

# Minimum Wage and Effects on Unemployment: The Case of Spain and Its Implications on Simpson's Paradox and Geographical Mobility

Jorge Monray<sup>1</sup> & Juan Morillo<sup>1</sup>

<sup>1</sup> American College of the Mediterranean, San Diego, USA

Correspondence: Jorge Monray, American College of the Mediterranean. San Diego, CA, USA. 409 Camino Del Rio South, Suite 200, San Diego, CA 92108. Tel. 1-800-221-2051. E-mail: jorge.monray@iau.edu

Received: October 27, 2024

Accepted: December 18, 2024

Online Published: December 25, 2024

doi: 10.5539/ijef.v17n2p26

URL: <https://doi.org/10.5539/ijef.v17n2p26>

## Abstract

This research explains the effects of the Government's regular increases in the minimum wages on unemployment in Spain. Using a longitudinal analysis covering the years 2010 to 2023 the research collects data split by gender, age group, and Autonomous Community (AC). The data has been adjusted calculating the minimum wage Mean and Mode values. A negative or inverse correlation between minimum wage variables and unemployment is observed presenting Pearson values between -0.4 and -0.6 in most groups. Also, the research applies a one-way ANOVA test. It shows findings of unemployment reduction, specifically in the categories of young males, even though, the minimum wage in Spain has been regularly increased during the last years, in line with other authors. The aggregated and disaggregated data obtained vary and move in opposite directions confirming in a certain way that the principle of the Simpson's Paradox could take place here. The research also confirms a relevant Estimated Size Effect (ETA) when comparing Autonomous Communities and their influence on unemployment for 55+ years old people.

**Keywords:** minimum wages, unemployment, Simpson's Paradox, ANOVA, unemployment in Spain

## 1. Introduction

### 1.1. Introduction to the Problem

The fact that, under certain conditions, minimum wage growth can be combined with a decrease in unemployment can be explained using economic and social factors. While this may sound counterintuitive in theory, given the traditional approach that states increasing the minimum wage leads to higher unemployment, there were various mechanisms described in reality that accounted for an opposite effect. The following represents some of the most common rational explanations:

An increase in minimum wages stimulates aggregate demand. For example, when the minimum wage rises, fewer waged workers earn higher incomes. Since these people tend to spend a large fraction of their income on basic commodities such as food, clothes, housing, etc., this may consequently raise aggregate demand in the economy. Firms that perceive that demand for their respective products or services is rising will mostly need to look for more workers to be in a position to experience the rise in demand and reduce unemployment.

An increase in minimum wages improves worker productivity and morale. The most obvious effect of a higher minimum wage can create more positive morale and involvement in workers, thus increasing their productivity. The more productive workers, the more certain companies are entitled to raise their revenue in specific situations and sometimes even hire more workers. In addition, with improved working conditions, worker turnover decreases, hence less expense for hiring and training new employees.

Increases in the minimum wage could increase formal job offers. A higher minimum wage may lead more people to decide to enter or re-enter the formal labor market instead of working in an informal economy. The shrinkage of the informal economy increases the number of people under regular jobs and regular conditions that can lower unemployment and precariousness rates.

In this research, we evaluate the increases in the minimum wage and its effect on unemployment in Spain. A longitudinal analysis covering the years 2010-2023 deployed by 17 Autonomous Communities and split by gender and age (Data collected N=3094).

### *1.2 Relevant Scholarship*

By now, a mountain of evidence suggests that moderate increases in the minimum wage do not necessarily lead to reductions in employment. For instance, Card and Krueger, in their seminal study of the fast-food industry in New Jersey and Pennsylvania, did not find any drop-off in employment due to increases in the minimum wage to contradict the traditional economics expectation based on competitive labor market models. This result was further confirmed by subsequent research, among others, those by Kim and Taylor, who also did not discover any adverse effects of teen employment due to the minimum wage increase in California in 1988. The general indication from these studies is that the response of the labour market to the minimum wage increase could be different from that advanced by the neoclassical theory of economics. Other effects, such as increased consumer spending with higher wages, may balance off any job losses.

The other explanation comes from the monopsony model of the labour market, which says employers have a partial power of wage setting and must raise employment in response to increases in minimum wages. This perspective is further supported by studies that show that a higher minimum wage could increase worker productivity and decrease turnover of workers, factors that would lead to more hiring by firms. This is best evidenced by “Investigating the Effects of Minimum Wage and Non-compliance on Formal Employment: Evidence in Java Island”, 2024, with the example of a study by Munshi, who determined that higher minimum wages were linked to more formal employment-particularly among women-in developing markets. This supports the notion that increasing the minimum wage changes the employment mix in favor of high-wage jobs and, in this manner, likely decreases poverty and inequality (Alaniz et al., 2011).

Secondly, the effects of the minimum wage can differ significantly according to particular sectors and demographic groups. For instance, Rybczynski and Sen discover that, in the study of Canadian provinces, increases in the minimum wage could even encourage, rather than discourage, employment is especially true for the low-wage sector of the labor market. Along the same line, results obtained from the IZA Journal of Labor Policy were able to show that even while the increase in employment effects is greater for younger individuals, once the wider labor market dynamics are factored in, the overall effect can remain positive. It is realized by Marimpi and Koning (2018).

Long-run research studies into minimum wage hikes point out that the initial adverse reactions of employment to minimum wage hikes fade away with time. For example, Kim and Lim found that for OECD countries, while higher minimum wages may reduce labor demand in the short run, it does not affect labor supply as much, so therefore, employment levels should stabilize over the long run. In this respect, the findings confirm the argument by Allegretto et al. that long-run elasticities of employment with respect to minimum wage increases are less adverse than previously estimated and that it is time to rethink the relationship between minimum wage increases and changes in employment levels. It is submitted that the foregoing findings give a different color to the dynamics between minimum wage increases and employment levels. While old economic theories claim that it will lead to job losses, evidence from numerous studies brings out the fact that moderate increases in minimum wages can result in higher employment, keeping in view the aspects of monopsony power, growing consumer spending, and sector-specific dynamics. It is this set of findings that argues for revisiting the one-dimensional narrative of higher minimum wages invariably translating into reduced employment.

It is important to underline that any influence of the increase in the minimum wage on unemployment is related to several factors: the economic context in which the country finds itself, level of increase in relation to labor productivity, characteristics of the labor market, and policies complementary to the decisions of the government, among others. Of course, in cases of highly informal economies or during a recession, this may be vice versa; hence, a raise in the minimum wage does not have straightforward implications for unemployment to drop every single time. In any case, under the conditions explained above, the phenomenon logically could be accounted for.

### *1.3 Minimum Wages*

The Minimum Wage laws were initially set in the early 1900s, again, in large part, in the industrialized countries to fight off worker exploitation during the Industrial Revolution. The United States instituted its federal minimum wage in 1938 and has also been re-aligned periodically for inflation and changes in cost-of-living standards over time, as well (Neumark & Wascher, 2008). Nowadays, minimum wage legislation exists in over 100 countries and comes in variable shapes and forms of structure and enforcement mechanisms. Minimum wages from around the world vary substantially between countries on wage levels, rates of compliance, and economic conditions.

Minimum wage laws in most developing countries are a means to alleviate poverty and raise living standards. For instance, Alaniz, Gindling, and Terrell (2011) feel that minimum wage legislation can reduce the share of

low-quality jobs in the formal sector and, thus can shift employment to higher-paying jobs. This is contrasted with countries, such as parts of Europe, where minimum wages are high relative to average wages; the effects in such cases are intricate and they balance towards higher-skilled employees instead of the low-wage earners whom the law intends to target (Kristensen & Cunningham, 2006).

#### *1.4 Economic Impacts of Minimum Wages*

The minimum wage laws have their economic implications embedded in the literature. On one side, supporters suggest that the minimum wage can raise the living standards of poor workers by reducing poverty and raising consumer expenditure, which could, in turn, enhance economic growth. For example, Alaniz et al. (2011) establish that rises in minimum wages in Nicaragua were followed by lower poverty levels, therefore deducing that with more raises, the families come out of poverty.

However, critics maintain that minimum wage laws could bring unemployment effects, particularly in low-skilled labor markets, provide a comprehensive review to show that minimum wages are not an effective policy tool for improving employment because they may provoke job losses among vulnerable populations, as pointed out by Neumark and Wascher (2008). A similar view is expressed by Müller and Steiner (2008), who note that the economic cost of subsidizing low-paid workers falls from the tax-benefit system on employers and may result in less employment opportunities within the low-paid sector. Indeed, it follows from their argumentation: "Furthermore, low-skilled employment opportunities might decrease as a consequence of a minimum wage when globalization holds" (Müller & Steiner, 2008).

The globalization context further complicates the debate on the employment effects of minimum wages. While competition rises, in particular in developing countries, many might be concerned that minimum wage legislation unconsciously makes countries race to the bottom in pursuit of minimizing labor costs from employers, which may tend to nullify the purpose of such legislation. The following research in Costa Rica by Alaniz, Gindling, and Terrell (2011), depicted that having several minimum wages across sectors might result in extreme variations in employment consequences, thus underlining the complication in enforcement of minimum wage legislation within varied economic backgrounds.

#### *1.5 Social Impact and Poverty Reduction*

The social impact of minimum wage legislation is that it significantly influences poverty reduction and income inequality. Devereux assumes that minimum wage laws can raise the incomes of the very poorest workers and, in turn, lead to a decrease in the overall level of poverty. Similarly, other authors mention that from observations, increases in minimum wages were followed by significant drops in the poverty rate, as evidenced by Indonesia's experience. The aforementioned findings do indicate that minimum wage policies can be one of the strong weapons of social equity, especially for countries plagued by a high level of poverty and income disparity.

However, the effectiveness of minimum wage laws in reducing poverty depends on many factors, such as the level of enforcement, the economic conditions of a country, and so on. In countries characterized by very large informal sectors and weak regulatory structures, compliance with minimum wage laws is problematic; hence, its impacts on poverty reduction remain limited. Also, Kristensen and Cunningham (2006) argued that not all low-wage workers benefit from minimum wages but rather that its' benefits, if any, have very strong reliance on the ways of wage distribution and specific demographics in a labor force.

#### *1.6 Political Dimensions and Policy Considerations*

Minimum wage laws are a constantly shifting area of political debate, from arguments about whether it is effective or if the laws are hurtful to the labor markets. According to Wilson (2017), the setting of minimum wages reflects the political atmosphere but reflects the wide issue of societal attitudes about welfare and economic inequality. There is growing acknowledgment of higher minimum wages in the change of economic orthodoxy as one of the necessary ways to contain income inequality and help low-income workers.

In the European context, Schulten (2008) looks at the possibility of EU minimum wage policy coordination and maintains that this is a means to substantially enhance social protection standards across EU member states. The position is basically in conformity with the general trend of recognizing the role of minimum wage legislation in ensuring social justice as well as economic stability.

##### *1.6.1 Empirical Evidence and Methodological Challenges*

There is voluminous empirical evidence on minimum wage legislation which again is very often antagonistic. As different approaches are taken towards the subject, different studies come to different conclusions as to how minimum wage laws affect employment and poverty. For example, some authors criticize studies in the

time-series approach as inappropriate for studying the minimum wage law since it may not handle the complex dynamics of the labor market. Along this thread of argument, Fairris and Pedacet (2004) insist that analyses of the spillover effect of minimum wage laws on general training and skill acquisition should be more qualified.

However, it is perceived to differ considerably in various causes and also between sectors and demographic groups. For example, Hohberg and Lay (2015) establish that minimum wages make positive spillovers both in the formal sector wages and none in the informal workers in Indonesia. This therefore calls for consideration of specific contexts in which minimum wage laws come into effect and also the possibility of unintended effects of the law.

Minimum wage is a broad topic, and various studies relate to the implications it has on labor markets, the dynamics of employment, wage distribution, and wider economic results. This review synthesizes key findings from various empirical and theoretical works to obtain an overall understanding of the multifaceted effects of minimum wage policies.

Minimum wage legislation has been one of those items dominant in economic discussions, at the same time followed by considerable interest related to its impact on employment levels. In general, the literature concludes that minimum wage effects on employment seem to be complex and depend largely on contexts. To be more concrete, Neumark and Wascher (2006) conclude that raising the minimum wage leads to small but significant adverse effects on employment, especially concerning low-skilled labor. This assertion is supported by a meta-analysis of various studies that bring out the relationship between wage floors and employment level, where it is suggested that though there are studies that find negligible impacts, there are also other studies that suggest potential job losses, particularly in small firms. On the other hand, Cengiz et al. (2022) apply machine learning methods to a wider demographic and find that increases in the minimum wage can increase average wages with limited employment losses, hence challenging the traditional story of adverse employment effects.

Discussion of the employment effects of the minimum wage is further muddled by the presence of monopsonistic labor markets. Cahuc and Laroque (2013) discuss the implication of monopsony power imbalance or having one buyer who can dictate prices and wages given that minimum wages correct labor market imperfections induced by employers' monopsony power. This is also reflected by Danziger (2010), who assumed that for small firms an imperfectly enforced minimum wage leads to an employment loss as this is the type of labor supply curve facing these firms. The interaction of the presence of monopsony power with minimum wage policies has significant implications for how the market structure should be taken into consideration while wage floors are being assessed.

Spillovers of Minimum Wage Increases to Wage Distributions Except for that, the literature also points to the spillover effects of increases in minimum wages to the distributions of wages. Furthermore, Campolieti (2015) emphasizes that the impacts of minimum wages reach beyond employees earning below the threshold to employees earning a little above the minimum wage, which normally leads to wage compression and, therefore, leads to reduced income inequality. This is further supported by Liu's work, which shows that minimum wages can affect occupational mobility- particularly for younger and less-educated workers- since wage rigidities prevent them from shifting into higher-paying jobs. The parallel effects of minimum wages on both direct and indirect wage adjustments point to the wider impact of wage policies on labor market adjustments.

Besides, several other studies have looked into the long-term macroeconomic impacts of minimum wages. Braun et al. (2019) using a general equilibrium model, investigated the long-run implications of increases in the minimum wage in frictional labor markets and found that even where employment tends to fall initially, readjustments later on could yield higher employment levels in the long run. This result is in line with Meer and West's work, who argue that changes in the minimum wage take time to manifest their effects and, hence, the immediate assessments may overlook significant longer-term dynamics. The time dimension to the minimum wage effects brings in the need for a more nuanced approach in policy evaluation, since short-run disruptions could give way to longer-run benefits.

The literature on minimum wages and wage inequality has received a good amount of attention lately, in light of the increasing earnings inequality. Autor et al. (2016) reassess the role of minimum wages in the analysis of wage inequality in the United States. They find that spiking minimum wages have been an important influence on the shape of upper-level wage distribution, but minimum wages themselves are not the sole driver of increasing inequality. As put by Öztürk, this is further problematically complicated by the fact that the effects of minimum wage on wage inequality can be reinforcing or mitigating under different labor market and institutional conditions. The multifaceted nature of wage inequality calls for comprehensive policy approaches considering the wider economic context.

Further, in addition to employment and wage dynamics, the social implications of minimum wage policies are discussed. Simonovits and Payson (2020) explore how local minimum wage laws have significant impacts on earnings inequality, particularly among underrepresented and marginalized populations, like women and people of color. Their results indicate that local policies can represent community will and make significant contributions to the effort to reduce wage disparity. This also aligns with the findings by Rodriguez and Rodríguez (2023), who reviewed minimum wage policies in Latin America and proved their possible impacts on poverty reduction and social welfare improvement.

The methodological approaches followed in the literature differ greatly, with some studies employing traditional econometric techniques, while others use innovative methods, such as machine learning. A good example is Cengiz et al. (2022), who use advanced statistical tools to provide a more heterogeneous minimum wage impact across diverse ranges of demographic groups. The diversity of such methodologies enriches the discussion related to minimum wages and allows for a fuller analysis of their impact on labor market outcomes.

The literature on minimum wages is complex and evolving, with a wide array of empirical findings and theoretical points of view. The effects of minimum wage policies depend on various factors, including things like market structure, demographic features, and general economic conditions. While policymakers remain in a curious mood about what minimum wage legislation has brought with it, such diverging outcomes do call for an explanation of long-term effects emanating from such diverse contexts, particularly with the changing dynamics of the labor market and economic fortunes.

### 1.6.2 Causes of Unemployment

Unemployment is a multicharacter problem facing economies in many different forms and propelled by so many factors. Understanding the causes of unemployment is important for policymakers, economists, and social scientists in designing policies to reduce the negative effects of unemployment in their societies

Several economists and experts have always pinpointed the economic factors to be amongst the top causes of unemployment. Economic growth and unemployment rates correlate inversely with one another. For example, Davidescu et al. (2021) have pointed out the fact that economic growth hurts unemployment rates. This suggests that when economies are growing, then more jobs are available, meaning correspondingly, there is a higher drop in the rate of unemployment. This also falls under Okun's law, whereby when the unemployment ratio falls, there is a steep rise in economic output. On the other hand, at times of economic recession, the unemployment rate is higher because companies eliminate their staff to reduce the level of expenses.

Besides that, unemployment is also affected highly by inflation. Research carried out by Sasongko and Huruta (2019) discloses that from unemployment to inflation, there is a one-way causality, the rise in unemployment would bring about increased inflationary pressure once the supply side firms up. This relationship complicates the economic landscape as policymakers have to balance inflation control with efforts to reduce unemployment.

Fiscal policy is another very significant determinant of the rate of unemployment. According to Rendahl (2016), accommodative fiscal policy may favor economic activity and, hence, employment and job creation, thereby reducing unemployment rates. This happens to be particularly the case during economic recessions when increased government spending acts as a counter-cyclical factor that jolts up demand and employment.

Structural factors must also be considered. Structural unemployment is a mismatch between the available skills of the workforce and the demand of the labor market. According to Dayaratna-Banda and Dharmadasa (2022), geographical immobility can be said to be another factor contributing to structural unemployment, with house and school obstacles being two major constraints to migration in seeking work opportunities. Such geographic immobility would only heighten the propensity for unemployment to become particularly severe in job-inadequate availability regions, further indicating how regional imbalances in the creation of jobs are an issue to be taken seriously.

Furthermore, education and the development of skills play a great role. The employability of graduates is always in question, with streams like humanities and social sciences, because of the lack of alignment between educational outcomes and labor market requirements. Misalignment of educational outcomes, therefore, with labor market requirements leads to a high rate of unemployment among graduates and calls for reforms in education that make individuals more job-market-oriented.

Other social factors contributing to unemployment include mental health and societal perceptions of unemployment. Mattei and Pistoiesi (2018) discuss the prolonged effect of unemployment on mortality rates resulting from suicide, where the psychological impact of unemployment increases mortality rates. This shows that, aside from one's self, unemployment contributes to other social ills, such as social withdrawal and

deteriorated mental states, which, when continuing, further deteriorate an individual's ability to get employment. Further, employability may be shaped by the stereotyping of the unemployed by society. Suomi et al. (2020) established that negative stereotyping of the unemployed is a potential cause for decreasing the probability of reemployment because such perceptions may result in discrimination in hiring practices, Suomi et al. (2020). Overcoming such biases in society is very important to further the causes of employment possibilities among the affected section.

Effective policy responses are imperative to address the root causes of unemployment. The governments should implement policies that would lead to economic growth, enhance labor capability, and reduce labor market rigidities. For instance, investment in education and training programs can bridge the gap in the level of skills of the labor, which can help them meet labor market demands. Amar et al. (2022) comment that enhancement in supply side increases the capacity and productivity of employees. While labor market flexibility can increase job formation and reduce structural unemployment as opined by Storm and Naastepad (2008).

Employment-stimulating fiscal policies like public works and incentives to firms for taking on more employees also help in reducing unemployment. Equally significant is the role of regional development programs designed to tackle regional disparities that enhance unemployment in regions with scanty job opportunities. In fact, López-Bazo et al. (2005) record

Regional development programs across nations aim to confront and eliminate problems linked to local labor markets characterized by specific features relevant to the analysis of unemployment—both at the national and sub-national level as the existence of reduced labor mobility, wage rigidities, and agglomeration economies.

Global events, such as economic crises or pandemics, can strongly influence unemployment rates. In this respect, the case of the COVID-19 pandemic is considered a textbook example of exogenous shocks that resulted in unprecedented levels of unemployment. Hong discusses the global situation of unemployment in the period of the pandemic and underlines that adaptive policy responses bear paramount importance for mitigating economic fallout. Such crises serve to further heighten the already worrisome vulnerability in the labor market that hits disproportionately the most marginalized groups of society and underlines the need for inclusive policy measures.

Finally, unemployment is complex in origin, deriving from a host of economic, structural, and social dimensions, and its solution thereby demands comprehension of the causes so that effective policy responses can be forged to reduce the blighting impact of unemployment on individuals and society as a whole. These dimensions are perhaps those that can continue to be explored in further research, especially during global phenomena that disrupt labor markets. This helps in constructing a resilient and inclusive labor market, with policymakers continuing to address the causes at the roots of unemployment.

### *1.7 Relationships between Minimum Wages and Unemployment*

Minimum wages and their impact on unemployment are multithreaded issues that have come to the fore in recent economic research. The link between minimum wage policies and unemployment rates is complex; different findings reveal that a rise in minimum wages would result in higher unemployment, while other studies conclude that increasing the minimum wage rate does not affect employment levels. This literature review synthesizes several studies in an attempt to explain such intricacies.

Perhaps the most straightforward reason against increasing the minimum wage is related to the fact that this may mean an increase in unemployment, in particular for unskilled labor and the youth. In this regard, it has been observed from studies conducted in Southeast Asia that policies on minimum wages tend to ruin employment, especially in industries where the demand for labor is elastic (Ra, 2014). This is also reinforced by studies conducted in East Java, Indonesia, finding an increase in minimum wages to have a positive linkage with the rate of unemployment, meaning the higher the minimum wage under various circumstances, the easier it is for people to lose their jobs. A study conducted to estimate the effect of minimum wage in India during the post-reform period showed that while hikes in minimum wage may not always increase unemployment, on many occasions it could worsen the latter for vulnerable groups. ("Impact of Economic Growth, Minimum Wage, and Human Development Index on Unemployment in India during the Post-Reform Era", 2023).

While there is, on the other hand, a fair volume of literature that keeps arguing the adverse employment effects of rises in minimum wages are indeed not as large as traditionally believed. For example, Garloff's review of models for labor markets suggests that moderate increases in the minimum wage might not be associated with significant losses in jobs since such increases redistribute income rather than cutting jobs. This is supported by findings from the UK care homes sector, which show that the introduction of the minimum wage was associated

with reduced wage inequality and without substantive evidence of increased unemployment (Machin & Wilson, 2004). Apart from that, an extensive study of the German minimum wage reform showed that no expected job losses came into view. That contradicts the suggestion that any rise in minimum wages should be followed by increased unemployment as well (Caliendo et al., 2018).

The debate is further blurred by a rather interesting notion-labor market segmentation-which purports that minimum wage increases often produce mixed results across industries and along demographic lines. For instance, studies conducted on the Visegrad Group nations (Czech Republic, Hungary, Poland, and Slovakia) have a very low positive correlation between minimum wage level and the unemployment rate among young workers in support of the fact that minimum wage policies do not have similar effects on the labor market. Third, studies, that are grounded on an informal sector, demonstrate that even though because of minimum wage, unemployment in a formal sector increases, at the same time, it can push workers into informal employment thus making general assessment of the employment effects more complicated (Yurievich & Muravyev, 2013).

Further, one should consider the non-linear effects of the minimum wage increases. As Gorry and Jackson maintain, "The analysis clearly shows that the relationship of increasing the minimum wage with unemployment is far from clear because the effects depend on the economic context and specific characteristics of the labor market." This is further emphasized by Lemos, who shows that while minimum wage increases naturally compress the wage distribution, the arising employment effects do duly depend on different firm responses, such as changing the level of prices or reducing employment. Indeed, Lemos (2008) asserts that such factors are dependent on firm responses.

For example, the general state of the economy is one factor that determines what minimum wage policies will impact unemployment, as well as the level of inflation and economic growth. For example, in Sweden, a study presents evidence that the relationship between minimum wage levels and unemployment is dependent on the ratio of minimum wage to social benefits. It suggests that the economic context is very decisive concerning employment. Also, there is some evidence of a positive relationship between minimum wage and inflation. In an economy with inflationary pressures, high increases in minimum wages could give rise to higher rates of unemployment (Suparta et al., 2021).

From the policy point of view, the literature postulates that even as minimum wage increases are an instrument for income redistribution and poverty reduction, they must be judiciously set so as not to create unintended consequence on employment. For instance, Fields and Kanbur emphasize that in a competitive labor market, minimum wage, when above the equilibrium wage, tends to be associated with unemployment, especially among low-skilled workers (Fields & Kanbur, 2022). However, they also express that in the case where redistribution is one of the crucial factors the government wants to focus on, there is certainly some rationale for a binding minimum wage even though the potential to elicit unemployment.

In conclusion, the relationship between minimum wages and unemployment is complexly interrelated and may be influenced by a myriad of factors, including labor market conditions, demographic characteristics, and broader economic trends. While some studies suggest that raising the minimum wage might result in higher unemployment, especially among vulnerable groups, other studies have indicated that such effects are usually minor and can even be positive in certain contexts. It, therefore, calls upon future research to continue with such dynamics, especially from the perspective of changing economic conditions and labor market structures.

## **2. Method**

### *2.1 The Case of Spain*

The debate relating to the relationship between the Interprofessional Minimum Wage, (in Spanish, SMI) and unemployment is one of the most heated debates in Spain relating to academia and politics. In general, the main question to be answered is if the increment of SMI increases unemployment rates or, on the other hand, if it will have a positive influence on the labor market. This critical analysis is supported by different research that has studied this correlation from different points of view.

Various studies have analyzed the effect of increasing the SMI on employment. Most of them have found a negative impact, especially on vulnerable groups, such as immigrant workers. Güemes et al. (2012) report evidence that increases in the SMI have hurt the employment of immigrant workers in Spain. This would indicate that this kind of worker is especially sensitive to changes in the minimum wage. The result is consistent with the economic theory of demand, which states that at a high minimum wage rate, labor demand goes down as the employer cuts down the hiring rate or results in layoffs to sustain the profit margin.

On the other hand, the results by Cebrián et al. (2010) also analyze the general effect that an increase in the SMI

has on employment, finding out how increases in SMI can result in job loss, especially in those industries where profit margins are narrow. This paper provides empirical evidence that enriches the hypothesis that a higher minimum wage theoretically might reduce hiring, especially in highly temporal and job-insecure contexts like that characterizing the Spanish labor market.

However, not all studies state that an increase in the SMI should necessarily raise unemployment automatically. Other scholars indicate that increasing higher minimum wages can be a positive activity to the general economy through the increase in the purchasing power of workers and, thus, aggregate demand. For example, Mingorance-Arnáez et al. (2017) argue that minimum wage policies can lead to greater employment stability by reducing labor turnover and by encouraging greater human capital accumulation. It means that although it is detrimental to the level of employment in the short run, it could mean a more robust labor market in the long run for a higher SMI.

The interrelationship between SMI and unemployment cannot turn a blind eye to the general trend at the macroeconomic level coupled with applied labor policies. Hernanz and Jimeno (2018) refer to job instability and high temporary employment as factors that could impact the efficiency of minimum wage policies in Spain. With high labor mobility, the depreciation of human capital in periods of unemployment could reduce the possibilities of workers benefiting from a higher SMI, itself being a cause of perpetuating unemployment.

Inequality and working poverty are also discussed as framing the SMI under a bigger context. In fact, Llopis & Andreu 2017 emphasize that, regardless of efforts to increase the SMI, working poverty has been increasing in Spain. This would entail that SMI perhaps will help improve the earnings of workers but does not deal with the structural issues of unemployment and poverty in the country.

On the contrary, regional and sector features cannot be avoided when researching the nexus between the SMI and unemployment. Rodríguez-Diosdado's work also indicated that an appropriate SMI takes into consideration those regional and sector peculiarities because the trends of labor markets can depict relevant differences. In that respect, what may apply to one situation may not necessarily apply in another, and certainly not through the one-size-fits-all method.

After all, the influence of the interprofessional minimum wage on unemployment in Spain is quite complex and multidimensional. Evidence does exist that an increase in the SMI might be associated with a rise in the unemployment rate, mainly among vulnerable groups, but there are also supportive arguments for the fact that a higher SMI may bear positive consequences on the economy at large in the long run. It is from this perspective that the solution to the problem will be found by considering the macroeconomic context, labor policies, and the regional and sectoral particularities influencing the Spanish labor market.

## 2.2 The Research Done

We have collected official data published on the INE website (Spanish National Statistics Institute) about unemployment percentages. The data collected belongs to the SMI (minimum wage) longitudinally from 2010-2023. The data is organized by autonomous communities, a total of 17, and split into 8 groups in total:

Gender: Male.

- Young men from 16-19 years old
- Young men from 20-25 years old
- Men from 25-54 years old
- Men 55+ years old

Female Gender:

- Young women from 16-19 years old
- Young women from 20-25 years old
- Women from 25-54 years old
- Women 55+ years old

Initially, a correlation analysis between SMI and Unemployment was done using the Pearson Coefficient. Then a One-way ANOVA test searching for causality SMI (minimum wage) and effects on unemployment was executed.

## 2.3 Data Collection

We have collected official data published on the INE website (Spanish National Statistics Institute) about



unemployment percentages. The data collected belongs to the SMI (minimum wage) longitudinally from 2010-2023. The data is deployed by autonomous communities, a total of 17, and split into 8 groups in total:

Gender: Male.

- Young men from 16-19 years old
- Young men from 20-25 years old
- Men from 25-54 years old
- Men 55+ years old

Female Gender:

- Young women from 16-19 years old
- Young women from 20-25 years old
- Women from 25-54 years old
- Women 55+ years old

### 2.4 Correlation Results

Initially, a correlation analysis between SMI and Unemployment was done using the Pearson Coefficient. Then a One-way ANOVA test searching for causality SMI (minimum wage) and effects on unemployment was executed. The first research explores possible correlations between the levels of SMI (minimum wage) and unemployment percentages. The coefficient used is the Pearson Correlation. The results obtained present a negative/inverse correlation in all groups, with values stating mid correlation of -0.537 in men 16-19 years old (TPH16-19), -0.636 for men 20-24 years old (TPH20-24), and -0.625 for men 25-54 years old (TPH 25-54). See Figure 1.

Variable		SMI	TPH16-19	TPM-16-19	TPH20-24	TPM20-24	TPH25-54	TPM-25-54	TPH55+	TPM-55+
1. SMI	Pearson's r	—								
	p-value	—								
	Lower 99% CI	—								
	Upper 99% CI	—								
2. TPH16-19	Pearson's r	-0.537***	—							
	p-value	< .001								
	Lower 99% CI	-1.000								
	Upper 99% CI	-0.420								
3. TPM-16-19	Pearson's r	-0.468***	0.605	—						
	p-value	< .001	1.000							
	Lower 99% CI	-1.000	-1.000							
	Upper 99% CI	-0.341	0.692							
4. TPH20-24	Pearson's r	-0.636***	0.712	0.662	—					
	p-value	< .001	1.000	1.000						
	Lower 99% CI	-1.000	-1.000	-1.000						
	Upper 99% CI	-0.537	0.779	0.739						
5. TPM20-24	Pearson's r	-0.512***	0.594	0.706	0.806	—				
	p-value	< .001	1.000	1.000	1.000					
	Lower 99% CI	-1.000	-1.000	-1.000	-1.000					
	Upper 99% CI	-0.392	0.684	0.775	0.853					
6. TPH25-54	Pearson's r	-0.625***	0.716	0.672	0.899	0.821	—			
	p-value	< .001	1.000	1.000	1.000	1.000				
	Lower 99% CI	-1.000	-1.000	-1.000	-1.000	-1.000				
	Upper 99% CI	-0.523	0.782	0.747	0.924	0.865				
7. TPM-25-54	Pearson's r	-0.482***	0.628	0.730	0.828	0.872	0.896	—		
	p-value	< .001	1.000	1.000	1.000	1.000	1.000			
	Lower 99% CI	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000			
	Upper 99% CI	-0.358	0.711	0.793	0.870	0.904	0.922			
8. TPH55+	Pearson's r	-0.446***	0.575	0.619	0.805	0.771	0.862	0.891	—	
	p-value	< .001	1.000	1.000	1.000	1.000	1.000	1.000		
	Lower 99% CI	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000		
	Upper 99% CI	-0.316	0.668	0.704	0.852	0.826	0.896	0.919		
9. TPM-55+	Pearson's r	-0.234***	0.479	0.603	0.634	0.719	0.692	0.868	0.846	—
	p-value	< .001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
	Lower 99% CI	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	
	Upper 99% CI	-0.067	0.587	0.691	0.716	0.785	0.763	0.901	0.884	

Note. All tests one-tailed, for negative correlation.  
 \* p < .05, \*\* p < .01, \*\*\* p < .001, one-tailed

Figure 1. Correlation table SMI-unemployment categories (groups)

The obtained results express a negative correlation between minimum wages and unemployment in all categories. This means that the regular increases of minimum wages in Spain from the year 2010 until 2023 by the Government correlate negatively with unemployment, consequently, when the minimum wages increase, the

unemployment decreases. This can be partially explained rationally because during some years of the financial crisis 2008-2012 still being the minimum wage really low the unemployment was high possibly due to a lack of employment and a serious economic crisis. Once the country has passed the economic crisis the economy has absorbed with no problem increase of the minimum wage.

### 2.5 ANOVA Results

Also, to explore possible causalities of SMI and unemployment levels, a Mode, and a Mean of the SMI values have been calculated, so an Analysis of Variance (ANOVA) searching for causality has been developed. Referring to the SMI-Mode, we analyze the longitudinal evolution of unemployment in Spain from 2010 until 2023 using the SMI-Mode values. We find significance at  $< 0.001$  in the categories “Men from 16-19, 20-25, and 25-54 years old” while there is no significance in the women categories (See Appendix A).

Referring to the SMI-Median the results present significance in all categories (including women as well) and confirm the possible causality of SMI minimum wages and unemployment (See Appendix B).

### 2.6 Estimated Size Effect (ETA)

The estimated size effect, a value measuring the strength of the relationship between two variables in a population, becomes more prominent in the categories of “Men 16-19, 20-24, and 25-54 years old” with values of 0.228, 0.324, and 0.296 respectively. So, the statistical variances in SMI-Unemployment can be explained up to 22.8%, 32.4%, and 29.6% by the former categories.

The regular increase in the minimum wage has had a positive effect on unemployment, decreasing unemployment mainly in the groups of men from 16 to 19 years old, 20 to 24 years old, and 25 to 54 years old.

### 2.7 The ANOVA Analysis Split by Autonomous Communities (AC)

Spain is geographically made up of 17 different regions called Autonomous Communities (AC). This research also tries to answer to what extent the AC plays a role in unemployment and in what categories present a bigger effect. All categories express that the AC determines the degree of unemployment but the findings suggest that it is more relevant in the categories of “Women 55+ years old” (ETA 0.761), “Men 55+ years old” (ETA 0.572), and “Women 25-54 years old” (ETA 0.628).

One of our main interpretations of the results is that people 55+ years old will face more difficulties finding a job in the same Autonomous Community (AC) while their chances could improve in case, they move to another AC that presents lower unemployment levels. Similar behavior could affect Women 25-54 years old.

### 2.8 Analysis of the National Survey on Workforce (EPA)

The figures of unemployment calculated by INE are derived from the database of the EPA, an official census that states people of a particular age and gender who are in a situation of working (actually work or are unemployed). The following charts presented in Figures 2 and 3 show the trend of the workforce in Spain from 2002 to 2023:



Figure 2. Evolution of women workforce (2002-2023)

Source: EPA.

This chart refers to the workforce evolution of women. As we can see there is a steady increase from the year 2002 until 2023 while in Figure 3 Men workforce has decreased significantly.

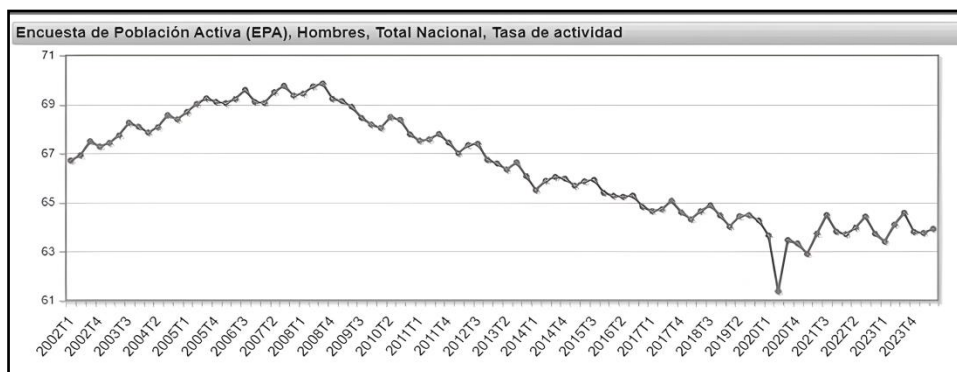


Figure 3. Evolution of men workforce (2002-2023)

Source: EPA.

## 4. Discussion

### 4.1 Discussion about the Implications of the EPA Data and Our ANOVA Analysis

The increase in the minimum wages during the last years in Spain has contributed positively to reducing unemployment for young males. Consequently, it makes sense to believe that the declining workforce (EPA) among men may be related to less pressure on the labor market, which in turn could contribute to the reduction of unemployment figures without necessarily making more jobs available. Young men are concentrated in sectors that benefit most directly from increases in the SMI, such as services, construction, manufacturing, or transportation.

A labor substitution effect could appear here, meaning that more young men are hired due to the type of sector or industry where they work. The minimum wage (SMI) increases could present a substitution effect on Spanish employment, where employers prefer to hire more qualified or productive workers when minimum wages increase. It is possible that young men, especially in sectors such as construction or manufacturing, may perceive themselves as more adaptable or willing to accept more physically demanding jobs, which could have given them a competitive advantage over other workers, even in a downsizing situation. of sectoral participation.

There are indirect effects of economic growth, precisely in those secondary sectors where young men tend to work more often. An increase in economic growth might have boosted again demand for labor in several sectors, especially in those that require unskilled labor (young men 16-19 and 20-24 years old) usually more represented, such as construction or industry. With the economic recovery after the 2008/2012 crisis, positions in the primary and secondary sectors have been filled with young men. Three possible reasons could explain this: 1) There are more work opportunities in the secondary sectors than in the tertiary sector 2) The increase in the Minimum Wage is perceived as more attractive in the poorest Autonomous Communities or regions where the cost of living is less, this might push young males to join the workforce more often than in other areas or categories. In the Autonomous Communities (AC) with the biggest presence of the primary sector, the male workforce decreases less than in AC where the tertiary sector is more relevant, and 3) Not all industries present the same salaries. For example, Retail and Hospitality are composed mainly of women, making their payments statistically closer to the minimum wage while others as construction or other industries where men are more present tend to pay higher than the minimum wage.

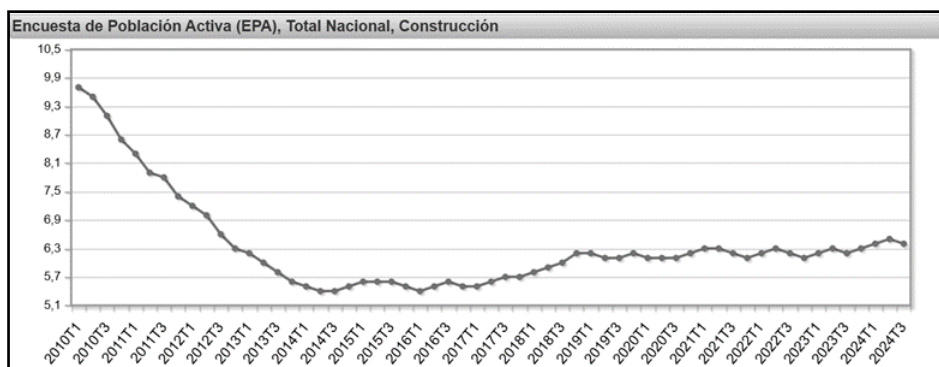


Figure 4. The trend of the workforce in construction in Spain

Source: INE.

Women have a more significant presence in the tertiary sector which requires qualified skills. At the same time, we know that women are also highly oriented to education, making them attractive to work in the tertiary sector. In fact, as the minimum wage increases, hiring by the minimum wage or SMI becomes more expensive, and companies will prioritize hiring more qualified labor willing to work for the same salary. For example, according to Statista (2024), the percentage of the male population employed in the construction sector was much higher than that of women between 2010 and 2023. Year 2023 11.1% of Spanish males worked in the construction industry compared with 1.2% of females.

Young men could be more flexible in accepting jobs with different working conditions, such as part-time work, night shifts, or positions in industries demanding bodywork, this would allow them opportunities created by the increase in the SMI. Women, on the other hand, tend to focus on tertiary sectors where working conditions tend to be more stable in average and general terms. Additionally, in many cases, they may face additional limitations such as mobility, which may restrict the types of jobs they can accept.

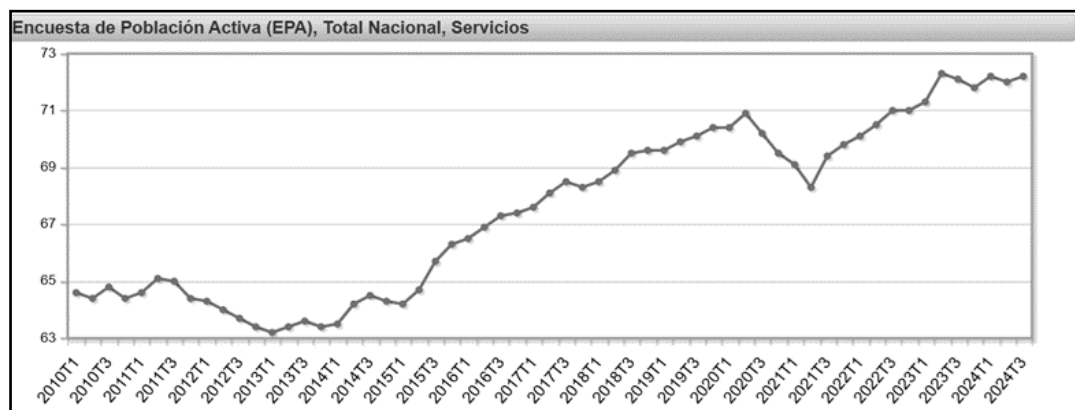


Figure 5. The trend of the workforce in industry in Spain

Source: INE.



Figure 6. The trend of the workforce in services in Spain

Source: INE.

Hiring patterns and salary negotiation can influence as well in the variables. Employers may perceive that young men are more likely to accept more physically demanding jobs or take more risks, which could cause them to benefit more quickly from job opportunities following an increase in the minimum wage (SMI). This could be particularly relevant in jobs where the salary difference between the SMI and other levels is small, making the increase more relevant for young men.

There could also be implications on labor mobility and frictional unemployment. Young men could have greater geographic or labor mobility, which would allow them to better adapt to emerging opportunities after the increase in the SMI. Young women, for their part, may be less willing or able to move from one place to another for work, which would limit their access to new jobs.

Implications on opportunity costs for young males also apply. While the minimum wage was really low some young men preferred to be in the shadow economy. This fact allowed them to be in the census of unemployed people while they were having some source of income close to the minimum wage. Not all industries or sectors can benefit from the shadow economy in the same way, traditionally some typical men's industries as construction for example have benefited from the shadow economy. These industries are made mainly of men. Now a percentage of these young men might move from the shadow economy to the official census, reducing the unemployment in their category.

## 5. Conclusion

- 1) Simpson's Paradox applies here. Using aggregated data derived from ANOVA analysis and means applied to the minimum wages we could initially assume that increases in SMI had led to decreases in unemployment in young men. (mainly 16-24 years old). Analyzing as well the correlation, the effect of the increase of SMI in unemployment is inverse. So, it looks like increasing the minimum wage (SMI) at this level should not present a problem for unemployment. Still, and consistently with Simpson's paradox, once the data is disaggregated, we can see that this phenomenon could be explained by changes in the amount of the workforce in genders, and gender participation in different industries, leading to the conclusion that the SMI increases have hurt or benefit industries depending on their average salaries. Also, the shift from the shadow economy (non-regulated work) and the official census could explain why the decrease is not what it looks like with the aggregated data.
- 2) In line with Rodríguez-Diosdado's work this research proves that sector peculiarities apply. What may apply to one industry may not necessarily apply to another, and certainly, unemployment and minimum wage evolution do not operate under the "one-size-fits-all" idea.
- 3) Geographical mobility between different Autonomous Communities will be crucial to reduce unemployment in 55+ years old people. Those people of 55+ years who cannot find a job in a certain Autonomous Community (AC) should consider moving to a different one, otherwise, their chances of finding jobs will be seriously reduced.

## References

- Aaronson, D., & Phelan, B. (2016). Wage shocks and the technological substitution of low-wage jobs. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2914347>
- Alam, S. (2023). The influence of unemployment and labor force participation rates on economic development in gcc countries: A cointegration approach. *Journal of Infrastructure Policy and Development*, 8(2). <https://doi.org/10.24294/jipd.v8i2.2962>
- Alam. (2023). The influence of unemployment and labor force participation rates on economic development in GCC countries: A cointegration approach. *Journal of Infrastructure Policy and Development*. <https://doi.org/https://10.24294/jipd.v8i2.2962>
- Alaniz, E., Gindling, T. H., & Terrell, K. (2011). The impact of minimum wages on wages, work and poverty in Nicaragua. *Labour Economics*, 18, S45-S59. <https://doi.org/10.1016/j.labeco.2011.06.010>
- Allegretto, S., Dubé A., & Reich, M. (2011). Do minimum wages really reduce teen employment? Accounting for heterogeneity and selectivity in state panel data. *Industrial Relations: A Journal of Economy and Society*, 50(2), 205-240. <https://doi.org/10.1111/j.1468-232x.2011.00634.x>
- Amar et al. (2022). Determination of Poverty, Unemployment, Economic Growth, and Investment in West Sumatra Province. *International Journal of Sustainable Development and Planning*. <https://https://doi.org/10.18280/ijstdp.170422>
- Amar, S., Satrianto, A., & Kurniadi, A. (2022). Determination of poverty, unemployment, economic growth, and investment in west Sumatra province. *International Journal of Sustainable Development and Planning*, 17(4), 1237-1246. <https://doi.org/10.18280/ijstdp.170422>
- Autor, D., Manning, A., & Smith, C. (2016). The contribution of the minimum wage to us wage inequality over three decades: A reassessment. *American Economic Journal Applied Economics*, 8(1), 58-99. <https://doi.org/10.1257/app.20140073>
- Braun, H., Döhrn, R., Krause, M., Micheli, M., & Schmidt, T. (2019). Macroeconomic long-run effects of the German minimum wage when labor markets are frictional. *Jahrbücher Für Nationalökonomie Und Statistik*, 240(2-3), 351-386. <https://doi.org/10.1515/jbnst-2018-0080>

- Cahuc, P., & Laroque, G. (2013). Optimal taxation and monopsonistic labor market: Does monopsony justify the minimum wage? *Journal of Public Economic Theory*, 16(2), 259-273. <https://doi.org/10.1111/jpet.12063>
- Caliendo, M., Fedorets, A., Preuß, M., Schröder, C., & Wittbrodt, L. (2018). The short-run employment effects of the German minimum wage reform. *Labour Economics*, 53, 46-62. <https://doi.org/10.1016/j.labeco.2018.07.002>
- Campolieti, M. (2015). Minimum wages and wage spillovers in Canada. *Canadian Public Policy*, 41(1), 15-34. <https://doi.org/10.3138/cpp.2013-060>
- Card, D. (1992). Using regional variation in wages to measure the effects of the federal minimum wage. *Ilr Review*, 46(1), 22-37. <https://doi.org/10.1177/001979399204600103>
- Card, D., Katz, L., & Krueger, A. (1994). Comment on David Neumark and William Wascher, “employment effects of minimum and subminimum wages: Panel data on state minimum wage laws”. *Ilr Review*, 47(3), 487-497. <https://doi.org/10.1177/001979399404700308>
- Cebrián et al. (2010). Análisis de los efectos del aumento del salario mínimo sobre el empleo de la economía española. *Revista de Economía Laboral*. <https://doi.org/10.21114/rel.2010.01.01>
- Cengiz, D., Dubé, A., Lindner, A., & Zentler-Munro, D. (2022). Seeing beyond the trees: Using machine learning to estimate the impact of minimum wages on labor market outcomes. *Journal of Labor Economics*, 40(S1), S203-S247. <https://doi.org/10.1086/718497>
- Chu, A., Cozzi, G., Fan, H., Furukawa, Y., & Liao, C. (2021). How minimum wages affect automation and innovation in a schumpeterian economy. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3973863>
- Danziger, L. (2010). Endogenous monopsony and the perverse effect of the minimum wage in small firms. *Labour Economics*, 17(1), 224-229. <https://doi.org/10.1016/j.labeco.2009.07.006>
- Davidescu et al. (2021). Forecasting the Romanian Unemployment Rate in Time of Health Crisis—A Univariate vs. Multivariate Time Series Approach. *International Journal of Environmental Research and Public Health*. <https://doi.org/10.3390/ijerph182111165>
- Davidescu, A., Apostu, S., & Marin, A. (2021). Forecasting the Romanian unemployment rate in time of health crisis—A univariate vs. multivariate time series approach. *International Journal of Environmental Research and Public Health*, 18(21), 11165. <https://doi.org/10.3390/ijerph182111165>
- Dayaratna-Banda, & Dharmadasa. (2022). An Economics Analysis of Employability and Unemployment of Humanities and Social Sciences Graduates in Sri Lanka. *South Asian Survey*. <https://doi.org/10.1177/09715231221124714>
- Dayaratna-Banda, O., & Dharmadasa, P. (2022). An economics analysis of employability and unemployment of humanities and social sciences graduates in Sri Lanka. *South Asian Survey*, 29(2), 155-180. <https://doi.org/10.1177/09715231221124714>
- Devereux, S. (2005). Can minimum wages contribute to poverty reduction in poor countries? *J. Int. Dev.*, 17, 899-912. <https://doi.org/10.1002/jid.1183>
- Eckardt, M. (2021). Minimum wages in an automating economy. *Journal of Public Economic Theory*, 24(1), 58-91. <https://doi.org/10.1111/jpet.12528>
- Fairris, D., & Roberto, P. (2004). The Impact of Minimum Wages on Job Training: An Empirical Exploration with Establishment Data. *Southern Economic Journal*, 70(3), 566-583. <https://doi.org/10.2307/4135331>
- Fang, T. and Lin, C. (2020). *Minimum wages and employment in China* (pp. 71-112). [https://doi.org/10.1007/978-981-15-2421-9\\_4](https://doi.org/10.1007/978-981-15-2421-9_4)
- Fields, G., & Kanbur, R. (2022). *Minimum wages and poverty with income-sharing* (pp. 237-255). [https://doi.org/10.1007/978-3-030-89265-4\\_11](https://doi.org/10.1007/978-3-030-89265-4_11)
- Garloff, A. (2010). Minimum wages, wage dispersion and unemployment in search models: A review. *Journal for Labour Market Research*, 43(2), 145-167. <https://doi.org/10.1007/s12651-010-0040-8>
- Gorry, A., & Jackson, J. (2016). A note on the nonlinear effect of minimum wage increases. *Contemporary Economic Policy*, 35(1), 53-61. <https://doi.org/10.1111/coep.12175>
- Grodzicki, T., & Jankiewicz, M. (2020). Forecasting the level of unemployment, inflation and wages: The case of Sweden. *European Research Studies Journal*, XXIII(Special Issue 2), 400-409. <https://doi.org/10.35808/ersj/1832>

- Güemes et al. (2012). Los efectos del incremento del salario mínimo interprofesional en el empleo de los trabajadores inmigrantes en España. *El Trimestre Económico*. <https://doi.org/10.20430/ete.v79i314.64>
- Hernanz, & Jimeno. (2018). Inestabilidad laboral en el empleo, duración del desempleo y depreciación del capital humano. *Cuadernos Económicos de Iice*. <https://doi.org/10.32796/cice.2018.95.6641>
- Hohberg, M., & Lay, J. (2015). The impact of minimum wages on informal and formal labor market outcomes: Evidence from Indonesia. *IZA Journal of Labor & Development*, 4(1), 1-25. <https://EconPapers.repec.org/RePEc:spr:izaldv:v:4:y:2015:i:1:p:1-25:10.1186/s40175-015-0036-4>.
- Hong, J. (2021). Analysis of the world unemployment rate and solutions in the context of COVID-19. <https://doi.org/10.2991/assehr.k.211020.153>
- Huang, Y., Loungani, P., & Wang, G. (2014). Minimum wages and firm employment: Evidence from China. *Imf Working Paper*, 14(184), 1. <https://doi.org/10.5089/9781498332309.001>
- Jardim, E., & Inwegen, E. (2019). Payroll, revenue, and labor demand effects of the minimum wage. <https://doi.org/10.17848/wp19-298>
- Jitendra, K. S. (2023). Impact of economic growth, minimum wage, and human development index on unemployment in India during the post-reform era. *CTBM*, 1(1). <https://doi.org/10.33140/ctbm.01.01.02>
- Kadeřábková, B., & Jašová, E. (2019). The relation between minimum wage and unemployment across the economic cycle in countries of the visegrad group. <https://doi.org/10.20472/efc.2019.011.008>
- Kai-Uwe, M., & Steiner, V. (2008). Imposed Benefit Sanctions and the Unemployment-to-Employment Transition: The German Experience. *DIW Berlin Discussion Paper No. 792*. <http://dx.doi.org/10.2139/ssrn.1135662>
- Kehoe, P., Pastorino, E., & Winberry, T. (2022). The distributional impact of the minimum wage in the short and long run. <https://doi.org/10.21034/sr.640>
- Kim, C., & Lim, G. (2018). Minimum wage and unemployment: An empirical study on oecd countries. *Journal of Reviews on Global Economics*, 7, 1-9. <https://doi.org/10.6000/1929-7092.2018.07.01>
- Kim, T., & Taylor, L. (1995). The employment effect in retail trade of California's 1988 minimum wage increase. *Journal of Business and Economic Statistics*, 13(2), 175. <https://doi.org/10.2307/1392371>
- Kristensen, N., & Cunningham, W. (2006). Do minimum wages in latin america and the Caribbean matter? Evidence from 19 countries. *Policy Research Working Papers*. <https://doi.org/10.1596/1813-9450-3870>
- Lemos, S. (2008). A survey of the effects of the minimum wage on prices. *Journal of Economic Surveys*, 22(1), 187-212. <https://doi.org/10.1111/j.1467-6419.2007.00532.x>
- Li, X., Peng, S., Huang, W., & Zhou, Q. (2022). What drives chinese firms' export sophistication? A perspective from the rise of minimum wages. *China & World Economy*, 30(2), 28-59. <https://doi.org/10.1111/cwe.12409>
- Liu, A. (2021). The minimum wage and occupational mobility. *International Economic Review*, 63(2), 917-945. <https://doi.org/10.1111/iere.12552>
- Llopis, & Andreu. (2017). Pobreza laboral en España: Causas y alternativas políticas. *Anuario Iet de Trabajo y Relaciones Laborales*. <https://doi.org/10.5565/rev/aiet.59>
- López-Bazo et al. (2005). Geographical distribution of unemployment in Spain. *Regional Studies*. <https://doi.org/10.1080/00343400500087034>
- López-Bazo, E., Barrio, T., & Artís, M. (2005). Geographical distribution of unemployment in Spain. *Regional Studies*, 39(3), 305-318. <https://doi.org/10.1080/00343400500087034>
- Machin, S., & Wilson, J. (2004). Minimum wages in a low-wage labour market: Care homes in the UK. *The Economic Journal*, 114(494), C102-C109. <https://doi.org/10.1111/j.0013-0133.2003.00199.x>
- Marimpi, M., & Koning, P. (2018). Youth minimum wages and youth employment. *Iza Journal of Labor Policy*, 7(1). <https://doi.org/10.1186/s40173-018-0098-4>
- Mattei, G., & Pistori, B. (2018). Unemployment and suicide in Italy: Evidence of a long-run association mitigated by public unemployment spending. *The European Journal of Health Economics*, 20(4), 569-577. <https://doi.org/10.1007/s10198-018-1018-7>
- Meer, J., & West, J. (2015). Effects of the minimum wage on employment dynamics. *The Journal of Human Resources*, 51(2), 500-522. <https://doi.org/10.3368/jhr.51.2.0414-6298r1>

- Mingorance-Arnáez et al. (2017). Efectos de las variables macroeconómicas e institucionales en el desempleo: un análisis para Europa (1985-2011). *Semestre Económico*. <https://doi.org/10.22395/seec.v20n42a1>
- Munshi, F. (2019). Do minimum wages reduce employment? some empirical evidence from bangladesh. *The Bangladesh Development Studies, XLI(3)*, 57-72. <https://doi.org/10.57138/hcgn5512>
- Neumark, D. and Wascher, W. (2006). Minimum wages and employment. *Foundations and Trends® in Microeconomics, 3(1-2)*, 1-182. <https://doi.org/10.1561/0700000015>
- Neumark, D., & Wascher, W. (2008). *Minimum wages*. <https://doi.org/10.7551/mitpress/9780262141024.001.0001>
- Öztürk, O. (2007). Employment effects of minimum wages in inflexible labor markets. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1113175>
- Phelan, B. (2019). Hedonic-based labor supply substitution and the ripple effect of minimum wages. *Journal of Labor Economics, 37(3)*, 905-947. <https://doi.org/10.1086/702651>
- Ra, H. (2014). Minimum wage levels across southeast asia: trends and issues. *International Area Studies Review, 17(3)*, 313-339. <https://doi.org/10.1177/2233865914546501>
- Rendahl, P. (2016). Fiscal policy in an unemployment crisis. *The Review of Economic Studies, 83(3)*, 1189-1224. <https://doi.org/10.1093/restud/rdv058>
- Rendahl, P. (2016). Fiscal Policy in an Unemployment Crisis. *The Review of Economic Studies*. <https://doi.org/10.1093/restud/rdv058>
- Rodriguez, F. (2023). The effects of minimum wage in the presence of monopsonic power in Latin America: A study case for Mexico. <https://doi.org/10.31235/osf.io/5x7uk>
- Rodríguez-Diosdado. (2022). Salario mínimo interprofesional en España y la Carta Social Europea: el desacuerdo permanente. *Lex Social Revista de Derechos Sociales*. <https://doi.org/10.46661/lexsocial.6477>
- Rybczynski, K., & Sen, A. (2017). Employment effects of the minimum wage: Panel data evidence from canadian provinces. *Contemporary Economic Policy, 36(1)*, 116-135. <https://doi.org/10.1111/coep.12241>
- Sasongko, G., & Huruta, A. (2019). The causality between inflation and unemployment: The Indonesian evidence. *Verslas Teorija Ir Praktika, 20*, 1-10. <https://doi.org/10.3846/btp.2019.01>
- Schulten, T. (2008). Towards a european minimum wage policy? fair wages and social europe. *European Journal of Industrial Relations, 14(4)*, 421-439. <https://doi.org/10.1177/0959680108097494>
- Simonovits, G., & Payson, J. (2020). Locally controlled minimum wages leapfrog public preferences. <https://doi.org/10.31219/osf.io/c6dfk>
- Storm, & Naastepad. (2008). The NAIRU reconsidered: why labor market deregulation may raise unemployment. *International Review of Applied Economics*. <https://doi.org/10.1080/02692170802287490>
- Storm, S., & Naastepad, C. (2008). The nairu reconsidered: Why labor market deregulation may raise unemployment. *International Review of Applied Economics, 22(5)*, 527-544. <https://doi.org/10.1080/02692170802287490>
- Suomi et al. (2020). Unemployment, Employability and COVID19: How the Global Socioeconomic Shock Challenged Negative Perceptions Toward the Less Fortunate in the Australian Context. *Frontiers in Psychology*. <https://doi.org/10.3389/fpsyg.2020.594837>
- Suomi, A., Schofield, T. P., & Butterworth, P. (2020). Unemployment, Employability and COVID19: How the Global Socioeconomic Shock Challenged Negative Perceptions Toward the Less Fortunate in the Australian Context. *Front. Psychol., 11*, 594837. <https://doi.org/10.3389/fpsyg.2020.594837>
- Suomi, A., Schofield, T., & Butterworth, P. (2020). Unemployment, employability and covid19: how the global socioeconomic shock challenged negative perceptions toward the less fortunate in the Australian context. *Frontiers in Psychology, 11*. <https://doi.org/10.3389/fpsyg.2020.594837>
- Suparta, I. (2021). Effect of minimum wages on inflation and unemployment in East Java - Indonesia. *JESD*. <https://doi.org/10.7176/jesd/12-8-04>
- Vojtovič, & Kordoš. (2016). Trends in Unemployment and Emigration of Labor Force. <https://doi.org/10.20472/efc.2016.005.028>
- Vojtovič, S., & Kordoš, M. (2016). Trends in unemployment and emigration of labor force..



<https://doi.org/10.20472/efc.2016.005.028>

Wilson, S. (2017). The politics of ‘minimum wage’ welfare states: the changing significance of the minimum wage in the liberal welfare regime. *Social Policy & Administration*, 51(2), 244-264. <https://doi.org/10.1111/spol.12286>

Yamada, H. (2016). Evidence of the likely negative effect of the introduction of the minimum wage on the least skilled and poor through “labor-labor” substitution. *International Journal of Development Issues*, 15(1), 21-34. <https://doi.org/10.1108/ijdi-05-2015-0038>

Yurievich, O., & Muravyev, A. (2013). Minimum wages and labor market outcomes: Evidence from the emerging economy of Russia. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2255896>

## Appendix A

### ANOVA Results (SMI Mode)

$N^2 = \text{ETA Squared}$ .

ANOVA - TPH16-19						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI-MODE	4265.743	1	4265.743	24.636	< .001	0.095
Residuals	40862.769	236	173.147			
ANOVA - TPM-16-19						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI-MODE	1938.609	1	1938.609	8.658	0.004	0.035
Residuals	52844.239	236	223.916			
ANOVA - TPH20-24						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI-MODE	1345.816	1	1345.816	11.796	< .001	0.048
Residuals	26924.571	236	114.087			
ANOVA - TPM20-24						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI-MODE	767.802	1	767.802	6.757	0.010	0.028
Residuals	26817.187	236	113.632			
ANOVA - TPH25-54						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI-MODE	993.667	1	993.667	30.597	< .001	0.115
Residuals	7664.315	236	32.476			
ANOVA - TPM25-24						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI-MODE	266.658	1	266.658	6.346	0.012	0.026
Residuals	9916.361	236	42.018			
ANOVA - TPH55+						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI-MODE	77.305	1	77.305	2.356	0.126	0.010
Residuals	7742.893	236	32.809			
ANOVA - TPM-55+						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI-MODE	10.476	1	10.476	0.328	0.567	0.001
Residuals	7530.377	236	31.908			

Note. Type III Sum of Squares.

**Appendix B****ANOVA Results (SMI Mean)** **$N^2 = \eta^2$  Squared.**

<i>ANOVA - TPH16-19</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI MEAN	10277.692	1	10277.692	69.598	< .001	0.228
Residuals	34850.820	236	147.673			
<i>ANOVA - TPM-16-19</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI MEAN	8754.419	1	8754.419	44.886	< .001	0.160
Residuals	46028.429	236	195.036			
<i>ANOVA - TPH20-24</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI MEAN	9154.917	1	9154.917	113.027	< .001	0.324
Residuals	19115.470	236	80.998			
<i>ANOVA - TPM20-24</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI MEAN	5162.006	1	5162.006	54.330	< .001	0.187
Residuals	22422.983	236	95.013			
<i>ANOVA - TPH25-54</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI MEAN	2566.579	1	2566.579	99.437	< .001	0.296
Residuals	6091.402	236	25.811			
<i>ANOVA - TPM-25-54</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI MEAN	1858.348	1	1858.348	52.683	< .001	0.182
Residuals	8324.671	236	35.274			
<i>ANOVA - TPH55+</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI MEAN	1219.658	1	1219.658	43.608	< .001	0.156
Residuals	6600.540	236	27.968			
<i>ANOVA - TPM-55+</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
SMI MEAN	355.274	1	355.274	11.668	< .001	0.047
Residuals	7185.579	236	30.447			

Note. Type III Sum of Squares.

**Appendix C****ANOVA per Autonomous Community.**

<i>ANOVA - TPH16-19</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
CCAA	6195.424	16	387.214	2.198	0.006	0.137
Residuals	38933.087	221	176.168			
<i>ANOVA - TPM-16-19</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
CCAA	14433.510	16	902.094	4.941	< .001	0.263
Residuals	40349.338	221	182.576			
<i>ANOVA - TPH20-24</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
CCAA	7743.703	16	483.981	5.211	< .001	0.274
Residuals	20526.684	221	92.881			

<i>ANOVA - TPM20-24</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
CCAA	10525.023	16	657.814	8.522	< .001	0.382
Residuals	17059.966	221	77.194			
<i>ANOVA - TPH25-54</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
CCAA	3192.554	16	199.535	8.068	< .001	0.369
Residuals	5465.428	221	24.730			
<i>ANOVA - TPM-25-54</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
CCAA	6390.163	16	399.385	23.271	< .001	0.628
Residuals	3792.856	221	17.162			
<i>ANOVA - TPH55+</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
CCAA	4472.405	16	279.525	18.452	< .001	0.572
Residuals	3347.793	221	15.148			
<i>ANOVA - TPM-55+</i>						
Cases	Sum of Squares	df	Mean Square	F	p	$\eta^2$
CCAA	5735.857	16	358.491	43.893	< .001	0.761
Residuals	1804.997	221	8.167			

*Note.* Type III Sum of Squares.

### Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).