reference.	396	9	Arellano and Bond (1991)	Hausman (1978); Nickell (1981); Arellano and Bond (1991); Arellano and Bover (1995); Blundell and Bond (1998); Wooldridge (2002) (*); Windmeijer (2005); Roodman (2009); Roodman (2009)
Openness/Globalization-Inequality	Analyses the relation between the degree of openness, in terms of trade and/or financial transactions, and/or globalization of an economy and inequality.	339	16	Jaumotte *et al.* (2013)	Stolper and Samuelson (1941); Bourguignon and Morrisson (1990); Richardson (1995); Feenstra and Hanson (1997); Edwards (1997); Spilimbergo *et al.* (1999); Reuveny and Li (2003); Dollar and Kraay (2004); Milanovic (2005); Anderson (2005); Goldberg and Pavcnik (2007); Dreher and Gaston (2008); Meschi and Vivarelli (2009); Bergh and Nilsson (2010); Jaumotte *et al.* (2013); Asteriou *et al.* (2014)
Data	Constructs a database that is used by the citing reference and/or describes or discusses issues related to data.	215	9	Solt (2009)	Barro and Lee (2001); Alesina *et al.* (2003); Galbraith and Kum (2005); Lane and Milesi Ferretti (2007); Solt (2009); Barro and Lee (2013); Jenkins (2015); Feenstra *et al.* (2015); Solt (2016)
Growth-Inequality/Kuznets Hypothesis	Analyses the relationship between growth and inequality, in general, or the Kuznets hypothesis, in particular.	176	5	Greenwood and Jovanovic (1990)	Greenwood and Jovanovic (1990); Bourguignon and Morrisson (1998); Ravallion (2001); Dollar and Kraay (2002); Lundberg and Squire (2003)
Determinants of Inequality	Procures to determine what factors determine inequality.	121	4	Li *et al.* (1998)	Li *et al.* (1998); Bourguignon and Morrisson (1998); Hall and Jones (1999); Easterly (2007)
Macroeconomic Variables-Inequality	Analyses the relationship between inequality and a or various macroeconomic variables (*e.g.*, inflation, unemployment) and inequality.	42	2	Easterly and Fischer (2001)	Easterly and Fischer (2001); Albanesi (2007)
Theories of Financial Development	Analyses and develops theories for the process of financial development of a country.	19	1	Rajan and Zingales (2003)	Rajan and Zingales (2003)
Fractionalization-Redistribution	Analyses how the degree of ethnic, linguistic, and religious fractionalization affects Redistribution Policies.	18	1	Alesina *et al.* (2003)	Alesina *et al.* (2003)
Corruption-Inequality	Analyses the relationship between corruption and inequality.	17	1	Gupta *et al.* (2002)	Gupta *et al.* (2002)

Education-Inequality	Analyses the relation between education related variables and Inequality.	16	1	Sokoloff and Engerman (2000)	Sokoloff and Engerman (2000)
Redistribution-Inequality	Analyses the relationship between Redistribution Policies and Inequality.	15	1	Musgrave and Thin (1959) (*)	Musgrave and Thin (1959) (*)

Notes: (*) non-article reference

Table 12 - Main Streams of Research of References in cluster 3

Streams of Research	Description	Tot. Cit.	N. Ref.	Most cited Ref.	Ref.
Empirical Analysis of the Inequality-Growth Relationship	Conducts an empirical analysis of the Inequality-Growth relationship and is cited for this motive, for the result that was found or for methodological reasons.	595	12	Barro (2000)	Clarke (1995); Alesina and Perotti (1996); Perotti (1996); Partridge (1997); Deininger and Squire (1998); Li and Zou (1998); Barro (2000); Forbes (2000); Panizza (2002); Banerjee and Duflo (2003); Partridge (2005); Voitchovsky (2005)
Political-Economy Models	Develops an economic model where both political and economic outcomes are endogenously determined.	441	9	Persson and Tabellini (1994)	Barro (1990); Glomm and Ravikumar (1992); Bertola (1993); Perotti (1993); Saint Paul and Verdier (1993); Alesina and Rodrik (1994); Persson and Tabellini (1994); Bénabou (1996); Bénabou (1996)
Model with Credit/Capital Market Imperfections	Develops an economic model where agents (*e.g.*, consumers, firms) face borrowing constraints in the credit market	332	5	Galor and Zeira (1993)	Banerjee and Newman (1991); Galor and Zeira (1993); Bénabou (1996); Aghion and Bolton (1997); Aghion *et al.* (1999)
Inequality-Human Capital-Growth	Analyses a transmission channel between Inequality and Growth through the impacts of the former on the accumulation of Human Capital	219	2	Galor and Zeira (1993)	Galor and Zeira (1993); Galor and Moav (2004)
Inequality-Redistribution-Growth	Develops or analyses a theoretical channel whereby inequality affects growth through its impacts on redistribution.	186	3	Alesina and Rodrik (1994)	Bertola (1993); Perotti (1993); Alesina and Rodrik (1994)
Endogenous Growth Models	Develops models where the growth rate is endogenously determined as a result of the actions of the agents in the economy.	180	7	Lucas (1988)	Romer (1986); Lucas (1988); Barro (1990); Grossman and Helpman (1991) (*); Aghion and Howitt (1992); Bertola (1993); Aghion and Howitt (1998) (*)
Convergence	Analyses the rate of convergence of income per capita between developed and developing countries, with or without consideration of the parameters determining their steady state values.	120	4	Barro (1991)	Barro (1991); Barro and Sala i Martin (1992); Mankiw *et al.* (1992); Barro and Sala i Martin (1995) (*)

Public versus Private Education Growth Models	Develops a growth model where the impacts on economic performance of a public and private education system are assessed and compared.	68	3	Glomm and Ravikumar (1992)	Glomm and Ravikumar (1992); Saint Paul and Verdier (1993); Bénabou (1996)
Determinants of Growth	Conducts an empirical analysis for the determinants of growth.	43	1	Barro (1991)	Barro (1991)
Model of Optimal Taxation	Develops and/or discussing a theory of optimal taxation.	29	1	Mirrlees (1971)	Mirrlees (1971)
Inequality-Technological Progress-Growth	Develops an economic model where greater inequality, by rewarding risk and productivity, increases technological progress and, therefore, growth.	25	1	Galor and Tsiddon (1997)	Galor and Tsiddon (1997)
Structural Changes Impacts on the Inequality--Growth Relationship	Develops a model where the relationship between inequality and growth is affected by structural changes (*e.g.*, rate of time preference, productivity, risk).	20	1	García Peñalosa and Turnovsky (2006)	García Peñalosa and Turnovsky (2006)
Model with Hierarchic preferences	Develops an economic model where the preferences of consumers are different to the existence of goods with different levels of desirability.	18	1	Murphy *et al.* (1989)	Murphy *et al.* (1989)
Classical approach	Develops a model that follows the classic approach according to which inequality increases savings, which is then applied by authors to analyse the inequality-growth relationship.	16	1	Bourguignon (1981)	Bourguignon (1981)
Equality-Growth Tradeoff	Establishes the notion of a trade-off between Equality and Economic Efficiency/Growth.	16	1	Okun (1975) (*)	Okun (1975) (*)
Inequality-Fertility-Growth	Analyses a transmission channel between Inequality and Growth through the impacts of the former on fertility rates.	16	1	De La Croix and Doepke (2003)	De La Croix and Doepke (2003)

Notes: (*) non-article reference

Table 13 - Main Streams of Research of References in cluster 4

Streams of Research	Description	Tot. Cit.	N. Ref.	Most cited Ref.	Ref.
GE Models with idiosyncratic risk and incomplete markets	Develops a General Equilibrium Model where agents face uninsurable risks due to the inexistence of complete markets, which is used to analysed the Distribution of Wealth.	236	7	Aiyagari (1994)	Huggett (1993); Aiyagari (1994); Huggett (1996); Krusell and Smith (1998); Quadrini (2000); Castañeda *et al.* (2003); Cagetti and De Nardi (2006)
GE Models with Intergenerational Links	Develops a General Equilibrium Model with several generations with links between them, such as the possibility of transmission of wealth and valuation of utility of future generations, which is used to analyse the Distribution of Wealth.	177	7	Stiglitz (1969)	Stiglitz (1969); Blinder (1973); Barro (1974); Becker (1974); Becker and Tomes (1979); Loury (1981); Becker and Tomes (1986)
GE Models with Heterogenous Agents	Develops a General Equilibrium Model where agents (*e.g.*, consumers, firms) differ in some respect (*e.g.*, endowments, preferences), which is used to analyse the Distribution of Wealth.	81	4	De Nardi (2004)	Chatterjee (1994); Caselli and Ventura (2000); De Nardi (2004); Benhabib *et al.* (2011)
Empirical analysis of the relation between Intergenerational Transfers and Wealth Inequality	Conducts an empirical analysis of the relative importance of Intergenerational Transfers in shaping the Wealth Distribution.	77	4	Atkinson and Harrison (1978) (*)	Atkinson (1971); Atkinson and Harrison (1978) (*); Kotlikoff and Summers (1981); Gale and Scholz (1994)
Relation between Income and Consumption Inequality	Conducts an empirical or theoretical analysis of the relation between consumption and income inequality.	77	4	Heathcote *et al.* (2010)	Blinder (1975); Deaton and Paxson (1994); Krueger and Perri (2006); Heathcote *et al.* (2010)
Empirical analysis of the Wealth Distribution	Conducts an empirical analysis of the Wealth Distribution over time and documenting the degree of inequality.	48	2	Saez and Zucman (2016)	Rodriguez *et al.* (2002); Saez and Zucman (2016)
Empirical Analysis of Mobility	Conducts an empirical analysis of the degree of mobility in the wealth distribution over time or, more specifically, across generations.	47	3	Solon (1992)	Solon (1992); Zimmerman (1992); Kopczuk *et al.* (2010)
Data	Constructs a database that is used by the citing reference and/or describes or discusses issues related to data.	40	2	Atkinson and Harrison (1978) (*)	Atkinson and Harrison (1978) (*); Díaz Giménez *et al.* (1997)

GE model with credit market imperfections	Develops a General Equilibrium Model where agents (*e.g.*, consumers, firms) face borrowing constraints in the credit market, which is used to analyse the Distribution of Wealth.	36	2	Piketty (1997)	Chatterjee (1994); Piketty (1997)
Transitory and Permanent components of Income	Makes a distinction between the Transitory and Permanent components of income.	27	1	Friedman (1957) (*)	Friedman (1957) (*)
Empirical analysis of heterogeneous saving rates	Conducts an empirical analysis to determine whether saving rates vary with with different groups.	25	1	Dynan *et al.* (2004)	Dynan *et al.* (2004)
Almost Ideal Demand System	Develops a system of of demand equations derived from consumer theory.	17	1	Deaton and Muellbauer (1980)	Deaton and Muellbauer (1980)
Econometric Techniques	Develops econometric techniques that are used by the citing reference.	16	1	Tauchen (1986)	Tauchen (1986)
Pareto Models of Wealth Distribution	Describes Pareto Models and how they fit the upper tail of the distribution of wealth.	15	1	Gabaix (2009)	Gabaix (2009)
Tax Progressivity	Defines and charaterizes a progressive income tax system.	15	1	Musgrave and Thin (1948)	Musgrave and Thin (1948)

Notes: (*) non-article reference

Table 14 - Main Streams of Research of References in cluster 5

Streams of Research	Description	Tot. Cit.	N. Ref.	Most cited Ref.	Ref.
Determinants of Inequality	Procures to determine what factors determine inequality.	157	2	Piketty (2014) (*)	Stiglitz (2012) (*); Piketty (2014) (*)
Evolution of Inequality	Documents an increase in inequality in a country/region over time.	151	2	Piketty (2014) (*)	Gollin (2002); Piketty (2014) (*)
Inequality-Aggregate Demand/Growth	Analyses how an increase inequality affects the different components of aggregate demand and/or growth a demand-side perspective.	137	6	Bhaduri and Marglin (1990)	Kalecki (1971) (*); Dutt (1984); Bhaduri and Marglin (1990); Dutt (2006); Hein and Vogel (2008); Stockhammer *et al.* (2009)
Classical approach	Develops a model that follows the classic approach according to which inequality increases savings, which is then applied by authors to analyse the inequality-growth relationship.	108	3	Kaldor (1955)	Kaldor (1955); Kaldor (1957); Pasinetti (1962)
Median-voter hypothesis	Develops and/or empirically tests the hypothesis that an increase in inequality has an impact on redistribution policies by worsening the position of the median voter.	93	3	Meltzer and Richard (1981)	Meltzer and Richard (1981); Bénabou (2000); Milanovic (2000)
Interpersonal Dependency of Preference Theory	Develops, analyses and/or empirically tests the hypothesis that the happiness or utility of individuals depends on their condition relative to other persons in terms of income/wealth.	89	5	Duesenberry (1949) (*)	Veblen (1899) (*); Duesenberry (1949) (*); Runciman (1966) (*); Luttmer (2005); Frank *et al.* (2014)
Inequality-Crisis	Analyses how an increase in income inequality can contribute to financial crises.	60	2	Rajan (2010) (*)	Rajan (2010) (*); Kumhof *et al.* (2015)
Inequality-Saving Rate	Establishes a connection between inequality and the aggregate saving rate.	41	1	Solow (1956)	Solow (1956)
Inequality-Health	Analyses the relationship between inequality and health outcomes.	40	2	Wilkinson (1996) (*); Deaton (2003)	Wilkinson (1996) (*); Deaton (2003)
Keynesian Theories	Develops growth theories that extend Keynes focus on short-run phenomenon to long-run outcomes and economic growth.	38	2	Keynes (1936) (*)	Keynes (1936) (*); Robinson (1956) (*)
Effects of Inequality	Describes and/or analyses the effects of inequality on several dimensions.	23	1	Stiglitz (2012) (*)	Stiglitz (2012) (*)

Notes: (*) non-article reference

Table 15 - Main Streams of Research of References in cluster 6

Streams of Research	Description	Tot. Cit.	N. Ref.	Most cited Ref.	Ref.
Evolution of Inequality	Documents an increase in inequality in a country/region over time.	512	15	Piketty and Saez (2003)	Kuznets and Jenks (1953) (*); Bound and Johnson (1992); Katz and Murphy (1992); Card and DiNardo (2002); Piketty (2003); Piketty and Saez (2003); Saez and Veall (2005); Piketty and Saez (2006); Atkinson and Piketty (2007) (*); Autor *et al.* (2008); OECD (2008) (*); Atkinson *et al.* (2011); Alvaredo *et al.* (2013); OECD (2015) (*); Milanovic (2016) (*)
Top Shares	Analyses the evolution of top income and wealth shares.	367	10	Piketty and Saez (2003)	Kuznets and Jenks (1953) (*); Piketty (2003); Piketty and Saez (2003); Saez and Veall (2005); Piketty and Saez (2006); Atkinson and Piketty (2007) (*); Autor *et al.* (2008); Atkinson *et al.* (2011); Alvaredo *et al.* (2013); Piketty *et al.* (2014)
Impacts of Inequality	Analyses empirically or theoretically the impact of inequality on a particular or several variables.	180	3	Piketty and Saez (2003)	Piketty (2003); Piketty and Saez (2003); OECD (2011) (*)
Skill Premium and SBTC hypothesis	Focuses on the rise of the relative wage of skilled workers and on exploring the Skill Biased Technological Change hypothesis	138	5	Katz and Murphy (1992)	Bound and Johnson (1992); Katz and Murphy (1992); Acemoglu (1998); Acemoglu (2002); Card and DiNardo (2002)
Determinants of Inequality	Procures to determine what factors determine inequality.	118	6	OECD (2008) (*)	Melitz (2003); OECD (2008) (*); Alvaredo *et al.* (2013); Piketty *et al.* (2014); OECD (2015) (*); Coibion *et al.* (2017)
Wealth to Income Ratio	Analyses the concentration of wealth relative to income	32	2	Piketty and Zucman (2014); OECD (2015) (*)	Piketty and Zucman (2014); OECD (2015) (*)
Measurement of Inequality	Analyses/discusses issues related to the measurement of inequality.	18	1	Cowell (2011) (*)	Cowell (2011) (*)
Labor share	Documents and/or analysing the decrease of the labor share	17	1	Karabarbounis and Neiman (2014)	Karabarbounis and Neiman (2014)

Notes: (*) non-article reference

Table 16 - Main Streams of Research of References in cluster 7

Streams of Research	Description	Tot. Cit.	N. Ref.	Most cited Ref.	Ref.
Growth-Inequality/Kuznets Hypothesis	Analyses the relationship between growth and inequality, in general, or the Kuznets hypothesis, in particular.	366	4	Kuznets (1955)	Kuznets (1955); Ram (1991); Anand and Kanbur (1993); Partridge *et al.* (1996)
Data	Constructs a database that is used by the citing reference and/or describes or discusses issues related to data.	251	4	Deininger and Squire (1996)	Deininger and Squire (1996); Atkinson and Brandolini (2001); Leigh (2007); Frank (2009)
Econometric Techniques	Develops econometric techniques that are used by the citing reference.	189	9	Im *et al.* (2003)	Engle and Granger (1987); Johansen (1988); Pesaran and Smith (1995); Maddala and Wu (1999); Pedroni (1999); Pesaran *et al.* (2001); Levin *et al.* (2002); Im *et al.* (2003); Pesaran (2007)
Education-Inequality	Analyses the relation between education related variables and Inequality.	77	4	Knight and Sabot (1983); De Gregorio and Lee (2002)	Becker and Chiswick (1966); Knight and Sabot (1983); De Gregorio and Lee (2002); Leigh (2007)
Inequality-Environment	Analyses the relation between Inequality and the Enviroment.	35	2	Boyce (1994)	Boyce (1994); Torras and Boyce (1998)
Openness-Inequality	Analyses the relation between the degree of openness of an economy and inequality.	16	1	Partridge *et al.* (1996)	Partridge *et al.* (1996)
Macroeconomic Variables-Inequality	Analyses the relationship between a or various macroeconomic variables (*e.g.*, inflation, unemployment) and inequality.	15	1	Mocan (1999)	Mocan (1999)

Notes: (*) non-article reference

5. Concluding Remarks

In this paper, we identified and characterized the main streams of research in the field of inequality since the 1950s. Our analysis added to the extant literature on the topic not only by the focus of the analysis but also due to the methodology employed. The analysis allowed the identification of several different clusters. The first cluster, and the largest, contains some of the oldest lines of research since 1950s, mainly devoted to the analysis of theoretical issues related to the measurement of inequality. The second cluster is concentrated in the exploration of the relation between the development process and inequality, with a particular focus on certain dimensions such a finance and openness. The third cluster aggregates those contributions exploring the relationship between inequality and growth, both theoretically (through the development of models largely influenced by the development of endogenous growth theories), and empirically. The fourth cluster contains research that focus on wealth distribution, intergenerational mobility, and consumption inequality. The fifth cluster aggregates more heterodox approaches, with authors focusing on the impacts of distribution changes in aggregate demand and growth, and also financial crisis, and whose approaches were much influenced by the contributions of Michael Kalecki. The sixth cluster contains lines of research that offer different perspectives to the increased inequality trends in advanced economies since the 1980s. Finally, the seventh cluster presents some similarities to the second, but is much more focused on the Kuznets hypothesis and related aspects, namely education and the environment.

By analysing the context in which the various lines of each cluster developed, we concluded that many developed as a result of particular seminal contributions and continued to grow due to interesting empirical or theoretical results their works arrived at. Nonetheless, we also noticed that that some clusters were largely influenced by particular academic departments and schools of thought. For instance, cluster 4, which is dedicated to wealth distribution, is largely influenced by the University of Chicago. Similarly, cluster 5 was considerably influenced by the University of Cambridge.

We acknowledge that our new method of analysis has its limitations. The classification of the streams of research relies on citations which are chosen by the researcher and, thus, are not immune to subjective considerations, especially when references are cited for multiple reasons. The tractability of the analysis does allow to analyze every reference related to the literature, which does not guarantee that we cover exhaustively all streams of research.

However, we believe that our approach has minimized the impact of these constraints. In what concerns subjectivity, although we do not fully eliminate it, our method minimizes it by relying to a great extent in an algorithm of the VOSviewer software, divides references by clusters according to well accepted measures of the degree of association between references in the literature (*e.g.*, van Eck *et al.* 2010, Waltman *et al.*, 2010). Moreover, our analysis encompasses the most important and influential contributions by focusing the on the most cited references and employing aresearch strategy that minimizes the inclusion of references unrelated to the topic covered.

Therefore, we consider that our work constitutes a valuable and original contribution to the analysis of economic research on inequality, a major topic of research in economics in the last decades, by providing an overview of the field of inequality with a new useful method of bibliometric analysis that combines the use of bibliometric techniques with an innovative qualitative analysis.

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