

DOI: <https://doi.org/10.57125/FED.2025.03.25.08>

How to cite: Zhu, M. (2025). A Bibliometric Analysis of Gender Wage Gap Research from an Inter-disciplinary Perspective. *Futurity Education*, 5(1). 131-150. <https://doi.org/10.57125/FED.2025.03.25.08>

A Bibliometric Analysis of Gender Wage Gap Research from an Inter-disciplinary Perspective

Meihua Zhu

*PhD in Education, School of Foreign Languages, Jimei University, Xiamen, Fujian Province, China,
<https://orcid.org/0000-0003-1997-9610>*

Corresponding author: meihua@jmu.edu.cn.

Received: October 29, 2024 | **Accepted:** February 11, 2025 | **Available online:** March 3, 2025

Abstract: This study comprehensively analyses research publications addressing the gender wage gap spanning the last two decades. A database comprising 1761 references sourced from the Web of Science was categorised into subgroups, including economic studies, sociological studies, and educational studies, based on the journals of publication. Gender wage gap research was initially proposed as a sociological issue in 1987, but has been intensively investigated and fully developed by economists in the past decade. It remains a persistent concern within educational journals, despite a comparatively lower volume of publications. Psychologists provide novel explanations for gender wage gap by studying gender differences in noncognitive skills, mathematics test scores, and the reversal of the gender education gap. Applying a combination of open-source software programs R and CiteSpace, this study tracks the evolving trends in gender wage gap research, particularly within educational contexts. Furthermore, it advocates for interdisciplinary collaboration among economics, sociology, and education researchers to address gender income disparities and foster socioeconomic development collectively.

Keywords: bibliometric, economic, gender wage gap, sociological, psychology.

Introduction

The issue of gender wage gap remains a continuing priority for socioeconomic researchers in many advanced western economies. These concerns have been given renewed focus in economic recession and labour market uncertainty. Interest in the study of gender discrimination in the labour market has persisted for decades and economists and other researchers have intensively investigated the issue of gender pay gap over the years. As the current pandemic exacerbates gender inequality in the labour force (Landivar et al., 2020), our society must call on economic, sociology, and education researchers to work collaboratively to reduce income inequalities and promote socioeconomic development.

Research Problem

In this paper, we take a closer look at the scientific productivity of research in the gender wage gap by applying a combination of the open-source software programs R and CiteSpace. This study aims to delineate the central development of gender wage gap research in three economic, sociology, and education fields and its evolution over time. Therefore, the research questions of the present research are as follows:

1. What are the primary publication characteristics (i.e. authors, publishing sources, annual production, keywords and most-cited documents) of the economic, sociological, and educational studies on gender wage gap, respectively?
2. How have the issue of gender wage gap evolved over the past three decades in the literature of economic, sociological, and educational studies, respectively?

Literature Review

Gender Wage Gap and Economy

Economists around the world intensely investigate the gender wage gap. They analysed the issue from various perspectives, from gender division of labour to labour force experiences and motherhood penalty. Some terms such as “sticky floor” and “glass ceiling” were proposed to describe invisible barriers that keep women from advancing in the workplace. Studies were conducted to examine whether there is a glass ceiling for women in the labour market (Arulampalam et al., 2007; Maume, 1999).

Research has repeatedly shown that gender equality in the labour market positively contributes to economic growth. It is a concern for economically advanced nations and has attracted increasing attention from developing countries such as Korea and Israel. Kim et al. (2016) analysed the impact of gender inequality in Korea on long-term economic growth. They suggested that when the disparities between men and women at home and in the labour market are entirely removed, the female labour force participation rate and the growth rate in per capita income increases significantly.

Gender Wage Gap and Sociology

Sociological studies on gender wage gaps often overlap with economic and psychological ones; thus, they explore the issue from socioeconomic and social psychological perspectives. Unfavourable socioeconomic conditions regarding income, education, and employment now contribute to ill health (CSDH, 2008). Women as a disadvantaged group are deserving of the whole society's efforts to promote their well-being rather than being discriminated against in the labour market.

Bylsma and Major (1994) explored how social comparisons can produce gender differences in personal entitlement, perceptions of one's performance, and pay satisfaction. They confirmed that the amount women felt they were entitled to be paid, and how satisfied they were with their pay, were both influenced more by same-sex than cross-sex comparison information.

Gender Wage Gap and Education

Education has long been recognised as the pathway to success in the labour market, especially for disadvantaged groups. Given this connection between educational success and labour market outcomes, many consider education key to reducing gender inequalities (Bobbitt-Zeher, 2007).

In the past three decades, psychologists have provided newer explanations for the gender wage gap by studying gender differences in noncognitive skills, mathematics test scores, and the reversal of the gender education gap, etc. Furthermore, some researchers, especially psychologists, have designed early intervention programs to reduce sexism and promote equity in schools and families to ultimately narrow their future income gap (Solbes-Canales et al., 2020).

Gender differences in college major are an essential determinant of the pay gap between college-educated men and women (Black et al., 2008). Although education is an area which has seen a reversal of the gender differential (Blau & Kahn, 2017), and studies have confirmed that women's gains in education may have been central to narrowing the gender gap in income historically (Bobbitt-Zeher, 2007), women still lag in the STEM (science, technology, engineering and mathematics) fields, particularly in mathematically-intensive fields (Ceci et al., 2014). Similarly, Bobbitt-Zeher (2007) also pointed out that gender differences in fields of study continue to disadvantage women, and gender differences in work-related factors are more important than are educational differences for understanding contemporary income inequality among young workers.

This study reports on a bibliometric analysis of gender wage gap research published from 1980 to 2020. Specific consideration is given to the volume of articles published annually, the most cited documents, the most productive authors, and the journals publishing gender wage gap research. This study comprised only reviewed articles classified by the WoS and does not represent relevant literature such as books and dissertations. However, the selection of sources seems reasonable and reliable given that it covers most papers published since 1900. In addition, bibliometric analysis helps track trends and the evolution of a given research domain (Bouchard et al., 2015).

Materials and Methods

Data Sources

The data analysed in the study were extracted from the Web of Science (WoS) Core Collection, which consists of six online databases, such as Science Citation Index Expanded, SSCI and Arts and Humanities Citation Index. To gather referential information from the system, "gender wage gap" was selected as the topic, "coverage" as from 1900 to August 13, 2020 (i.e. when this study was conducted), and "article" as the document type (i.e. the most common format of published material) (Lin et al., 2016). A total of 1,803 papers were exported in plaintext format before being converted to a data frame through a function in bibliometrix. The data frame was filtered to exclude proceedings, book reviews, anonymous documents and other such documents.

Consequently, 1,761 articles indexed in SSCI were chosen as the raw data for the study, before they were further filtered into three subgroups of studies: Economic, Sociological, and Educational. These three fields were identified by the top ten journal categories publishing most gender wage gap research in the Web of Science. In other words, the titles of the top ten categories indicate three main

domains central to this issue. Subsequently, some journals were added to these three domains in addition to the top ten journal categories. Specifically, “Economic studies” include journals categorised into economics, industrial relations, labour, management, and business. “Sociological studies” include journals categorised into sociology, development studies, demographics, social sciences, interdisciplinary social sciences, mathematical methods, social work, and social issues. “Educational studies” include those journals categorised into education, educational research, psychology, social, multidisciplinary, psychology, clinical, developmental, and education.

Data Analysis

The data were analysed using R (version 3.5.2) and CiteSpace (version 5.6). Bibliometrix R package, an R-tool for comprehensive science mapping analysis, is an open-source tool for quantitative research in scientometrics and bibliometrics, including the main bibliometric analysis methods (Aria & Cuccurullo, 2017).

CiteSpace is another widely used tool for visual exploration of scientific literature. It has many functions, such as network analyses and providing geographical distribution maps for authors (Chen, 2006). The present study obtained top keywords with the strongest citation burst using CiteSpace (version 5.6).

This study is the first bibliometric analysis of gender wage gap research, and it creatively examines the literature from three perspectives, economic, sociological, and educational.

Results

In the following section, a bibliometric analysis of gender wage gap research focuses on three fields of studies: economics, sociology, education and psychology.

An Overview of Gender Wage Gap Research

Although the “coverage” of research is from 1980 to 2020, the first research on gender wage gap was published in 1987. As presented in Table 1, of the 1,551 articles on gender wage gap published in 432 SSCI-indexed journals, only 458 are single-authored. There are 2.09 co-authors per document on average, and the average citations per document are 19.05. Gender wage gap research has been published in social and psychological fields since 1987 and 1988, respectively, but the number of studies is relatively low, with only 565 and 106 papers.

Table 1

An Overview of Gender Wage Gap Research Papers

Description	Economic	Social	Educational
Documents	1090	565	106
Sources (Journals)	227	129	44
Period	1990-2020	1987-2020	1988-2020
Average citations per document	19.81	20.14	19.92
Authors	1784	958	204

Annual Production of Gender Wage Gap Research

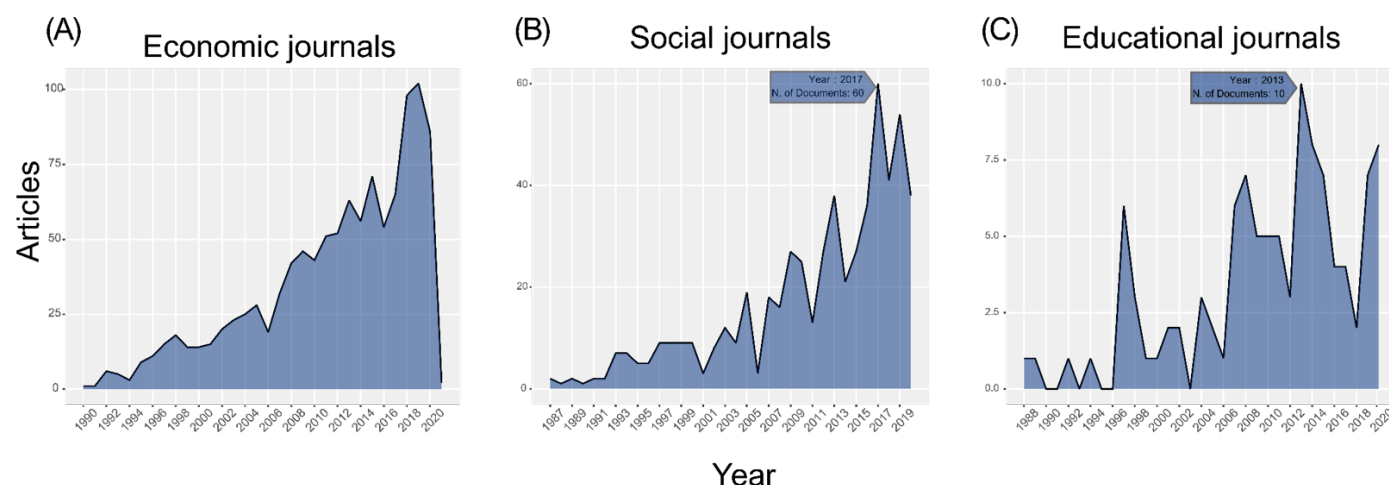
In general, the number of studies on gender wage gap rises sharply in the recent decade, but very few are related to educational or psychological studies. Figure 1A depicts the number of relevant publications since 1900 up to the present. It shows very few publications on the gender wage gap before 2000. Nevertheless, annual publications on the gender wage gap started to rise steadily in the subsequent years, before growing exponentially in the recent decade—more specifically, significant surges in relevant publications from 2016 to 2019. Similarly, there has been an increase in educational and psychological studies on the gender wage gap after 2006, and the number of studies peaked in 2013 with 10 papers.

Research on gender wage gap was initiated as a social issue, but now has been fully developed as an economic problem. At the same time, there is still some potential for development in education and psychology. This can be implied from the earliest document, which was published in social journals in 1987, followed by educational journals in 1988. Although the economists started investigating the gender pay gap until 1990, the number of their research became the largest compared to the other two groups as shown in Figure 1B and 1C.

In addition, the gender wage gap seems to be a long-standing issue and efforts to bridge the gender wage gap were already initiated three decades ago, as reflected in one of the first research papers published in 1987, which is titled “Narrowing the gender wage gap - Is Equal Value Legislation the Answer?”

Figure 1

Annual Production of Gender Wage Gap Research in Economic (A), Social (B) and Educational Journals (C)



Journals Publishing Relevant Research

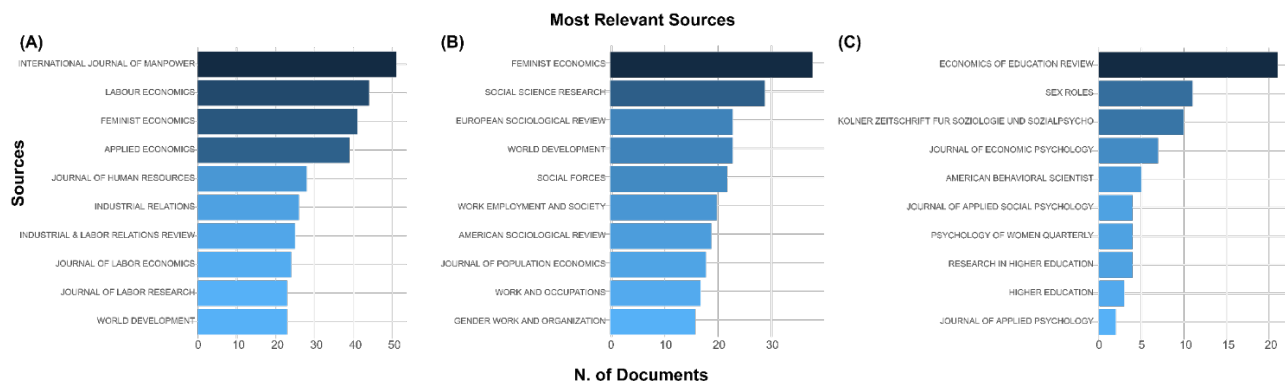
Analysis of publication outlets enables readers to identify appropriate sources and data for gender wage gap research. Figure 2A suggests that the source of the most articles ($n = 43$) among economic journals is the reputable journal *International Journal of Manpower*, concerned with the utilisation, management and planning of human resources and the economics of labour markets, from various perspectives. The other two sources of the most articles published in social and educational journals are *Feminist Economics* and *Economics of Education Review*.

As can be summarised from Figure 2, the sources of most of the articles in the three categories are, to some extent, about economics. This implies that the issue has been intensively studied from an

economic perspective, and there is some potential for development in education and psychology. Two themes can be identified from the titles of the top sociological journals of relevant research: sociology and labour economics, which correspond to issues about gender and wage gap. In addition, there are many overlaps between economic and sociological journals, probably the result of socioeconomic fields.

Figure 2

Top Ten Economic (A), Social (B) and Educational (C) Journals Publishing Gender Wage Gap Research

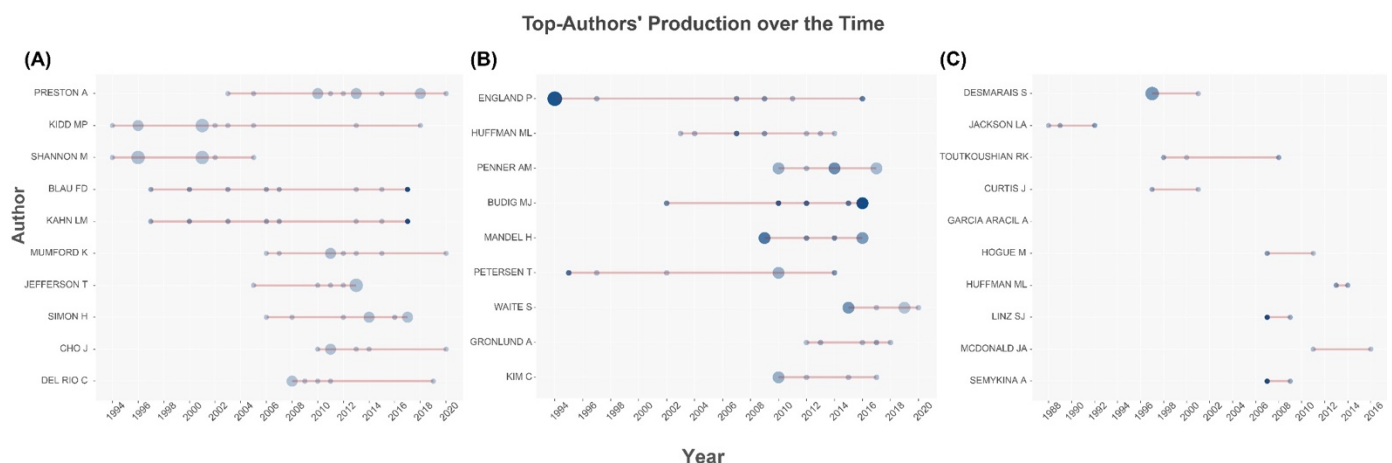


Top Authors of Relevant Research

Figure 3 illustrates top authors' production over time. A line represents an author's timeline, bubble size is proportional to the number of documents, and colour intensity is proportional to total citations per year. Most relevant research has been conducted since 2006. The results generally indicate a growing trend for gender wage gap research over the last 15 years.

Figure 3

Top Economists' (A), Educationists' (B), and Sociologists' (C) Production over Time



As can be observed in Figure 3, Anne Preston, Paula England, and Serge Desmara are the most productive researchers on this topic in economic, social, and educational fields. They are economist, sociologists, and social psychologists (Figure 3C), each published 12, 9 and 3 articles, respectively. Although they specialised in three different disciplines, one thing they share in common is that their research focuses on gender inequality in the labour market from various perspectives.

Kidd has the longest timeline, from 1994 to 2018, followed by England from 1994 to 2016. Blau and Kahn (2017), Professors of Economics, co-authored an influential article titled "The gender wage gap: Extent, trends, and explanations", which collected the highest total citations (59.75) for a year.

Most Cited Documents in Gender Wage Gap Research

Table 2

Most Cited Articles by Total Citations and Total Citations per Year

Classification	Year	Author	Paper	Total Citations	TC Per Year
Economic studies	1990	Even and Macpherson	The gender gap in pensions and wages	27	0.9
	1993	Galor and Weil	The gender gap, fertility, and growth	485	19.40
	1998	Waldfogel	Understanding the "Family Gap" in pay for women with children	352	15.30
	2002	Card and DiNardo	Skill-biased technological change and rising wage inequality: Some problems and puzzles	434	22.84
	2007	Arulampalam et al.	Is there a glass ceiling over Europe? Exploring the gender pay gap across the wage distribution	311	22.21
	2007	Stevenson and Wolfers	Marriage and divorce: Changes and their driving forces	283	20.21
	2017	Blau and Kahn	The gender wage gap: Extent, trends, and explanations	239	59.75
	2018	Albrecht et al.	The career dynamics of high-skilled women and men: Evidence from Sweden	307	17.06
Sociological studies	1988	Reskin	Bringing the men back in: Sex differentiation and the devaluation of women's work	269	8.15
	1999	Maume	Glass ceilings and glass escalators - occupational segregation and race and sex differences in managerial promotions	232	10.55
	2007	Cohen and Huffman	Working for the woman? Female managers and the gender wage gap	172	12.29
	2010	Heckman and LaFontaine	The American high school graduation rate: Trends and levels	165	15
	2013	Korpi et al.	Women's opportunities under different family policy constellations: Gender, class, and inequality tradeoffs in Western countries re-examined	198	24.75
	2014	Cha and Weeden	Overwork and the slow convergence in the gender gap in wages	105	15
	2016	England et al.	Do highly paid, highly skilled women experience the largest motherhood penalty?	54	10.8
	2019	Fuller and Hirsh	"Family-friendly" jobs and motherhood pay penalties: The impact of flexible work arrangements across the educational spectrum	10	5
Educational studies	1994	Bylsma and Major	Social comparisons and contentment - exploring the psychological costs of the gender wage gap	44	1.63
	2002	Jacob	Where the boys aren't: Non-cognitive skills, returns to school and the gender gap in higher education	192	10.11
	2007	Bobbitt-Zeher	The gender income gap and the role of education	124	8.86
	2007	McGuinness and Bennett	overeducation in The graduate labour market: A quantile regression approach	64	4.57
	2008	Andreoni and Petrie	Beauty, gender and stereotypes: Evidence from laboratory experiments	121	9.31
	2012	Judge et al.	Do nice guys-and gals-really finish last? The joint effects of sex and agreeableness on income	84	9.33

2014	Becker et al.	Confronting and reducing sexism: A call for research on intervention	27	3.86
2019	Ma	The impact of intra-household bargaining power on happiness of married women: evidence from Japan	5	2.5
2019	Manzoni and Streib	The equalizing power of a college degree for first-generation college students: Disparities across institutions, majors, and achievement levels	5	2.5
2020	Solbes-Canales et al.	Socialization of gender stereotypes related to attributes and professions among young Spanish school-aged children	2	2

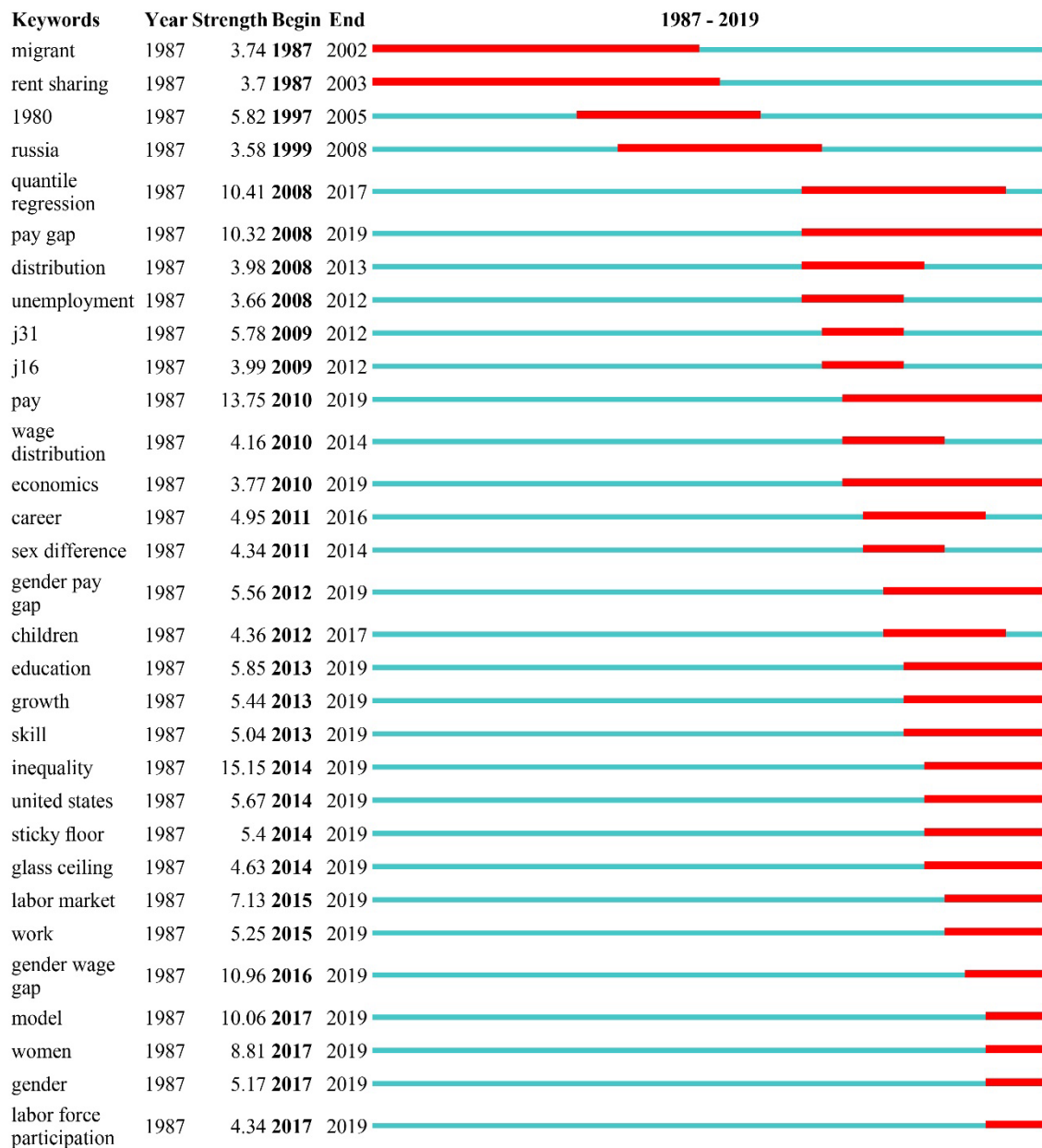
Global citations measure the number of citations for a document, exemplifying the impact of a document in the whole bibliographic database. This analysis could further infer the most important research directions or focuses.

The most cited articles by total citations and total citations per year are summarised in Table 2 in chronological order, and the shift in research focus over the past two decades may be seen through the titles. These most-cited papers studied socioeconomic factors and impacts on gender pay gap, seeking possible solutions from various perspectives to close the gender pay gap. A pioneering research on gender wage gap published by Reskin, a Professor of Sociology, has stood the tests of time since 1988. Social issues related to gender wage gap have been increasingly emphasised over the past two decades. As for economic studies, the first study on gender wage gap published in an economic journal appears in 1990. Conducted by Even and Macpherson (1990), the study provides rationale for the underrepresentation of women in the pension sector, and examines the consequences for the gender wage gap.

While the first psychological study on gender wage gap was published in the Journal of Applied Social Psychology, authored by Jackson and Grabski (1988), the study examined how the wage gap between men and women is perceived as “fair”. Career obstacles confronted by high-skilled women were brought into sharp focus in the recent decade. Arulampalam et al. (2007) analysed them from a psychological perspective using the psychological term “glass ceiling effect”. This shift in research focus, moving from “sticky floor” to “glass ceiling”, can also be observed in Figure 4.

Figure 4

Keywords with the Most Vigorous Citation Bursts in Economic Studies



Analysis of Keywords

Three fields can be identified based on journals publishing gender wage gap research (see Figure 1B): economic, sociological, and educational. In this section, gender wage gap studies were divided into these three categories before their keywords were further analysed. Burst detection was based on the frequency with which words appeared in the articles under study. Keyword citation bursts are keywords that develop drastically in citations (Guo et al., 2019). The red lines in the figure represent the period of citation bursts, whereas the blue lines represent the time interval. Keywords with the most vigorous citation bursts between 1987 and 2020 were identified using CiteSpace (version 5.6), the software used to predict research frontiers.

Keywords of Economic Studies

In terms of economic studies on gender wage gap, 31 keywords with the most vigorous citation bursts over the period between 1987 and 2020 were identified. As Figure 4 reveals, the keyword with the most vigorous citation burst is “inequality”, and its burst lasted from 2014 up to present with a burst strength of 15.15.

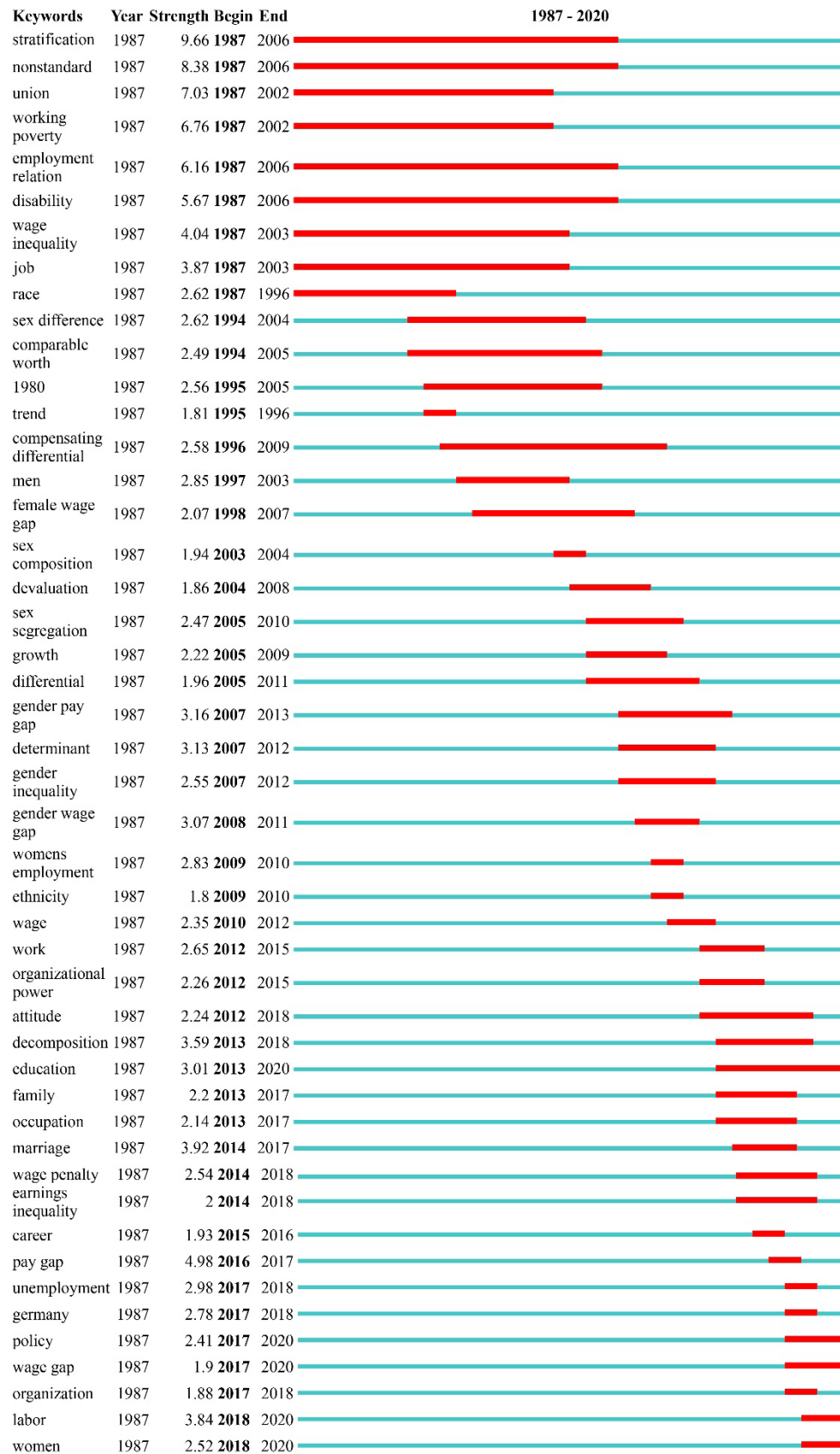
Figure 4 displays the society’s gradual shift in research focus at different periods of the past three decades. After the global financial crisis in 2008, the centre of research was on “unemployment” and “wage distribution”, before gradually turning to “education”, “children”, and “skill”, implying education-related issues were brought into sharp focus. In the recent five years, the frontier of research has shifted to “labor force participation”, “sticky floor”, and “glass ceiling”, which refers to invisible barriers that keep women from advancing in the workplace. Research focus appears to simultaneously change with society, reflecting changing political, economic, and social realities.

Keywords of Sociological Studies

In sociological studies on gender wage gap, 47 keywords with the most vigorous citation bursts between 1987 and 2020 were identified. As shown in Figure 5, the keyword with the most vigorous citation burst is “stratification”, and its burst lasted for nearly 20 years with a burst strength of 9.66. This implies that social stratification has long been interested in gender wage gap research.

Figure 5

Keywords with the Most Vigorous Citation Bursts in Social Studies



The research frontier seems to have shifted from the phenomenon to the underlying reasons of the gender wage gap. At the initial stage of gender wage gap research, the centre of research was on “working poverty”, “disability”, and “wage inequality”, before moving to “compensating differential” and “sex segregation”. For the most recent decade, the word with the second strongest citation burst is “marriage” with a burst strength of 3.92, along with keywords such as “education”, and “family”.

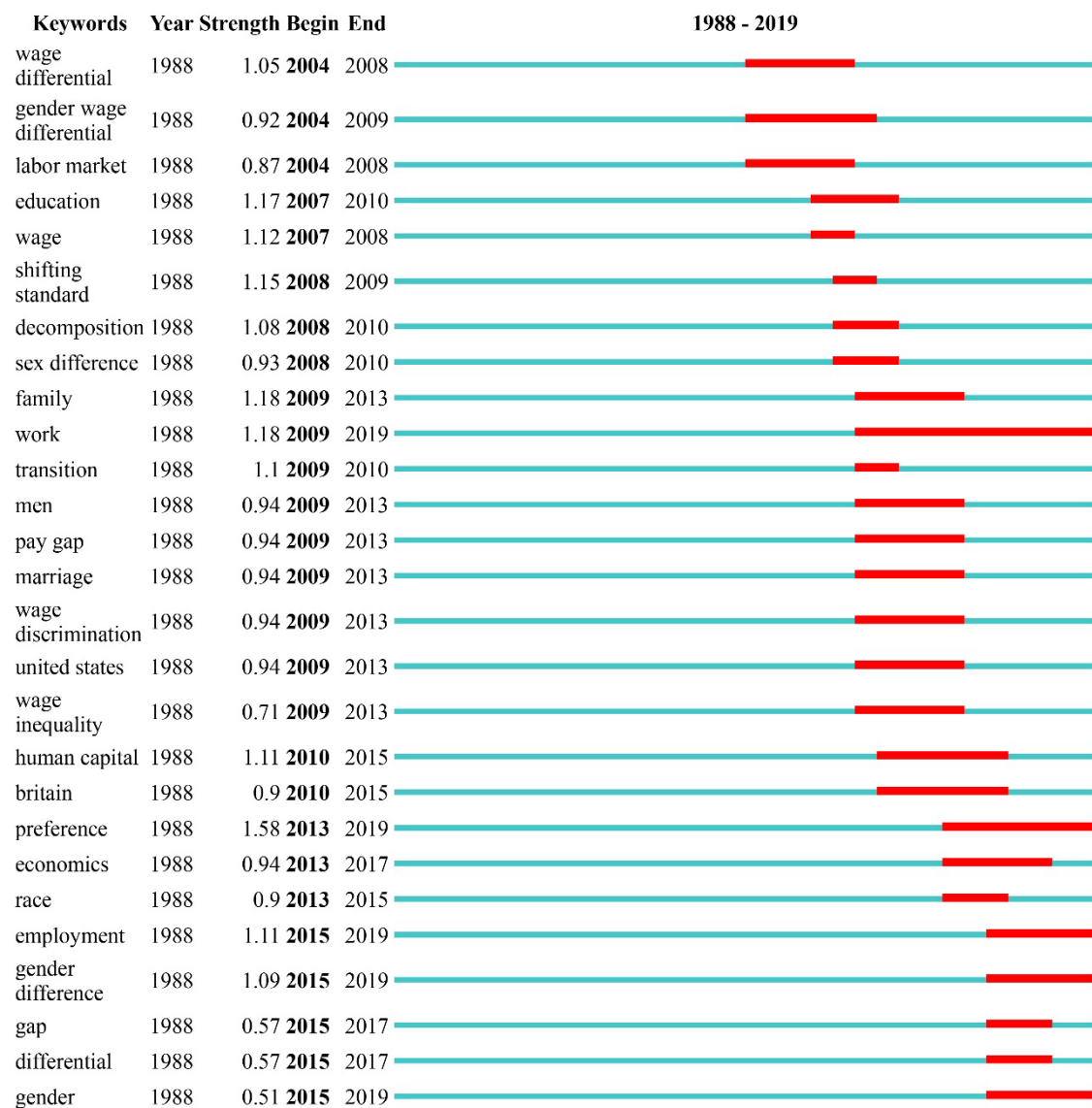
Keywords of Educational Studies

In terms of educational studies on gender wage gap, 27 keywords with the most vigorous citation bursts over the period between 1988 and 2020 were identified. The extent of citation burst in this list is generally lower than that of the previously mentioned keywords. The first keyword with citation burst “wage differential” appeared in 2004 with a burst strength of 1.05, implying that there were very few educational publications before that.

Figure 6 indicates that gender wage gap research is at the initial stage in education and psychology. At the same time, it is also an interdisciplinary issue involving economics, sociology, and education simultaneously. This could be reflected by the keywords such as “labour market”, “human capital”, “education”, and “race”. More specifically, the focus of educational studies on gender wage gap can be observed through a network graph below.

Figure 6

Keywords with the Most Vigorous Citation Bursts in Educational Studies



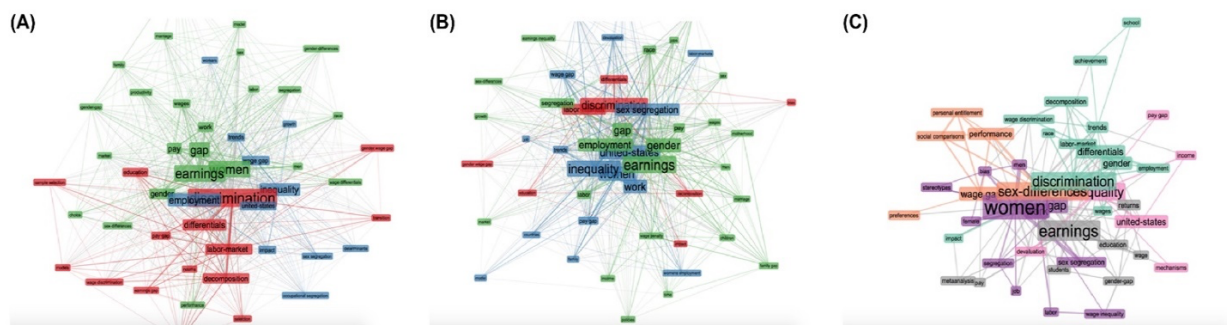
Co-occurrence Network by Keywords

In science mapping, a network graph represents co-occurrences among bibliographic metadata (Aria & Cuccurullo, 2017). This graph models pairwise relations between keywords and is made up of vertices. Each vertex represents a word and is connected by edges. The vertex size is proportional to the word occurrence, reflecting the number of appearances of a particular word in the document collection. The edge size is proportional to item co-occurrences, measuring how often the words appear together in the same corpus. The colours represent the clusters to which each word belongs. The word's position in the centre or periphery represents its farness and normalised closeness centrality.

Take the co-occurrence network by keywords in educational studies, for example. As shown in Figure 7, three clusters are distinguished by different colours: discrimination, earnings, sex difference, and women. The vertex size of “sex differences” is only second to “women”, meaning it has the second largest number of appearances in the document collection. The firm edge size of the lines between “discrimination” and “gender” indicates frequent item co-occurrences. The other firm edge size of the lines is observed between “bias”, “women” and “stereotype”. “School” and “achievement” lie in the periphery, so there is probably more potential for research to be developed.

Figure 7

Co-occurrence Network by Keywords in Economic (A), Social (B) and Educational Studies



The contents of the three co-occurrence networks overlap with one another to some extent, but each of them has different emphases. Specifically, the co-occurrence network by keywords in Economic studies tends to focus on “employment” in the “labour market”; In contrast, for sociological studies, they are inclined to emphasise “inequality”, “family”, and “policy”. As for educational studies, they are likely to investigate the gender wage gap from an early stage, by considering the long-term effect of “students” “achievement” at “school”.

Discussion

Among various research papers on gender wage gap, there are some general rules they share in common. They primarily analyse longitudinal data, thus adopting quantitative research methods. The research focus of the gender wage gap has expanded to women’s well-being and positive emotion in the recent decade. At the same time, they paid more attention to employment and discrimination in the labour market in the early research stage. Furthermore, the focus of recent research has shifted from “sticky floor” to “glass ceiling”, which somehow represents a progress. In other words, a barrier to further advancement once women have attained a certain level, instead of those in low-level, low-paying positions, is recently attracting more attention. Both terms analyse inequality between men and women in the workplace. The “sticky floor” can be viewed as the opposite scenario of the “glass ceiling”, when the gaps widen at the bottom of the wage distribution. Some other insights are further analysed in three domains to answer the second research question.

Research Question: How have the issue of gender wage gap evolved over the past three decades in the literature of economic, sociological, and educational studies, respectively? This research question is answered from three perspectives (i.e., Economic, Sociological, Educational perspectives).

Insights from the Economic Studies

Research on gender wage gap has been fully developed as an economic problem, despite being initiated as a social issue. In other words, although the economists started investigating the gender pay gap until 1990, the number of their research became the most significant proportion of gender wage gap research. The most productive economist and sociologist listed in Figure 3A and B are females, implying that women are relatively more concerned about this gender issue.

There are roughly three phases of development in terms of annual publications of economic studies on gender wage gap. Very few studies on gender wage gap were conducted before 1995, when it entered a steadily growing phase until 2008. After the global financial crisis in 2008, the amount of research that has been done rose drastically and has continued to rise.

As for the research focus, it seems to change simultaneously with society, reflecting changing economic and social realities. After the global financial crisis of 2008, the centre of research was on “unemployment” and “wage distribution”, before gradually turning to education-related issues. The research frontier has recently shifted to “sticky floor” and “glass ceiling”, referring to invisible barriers that keep women from advancing in the workplace.

Recent studies provide further insights into this evolution. For instance, Fogel and Modenesi (2024) introduced a network-based approach to account for unobserved worker skills, offering a nuanced decomposition of wage disparities. This method allows a more precise understanding of the structural factors contributing to the gender wage gap. The findings from recent economic studies align with the broader trends identified in the literature, demonstrating the continued significance of economic frameworks in understanding and addressing the gender wage gap.

Insights from the Sociological studies

Gender wage gap was initially discussed and explored as a social issue in the earliest publication in 1987. This discussion, which sociologists led, lasted until 1995, before entering the second research development phase. That is when economists took over the control and fully developed the topic from economic perspectives. At the same time, the number of sociological studies on gender wage gap levelled off before fluctuating up and down since 2005 up to the present. Overall, there is an upward fluctuation, peaking at 60 in 2017, implying that the wage gap is also a rising concern in sociology.

As research on gender wage gaps develops, they have become a multidisciplinary issue that broadly concerns sociology, economics, education, etc. This could be inferred from the top social and educational journals publishing gender wage gap research, as listed in Figures 2B and C. The titles of two top journals are “Feminist economics” and “Economics of Education Review”, overlapping with economics.

The co-occurrence network by keywords illustrates different emphases in different domains. The co-occurrence network in economic studies tends to focus on “employment” in the “labour market”; while sociological studies are inclined to emphasise “inequality”, “family”, and “policy”. As for educational studies, they are likely to investigate the gender wage gap from an early stage, by considering the long-term effect of “students” “achievement” at “school”.

Recent sociological studies further reveal the complex dynamics of the gender wage gap. For example, Minot et al. (2023) investigate the language in millions of U.S. workers’ resumes to analyse how gendered self-representation correlates with wage disparities. Their findings suggest that occupations with more significant linguistic differences in male and female resumes exhibit smaller gender pay gaps. This paradox sheds light on the intricate relationship between self-presentation and structural inequities in the labor market. Such insights underscore the nuanced and multifaceted nature of sociological perspectives on the gender wage gap, emphasising the interplay between individual agency and systemic factors.

Insights from the Educational and Psychological Studies

An inspiring perspective on the gender wage gap has come from education and psychology. Gender wage gap was presented as a research topic in educational publications as early as 1988, but there were very few relevant publications until 2008. In the past decade, the number of annual publications in educational journals fluctuates up and down and peaks at ten in 2013.

As mentioned above, the total number of studies on gender wage gap rises sharply in the recent decade, but very few of them are related to educational or psychological studies. The gender wage gap

is mainly considered an economic problem, and economists and sociologists are intensively studying it. However, it seems to be a growing concern for education and psychology, as graduate employment has become a critical issue in the era of post-massification of higher education. Moreover, recent studies on gender wage gap tend to focus on school-aged children and show what type of environments affect children's acquisition of traditional gender roles, early intervention programs to reduce sexism and to promote equity in schools and families were also suggested (Solbes-Canales et al., 2020).

It was summarised that psychological attributes or noncognitive skills comprise one of the newer explanations for gender differences in outcomes (Blau & Kahn, 2017). Early psychological research has focused on gender stereotypes as the cause of gender wage gap, and has provided a theoretical understanding of the issue (Terborg & Ilgen, 1975). As the issue evolves, emphasis is gradually placed on how and why gender stereotypes result in pay gap (Jackson & Grabski, 1988), and recent psychologists are inclined to argue for the importance of the interplay among theory, practice, and policy in targeting gender stereotypes in the workplace and further identify intervention strategies to combat it (Becker et al. 2014; Heilman & Caleo, 2018).

While current research efforts on the topic of "gender wage gap" are overwhelming and prevailing, there is a lack of tracing back to the issue's roots, or finding an explanation in education and environment. The influences of closest environments such as family and school, and more distant systems such as media or cultural values are deemed to be significant as children are socialised in these norms and values, they increasingly internalise those schemes and use them to construct expectations of others (Solbes-Canales et al., 2020). Although it seems an indirect way of probing into gender and occupational segregation in the labour market, studies have confirmed the critical role of education on gender wage gap, and have further shown that women's gains in education may have been central to narrowing the gender gap in income historically (Bobbitt-Zeher, 2007). However, Bobbitt-Zeher (2007) also pointed out that gender differences in fields of study continue to disadvantage women, and gender differences in work-related factors are more important than are educational differences for understanding contemporary income inequality among young workers. Therefore, it seems that there is great potential to be developed in education to intervene and narrow the gender wage gap.

Strengths and Limitations

One major limitation of this bibliometric study is that the analysed data are extracted solely from the Web of Science database. This database is confined to scholarly research papers published in English academic journals, thus excluding other sources of knowledge such as books, or publications in other languages. In addition, most studies have employed a quantitative approach for data analysis. Still, the optimal approach to this issue is to incorporate advantages of both quantitative and qualitative methods.

Conclusions

This paper draws upon various studies to highlight the different perceptions of gender wage gap research conducted by economists, sociologists, and psychologists. It further draws upon educational research exploring intervention strategies to weaken gender stereotypes in the labour market and ways to reduce income inequalities. The paper provides some insights into research development that have informed understandings of gender wage gap, and argues for a broader understanding of this issue than that offered by a single discipline.

Gender wage gap research began to flourish as of the early 2000s. During these past two decades, the scientific productivity of this research has climbed exponentially, and has enlightened and reinforced the progress of society. Now is the time for researchers across different fields to contribute

towards collaborative efforts in identifying the best approaches for narrowing the gender wage gap. Society must work alongside researchers to promote more egalitarian environments that will protect children's future psychological, social and professional development (Solbes-Canales et al., 2020).

Suggestions for Future Research

While this study provides a comprehensive bibliometric analysis of gender wage gap research, future studies could expand on several key areas. First, interdisciplinary collaboration should be further explored, particularly integrating psychological and educational perspectives into economic and sociological analyses. Future research could examine how early childhood education and socialization patterns influence long-term gender wage disparities.

Second, qualitative studies are needed to complement existing quantitative analyses. For example, in-depth interviews with employees and employers across different industries could provide nuanced insights into workplace dynamics and implicit biases contributing to wage gaps.

Third, with the rise of artificial intelligence and automation in the labor market, future research should investigate how technological advancements impact gender wage inequality. Do new digital skills exacerbate or mitigate the wage gap?

Lastly, cross-cultural comparisons are essential for understanding how regional policies and cultural norms shape gender wage disparities. Studies incorporating diverse economies, particularly those in developing regions, could offer valuable policy implications for reducing income inequality globally.

By addressing these gaps, future research can contribute to more effective strategies for closing the gender wage gap across different social and economic contexts.

Acknowledgements

None.

Conflict of Interest

None.

Funding

The Author received no funding for this research.

References

- Albrecht, J., Bronson, M. A., Thoursie, P. S., & Vroman, S. (2018). The career dynamics of high-skilled women and men: Evidence from Sweden. *European Economic Review*, 105, 83–102. <https://doi.org/10.1016/j.eurocorev.2018.03.012>
- Andreoni, J., & Petrie, R. (2008). Beauty, gender and stereotypes: Evidence from laboratory experiments. *Journal of Economic Psychology*, 29(1), 73–93. <https://doi.org/10.1016/j.joep.2007.07.008>
- Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), 959–975. <https://doi.org/10.1016/j.joi.2017.08.007>
- Arulampalam, W., Booth, A. L., & Bryan, M. L. (2007). Is there a glass ceiling over Europe? Exploring the gender pay gap across the wage distribution. *ILR Review*, 60(2), 163–186. <https://doi.org/10.1177/001979390706000201>

- Becker, J. C., Zawadzki, M. J., & Shields, S. A. (2014). Confronting and reducing sexism: A call for intervention research. *Journal of Social Issues*, 70(4), 603–614. <https://doi.org/10.1111/josi.12081>
- Black, D. A., Haviland, A. M., Sanders, S. G., & Taylor, L. J. (2008). Gender wage disparities among the highly educated. *Journal of Human Resources*, 43(3), 630–659. <https://doi.org/10.3368/jhr.43.3.630>
- Blau, F. D., & Kahn, L. M. (2017). The gender wage gap: Extent, trends, and explanations. *Journal of Economic Literature*, 55(3), 789–865. <https://doi.org/10.1257/jel.20160995>
- Bobbitt-Zeher, D. (2007). The gender income gap and the role of education. *Sociology of Education*, 80(1), 1–22. <https://doi.org/10.1177/003804070708000101>
- Bouchard, L., Albertini, M., Batista, R., & De Montigny, J. (2015). Research on health inequalities: A bibliometric analysis (1966–2014). *Social Science & Medicine*, 141, 100–108. <https://doi.org/10.1016/j.socscimed.2015.07.022>
- Bylsma, W. H., & Major, B. (1994). Social comparisons and contentment: exploring the psychological costs of the gender wage gap. *Psychology of Women Quarterly*, 18(2), 241–249. <https://doi.org/10.1111/j.1471-6402.1994.tb00453.x>
- Card, D., & DiNardo, J. (2002). *Skill biased technological change and rising wage inequality: Some problems and puzzles* (No. w8769; p. w8769). National Bureau of Economic Research. <https://doi.org/10.3386/w8769>
- Ceci, S. J., Ginther, D. K., Kahn, S., & Williams, W. M. (2014). Women in academic science: A changing landscape. *Psychological Science in the Public Interest*, 15(3), 75–141. <https://doi.org/10.1177/1529100614541236>
- Cha, Y., & Weeden, K. A. (2014). Overwork and the slow convergence in the gender gap in wages. *American Sociological Review*, 79(3), 457–484. <https://doi.org/10.1177/0003122414528936>
- Chen, C. (2006). CiteSpace II: Detecting and visualizing emerging trends and transient patterns in scientific literature. *Journal of the American Society for Information Science and Technology*, 57(3), 359–377. <https://doi.org/10.1002/asi.20317>
- Cohen, P. N., & Huffman, M. L. (2007). Working for the woman? Female managers and the gender wage gap. *American Sociological Review*, 72(5), 681–704. <https://doi.org/10.1177/000312240707200502>
- CSDH (2008). *Closing the gap in a generation: Health equity through action on the social determinants of health. Final Report of the Commission on Social Determinants of Health*. Geneva, World Health Organization. https://iris.who.int/bitstream/handle/10665/43943/9789241563703_eng.pdf
- England, P., Bearak, J., Budig, M. J., & Hodges, M. J. (2016). Do highly paid, highly skilled women experience the largest motherhood penalty?. *American Sociological Review*, 81(6), 1161–1189. <https://doi.org/10.1177/0003122416673598>
- Even, W. E., & Macpherson, D. A. (1990). The gender gap in pensions and wages. *The Review of Economics and Statistics*, 72(2), 259. <https://doi.org/10.2307/2109715>
- Fogel, J., & Modenesi, B. (2024). *Detailed gender wage gap decompositions: Controlling for worker unobserved heterogeneity using network theory* (Version 1). arXiv. <https://doi.org/10.48550/ARXIV.2405.04365>

- Fuller, S., & Hirsh, C. E. (2019). "Family-Friendly" jobs and motherhood pay penalties: The impact of flexible work arrangements across the educational spectrum. *Work and Occupations*, 46(1), 3–44. <https://doi.org/10.1177/0730888418771116>
- Galor, O., & Weil, D. (1993). *The gender gap, fertility, and growth* (Working paper No. 4550). National Bureau of Economic Research. <https://doi.org/10.3386/w4550>
- Guo, Y.-M., Huang, Z.-L., Guo, J., Li, H., Guo, X.-R., & Nkeli, M. J. (2019). Bibliometric analysis on smart cities research. *Sustainability*, 11(13), Article 3606. <https://doi.org/10.3390/su11133606>
- Heckman, J. J., & LaFontaine, P. A. (2010). The American high school graduation rate: trends and levels. *Review of Economics and Statistics*, 92(2), 244–262. <https://doi.org/10.1162/rest.2010.12366>
- Heilman, M. E., & Caleo, S. (2018). Combatting gender discrimination: A lack of fit framework. *Group Processes & Intergroup Relations*, 21(5), 725–744. <https://doi.org/10.1177/1368430218761587>
- Jackson, L. A., & Grabski, S. V. (1988). Perceptions of fair pay and the gender wage gap. *Journal of Applied Social Psychology*, 18(7), 606–625. <https://doi.org/10.1111/j.1559-1816.1988.tb00040.x>
- Jacob, B. A. (2002). Where the boys aren't: Non-cognitive skills, returns to school and the gender gap in higher education. *Economics of Education Review*, 21(6), 589–598. [https://doi.org/10.1016/S0272-7757\(01\)00051-6](https://doi.org/10.1016/S0272-7757(01)00051-6)
- Judge, T. A., Livingston, B. A., & Hurst, C. (2012). Do nice guys—and gals—really finish last? The joint effects of sex and agreeableness on income. *Journal of Personality and Social Psychology*, 102(2), 390–407. <https://doi.org/10.1037/a0026021>
- Kim, J., Lee, J., & Shin, K. (2018). Gender inequality and economic growth in Korea. *Pacific Economic Review*, 23(4), 658–682. <https://doi.org/10.1111/1468-0106.12181>
- Korpi, W., Ferrarini, T., & Englund, S. (2013). Women's opportunities under different family policy constellations: Gender, class, and inequality tradeoffs in western countries re-examined. *Social Politics: International Studies in Gender, State & Society*, 20(1), 1–40. <https://doi.org/10.1093/sp/jxs028>
- Landivar, L. C., Ruppanner, L., Scarborough, W. J., & Collins, C. (2020). Early signs indicate that COVID-19 is exacerbating gender inequality in the labor force. *Socius: Sociological Research for a Dynamic World*, 6, 2378023120947997. <https://doi.org/10.1177/2378023120947997>
- Lin, A. J., Hsu, C.-L., & Chiang, C.-H. (2021). Retraction note to: Bibliometric study of electronic commerce research in information systems & MIS Journals. *Scientometrics*, 126(1), 909–909. <https://doi.org/10.1007/s11192-020-03818-6>
- Ma, X., & Piao, X. (2019). The impact of Intra-household bargaining power on happiness of married women: Evidence from Japan. *Journal of Happiness Studies*, 20(6), 1775–1806. <https://doi.org/10.1007/s10902-018-0023-y>
- Manzoni, A., & Streib, J. (2019). The equalizing power of a college degree for first-generation college students: Disparities across institutions, majors, and achievement levels. *Research in Higher Education*, 60(5), 577–605. <https://doi.org/10.1007/s11162-018-9523-1>
- Maume, D. J. (1999). Glass ceilings and glass escalators: Occupational segregation and race and sex differences in managerial promotions. *Work and Occupations*, 26(4), 483–509. <https://doi.org/10.1177/0730888499026004005>

- McGuinness, S., & Bennett, J. (2007). Overeducation in the graduate labour market: A quantile regression approach. *Economics of Education Review*, 26(5), 521–531. <https://doi.org/10.1016/j.econedurev.2005.12.003>
- Minot, J. R., Maier, M., Demarest, B., Cheney, N., Danforth, C. M., Dodds, P. S., & Frank, M. R. (2023). *The resume paradox: Greater language differences, smaller pay gaps* (Version 1). arXiv. <https://doi.org/10.48550/ARXIV.2307.08580>
- Reskin, B. F. (1988). Bringing the men back in: Sex differentiation and the devaluation of women's work. *Gender & Society*, 2(1), 58–81. <https://doi.org/10.1177/089124388002001005>
- Solbes-Canales, I., Valverde-Montesino, S., & Herranz-Hernández, P. (2020). Socialization of gender stereotypes related to attributes and professions among young Spanish school-aged children. *Frontiers in Psychology*, 11, Article 609. <https://doi.org/10.3389/fpsyg.2020.00609>
- Stevenson, B., & Wolfers, J. (2007). Marriage and divorce: Changes and their driving forces. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1007827>
- Terborg, J. R., & Ilgen, D. R. (1975). A theoretical approach to sex discrimination in traditionally masculine occupations. *Organizational Behavior and Human Performance*, 13(3), 352–376. [https://doi.org/10.1016/0030-5073\(75\)90056-2](https://doi.org/10.1016/0030-5073(75)90056-2)
- Waldfoegel, J. (1998). Understanding the "family gap" in pay for women with children. *Journal of Economic Perspectives*, 12(1), 137–156. <https://doi.org/10.1257/jep.12.1.137>