

Systematic Review

Reassessing Minimum Wage Impacts: What the Spanish Case Contributes to International Evidence

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Abstract

Minimum wage policies have become a central instrument for promoting social and economic sustainability by ensuring sufficient income to cover basic needs and reduce inequalities. They align with recent predistribution approaches in the literature and with goal 10.4 of the United Nations 2030 Agenda. In the European context, these policies are explicitly embedded within the sustainable development and just transition agenda, where the European Union emphasises that securing fair wages is a necessary condition for inclusive, balanced and equality-enhancing growth. At the same time, the methodological debate has evolved from early time-series-based approaches to a new generation of quasi-experimental studies, which provide more rigorous and less biased evidence. Within this framework, Spain represents a relevant case due to the scale and persistence of its minimum wage reforms since 2019, yet the Spanish case has lacked a systematic synthesis comparable to those available for other advanced economies (e.g., Germany, the UK, the USA). This article offers the first systematic synthesis of empirical evidence on the effects of the minimum wage in Spain from the 1990s to 2025, following the PRISMA 2020 methodology. This process yielded a large number of articles, from which an initial selection of 249 was made. Following the full screening and eligibility assessment, 34 articles were retained. The results allow for an analysis of the current state of research on the effects of the minimum wage across multiple dimensions, especially on employment and inequality. Other aspects, such as productivity, prices, other business adjustments, administrative obstacles, and public finances, are still poorly addressed in the available literature. In any case, this is a valuable exercise in understanding how wage policies can help to clarify the relationship between minimum wage policies and the transformation of labour markets.



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1. Introduction

Minimum wage policies aim to ensure that households can meet their basic needs and reduce inequalities, both of which are prerequisites for inclusive and sustainable development [1,2]. Regarding inequality, recent studies emphasise predistribution [3]—alongside redistribution—as a key dimension of the debate. Piketty argues that political debates on inequality should focus on policies that affect pre-tax inequality rather than concentrating exclusively on fiscal redistribution [4]. The minimum wage is one such policy tool.

Reducing inequality and promoting decent work for all women and men are core goals of the 2030 Agenda for Sustainable Development adopted by the United Nations in 2015. Goal 10.4 highlights the need to adopt policies—particularly fiscal, wage and social protection policies—to progressively achieve greater equality. To this end, the guarantee of a fair minimum wage that secures a dignified standard of living has been strengthened. In fact, minimum wage legislation has been implemented or updated across the world. Most countries are increasingly turning to minimum wage regulation as a tool to improve working conditions and raise incomes at the lower end of the wage distribution. Minimum wages exist in more than 90 per cent of the Member States of the International Labour Organization (ILO). All European countries have a minimum wage, either statutory or collectively negotiated. In the Americas the exceptions are very few, while more exceptions remain in Asia, Africa and particularly in the Arab States.

In Europe, most countries have significantly increased their minimum wages—such as the United Kingdom, Germany, and many Eastern European countries—within the framework of new European Union legislation under the European Pillar of Social Rights. EU recommendations on minimum wages are embedded within broader considerations related to sustainable development and the just transition. The EU frames the minimum wage as part of its sustainable growth strategy, emphasising that ensuring fair working conditions is essential for balanced development. The European Commission's 2019 and 2020 Communications on sustainable growth (COM(2019) 650 final and COM(2020) 575) underline that, in a context of growing inequalities, ensuring that every worker receives a fair wage is key to inclusive and sustainable growth. Moreover, the Directive of the European Parliament and of the Council of 19 October 2022 on adequate minimum wages in the European Union (Directive (EU) 2022/2041) highlights that adequate minimum wages improve living and working conditions, benefit firms and society, and constitute a precondition for a sustainable economic model. It also emphasises their impact on gender equality, as minimum wages help to reduce gender pay and pension gaps and thus support more equitable and sustainable development across the Union.

From a theoretical perspective, minimum wage regulation can be situated within a multidimensional sustainability framework where social, economic, and environmental dimensions interact. Beyond its role in reducing wage inequality and promoting decent work (SDGs 8 and 10), minimum wages activate well-established adjustment mechanisms that extend to broader sustainability outcomes. The recent literature shows that minimum wages can influence productivity, business investment, cost structures, profit margins, and prices, thereby shaping the economic resilience and distributive capacity of labour relations. Evidence also indicates that these mechanisms support the long-term sustainability of businesses and labour markets by linking wage regulation to productivity dynamics and the capacity of economies to maintain inclusive welfare trajectories over time. These channels are increasingly recognised in academic discourse. For example, Gao, Ruan, and Ye [1] document how changes in the minimum wage affect productivity, investment behaviour, and firms' adaptability, offering microeconomic foundations for understanding their implications for economic resilience and social sustainability. This also has implications for the environmental dimension. However, developing a comprehensive theoretical explanation of these interactions across the economic, social, and potentially environmental pillars of sustainability is beyond the scope of this systematic review. Consequently, our contribution focuses on providing a rigorous and transparent synthesis of the empirical evidence for the Spanish case, situating this evidence within its broader framework of sustainability—especially social, but also economic and environmental.

In the academic sphere, the debate on minimum wages [5–8] has intensified worldwide over the past two decades, driven by rising inequality, in work-poverty and structural weaknesses in labour markets. Empirical studies have contributed substantially to this debate. For much of the twentieth century, evidence-based minimum wage (MW) studies were scarce. One of the first rigorous empirical analyses was that of Obenauer and Von der Nienburg in 1915 [9]. Kennan [10] documents other early case studies (Maloney 1942; Lester 1946; Peterson 1957, 1959) [11–14], although the dominant methodology soon became time-series regression, primarily focused on teenagers [5,15,16]. The review by Brown, Gilroy and Kohen [17] synthesised the evidence up to 1980. Subsequent syntheses [6,9,18] expanded the analysed period, maintaining the debate on the true magnitude of the impact and revising the negative estimates downward, largely restricting them to youth employment.

A methodological turning point occurred in the 1990s, with a considerable increase in empirical work focusing mainly on employment effects. According to Jiménez and Jiménez [19], 68.2% of the 588 studies published since then are empirical, with a predominance of “natural experiments” and designs using control groups. The critical review by Card and Krueger [5,15] highlighted methodological issues and publication bias in the earlier literature, inaugurating the New Minimum Wage Research (NMWR) movement, characterised by more rigorous techniques and more consistent results. In their 2016 synthesis, Card and Krueger argued that moderate minimum wage increases have “little or no effect on employment”, a conclusion supported by meta-analyses such as Belman and Wolfson [20] or Doucouliagos and Stanley [21], and by influential empirical studies by Dube, Lester and Reich, Giuliano, or Hirsch, Kaufman and Zelensa [22–25]. Overall, the subsequent literature shows positive and negative findings in similar proportions, with an average estimate close to zero, challenging the traditional view of minimum wage effects [26].

In any case, the debate remains active, underscoring the need for further empirical research across different contexts to provide new evidence. In this respect, Spain stands out as a particularly relevant case, not only because of the magnitude of the reforms introduced since 2019—when the legal minimum wage (SMI) rose by 22.3% in a single year and continued to increase in subsequent years—but also because of the sustained nature of this policy change and the impact on low-wage jobs in the country.

Despite its relevance, the Spanish case has not received the same international visibility as other well documented experiences. By contrast, the reintroduction of the UK National Minimum Wage in 1999 generated a vast body of empirical research, particularly through the Low Pay Commission, inspiring widely cited studies applying quasi-experimental methods to evaluate effects on employment and wages. Similarly, the introduction of a national minimum wage in Germany in 2015 spurred an intense empirical agenda, including important publications examining effects on reallocation, spillovers and firm level adjustments. These international cases have become reference points in comparative labour market research.

This article addresses this gap by offering the first comprehensive, systematic and methodologically standardised synthesis of the empirical evidence on the effects of minimum wage policies in Spain from the early 1990s to 2025. This study applies the PRISMA 2020 methodology, a standardised framework designed to ensure transparent, systematic and replicable literature reviews. Following PRISMA, we explicitly document the search strategy, inclusion and exclusion criteria, selection procedures and the full review workflow. The methodology—including the checklist and flow diagram—enhances the transparency and auditability of the process and represents a substantial improvement over earlier narrative approaches.

Given this context, we clarify the methodological orientation of the study. In line with the methodological logic of systematic reviews, this study does not start from a theoretical hypothesis, but from a well-defined empirical question that structures the entire analysis. Following PRISMA 2020 standards, our aim is to compile, organise and critically assess all available empirical evidence on the effects of minimum wage variations in Spain. The guiding question is therefore straightforward: “What does the empirical evidence reveal about the effects of minimum wage variations on employment, poverty, inequality, and other variables in the Spanish case?” The synthesis presented in this article responds directly to this question, allowing the patterns that emerge from the evidence—rather than any prior theoretical proposition—to guide the interpretation of results.

A key contribution of this work is its breadth. We analyse three chronological phases of minimum wage policy in Spain: the first refers to the reforms of the 1990s; the second to the initial attempts to adapt to EU guidelines from 2004 onwards, which were halted by the 2008 crisis; and the third to the transformation phase that began in 2019. This timeframe allows us to analyse how institutional and labour market contexts influence the effects of changes in the minimum wage. It also enables methodological comparison between studies, based primarily on correlation, and quasi-experimental research using administrative microdata.

Many of the Spanish studies—particularly those produced by public institutions or independent research centres—have not been published in peer-reviewed international journals and therefore remain largely invisible to the broader scientific community. This review addresses that gap by systematically identifying, screening, and evaluating all available empirical evidence, irrespective of publication outlet. It integrates peer-reviewed articles published in international journals, studies appearing in national or regional academic venues, and technical reports issued by public or private institutions. By assembling and synthesising this diverse body of work, the review provides a comprehensive and coherent assessment of the evidence on minimum wage effects in Spain, thus partially correcting the bias regarding accessibility and visibility within the field.

Beyond its historical and documentary breadth, the article offers a comprehensive methodological assessment. The review compares the main econometric strategies employed in the literature, including difference-in-differences approaches that identify causal relationships through the use of treatment and control groups, matching techniques that enhance comparability between units, synthetic control methods that construct data driven counterfactuals, and structural vector autoregressive (structural VAR) models used to analyse dynamic macroeconomic relationships. By evaluating the strengths and limitations of each approach, the review clarifies why different studies sometimes arrive at divergent conclusions and provides guidance for future empirical research.

Finally, this review broadens the analytical approach beyond the traditional debate focused on employment. The literature includes a substantial body of work on the effects on employment and a growing number of studies examining the effects of the minimum wage on inequality and poverty, though less so on prices, productivity, business performance, and fiscal variables. In the case of Spain, we are far from offering a multidimensional perspective on the impact of these policies with the available studies. Nevertheless, this paper enriches the debate by aligning the Spanish case with the most recent analytical approaches already developed in the United Kingdom and Germany.

Taken together, the contribution of this article is threefold: (1) it provides the most comprehensive and methodologically rigorous synthesis of the empirical evidence on the effects of the minimum wage in Spain; (2) it clarifies Spain’s relevance as a reference in the context of rapid and sustained minimum wage reforms; and (3) it contributes to the theoretical discussion on the relationship between MW and other economic variables,

especially with employment. Following this introduction, Section 2 offers a brief outline of the key institutional features of the Spanish minimum wage. Section 3 describes the materials and methods in detail, including the application of the PRISMA 2020 methodology (with Appendix A providing extended methodological information). Section 4 presents the results of the systematic review process, compiling and analysing all available evidence for Spain, while Section 5 develops a critical discussion of the objectives, methodologies and findings of the identified works and synthesises the main contributions of the literature. Finally, Section 6 provides the conclusions of the study.

2. Evolution of the MW in Spain—Institutional Aspects

The first regulation establishing a statutory minimum wage in Spain (Salario Mínimo Interprofesional, SMI) was Decree 55/1963 of 17 January. It introduced a daily or monthly wage floor applicable to all sectors, occupational categories, and age groups. The Spanish Constitution of 1978, which reinitiated the democratic period, enshrined the right of every person to receive remuneration for productive work sufficient to meet their own needs and those of their family in Article 35, although it made no explicit reference to the MW.

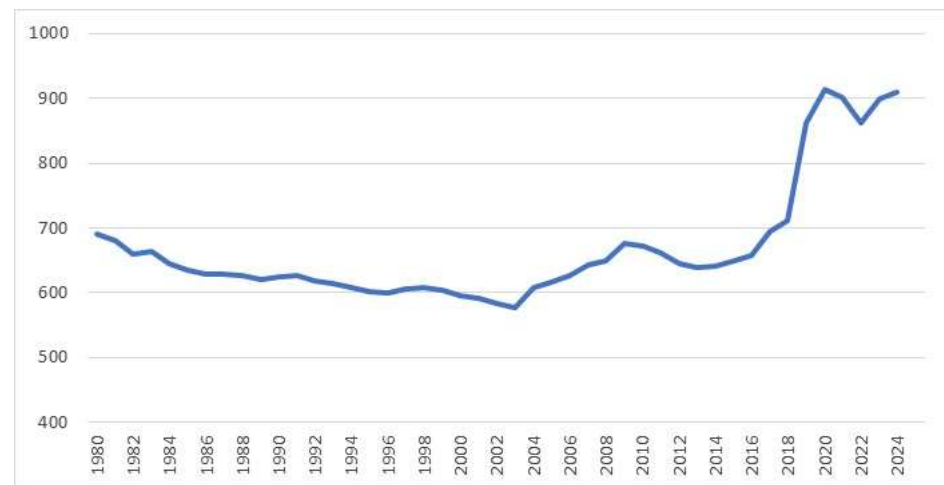
In 1980, Spain joined the European Social Charter (ESC), which entered into force on 5 June 1980; much of its content was already reflected in the Constitution. That same year, the Workers' Statute was approved, becoming the basic law governing labour relations in Spain. The Statute established and defined the main characteristics of the minimum wage and formalised the procedure for its annual determination by decree, after consultation with social partners, as is also the case in the Czech Republic and Romania. In other European countries, consultations may involve a body of experts, as in France, the United Kingdom, the Netherlands, Portugal, Ireland, Latvia, Lithuania, Malta, Hungary, and Bulgaria [27]. Following this trend, in 2021 the Ministry of Labour and Social Economy created the Advisory Commission for the Analysis of the Minimum Wage.

The evolution of the MW in Spain can be divided into three phases, marked by key milestones reflecting different contexts, policies, and events. The first milestone came in 1997 with the equalisation of MW by age. Initially, the MW was established in three age brackets with differentiated amounts for workers aged 16, 17, and 18 or over. In 1990, these became two groups (16–17 years old and 18 and over), and finally, Royal Decree 2015/1997 of 26 December established a general MW. Since then, the Minimum Wage has applied uniformly to all workers, regardless of age, sector, type of working day or contract, or territory. During this first phase, successive governments' primary concern was inflation, and wage moderation was used as a tool to contain it.

A second phase began in 2004, when a significant policy shift occurred. Until then, the MW had remained at very low levels and functioned almost exclusively as a reference for calculating social benefits rather than as an effective wage floor for employed individuals. In 2004, however, its role as a tool for inflation control was abandoned, and attention turned to compliance with the European Social Charter (setting the MW at 60% of the average wage). The government announced a target of €800 by 2012, representing a 28% increase. To achieve this, the MW was initially raised by more than the rate of inflation. To mitigate the fiscal burden, the MW was no longer used as the reference for social benefits, and the Public Indicator of Multiple Effect Income (IPREM, for its acronym in Spanish) was created. From that point onward, the IPREM became the benchmark for social assistance in Spain, clearly decoupling it from the MW [28].

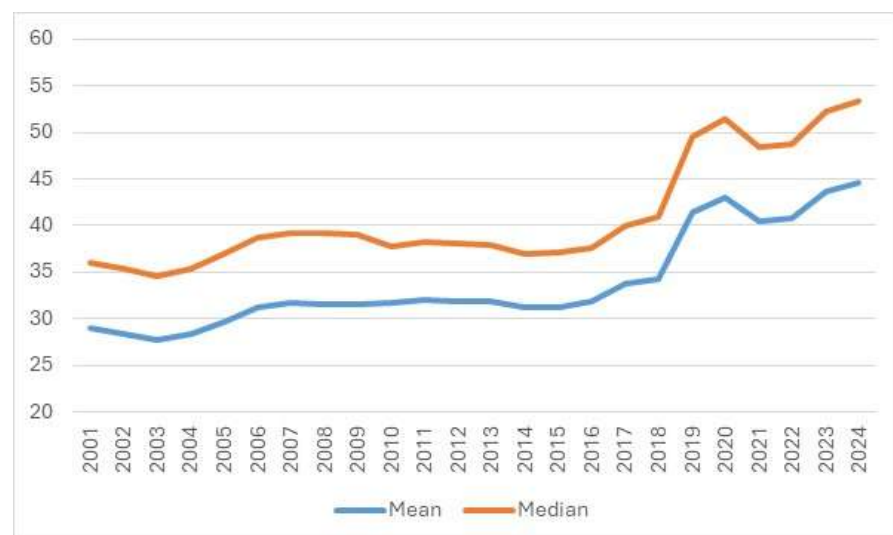
This upward trend was interrupted by the Great Recession of 2008 and did not resume until 2017, when efforts were made to recover some of the purchasing power lost due both to the 2008 crisis and the 2012 labour reform. In any case, the MW remained relatively low

during this period (see Figures 1 and 2), and its overall impact on the working population was therefore limited.



Source: Authors' elaboration based on data from INE (National Statistics Institute).

Figure 1. Evolution of the Minimum Wage, monthly wage (14 payments per year) in constant 2015 euros.



Note: Relationship between the Minimum Wage and the Mean and Median Wage, according to data from the Organisation for Economic Co-operation and Development (OECD)

Source: Authors' elaboration based on data from the Organisation for Economic Co-operation and Development (OECD)

Figure 2. Minimum wage as a percentage of the mean wage of full-time employees.

Finally, in 2019 the MW was raised by 22.3%—Royal Decree 1462/2018 (of 21 December) established the minimum wage at €900 per month in 14 payments (€12,600 per year), effective 1 January 2019, for full-time workers, an increase of 22.3% (21.3% in real terms)—marking the beginning of a significant shift in Spain's minimum wage policy. With this increase, the Spanish government renewed its commitment to the target established by the European Social Charter: 60% of the average net wage. The Advisory Commission for the Analysis of the Minimum Wage (CAASMI, for its acronym in Spanish) was created in 2021 to establish the process for achieving this goal within a short period of time. This Commission has issued four reports so far (the most recent in December of 2025), which have focused primarily on establishing the concepts involved, the method of calculation,

and summarising some studies on the effects of the measure. In fact, at present (2026), this goal is considered to have been achieved. Thus, CAASMI's work consists of advising on determining how much the minimum wage should be increased annually to maintain this ratio, far from the level it represents in other European countries. The upward trend has continued, although the 2020 and 2022 crises interrupted progress in real terms and in relation to both the average and the median wage. This third phase is especially relevant, not only because of the magnitude of the increase but also because its incidence rose substantially—from 1.2% of workers in 2016 to more than 6% in 2019, and it is projected to reach around 10% by 2026. The data differs depending on the source used: Labour Force Survey or Continuous Sample of Working Lives. For example, for 2019, the Labour Force Survey estimates it at 7.6% and the Continuous Sample of Working Lives at 6.2% for full-time workers who work 30 days a month.

As a result of this policy shift, Spain's recent trajectory has become similar to that of other EU countries, given that the goal of reaching 60% of the average wage is a European objective enshrined in the Social Charter and its implementing Directive.

3. Materials and Methods

As noted in the Introduction, the PRISMA 2020 methodology was applied to identify, screen, evaluate and synthesise all empirical studies analysing the effects of the minimum wage (MW) in Spain. This approach ensures a systematic, explicit and transparent review process and allows the procedure to be independently verified. The full methodology, together with the flow diagram and checklist, is presented in Appendix A.

Application of the PRISMA methodology. This review follows the PRISMA 2020 guidelines in full, applying a structured process of identification, screening, eligibility assessment and final inclusion. Eligibility criteria covered all empirical studies relevant to the research question, including peer-reviewed scientific publications and unpublished or institutionally commissioned studies. Because the latter had not undergone formal evaluation, they were subjected to an additional verification process to ensure their quality and relevance. Due to the scarcity of prior empirical evidence for Spain, all empirical methodologies were considered without restriction, and studies written in either English or Spanish were included. Non-empirical, declarative, opinion-based or methodologically unspecified works were excluded.

Source identification. The search was carried out across the 165 databases integrated in the Columbus-UHU metabase (including WoS, Scopus and ProQuest), complemented by targeted searches in Google Scholar and institutional publications. Cascade searches were also performed by systematically reviewing the reference lists of the included studies and the academic output of their authors.

Search strategy. Initial exploratory searches used individual keywords ("minimum wage", "empirical evidence"), followed by more specific combinations ("minimum wage and Spain", "minimum wage and the Spanish case"). Searches were replicated across platforms to detect unpublished or preliminary versions. Undergraduate theses were excluded, while master's theses were included when they met the methodological criteria. The search was updated at the end of the review to incorporate the most recent contributions.

Selection process. All quantitative and qualitative information was recorded in a structured registry, independently reviewed by several team members, with discrepancies resolved by consensus. Duplicates were removed and consistency in the application of inclusion and exclusion criteria was verified.

Synthesis and evaluation. A systematic narrative synthesis was developed, and confidence in the cumulative evidence was assessed by evaluating consistency, precision, robustness, susceptibility to bias and validity of the identification strategy.

Classification and comparability. To facilitate comparability, the studies were grouped according to: Primary analytical domain: Employment (E); wage distribution, inequality, poverty and household income (D); other adjustment channels (O). Data source: AEAT: Tax Microdata for Distribution Analysis; ECL: Employment Situation Survey; ECV: Living Conditions Survey; ECEE: Wage Structure Survey, EPA, Labour Force Survey; ETCL, Quarterly Labour Cost Survey; MCVL: Administrative Microdata of the Social Security and other aggregate sources; sector-specific surveys. Unit of analysis: individuals; households; firms; aggregated geographical units; population subgroups (youth, migrants, temporary workers, low-wage quintiles).

Additionally, all studies were classified into four levels according to their identification strategy (IS). This classification functions as a tool for transparency and causal credibility, but it is not intended to be a scheme for weighing exhaustive methodological quality and in no case is it intended to be a standard scale of risk of bias (see Tables 1–3): A—High: Causal designs such as DiD with microdata; strictly bounded treatment groups; validated parallel-trend assumptions; robustness checks. B—Moderate: Causal approaches with identifiable limitations (e.g., differential-exposure DiD). C—Low: Correlational models or aggregate time-series analyses without a valid causal identification strategy. D—Non-causal/descriptive/simulated: Ex-ante projections, scenario analyses, descriptive institutional reports or aggregate-trend studies.

A PRISMA-standard evidence map was constructed for the 34 included studies, documenting publication type, peer-review status, data source, identification strategy, main risks of bias and causal-inference credibility. The final sample reveals substantial methodological heterogeneity: 7 studies meet the criteria for high-credibility causal identification (A), 9 correspond to quasi-experimental designs with moderate credibility (B), 12 rely on correlational or aggregate approaches (C) and 6 are descriptive or simulation-based (D).

Although a meta-analytic approach would in principle enhance comparability across studies, this option is not feasible in the present review due to the substantial heterogeneity in units of analysis, data sources, empirical designs and outcome measures. The studies included differ markedly in their dependent variables in the granularity of the microdata used, and in the econometric strategies applied, which makes the computation of standardised effect sizes neither meaningful nor methodologically sound. For this reason, and following the recommendations for heterogeneous bodies of evidence in systematic reviews, the synthesis provided here adopts a structured narrative approach rather than a quantitative meta-analytic integration.

Table 1. Selected works from the 1st phase (before 2004). PRISMA Evidence Map with IS Classification.

Num.	Year of Publication	Author	Period Analysed	Object of Study	Publication Type	Peer Review	Data Source	Identification Strategy	IS	Critical Analysis and Risk of Bias	Domain	Direction of Findings
1 [29]	1995	Carlos Pérez Domínguez	1985–1994	Effects on employment, activity and unemployment of adolescents, young people and adults	National journal	Not specified	Time-Series	OLS time-series regression	C	Correlational; no counterfactual	E	MIXED Adolescents: neg. elasticity (−0.61); Youth: neg. but less (−0.20); Adults: null
2 [30]	1996	Juan José Dolado, Francis Kramarz, Stephen Machin, Alan Manning, David Margolis, Coen Teulings, Gilles Saint-Paul and Michael Keen	1967–1994	Effects on employment	International journal	Yes	Time-Series	OLS time-series regression	C	Correlation; macro shocks	E	MIXED Youth Neg. (but insignificant); Total employment: Pos.
3 [31]	1997	Inmaculada González Güemes	1976–1995 and 1981–1992	Effects on employment (youth, adolescents and women)	National journal	No	Time-Series	OLS/GLS time-series regression	C	No causal identification	E	MIXED Adolescents: Neg; Women/young men: Mixed
4 [32]	1997	Juan José Dolado and Florentino Felgueroso	1989–1995	Effects on employment and wage distribution	National journal	No	Time-Series	OLS time-series regression	C	Aggregated; correlational	E	NULL
5 [33]	1999	Juan José Dolado, Florentino Felgueroso and Juan Francisco Jimeno	1990–1998	Effects on youth employment	National journal	No	Time-Series	OLS time-series regression	C	Elasticity sensitive to cycle	E	MIXED Neg. 16–17 years; pos. 18+
6 [34]	2001	Inmaculada González Güemes and Carlos Pérez Domínguez	1981–1999	Effects on adolescent employment	National journal	No	Time-Series	OLS time-series regression	C	Correlational	E	MIXED For 18–19 years: Pos. unemployment elasticity; for 16–17 years: Neg elasticity
7 [35]	2001	Antonio Caparrós Ruiz and M ^a Luisa Navarro Gómez	1993	Effect on the labour supply of adolescents and young people	National journal	No	Time-Series	Multinomial logit (correlational)	C	Weak identification	E	POS-NS Higher MW increases school-leaving

Table 1. Cont.

Num.	Year of Publication	Author	Period Analysed	Object of Study	Publication Type	Peer Review	Data Source	Identification Strategy	IS	Critical Analysis and Risk of Bias	Domain	Direction of Findings
8 [36]	2002	Carlos Pérez Domínguez, Inmaculada González Güemes and M ^a Dolores de Prada Moraga	1981–1999	Simultaneous effects of the minimum wage on employment, participation, and the unemployment rate of Spanish adolescents	National journal	No	Time-Series	Simultaneous-equations model	C	Endogeneity	E	NEG Adolescent: neg. employment; Higher unemployment; Participation reductions under some specifications
9 [37]	2002	Antonio Caparrós Ruiz and M ^a Luisa Navarro Gómez	1979–1992	Effect on industrial employment	National journal	No	Time-Series	Panel regression (sectoral)	C	Sector aggregation issues	E	POS Positive industrial employment
10 [38]	2003	Inmaculada González Güemes, Sergi Jiménez Martín and Carlos Pérez Domínguez	1989–1998	Effect on adolescent employment	National journal	No	Time-Series	Panel regression with regional/lags	C	No causal identification	E	MIXED Lagged neg in some regions
11 [39]	2011	José-Ignacio Antón and Rafael Muñoz de Bustillo	1995–1998	Effect on employment, unemployment and school enrolment of adolescents	Working paper	No	EPA	DiD	B	Spillovers; CG problematic	E	NEG Lower employment for 16–17; Higher unemployment; Reduced school enrolment

Notes: IS (identification strategy level): A: strong causal identification; B: quasi-experimental with limitations; C: correlational; D: non-causal. Main domain of analysis: Employment (E), inequality and wage distribution, poverty and income (D), adjustment channels (O). Direction of Findings: NEG (Negative effect): The study finds statistically significant negative effects on the main outcome; NULL (Null effect): The study finds no statistically significant effect; POS (Positive effect): The study finds statistically significant positive effects on the main outcome; POS-NS (Positive non-significant): The study estimates a positive effect, but it is not statistically significant; MIXED (Mixed findings): The study presents heterogeneous results across groups, periods, regions, or model specifications. Data source: AEAT: Tax Microdata for Distribution Analysis; ECL: Employment Situation Survey; ECV: Living Conditions Survey; ECEE: Wage Structure Survey, EPA, Labour Force Survey; ETCL, Quarterly Labour Cost Survey; MCVL: Administrative Microdata of the Social Security.

Table 2. Selected works from the 2nd phase (2004–2018). PRISMA Evidence Map with IS Classification.

Num.	Year of Publication	Author	Period Analysed	Object of Study	Publication Type	Peer Review	Data Source	Identification Strategy	IS	Critical Analysis and Risk of Bias	Domain	Direction of Findings
1 [40]	2010	Inmaculada Cebrián, Joaquín; Pitarch, César Rodríguez, Luis Toharia	2000/2008	Effect on employment	National journal	Unclear	ECL	OLS time-series regression	C/D	Non-causal	E	NULL No significant effects of the minimum wage on employment for adolescents, youth, or the total population
2 [41]	2011	Josep Banyuls Llopis, Ernest Cano Cano, Empar Aguado Bloise	2004/2008	Effect on the income of low-wage earners	National journal	No	Sectoral survey	Descriptive institutional analysis	D	No identification	D	NULL No significant impact of MW increases on actual wage levels.
3 [42]	2011	Maite Blázquez Cuesta, Raquel Llorente Heras and Julián Moral Carcedo	2000/2008	Effect on youth employment	National journal	Unclear	EPA	Seasonal-adjusted OLS panel models	C	Seasonality risk	E	MIXED Pos. lagged effects initially; Neg. effect at lag 3; Non-significant after adjusting for seasonality.
4 [43]	2012	Inmaculada González Güemes, Carlos Pérez Domínguez and Juan Carlos Rodríguez Caballero	1996/2008	Effect on the employment of immigrants	National journal	No	EPA/ETCL	ARDL/2SLS dynamic regression	C	Weak specification	E	NEG Neg for immigrants (around −0.7)
5 [44]	2014	F Alfonso Arellano Espinar and Marcel Jansen	2007/2013	Effects on the employment situation of younger workers	National journal	Yes	MCVL	Descriptive microdata comparison	D	Non-causal	E	NEG-NS Some evidence neg youth with no causal identification
6 [45]	2015	Sofia Galán and Sergio Puente	2000–2010	Effect on the probability of losing a job	International journal	Yes	MCVL	DiD	B	Crisis–expansion confounding	E	NEG Higher dismissal prob
7 [46]	2017	Ignacio Archondo, Juan Ramón García and Camilo Ulloa (BBVA)	2017	Effects on employment and GDP Type of recipients	Institutional	No	ECEE	Structural VAR simulation	D	Non causal	E	NEG-NS Small negative long-run effects on employment and GDP (−0.1 to −0.2 p.p.), but not causal.

Table 2. Cont.

Num.	Year of Publication	Author	Period Analysed	Object of Study	Publication Type	Peer Review	Data Source	Identification Strategy	IS	Critical Analysis and Risk of Bias	Domain	Direction of Findings
8 [47]	2019	Aitor Lacuesta, Mario Izquierdo and Sergio Puente (BE)	2013–2017	Effects on job loss	Institutional	No	MCVL	DiD	B	TG not bounded	E	NEG-NS Estimate a 0.1% total job loss sensitive to specification.
9 [48]	2022	Jordi López-Tamayo, Celia Melguizo and Raúl Ramos	2006/2018	Effects on youth employment	International journal	Yes	EPA/AEAT	Spatial econometric models	C	Spatial dependence	E	MIXED Neg. for 16–19; null others
Notes: IS (identification strategy level): A: strong causal identification; B: quasi-experimental with limitations; C: correlational; D: non-causal. Main domain of analysis: Employment (E), inequality and wage distribution, poverty and income (D), adjustment channels (O). Direction of Findings: NEG (Negative effect): The study finds statistically significant negative effects on the main outcome; NEG-NS (Negative effect non-significant): The study estimates a negative effect, but it is not statistically significant; NULL (Null effect): The study finds no statistically significant effect; POS (Positive effect): The study finds statistically significant positive effects on the main outcome; POS-NS (Positive non-significant): The study estimates a positive effect, but it is not statistically significant; MIXED (Mixed findings): The study presents heterogeneous results across groups, periods, regions, or model specifications. Data source: AEAT: Tax Microdata for Distribution Analysis; ECL: Employment Situation Survey; ECV: Living Conditions Survey; ECEE: Wage Structure Survey, EPA, Labour Force Survey; ETCL, Quarterly Labour Cost Survey; MCVL: Administrative Microdata of the Social Security.												

Table 3. Selected works from the 3rd phase (since 2019). PRISMA Evidence Map with IS Classification.

Num.	Year of Publication	Author	Period Analysed	Object of Study	Publication Type	Peer Review	Data Source	Identification Strategy	IS	Critical Analysis and Risk of Bias	Domain	Direction of Findings
1 [49]	2021	Cristina Barceló, Mario Izquierdo, Aitor Lacuesta, Sergio Puente, Ana Regil and Ernesto Villanueva (Bank of Spain)	2019	Effect on employment	Institutional	No	MCVL	Differential impact DiD	B	TG not bounded	E	NEG-NS Lower hiring rates among low-wage groups; Uncertain effects on total employment
2 [50]	2022	Pablo Fernández-Baldor Laporta (IEB)	2019	Effect on employment	Working paper	No	MCVL	PSM + DiD	B	Matching limitations	E	NEG-NS Neg. small (0.38–0.44 pp)
3 [51]	2023	José M Arranz, Carlos García-Serrano and Ana M Silva (IEF)	2019	Effect on employment	Working paper	No	MCVL	Strict DiD	A	Exit not observable	E	NULL No effect on job loss
4 [52]	2023	Alejandro Hijzen, Mateo Montenegro and Ana Sofia Pessoa (OECD)	2019	Effect on wages, employment and unemployment	OECD WP	No	MCVL	DiD (heterogeneous exposure)	A/B	Exposure heterogeneity	E/D	MIXED Full-time equivalent income + 5.8%; Employment—0.6%

Table 3. Cont.

Num.	Year of Publication	Author	Period Analysed	Object of Study	Publication Type	Peer Review	Data Source	Identification Strategy	IS	Critical Analysis and Risk of Bias	Domain	Direction of Findings
5 [53]	2023	Rubén González Salmerón (unpublished)	2019	Effect on total productivity (TFP) and capital investment	Unpublished	No	Firm accounts	Correlational firm-level regressions	C/D	Endogeneity	O	POS Higher productivity and greater capital investment
6 [54]	2023	Ferrán Elías and Marc Riudavets-Barcóns (unpublished)	2017/2019	Impact on employment, wages and public budgets	Unpublished	No	MCVL	Wage-distribution method (Cengiz approach)	B	No hours data	E/O	MIXED Slight job loss; Higher wages; Increased revenues for public budgets
7 [55]	2024	Lucia Gorjón, David Martínez de Lafuente and Gonzalo Romero (ISEAK)	2019	Effect on employment	Scientific journal	Yes	MCVL	CEM + DiD	B	Matching insufficient	E/D	MIXED No short-term employment effect; Mild negative effect later; Lower inequality
8 [56]	2024	Marco Lacasa. Cazcarra	2001–2021	Effect on income inequality, inflation, profit margins, and unemployment	Preprint	No	AEAT	Machine-learning structural model	C/D	Associational only	D	POS Lower inequality; Higher employment; Stable prices
9 [57]	2024	Manuela A. De Paz-Báñez, Celia Sánchez-López and María José Asensio-Coto	2019	Effect on income inequality	Scientific journal	Yes	ECV	Strict DiD	A	Income measurement issues	E	POS Income + 18% (treated households); Spillovers + 3.7%; –Inequality
10 [58]	2024	Juan J. Arnadillo, Amadeo Fuenmayor and Rafael Granell	2019	Effect on employment	Scientific journal	Yes	EPA	Synthetic Control Method (SCM)	C/B	International comparability	E/O	NULL No effect on employment
11 [59]	2024	Michael Christl, Andrea Cubells Enguádanos and Filippo di Pietro (GLO)	2019 2015–2023	Effect on the labour market, prices and business bankruptcy	GLO WP	No	EPA	SCM (aggregate data)	C	Donor pool heterogeneity	E	MIXED No labour-market effect; Price increases; Small rise in bankruptcies
12 [60]	2025	Jorge Monray and Juan Morillo	2010–2023	Effect on unemployment	Scientific journal	Yes	EPA	Correlational analysis	C/D	No counterfactual	P	NEG Negative correlation unemployment

Table 3. Cont.

Num.	Year of Publication	Author	Period Analysed	Object of Study	Publication Type	Peer Review	Data Source	Identification Strategy	IS	Critical Analysis and Risk of Bias	Domain	Direction of Findings
13 [61]	2025	José María Arranz and Carlos García-Serrano (IEF)	2016/2019	Effect on family income and poverty	Scientific journal	Yes	ECV	DiD on household income	A	Household income errors	E	POS Income + (8–10%); poverty – (36–49%)
14 [62]	2025	Celia Sánchez-López, María José Asensio-Coto and Manuela A. de Paz-Báñez (forth coming)	2018–2019, 2022–2023	Effect on employment	Scientific journal	Yes	MCVL	Strict DiD	A	No hours; anticipation	D	Null No significant effect on job loss for 2019; nor for 2022–2023

Notes: IS (identification strategy level): A: strong causal identification; B: quasi-experimental with limitations; C: correlational; D: non-causal. Main domain of analysis: Employment (E), inequality and wage distribution, poverty and income (D), adjustment channels (O). Direction of Findings: NEG (Negative effect): The study finds statistically significant negative effects on the main outcome; NEG-NS (Negative effect non-significant): The study estimates a negative effect, but it is not statistically significant; NULL (Null effect): The study finds no statistically significant effect; POS (Positive effect): The study finds statistically significant positive effects on the main outcome; POS-NS (Positive non-significant): The study estimates a positive effect, but it is not statistically significant; MIXED (Mixed findings): The study presents heterogeneous results across groups, periods, regions, or model specifications. Data source: AEAT: Tax Microdata for Distribution Analysis; ECL: Employment Situation Survey; ECV: Living Conditions Survey; ECEE: Wage Structure Survey, EPA, Labour Force Survey; ETCL, Quarterly Labour Cost Survey; MCVL: Administrative Microdata of the Social Security.

4. Results

The identified studies can broadly be grouped into phases that coincide with significant changes in the MW. The first phase (before 2004) reflects the equalisation of the MW across age groups in the 1990s, which resulted in a sharp increase for adolescents (aged 16–19). The second phase (2004–2018) corresponds to the policy shift toward meeting the objectives of the European Social Charter, a process interrupted by the Great Recession of 2008 and subsequent austerity measures, and only tentatively resumed in 2017. The third phase relates to the sharp and sustained increase in the MW beginning in 2019. It should be noted that this classification refers to the period analysed by each study, not to the year of publication. The works reviewed below are presented according to these phases. A summary of each of these works is available as Supplementary Materials to this article.

4.1. Results First Phase (Before 2004)

In this first phase, the minimum wage had little impact on real wages due to its low level, except for the cohorts affected by the age equalisation reform implemented between 1990 and 1998. A total of eleven studies were published (Table 1). All stem from an academic context, most of them published in national or regional journals. Only one appeared in an international peer-reviewed outlet. Ten of these studies are classified as Group C in our causal-inference credibility framework: correlational or aggregate time-series models without causal identification. The working paper by Antón & Muñoz (2011) [39], which applies a difference-in-differences design, is included in Group B. The studies identified for this period focus primarily on examining whether age equalisation influenced adolescent employment, given that it implied a substantial increase in the real minimum wage for the youngest workers. Most works had the explicit or implicit objective of identifying adverse effects on younger workers, in line with predictions derived from basic neoclassical theory [63].

4.2. Results Second Phase (2004–2018)

A new phase began in 2004 following a shift in minimum wage (MW) policy. Substantial increases occurred across two specific periods: 2004–2008 and 2017–2018. Research during this stage was stimulated by this policy shift and once again questioned the employment effects of MW increases. Between 2004 and 2009, the cumulative nominal increase in the MW reached 38.3%, well above both average wage growth and the consumer price index [43]. Nevertheless, by the end of this period of so-called extraordinary increases, the real value of the MW had merely returned to its 1980 level, and the Kaitz index remained below that benchmark (see Figures 1 and 2).

A total of nine studies were published (Table 2). Seven originate from academic settings, five of them in national journals and two in international scientific publications (the first version of Galán and Puente [45] appeared as a Bank of Spain working paper in 2012 [64]). Only three underwent independent peer review. Two additional studies were published by institutional research centres (Bank of Spain and BBVA). As the table shows, methodological approaches became more diverse than in the first phase, reflected in the wider range of data sources and increased use of causal-inference techniques.

The studies analysed empirical evidence on real increases from 2004 onward and from 2017 to 2018. Most focused on employment effects, and two specifically examined whether these increases disproportionately harmed young workers during the 2008 crisis. Only one article investigated the impact of MW increases on improving the incomes of low-wage earners [41].

4.3. Results Third Phase (Since 2019)

The third phase begins in 2019, marked by a 22.3% increase in the minimum wage (21.3% in real terms), followed by additional rises in subsequent years. This abrupt and sustained policy change expanded the share of workers directly affected by the MW and provides favourable conditions for quasi-experimental research assessing the effects of a large increase in the MW on a growing proportion of workers. This makes the period particularly relevant for empirical analysis.

Despite the unique opportunity this event offered for experimental or quasi-experimental research, peer-reviewed academic studies did not appear until 2024 [55,57,58]. For this reason, the present review also considers technical studies applying rigorous methodologies beyond purely descriptive analysis. Initially, the increase generated mainly technical reports commissioned by institutions; more recently, it has also produced peer-reviewed academic research. Many of these studies were motivated by concerns that such a sharp rise would generate significant negative employment effects.

A total of fourteen studies were identified for this phase (Table 3). These works include both academic publications and institutional reports produced between 2021 and 2025. Most studies rely on administrative microdata—primarily the Continuous Sample of Working Lives for employment analyses and EU-SILC microdata for income and inequality outcomes—while a smaller number employ firm-level administrative datasets or national household surveys. The methodological approaches include difference-in-differences designs, synthetic control methods, matching procedures, and other quasi-experimental techniques, although the specific choice varies across studies.

Although employment effects remained the predominant focus (nine studies, some combined with other outcomes), four articles analysed income inequality and poverty. More recent contributions examine additional adjustment channels, including productivity [53], inflation, economic growth, business bankruptcy [59], and institutional aspects such as the political drivers of MW increases [65] (this article was not included in the selection because it uses an exploratory cross-country methodology and treats Spain only tangentially, but it is mentioned here because it addresses a novel and interesting topic). Almost all studies concentrate on the 2019 reform, with only a few extending their analysis to subsequent years (see Table 3). Despite differences in methodological focus, research from this phase collectively provides a broad empirical mapping of the consequences of recent minimum wage reforms in Spain.

Finally, other technical studies on employment effects [66,67] and simulation exercises analysing inequality and poverty [68,69] were excluded from the present review as they are not genuinely empirical but prospective in nature.

The most frequently used data sources include the Continuous Sample of Working Lives for employment studies and the European Union Survey on Income and Living Conditions (EU-SILC) for inequality and poverty analyses of the corresponding microdata. These studies typically employed causal methodologies, often following preliminary descriptive analyses to contextualise results. The difference-in-differences approach predominated, with variations in dependent variables and the definition of treatment and control groups.

5. Discussion

As outlined in the previous section, an exhaustive review was undertaken of all studies addressing the effects of the minimum wage (MW) in Spain, focusing exclusively on empirical methodologies that went beyond purely exploratory approaches. Following the PRISMA methodology, 34 studies were ultimately selected that attempted to measure or estimate the impact of MW increases in Spain.

It should be noted that not all of these works have been published in scientific journals. In the first and second phases, most appeared in national or even regional journals (seven and five studies, respectively), with very few in international journals (one and two, respectively) and a limited number in institutional publications (three and two, respectively). By contrast, in the third phase, most contributions came in the form of institutional reports (nine studies). Only very recently (from 2024 onward) have studies begun to appear in international peer-reviewed journals (a total of five) (see Tables 1–3). This uneven trajectory has contributed to the perception that the Spanish case remains understudied. At the same time, locally published studies often provide valuable contextual knowledge, even if they are not always easily accessible or verifiable internationally. One of the contributions of this article is precisely to bring together and critically assess this dispersed body of evidence, highlighting works that might otherwise go unnoticed.

This section offers a critical discussion of the identified studies, focusing on the methodologies applied and the results obtained, concluding with several theoretical considerations.

5.1. Methodologies and Data Sources

High-quality, reliable data are essential for conducting empirical analyses. Spain, like the rest of the EU, benefits from a wide range of robust data sources. Indeed, almost all of them have been used in the studies examined. A key issue, however, is whether the data were employed in aggregate form or whether microdata were available, which would allow for finer groupings tailored to the research objectives.

When aggregate data were used, the sources varied widely: for employment, the Labour Force Survey, the Quarterly Labour Cost Survey, the Four-Yearly Wage Structure Survey, the Employment Situation Survey, the Wage Distribution Survey, and the Continuous Sample of Working Lives. When microdata was employed, the Continuous Sample of Working Lives was the most widely used for studies on employment, while the Living Conditions Survey was the primary source for analyses of wage and income inequality. Only one study [16] relied on an original survey conducted in Valencia.

The methodologies applied have evolved substantially over time. Early works were largely descriptive or based on econometric correlations with aggregate data. More recently, the literature has shifted toward causal methodologies using quasi-experimental designs. In the first phase, almost all studies (except two) relied on econometric correlation. Most studies estimated traditional employment equations in which the minimum wage index was the explanatory variable, supplemented with additional controls capturing seasonal, cyclical, and other effects. These analyses were generally based on time-series models that correlated employment (or unemployment) rates with minimum wage trends, typically expressed through their relationship with the average wage (the Kaitz index), and estimated using ordinary (OLS) or generalised least squares (GLS). In short, they sought to estimate the elasticity of a labour demand curve. Only three studies adopted a causal methodology [30,32,39]. In the second phase, methods became somewhat more sophisticated, beginning to account for sectoral and regional heterogeneity. In the third phase, nearly all studies adopted causal methodologies, except for Monray and Morillo [60] and Lacasa-Cazcarra [56]. Below, the focus is placed on the causal approaches, which are now dominant and provide the greatest insight.

The earliest works applying causal methodology appeared in the first phase [30,32,39]. Two further contributions used this approach in the second phase [45,47]. It was not until the third phase, however, that causal methodologies became widespread, though significant differences remained across studies. Most of these employed a treatment group (TG) and a control group (CG), generally using the difference-in-differences (DiD) technique; however, the identification strategies varied and the studies could be grouped accordingly.

(a) *Differential impact*

Following Card's seminal contribution [70], several of the studies included in our review applied similar identification strategies to the Spanish case. Early examples are Dolado et al. [30], Dolado and Felgueroso [32], and Galán and Puente [45], and this line of work was later extended by other Spanish contributions such as Lacuesta, Izquierdo, and Puente [47], Barceló et al. [49], Fernández-Baldor [50], Hijzen et al. [52], and Gorjón et al. [55]. Although these studies distinguish between a treatment group (TG) and a control group (CG), their selection strategy is often problematic. In most cases, treatment intensity is inferred from regional or demographic variation in exposure to the minimum wage—an approach conceptually related to quasiexperimental designs used in international minimum wage evaluations—yet, such differentiation does not guarantee that TG and CG are unaffected by unobserved factors, nor does it allow for a precise estimation of the effect for the full population directly impacted by the policy. Another strategy, exemplified by Galán and Puente [45], relies on using earlier cohorts of the same groups as the control group; however, this may introduce bias because economic conditions differ across periods, meaning that uncontrolled variables can influence employment dynamics independently of the minimum wage reform. Finally, a further limitation is the frequent definition of the TG as encompassing all workers earning at or below the new MW, without excluding those who were already earning below the previous threshold. This practice introduces measurement errors and cases of non-compliance. A more rigorous approach would restrict the TG to workers earning between the old and new MW levels.

Dependent variables also vary; for instance, 'number of new workers hired' may obscure changes linked to contract conversions from temporary to permanent, reducing turnover but not employment. Similarly, 'probability of job loss' does not capture alternative exits (retirement, self-employment, migration) or the hiring of replacement workers, which may leave firm-level employment unaffected.

(b) *Differential impact with matching*

When using a control group with a salary higher than the minimum wage, matching is often used to ensure that the TG and CG have similar characteristics, assuming that they would behave in the same way if the change in the minimum wage had not occurred. In this line, some studies address comparability issues by applying matching techniques to TG and CG, such as Propensity Score Matching (PSM) or Coarsened Exact Matching (CEM). Fernández-Baldor [58] and Gorjón et al. [55] exemplify this approach. While these methods improve balance across observable characteristics (e.g., age, gender, sector, region), salary group differences inherently affect probabilities of job loss, which limits comparability.

(c) *Difference-in-differences with synthetic control method (SCM)*

In this case, a comparable control group is sought by constructing a synthetic combination of neighbouring countries that did not experience minimum wage increases. This approach is used in [53,58,59]. When only aggregate data are available and precision in defining treatment and control groups is limited, this can be an appropriate method provided that all variables unrelated to the treatment are properly incorporated. The main limitation, however, is the assumption that European countries share sufficiently similar characteristics, which is possible not very realistic in some dimensions, particularly social, institutional, and cultural factors, in addition to purely macroeconomic ones that directly affect the phenomenon under study.

(d) *Standard difference-in-differences (DiD)*

The DiD approach was first applied in Spain by Antón and Muñoz de Bustillo [39]. However, their study faced problems in the choice of the control group (CG), since it

relied on slightly older youth (18–20 years old) than the treatment group (TG, 16–17 years old), who may have been affected by spillover or transfer effects. The robustness test that extended the CG to 18–24-year-olds did not resolve this issue.

More recently, DiD has been used to analyse the 2019 reform by Arranz et al. [51,61], Elias and Riudavets [54], De Paz-Báñez et al. [57], and Sánchez-López et al. [62]. This is now the most widely used technique in the literature. These studies attempt to overcome earlier limitations by exploiting microdata from broad sources (Continuous Sample of Working Lives and Living Conditions Survey carried out in Spain). This allows them to define TG and CG with greater precision, avoiding reliance on differential exposure across groups or regions, and instead directly identifying the workers most affected.

In defining the TG, they exclude the lower segment of the wage distribution to reduce measurement error and non-compliance. For comparison, these studies use October of the previous year—rather than December—to avoid anticipatory wage adjustments that typically occur at year-end and to ensure a cleaner pre-treatment comparison. For the counterfactual, the CG is chosen among workers just above the MW threshold for employment effects, and slightly above for inequality effects, to account for potential spillovers. All these studies test the parallel-trends assumption and apply robustness checks by varying TG and CG definitions and incorporating placebo tests, which make it possible to verify that no spurious effects appear before the minimum wage change, thereby reinforcing the validity of the DiD strategy.

Nonetheless, several limitations remain. It is difficult to distinguish exits from the Social Security system due to unemployment for other reasons, such as emigration or other forms of labour market exit. Retirement is only partially addressed by excluding individuals over 64 years old. Another limitation is that the data source does not provide reliable information on hours worked, preventing precise analysis of employment intensity. Attempts to use part-time employment as a proxy have been unsatisfactory due to widespread inaccuracies. This is the case of Elias and Riudavets [54], who adopt Cengiz's wage-distribution methodology [71]. They construct wage distributions before and after the 2019 MW increase using data from the Continuous Sample of Working Lives, identifying workers who adjusted to the new threshold and those who dropped out. However, the absence of working hours data limits their interpretation. Moreover, their reliance on the same individuals as CG in earlier years (2015 and 2016) introduces additional comparability problems, as noted above.

5.2. Results of the Studies

In relation to the results, it is necessary to take into account the situation during the different periods analysed.

5.2.1. Discussion First Phase (Before 2004)

In the first phase, the analyses focused mainly on the effects on young people and adolescents, with a clear interest in demonstrating that equalising the minimum wage was a mistake, since it would cause generalised drops in employment at those ages, following the most basic traditional economic theory. The empirical studies from that time do not confirm this hypothesis but instead provide ambiguous results. Specifically, in this first phase, some studies found a reduction in adolescent employment—although non-significant—and no effect on adults, not even in general terms [29]. Others observed the replacement of adolescent workers by young workers [30]; some found no effect [31–33,42], observed a smaller reduction in youth employment than in the period when there was no increase in the minimum wage, which implies a positive result for youth employment; Caparrós Ruiz and Navarro Gómez [37] found a positive relationship between employment and the

minimum wage in the industrial sector. The work of Antón and Muñoz de Bustillo [39], which applied a causal methodology, reflected negative results for employment among 16- and 17-year-olds. However, since the control group consisted of slightly older youth (18–20 years old), these results may be distorted because the effect of the minimum wage may also be present in the control group but in the opposite direction (transfer), as other works on this event also suggest [30]. In fact, the other study from this period that used a causal methodology did not find a significant effect [32]. Therefore, whether using correlational or causal methods, the results do not reveal any effect that would render the measure unviable; rather, they may be consistent with other measures pursued at the time to reduce adolescent dropout rates so that they could obtain more education. Nonetheless, despite not confirming their hypothesis, whether the results were positive, negative, or non-significant, all the studies concluded that equalising the MW of adolescents and young adults was an error, without providing further explanation. In any case, the analysis of the adolescent employment situation cannot ignore the qualitative importance of the school-to-work transition which, from a sustainability perspective, plays a crucial role [72]. The quality of the first job is a decisive element in the school-to-work transition, as it determines initial productivity levels and shapes future career paths. High-quality employment facilitates new opportunities, smoother subsequent transitions, and greater long-term employability, while a precarious start can have lasting negative effects on career development and life outcomes.

5.2.2. Discussion Second Phase (2004–2018)

In the second phase, studies continued to search for a decline in employment resulting from the rise in the minimum wage according to neoclassical theory. When they did not find one, they focused their analyses on groups assumed to be affected, such as young people or immigrants. However, the results remained inconclusive. Cebrián et al. [40] found non-significant effect on employment among adolescents, young people, or the population as a whole, but predicted negative effects in the future if the government implemented a measure to equate the minimum wage for adolescents with that of adults. Blázquez, Llorente, and Moral [42], since they did not find employment effects, hypothesised a delay but failed to confirm it. In fact, for the first and second quarters, the effect was positive; they only found a negative effect for the third quarter, but once the seasonal effect was subtracted, the result ceased to be significant. González Güemes et al. [43] examined immigrant employment, finding a certain negative effect in some groups with very low incidence. Galán and Puente [45] also reported a negative effect, not only for young people but also for those over 45 years old, although this study (as well as Arellano and Jansen [44]) had the drawback of mixing periods of prosperity and crisis (2005–2010). All the other works of this phase stopped in 2008 to avoid the impact of the Great Recession on the analysis. In their later work, Lacuesta, Izquierdo, and Puente [47] maintained these results and limitations. López-Tamayo et al. [48] analysed the 2017 increase, attempting to explain the lack of relevant results through provincial disparities using spatial models that reflect significant spatial dependence in total employment rates, which becomes more evident among young people. The challenge here is to isolate the influence of other variables correlated with regions of low-wages, in addition to the MW. Only one work analysed the effect on inequality and poverty during this period: Banyuls Llopis et al. [41] reported positive results, showing that increases in the MW reduce inequality and poverty.

5.2.3. Discussion Third Phase (Since 2019)

In the third phase, the first studies were forecasts or extrapolations commissioned by non-scientific institutions on the effects of the 2019 minimum wage increase, before real data were available. These extrapolations predicted job losses ranging from 125,000 to 140,000 according to the Bank of Spain, and between 24,000 and 40,000 or 19,000 and 33,000 according to AIReF in two separate studies. In any case, for a group of 20 million workers, this represented a relatively non-significant reduction (between 0.1% and 0.3%), especially when compared with forecasts on inequality and poverty, which highlighted improved living conditions for those affected. In fact, projections in this regard [68,69] predict an 18% reduction in inequality among those affected (around 10% of all workers, approximately 1.6 million people) and a 20% reduction in work-poverty (around 250,000 people lifted out of poverty). Nevertheless, the figures on potential job losses were magnified and emphasised in public debate, encouraging opposition to the measure in some sectors, while the positive projections on inequality and poverty received much less attention.

In any case, the results of studies with real data do not corroborate these forecasts. Regarding employment, the findings generally show non-significant or only very small negative or even positive effects, and report somewhat different outcomes depending on methodological specifications, since they analyse different aspects and some specifications are questionable, as previously noted. For example, studies using the differential impact methodology [49,50,52,55] typically find slightly negative effects. Although some introduce matching techniques, they encounter problems with the definition of treatment and control groups, as noted above. When the treatment group is not bounded on the lower end of the wage distribution, these studies usually produce negative evidence that ceases to be significant when the distribution is properly bounded. Another issue is the use of new hiring as the dependent variable, which may be misleading if minimum wage increases also change working conditions; for instance, converting temporary contracts into permanent ones, thereby reducing turnover. In such cases, less hiring does not mean fewer jobs, but rather greater job stability. Similarly, December 2018 is often used as a comparison point, even though it may be distorted by employers' anticipatory behaviour and by being an atypical month. This problem can be mitigated by using an earlier month, such as October (see [32,51,57,62]), which avoids strong seasonality while remaining close to the policy change. Elias and Riudavets [54] also find negative but even less significant effects, though their study faces problems in defining the control group. Studies using synthetic control methods [7,25] do not detect employment effects. Monray and Morillo [60], using correlation methodology, even report an inverse relationship between the minimum wage and unemployment.

Studies applying difference-in-differences (DiD) techniques with microdata to determine treatment and control groups reach similar conclusions, finding non-significant employment impact. For instance, Arranz et al. [51] and Sánchez-López et al. [62] determine that the large increase in the minimum wage in 2019 has non-significant effect on the probability of remaining employed. Even when considering a broader period, as Sánchez-López et al. [62] did, full-time employment remains unaffected, despite the fact that the minimum wage in Spain has risen to about 60% of the average net salary. In summary, in the Spanish case, even with very significant increases in the minimum wage and with high coverage (close to 60% of the average net salary), the effect on employment is null or no significant across methodologies. This constitutes empirical evidence consistent with many other international studies.

The works analysing income inequality and poverty are largely matching. As in the rest of the international literature, all highlight the positive effects of raising the minimum wage in reducing inequality and poverty. According to Arranz et al. [61], income increases

by 8–10% in households with workers earning wages equal to or below the minimum wage, especially in the lowest deciles, and the probability of escaping poverty is around 40%. De Paz-Báñez et al. [57] find even stronger effects: income rises by about 18% for the affected group and by 3.7% as a spillover effect for low-wage workers earning just above the minimum wage. For Lacasa-Cazcarra [56], raising the minimum wage reduces inequality and, moreover, has no effect on inflation or unemployment; in fact, it coincides with increases in net employment and business profit margins. Gorjón et al. [55] also find positive results; specifically, a reduction in wage inequality and an increase in the income share of the lowest quintiles. Hijzen et al. [52] report the same pattern.

Regarding other potential effects of the minimum wage increase, although the number of studies is still limited, the findings are promising. Improvements have been detected in productivity and capital investment rates; in public budgets through higher fiscal revenue [54]; and in business outcomes, with some studies reporting higher profit margins and increases in national wealth [56]. On inflation, results are mixed: some identify upward pressure on prices [59], while others find no effect [56]. In any case, scientific consensus on these issues has yet to emerge.

Overall, studies with real data show that increases in the minimum wage significantly reduce wage and income inequality by raising the earnings of low-wage workers, who are predominantly in the lower deciles of the distribution. At the same time, they indicate that these increases have no substantial effect on employment, with at most minor reductions or non-significant increases.

5.3. Theoretical Frameworks

All these empirical studies have clearly influenced the evolution of the corresponding theoretical frameworks. Indeed, the framework itself has also undergone significant changes over time. In the first phase, it was explicitly neoclassical, and the objective of most studies was to corroborate this theory. In the second phase, however, it began to be questioned as empirical evidence increasingly contradicted neoclassical predictions, prompting the search for alternative explanations. Following international trends, markets came to be viewed as non-competitive, giving rise to the concept of monopsonistic markets, which acknowledged the possibility of employers setting wages unilaterally. Under this framework, the imposition of a minimum wage could be beneficial not only by raising the earnings of low-wage workers, but also by increasing employment.

By the last phase, this perspective had become predominant in the scientific community. Since 2019, not only has Spain's minimum wage policy changed, but so too has the prevailing scientific and social consensus surrounding it. The 'new consensus' that emerged internationally during the 1990s—that the effect of the minimum wage on employment, if it exists, is very small and may even be positive—has been widely adopted. While in most cases the effect is not economically significant, it is sometimes statistically significant, and empirical evidence corroborates this.

Nonetheless, the theoretical framework continues to evolve, with increasing attention directed at alternative adjustment channels and employer strategies in response to higher labour costs. Recent studies have examined the effects on productivity, capital investment, and inflation [53,56,59]. However, this line of research remains incipient and far from reaching scientific consensus.

New theoretical approaches emphasise the role of alternative Channels of Adjustment (CoA). In this case, increases in the minimum wage are considered as a further increase in labour costs. The strategies adopted by economic actors—especially employers—are seen as diverse and flexible. Reductions in employment tend to be considered only as a last resort due to their disruptive implications, while priority is often given to other

mechanisms such as raising productivity, narrowing profit margins, or adjusting prices (see [25,73]).

6. Conclusions

The recent literature underscores that inequality, poverty, and sustainability are deeply interconnected, with distributional gaps slowing progress toward the 2030 Agenda. Furthermore, the climate crisis exacerbates the vulnerability of households and territories, impacting progress on the Sustainable Development Goals (SDGs). This evidence suggests that any sustainability strategy must simultaneously reduce inequality and poverty, with a focus on the most vulnerable groups.

This study involved a comprehensive effort to compile all studies that conduct empirical analyses of the effects of minimum wage variations in Spain. The PRISMA methodology was applied to ensure systematic, exhaustive, unbiased, and transparent identification, selection, and analysis of relevant works. Of the 249 articles initially screened, 34 were ultimately included. Only eight of these were published in international peer-reviewed journals (see Tables 1–3).

The vast majority of the studies (28 out of 34) analyse the impact of the minimum wage on employment. Only four focus primarily on the policy objective of reducing inequality and poverty [41,56,57,61]. Among the 28 employment-focused studies, three also address additional outcomes: income inequality [55], GDP [46], and wages and public accounts [54]. More recently, research has begun to examine impacts on productivity [53], inflation [59], and institutional dynamics—specifically, why governments decide to raise the minimum wage [65].

The analysis reveals a clear evolution in both research focus and theoretical and methodological approaches. Initially, studies concentrated almost exclusively on employment, working within a neoclassical framework that sought to validate predictions of job losses, using exploratory or correlational methods. Subsequently, the scope broadened to include inequality and poverty, while causal methodologies became more widespread. Since 2019, the literature has been more balanced, examining employment, inequality, and other adjustment channels. Methodologically, there has been a clear shift toward causal designs using microdata, enabling more precise and robust results.

Theoretical frameworks have also advanced, moving from simple neoclassical models to monopsonistic perspectives, and more recently to complex frameworks incorporating multiple adjustment channels and employer strategies. This evolution reflects attempts to open the ‘black box’ of how firms adapt to labour cost increases.

The most credible available evidence suggests substantial distributional gains without evidence of large employment losses, although heterogeneity across designs, groups and outcomes remains.

Key aspects of the broader debate on the minimum wage—such as administrative challenges, corporate adaptation costs and regional disparities that may arise during policy implementation—have not yet been addressed by the empirical literature for the Spanish case. As shown in this review, existing studies focus primarily on estimating employment, inequality, poverty and labour market-related outcomes. These gaps highlight the need for further research that incorporates institutional, administrative and territorial dimensions into the analysis of minimum wage reforms. Future research will need to focus on the decision-making strategies of employers, workers, consumers, and public institutions, and on the broader macroeconomic consequences of these strategies, including effects on inflation, productivity, and long-term growth. Such efforts are expected to contribute to the development of a more comprehensive theoretical framework, which remains fragmented and incomplete despite recent advances.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/su18094206/s1>, S1. Protocol PRISMA methodology (PRISMA-P 2015); S2. Main Checklist (PRISMA-P 2015). S3. Summary sheets of all the works considered in this article.

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Abbreviations

The following abbreviations are used in this manuscript:

AEAT	Tax Microdata for Distribution Analysis (for its acronym in Spanish)
AIReF	Independent Authority for Fiscal Responsibility (for its acronym in Spanish)
CEM	Coarsened Exact Matching
CG	Control Group
DiD	Difference-in-Differences
ECEE	Four-Yearly Wage Structure Survey (for its acronym in Spanish)
ECL	Employment Situation Survey (for its acronym in Spanish)
ECV	Living Conditions Survey (for its acronym in Spanish)
EPA	Labour Force Survey (for its acronym in Spanish)
ESC	European Social Charter
ETCL	Quarterly Labour Cost Survey (for its acronym in Spanish)
EU-SILC	European Union Survey on Income and Living Conditions
FEDEA	Foundation for Applied Economic Studies (for its acronym in Spanish)
GLS	Generalised Least Squares
IPREM	Public Indicator of Multiple Effect Income (for its acronym in Spanish)
MCVL	Continuous Sample of Working Lives (for its acronym in Spanish)
MW	Minimum Wage
OLS	Ordinary Least Squares
PET	Firm-Worker Panel
PSM	Propensity Score Matching
SCM	Synthetic Control Method
SDG	Sustainable Development Goals
TG	Treatment Group

Appendix A. Systematic Review of the Effects of MW in Spain

Appendix A.1. Results of the PRISMA Methodology

The PRISMA methodology (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) is designed to conduct bibliographic reviews in a systematic manner, ensuring that they are exhaustive, unbiased, complete, and accurate. It is inherently transparent and can be evaluated by other researchers, as all procedures, criteria, and results

are explicitly specified and made available. The first version of the PRISMA methodology was introduced in 2009; the most recent version, adopted in this article, is from 2020. The report of the systematic review conducted for this study is provided in Appendix A.1, together with the corresponding flow diagram (Appendix A.2). The protocol used as the basis for this article is available to the interested reader as Supplementary Material, as well as the checklist of the methodology applied. All materials follow the criteria recommended by the PRISMA 2020 guidelines.

Administrative information:

- Identification: Reassessing Minimum Wage Impacts: What the Spanish Case Contributes to International Evidence. Systematic Review. Report on its implementation.
- Authors: Manuela A de Paz-Báñez (depaz@uhu.es), María José Asensio Coto (asensio@uhu.es) and Celia Sánchez-López (celia.sanchez@dege.uhu.es). (a) All of them from the University of Huelva (Spain), Department of Economics; (b) Each author contributed to this protocol: preparation and writing of the manuscript: MADPB, MJAC and CSL; development and application of the selection criteria: MADPB, MAJC and CSL; review and approval of the final document: MADPB, MAJC and CSL.
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Introduction:

Justification. Despite the substantial increase in the minimum wage (MW) in Spain in 2019, relatively few empirical studies have examined its effects, in contrast to experiences in other countries; for example, the introduction of the MW in Germany in 2015 prompted a large body of empirical analyses on its effects. It is therefore of considerable interest to bring together this less accessible body of Spanish studies and to establish the state-of-the-art in this case. The Spanish experience is particularly relevant because it involves a large and sustained rise in the MW—reaching 60% of the mean net salary—in a country with persistently high unemployment among groups likely to be affected by MW increases. Beyond documenting existing evidence, compiling these studies can also help to identify research gaps and stimulate further work in this field.

Objectives. To compile and critically assess empirical evidence on the effects of minimum wage variations in Spain, with special emphasis on the 2019 increase. The guiding question is: What does the empirical evidence reveal about the effects of minimum wage variations on employment, poverty, inequality, and other variables in the Spanish case?

Methods: Eligibility criteria. All empirical studies relevant to the research question were considered, including those published in peer-reviewed scientific journals indexed to establish scientific quality, as well as unpublished works or those published by public or private institutions that are not peer-reviewed. For the latter, since they had not undergone formal evaluation, a screening process was applied to ensure their quality and relevance to the research objective.

Selected specific methodologies. Given the limited empirical evidence on the effects of the minimum wage in Spain, all empirical methodologies were included in order to capture the widest possible range of relevant information. Both English and Spanish were used as reference languages. Non-empirical works—such as exploratory, declarative, or opinion-based studies, or those lacking a scientific method that clearly identifies their specifications and results—were excluded.

Information sources. Resources provided by the Columbus database were used. In collaboration with all Spanish universities, the EU, and universities worldwide, Columbus integrates a combined system of 165 publication databases (Columbus-UHU: <https://guiasbuh.uhu.es/az.php>, date of last access 20 May 2025). These include all major sources, such as WoS, Scopus, and ProQuest. Google Scholar and literature from public and private

reference organisations were also reviewed. To ensure literature saturation, the reference lists of the included studies and the publications of the selected authors were screened to capture any additional relevant material (a ‘cascade search’). The selected articles were reviewed by the working group, which also evaluated the search procedure to minimise bias. The initial formal search was conducted in October 2024 and was updated at the end of the review (May 2025) to ensure that the most recent contributions were incorporated.

Search strategy. After several exploratory searches to refine the keywords, the first formal search using individual keywords was conducted; specifically, ‘minimum wage’ and ‘Spain’ in the databases. Subsequently, combinations closely aligned with the systematic review question were used, such as ‘minimum wage and Spain’ and ‘minimum wage and the Spanish case’, in both English and Spanish. These searches were replicated in Google Scholar under the same guidelines to identify unpublished studies or those available only in preliminary versions.

To reach the final set of papers considered, a large number of additional documents were screened that ultimately did not meet the minimum requirements established by the quality criteria. The initial search and screening were carried out by MJAC and MAPB, and subsequently supervised and evaluated by MAPB, MJAC, and CSL. All authors worked independently and reached consensus on any discrepancies.

Study record:

Selection process. All information collected from the documents, both quantitative and qualitative, was summarised in an Excel spreadsheet. Particular care was taken to identify duplicate studies, multiple versions of the same work, and other potential sources of data management bias. Each author repeated the search process independently, after which results were compared and discussed in cases of disagreement. Screening, eligibility, and inclusion and exclusion criteria were consistently applied in the final registry and summary of results. Relevant data extracted from the studies were independently reviewed by at least two members of the research team, with discrepancies resolved through discussion. Peer-review status was not used as an exclusion criterion, but non-peer-reviewed studies were subject to additional screening for relevance and methodological transparency.

Data collection process. The most relevant data for each period were collected and compiled into an Excel spreadsheet.

Results and prioritisation. Results were sought regarding changes in the minimum wage across all variables analysed in a broad sense (see Sections 3 and 4).

Data synthesis. A systematic narrative synthesis of the findings of each study is presented in Section 3, along with a summary Excel table specifying the most important characteristics of the results of each study.

Results of the systematic search and screening procedure. Bias analysis

Stage 1. Identification of works.

The initial searches were conducted in October 2024, yielding a total of 249 articles (202 in English and 47 in Spanish). The search was repeated in April 2025 to capture more recent publications, and two additional papers were identified. Duplicate entries and multiple versions of the same study were subsequently removed, retaining only the most recent version; 12 papers were eliminated for this reason. In total, 239 articles advanced to the second phase.

Stage 2. Screening and selection.

Screening was carried out to determine whether the studies were relevant to the research question. A total of 193 papers were excluded for not addressing the subject under study. The remaining 46 were carefully reviewed to reach the final selection, with 27 further papers excluded based on the following criteria:

- (a) Reason 1: Not empirical, lacking a specific methodology, or merely exploratory, descriptive, declarative, or opinion-based (21 papers).
- (b) Reason 2: No reference to the Spanish case (6 papers).

To saturate the search, the reference lists of the most relevant articles and authors were reviewed (a ‘cascade review’). Through this process, and once the selection criteria were applied, a total of 15 additional works. These studies were incorporated into the final body of evidence.

After completing this process, a total of 34 articles were ultimately considered (see flow diagram). A summary of the most relevant elements—objectives, scope, study group, methodology, and results—is provided in Section 3 of this article. Their critical analysis is presented in Section 4.

Appendix A.2. Flow Diagram of the Results of the PRISMA Methodology

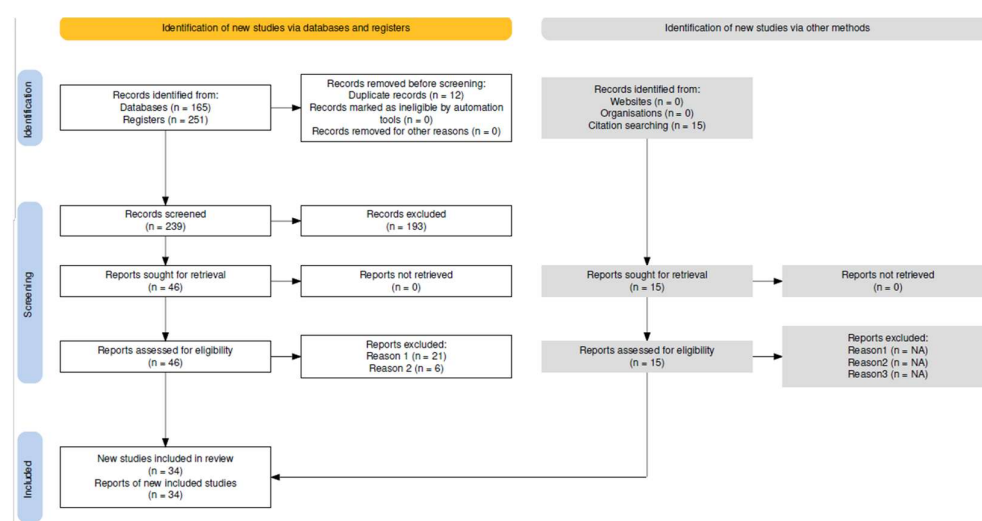


Figure A1. Flow diagram of the results of the PRISMA methodology [74,75].

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