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Three Decades of Research on Innovation and Inequality: Causal Scenarios, Explanatory Factors, and Suggestions

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Abstract

Prompted by rising income inequality (in short, *inequality*) in advanced economies, a rapidly growing number of studies across various fields and disciplines of social science have, since the 1990s, sought to find out how innovation (as the main engine of economic progress) affects the distribution of income in modern-day capitalist societies. Using the systematic literature review method, this paper provides the first critical review of 166 studies on innovation and inequality published in 114 journals in the last three decades (1990-2019). It is shown that while the great majority of studies under review concur that innovation induces inequality, this finding is subject to the disciplinary origins of research (e.g., development studies, economics, etc.) and the country under investigation (e.g., United States, United Kingdom, etc.). Furthermore, guided by an original causally holistic analytical framework, the analysis demonstrates that the relationship between innovation and inequality is significantly more causally complex than the most popular theoretical perspective (i.e. skill-biased technological change account) has let us believe; in particular, it is subject to *five causal scenarios* and *a range of explanatory factors* (i.e. skill premiums, technological unemployment, international trade, declining union membership, spatial aspects, changing employment conditions, policy, horizontal inequalities, sectoral composition and types of innovation). The paper ends by discussing findings, policy implications and knowledge gaps, one of which concerns the following under-researched question: *how, and under what conditions do publicly-funded innovation policies reduce (or increase) inequality?*

Keywords: Innovation, Income Inequality, Innovation Studies, Systematic Literature Review

1 Introduction

What do the contributions of notable thinkers – such as the writings of Adam Smith (1776/1982), David Ricardo (1891), Karl Marx (1999), Thorstein Veblen (1899/2009), Joseph Schumpeter (1934, 1944) and Werner Sombart (1967) – have in common other than their obvious significance for contemporary socioeconomic thought? In a nutshell, the classics of socioe-

conomic thought are replete with passages demonstrating that *innovation*[2] is (bi-)causally related to *inequality*[3] in capitalist societies. Despite this, innovation scholars had, for several decades of the previous century, mainly examined the positive side of the story, particularly the relationship between innovation, employment-creation, competitiveness and growth (Fagerberg, 1994, Pianta, 2005, Antonelli, 2009), whilst the question of inequality was largely ignored. Today, this no longer occurs: there exists a sustained interest in innovation and inequality in various fields of social science. For instance, *economists* (e.g. Acemoglu, 2002, Van Reenen, 2011), *economic geographers* (e.g. Breau et al., 2014, Lee, 2016), *development scholars* (e.g. Hilbert, 2010), *industrial relations* scholars (e.g. Belman and Monaco, 2001), *innovation scholars* (e.g. Cozzens and Kaplinsky, 2009, Lazonick and Mazzucato, 2013), *sociologists* (e.g. Fernandez, 2001) and *political scientists* (e.g. Hope and Martelli, 2019) have all examined the relationship between (technological) innovation and inequality.

Despite such a discipline-diverse interest, our knowledge of this rapidly-expanding literature has, to date, been overshadowed by the work of mainstream labour economists (Ashenfelter and Card, 2010), particularly by research informed by the skill-biased technological change (SBTC) account[4]. Thanks to a few literature reviews on SBTC research (e.g. Acemoglu, 2002, Acemoglu and Autor, 2011, Bogliacino, 2014, Goos, 2018), we know a great deal about the work of mainstream economists on innovation and inequality but much too little about the work, for instance, of development studies scholars, heterodox economists, employment relations scholars, innovation scholars, geographers and sociologists.

This 'disciplinary parochialist' (Sayer, 2000*a*) perspective has several important ramifications for research and policy. Firstly, it limits the cross-fertilisation of knowledge, includ-

[2]In this paper, innovation is defined as the development of novel and socioeconomically-significant combinations of resources, which can take the form of new products, services, institutions and organisational models (Edquist, 2005, Fragkandreas, 2017).

[3]Broadly defined as *the unequal distribution of income* (Tilly, 1998, Dorling, 2019).

[4]According to this account, innovation has – for much of the 20th century – been complementary to skills in general, and the labour productivity (and thus also wages) of the skilled-labour force in particular (Card and DiNardo, 2002, Acemoglu, 2002, Van Reenen, 2011). Innovation, as SBTC scholars argue, induces inequality by increasing the wage gap between skilled and unskilled employees (Acemoglu, 2002, Van Reenen, 2011, Bogliacino, 2014, Goos, 2018). At the macro-level, the SBTC account predicts that the more technologically advanced the modern-day capitalist system becomes, the more polarising the distribution of skills and wages among workers tends to be (Autor et al., 1998, Krusell et al., 2000).

ing the formation of interdisciplinary research synergies and projects, among like-minded scholars in social sciences. Secondly, and as will be shown in this paper, it propagates assumptions about innovation and inequality that have long been found to be fundamentally misleading and fallacious in another field of study. Finally, a disciplinary perspective reduces the knowledge variety – a necessary element in designing a new generation of inequality-sensitive and inclusive innovation policies (Perez, 2013, Zehavi and Breznitz, 2017, Schot and Steinmueller, 2018, Edquist, 2019).

The present paper redresses the lack of an interdisciplinary assessment of the current stock of knowledge on innovation and inequality. It does so by identifying and reviewing, in a critical manner, 166 studies published in a broad range of journals (n=114) in the last three decades (1990-2019). A major novelty of the present review is that unlike previous reviews on the subject, which are narrative and focus exclusively on research within only a single field (e.g. Acemoglu, 2002, Acemoglu and Autor, 2011, Van Reenen, 2011, Bogliacino, 2014, Lee, 2016, Goos, 2018), the analysis in this paper is *cross-disciplinary* (i.e. synthesising knowledge from different fields), *systematic* (i.e. based on the systematic literature review method) and *causally-holistic* (i.e. utilising an original conceptual framework). All of this enables the review process to freely cross the disciplinary boundaries of knowledge and identify several overlooked aspects of causality in the relationship between innovation and inequality.

Several novel insights and critical observations emanate from the analysis. Firstly, it is shown that whilst, in *quantitative terms*, the extant research concurs that innovation induces inequality, one needs to be extremely cautious about the validity of this finding. This is due to the fact that the disciplinary origins of research (e.g. economics, development studies, sociology, etc.) and the country under investigation (e.g. US, UK, etc.) seem to affect the propensity of research to report that innovation induces inequality. Secondly, against the STBC account, which rests upon a one-dimensional perspective on causality, this review shows that there are *five main causal possibilities* through which innovation and inequality are causally-related. These are as follows: absence of causality (*Causal scenario O*); innovation induces inequality (*Causal scenario I*); inequality stimulates innovation (*Causal*

scenario II); innovation ameliorates inequality (*Causal scenario III*); inequality hampers innovation (*Causal scenario IV*). Thirdly, the analysis identifies numerous determinants (i.e. skill premiums, technological unemployment, international trade, declining union membership, geographical aspects, changing employment conditions, policy, horizontal inequalities, sectoral composition and types of innovation) that appear to be shaping (in the form of causal mechanisms) the multidimensional direction and strength of causality. Finally, and due to its critical outlook, the paper detects and challenges several prevalent assumptions and methodological practices, such as the following:

1. The lack of a sophisticated understanding of innovation as a highly uncertain, collective (multi-actor), organisation-specific and sectorally differentiated activity;

2. The widely held theoretical assumption that income acquisition is being primarily shaped by atomistic (human capital) attributes in labour markets, rather than being the primary outcome of relationally created and maintained processes that mainly occur in concrete, unequally structured organisations such as the innovative firm;

3. The widely adopted methodological practice in which the identification of a few statistically significant associations, including the absence of them, is treated as conclusive evidence of operative causal mechanisms; and

4. The easy extrapolation of the research findings on the liberal market economies (e.g. US, UK, and Canada) to the other market economies (e.g. coordinated and mixed market economies).

The analysis in this paper responds, albeit in a different manner than is customary (e.g. concrete research), to recent calls made by innovation scholars (e.g. Soete, 2013, Martin, 2016, Chaminade et al., 2018, Schot and Steinmueller, 2018, Coad et al., 2021) that inequality needs to be placed much higher on the research agenda in the field of *innovation studies*[5]. By offering an up-to-date, causally holistic analysis of the extant multidisciplinary

[5]By innovation studies, this paper refers to the half-century-old, cross-disciplinary field of research whose primary aim is to study, in a systematic manner, the nature, determinants, social and economic benefits and consequences of innovation (Fagerberg et al., 2012, Lundvall, 2013). While diverse, much innovation studies

lines of research, the paper transforms a highly fragmented body of research into a coherent guide to the current empirical stock of knowledge on innovation and inequality, whilst also suggesting several cross-disciplinary, yet consistent with the theoretical core of the field of innovation studies (Fagerberg et al., 2012, Martin, 2012, Lundvall, 2013), paths of research on a topic of increasing scientific and policy relevance.

The remainder of this paper consists of four sections. Section 2 introduces key stylised facts of inequality research, before spelling out the key dimensions of the analytical framework of this review. Section 3 discusses the key steps and procedures that this paper has followed to identify and analyse, in a systematic manner, the extant research on innovation and inequality, whereas Section 4 provides a chronological review of the literature, focusing on bibliometric issues (e.g. prolific authors, journals, disciplines, and keyword developments), causal scenarios, and explanatory themes. The paper ends with Section 5, wherein a summary of key findings, knowledge gaps, policy implications, and suggestions is provided.

2 Innovation and Inequality: Theoretical Background and Review Framework

2.1 Rising Inequality: Key Trends and Determinants

Over the past three decades, numerous studies have shown that inequality has been galloping in both developed and developing economies (e.g. Stiglitz, 2012, Piketty, 2014, OECD, 2015, Lakner and Milanovic, 2016, Milanovic, 2016). OECD data confirm that, as measured by the Gini coefficient[6], inequality has risen considerably in nearly all of the 37 OECD member states: from 0.29 in the mid-1980s to 0.315 in 2013 (OECD, 2015). Similarly, the 90/10 percentile (another widely used measure of inequality) shows that the wealthiest 10% of the population in OECD countries earned 10 times more than did the remaining 90% of

research falls into three main strands (Fagerberg et al., 2012, Lundvall, 2013): the economics of innovation strand (Fagerberg, 2003); the management and organisation of innovation strand (Tidd and Bessant, 2018); and the socioeconomic strand dealing mainly with the diffusion of innovation (Rogers, 1995), innovation (eco-)systems (Edquist, 2005, Granstrand and Holgersson, 2020) and sociotechnical systems and transitions (Geels, 2004).

[6]For an overview of the measures of inequality, see Allison (1978) and (McGregor et al., 2019).

the population in 2013 (OECD, 2015). Compared to the 1980s, this ratio has increased by 37% (ibid.). Other studies show that the top 1% of income earners (i.e. 99/1 percentile) have made unprecedented income gains (Atkinson et al., 2011, Alvaredo et al., 2013, Dorling, 2019), and this has occurred at a time when some quite old and worrisome social phenomena – such as the 'working rich', 'working poor', 'underpaid and overworked' – have been re-emerging from the dustbin of economic history (Bogliacino, 2009, Lohmann, 2009, Sayer, 2015, Pianta, 2018, Dorling, 2019).

'Why has inequality kept rising during one of the affluent periods in the history of the capitalist system?', one may rightly wonder. After all, the work of eminent economists, such as Milton Friedman's (2002) work on capitalism, as well as the public speeches of iconic conservative politicians (e.g. Margaret Thatcher and Ronald Reagan), have taught us that growing inequality is a transitory social evil on the path to economic equality in capitalist societies (Harvey, 2005, Senker, 2015, Albertson and Stepney, 2020). Similarly, Kuznets' (1955) 'inverted-U curve' hypothesis (also known as the Kuznets curve) predicts that inequality rises in the early stages of economic growth, then it peaks, before subsequently reaching a historic low (cf. Alderson and Nielsen, 2002, Stiglitz, 2012, Piketty, 2014, Milanovic, 2016).

Traditionally, social scientists – especially Marxian economists, geographers and sociologists – have approached the question of rising inequality from the standpoint of the 'class struggle' perspective (e.g. Braverman, 1974, Peet, 1975, Wright, 1994, Smith, 2010, Piketty, 2014, Papaioannou, 2016). According to this perspective, inequality is the outcome of (over-)exploitation between the two antagonistic social classes in capitalist societies, namely capitalists and labourers. Dissatisfied with the somewhat 'too abstract' and deterministic outlook of the class struggle perspective, the more recent research (circa 1990s) has sought to understand rising inequality in a more theoretically and empirically diverse manner (Neckerman and Torche, 2007, Lemieux, 2008, Vallas and Cummins, 2014, Cavanaugh and Breau, 2018). Today, inequality researchers tend to agree that income inequality is a *multidimensional* and *multi-determined* phenomenon, in the sense that it contains various interrelated forms (e.g. wealth, education, health inequality etc.) (Bourdieu, 1987, Tilly, 1998, Fragkandreas, 2012,

Dorling, 2019), as well as being shaped by various (multi-scalar) factors and forces, such as education, gender, race, international trade, immigration, declining union membership and minimum wages, financialisation, unequal organisational structures, neoliberal policies, and welfare state retrenchment (Neckerman and Torche, 2007, DiPrete, 2007, Lemieux, 2008, Donegan and Lowe, 2008, Piketty, 2014, Tomaskovic-Devey, 2014, Stockhammer, 2017, Cavanaugh and Breau, 2018, Munir, 2020).

From these factors, however, it is innovation which, according to a growing number of contributions, constitutes one of the most significant causal determinants of rising inequality in contemporary societies (e.g. Fernandez, 2001, Acemoglu, 2002, Angelini et al., 2009, Cozzens and Kaplinsky, 2009, Van Reenen, 2011, Lazonick and Mazzucato, 2013, Lee, 2016, Pianta, 2018).

2.2 Innovation and Inequality: Review Framework

How does innovation shape the distribution of income in contemporary societies? Unfortunately, due to the predominance of skill-biased technological change (SBTC) research[7], the broader academic discourse regarding innovation and inequality gives the impression that all that exists, in terms of causality, in the relationship between innovation and inequality is that the former has a significant impact on the latter through mainly the skill premiums mechanism.

However, a closer examination of the relevant (empirical) literature reveals an entirely different picture. On the one hand, and in line with the SBTC account, several studies suggest that innovation is positively associated with inequality (e.g. Krueger, 1993, Lee, 2011, Breau et al., 2014). On the other hand, and in contrast to the SBTC account, other contributions allude to the fact that innovation lessens inequality (Lundvall, 2002, Heeks et al., 2014, Antonelli and Gehringer, 2017). Yet, another line of research demonstrates that it is inequality that affects, either positively or negatively, the development of innovative

[7]For instance, in one of its reports on inequality, the OECD (2011) describes the SBTC hypothesis as the leading explanation on rising inequality in the OECD economies. Similarly, critics of the account in question point out that "[m]*any inequality scholars view skill-biased technological change...as the main cause of rising wage inequality*"(Kristal and Cohen, 2017, p.218).

activities in contemporary societies (e.g. Falkinger and Zweimüller, 1997, Tselios, 2011, Vona and Patriarca, 2011, Woodson et al., 2019). Thus, to offer an eclectic disciplinary overview of the existing empirical literature, as well as to analyse, reconcile and synthesise contradictory research findings, this paper develops an analytical framework (henceforth, *review framework*). Central to the latter are five causal scenarios, each of which has its own theoretical origin.

- *Causal scenario 0 – Absence of Causality.* Today, it is somewhat commonplace to argue that innovation is a major force behind rising rates of labour productivity, employment-creation, profitability, growth, and standards of living in general (Schumpeter, 1934, Freeman and Louçã, 2001, Pianta, 2005, Antonelli, 2009). However, this was not always the case. Neoclassical economists (e.g. Solow, 1956), for instance, had long argued that economic growth is best studied as a function of two factors: capital and labour. This view was, among others, challenged by early neoclassical growth research, particularly by Solow (1957) whose analysis of the US growth shows that the variables of capital and labour leave unexplained as much as 90% of the variance in the US growth rates. To account for this residual (also known as the *Solow residual*), innovation was introduced – initially in the form of technical change (a total factor productivity measure) – to a new generation of neoclassical growth models (Fagerberg, 1994, Antonelli, 2009). As far as the relationship between innovation and growth is concerned, neoclassical growth theory implies that rising technological intensity and inequality are two unrelated phenomena (Violante, 2008, Cozzens and Kaplinsky, 2009): innovation is assumed to be exogenous and factor-neutral, meaning that it benefits the skills, marginal productivity and average wages of all economic agents equally. Although no longer influential, the neoclassical perspective on growth raises, in the context of this study, the possibility that innovation and inequality may not always be (bi-)causally related.

- *Causal Scenario I: Innovation Induces Inequality* – According to Schumpeter's (1934) theory of economic development, innovation encompasses the development of new

products, services, organisational models and markets. In doing so, innovation creates new competences, whilst gradually destroying those that are no longer needed in the innovation process (Archibugi and Lundvall, 2001, Lundvall, 2002). When the competence-building process is socially exclusive (rather than inclusive), innovation tends to intensify existing socioeconomic inequalities, such as *horizontal (gender and racial) inequalities* (Gray et al., 1998, Asheim and Gertler, 2005, Cozzens and Kaplinsky, 2009, Juhn et al., 2014, Cheng et al., 2019, Feldman et al., 2021). In a somewhat similar manner, the skill-biased technological change (SBTC) account maintains that innovation creates and intensifies *skill premiums*, i.e. the wage gap among skilled and less skilled employees (Acemoglu, 2002, Violante, 2008), whilst the more recent version of the SBTC account (i.e. task or routine-biased technological change account) argues that innovation leads to income polarisation through both skill premiums and *technological unemployment*; for instance, by replacing highly-routinised job tasks with artificial intelligence and robots (Autor et al., 2003, 2008, Brynjolfsson and McAfee, 2012, Frey and Osborne, 2017, Goos, 2018, Pianta, 2018, 2020, Cirillo et al., 2021). Furthermore, due to its highly uncertain and failure-prone character (Schumpeter, 1934, Kline and Rosenberg, 1986), innovation can embed an unequal distribution of risks and rewards (Lazonick and Mazzucato, 2013). Thus, when the costs of innovation are collectively undertaken (e.g. state, universities, research institutes), but the benefits of innovation are mainly distributed within the boundaries of the innovative firm (e.g. shareholders, top executives and employees), innovation can lead to (top) income inequality (Lazonick and Mazzucato, 2013, Bapuji, 2015, Aghion et al., 2019, Tomaskovic-Devey and Avent-Holt, 2019, Munir, 2020).

- *Causal scenario II – Inequality Stimulates Innovation*. The idea that inequality shapes the nature and direction of innovative activity has a very long intellectual pedigree in social science. For instance, Karl Marx's (1999) work on social classes, Thorstein Veblen's (1899/2009) analysis of the leisure class, Werner Sombart's (1967) theory of economic development, and, more recently, Pierre Bourdieu's (1987) work on social distinction underline that inequality has a profound effect on innovation and economic

development in general. In a somewhat similar manner, neoclassical economists have long believed that inequality provides strong incentives for economic agents (i.e. incentive thesis) to do the 'right things', such as to work harder (e.g. productivity gains) and to engage in growth-boosting (Schumpeterian) activities such as innovation and entrepreneurship (Falkinger and Zweimüller, 1997, Samuelson, 2010, Sayer, 2015, Xavier-Oliveira et al., 2015, Stiglitz, 2012). Therefore, in theory, it is not only innovation that shapes the distribution of income but also the latter that moulds the former.

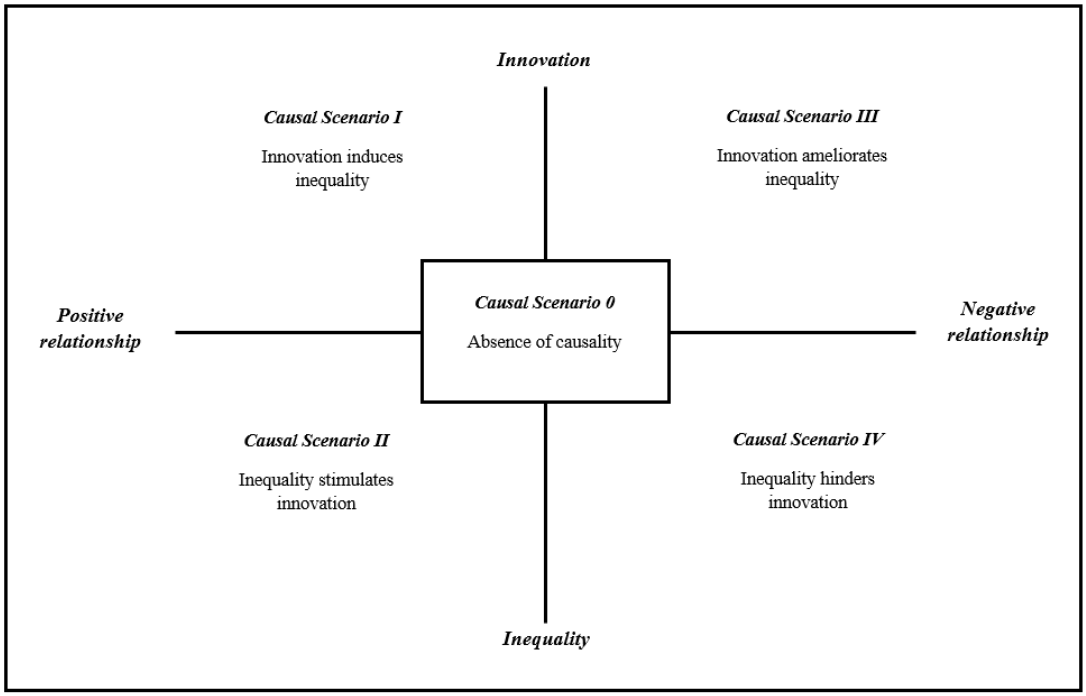
- *Causal scenario III – Innovation Ameliorates Inequality*. Traditionally, innovation has been associated with increased standards of living and economic equality (Schumpeter, 1934, Kuznets, 1955, Freeman, 2001, Freeman and Louçã, 2001). For instance, in the Golden (Fordist) Age of capitalism (between the 1940s and the 1970s), innovation-driven growth led to a significant reduction in (male) unemployment and inequality rates (Freeman, 2001, Pianta, 2005, Cozzens and Kaplinsky, 2009, Atkinson et al., 2011). Due to its creative nature, innovation requires the creation of new competences (Archibugi and Lundvall, 2001, Lundvall, 2002). When the competence-building process involves marginalised social groups and actors, innovation can mitigate existing horizontal inequalities (Freeman, 2001, Lundvall, 2002, Arndt et al., 2009, Cozzens and Kaplinsky, 2009, Heeks et al., 2014). In addition, by being a creative destructive process (Schumpeter, 1944), innovation undermines the nature of wealth inequality, whilst also fostering social mobility, such as when innovators and entrepreneurs belong to marginalised social groups (Heeks et al., 2014, Antonelli and Gehringer, 2017, Kim and De Moor, 2017). Thus, as with the previous causal scenarios, innovation can mitigate inequality through various causal mechanisms and processes.

- *Causal scenario IV – Inequality Hinders Innovation.* In line with Adam Smith's (1776/1982) theory of the division of labour, Schumpeter's (1934) theory of economic development assumes that the entrepreneurial act of innovation reduces inequality and poverty in capitalist societies over time (Freeman, 1994, 2001, Antonelli

and Gehringer, 2017). However, in his subsequent work, and echoing the work of Marx (1999) and Veblen (1899/2009), Schumpeter (1944) argues that innovation reinforces existing socioeconomic inequalities in capitalist societies. Schumpeter goes as far as to claim that, if unabated, rising inequality erodes the institutional foundations of long-term economic growth in capitalist societies, potentially leading to the displacement of capitalism by socialism (Elliott, 1980, Henrekson and Jakobsson, 2001, Fagerberg, 2003). Rising inequality engenders crime and corruption, both of which can, over time, transform inclusive institutions into extractive ones (Neckerman and Torche, 2007, Acemoglu and Robinson, 2012, Stiglitz, 2012). The latter can reinforce the significance of certain forms of social capital (e.g. bonding social capital), thus prohibiting the formation of alternative forms of social capital (e.g. bridging social capital) among socially and cognitively diverse actors in the innovation process (Archibugi and Lundvall, 2001, Nielsen, 2003, Fragkandreas, 2012, Barnes and Mattsson, 2016). Furthermore, by reducing the overall demand for new products and services (Falkinger and Zweimüller, 1997, Jung et al., 2018), whilst also increasing social costs (e.g. tensions and frictions) among affluent and less affluent social groups (Cozzens and Kaplinsky, 2009, Juma, 2016), inequality can hinder the adoption of socially desirable radical innovations (e.g. COVID-19 vaccines), sustainable technological transitions and structural change in general (Freeman, 2001, Geels, 2004, Cozzens and Kaplinsky, 2009, Riaz, 2015).

Figure 1 provides a graphical representation of the review framework. The remainder of this paper utilises this framework as a guide to analyse and synthesise the findings of the existing research on innovation and inequality.

Figure 1: Innovation and Inequality – Review Framework



3 Review Method, Sample and Analysis

3.1 Systematic Literature Review

As mentioned in the introductory section, there exists a large body of research on innovation and inequality in various fields of social science. This, in turn, begs the following methodological question: how can one identify, select and critically review the most relevant studies on innovation and inequality? To address this question, this paper adopts the *systematic literature review* (SLR) method (Tranfield et al., 2003, Petticrew and Roberts, 2008).

Originally used in medical studies, the SLR method is increasingly being adopted in social sciences (Tranfield et al., 2003, Petticrew and Roberts, 2008, Haddaway et al., 2015). As far innovation research is concerned, SLRs have recently emerged as the the 'methodological norm' when it comes to reviewing the current stock of knowledge on innovation (e.g. Martin, 2012, Doloreux and Porto Gomez, 2017, Compagnucci and Spigarelli, 2020, Kalantaridis and Küttim, 2021). Like traditional (narrative) reviews, SLRs summarise and synthesise the current state of knowledge in a given research topic or field, as well as iden-

tifying key weaknesses and opportunities for further research (Tranfield et al., 2003, Weed, 2005, Petticrew and Roberts, 2008, Randolph, 2009). However, and in contrast to narrative reviews, wherein the analytical steps and procedures do not need to be documented, SLRs state in a clear manner the various stages, sampling criteria and method of analysis (Tranfield et al., 2003, Weed, 2005, Petticrew and Roberts, 2008, Haddaway et al., 2015).

Furthermore, and in contrast to other review methods (e.g. meta-nalysis and meta-interpretive or ethnographic reviews), in which the underlying emphasis is on either quantitative or qualitative research (Weed, 2005, Randolph, 2009, Brannan et al., 2017), SLRs often incorporate the findings of both quantitative (*extensive*) and qualitative (*intensive*) studies[8] (Doloreux and Porto Gomez, 2017, Compagnucci and Spigarelli, 2020). Due to their underlying methodological procedures, SLRs can review a much larger number of studies than can narrative reviews, albeit not in an entirely neutral manner (as the work of SLR practitioners implies) (Tranfield et al., 2003, Petticrew and Roberts, 2008). As is the case with any form of scientific analysis, SLRs are *theory-laden* (Sayer, 2000*b*, Bhaskar, 2008); thus, their relevance and contribution are contingent upon the theoretical perspective that one takes. Due to their eclectic nature, a major challenge that SLRs often face is how to synthesise key insights from a very large corpus of studies, especially when the findings are contradictory (Petticrew and Roberts, 2008). To overcome this challenge, this paper uses the review framework as the overall guide to the analysis.

3.2 Review Sample: Collection and Analysis

The data in this SLR consist of 166 studies (henceforth, *review sample*[9]) that were published in 114 journals in the last three decades (1990[10]-2019). The review sample was identified through an iterative search in the Scopus database (`https://www.scopus.com/`). This database was chosen because it contains 50 % more entries than do other popular scholarly

[8]Following Sayer (2000*b*) and other critical realist social scientists (e.g. Danermark et al., 2002), this paper refers to qualitative research (e.g. grounded theory, case study research, ethnography, discourse analysis, etc.) as *intensive*, and to quantitative research (e.g. econometrics, advanced inferential statistics) as *extensive*. In the critical realist tradition, intensive and extensive research are seen as being both distinct and complementary (e.g. mixed method research) (Downward and Mearman, 2007).

[9]For a detailed overview of the sample, see Appendix A.

[10]This is based on the earliest observation in the data.

databases (e.g. Web of Science). A set of keywords was used (in the form of a Boolean equation) to identify the most relevant contributions. These included the following: innovation, technology, technological change, income, wage or earning(s) inequality, poverty, income distribution and distribution of income, wages and/or earnings. The first search, which was performed in the summer of 2019, identified 1,832 contributions. After excluding conference papers, papers published in predatory journals[11], conceptual (including formal, mathematical modelling) papers, reviews, book chapters and editorials, as well as after scrutinising the abstract section of each study for false positives (i.e. articles containing keywords that are relevant but not directly related to the subject), 166 peer-reviewed studies[12] met the following three inclusion criteria: being an empirical study (*1st inclusion criterion*), published in English (*2nd inclusion criterion*), and available in a digital form (e.g. PDF) (*3rd inclusion criterion*).

In line with recent reviews on innovation (Doloreux and Porto Gomez, 2017, Compagnucci and Spigarelli, 2020), the review sample was analysed in a systematic manner by using a *coding template* (see Table 1). The latter consists of 11 codes. The first six codes (A to F) were developed in the early stages of the review (i.e. *a priori coding*), whereas the rest of the codes (G to M) emerged from the analysis (i.e. *bottom-up coding*) in the more mature stages of the review (King and Brooks, 2017). To establish the construct validity (Yin, 2009, p.34) of the coding template, three independent researchers were asked to use the coding scheme to analyse a sample of 6 studies. As illustrated in Table 1, a very high score of inter-coder reliability was achieved. Finally, following Cooper's (1988) taxonomy of literature reviews, the findings of this review are discussed in a *chronological* way. As will be shown in the next section, a chronological perspective offers a comparatively rich understanding of the disciplinary origins, development and major findings of three decades of research on innovation and inequality.

[11]To do so, a list of predatory journals was used, which was retrieved from the following link: `https://predatoryjournals.net/` (accessed in September 2020).

[12]The sole focus on peer-reviewed studies is based on the assumption that peer-reviewed published studies often yield reliable and novel findings by applying advanced methodological standards (see also Biggi and Giuliani, 2021).

Table 1: Coding Template

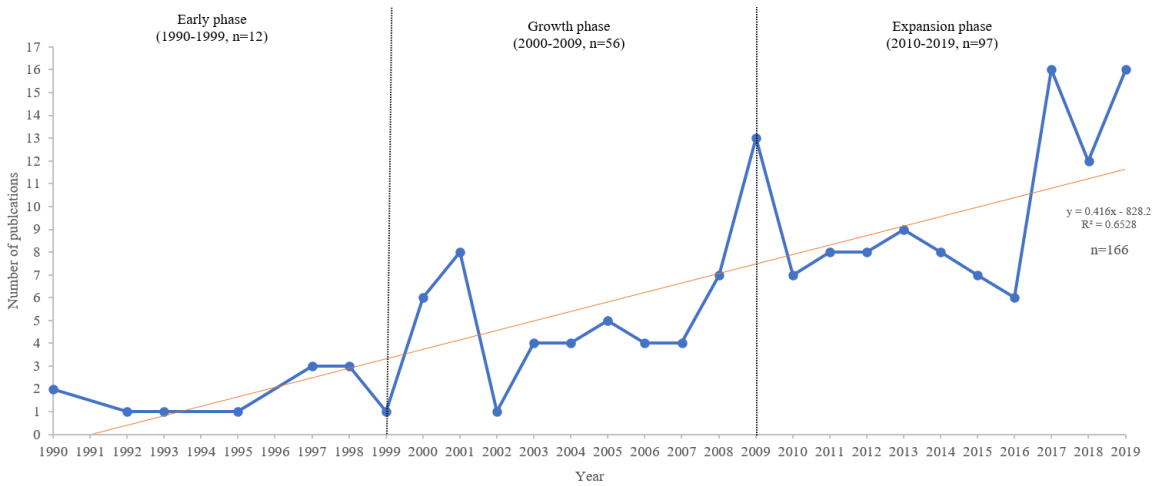
Code	Label	Description	Illustration based on Aghion et al. (2019)	Intercoder agreement (%) *
A	Author(s)	Full name of author(s)	Philippe Aghion, Ufuk Akcigit, Antonin Bergeaud, Richard Blundell and David Hemous	100
B	Year	Year of publication	2019	100
C	Title	Title of publication	Innovation and Top Income Inequality	100
D	Journal	Journal of publication	Review of Economic Studies	100
E	Field	Primary field(s) to which the journal belongs (based on the journal's description)	Economics: *"The Review of Economic Studies is a quarterly peer-reviewed academic journal covering economics."* (source: https://www.restud.com/)	100
F	Keywords	Authors' keywords	Top Income, Inequality, Innovation, Patenting, Citations, Social Mobility, Incumbents, Entrant	100
G	Research context	Country	United States	100
H	Primary research unit	Individuals, employees, households, firms, sectors, cities, regions, countries	Individuals, metropolitan regions: "*we use cross-state panel and cross-U.S. commuting-zone data*"(Aghion et al., 2019, p.1)	100
I	Research design	Extensive (quantitative) research, intensive (qualitative) research or mixed (both)	Extensive (regression): "*We start our empirical analysis by exploring correlations between innovation and various measures of inequality using OLS regressions.* (Aghion et al., 2019, p.3)"	100
J	Measure of innovation	Patent intensity, R&D investments, types of innovation, etc.	Patents: "*In our empirical analysis, we shall regress top income shares on innovation. Our innovation measure is based on the number of patents per capita* (Aghion et al., 2019, p.2)"	100
K	Measure of inequality	Gini index, Theil index, percentiles, etc.	Percentiles, Gini, Atkinson index:"*Percentiles are computed from the national income distribution*." (Aghion et al., 2019, p.38)	100
L	Causal scenario	There is no causal relationship (Causal scenario 0), innovation induces inequality (Causal scenario I), inequality is positively associated with innovation (Causal scenario II), innovation ameliorates inequality (Causal scenario III), inequality affects innovation negatively (Causal scenario IV)	Causal scenario I: "*we found a positive and significant correlation between innovation and top income inequality*" (Aghion et al., 2019, p.41)	100
M	Explanatory factor(s)	Key factors and determinants that explain the direction of causality	"*entrants' and incumbents' innovation increase top income inequality*" (Aghion et al., 2019, p.2)	100
			Average intercoder agreement	100

* average score based on the assessment of three intercoders
Source: own elaboration, Scopus

4 Innovation and Inequality Research: Chronological Review

One of the earliest observations in this review was that the number of published studies on innovation and inequality has, on average, risen by 220% every 10 years (Figure 2). Even though this number suggests that research on innovation and inequality is growing at a much faster pace than that of research on other topics[13], the growth in published research, however, did not occur in a linear manner. For instance, while seven studies were published in 2001, this number drops to one study merely one year later. Similarly, 12 studies were published in 2009, before this figure fell to six studies in 2010. To capture the 'ebbs and flows' of research on innovation and inequality, the analysis distinguishes between three main research phases: the ***early phase*** (1990-1999), the ***growth phase*** (2000-2009), and the ***expansion phase*** (2010-2019). The remainder of this section looks more closely into each phase, focusing on key aspects of research such as bibliometric issues, fields of research, causal scenarios and explanatory themes.

Figure 2: Publications by Year



[13]For instance, bibliometric studies show that the number of published research doubles in size every 10-15 years (Bornmann and Mutz, 2015).

4.1 Early Phase (1990-1999)

Bibliometric Insights In the early phase, and unlike the subsequent two phases, research on innovation and inequality was extremely sparse, with less than one published study per year (Table 2). The paucity of research on innovation and inequality in the early phase reflects key events and developments in the domains of academia, economy and policy. For instance, the advent of free-market capitalism (in short, *neoliberalism*) as the dominant policy paradigm in the 1980s and 1990s systematically favoured academic discourses and theoretical perspectives that glorify the benefits of extensive economic growth (Harvey, 2005, Smith, 2010, Senker, 2015, Fotaki and Prasad, 2015, Albertson and Stepney, 2020), whereas the negative consequences of growth – such as rising inequality, social exclusion, mental health problems due to job insecurity, excessive wealth concentration and environmental degradation (Pickett and Wilkinson, 2010, Breau and Essletzbichler, 2013, Sayer, 2015, Biggi and Giuliani, 2021) – were seen as secondary evils that sooner or later will be addressed, in the most efficient manner possible, through the undisturbed operation of (global) markets (Harvey, 2005, Fotaki and Prasad, 2015, Senker, 2015, Albertson and Stepney, 2020). In this context, rising inequality was, initially, seen as a temporary anomaly of the liberal market economies of the US and UK, rather than a general socioeconomic challenge that equally concerns all market economies (Freeman, 2001, Hall and Soskice, 2001, Lundvall, 2002, Piketty, 2014, Dorling, 2019).

Research in the 1990s was ascetic, being mainly based on single author contributions. While single-author contributions were endemic to published research on innovation in the 1990s (see, for instance, Table 1 in Martin, 2012), the early work has been highly cited (302 citations per study). The three most cited studies (i.e. Krueger, 1993, Bernard and Jensen, 1997, Bresnahan, 1999) were published in (mainstream) economic journals[14]. Although the number of citations is, by no means, a reliable indication of scholarly novelty and quality (Macdonald and Kam, 2011, MacRoberts and MacRoberts, 2018), it implies, nonetheless, that mainstream economic research has, in one way or another, been highly

[14]To distinguish between mainstream and heterodox economic journals, Cronin's (2020) list of economic journals was used (also available at `https://www.hetecon.net/resources/journal-rankings/`)

influential, constituting either an impetus for further research or an object of critique (e.g. Card and DiNardo, 2002, Autor et al., 2008, Lazonick and Mazzucato, 2013, Avent-Holt and Tomaskovic-Devey, 2014, Hanley, 2014). However, as is shown in Table 2, development studies scholars and employment relations scholars were also very active in the 1990s. Thus, unlike previous stock-taking assessments (e.g. Acemoglu, 2002, Acemoglu and Autor, 2011), which give the impression that it is only mainstream labour economists who have investigated the relationship between technological innovation and inequality, research appears to have, from the outset, been significantly more discipline-diverse than previously thought.

Table 2: Early Phase

	1990-1999 (n=12)
Number of published studies per year	0,83
Number of authors per study	1,04
Citations per study*	305
Percentage of studies reporting financial support	16
Most active donors by country	National Science Foundation, Dutch Research Council (NWO)
Affiliation (country) of most authors	US, UK, Netherlands, Germany, Japan
Most used keywords	Income distribution, income inequality, technological change, labour market, Europe, Asia
Journals	Agricultural Economics, Economic Journal, Economics of Innovation and New Technology, Journal of International Economics, Metroeconomica, National Institute Economic Review, Quarterly Journal of Economics, Review of Radical Political Economics, Work and Occupations, World Development
Most active fields	Economics, development studies, employment relations
Popular research context	US, UK
Most used research design	Extensive
Most used unit of analysis	Employees, individuals, sectors, countries
Most used measure(s) of innovation	Computer usage, R&D intensity, specific technologies
Most used measure(s) of inequality	Percentiles, Gini index, wage gap
Most observed causal scenarios	Innovation induces inequality (*Causal scenario I*), absence of causality (*Causal scenario O*), innovation reduces inequality (*Causal scenario III*), inequality positively affects innovation (*Causal scenario II*)
Recurrent explanatory factors	*Skill premiums* (Krueger, 1993, Bernard and Jensen, 1997, Bresnahan, 1999)

* based on Google Scholar, July 2020
Source: own elaboration, Scopus

Research Context, Design, Measures and Units of Analysis More than 60% of all studies in the 1990s were concerned with the US and UK (Krueger, 1993, Chennells and Reenen, 1998, Bresnahan, 1999), whereas 40% of all studies examined a few developing countries such as Indonesia (James and Khan, 1998), Nepal (Thapa et al., 1992) and the Philippines (Otsuka et al., 1990). The focus on the US and the UK can be associated with the fact that most researchers are affiliated with academic organisations in these countries. Innovation was gauged by using narrow measures (e.g. computer usage and R&D intensity) (Krueger, 1993, Machin, 1998), and inequality by utilising the following measures: percentiles, Gini index, and wage gaps (e.g. Thapa et al., 1992, Krueger, 1993, Machin, 1998). More than 92% of studies were extensive, using econometrics and advanced inferential methods, with only one study (Gray et al., 1998), which was published in a heterodox economic journal (*Review of Radical Political Economics*), using a mixed-method research design. Although no specific methodological reason is stated in all studies under review for the wide use of extensive research designs, this could, arguably, be linked to the fact that 75% of all studies in the 1990s were published in economic journals[15]. Employees and individuals are the primary unit of analysis, followed by sectors and countries (cross-country analysis). This, among other things, reveals that, since the beginning, researchers have assumed that the relationship between innovation and inequality is a multilevel one.

Causal Scenarios and Explanatory Factors The majority of studies (approximately 58%) find that innovation induces inequality (*Causal Scenario I*) (e.g. Krueger, 1993, Bresnahan, 1999), while 25% opined that there is no causal connection between innovation and inequality (*Causal scenario 0*)(e.g. Colclough and Tolbert, 1990, Otsuka et al., 1990, Freebairn, 1995). The remaining studies (17 %) imply either that inequality can positively affect innovation (*Causal scenario II*) (e.g. Falkinger and Zweimüller, 1997) or that innovation reduces inequality (*Causal scenario III*) (e.g. James and Khan, 1998).

Causal Scenario I is mainly attributed to the skill-biased character of technological inno-

[15]It goes without saying that, unlike the work of classical economists, including the work of other influential economists (e.g. Thorstein Veblen, Werner Sombart, Max Weber, Joseph Schumpeter), modern economists – regardless of being mainstream or heterodox – believe, in one way or another, that econometrics is the most *scientifically legitimate* method to study the economic world (Lawson, 1997, Lazear, 2000, Louçã, 2007).

vation in general, and to the skill premium mechanism in particular (Krueger, 1993, Bernard and Jensen, 1997, Chennells and Reenen, 1998, Bresnahan, 1999). Krueger (1993), for instance, provides evidence suggesting that US workers who use computers at work earn, on average, 10 to 15% higher wages. Regarding the possibility that innovation and inequality are not causally related (*Causal scenario 0*), which is the second most popular in the early phase, research does not identify recurrent explanatory factors.

Nonetheless, studies falling to Causal scenario 0 raise some interesting questions about the skill-biased technological change hypothesis. For instance, Bernard and Jensen (1997) provide firm-based evidence confirming that while international trade has increased the demand for white-collar labour in US manufacturing plants, it had no significant impact on the wage gap among white and blue-collar workers (see also Machin, 1998). Additionally, the analysis of Colclough and Tolbert (1990) raises the possibility that the skill-biased character of technological change may favour the skills, marginal productivity and wages of privileged social groups and actors (e.g. educated, native white men) (see also Echeverri-Carroll et al., 2018, ten Berge and Tomaskovic-Devey, 2021). As will be shown throughout this review, economic studies have paid very little attention to the horizontally-biased (i.e. gender and racially biased) character of skill premiums.

4.2 Growth Phase (2000-2009)

Bibliometric Insights As is the case with the early phase, research in the growth phase consists mainly of single-authored publications: 1.1 authors per study (Table 3). However, unlike the early phase, the amount of published studies per year increased tremendously: from 0.8 studies per year to 5.6 studies per year. This can, among other issues, be attributed to a growing interest in the causes and consequences of rising inequality (Neckerman and Torche, 2007, Kim and Sakamoto, 2008, Pickett and Wilkinson, 2010, Cavanaugh and Breau, 2018). Similarly, vivid discussions among mainstream labour economists with regard to the skill-biased character of technological innovation (e.g. Krusell et al., 2000, Card and DiNardo, 2002, Autor et al., 2008), including debates surrounding the impact of international trade and declining union membership upon inequality (Belman and Monaco,

2001, Card and DiNardo, 2002, Autor et al., 2003, Mosher, 2007, Adams, 2008, Autor et al., 2008, Meschi and Vivarelli, 2009), prompted further research on innovation and inequality in the growth phase.

Regarding fields, no significant change was observed other than that the field of employment relations is the second most active, whilst the fields of economics and development studies are first and third, respectively. This disciplinary division of research is also reflected in the most popular journals in the period under consideration (e.g. World Development, Journal of Development Economics, Industrial Relations, Labour, Economics of Transition, International Review of Applied Economics, Review of Economics and Statistics, and Industrial and Labor Relations Review). Thus, as is the case with research in the early phase, it is mainly non-economic journals that provided important fora for researchers on innovation and inequality in the growth phase.

Table 3: Growth Phase

	2000-2009 (n=56)
Number of published studies per year	5.6
Number of authors per study	1.1
Citations per study (Google Scholar, July 2020)	219
Percentage of studies reported financial support	14.3
Most active non-academic donor (country)	National Science Foundation (US), Deutsche Forschungsgemeinschaft (Germany)
Affiliation (country) of most authors	US, UK, Canada, Italy, Germany, Portugal, China, Japan and South Korea
Recurrent keywords	Income distribution, technological change, United States, North America, skilled labour, labour market, wage gap, wage inequality, wages, innovation
Most preferred journals	World Development, Journal of Development Economics, Industrial Relations, Labour, Economics of Transition, International Review of Applied Economics (HE), Review of Economics and Statistics, Industrial and Labor Relations Review
Most active fields	Economics, employment relations, development studies,
Most chosen research context	US, UK, cross-country, Canada, Germany
Popular research designs	Extensive, mixed
Most preferred units of analysis	Individuals, sectors, countries, employees, firms
Most used measure(s) of innovation	Latent variable, computer usage/intensity, R&D expenditure, technology, product and process innovation, exports
Most used measure(s) of inequality	Percentiles, Gini index, income and wage gaps, Theil index
Causal scenarios	Innovation induces inequality (*Causal scenario I*), absence of causality (*Causal scenario O*), inequality positively affects innovation (*Causal scenario II*), innovation reduces inequality (*Causal scenario III*), inequality hinders innovation (*Causal scenario IV*)
Recurrent explanatory factors	*Skill premiums* (Krusell et al., 2000, Fernandez, 2001), *international trade* (Baldwin and Cain, 2000, Attanasio et al., 2004, Choi and Jeong, 2005, Xu and Li, 2008), *geographical aspects* (e.g. Pastor and Marcelli, 2000, Wheeler, 2005, Hudson, 2006, Taylor, 2006, Kijima, 2006, Echeverri-Carroll and Ayala, 2009), *horizontal inequality* (e.g. Mukhopadhyay and Nandi, 2007), *innovation policy* (e.g. Langer, 2001, Cozzens et al., 2002, Attanasio et al., 2004, Hudson, 2006, Donegan and Lowe, 2008, Weinhold and Nair-Reichert, 2009), *declining union membership* (e.g. Belman and Monaco, 2001, Mosher, 2007), *digital gaps* (e.g. Gibson, 2003, Chakraborty and Bosman, 2005, Fuchs, 2009), *organisational practices* (Black et al., 2004, Handel and Gittleman, 2004)

* based on Google Scholar, July 2020
Source: own elaboration, Scopus

Research Context, Design, Measures and Units of Analysis Research in the 2000s examined several countries such as *Australia* (e.g. Gibson, 2003), *China* (Wei et al., 2001), *Chile* (Álvarez and López, 2009), *Colombia* (e.g. Attanasio et al., 2004), *India* (e.g. Kijima, 2006), *Germany* (e.g. Dustmann et al., 2009), *Mexico* (e.g. Esquivel and Rodrıguez-López, 2003), *the Netherlands* (Bruinshoofd et al., 2001*a*) and *South Korea* (Xu and Li, 2008). However, it was the Anglo-Saxon trinity (i.e. US, UK and Canada) that was central to the analysis in most studies (55% of all studies). Like in the early phase, this could be related to the affiliation of authors, including the location of the most active funding donors (see Table 3).

The great majority of studies (i.e. 95%) were extensive, with the remaining studies (5%) using a mixed-method design (e.g. Cozzens et al., 2002, Mukhopadhyay and Nandi, 2007). As with research in the early phase, no study adopts an intensive research design such as grounded theory, case study research and/or ethnography. This, among other issues, implies that the great majority of researchers in the growth phase see extensive research as ideal in distinguishing what is causal from what it is not in the relationship between innovation and inequality. As will be discussed in the concluding section of this paper, the methodological monopoly of extensive research has a number of crucial epistemological consequences for both explanatory research and policy design.

One out of three studies (34%) analyses micro units (e.g. individuals and employees) (e.g. Krusell et al., 2000, McCall, 2000, Englehardt, 2009), while the remainder (64%) focuses on the meso level (e.g. sectors, firms, cities and villages) and/or the macro level (e.g. countries) (e.g. Kijima, 2006, Bogliacino, 2009, Echeverri-Carroll and Ayala, 2009, Fuchs, 2009, Weinhold and Nair-Reichert, 2009). Thus, unlike research in the 1990s, the more recent research has used sectors and firms as the primary unit of analysis. One possible explanation for this is the availability of firm-level and sectoral data in the 2000s due to the wide circulation of international (firm-based) surveys on innovation (e.g. Community Innovation Survey) (Smith, 2005, Hong et al., 2012). Nonetheless, innovation is measured in a narrow manner (e.g. *computer usage, R&D intensity, patents*) (e.g. Xu and Li, 2008, Weinhold and Nair-Reichert, 2009), with only a very small portion of studies using alternative

measures such as the percentage of *high-tech employment* (e.g. McCall, 2000, MacPhail, 2000), *indicators of product and process innovation* (e.g. Angelini et al., 2009, Bogliacino, 2009). Additionally, and in line with several studies in the early phase, 25% of all studies treated innovation either as a *latent* (background) causal factor (e.g. Wheeler, 2005, Kim and Sakamoto, 2008, Xu and Li, 2008, Dustmann et al., 2009) or as *export intensity* (e.g. Meschi and Vivarelli, 2009). However, since these measures explain very little about the actual nature of innovation (Smith, 2005), several questions are raised as to the construct validity and explanatory power of research in the growth phase.

Regarding the measurement of inequality, *percentiles* (e.g. Cozzens et al., 2002, Kijima, 2006, Borghans and Ter Weel, 2007), the *Gini index* (e.g. Langer, 2001, Kim and Sakamoto, 2008, Adams, 2008), *income and wage gaps* (Krusell et al., 2000, McCall, 2000, Bogliacino, 2009) were used widely. The *Theil index* was also used in some studies (e.g. Cozzens, 2003, Meschi and Vivarelli, 2009), either on its own or in conjunction with other measures, mainly for robustness check purposes.

Causal Scenarios and Explanatory Factors In line with research in the early phase, 70% of all studies in the expansion phase confirm that innovation induces inequality (*Causal scenario I*) (e.g. Krusell et al., 2000, Bogliacino, 2009, Echeverri-Carroll and Ayala, 2009, Wheeler, 2005), whereas the remaining 30% is divided between the rest four causal possibilities: 9% suggest that there is no causality between innovation and inequality (*Causal scenario O*) (e.g. Brown and Campbell, 2001, Handel and Gittleman, 2004, Belman and Levine, 2004); 8 % of studies point out that inequality has a positive impact on innovation (*Causal scenario II*) (e.g. Chakraborty and Bosman, 2005, Englehardt, 2009); 8 % has a negative effect on innovation (*Causal scenario IV*); lastly, 5% opine that innovation lessens inequality (e.g. Gibson, 2003, Martin and Robinson, 2007, Mukhopadhyay and Nandi, 2007). In short, as is the case with research in the early phase, the great majority of studies in the growth phase suggest that innovation induces inequality.

Regarding explanatory factors, *Causal Scenario I* is mainly attributed to skill premiums due to technological innovation (e.g. Krusell et al., 2000, Wheeler, 2005, Commander and

Kollo, 2008, Englehardt, 2009), whereas another much smaller, albeit highly cited, number of studies propose and substantiate empirically the task-biased version of the skill-biased technological change hypothesis, wherein innovation leads to income polarisation through the skill premiums and technological unemployment mechanisms (e.g. Autor et al., 2003, 2008). Another strand of research suggests that skill-premiums are sector-specific (e.g. high-tech sectors) and geographically confined, particularly occurring mostly in high-tech sectors and regions (Cozzens, 2003, Wheeler, 2005, Florida, 2007, Angelini et al., 2009, Bogliacino, 2009, Doussard et al., 2009, Echeverri-Carroll and Ayala, 2009). For instance, Echeverri-Carroll and Ayala (2009) find that employees in US cities with a high-tech industry earn, on average, 17% higher salaries than employees in other regions.

Other studies examine the interaction between skills and international trade in both developed and developing countries (Haskel and Slaughter, 2001, Esquivel and Rodrıguez-López, 2003, Attanasio et al., 2004, Baldwin and Cain, 2000, Kijima, 2006, Xu and Li, 2008, Bogliacino, 2009, Meschi and Vivarelli, 2009). The findings of these studies lead to two contradictory conclusions. On the one hand, it is skill-biased technological change, rather than international trade per se, that leads to inequality via the skill premiums mechanism (e.g. Commander and Kollo, 2008). On the other hand, it is the complementary dynamics between innovation, international trade and organisational factors (e.g. the ownership structure of innovative firms) that trigger export-induced skill premiums (e.g. Xu and Li, 2008, Bogliacino, 2009).

In addition to the above, non-economic studies show that skill premiums have a strong horizontal dimension (MacPhail, 2000, Fernandez, 2001, Taylor, 2006). Fernandez (2001), for instance, found that the adoption of technological innovation in a US food firm led to "*greater racial inequalities in wages*" (Fernandez, 2001, p.273). Another line of research raises the possibility that skill premiums may also be induced by non-market forces such as policies, especially by policies (a) aimed at boosting high-tech employment and growth in regions (Cozzens et al., 2002, Mukhopadhyay and Nandi, 2007), or (b) reinforcing the intellectual property rights regime (Adams, 2008, Arndt et al., 2009). A relatively small number of mainly employment relations studies (Belman and Monaco, 2001, Brown and

Campbell, 2001, Black et al., 2004, Handel and Gittleman, 2004, Mosher, 2007, Doussard et al., 2009) underline that the ability of innovation to induce inequality is subject to both institutional (e.g. declining union membership and collective wage bargaining) and organisational factors (e.g. new employment practices). Belman and Monaco (2001), for instance, showed that thanks to labour market deregulation, the use of advanced technologies (e.g. satellite communication systems) led to a reduction of 21% in the wages of US truck drivers in the 1990s. Lastly, Black et al. (2004) find that new flexible employment practices (e.g. job rotation) are associated with lower employment reductions but higher wage inequality (cf. Handel and Gittleman, 2004).

Regarding the second most observed causal possibility (i.e. absence of causality), *Causal scenario O*), research in the growth phase provides no clear insight in terms of recurrent explanatory factors. Nonetheless, some of these studies offer a few interesting insights regarding the explanatory validity of the skill premiums hypothesis. For instance, Kim and Sakamoto (2008) find in their analysis of the US manufacturing industries that the adoption of radical technological innovation at work increased wage inequality but not labour productivity as the skill-biased technological change account assumes (Acemoglu and Autor, 2011); in short, skill premiums do not necessarily reflect human capital factors such as higher labour productivity (see also Hanley, 2014, Tomaskovic-Devey and Avent-Holt, 2019). Other studies (Mishel and Bernstein, 2003, Borghans and Ter Weel, 2007, Xu and Li, 2008) suggest that, since wage inequality has not risen to the same extent in all countries (e.g. OECD, 2015, Kawaguchi and Mori, 2016), the inequality-inducing abilities of innovation (e.g. skill premiums and technological unemployment) seem to be significantly curtailed by non-market factors such as employment strategies, organisational structures and national institutional arrangements (e.g. Card and DiNardo, 2002, Belman and Levine, 2004, Goos et al., 2014, Hanley, 2014, Boyer, 2015, Kawaguchi and Mori, 2016, Croce and Ghignoni, 2020, Tomaskovic-Devey and Avent-Holt, 2019).

Regarding the remaining causal possibilities, namely that inequality stimulates innovation (*Causal scenario II*), inequality hinders innovation (*Causal scenario IV*) and innovation reduces inequality (*Causal scenario III*), research in the growth phase is not that illuminat-

ing. An exception is that of a few studies that investigate the relationship between existing socioeconomic inequality and the diffusion of innovation (e.g. Gibson, 2003, Chakraborty and Bosman, 2005, Martin and Robinson, 2007). According to this (mainly non-economic) line of research, existing horizontal inequalities adversely affect the ability of marginalised actors to participate in and take advantage of (digital) innovation activities (Gibson, 2003, Cozzens and Kaplinsky, 2009, Fuchs, 2009, Vona and Patriarca, 2011). Gibson (2003), for instance, examines the use of ICTs in Australia. Using data gathered by Australia's national census, the author identifies a significant digital gap among households and territories in Australia. Similarly, like Martin and Robinson's (2007) analysis in the US, as well as Mendonça et al.'s (2015) analysis in Portugal, Chakraborty and Bosman (2005) indicate that digital inequality has a persistent horizontal dimension in the US: "*while income inequalities among PC owners (households) decreased between 1994 and 2001 in all regions and states, the magnitude of this inequality has declined more rapidly among white households compared to African Americans*" (Chakraborty and Bosman, 2005, p.395).

Overall, research in the growth phase identifies several recurrent explanatory factors in most causal scenarios. As will be shown shortly, research in the expansion phase has, in general, moved along similar lines.

4.3 Expansion Phase (2010-2019)

Bibliometric Insights Like the growth phase, the expansion phase exhibits a significant increase in publications, from 5.6 studies per year to 9.7 studies per year (Table 4). This could, among other issues, be associated with the occurrence of social movements (e.g. *Occupy Wall Street* and *We are the 99%*), including the global financial crisis, and the striking income inequalities (e.g. excessive pay compensation packages and bonuses) that were brought to light (Blankenburg and Palma, 2009, Crotty, 2009, Sayer, 2015). All of these have triggered further debates and research on the underlying causes and consequences of inequality (Pickett and Wilkinson, 2010, Stiglitz, 2012, Breau and Essletzbichler, 2013, Bapuji, 2015, Arestis, 2020).

The number of authors per study from 1.1 authors to 1.9 authors per study. On the one

hand, this reflects the broader trend among innovation researchers towards collaboration (Fagerberg et al., 2012, Martin, 2012). On the other hand, this implies that conducting and publishing research on innovation and inequality has become more demanding and time-consuming than previously. Nonetheless, the number of citations per study is lower than in the previous two phases: it is 118 citations per study. Arguably, this could be attributed to older studies being more likely than recently published ones to have more citations. Of importance is also the fact that, unlike in the previous two phases, wherein, on average, only 15% of published studies received financial support, more than 32% of published studies were sponsored by academic organisations, think tanks, and policy organisations, with the most active non-academic donors being located in the UK (e.g. Economic and Social Research Council, UK Research and Innovation), Europe (e.g. European Commission), the US (e.g. National Science Foundation), and South Korea (National Research Foundation of Korea). Important is also the fact that, unlike the previous two phases where, on average, only 15% of published studies received financial support, more than 32% of published studies were sponsored by academic organisations, think-tanks and policy organisations, with the most active non-academic donors being located in the UK (e.g. Economic and Social Research Council, UK Research and Innovation), Europe (e.g. European Commission), the US (e.g. National Science Foundation), and South Korea (National Research Foundation of Korea). Although an in-depth analysis of the power issues and dynamics between sponsors and researchers falls beyond the scope of this paper, it is important to mention that external funding activities seem to have reinforced, albeit not necessarily intentionally, certain disciplinary discourses and types of research in the expansion phase, such as the research focus on skill premiums, few countries and research methods (see Table 4).

Table 4: Expansion Phase

	2010-2019(n=97)
Number of published studies per year	9,7
Number of authors per study	1,9
Citations per study (Google Scholar, July 2020)	116
Percentage of studies reporting financial support	32
Most active non-academic donors (country)	Economic and Social Research Council (UK), European Commission (Belgium), National Research Foundation of Korea (Korea), National Science Foundation (USA), UK Research and Innovation (UK)
Affiliation (country) of most authors	US,UK, Canada, Italy, Germany
Most used keywords	Income distribution, wage gap, technological change, innovation, information and communication technology, skilled labour, labour market, United States
Most preferred journals	American Behavioral Scientist, American Economic Journal: Macroeconomics, Applied Economics, American Sociological Review, Applied Economics Letters, Industrial and Corporate Change, Journal of Economic Issues, Journal of the European Economic Association, Regional Studies, Review of Development Economics, Scandinavian Journal of Economics, Social Indicators Research, Technological Forecasting and Social Change, World Development
Most active fields	Economics, innovation studies, geography and sociology
Most used research context	Cross-country, US, UK, Canada, European Union
Most used research designs	Extensive
Most preferred units of analysis	Individuals, countries, employees, cities and regions
Most used measure(s) of innovation	Latent variable, R&D expenditure, patents, high-tech employment, employment in KIBS, ICT investments
Most used measure(s) of inequality	Gini index, percentiles, wage/income gap, gender gap, Theil index
Causal scenarios	Innovation induces inequality (*Causal scenario I*), inequality positively affects innovation (*Causal scenario II*), inequality hinders innovation (*Causal scenario IV*), innovation reduces inequality (*Causal scenario III*), and absence of causality (*Causal scenario O*)
Recurrent explanatory factors	*Skill premiums* (Goos et al., 2014, Adermon and Gustavsson, 2015), *trade* (Almeida and Afonso, 2010, Jaumotte et al., 2013, Juhn et al., 2014), *technological unemployment* (Frey and Osborne, 2017),*geographical aspects* (Lee, 2011, Consoli et al., 2013, Breau et al., 2014, Florida and Mellander, 2016, Otioma et al., 2019), *digital gap* (Hilbert, 2010), *horizontal inequality* (Brouwer and Brito, 2012, Brynin and Perales, 2016, Juhn et al., 2014, Echeverri-Carroll et al., 2018, Cheng et al., 2019), *deunionisation* (Kristal, 2013, Kristal and Cohen, 2017, Stockhammer, 2017), *innovation policy* (Cozzi and Impullitti, 2010, Lee, 2019), *organisational factors* (Hanley, 2014), *types of innovation* (Thakur, 2012, Richmond and Triplett, 2018)

Source: own elaboration, Scopus

Research Fields Regarding research fields, a significant reshuffle occurred in the expansion phase. Unlike in the growth phase, wherein the fields of economics, development studies, and employment relations were the three most active, the fields of economics, innovation studies, geography, and sociology are the first, second, third and fourth most active in the post-2010 period, respectively. The emergence of innovation studies journals (i.e. *Technological Forecasting and Social Change, Industrial and Corporate Change*), geographical journals (e.g. *Regional Studies*) and sociological journals (e.g. *American Behavioral Scientist*, *American Sociological Review*) in the list with the most preferred journals is illustrative of this trend.

However, a closer examination of published studies in these journals reveals several important insights and critical observations. Specifically, while, at first sight, it appears that innovation studies researchers have begun to pay some serious attention to inequality (see, for instance, Faggio et al., 2010, Lazonick and Mazzucato, 2013), the rise in published innovation research is due to guest editorial issues (e.g. Coad et al., 2021, Cozzens, 2012) rather than to independent studies. This, among other issues, raises important questions as to the role that the peer review mechanism might play in shaping the research agenda in the field (Macdonald, 2015, Martin, 2016). Questions are also raised with regard to the absence of the flagship journal of the field of innovation studies (i.e. *Research Policy*), including *Prometheus*, from the list of the most active journals. This is a quite surprising because both journals seek, by tradition, to publish critically-minded research on innovation (Cozzens, 2003, Fagerberg et al., 2012). Judging from this situation, it seems that, unlike the work of the founding figures of the field (e.g. Christopher Freeman, Dick Nelson and Bengt-Åke Lundvall), where economic and societal challenges (e.g. jobless growth, social inclusion and technological unemployment) figured prominently (e.g. Archibugi and Lundvall, 2001, Lundvall, 2002, Fagerberg et al., 2011), the great majority of contemporary innovation researchers seem to be interested in conducting research that primarily reflects the interests of a few select actors (e.g. elite scholars and policymakers) rather than the society as a whole (see also Martin, 2016).

Geographers have also been quite active in the expansion phase, publishing several well-

conducted studies (e.g. Lee, 2011, Consoli et al., 2013, Lee and Rodríguez-Pose, 2013, Breau et al., 2014, Guo, 2019, Otioma et al., 2019). However, by mainly investigating cities and regions in the US (Lee and Rodríguez-Pose, 2013), Europe (Lee, 2011, Tselios, 2011) and Canada (Breau et al., 2014), geographical research has extended, yet intensified, our knowledge of a few English-speaking countries (e.g. US, UK and Canada). While the choice to investigate a certain group of cities and regions over others is determined by data availability (e.g. Lee, 2011, Tselios, 2011), the fact that several geographical studies in the expansion phase received financial support from organisations based in the UK and Europe seems to have also played a role.

Despite being 'too late to join the party', sociological studies have looked mainly at the relationship between innovation and inequality in the US. (e.g. Fernandez, 2001, DiPrete, 2007, Kristal, 2013, Hanley, 2014, Kristal and Cohen, 2017). However, unlike most innovation and geographical studies, which seem to have uncritically adopted the underlying assumptions and hypotheses of the skill-biased technological change account (e.g. Wheeler, 2005, Lee, 2011, Breau et al., 2014, Cirillo et al., 2021), sociological studies tend to problematise, criticise and empirically illustrate that the account in question, including its variants, is misleading and handicapped (e.g. Fernandez, 2001, Kristal, 2013, Hanley, 2014, Kristal and Cohen, 2017). Yet, another emerging line of sociological research seeks to develop an alternative explanatory account based on relational inequality theory (Avent-Holt and Tomaskovic-Devey, 2014, Hanley, 2014, Vallas and Cummins, 2014). Nonetheless, despite being equipped with a sophisticated theory of income distribution as a relational-organisational phenomenon (Avent-Holt and Tomaskovic-Devey, 2014, Tomaskovic-Devey, 2014), this sociological line of research lacks – and is the case with SBTC research – an appropriate theory of innovation (see also Lazonick and Mazzucato, 2013, Fragkandreas, 2021).

Research Designs and Measures Research in the expansion phase is characterised by the excessive use of extensive research designs and methods (97% of all studies), with only 3% of all studies adopting intensive research designs and mixed methods (e.g. Brouwer

and Brito, 2012, Hanley, 2014, Thakur, 2012, Woodson et al., 2019). This, among other things, implies that innovation scholars and geographers have added very little methodological novelty and variety. Regarding the measurement of innovation, and in line with research in the growth phase, 20% of all studies treated innovation as a *background* variable (e.g. Kawaguchi and Mori, 2016, Echeverri-Carroll et al., 2018, Antonczyk et al., 2018, Frey and Osborne, 2017), while the remaining 80% used various measures. These include *patents* (e.g. Lee, 2011, Antonelli and Gehringer, 2017, Aghion et al., 2019), *R&D intensity* (Almeida and Afonso, 2010, Hatipoglu, 2012, Cirillo et al., 2017), *high-tech employment* (Lee, 2011, Mehic, 2018, Hope and Martelli, 2019), *ICT investments and usage* (e.g. Broccolini et al., 2011, Shahabadi et al., 2017) and *concrete cases and types of innovations* (e.g. Santos et al., 2017, Woodson et al., 2019).

As for the measurement of inequality, no significant change is registered; besides that, some studies use two new (to this research field) measures, namely the *Atkinson index* (e.g. Lee, 2011) and the *Palma ratio* (e.g. Mehic, 2018). The remaining studies deploy the usual measures, such as the *Gini index* (Antonelli and Gehringer, 2017), *income gaps among groups* (e.g. Cheng et al., 2019), *percentiles* (e.g. Hope and Martelli, 2019) and *Theil index* (e.g. Tselios, 2011, Hatipoglu, 2012, Breau et al., 2014). These measures are deployed either individually or in concert (e.g. Lee, 2011, Breau et al., 2014, Cirillo et al., 2017) for construct validity purposes.

Causal Scenarios and Explanatory Factors Echoing the findings of research in the previous two phases, the great majority of studies (72%) confirm that innovation induces inequality (*Causal scenario I*) (Almeida and Afonso, 2010, Breau et al., 2014, Santos et al., 2017, Comin and Mestieri, 2018, Hope and Martelli, 2019). However, unlike in the previous two phases, wherein the absence of causality (*Causal scenario 0*) was the second most observed causal possibility, the second most observed causal scenario (12% of studies) in the expansion phase is that inequality negatively impacts innovation (*Causal scenario IV*) (e.g. Vona and Patriarca, 2011, Hatipoglu, 2012, Otioma et al., 2019, Hilbert, 2010). The remaining studies (16%) find that inequality benefits innovation (*Causal scenario II*) (e.g. Hyytinen

and Toivanen, 2011, Tselios, 2011) or that innovation lessens inequality (*Causal scenario III*) (e.g. Dell'Anno and Solomon, 2014, Antonelli and Gehringer, 2017, Shahabadi et al., 2017), whilst only 5% indicate that there is no significant causality between innovation and inequality (*Causal scenario 0*) (e.g. Ding et al., 2011, Bonjean, 2019, Croce and Ghignoni, 2020).

Regarding popular explanatory factors, no significant change is noticed: causality in its various forms is related to the same explanatory factors as in the growth phase (for more information, see Table 4). However, and unlike in the previous two phases in which the great majority of studies assessed the (statistical) impact of a few explanatory factors (in the form of independent variables), a number of studies in the expansion phase consider competing or alternative explanations for *Causal Scenario I* (e.g. Almeida and Afonso, 2010, Jaumotte et al., 2013, Lin and Tomaskovic-Devey, 2013, Kristal, 2013, Kristal and Cohen, 2017, Stockhammer, 2017). For instance, Kristal (2013) and Kristal and Cohen (2017) provide evidence that rising inequality in the US is primarily driven by workers' disempowerment rather than by skill premiums due to technological change (e.g. Acemoglu et al., 2001). Thewissen et al. (2018) extend this finding by exploring the drivers of earnings inequality at the sectoral level in eight OECD countries. The findings "*provide mixed evidence for the hypothesis that skill-biased technological change increases earnings inequality*" (p.1023). On the contrary, Thewissen et al. (2018) show that waning labour union power is an important driver of earnings inequality in the countries under investigation. Similarly, in their study on 109 developing and developed countries, Richmond and Triplett (2018) confirm that the causal association between innovation and inequality is conditioned not only by the types of innovation (e.g. product or process innovation) and sectoral technological intensity (see also Angelini et al., 2009, Broccolini et al., 2011), but also by the economic and political characteristics of each country (see also, Dell'Anno and Solomon, 2014, Iversen and Soskice, 2015, Goel, 2017, Antonczyk et al., 2018).

As will be discussed in the concluding section, identifying concrete configurations of causal factors (i.e. causal mechanisms) that enable (or constrain) certain types of innovation to induce (or reduce) inequality in certain places (e.g. cities, regions and nations) but not in

others constitutes a promising research opportunity.

5 Concluding Discussion: Findings, Knowledge Gaps, Implications and Limitations

5.1 Main Findings

This paper was among the first to identify and review in a critical, systematic manner the extant stock of knowledge on innovation and inequality in various fields of social science. Driven by a novel analytical framework, the analysis yields several novel findings and critical observations. Specifically, and in line with previous reviews (Acemoglu, 2002, Bogliacino, 2014, Lee, 2016), including research on skill-biased technological change (STBC) (Acemoglu and Autor, 2011), the present review confirms that most studies (approximately 71%) find that innovation induces inequality in contemporary capitalist societies (*Causal scenario I*). However, and in contrast to previous reviews, including SBTC research, it was shown that a considerable number of studies (approximately 30%) point to four other causal possibilities (see Table 5). In short, there is significantly much more to our understanding of causality in the relationship between innovation and inequality than research on SBTC has assumed.

Important also is the fact that, unlike previous contributions that cultivate the impression that it is research on mainstream economics that mainly drives our knowledge on innovation and inequality, this review shows that, from a cross-disciplinary standpoint, this view is misleading. While economic studies do, indeed, dominate our knowledge on Causal scenario I, development studies and employment relations studies are leading our knowledge on *Causal scenarios O, II and IV* (see Table 6). Similarly, there appears to be a clear disciplinary perspective on explanatory factors (see Table 7). Mainstream economic research attributes causality to market-related factors (e.g. skill premiums, trade, and technological unemployment). In contrast, research in other fields, including heterodox economic research, is more likely to examine — in addition to skill premiums — a host of other non-market factors

(e.g. deunionisation, types of innovation, innovation diffusion process, changing employment conditions, organisational factors, spatial aspects, digital gaps, and sectoral change). While this finding showcases a distinct specialisation of knowledge among different fields, it also challenges the explanatory ability of disciplinary research on innovation and inequality; in addition, it paves little ground for a cross-disciplinary research agenda.

Table 5: Causal Scenarios

Causal scenarios	All years 1990-2019 n=166	Early phase 1990-1999 n=12	Growth phase 2000-2009 n=56	Expansion phase 2010-2019 n=94	Trend directions
Causal scenario 0 – Absence of causality	7,8	25,0	9,1	9,4	Decreasing, then slightly increasing
Causal scenario I – Innovation induces inequality	71,1	58,3	70,9	73,1	Increasing
Causal scenario II – Inequality stimulates innovation	6,0	8,3	7,3	7,5	Decreasing, then slightly increasing
Causal scenario III – Innovation ameliorates inequality	6,0	8,3	5,5	5,6	Decreasing, then slightly increasing
Causal scenario IV – Inequality hampers innovation	8,4	0,0	7,3	7,5	Increasing

Source: own elaboration

Table 6: Causal Scenarios, Fields, and Journals

Causal Scenario	Active fields	Most chosen journals (alphabetical order)
Causal scenario 0 – Absence of causality	Employment relations, development studies, economics, other social sciences	Agricultural Economics, Applied Economics, Canadian Public Policy, China Economic Review, Industrial and Labor Relations Review, Industrial Relations, Journal of Development Economics, Journal of International Studies, Labour, Work and Occupations, World Development
Causal scenario I – Innovation induces inequality	Economics, geography, employment relations, innovation studies, sociology	American Economic Journal: Macroeconomics, American Sociological Review, Applied Economics, Applied Economics Letters, Economic Journal, Economics of Transition, Industrial and Corporate Change, International Review of Applied Economics, Journal of Development Economics, Journal of Economic Issues, Journal of the European Economic Association , Journal of International Economics, Quarterly Journal of Economics, Regional Studies, Review of Development Economics, Review of Economics and Statistics, Quarterly Journal of Economics, Social Indicators Research, Technological Forecasting and Social Change, World Development
Causal scenario II – Inequality stimulates innovation	Development studies, geography	International Regional Science Review, Professional Geographer,World Development
Causal scenario III – Innovation ameliorates inequality	Economics, innovation studies	Agricultural Economics, Asian Economic Journal, Eastern European Economics, Journal of the Knowledge Economy, Metroeconomica, Southeast Asian Journal of Economics, Technovation
Causal scenario IV – Inequality hampers innovation	Development studies, economics, geography	Australian Geographer, Ecological Economics, Economic Development Quarterly, Environment and Development Economics, Gender, Technology and Development, GeoJournal, Information Economics and Policy, Scottish Journal of Political Economy, Work and Occupations, World Development

Source: own elaboration

Finally, a significant proportion of our knowledge regarding the relationship between innovation and inequality, especially *Causal scenario I* (innovation induces inequality), has mainly been based on research in three English-speaking countries: the US, the UK, and Canada. This is a significant issue that seems to affect the research outcome. As is shown in Table 8, studies focusing on non-liberal market economies (e.g. coordinated and state-led

Table 7: Explanatory Factors by Field

Fields (alphabetical order)		Recurrent explanatory factors
Development studies		Skill premiums and trade (e.g. Esquivel and Rodrıguez-López, 2003, Attanasio et al., 2004, Meschi and Vivarelli, 2009), horizontal inequality (e.g. Mukhopadhyay and Nandi, 2007, Juhn et al., 2014), policy (e.g. Rijkers et al., 2010, Martorano and Sanfilippo, 2015)
Employment relations		Skill premiums (e.g. Brown and Campbell, 2001, Bruinshoofd et al., 2001*b*, Kim and Sakamoto, 2008, Stockhammer, 2017), deunionisation (Belman and Levine, 2004, Black et al., 2004), changing employment conditions (e.g. Colclough and Tolbert, 1990, Black et al., 2004, Handel and Gittleman, 2004), horizontal inequality (e.g. Colclough and Tolbert, 1990, Asplund and Lilja, 2014)
Economics		
	Mainstream economics	Skill premiums (Krueger, 1993, Krusell et al., 2000), international trade (e.g. Bernard and Jensen, 1997, Baldwin and Cain, 2000, Adams, 2008), technological unemployment (e.g. Autor et al., 2003, Goos et al., 2014, Adermon and Gustavsson, 2015), innovation diffusion (e.g. Borghans and Ter Weel, 2007, Comin and Mestieri, 2018)
	Heterodox economics	Skill premiums (e.g. Manso, 2006), types of innovation (e.g. Bogliacino, 2009), innovation diffusion (e.g. Santos et al., 2017), deunionisation (e.g. MacPhail, 2000), national institutional framework (Richmond and Triplett, 2018), sectoral composition (e.g. Angelini et al., 2009)
Geography		Spatial aspects (e.g. Echeverri-Carroll and Ayala, 2009, Lee, 2011, Guo, 2019), digital gaps (e.g. Gibson, 2003, Otioma et al., 2019), skill premiums (Wheeler, 2005, Consoli et al., 2013, Florida and Mellander, 2016), horizontal inequality (e.g. Pastor and Marcelli, 2000)
Innovation studies		Skill premiums (e.g. Chennells and Reenen, 1998, Martorano and Sanfilippo, 2015), diffusion (Brouwer and Brito, 2012, Thakur, 2012), technological unemployment (e.g. Mehic, 2018, Frey and Osborne, 2017)
Sociology		Horizontal inequality (McCall, 2000, Brynin and Perales, 2016, Cheng et al., 2019), deunionisation (e.g. Kristal, 2013, Kristal and Cohen, 2017) and digital gaps (e.g. Martin and Robinson, 2007)

Source: own elaboration

market economies) are less likely to report that innovation exacerbates inequality. In short, there appear to be some significant (external validity) questions that most studies under review have either, purposefully or not, neglected or downgraded.

Table 8: Causal Scenarios and Country

Causal Scenario	Most chosen research context
Causal scenario 0 – Absence of causality	US, cross-country analysis, China, Europe, Italy, Mexico, Philippines, Spain, Peru
Causal scenario I – Innovation induces inequality	US, UK, Canada, cross-country analysis
Causal scenario II – Inequality stimulates innovation	Cross-country analysis, US
Causal scenario III – Innovation ameliorates inequality	Cross-country analysis, Brazil, China, Ethiopia, European Union, Peru, Thailand, Taiwan, UK
Causal scenario IV – Inequality hampers innovation	US, Brazil, Mexico, Germany, India, South Korea

Source: own elaboration

5.2 Knowledge Gaps and Critical Remarks

The review process has detected several essential knowledge gaps that research could address in the years to come (for an overview, see Table 9). Specifically, in all causal scenarios, our knowledge on causal mechanisms is significantly wanting – causal mechanisms remain essentially black boxes that future research needs to unpack. This critical knowledge omission stems from an implicit methodological consensus in the literature that quantification and statistical significance are integral to a sophisticated analysis on causality, even though how innovation causes inequality "*has nothing to do with the number of times we have ob-*

served it happening" (Sayer, 2000*b*, p.14). Future research needs to make use of intensive research designs and methods (e.g. case study research, grounded theory and ethnography) as a means by which to extend and deepen our knowledge on causality in general and causal mechanisms in particular (Archer, 2015, Fragkandreas, 2021). The views and experiences of, among others, employees,managers, and policymakers, including marginalised social actors, need to be integral to explanatory causal analysis on innovation and inequality. Otherwise, and due to its excessive, yet naive reliance on secondary statistics, the extant research could be criticised for being *externalist* (i.e. deliberately detached from the everyday world) and *elitist* (i.e. based exclusively on the views of researchers rather than on the views of social actors).

In addition, research appears to have largely been neglectful of several key stylised facts regarding our knowledge on innovation (Fagerberg et al., 2012, Martin, 2012). While several decades of innovation research has shown that innovation is a collective activity, often encompassing intense collaboration among a wide array of private and public actors (e.g. firms, suppliers, universities, governmental organisations, laboratories, banks, venture capitalists, etc.) (Edquist, 2005, Lundvall, 2013), none of the studies under review have – to date – examined how collectivities of innovative actors (e.g. clusters, networks of innovation, and innovation systems) shape the distribution of income. This is a significant knowledge gap as the skill premiums mechanism may, after all, be due to network fragmentation issues (e.g. absent or weak university-industry interactions) among focal (triple-helix) actors in innovation systems rather than being simply the outcome of the supply and demand forces in labour markets (see, for instance, Christopherson and Clark, 2007, Lawton-Smith, 2009, Fragkandreas, 2021).

Furthermore, the great majority of studies under review seem to suffer from 'linear-techno-fetishism', in the sense that innovation is mainly conceptualised and analysed as being a technological, linear, R&D-driven process. Future research needs to go beyond the narrow technological variables of innovation to examine the impact that different types of innovation (e.g. business model, product, incremental, organisational and institutional innovation) have on the distribution of income; for instance, by utilising data from inno-

vation surveys (Smith, 2005, Hong et al., 2012) and alternative methodological approaches to extensive research (e.g. qualitative comparative analysis) to identify configurations of factors (see, for instance, Greckhamer et al., 2018). This could extend our knowledge not only on the composition of causal mechanisms but also on the impact that different types of innovation have on the distribution of income, including the reverse (Veblenian) case in which existing inequalities shape the nature, direction and success of innovation (Cozzens and Kaplinsky, 2009, Rikap and Lundvall, 2021).

Extremely little is also known about the distribution of economic rewards among innovative actors (e.g. global innovation networks, value chains and production networks) (Cozzens and Kaplinsky, 2009, Rikap and Lundvall, 2021). Future research needs to systematically examine wage inequality within (and between large and small) innovative firms. For instance, are large firms more unequal than large firms? (Cirillo et al., 2017, Song et al., 2019). Emphasis must also be placed on the (ontological) fact that the income that innovation generates is, primarily, distributed within the legal boundaries of the firm (rather than in labour markets as the bulk of the extant economic literature implies) (Lazonick and Mazzucato, 2013, Tomaskovic-Devey and Avent-Holt, 2019, Rikap and Lundvall, 2021). Research on this issue could also help us to better understand the significantly overlooked relationship between innovation and top income inequality (Lazonick and Mazzucato, 2013, Aghion et al., 2019); particularly, how a set of high-income organisational actors (e.g. top executives, and venture capitalists) manage to convince other organisational actors (e.g. labour representatives, and shareholders) that they deserve a significant share of the value that innovation generates (Kay and Hildyard, 2021, Rikap and Lundvall, 2021), even though, as Lazonick and Mazzucato (2013) have emphasised, high-income organisational actors, including larger firms (e.g. high-tech giants) (Rikap and Lundvall, 2021), do not necessarily bear the lion's share of the risks involved in the innovation process. Relatedly, more research needs to be dedicated to the distributional impact of innovation policies (Cozzens et al., 2002, Zehavi and Breznitz, 2017, Schot and Steinmueller, 2018). In particular, how, and under what conditions, do innovation policies reduce or increase income differentials? This is an essential question with far-reaching implications for both theory and policy.

Table 9: Causal Scenarios and Knowledge Gaps

Causal Scenarios	Knowledge gaps and research questions
Causal scenario 0 – *Absence of causality*	
	• (How) Do skills, institutional factors, organisational strategies and types of innovation combine to form blocking mechanisms of inequality (i.e. mechanisms that countervail the inequality-inducing abilities of innovation)?
Causal scenario I – *Innovation induces inequality*	
	• What are the mechanisms through which innovation induces top income inequality (Lazonick and Mazzucato, 2013, Aghion et al., 2019)?
	• What strategies do innovative firms adopt to address skill shortages in the innovation process? And how do these strategies impact the (horizontal) distribution of income in innovative firms?
	• Are large innovative firms more unequal than small firms (Cirillo et al., 2017)?
	• How does the collective nature of innovation (e.g. innovation ecosystems and (global) innovation networks) affect the distribution of income (Gray et al., 1998, Fragkandreas, 2021)?
	• Under what conditions does innovation policy exacerbate inequality (Cozzens et al., 2002)?
	• (How) Does the sectoral mode of innovation (e.g. science-based sectors, scale-intensive sectors, etc.) affect the distribution of risks and rewards in the innovation process (Pavitt, 1984, Lazonick and Mazzucato, 2013)?
	• Does innovation, indeed, embed an unequal distribution of risks and rewards (Lazonick and Mazzucato, 2013)?
	• Which (organisational) actor(s) take(s) the lion's share of risks in the innovation process? And who does capture the rewards?
	• Are some types of innovation (e.g. product innovation) more inequality-prone than others (e.g. process innovation and organisational innovation) (Angelini et al., 2009, Bogliacino, 2009)?
	• How do a host of innovation-related factors combine to form causal mechanisms of inequality?
Causal scenario II – *Inequality stimulates innovation*	
	• (How) Does inequality benefit the nature, direction and success of innovative activity (Yanadori and Cui, 2013)?
	• In what ways does inequality motivate (marginalised) actors to innovate or participate in the innovation process (Xavier-Oliveira et al., 2015)?
Causal scenario III – *Innovation ameliorates inequality*	
	• How does innovation enable equality, inclusive competence building and social mobility (Lundvall, 2002, Xavier-Oliveira et al., 2015)?
	• Do (inclusive) innovation policies, indeed, ameliorate inequality (Zehavi and Breznitz, 2017, Schot and Steinmueller, 2018)?
Causal scenario IV – *Inequality hampers innovation*	
	• How does rising inequality shape the nature, direction, success and failure of innovative activity (Yanadori and Cui, 2013, Jung et al., 2018, Nakara et al., 2019) ?

Source: own elaboration

5.3 Policy Implications

Despite being a critical stocktaking exercise, the present paper has a few policy implications and recommendations. The analysis in this paper confirms, among other issues, that contemporary innovation scholars and policymakers are right (albeit belatedly) to question the trickle-down thesis, whereby innovation-driven growth will over time benefit less affluent individuals and social groups (e.g. Perez, 2013, Soete, 2013, Breznitz, 2021). Instead, at least as far as the experience in liberal market economies is concerned, the pressing question appears to be concerned with 'innovation for inclusive growth' (e.g. Martin, 2016, Schot and Steinmueller, 2018, Lee, 2019). In particular, what kinds of innovation policies need to be in place to ensure that innovation-driven growth is much more inclusive than hitherto? Unfortunately, regarding this essential question, the existing research on innovation and inequality remains emphatically mute. Other than the main policy implications derived from the SBTC account – i.e. addressing skilled labour shortages could reduce skill premiums and incentivise firms, marginalised and low-skilled employees to invest in education and training (Acemoglu, 2002, Goos, 2018) – the existing research on innovation and inequality appears largely to be policy-irrelevant, despite the fact that one third of published research is sponsored by several scientific and policymaking organisations. Policymakers (and research donors in general) need to stimulate policy-relevant research on innovation and inequality, for instance, by sponsoring research projects in which the underlying emphasis is on a cross-disciplinary yet methodologically diverse analysis geared towards unearthing active causal mechanisms (rather than registering a few statistically significant associations among variables). Funding various forms of interdisciplinary yet methodologically diverse research on innovation and inequality seems to be in the interest of knowledge creation, inclusive policy design, and social cohesion.

5.4 Limitations

As is the case with every study, this review could not escape the rule of limitations. By using the scholarly database with the most entries (Scopus), the analysis may have, unin-

tentionally, overlooked a few studies which are not included in this database. Similarly, due to its epistemological aims, methodological criteria, and the sheer number of papers under review (n=166), the paper did not consider conceptual and grey literature (e.g. books, book chapters, and policy reports). In addition, the review process made no extensive use of advanced bibliometric methods. This was due to the fact that a bibliographical coupling and co-citation analysis, which was conducted in the early phases of the review process (albeit not reported in this paper), added very little that was new to the analysis. In fact, it illustrated that, if uncritically applied, an ostensibly neutral method exhibits a systematic bias towards "*the skewed few*" (Macdonald and Kam, 2011), namely mainstream economic research on innovation and inequality. Despite this, future reviews could make use of bibliometric tools as one of the means by which to assess the extent to which a narrow mono-disciplinary perspective prevails in the more recent (i.e. post-2020) research. This type of analysis can be performed on policy papers and reports. This could help us to determine whether policy documents favour certain disciplinary discourses and research streams over others. These are a few questions that future reviews on innovation and inequality may consider, among several other issues.

References

Acemoglu, D. (2002), 'Technical change, inequality, and the labor market', *Journal of Economic Literature* **40**(1), 7–72.

Acemoglu, D., Aghion, P. and Violante, G. L. (2001), Deunionization, technical change and inequality, *in* 'Carnegie-Rochester conference series on public policy', Vol. 55, Elsevier, pp. 229–264.

Acemoglu, D. and Autor, D. (2011), Skills, tasks and technologies: Implications for employment and earnings, *in* O. Ashenfelter and D. Card, eds, 'Handbook of Labor Economics', Elsevier, Amsterdam, pp. 1043–1171.

Acemoglu, D. and Robinson, J. (2012), *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*, Crown, New York.

Adams, S. (2008), 'Globalization and income inequality: Implications for intellectual property rights', *Journal of Policy Modeling* **30**(5), 725–735.

Adermon, A. and Gustavsson, M. (2015), 'Job polarization and task-biased technological change: Evidence from Sweden, 1975–2005', *The Scandinavian Journal of Economics* **117**(3), 878–917.

Aghion, P., Akcigit, U., Bergeaud, A., Blundell, R. and Hémous, D. (2019), 'Innovation and top income inequality', *The Review of Economic Studies* **86**(1), 1–45.

Albertson, K. and Stepney, P. (2020), '1979 and all that: A 40-year reassessment of Margaret Thatcher's legacy on her own terms', *Cambridge Journal of Economics* **44**(2), 319–342.

Alderson, A. S. and Nielsen, F. (2002), 'Globalization and the Great U-Turn: Income Inequality Trends in 16 OECD Countries', *American Journal of Sociology* **107**(5), 1244–1299.

Allison, P. D. (1978), 'Measures of inequality', *American Sociological Review* **43**(6), 865–880.

Almeida, A. and Afonso, Ó. (2010), 'SBTC versus trade: Testing skill-premia evidence across 25 OECD countries', *Applied Economics Letters* **17**(15), 1497–1501.

Alvaredo, F., Atkinson, A. B., Piketty, T. and Saez, E. (2013), 'The top 1 percent in international and historical perspective', *Journal of Economic perspectives* **27**(3), 3–20.

Álvarez, R. and López, R. A. (2009), 'Skill upgrading and the real exchange rate', *World Economy* **32**(8), 1165–1179.

Angelini, E. C., Farina, F. and Pianta, M. (2009), 'Innovation and wage polarisation in Europe', *International Review of Applied Economics* **23**(3), 309–325.

Antonczyk, D., DeLeire, T. and Fitzenberger, B. (2018), 'Polarization and rising wage inequality: comparing the us and germany', *Econometrics* **6**(2), 20.

Antonelli, C. (2009), 'The economics of innovation: From the classical legacies to the economics of complexity', *Economics of Innovation and New Technology* **18**(7), 611–646.

Antonelli, C. and Gehringer, A. (2017), 'Technological change, rent and income inequalities: A Schumpeterian approach', *Technological Forecasting and Social Change* **115**, 85–98.

Archer, M. S. (2015), *Generative Mechanisms: Transforming the Social Order*, Springer, Cham.

Archibugi, D. and Lundvall, B.-A. (2001), *The Globalizing Learning Economy*, Oxford University Press, Oxford.

Arestis, P. (2020), 'Productivity and inequality in the UK: a political economy perspective', *Review of Evolutionary Political Economy* **1**, 183–197.

Arndt, C., Benfica, R., Tarp, F., Thurlow, J. and Uaiene, R. (2009), 'Biofuels, poverty, and growth: A computable general equilibrium analysis of Mozambique', *Environment and Development Economics* **15**(1), 81–105.

Asheim, B. T. and Gertler, M. S. (2005), The Geography of Innovation: Regional Innovation Systems, *in* 'The Oxford Handbook of Innovation', Oxford University Press, Oxford, pp. 291–317.

Ashenfelter, O. and Card, D. (2010), *Handbook of Labor Economics*, Elsevier, Amsterdam.

Asplund, R. and Lilja, R. (2014), 'Wage formation and gender wage gaps: Is there a role for job-task evaluation schemes?', *International Journal of Manpower* **35**(3), 267–290.

Atkinson, A. B., Piketty, T. and Saez, E. (2011), 'Top incomes in the long run of history', *Journal of Economic Literature* **49**(1), 3–71.

Attanasio, O., Goldberg, P. K. and Pavcnik, N. (2004), 'Trade reforms and wage inequality in Colombia', *Journal of Development Economics* **74**(2), 331–366.

Autor, D. H., Katz, L. F. and Kearney, M. S. (2008), 'Trends in US wage inequality: Revising the revisionists', *The Review of Economics and Statistics* **90**(2), 300–323.

Autor, D. H., Katz, L. F. and Krueger, A. B. (1998), 'Computing inequality: Have computers changed the labor market?', *The Quarterly Journal of Economics* **113**(4), 1169–1213.

Autor, D. H., Levy, F. and Murnane, R. J. (2003), 'The skil content of recent technological change: An empirical exploration', *The Quarterly Journal of Economics* **118**(4), 1279–1333.

Avent-Holt, D. and Tomaskovic-Devey, D. (2014), 'A relational theory of earnings inequality', *American Behavioral Scientist* **58**(3), 379–399.

Baldwin, R. E. and Cain, G. G. (2000), 'Shifts in relative US wages: The role of trade, technology, and factor endowments', *Review of Economics and Statistics* **82**(4), 580–595.

Bapuji, H. (2015), 'Individuals, interactions and institutions: How economic inequality affects organizations', *Human Relations* **68**(7), 1059–1083.

Barnes, S. J. and Mattsson, J. (2016), 'Building tribal communities in the collaborative economy: An innovation framework', *Prometheus* **34**(2), 95–113.

Belman, D. L. and Monaco, K. A. (2001), 'The effects of deregulation, de-unionization, technology, and human capital on the work and work lives of truck drivers', *Industrial and Labor Relations Review* **54**(2A), 502–524.

Belman, D. and Levine, D. I. (2004), 'Size, skill and sorting', *Labour* **18**(4), 515–561.

Bernard, A. B. and Jensen, J. B. (1997), 'Exporters, skill upgrading, and the wage gap', *Journal of International Economics* **42**(1-2), 3–31.

Bhaskar, R. (2008), *A Realist Theory of Science*, Verso, London.

Biggi, G. and Giuliani, E. (2021), 'The noxious consequences of innovation: What do we know?', *Industry and Innovation* **28**(1), 19–41.

Black, S. E., Lynch, L. M. and Krivelyova, A. (2004), 'How workers fare when employers innovate', *Industrial Relations: A Journal of Economy and Society* **43**(1), 44–66.

Blankenburg, S. and Palma, J. G. (2009), 'Introduction: the global financial crisis', *Cambridge Journal of Economics* **33**(4), 531–538.

Bogliacino, F. (2009), 'Poorer workers: The determinants of wage formation in Europe', *International Review of Applied Economics* **23**(3), 327–343.

Bogliacino, F. (2014), 'A critical review of the technology-inequality debate', *Suma De Negocios* **5**(12), 124–135.

Bonjean, I. (2019), 'Heterogeneous incentives for innovation adoption: The price effect on segmented markets', *Food Policy* **87**, 101741.

Borghans, L. and Ter Weel, B. (2007), 'The diffusion of computers and the distribution of wages', *European Economic Review* **51**(3), 715–748.

Bornmann, L. and Mutz, R. (2015), 'Growth rates of modern science: A bibliometric analysis based on the number of publications and cited references', *Journal of the Association for Information Science and Technology* **66**(11), 2215–2222.

Bourdieu, P. (1987), *Distinction: A Social Critique of the Judgement of Taste*, Harvard university press, Cambridge(MA).

Boyer, R. (2015), 'A world of contrasted but interdependent inequality regimes: China, United States and the European Union', *Review of Political Economy* **27**(4), 481–517.

Brannan, M. J., Fleetwood, S., O'Mahoney, J. and Vincent, S. (2017), 'Meta-analysis: A critical realist critique and alternative', *Human Relations* **70**(1), 11–39.

Braverman, H. (1974), *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century*, Monthly Review Press, New York.

Breau, S. and Essletzbichler, J. (2013), 'Commentary: Contesting inequality', *Environment and Planning A* **45**, 1775–1784.

Breau, S., Kogler, D. F. and Bolton, K. C. (2014), 'On the relationship between innovation and wage inequality: New evidence from Canadian cities', *Economic Geography* **90**(4), 351–373.

Bresnahan, T. F. (1999), 'Computerisation and wage dispersion: An analytical reinterpretation', *The Economic Journal* **109**(456), 390–415.

Breznitz, D. (2021), *Innovation in Real Places: Strategies for Prosperity in an Unforgiving World*, Oxford University Press, Oxford.

Broccolini, C., Lo Turco, A., Presbitero, A. F. and Staffolani, S. (2011), 'Individual earnings, international outsourcing and technological change: Evidence from Italy', *International Economic Journal* **25**(1), 29–46.

Brouwer, R. and Brito, L. (2012), 'Cellular phones in Mozambique: Who has them and who doesn't?', *Technological Forecasting and Social Change* **79**(2), 231–243.

Brown, C. and Campbell, B. (2001), 'Technical change, wages, and employment in semiconductor manufacturing', *ILR Review* **54**(2A), 450–465.

Bruinshoofd, A., Hollanders, H. and Weel, B. t. (2001*a*), 'Knowledge spillovers and wage inequality: An empirical analysis of Dutch manufacturing', *Labour* **15**(4), 641–662.

Bruinshoofd, A., Hollanders, H. and Weel, B. t. (2001*b*), 'Knowledge spillovers and wage inequality: an empirical analysis of dutch manufacturing', *Labour* **15**(4), 641–662.

Brynin, M. and Perales, F. (2016), 'Gender wage inequality: The de-gendering of the occupational structure', *European Sociological Review* **32**(1), 162–174.

Brynjolfsson, E. and McAfee, A. (2012), *Race Against the Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy*, Digital Frontier Press.

Card, D. and DiNardo, J. E. (2002), 'Skill-biased technological change and rising wage inequality: Some problems and puzzles', *Journal of Labor Economics* **20**(4), 733–783.

Cavanaugh, A. and Breau, S. (2018), 'Locating geographies of inequality: Publication trends across OECD countries', *Regional Studies* **52**(9), 1225–1236.

Chakraborty, J. and Bosman, M. M. (2005), 'Measuring the digital divide in the United States: Race, income, and personal computer ownership', *The Professional Geographer* **57**(3), 395–410.

Chaminade, C., Lundvall, B.-A. and Haneef, S. (2018), *Advanced Introduction to National Innovation Systems*, Edward Elgar Publishing, Cheltenham (UK).

Cheng, S., Chauhan, B. and Chintala, S. (2019), 'The rise of programming and the stalled gender revolution', *Sociological Science* **6**, 321–351.

Chennells, L. and Reenen, J. V. (1998), 'Establishment level earnings, technology and the growth of inequality: Evidence from Britain', *Economics of Innovation and New Technology* **5**(2-4), 139–164.

Choi, K.-S. and Jeong, J. (2005), 'Technological change and wage premium in a small open economy: The case of Korea', *Applied Economics* **37**(1), 119–131.

Christopherson, S. and Clark, J. (2007), 'Power in firm networks: What it means for regional innovation systems', *Regional Studies* **41**(9), 1223–1236.

Cirillo, V., Evangelista, R., Guarascio, D. and Sostero, M. (2021), 'Digitalization, routineness and employment: An exploration on Italian task-based data', *Research Policy* **50**(7), 104079.

Cirillo, V., Sostero, M. and Tamagni, F. (2017), 'Innovation and within-firm wage inequalities: Empirical evidence from major European countries', *Industry and Innovation* **24**(5), 468–491.

Coad, A., Nightingale, P., Stilgoe, J. and Vezzani, A. (2021), 'The dark side of innovation', *Industry and Innovation* **28**(1), 102–112.

Colclough, G. and Tolbert, C. M. (1990), 'High technology, work, and inequality in southern labor markets', *Work and Occupations* **17**(1), 3–29.

Comin, D. and Mestieri, M. (2018), 'If technology has arrived everywhere, why has income diverged?', *American Economic Journal: Macroeconomics* **10**(3), 137–78.

Commander, S. and Kollo, J. (2008), 'The changing demand for skills evidence from the transition', *Economics of Transition* **16**(2), 199–221.

Compagnucci, L. and Spigarelli, F. (2020), 'The third mission of the university: A systematic literature review on potentials and constraints', *Technological Forecasting and Social Change* **161**, 120284.

Consoli, D., Vona, F. and Saarivirta, T. (2013), 'Analysis of the graduate labour market in Finland: Spatial agglomeration and skill–job match', *Regional Studies* **47**(10), 1634–1652.

Cooper, H. M. (1988), 'Organizing knowledge syntheses: A taxonomy of literature reviews', *Knowledge in Society* **1**(1), 104.

Cozzens, S. (2003), 'Science policy: two views from two decades', *Prometheus* **21**(4), 509–521.

Cozzens, S. E. (2012), 'Editor's introduction: Distributional consequences of emerging technologies', *Technological Forecasting and Social Change* **79**(2), 199–203.

Cozzens, S. E., Bobb, K. and Bortagaray, I. (2002), 'Evaluating the distributional consequences of science and technology policies and programs', *Research Evaluation* **11**(2), 101–107.

Cozzens, S. and Kaplinsky, R. (2009), Innovation, Poverty and Inequality: Cause, Coincidence, or Co-Evolution?, *in* B.-Å. Lundvall, K. Joseph, C. Chaminade and J. Vang, eds, 'Handbook of Innovation Systems and Developing Countries', Edward Elgar Publishing, Cheltenham.

Cozzi, G. and Impullitti, G. (2010), 'Government spending composition, technical change, and wage inequality', *Journal of the European Economic Association* **8**(6), 1325–1358.

Croce, G. and Ghignoni, E. (2020), 'The evolution of wage gaps between STEM and non-STEM graduates in a technological following economy', *Applied Economics* **52**(23), 2427–2442.

Cronin, B. (2020), Heterodox economic journal rankings revisited, *in* 'Contemporary Issues in Heterodox Economics', Routledge, London, pp. 231–258.

Crotty, J. (2009), 'Structural causes of the global financial crisis: a critical assessment of the 'new financial architecture'', *Cambridge journal of economics* **33**(4), 563–580.

Danermark, B., Ekström, M., Jakobsen, L. and Karlsson, J. C. (2002), *Explaining Society: Critical Realism in the Social Sciences*, Routledge, London.

Dell'Anno, R. and Solomon, H. O. (2014), 'Informality, inequality, and ICT in transition economies', *Eastern European Economics* **52**(5), 3–31.

Ding, S., Meriluoto, L., Reed, W. R., Tao, D. and Wu, H. (2011), 'The impact of agricultural technology adoption on income inequality in rural China: Evidence from southern Yunnan Province', *China Economic Review* **22**(3), 344–356.

DiPrete, T. A. (2007), 'What has sociology to contribute to the study of inequality trends? A historical and comparative perspective', *American Behavioral Scientist* **50**(5), 603–618.

Doloreux, D. and Porto Gomez, I. (2017), 'A review of (almost) 20 years of regional innovation systems research', *European Planning Studies* **25**(3), 371–387.

Donegan, M. and Lowe, N. (2008), 'Inequality in the creative city: Is there still a place for "old-fashioned" institutions?', *Economic Development Quarterly* **22**(1), 46–62.

Dorling, D. (2019), *Inequality and the 1%*, Verso, London.

Doussard, M., Peck, J. and Theodore, N. (2009), 'After deindustrialization: Uneven growth and economic inequality in "postindustrial" chicago', *Economic Geography* **85**(2), 183–207.

Downward, P. and Mearman, A. (2007), 'Retroduction as mixed-methods triangulation in economic research: reorienting economics into social science', *Cambridge Journal of Economics* **31**(1), 77–99.

Dustmann, C., Ludsteck, J. and Schönberg, U. (2009), 'Revisiting the German wage structure', *The Quarterly journal of economics* **124**(2), 843–881.

Echeverri-Carroll, E. and Ayala, S. G. (2009), 'Wage differentials and the spatial concentration of high-technology industries', *Papers in Regional Science* **88**(3), 623–641.

Echeverri-Carroll, E. L., Oden, M. D., Gibson, D. V. and Johnston, E. A. (2018), 'Unintended consequences on gender diversity of high-tech growth and labor market polarization', *Research Policy* **47**(1), 209–217.

Edquist, C. (2005), Systems of Innovation: Perspectives and Challenges, *in* J. Fagerberg, D. C. Mowery and R. R. Nelson, eds, 'The Oxford Handbook of Innovation', Oxford University Press, Oxford, pp. 181–208.

Edquist, C. (2019), 'Towards a holistic innovation policy: Can the Swedish national innovation council (NIC) be a role model?', *Research Policy* **48**(4), 869–879.

Elliott, J. E. (1980), 'Marx and Schumpeter on capitalism's creative destruction: A comparative restatement', *The Quarterly Journal of Economics* **95**(1), 45–68.

Englehardt, S. J. (2009), 'The evolution of skill-biased effects on American wages in the 1980s and 1990s', *Journal of Labor Research* **30**(2), 135–148.

Esquivel, G. and Rodrıguez-López, J. A. (2003), 'Technology, trade, and wage inequality in Mexico before and after NAFTA', *Journal of Development Economics* **72**(2), 543–565.

Fagerberg, J. (1994), 'Technology and international differences in growth rates', *Journal of economic Literature* **32**(3), 1147–1175.

Fagerberg, J. (2003), 'Schumpeter and the revival of evolutionary economics: An appraisal of the literature', *Journal of Evolutionary Economics* **13**(2), 125–159.

Fagerberg, J., Fosaas, M., Bell, M. and Martin, B. R. (2011), 'Christopher Freeman: social science entrepreneur', *Research Policy* **40**(7), 897–916.

Fagerberg, J., Fosaas, M. and Sapprasert, K. (2012), 'Innovation: Exploring the knowledge base', *Research Policy* **41**(7), 1132–1153.

Faggio, G., Salvanes, K. G. and Van Reenen, J. (2010), 'The evolution of inequality in productivity and wages: Panel data evidence', *Industrial and Corporate Change* **19**(6), 1919–1951.

Falkinger, J. and Zweimüller, J. (1997), 'The impact of income inequality on product diversity and economic growth', *Metroeconomica* **48**(3), 211–237.

Feldman, M., Guy, F. and Iammarino, S. (2021), 'Regional income disparities, monopoly and finance', *Cambridge Journal of Regions, Economy and Society* **14**(1), 25–49.

Fernandez, R. M. (2001), 'Skill-biased technological change and wage inequality: Evidence from a plant retooling', *American Journal of Sociology* **107**(2), 273–320.

Florida, R. L. (2007), *The Flight of The Creative Class: The New Global Competition for Talent*, HarperCollins, New York.

Florida, R. and Mellander, C. (2016), 'The geography of inequality: Difference and determinants of wage and income inequality across US metros', *Regional Studies* **50**(1), 79–92.

Fotaki, M. and Prasad, A. (2015), 'Questioning neoliberal capitalism and economic inequality in business schools', *Academy of Management Learning & Education* **14**(4), 556–575.

Fragkandreas, T. (2012), 'Reflections on social capital and economic performance', *International Review of Sociology* **22**(2), 259–271.

Fragkandreas, T. (2017), 'Innovation paradoxes: A review and typology of explanations', *Prometheus* **35**(4), 267–290.

Fragkandreas, T. (2021), *Innovation, Innovation Systems and Income Inequality: A Study of Causal Mechanisms*, PhD Thesis, Birkbeck, University of London, London.

Freebairn, D. K. (1995), 'Did the green revolution concentrate incomes? A quantitative study of research reports', *World Development* **23**(2), 265–279.

Freeman, C. (1994), Innovation and growth, *in* M. Dodgson and R. Rothwell, eds, 'The Handbook of Industrial Innovation', Edward Elgar Publishing, Cheltenham, pp. 78–93.

Freeman, C. (2001), Learning Economy and Inequality, *in* 'The Globalizing Learning Economy', Oxford University Press, Oxford.

Freeman, C. and Louçã, F. (2001), *As Time Goes By: From the Industrial Revolutions to the Information Revolution*, Oxford University Press, Oxford.

Frey, C. B. and Osborne, M. A. (2017), 'The future of employment: How susceptible are jobs to computerisation?', *Technological Forecasting and Social Change* **114**, 254–280.

Friedman, M. (2002), *Capitalism and Freedom*, University of Chicago Press, Chicago.

Fuchs, C. (2009), 'The role of income inequality in a multivariate cross-national analysis of the digital divide', *Social Science Computer Review* **27**(1), 41–58.

Geels, F. W. (2004), 'From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory', *Research Policy* **33**(6-7), 897–920.

Gibson, C. (2003), 'Digital divides in New South Wales: A research note on socio-spatial inequality using 2001 census data on computer and internet technology', *Australian Geographer* **34**(2), 239–257.

Goel, M. (2017), 'Inequality between and within skill groups: The curious case of India', *World Development* **93**, 153–176.

Goos, M. (2018), 'The impact of technological progress on labour markets: policy challenges', *Oxford review of economic policy* **34**(3), 362–375.

Goos, M., Manning, A. and Salomons, A. (2014), 'Explaining job polarization: Routine-biased technological change and offshoring', *American Economic Review* **104**(8), 2509–26.

Granstrand, O. and Holgersson, M. (2020), 'Innovation ecosystems: A conceptual review and a new definition', *Technovation* **90**, in press.

Gray, M., Golob, E., Markusen, A. and Park, S. O. (1998), 'New industrial cities? The four faces of silicon valley', *Review of Radical Political Economics* **30**(4), 1–28.

Greckhamer, T., Furnari, S., Fiss, P. C. and Aguilera, R. V. (2018), 'Studying configurations with qualitative comparative analysis: Best practices in strategy and organization research', *Strategic Organization* **16**(4), 482–495.

Guo, Q. (2019), 'Analysis on the relationship between regional innovation and income inequality in Chinese city regions', *The Professional Geographer* **71**(3), 472–490.

Haddaway, N., Woodcock, P., Macura, B. and Collins, A. (2015), 'Making literature reviews more reliable through application of lessons from systematic reviews', *Conservation Biology* **29**(6), 1596–1605.

Hall, P. A. and Soskice, D. W., eds (2001), *Varieties of Capitalism: The institutional Foundations of Comparative Advantage*, Oxford University Press, Oxford.

Handel, M. J. and Gittleman, M. (2004), 'Is there a wage payoff to innovative work practices?', *Industrial Relations: A Journal of Economy and Society* **43**(1), 67–97.

Hanley, C. (2014), 'Putting the bias in skill-biased technological change? A relational perspective on white-collar automation at General Electric', *American Behavioral Scientist* **58**(3), 400–415.

Harvey, D. (2005), *A Brief History of Neoliberalism*, Oxford University Press, USA.

Haskel, J. and Slaughter, M. J. (2001), 'Trade, technology and UK wage inequality', *The Economic Journal* **111**(468), 163–187.

Hatipoglu, O. (2012), 'The relationship between inequality and innovative activity: A Schumpeterian theory and evidence from cross-country data', *Scottish Journal of Political Economy* **59**(2), 224–248.

Heeks, R., Foster, C. and Nugroho, Y. (2014), 'New models of inclusive innovation for development', *Innovation and Development* **4**(2), 175–185.

Henrekson, M. and Jakobsson, U. (2001), 'Where Schumpeter was nearly right–the Swedish model and capitalism, socialism and democracy', *Journal of Evolutionary Economics* **11**(3), 331–358.

Hilbert, M. (2010), 'When is cheap, cheap enough to bridge the digital divide? Modeling income related structural challenges of technology diffusion in Latin America', *World Development* **38**(5), 756–770.

Hong, S., Oxley, L. and McCann, P. (2012), 'A survey of the innovation surveys', *Journal of Economic Surveys* **26**(3), 420–444.

Hope, D. and Martelli, A. (2019), 'The transition to the knowledge economy, labor market institutions, and income inequality in advanced democracies', *World Politics* **71**(2), 236–288.

Hudson, J. (2006), 'Inequality and the knowledge economy: Running to stand still?', *Social Policy and Society* **5**(2), 207.

Hyytinen, A. and Toivanen, O. (2011), 'Income inequality and technology diffusion: Evidence from developing countries', *Scandinavian Journal of Economics* **113**(2), 364–387.

Iversen, T. and Soskice, D. (2015), 'Democratic limits to redistribution: Inclusionary versus exclusionary coalitions in the knowledge economy', *World Politics* **67**(2), 185–225.

James, J. and Khan, H. A. (1998), Technology choice and income distribution, *in* 'Technological Systems and Development', Springer, pp. 105–130.

Jaumotte, F., Lall, S. and Papageorgiou, C. (2013), 'Rising income inequality: Technology, or trade and financial globalization?', *IMF Economic Review* **61**(2), 271–309.

Juhn, C., Ujhelyi, G. and Villegas-Sanchez, C. (2014), 'Men, women, and machines: How trade impacts gender inequality', *Journal of Development Economics* **106**, 179–193.

Juma, C. (2016), *Innovation and its Enemies: Why People Resist New Technologies*, Oxford University Press, Oxford.

Jung, H., Seo, I. and Jung, K. (2018), 'Mediating role of entrepreneurship in explaining the association between income inequality and regional economic performance', *Economic Development Quarterly* **32**(2), 135–145.

Kalantaridis, C. and Küttim, M. (2021), 'University ownership and information about the entrepreneurial opportunity in commercialisation: A systematic review and realist synthesis of the literature', *The Journal of Technology Transfer* **46**(1), 1487–1513.

Kawaguchi, D. and Mori, Y. (2016), 'Why has wage inequality evolved so differently between Japan and the US? the role of the supply of college-educated workers', *Economics of Education Review* **52**, 29–50.

Kay, R. and Hildyard, L. (2021), What happened to CEO pay in 2020?, Technical report, High Pay Centre.

Kijima, Y. (2006), 'Why did wage inequality increase? evidence from urban India 1983–99', *Journal of Development Economics* **81**(1), 97–117.

Kim, C. and Sakamoto, A. (2008), 'Does inequality increase productivity? Evidence from US manufacturing industries, 1979 to 1996', *Work and Occupations* **35**(1), 85–114.

Kim, H. and De Moor, L. (2017), 'The case of crowdfunding in financial inclusion: A survey', *Strategic Change* **26**(2), 193–212.

King, N. and Brooks, J. M. (2017), *Template Analysis for Business and Management Students*, Mastering Business Research Methods, Sage, Los Angeles ; Thousand Oaks, CA. OCLC: ocn968904911.

Kline, S. J. and Rosenberg, N. (1986), An overview of innovation, *in* N. Rosenberg and R. Landau, eds, 'The Positive Sum Strategy: Harnessing Technology for Economic Growth'.

Kristal, T. (2013), 'The capitalist machine: Computerization, workers' power, and the decline in labor's share within US industries', *American Sociological Review* **78**(3), 361–389.

Kristal, T. and Cohen, Y. (2017), 'The causes of rising wage inequality: The race between institutions and technology', *Socio-Economic Review* **15**(1), 187–212.

Krueger, A. B. (1993), 'How computers have changed the wage structure: Evidence from microdata, 1984–1989', *The Quarterly Journal of Economics* **108**(1), 33–60.

Krusell, P., Ohanian, L. E., Ríos-Rull, J.-V. and Violante, G. L. (2000), 'Capital-skill complementarity and inequality: A macroeconomic analysis', *Econometrica* **68**(5), 1029–1053.

Kuznets, S. (1955), 'Economic Growth and Income Inequality', *The American Economic Review* **45**(1), 1–28.

Lakner, C. and Milanovic, B. (2016), 'Global Income Distribution: From the Fall of the Berlin Wall to the Great Recession', *The World Bank Economic Review* **30**(2), 203–232.

Langer, L. (2001), 'The consequences of state economic development strategies on income distribution in the American states, 1976 to 1994', *American Politics Research* **29**(4), 392–415.

Lawson, T. (1997), *Economics and Reality*, Routledge, London.

Lawton-Smith, H. (2009), 'Technicians: skills, age and gender profiles and training implications in oxfordshire', *Professional Geographer* **61**(1), 59–69.

Lazear, E. P. (2000), 'Economic imperialism', *Quarterly Journal of Economics* **115**(1), 99–146.

Lazonick, W. and Mazzucato, M. (2013), 'The risk-reward nexus in the innovation-inequality relationship: Who takes the risks? Who gets the rewards?', *Industrial and Corporate Change* **22**(4), 1093–1128.

Lee, N. (2011), 'Are innovative regions more unequal? Evidence from Europe', *Environment and Planning C: Government and Policy* **29**(1), 2–23.

Lee, N. (2016), Growth With Inequality? The Local Consequences of Innovation and Creativity, *in* R. Shearmur, C. Carrincazeaux and D. Doloreux, eds, 'Handbook on the Geographies of Innovation', Edward Elgar Publishing, Cheltenham.

Lee, N. (2019), 'Inclusive growth in cities: A sympathetic critique', *Regional Studies* **53**(3), 424–434.

Lee, N. and Rodríguez-Pose, A. (2013), 'Innovation and spatial inequality in Europe and USA', *Journal of Economic Geography* **13**(1), 1–22.

Lemieux, T. (2008), 'The changing nature of wage inequality', *Journal of Population Economics* **21**(1), 21–48.

Lin, K.-H. and Tomaskovic-Devey, D. (2013), 'Financialization and US income inequality, 1970–2008', *American Journal of Sociology* **118**(5), 1284–1329.

Lohmann, H. (2009), 'Welfare states, labour market institutions and the working poor: A comparative analysis of 20 European countries', *European Sociological Review* **25**(4), 489–504.

Louçã, F. (2007), *The Years of High Econometrics: A Short History of the Generation that Reinvented Economics*, Routledge, London.

Lundvall, B.-A. (2002), *Innovation, Growth and Social Cohesion: The Danish Model*, Edward Elgar.

Lundvall, B.-A. (2013), Innovation Studies: A Personal Interpretation of 'The State of the Art', *in* J. Fagerberg, B. R. Martin and E. S. Andersen, eds, 'Innovation Studies: Evolution and Future Challenges', Oxford University Press, Oxford, pp. 20–70.

Macdonald, S. (2015), 'Emperor's new clothes: The reinvention of peer review as myth', *Journal of Management Inquiry* **24**(3), 264–279.

Macdonald, S. and Kam, J. (2011), 'The skewed few: People and papers of quality in management studies', *Organization* **18**(4), 467–475.

Machin, S. (1998), 'Recent shifts in wage inequality and the wage returns to education in Britain', *National Institute Economic Review* **166**, 87–96.

MacPhail, F. (2000), 'What caused earnings inequality to increase in Canada during the 1980s?', *Cambridge Journal of Economics* **24**(2), 153–175.

MacRoberts, M. H. and MacRoberts, B. R. (2018), 'The mismeasure of science: Citation analysis', *Journal of the Association for Information Science and Technology* **69**(3), 474–482.

Manso, E. P. (2006), 'The influence of earnings on income distribution in the united states', *The Journal of Socio-Economics* **35**(4), 710–726.

Martin, B. R. (2012), 'The evolution of science policy and innovation studies', *Research policy* **41**(7), 1219–1239.

Martin, B. R. (2016), 'Twenty challenges for innovation studies', *Science and Public Policy* **43**(3), 432–450.

Martin, S. P. and Robinson, J. P. (2007), 'The income digital divide: Trends and predictions for levels of internet use', *Social Problems* **54**(1), 1–22.

Martorano, B. and Sanfilippo, M. (2015), 'Structural change and wage inequality in the manufacturing sector: Long run evidence from East Asia', *Oxford Development Studies* **43**(2), 212–231.

Marx, K. (1999), *Capital: A New Abridgement*, Oxford University Press Oxford.

McCall, L. (2000), 'Gender and the new inequality: Explaining the college/non-college wage gap', *American Sociological Review* pp. 234–255.

McGregor, T., Smith, B. and Wills, S. (2019), 'Measuring inequality', *Oxford Review of Economic Policy* **35**(3), 368–395.

Mehic, A. (2018), 'Industrial employment and income inequality: Evidence from panel data', *Structural Change and Economic Dynamics* **45**, 84–93.

Mendonça, S., Crespo, N. and Simões, N. (2015), 'Inequality in the network society: An integrated approach to ICT access, basic skills, and complex capabilities', *Telecommunications Policy* **39**(3-4), 192–207.

Meschi, E. and Vivarelli, M. (2009), 'Trade and income inequality in developing countries', *World Development* **37**(2), 287–302.

Milanovic, B. (2016), *Global Inequality: A New Approach for the Age of Globalization*, Harvard University Press, Cambridge, MA.

Mishel, L. and Bernstein, J. (2003), 'Wage inequality and the new economy in the US: Does it-led growth generate wage inequality', *Canadian Public Policy/Analyse de Politiques* pp. S203–S221.

Mosher, J. S. (2007), 'US wage inequality, technological change, and decline in union power', *Politics & Society* **35**(2), 225–263.

Mukhopadhyay, S. and Nandi, R. (2007), 'Unpacking the assumption of gender neutrality: Akshaya project of the Kerala it mission in India', *Gender, Technology and Development* **11**(1), 75–95.

Munir, K. A. (2020), 'Inequality in the time of Corona virus', *Journal of Management Studies* .

Nakara, W. A., Messeghem, K. and Ramaroson, A. (2019), 'Innovation and entrepreneurship in a context of poverty: A multilevel approach', *Small Business Economics* pp. 1–17.

Neckerman, K. M. and Torche, F. (2007), 'Inequality: Causes and Consequences', *Annual Review of Sociology* **33**(1), 335–357.

Nielsen, K. (2003), 'Social capital and the evaluation of innovation policies', *International Journal of Technology Management* **26**(2-4), 205–225.

OECD (2011), *Divided We Stand: Why Inequality Keeps Rising*, OECD, Paris.

OECD (2015), *In It Together: Why Less Inequality Benefits All*, OECD, Paris.

Otioma, C., Madureira, A. M. and Martinez, J. (2019), 'Spatial analysis of urban digital divide in Kigali, Rwanda', *GeoJournal* **84**(3), 719–741.

Otsuka, K., Cordova, V. G. and David, C. C. (1990), 'Modern rice technology and regional wage differentials in the Philippines', *Agricultural Economics* **4**(3-4), 297–314.

Papaioannou, T. (2016), 'Marx and Sen on incentives and justice: Implications for innovation and development', *Progress in Development Studies* **16**(4), 297–313.

Pastor, M. and Marcelli, E. A. (2000), 'Men n the hood: Skill, spatial, and social mismatch among male workers in los angeles county', *Urban Geography* **21**(6), 474–496.

Pavitt, K. (1984), 'Sectoral patterns of technical change: Towards a taxonomy and a theory', *Research Policy* **13**(6), 343–373.

Peet, R. (1975), 'Inequality and poverty: A Marxist-Geographic Theory', *Annals of the Association of American Geographers* **65**(4), 564–571.

Perez, C. (2013), Innovation systems and policy for development in a changing world, *in* J. Fagerberg, B. R. Martin and E. S. Andersen, eds, 'Innovation Studies: Evolution and Future Challenges', Oxford University Press, Oxford, pp. 90–110.

Petticrew, M. and Roberts, H. (2008), *Systematic Reviews in the Social Sciences: A Practical Guide*, John Wiley & Sons.

Pianta, M. (2005), Innovation and employment, *in* J. Fagerberg, D. C. Mowery and R. R. Nelson, eds, 'The Oxford Handbook of Innovation', Oxford University Press, Oxford, pp. 568–598.

Pianta, M. (2018), 'Technology and employment: Twelve stylised facts for the digital age', *The Indian Journal of Labour Economics* **61**(2), 189–225.

Pianta, M. (2020), 'Technology and work: Key stylized facts for the digital age', *Handbook of Labor, Human Resources and Population Economics* pp. 1–17.

Pickett, K. and Wilkinson, R. (2010), *The Spirit Level: Why Equality Is Better for Everyone*, Penguin UK, London.

Piketty, T. (2014), *Capital in the Twenty-First Century*, The Belknap Press of Harvard University Press, Cambridge MA.

Randolph, J. (2009), 'A guide to writing the dissertation literature review', *Practical Assessment, Research, and Evaluation* **14**(1), 13.

Riaz, S. (2015), 'Bringing inequality back in: The economic inequality footprint of management and organizational practices', *Human Relations* **68**(7), 1085–1097.

Ricardo, D. (1891), *Principles of Political Economy and Taxation*, G. Bell and sons.

Richmond, K. and Triplett, R. E. (2018), 'ICT and income inequality: A cross-national perspective', *International Review of Applied Economics* **32**(2), 195–214.

Rijkers, B., Laderchi, C. R. and Teal, F. (2010), 'Who benefits from promoting small enterprises? some empirical evidence from ethiopia', *World Development* **38**(4), 523–540.

Rikap, C. and Lundvall, B.-Å. (2021), *The Digital Innovation Race: Conceptualizing the Emerging New World Order*, Palgrave, New York.

Rogers, E. M. (1995), *Diffusion of Innovations*, 4th ed edn, Free Press, New York.

Samuelson, P., N.-D. (2010), *Economics*, McGraw-Hill.

Santos, M., Sequeira, T. N. and Ferreira-Lopes, A. (2017), 'Income inequality and technological adoption', *Journal of Economic Issues* **51**(4), 979–1000.

Sayer, A. (2000*a*), For postdisciplinary studies: Sociology and the curse of disciplinary parochialism/imperialism, *in* S. S. W. C. Eldridge, J. MacInnes and A. Witz, eds, 'For Sociology: Legacies and Prospects', Sociologypress, Durham.

Sayer, A. (2015), *Why We Can't Afford the Rich*, Policy Press, Cambridge.

Sayer, R. A. (2000*b*), *Realism and Social Science*, Sage, London.

Schot, J. and Steinmueller, W. E. (2018), 'Three frames for innovation policy: R&D, systems of innovation and transformative change', *Research Policy* **47**(9), 1554–1567.

Schumpeter, J. A. (1934), *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*, Transaction Books, New Brunswick, N.J.

Schumpeter, J. A. (1944), *Capitalism, Socialism and Democracy*, HarperPerennial, New York.

Senker, P. (2015), 'The triumph of neoliberalism and the world dominance of capitalism', *Prometheus* **33**(2), 97–111.

Shahabadi, A., Nemati, M. and Hosseinidoust, S. E. (2017), 'The effect of knowledge economy factors on income inequality in the selected Islamic countries', *Journal of the knowledge economy* **8**(4), 1174–1188.

Smith, A. (1776/1982), *The Wealth of Nations: An Inquiry into the Nature and Causes of the Wealth of Nations*, Penguin.

Smith, K. (2005), Measuring innovation, *in* J. Fagerberg, D. C. Mowery and R. R. Nelson, eds, 'The Oxford Handbook of Innovation', Oxford University Press, Oxford, pp. 148–179.

Smith, T. (2010), 'Technological change in Capitalism: Some Marxian themes', *Cambridge Journal of Economics* **34**(1), 203–212.

Soete, L. (2013), Is innovation always good, *in* B. Fagerberg, Jan Martin and E. S. Andersen, eds, 'Innovation Studies: Evolution and Future Challenges', Oxford University Press, Oxford, pp. 134–144.

Solow, R. M. (1956), 'A contribution to the theory of economic growth', *The Quarterly Journal of Economics* **70**(1), 65–94.

Solow, R. M. (1957), 'Technical change and the aggregate production function', *The Review of Economics and Statistics* pp. 312–320.

Sombart, W. (1967), *Luxury and Capitalism*, University of Michigan Press.

Song, J., Price, D. J., Guvenen, F., Bloom, N. and Von Wachter, T. (2019), 'Firming up inequality', *The Quarterly Journal of Economics* **134**(1), 1–50.

Stiglitz, J. E. (2012), *The Price of Inequality: How Today's Divided Society Endangers Our Future*, W.W. Norton & Co, New York.

Stockhammer, E. (2017), 'Determinants of the wage share: A panel analysis of advanced and developing economies', *British Journal of Industrial Relations* **55**(1), 3–33.

Taylor, K. (2006), 'UK wage inequality: An industry and regional perspective', *Labour* **20**(1), 91–124.

ten Berge, J. and Tomaskovic-Devey, D. (2021), 'Immigrant-biased technological change: The effect of new technology implementation on native and non-Western immigrant employment in the Netherlands', *Social Forces* .

Thakur, D. (2012), 'A limited revolution—the distributional consequences of open source software in North America', *Technological Forecasting and Social Change* **79**(2), 244–251.

Thapa, G., Otsuka, K. and Barker, R. (1992), 'Effect of modern rice varieties and irrigation on household income distribution in Nepalese villages', *Agricultural Economics* **7**(3-4), 245–265.

Thewissen, S., van Vliet, O. and Wang, C. (2018), 'Taking the sector seriously: Data, developments, and drivers of intrasectoral earnings inequality', *Social Indicators Research* **138**(3), 1023–1048.

Tidd, J. and Bessant, J. R. (2018), *Managing Innovation: Integrating Technological, Market and Organizational Change*, John Wiley & Sons, Hoboken.

Tilly, C. (1998), *Durable Inequality*, University of California Press, Berkeley.

Tomaskovic-Devey, D. (2014), 'The relational generation of workplace inequalities', *Social Currents* **1**(1), 51–73.

Tomaskovic-Devey, D. and Avent-Holt, D. (2019), *Relational Inequalities: An Organizational Approach*, Oxford University Press, USA, Oxford.

Tranfield, D., Denyer, D. and Smart, P. (2003), 'Towards a methodology for developing evidence-informed management knowledge by means of systematic review', *British Journal of Management* **14**(3), 207–222.

Tselios, V. (2011), 'Is inequality good for innovation?', *International Regional Science Review* **34**(1), 75–101.

Vallas, S. and Cummins, E. (2014), 'Relational models of organizational inequalities: Emerging approaches and conceptual dilemmas', *American Behavioral Scientist* **58**(2), 228–255.

Van Reenen, J. (2011), 'Wage inequality, technology and trade: 21st century evidence', *Labour Economics* **18**(6), 730–741.

Veblen, T. (1899/2009), *The Theory of the Leisure Class: An Economic Study in the Evolution of Institutions*, Oxford University Press.

Violante, G. L. (2008), Skill-Biased Technical Change, *in* Matias Vernengo, Esteban Perez Caldentey, Barkley J. Rosser Jr, ed., 'The New Palgrave Dictionary of Economics', Palgrave Macmillan UK, London, pp. 1–6.

Vona, F. and Patriarca, F. (2011), 'Income inequality and the development of environmental technologies', *Ecological Economics* **70**(11), 2201–2213.

Weed, M. (2005), '"Meta interpretation": A method for the interpretive synthesis of qualitative research', *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* **6**(1).

Wei, Y., Liu, X., Song, H. and Romilly, P. (2001), 'Endogenous innovation growth theory and regional income convergence in China', *Journal of International Development: The Journal of the Development Studies Association* **13**(2), 153–168.

Weinhold, D. and Nair-Reichert, U. (2009), 'Innovation, inequality and intellectual property rights', *World Development* **37**(5), 889–901.

Wheeler, C. H. (2005), 'Cities, skills, and inequality', *Growth and Change* **36**(3), 329–353.

Woodson, T., Alcantara, J. T. and do Nascimento, M. S. (2019), 'Is 3D printing an inclusive innovation?: An examination of 3d printing in brazil', *Technovation* **80**, 54–62.

Wright, E. O. (1994), *Interrogating Inequality: Essays on Class Analysis, Socialism, and Marxism*, Verso, London ; New York.

Xavier-Oliveira, E., Laplume, A. O. and Pathak, S. (2015), 'What motivates entrepreneurial entry under economic inequality? The role of human and financial capital', *Human Relations* **68**(7), 1183–1207.

Xu, B. and Li, W. (2008), 'Trade, technology, and China's rising skill demand', *Economics of Transition* **16**(1), 59–84.

Yanadori, Y. and Cui, V. (2013), 'Creating incentives for innovation? The relationship between pay dispersion in R&D groups and firm innovation performance', *Strategic Management Journal* **34**(12), 1502–1511.

Yin, R. K. (2009), *Case Study Research: Design and Methods*, 4th edn, Sage, Los Angeles.

Zehavi, A. and Breznitz, D. (2017), 'Distribution sensitive innovation policies: Conceptualization and empirical examples', *Research Policy* **46**(1), 327–336.

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	Author	Year	Title	Journal	Field	Citations (Google Scholar*)
1	Frey C.B., Osborne M.A.	2017	The future of employment: How susceptible are jobs to computerisation?	Technological Forecasting and Social Change	Innovation studies	6,906
2	Autor D.H., Katz L.F., Kearney M.S.	2008	Trends in U.S. wage inequality: Revising the revisionists	Review of Economics and Statistics	Economics	2,807
3	Krueger A.B.	1993	How computers have changed the wage structure: Evidence from microdata, 1984–1989	Quarterly Journal of Economics	Economics	2,055
4	Krusell P., Ohanian L.E., Ríos-Rull J.-V., Violante G.L.	2000	Capital-skill complementarity and inequality: A macroeconomic analysis	Econometrica	Economics	2,012
5	Lemieux T.	2006	Increasing residual wage inequality: Composition effects, noisy data, or rising demand for skill?	American Economic Review	Economics	1,119
6	Dustmann C., Ludsteck J., Schönberg U.	2009	Revisiting the german wage structure	Quarterly Journal of Economics	Economics	1,066
7	Attanasio O., Goldberg P.K., Pavcnik N.	2004	Trade reforms and wage inequality in Colombia	Journal of Development Economics	Economics, development economics	677
8	Jaumotte F., Lall S., Papageorgiou C.	2013	Rising income inequality: Technology, or trade and financial globalization?	IMF Economic Review	Economics	641
9	Bernard A.B., Jensen J.B.	1997	Exporters, skill upgrading, and the wage gap	Journal of International Economics	Economics	630
10	Bresnahan T.F.	1999	Computerisation and wage dispersion: An analytical reinterpretation	Economic Journal	Economics	491
11	Lin K.-H., Tomaskovic-Devey D.	2013	Financialization and U.S. income inequality	American Journal of Sociology	Sociology	432
12	Baldwin R.E., Cain G.G.	2000	Shifts in relative U.S. Wages: The role of trade, technology, and factor endowments	Review of Economics and Statistics	Economics	310
13	Meschi E., Vivarelli M.	2009	Trade and Income Inequality in Developing Countries	World Development	Development studies	304
14	Haskel J., Slaughter M.J.	2001	Trade, technology and U.K. wage inequality	Economic Journal	Economics	284
15	Esquivel G., Rodríguez-López J.A.	2003	Technology, trade, and wage inequality in Mexico before and after NAFTA	Journal of Development Economics	Economics, development economics	279
16	Faggio G., Salvanes K.G., van Reenen J.	2010	The evolution of inequality in productivity and wages: Panel data evidence	Industrial and Corporate Change	Innovation studies	277
17	Freebairn D.K.	1995	Did the Green Revolution Concentrate Incomes? A Quantitative Study of Research Reports	World Development	Development studies	234
18	Arndt C., Benfica R., Tarp F., Thurlow J., Uaiene R.	2010	Biofuels, poverty, and growth: A computable general equilibrium analysis of Mozambique	Environment and Development Economics	Economics, development economics, environmental economics	233
19	Aghion P., Akcigit U., Bergeaud A., Blundell R., Hemous D.	2019	Innovation and Top Income Inequality	Review of Economic Studies	Economics	227
20	Fernandez R.M.	2001	Skill-biased technological change and wage inequality: Evidence from a plant retooling	American Journal of Sociology	Sociology	223
21	Kijima Y.	2006	Why did wage inequality increase? Evidence from urban India 1983-99	Journal of Development Economics	Economics, development economics	209
22	Juhn C., Ujhelyi G., Villegas-Sanchez C.	2014	Men, women, and machines: How trade impacts gender inequality	Journal of Development Economics	Economics, development economics	183
23	Martin S.P., Robinson J.P.	2007	The income digital divide: Trends and predictions for levels of internet use	Social Problems	Sociology	182
24	Chakraborty J., Bosman M.M.	2005	Measuring the digital divide in the United States: Race, income, and personal computer ownership	Professional Geographer	Geography	181
25	Greenwood J., Guner N., Kocharkov G., Santos C.	2016	Technology and the changing family: A unified model of marriage, divorce, educational attainment, and married female labor-force participation	American Economic Journal: Macroeconomics	Economics, macroeconomics	176
26	Comin D., Mestieri M.	2018	If technology has arrived everywhere, why has income diverged?	American Economic Journal: Macroeconomics	Economics, macroeconomics	176
27	Black S.E., Lynch L.M., Krivelyova A.	2004	How workers fare when employers innovate	Industrial Relations	Industrial, work and employment relations	174
28	Kristal T.	2013	The Capitalist Machine: Computerization, Workers' Power, and the Decline in Labor's Share within U.S. Industries	American Sociological Review	Sociology	168
29	Handel M.J., Gittleman M.	2004	Is there a wage payoff to innovative work practices?	Industrial Relations	Industrial, work and employment relations	161
30	McCall L.	2000a	Explaining levels of within-group wage inequality in U.S. labor markets	Demography	Sociology	150
31	Subramanian A., Qaim M.	2009	Village-wide Effects of Agricultural Biotechnology: The Case of Bt Cotton in India	World Development	Development studies	144
32	Stockhammer E.	2017	Determinants of the Wage Share: A Panel Analysis of Advanced and Developing Economies	British Journal of Industrial Relations	Industrial, work and employment relations	141
33	Ge S., Yang D.T.	2014	Changes in china's wage structure	Journal of the European Economic Association	Economics	129
34	Hilbert M.	2010	When is cheap, cheap enough to bridge the digital divide? Modeling income related structural challenges of technology diffusion in Latin America	World Development	Development studies	122
35	McCall L.	2000b	Gender and the new inequality: Explaining the college/ non-college wage gap	American Sociological Review	Sociology	122
36	Tansel A., Bodur F.B.	2012	Wage inequality and returns to education in Turkey: A quantile regression analysis	Review of Development Economics	Economics, development economics	108
37	Belman D.L., Monaco K.A.	2001	The effects of deregulation, de-unionization, technology, and human capital on the work and work lives of truck drivers	Industrial and Labor Relations Review	Industrial, work and employment relations	107
38	Florida R., Mellander C.	2016	The Geography of Inequality: Difference and Determinants of Wage and Income Inequality across US Metros	Regional Studies	Geography	103
39	Commander S., Kollo J.	2008	The changing demand for skills: Evidence from the transition	Economics of Transition	Economics	102
40	Doussard M., Peck J., Theodore N.	2009	After deindustrialization: Uneven growth and economic inequality in "Postindustrial" Chicago	Economic Geography	Geography	100
41	Fuchs C.	2009	The role of income inequality in a multivariate cross-national analysis of the digital divide	Social Science Computer Review	Other social sciences	99
42	Lee N., Rodríguez-pose A.	2013	Innovation and spatial inequality in europe and USA	Journal of Economic Geography	Geography	98
43	Adams S.	2008	Globalization and income inequality: Implications for intellectual property rights	Journal of Policy Modeling	Economics	93
44	Xu B., Li W.	2008	Trade, technology, and China's rising skill demand	Economics of Transition	Economics	89
45	Wei Y., Liu X., Song H., Romilly P.	2001	Endogenous innovation growth theory and regional income convergence in China	Journal of International Development	Development studies	84
46	Blum B.S.	2008	Trade, technology, and the rise of the service sector: The effects on US wage inequality	Journal of International Economics	Economics	82
47	Adermon A., Gustavsson M.	2015	Job Polarization and Task-Biased Technological Change: Evidence from Sweden, 1975-2005	Scandinavian Journal of Economics	Economics	79
48	Lindley J., Machin S.	2014	Spatial changes in labour market inequality	Journal of Urban Economics	Geography	77
49	Perugini C., Pompei F.	2009	Technological change and income distribution in Europe	International Labour Review	Industrial, work and employment relations	73
50	Vona F., Patriarca F.	2011	Income inequality and the development of environmental technologies	Ecological Economics	Economics, environmental economics	71
51	Cozzi G., Impullitti G.	2010	Government spending composition, technical change, and wage inequality	Journal of the European Economic Association	Economics	68
52	Jerzmanowski M., Nabar M.	2013	Financial development and wage inequality: Theory and evidence	Economic Inquiry	Economics	66
53	Breau S., Kogler D.F., Bolton K.C.	2014	On the Relationship between Innovation and Wage Inequality: New Evidence from Canadian Cities	Economic Geography	Geography	62
54	Borghans L., ter Weel B.	2007	The diffusion of computers and the distribution of wages	European Economic Review	Economics	58
55	Gaggl P., Wright G.C.	2017	A short-run view of what computers do: Evidence from a UK tax incentive	American Economic Journal: Applied Economics	Economics	58
56	Machin S.	1998	Recent shifts in wage inequality and the wage returns to education in Britain	National Institute Economic Review	Economics	56
57	Lee J.-W., Wie D.	2015	Technological change, skill demand, and wage inequality: Evidence from Indonesia	World Development	Development studies	56
58	Kristal T., Cohen Y.	2017	The causes of rising wage inequality: The race between institutions and technology	Socio-Economic Review	Economics, Sociology	55
59	Wheeler C.H.	2005	Cities, skills, and inequality	Growth and Change	Geography, development studies	49
60	Gibson C.	2003	Digital divides in New South Wales: A research note on socio-spatial inequality using 2001 Census data on computer and Internet technology	Australian Geographer	Geography	47
61	Pastor M., Jr., Marcelli E.A.	2000	Men n the hood: Skill, spatial, and social mismatch among Male workers in Los Angeles County	Urban Geography	Geography	47
62	Roser M., Cuaresma J.C.	2016	Why is Income Inequality Increasing in the Developed World?	Review of Income and Wealth	Economics	46
63	Lee N.	2011	Are innovative regions more unequal? evidence from Europe	Environment and Planning C: Government and Policy	Geography	45
64	Ding S., Meriluoto L., Reed W.R., Tao D., Wu H.	2011	The impact of agricultural technology adoption on income inequality in rural China: Evidence from southern Yunnan Province	China Economic Review	Economics	43
65	Falkinger J., Zweimüller J.	1997	The impact of income inequality on product diversity and economic growth	Metroeconomica	Economics	43
66	Alene A.D., Coulibaly O.	2009	The impact of agricultural research on productivity and poverty in sub-Saharan Africa	Food Policy	Other multidisciplinary, food studies	43
67	Močnik D., Širec K.	2010	The determinants of Internet use controlling for income level: Cross-country empirical evidence	Information Economics and Policy	Economics, technology	40
68	Weinhold D., Nair-Reichert U.	2009	Innovation, Inequality and Intellectual Property Rights	World Development	Development studies	40
69	Echeverri-Carroll E., Ayala S.G.	2009	Wage differentials and the spatial concentration of high-technology industries	Papers in Regional Science	Geography	38
70	MacPhail F.	2000	What caused earnings inequality to increase in Canada during the 1980s?	Cambridge Journal of Economics	Economics	35
71	Hagos F., Jayasinghe G., Awulachew S.B., Loulseged M., Yilma A.D.	2012	Agricultural water management and poverty in Ethiopia	Agricultural Economics (United Kingdom)	Economics, Agricultural economics	34
72	Angelini E.C., Farina F., Pianta M.	2009	Innovation and wage polarisation in Europe	International Review of Applied Economics	Economics	32
73	James J., Khan H.	1997	Technology choice and income distribution	World Development	Development studies	30
74	Choi K.-S., Jeong J.	2005	Technological change and wage premium in a small open economy: The case of Korea	Applied Economics	Economics	29
75	Gray M., Golob E., Markusen A., Park S.O.	1998	New industrial cities? The four faces of Silicon Valley	Review of Radical Political Economics	Economics	29
76	Thapa G., Otsuka K., Barker R.	1992	Effect of modern rice varieties and irrigation on household income distribution in Nepalese villages	Agricultural Economics	Economics, Agricultural economics	29
77	Brouwer R., Brito L.	2012	Cellular phones in Mozambique: Who has them and who doesn't?	Technological Forecasting and Social Change	Innovation studies	28
78	Brynin M., Perales F.	2016	Gender wage inequality: The de-gendering of the occupational structure	European Sociological Review	Sociology	28
79	Tselios V.	2011	Is inequality good for innovation?	International Regional Science Review	Geography	27
80	Taylor K.	2006	UK wage inequality: An industry and regional perspective	Labour	Industrial, work and employment relations	27
81	Chennells L., Reenen J.V.	1998	Establishment level earnings, technology and the growth of inequality: Evidence from Britain	Economics of Innovation and New Technology	Innovation studies, economics	25
82	Cozzens S.E., Bobb K., Deas K., Gatchair S., George A., Ordonez G.	2005	Distributional effects of science and technology-based economic development strategies at state level in the United States	Science and Public Policy	Innovation studies	25
83	Antonelli C., Gehringer A.	2017	Technological change, rent and income inequalities: A Schumpeterian approach	Technological Forecasting and Social Change	Innovation studies	23

	Author	Year	Title	Journal	Field	Citations (Google Scholar*)
84	Álvarez R., López R.A.	2009	Skill upgrading and the real exchange rate	World Economy	Economics, international relations	22
85	Hyytinen A., Toivanen O.	2011	Income Inequality and Technology Diffusion: Evidence from Developing Countries	Scandinavian Journal of Economics	Economics	22
86	Reshef A.	2013	Is technological change biased towards the unskilled in services? An empirical investigation	Review of Economic Dynamics	Economics	22
87	Belman D., Levine D.I.	2004	Size, skill and sorting	Labour	Industrial, work and employment relations	22
88	Colclough G., Tolbert C.M., II	1990	High Technology, Work, and Inequality in Southern Labor Markets	Work and Occupations	Industrial, work and employment relations	22
89	Antonczyk D., Deleire T., Fitzenberger B.	2018	Polarization and rising wage inequality: Comparing the U.S. and Germany	Econometrics	Economics	21
90	Mendonça S., Crespo N., Simões N.	2015	Inequality in the network society: An integrated approach to ICT access, basic skills, and complex capabilities	Telecommunications Policy	Other multidisciplinary, technology	20
91	Kim C., Sakamoto A.	2008	Does inequality increase productivity?: Evidence from U.S. Manufacturing industries, 1979 to 1996	Work and Occupations	Industrial, work and employment relations	19
92	Otsuka K., Cordova V.G., David C.C.	1990	Modern rice technology and regional wage differentials in the Philippines	Agricultural Economics	Economics, Agricultural economics	18
93	Mosher J.S.	2007	U.S. wage inequality, technological change, and decline in union power	Politics and Society	Other political science	18
94	Cook P., Uchida Y.	2008	Structural change, competition and income distribution	Quarterly Review of Economics and Finance	Economics	17
95	Warman C., Worswick C.	2015	Technological change, occupational tasks and declining immigrant outcomes: Implications for earnings and income inequality in Canada	Canadian Journal of Economics	Economics	17
96	Hanley C.	2014	Putting the Bias in Skill-Biased Technological Change? A Relational Perspective on White-Collar Automation at General Electric	American Behavioral Scientist	Sociology	17
97	Bogliacino F.	2009	Poorer Workers. The Determinants of wage Formation in Europe	International Review of Applied Economics	Economics	14
98	Hatipoglu O.	2012	The relationship between inequality and innovative activity: A Schumpeterian theory and evidence from cross-country data	Scottish Journal of Political Economy	Economics, political science	14
99	Kharlamova G., Stavytskyy A., Zarotiadis G.	2018	The impact of technological changes on income inequality: The EU states case study	Journal of International Studies	Sociology, Economics	14
100	Broccolini C., Turco A.L., Presbitero A.F., Staffolani S.	2011	Individual earnings, international outsourcing and technological change: Evidence from Italy	International Economic Journal	Economics	13
101	Kawaguchi D., Mori Y.	2016	Why has wage inequality evolved so differently between Japan and the US? The role of the supply of college-educated workers	Economics of Education Review	Economics	13
102	Rijkers B., Ruggeri Laderchi C., Teal F.	2010	Who Benefits from Promoting Small Enterprises? Some Empirical Evidence from Ethiopia	World Development	Development studies	13
103	Adrián Risso W., Sánchez Carrera E.J.	2019	On the impact of innovation and inequality in economic growth	Economics of Innovation and New Technology	Innovation studies, economics	13
104	Woodson T., Alcantara J.T., do Nascimento M.S.	2019	Is 3D printing an inclusive innovation?: An examination of 3D printing in Brazil	Technovation	Innovation studies	13
105	Thakur D.	2012	A limited revolution - The distributional consequences of Open Source Software in North America	Technological Forecasting and Social Change	Innovation studies	13
106	Thakur D.	2012	Market competition and the distributional consequences of mobile phones in Canada	Technological Forecasting and Social Change	Innovation studies	13
107	Langer L.	2001	The consequences of state economic development strategies on income distribution in the American states, 1976 to 1994	American Politics Research	Other political science	13
108	Richmond K., Triplett R.E.	2018	ICT and income inequality: a cross-national perspective	International Review of Applied Economics	Economics	12
109	Tsou M.-W.	2002	Wage differentials in Taiwanese manufacturing, 1982-1997	Asian Economic Journal	Economics	12
110	Consoli D., Vona F., Saarivirta T.	2013	Analysis of the Graduate Labour Market in Finland: Spatial Agglomeration and Skill-Job Match	Regional Studies	Geography	12
111	Walton M., Pallitt N.	2012	'Grand Theft South Africa': Games, literacy and inequality in consumer childhoods	Language and Education	Other, education	12
112	Manso E.P.	2006	The influence of earnings on income distribution in the United States	Journal of Socio-Economics	Economics	11
113	Brown C., Campbell B.	2001	Technical change, wages, and employment in semiconductor manufacturing	Industrial and Labor Relations Review	Industrial, work and employment relations	11
114	Eriksson T., Pytliková M., Warzynski F.	2013	Increased sorting and wage inequality in the Czech Republic: New evidence using linked employer-employee dataset	Economics of Transition	Economics	10
115	Echeverri-Carroll E.L., Oden M.D., Gibson D.V., Johnston E.A.	2018	Unintended consequences on gender diversity of high-tech growth and labor market polarization	Research Policy	Innovation studies	10
116	Asplund R., Lilja R.	2014	Wage formation and gender wage gaps: Is there a role for job-task evaluation schemes?	International Journal of Manpower	Industrial, work and employment relations	10
117	Cirillo V., Sostero M., Tamagni F.	2017	Innovation and within-firm wage inequalities: empirical evidence from major European countries	Industry and Innovation	Innovation studies	9
118	Toh R., Tat H.W.	2012	Trade liberalization, labor demand shifts and earnings inequality in Singapore	Review of Urban and Regional Development Studies	Geography	9
119	Katz V.S., Gonzalez C., Clark K.	2017	Digital inequality and developmental trajectories of low-income, immigrant, and minority children	Pediatrics	Other, health	9
120	Almeida A., Afonso O.	2010	SBTC versus trade: Testing skill-premia evidence across 25 oecd countries	Applied Economics Letters	Economics	8
121	Dell'Anno R., Solomon H.O.	2014	Informality, Inequality, and ICT in Transition Economies	Eastern European Economics	Economics	8
122	Ojala J., Pehkonen J., Eloranta J.	2016	Deskilling and decline in skill premium during the age of sail: Swedish and Finnish seamen, 1751–1913	Explorations in Economic History	Economics	8
123	Mukhopadhyay S., Nandi R.	2007	Unpacking the assumption of gender neutrality: Akshaya project of the Kerala IT mission in India	Gender, Technology and Development	Development studies, gender	8
124	Lee S.	2017	International trade and within-sector wage inequality: The case of South Korea	Journal of Asian Economics	Economics	7
125	Otioma C., Madureira A.M., Martinez J.	2019	Spatial analysis of urban digital divide in Kigali, Rwanda	GeoJournal	Geography	7
126	Włodarczyk J.	2017	Innovations and income inequalities – A comparative study	Journal of International Studies	Sociology, Economics	7
127	Bruinshoofd A., Hollanders H., Ter Weel B.	2001	Knowledge spillovers and wage inequality: An empirical analysis of Dutch manufacturing	Labour	Industrial, work and employment relations	7
128	Moreno-Galbis E., Wolff F.-C.	2011	Evidence on new technologies and wage inequality in France	Applied Economics	Economics	6
129	Peng F., Kang L.	2013	Labor market institutions and skill premiums: An empirical analysis on the UK, 1972-2002	Journal of Economic Issues	Economics, interdisciplinary	6
130	Xu Y., Ouyang A.Y.	2015	China wage inequality: The role of trade and technology	Applied Economics	Economics	6
131	Goel M.	2017	Inequality Between and Within Skill Groups: The Curious Case of India	World Development	Development studies	6
132	Mehic A.	2018	Industrial employment and income inequality: Evidence from panel data	Structural Change and Economic Dynamics	Innovation studies	6
133	Shahabadi A., Nemati M., Hosseinidoust S.E.	2017	The Effect of Knowledge Economy Factors on Income Inequality in the Selected Islamic Countries	Journal of the Knowledge Economy	Innovation studies	6
134	Engelmann S.	2014	International trade, technological change and wage inequality in the UK economy	Empirica	Economics	5
135	Santos M., Sequeira T.N., Ferreira-Lopes A.	2017	Income Inequality and Technological Adoption	Journal of Economic Issues	Economics, interdisciplinary	5
136	Martorano B., Sanfilippo M.	2015	Structural Change and Wage Inequality in the Manufacturing Sector: Long Run Evidence from East Asia	Oxford Development Studies	Development studies	4
137	Colclough G.S., Tolbertii C.M.	2001	Transformations of hightech labor markets and socioeconomic inequalities	Sociological Focus	Sociology	4
138	Englehardt S.J.	2009	The evolution of skill-biased effects on American wages in the 1980s and 1990s	Journal of Labor Research	Industrial, work and employment relations	4
139	Barua A., Ghosh P.	2017	Factor specificity and wage inequality in a developing economy: The role of technology and trade in Indian manufacturing	International Review of Economics and Finance	Economics	3
140	Hühne P., Herzer D.	2017	Is inequality an inevitable by-product of skill-biased technical change?	Applied Economics Letters	Economics	3
141	Nogueira M.C., Afonso Ó., Soukiazis E.	2018	Skill premium in Portuguese manufacturing industries	Applied Economics Letters	Economics	3
142	Mishel L., Bernstein J.	2003	Wage inequality and the new economy in the US: Does IT-led growth generate wage inequality	Canadian Public Policy	Other political science	3
143	Jung H., Seo I., Jung K.	2018	Mediating Role of Entrepreneurship in Explaining the Association Between Income Inequality and Regional Economic Performance	Economic Development Quarterly	Economics, development economics	2
144	Suphanachart W.	2019	Effects of technological change on income inequality in Thailand	Southeast Asian Journal of Economics	Economics	2
145	Martorano B., Park D., Sanfilippo M.	2017	Catching-up, structural transformation, and inequality: Industry-level evidence from Asia	Industrial and Corporate Change	Innovation studies, economics, management	2
146	Thewissen S., van Vliet O., Wang C.	2018	Taking the Sector Seriously: Data, Developments, and Drivers of Intrasectoral Earnings Inequality	Social Indicators Research	Other, interdisciplinary	2
147	Cozzens S.E., Bobb K.	2003	Measuring the relationship between high technology development strategies and wage inequality	Scientometrics	Other social sciences	2
148	Scott P.	2011	Still a niche communications medium: The diffusion and uses of the telephone system in interwar Britain	Business History	Other management	2
149	Arendt Ł., Grabowski W.	2019	Technical change and wage premium shifts among task-content groups in Poland	Economic Research-Ekonomska Istrazivanja	Economics	1
150	Croce G., Ghignoni E.	2020	The evolution of wage gaps between STEM and non-STEM graduates in a technological following economy	Applied Economics	Economics	1
151	Nogueira M.C., Afonso Ó.	2018	Intra-country wage inequality in the OECD countries	Panoeconomicus	Economics	1
152	Antonelli C., Scellato G.	2019	Wage inequality and directed technological change: Implications for income distribution	Technological Forecasting and Social Change	Innovation studies	1
153	Tyrowicz J., Smyk M.	2019	Wage Inequality and Structural Change	Social Indicators Research	Other, interdisciplinary	1
154	Martínez M.-S.C., Fuensanta M.J.R., Rodríguez I.M.	2013	The influence of socioeconomic factors on entrepreneurship and innovation	Journal of Small Business Strategy	Other management	1
155	Hope D., Martelli A.	2019	The Transition to the Knowledge Economy, Labor Market Institutions, and Income Inequality in Advanced Democracies	World Politics	Other political science	1
156	Hall J.D.	2019	Measuring the Diffusion of Technologies Through International Trade	International Advances in Economic Research	Economics	0
157	Pehkonen J., Neuvonen T., Ojala J.	2019	Technological change and wage premiums amongst high-skilled labour	Applied Economics Letters	Economics	0
158	Saini S., Mehra M.	2018	Impact of strengthening Intellectual Property Rights Regime on income inequality: An Econometric Analysis	Economics Bulletin	Economics	0
159	Torres N., Afonso Ó., Soares I.	2017	Manufacturing Skill-biased Wage Inequality, Natural Resources and Institutions	Review of Development Economics	Economics, development economics	0
160	Guo Q.	2019	Analysis on the Relationship between Regional Innovation and Income Inequality in Chinese City Regions	Professional Geographer	Geography	0
161	Cheng S., Chauhan B., Chintala S.	2019	The rise of programming and the stalled gender revolution	Sociological Science	Sociology	0
162	Chang Y., Cho S., Kim I., Khang Y.-H.	2019	Socioeconomic inequalities in e-cigarette use in Korea: Comparison with inequalities in conventional cigarette use using two national surveys	International Journal of Environmental Research and Public Health	Other interdisciplinary, Environmental studies	0
163	Nakara W.A., Messeghem K., Ramaroson A.	2019	Innovation and entrepreneurship in a context of poverty: a multilevel approach	Small Business Economics	Other entrepreneurship	0
164	Bonjean I.	2019	Heterogeneous incentives for innovation adoption: The price effect on segmented markets	Food Policy	Other, multidisciplinary / food studies	0
165	Dueñas-Fernández D., Iglesias-Fernández C., Llorente-Heras R.	2015	Is there less gender inequality in the service sector? The gender wage-gap in knowledge-intensive services	Social Science Information	Other social sciences	0
166	Permana M.Y., Lantu D.C., Suharto Y.	2018	The effect of innovation and technological specialization on income inequality	Problems and Perspectives in Management	Other management	0

Total	27,030.00
Citation per contribution	162.83

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