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Evidence from Survey and Administrative Tax Data

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Abstract

Minimum wages are an essential component of a country's social protection system, aiming to protect vulnerable workers and reduce poverty and wage inequality. Yet, there are risks associated with poor minimum wage design. Higher minimum wages may result in higher earnings for affected workers but fewer job opportunities for others, including the demographic groups they are intended to help, such as those with very low wages and skills and youth, so ex-ante evaluation of potential employment, wage, and distributional impacts is needed. Over the past decade, Romania experienced significant real growth in the minimum wage and a rising minimum-to-median wage ratio. However, when looking at minimum living standards, the analysis shows that the statutory minimum wage is higher than

the living wage needed to cover a consumption food basket estimated by the European Commission under the European Reference budget network, but not enough to include non-food components. The microsimulation results using administrative tax data show that tying minimum wage to inflation or the living wage could lead to a slight short-term wage increase for some workers but may cause job loss in the long run, especially for younger workers. The minimum wage increase could have varying impacts across regions and sectors, with the accommodation and food services sector and those living in the Suceava region, which has the highest proportion of affected employees. Moreover, male employees tend to be more affected than their female counterparts.

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Simulating Aggregate and Distributional Effects of Minimum Wage Increases in Romania: Evidence from Survey and Administrative Tax Data*

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I. Introduction

Minimum wages represent a critical aspect of the nation's social protection system geared towards protecting vulnerable workers; however, the configuration of minimum wage structures harbors associated risks when their design is suboptimal. The International Labour Organization (2012) states that the minimum wage is "the salary which constitutes the floor of the wage structure intending to protect workers who occupy the lowest position in the wage distribution." These legislated wage floors hold potential value in preventing unfair low compensation, curtailing wage disparities, and mitigating working poverty.¹ Nonetheless, they also potentially increase unemployment levels, particularly among the young and those with limited skills. Setting the minimum wage above the productivity of some workers may force them out of the labor market or into informality. Hence, when appropriately calibrated, the minimum wage can assist low-paid workers without negatively impacting employment opportunities.

Most European Union (EU) member states, including Romania, have established statutory minimum wages. Among the 27 EU member states, 22 have instituted formal statutory minimum wage regulations. In contrast, the remaining five countries—Austria, Denmark, Italy, Finland, and Sweden—structure their wage frameworks around sectoral collective agreements, which, in certain instances, encompass stipulations for minimum wages.

In 2022, a new European Union directive (Directive 2022/2041) aimed to guarantee the safeguarding of minimum wage standards across the EU and contribute to establishing a decent living standard. Under the new EU directive, determining a minimum wage continues to fall under the jurisdiction of individual nations. Yet, member states are mandated to ensure that their national minimum wage rates enable workers to maintain a satisfactory standard of living, factoring in living costs and broader wage benchmarks. The Directive also advocates for collective bargaining, acknowledging that robust and comprehensive collective bargaining systems play a significant role in guaranteeing sufficient safeguards for minimum wage standards. In June 2024, a new draft legislative act was approved by the Romanian government and it is set to be passed by Parliament, transposing Directive 2022/2041 on adequate minimum wages in the European Union into Romanian law.

In order to guide the discussion with member states and social partners, the European Commission has provided an ex-ante impact assessment (European Commission, 2020). The analysis highlights that, in 2018, most of those remunerated at the minimum wage were women, young people, low-skilled individuals, single parents, or those with temporary or part-time employment contracts. Additionally, in certain Central and

¹ In the European Union, the in-work at-risk-of-poverty rate refers to the percentage of persons in the total population who declared to be at work (employed or self-employed) who are at risk of poverty (i.e., with an equivalized disposable income below the risk-of-poverty threshold, which is set at 60 % of the national median equivalized disposable income (after social transfers)).

Eastern European countries, a significant proportion of those remunerated at the minimum wage were concentrated in industry – more than 30% in Bulgaria, Czechia, Croatia, the Slovak Republic, Poland, and Romania. Generally, small and medium-sized enterprises employ the vast majority of those remunerated at the minimum wage, but patterns differ at the level of member states. The impact analysis based on the EUROMOD microsimulation model reflects significant reductions in income inequalities for certain member states, especially in scenarios where the minimum wage is increased to 60% of the median wage (Czechia, Estonia, Spain, Luxembourg, Poland, and the Slovak Republic) or 50% of the average wage (Bulgaria, Estonia, Spain, Luxembourg, Poland, Romania, and the Slovak Republic).

In Romania, the government sets the legally mandated minimum wage after non-binding consultation with trade unions and employer organizations; distinct minimum wage tiers apply to various sectors of economic activity. Between 2019 and 2021, a higher minimum wage was applied for employees with tertiary education and at least one year of experience. The government's decision set the gross level of the minimum wage. The minimum wage applies to full-time and part-time workers, entitled to the minimum wage proportional to the working time (e.g., someone employed for 50% of the total time is entitled to a minimum wage equal to 50% of the minimum wage for full-time workers). The statutory level does not vary across regions, accounting for price differences or age groups. The minimum wage level is revised yearly, but this process is not based on any strict rules determining the new minimum wage level. However, the government has used macroeconomic indicators (productivity rate, inflation rate, wage growth) to substantiate the minimum wage increases over the last few years. Since 2019, three different minimum wage levels have been established. In January 2020, those in the construction sector were entitled to the highest level (3,000 RON gross per month) and additional fiscal benefits (lower taxation of labor income, as they were exempt from income tax, health contribution, and reduced social security contributions). Between 2019 and 2021, two different levels applied based on education for those not in the construction sector. Those with higher education² and a year of work experience received 2,350 RON; the remaining workers (non-construction, non-high education) received 2,230 RON monthly. These are equivalent to approximately 620, 485, and 460 euros per month. As of 2022, the minimum wage for employees with tertiary education has been naturally eliminated, given that the government has not increased it. In this year, higher minimum wages were also stipulated for agriculture and food sectors.

One important reform outlined in the Romanian Recovery and Resilience Plan involves establishing an objective minimum wage setting mechanism. The law shall provide an objective mechanism and formula to determine the minimum wage level after consultation with social partners. The new mechanism should be consistent with job creation and external competitiveness.

² Higher education is at least a bachelor's degree (ISECED-6).

In recent years, there has been a substantial surge in Romania's real gross minimum wages. Upon joining the European Union, Romania had one of the EU's lowest statutory gross minimum wages. In 2007, the gross statutory minimum wage stood at 390 RON gross (approximately 115 EUR). This compares to 92 EUR in Bulgaria, 240 EUR in Poland, 666 EUR in Greece, and 1254 EUR in France. While expressed nominally, the minimum wage in Romania was among the lowest in the EU; if adjusted by purchasing power parity (PPP), the minimum wage in Romania was the lowest in the EU (European Commission, 2007).³ Since then, there has been a rapid increase, with an average annual real increase of 14.3% (inflation-adjusted) between 2007 and 2023. Some years (i.e., 2008, 2016, and 2018⁴) have witnessed increments close or surpassing the 20 percent mark. Figure 1 depicts the minimum wage's value and annual progression during this period.

Figure 1. Evolution of Gross Statutory Minimum Wage (Nominal Levels and Annual Changes in Real Terms) Romania, 2007-2023



Source: Own estimates based on the Romanian Ministry of Public Finance and National Statistics Institute.
 Note: Since 2019, three statutory minimum wage levels were established, so the estimate represents the lowest of minimum wage levels (basic minimum wage). Changes in 2018/2019 also capture the government's imposition of mandatory social contributions transfer from the employer to the employee regarding income from wages. Change in real terms calculated using HICP inflation.

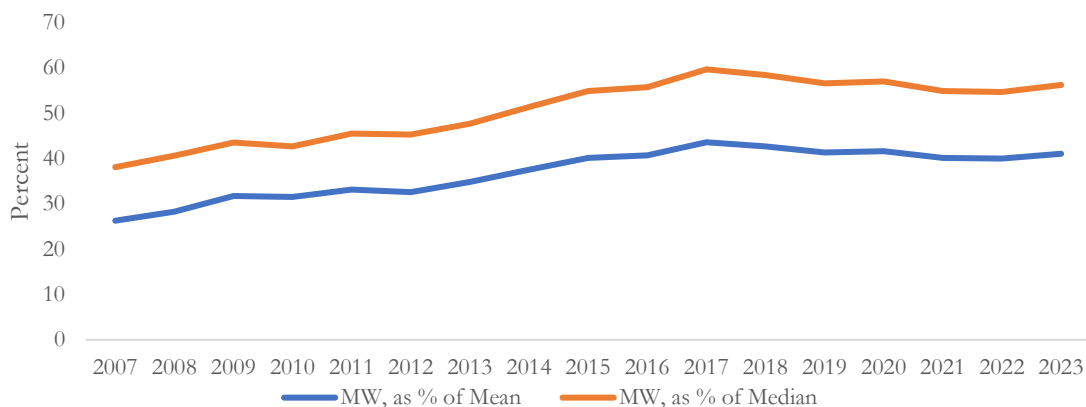
³ Source: https://ec.europa.eu/commission/presscorner/detail/en/STAT_07_85.
⁴ The year 2018 stands out as an anomaly in the context of wage increases, including the minimum wage, due to the government's imposition of mandatory social contributions transfer from the employer to the employee in the case of income from wages. Therefore, changes between pre-2018 and 2018 wages are not fully comparable to changes in other years, as they partly captured this policy change. For example, the minimum wage's rise from RON 1450 in 2017 to RON 1,900 in 2018 represented a 31% increase, influenced significantly by the transfer of contributions from the employer to the employee, constituting 22.75% of the total increase.

Notably, the considerable expansions in the real minimum wage have been accompanied by a rise in the ratio of minimum wage to median wage, a measure of the relative importance of the minimum wage in the labor market. This ratio now positions Romania at mid-ranking among OECD nations and is elevated compared to other EU countries. From 2007 to 2017, the minimum-to-median wage ratio surged from 38% to its peak of 60%, placing Romania among the upper ranks of the EU. During these years, Romania transited from the bottom to the top in the ranking of the EU member states by this ratio (minimum-to-median wage). Subsequently, post-2017, this ratio experienced a slight decline, settling at 55%. Similar trends are observed when looking at the minimum-to-mean ratio (figure 2, panel a). Despite slower minimum wage growth post-2017, Romania is still ranked at the top. In 2023, among European OECD countries, only France, Portugal and Slovenia have significantly higher minimum-to-median wages than Romania. In Poland and Luxembourg, these values are similar to those in Romania (figure 2, panel b).

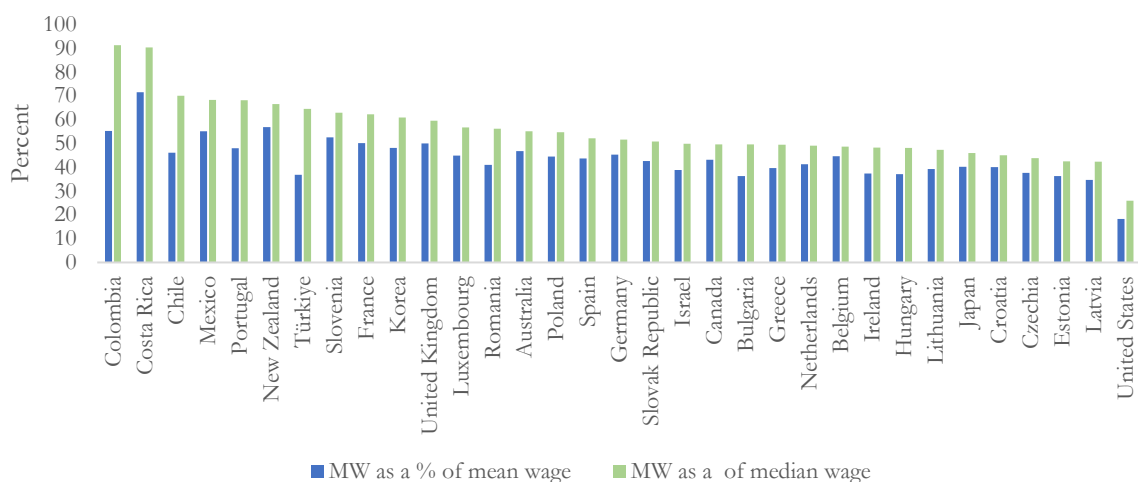
This ratio is relevant, as it has been frequently used to assess the constrictive nature of minimum wage policies (ILO, 2012). When the minimum wage is high relative to the median (the so-called Kaitz index (KI)), it is expected to have a more significant bite or stronger “disemployment”⁵ effects on the labor market (Medrano-Adán & Salas-Fumás, 2023; Cengiz et al., 2019). Ahlfeldt et al. (2022) found that beyond 50% of the mean wage, increases in the minimum wage result in a progressively greater reduction in employment. Rutkowski (2003) suggests this ratio should be at most one-third in countries with elevated unemployment among young and low-skilled workers. In 2022, Romania's unemployment rate for individuals aged 15 to 74 fell within the middle range compared to other European Union (EU) member states. Specifically, it was 5.6%, whereas the EU average was 6.2%. However, the youth unemployment rate for those aged 15 to 24 was relatively high in Romania at 22.8%, surpassing the EU average of 14.5% (Eurostat, 2024).

⁵ "Disemployment effects" is a term commonly employed in minimum wage studies, denoting adverse impacts on employment levels.

Figure 2. Minimum-to-median and minimum-to-mean wage ratio, Romania and selected OECD countries
a. Romania, 2007-2023



b. OECD countries and selected non-OECD countries, 2023



Source: Own estimates based on OECD data, available here: [OECD data explorer](#)

Note: This indicator represents the ratio of minimum wages in relation to the mean and median earnings of full-time employees. Using median earnings, as opposed to mean earnings, offers a more accurate basis for international comparisons by accounting for variations in earnings dispersion across different countries. The median is also less affected by extreme values (outliers) in the data compared to the mean. Outliers, which can be unusually high or low values, have a greater impact on the mean, potentially skewing the average. The median wage is defined as follows: 50 percent of workers receive a wage below the minimum wage. Certain countries establish varied rates, varying across sectors, regions, occupations, and age groups, and this statistic can hide these differences within countries. Non-OECD countries include Croatia, Romania and Bulgaria.

The empirical evidence on the impacts of the minimum wage on labor market outcomes and poverty is mixed and contended.

As economic theory outlines, in a labor market governed by perfect competition, an increase in the minimum wage is expected to trigger job cuts within the subset of workers earning that wage (as

explored by Neumark and Wascher, 2006, among others). This adverse employment impact is attributed to employers potentially substituting minimum wage workers with alternative resources like skilled non-minimum wage workers or capital. Economic theory also posits that heightened wages can lead to higher input costs, reduced production, and decreased labor demand. However, if the labor market operates under monopsonistic competition, a market structure where employers wield influence in determining wages,⁶ a minimum wage hike might paradoxically lead to augmented employment. Moreover, the potential ramifications of minimum wages could also hinge upon factors like coverage and adherence to regulations (as highlighted by Posadas and Sanz-de-Galdeano, 2018).

A potential risk of high minimum wages is an increase in the informality of the economy. Since undeclared work is, by definition, not reported to authorities, accurately estimating its size is challenging. Due to the availability of information in the EU labor force surveys,⁷ Eurostat does not publish statistics on informal employment. Estimates of temporary work and self-employment are available, but they are considered imperfect proxies of informality. Other global databases of informality do not include recent Romania estimates.^{8 9} An EC study used an indirect approach (the Labour Input Method (LIM) to measure the size of the undeclared economy. The results indicate that Romania was one of the countries with the highest share of informal employment in the European Union. In 2013, the share of undeclared work in the private sector's gross value added was 26.2%. This was significantly more than the EU average (16.4%) and the second-highest result in the EU after Poland (27.3%). Romania also stands out when undeclared work is measured in terms of total labor input, with one of the highest shares of the EU (European Commission, 2017). The standard dual economy models of labor market segmentation suggest increasing the minimum wage can drive the least productive workers from the formal sector into the informal one. However, other effects may be observed. Gindling (2018) contends that certain evidence suggests wage hikes in the informal sector due to "lighthouse effects," where employers compete for workers with the formal sector, resulting in higher wages and reduced employment in the informal sector. In contrast, other studies, such as Papps (2012) and Carneiro and Corseuil (2001), have found no discernible impact on wages in the informal sector.

The empirical literature examining the impact of the minimum wage on employment is extensive, yielding a range of mixed findings; research focused on the least-skilled workers reveals more

⁶ Due to constraints binding workers to particular firms, hiring additional workers increases the cost of existing ones. Consequently, market-driven employment may drop below the economically efficient competitive level. Furthermore, in the monopsony model, a minimum wage can occasionally result in increased employment.

⁷ For example, the EU-LFS allow distinguishing between permanent and temporary contracts. However, it does not allow identification of workers without a contract.

⁸ The World Bank has constructed an informal database of informality covering up to 196 economies over the period 1990-2020, but Romania was not included. <https://www.worldbank.org/en/research/brief/informal-economy-database>

⁹ The ILO publishes a database with global statistics on informal employment, but Romania estimates are not available. <https://ilostat.ilo.org/topics/informality/#>.

compelling evidence of adverse effects on employment. Rown, Gilroy, and Cohen (1982) conducted a comprehensive review of early minimum wage studies, revealing that a 10 percent minimum wage increase resulted in a one to three percent reduction in teenage employment. Neumark and Wascher (2006), Neumark (2019), Neumark & Shirley (2022), and Dube (2019) reviewed the literature and unveiled a broader spectrum of employment effect estimates, reflecting the diverse methodologies adopted in newer studies. Among the studies surveyed by Neumark and Wascher (2006), most indicated decreased employment stemming from minimum wage hikes. Interestingly, of the most robust studies, 85 percent reported a negative impact on employment. Studies analyzing low-skilled labor observed the most substantial negative employment consequences (Neumark, 2019). Neumark and Shirley (2022) conclude that most US research indicates the impacts of minimum wage increases, which are more pronounced for teenagers, young adults, and individuals with lower education levels. However, evidence from studies of low-wage industries is less consistently one-sided, showing a more nuanced picture in these sectors. Bossavie et al. (2023) find that a rapid increase in minimum wage results in higher rates of firm destruction concentrated among smaller firms. Some workers who lose formal employment may be forced out of the formal labor market and into informal employment, especially in the case of emerging economies with weak regulation enforcement. (Del Caprio & Pabon, 2017).

Moreover, contemporary empirical evidence has suggested that the minimum wage reduces employment growth, potentially attributed to labor-saving technology implementation in response to heightened labor costs (Meer and West, 2016). A minimum wage increase may result in higher capital investments, which may or may not be enough to offset the adverse effects of diminished employment on total output (Bauducco & Janiak, 2018; Seok & You, 2022). On the other hand, if increasing the minimum wage does not reduce employment, it may result in higher inflationary pressure (Majchrowska, 2022). Evidence from the US shows that the impact of the minimum wage on employment manifests over time through shifts in growth rather than an immediate decline in relative employment levels. They contend that commonly employed specifications in this field, particularly those incorporating state-specific time trends, need to be revised to capture these effects. Through analyzing three distinct state panels of administrative employment data, this research reveals that the minimum wage curtails job growth over multiple years. This conclusion is robust across various empirical specifications.

In contrast, more recent investigations (Dube, Lester, and Reich, 2010; Allegretto, Dube, and Reich, 2011) found no adverse employment repercussions linked to minimum wage changes, but these results have been contested. Nonetheless, Neumark, Salas, and Wascher (2014a) and Neumark, Salas, and Wascher (2014b) have cast doubt on these findings. Recently, studies have identified significant disemployment effects of the minimum wage (e.g., Baskaya and Rubinstein, 2016; Clemens and Wither, 2019; Powell, 2016). These

studies have calculated elasticities ranging from approximately -0.3 to -0.5 for teenagers and around -1 for minimum-wage earners.

Moreover, the effectiveness of the minimum wage in adequately addressing poverty concerns could be limited in countries grappling with substantial unemployment rates or entrenched informal labor markets. This phenomenon primarily occurs because individuals in poor households are more likely to experience unemployment, inactivity or become engaged in informal work, thus staying outside the scope of labor market regulations. In such contexts, the impact of minimum wage policy might predominantly benefit workers occupying positions with lower wage brackets, yielding potentially limited direct benefits for households characterized by higher at-risk-of-poverty. The policy could also lead to potential reluctance on the part of employers to engage in low-skilled labor, leading to a potential uptick in unemployment rates among certain groups and overall. Hence, the potential impact of minimum wage reform in mitigating poverty outcomes is contingent upon its capacity to effectively target and cover the poor (or if the “winners” are disproportionately from poor households) and how incremental income gains could offset potential reductions in employment opportunities and the broader spillover of price increases across the economy. The extent to which the rising minimum wage affects income inequality will depend on these equilibrium factors and is an empirical question.

Empirical evidence suggests that the effectiveness of the minimum wage in reducing poverty and inequality depends on the characteristics of the labor market. The impact of increasing minimum wages on reducing poverty is contingent not only on potential job losses for formal sector workers but also on factors such as the socioeconomic status of low-wage workers' households, the extent of minimum wage enforcement, the influence on informal workers, and the presence of adequate social safety nets. If job losses in the formal sector are minimal and informal sector wages rise alongside the minimum wage increase, higher minimum wages can alleviate poverty. Additionally, if those earning the minimum wage are heads of low-income households and social safety nets are in place to protect against job losses, the impact on poverty may be positive. Conversely, if higher minimum wages result in job losses in the formal sector or do not cover a significant portion of informal workers, the potential to reduce poverty diminishes. Moreover, if the affected workers are secondary family earners and lack social safety nets, higher minimum wages may not reduce poverty and could even exacerbate the situation (Gindling, 2018).

While the minimum wage could reduce poverty rates among employed individuals, its overall impact on poverty rates might be limited due to various household compositions and potential indirect consequences such as increased unemployment. The magnitude of the direct effects of increasing the minimum wage on poverty depends on the composition of households. Moreover, some employees in poor households may earn a relatively high hourly wage but work only part-time or a few months per year (seasonal

activities) (IMF, 2020). Thus, it is not necessarily the case that those remunerated at the minimum wage are at risk of poverty, as they may be students or individuals with secondary incomes from relatively affluent households. An analysis conducted by the OECD (1998) covering nine developed countries concludes that most low-wage workers (between 60% and 90%) earning less than two-thirds of the median wage live in households with medium or high incomes. Only 10% of them live in poor households, limiting the effectiveness of this instrument in reducing the poverty rate overall. On the other hand, the beneficial impact of increasing the minimum wage on poverty among employed individuals may be eroded by possible indirect effects of the minimum wage increase (such as increased unemployment rate, loss of purchasing power due to intensified inflationary pressures, loss of specific social benefits - means-tested benefits).

Many studies have shown that poor individuals are not necessarily active in the labor market in general (Freeman, 1996; Belman and Wolfson, 2014; IMF, 2016; 2020). An IMF (2020) analysis based on the elements of the EU Directive on adequate minimum wages underlines that raising the minimum wage to 60% of the median wage or 50% of the average wage would lead to a reduction in poverty among employed individuals. Still, it would have a limited impact on the overall poverty rate, given that many of the poorest households are not active in the labor market. Thus, not all poor households have adult members who work and are remunerated at the minimum wage level, especially considering that household members at risk of poverty may be pensioners (as is frequently the case in Greece), unemployed, or out of the labor force (especially in Romania and Hungary). Recent findings for Romania (Militaru et al., 2019) indicate that the minimum wage contributed to a reduction in income inequality. The income inequality following the minimum wage hikes in 2014 was lower than it would have been in the hypothetical scenario of no increase, even though the analysis did not account for potential disemployment effects. IMF (2016) also emphasizes that the minimum wage policy has contributed to reducing income inequalities in Romania, influencing the lower part of the wage distribution. On the other hand, the increase in the minimum wage seems to have only a limited impact as it does not generate income growth for the poorest households, which are generally composed of inactive individuals, pensioners, unemployed individuals, or those engaged in another form of occupation. Therefore, the minimum wage policy needs to be synchronized with other social policies to address poverty-related issues.

The minimum wage could retain its efficacy as a tool for diminishing poverty if the beneficiaries of the minimum wage policy are disproportionately drawn from low-income households. While research in the United States indicates that minimum wages might not effectively uplift the poor (Neumark et al., 2005; MaCurdy, 2015), findings from developing countries yield a mixed perspective (Bell, 1997; Del Carpio, Messina, and Sanz-de-Galdeano, 2014; Gindling and Terrell, 2007 and 2009; Maloney and Nunez, 2000, Del Carpio, 2019). Ultimately, the impact of minimum wage policies on poverty alleviation hinges on contextual factors and the attributes of the workers affected by these wages. Therefore, a comprehensive exploration of the potential

beneficiaries of minimum wage increases and the specific disemployment repercussions on economically disadvantaged families remains pivotal.

For policy makers, the challenge consists of the delicate calibration of a wage threshold that resonates as equitable, aligning with the fundamental needs of workers and the prevailing living standards. This imperative task, however, needs a careful balancing act between employment and equality in earnings. Justifying a minimum wage approaching a living wage¹⁰ can be supported on both normative and economic/social welfare grounds (Fabo et al., 2017), but this needs to be done in a way that prevents inflicting substantial adverse repercussions on overall employment levels within the economy and across the demographic groups it is intended to protect.

To design a minimum wage effectively, it is crucial to initially examine the levels from a living wage perspective and quantify the potential ex-ante aggregate and distributional impacts of various policy designs. First, we must analyze the gap between minimum and living wages. The adequacy of the minimum wage should be linked with the ability of households to afford a minimum consumption basket, which represents the amount of goods and services that meet the needs of the minimum level of living standards formed (actually expressed) in society. Romania has no official measures, as the country does not use a consumption measure of poverty, but several unofficial estimates exist (as presented in section II). Also, changes in real terms should be evaluated appropriately, such that purchasing power is maintained over time. While increasing the minimum wage may result in higher earnings for employed workers, if set too high, minimum wages may decrease job creation and increase job destruction, especially among workers who become too costly for firms given their productivity levels (typically low-skilled workers or young workers with little work experience). The magnitude of these so-called dis-employment effects is expected to be more prominent in economies characterized by high labor demand elasticity. This implies that firms respond more strongly to a change in the wage rate by reducing their demand for labor. These effects are expected to be more pronounced when the minimum wage increase affects a substantial share of workers, mainly if a large share of workers earn between the current and the new minimum wage. On average, if these dis-employment effects offset the increase in earnings due to higher minimum wages, the minimum wage increase's overall effect will be detrimental to the economy. Yet, even with overall neutral or positive effects, it is essential to understand the policy's distributional impact, as some workers may gain (in earnings) and others may lose (their jobs), while on average, effects net out.

This paper closely examines Romania's minimum wage in relation to living wages and provides evidence on the anticipated overall and distributional effects of a set of policy options. It employs rich

¹⁰ The living wage is conceptually defined as a wage essential for survival, calculated in accordance with the real cost of living (May 1982; Wills and Linneker 2014).

administrative tax data and microsimulation techniques, making it the first study to utilize such comprehensive data for assessing the impacts of the minimum wage. The primary goal is to evaluate the potential effects of increasing minimum wages and aligning them with living wages in Romania. The study explores the characteristics of minimum-wage workers using a detailed administrative tax dataset from the Romanian Ministry of Finance. Subsequently, it assesses the potential impacts of recent minimum wage increases using the same dataset. By applying labor demand elasticities estimated for other countries, the study simulates the effects of the minimum wage increase on wages, net labor earnings, and employment. Additionally, it examines the distributional consequences of alternative minimum wage adjustments.

We aim to evaluate the potential impacts of the proposed minimum wage increase on employment and earnings. Specifically, we intend to disentangle two categories of effects:

- **Disemployment Effects:** When minimum wages are "binding," there is a potential for reduced job creation and increased job loss among low-skilled workers. Numerous global examples indicate that higher minimum wages can diminish employment, especially for the least skilled employees. The expected employment effects of minimum wages are contingent upon the structure of labor demand. As explained above, in theory, while competitive labor markets can potentially yield adverse employment outcomes among low-skilled workers, this is not always the case in monopsonistic situations, where a surge in labor demand might also arise depending on the minimum wage level. These theoretical employment variations (on the extensive margin) are usually observed over the long term. In the short term, other adjustment mechanisms could delay changes in worker behavior (e.g., adjustments on the intensive margin, shifts in working hours (Stewart and Swaffield, 2008), firm profitability (Mirko et al., 2011), transfer of higher labor costs into final prices (Lemos, 2004) or incomplete non-compliance (Metcalf, 2008). The comprehensive assessment of overall employment effects is an empirical question specific to the country under study.
- **Distributional Effects:** Due to the disemployment effects, the minimum wage is not a "free lunch" and creates winners and losers. Rising minimum wages could generate distributional impacts, leading to increased earnings for some employed workers while triggering job losses for others, especially among younger and older low-skilled individuals. Who is most susceptible to the impacts of minimum wage hikes? Are the aggregate gains outweighing the losses? Balancing employment reductions against wage increases raises the broader question of how the minimum wage influences inequality. Suppose the beneficiaries of a minimum wage increase, predominantly from low-income families, experience substantial gains, and the losses are concentrated among higher-income workers or other groups that policy makers are open to redistributing income from. In that case, the adverse effects on the losers may be considered acceptable (Neumark, 2018).

The paper is organized as follows. Section II assesses the adequacy of the minimum wage in Romania and checks whether the statutory minimum wage is high enough so the working poor¹¹ can afford a basic consumption basket for their families. Section III describes the data and identification of minimum wage workers in the administrative tax database and presents estimates of the share of minimum wage earners among employees and their profiles. Section IV simulates the ex-ante impact of the hypothetical minimum wage increase on the labor market. Lastly, Section V concludes.

II. Assessing the Gap between the Statutory Minimum Wage and Living Wages in Romania

Setting adequate wages is crucial for ensuring a decent living standard for workers and their families, while also maintaining the viability of the firms that employ them. To be meaningful, minimum wages have to be set at a level that covers the needs of workers and their families. However, wage setting should balance both the needs of workers and economic considerations taken into account for the potential impact of the labor market and other economic indicators. If wages are set solely based on workers and families' needs, they may exceed what many businesses can afford, potentially leading to job losses, increased informality and non-compliance (especially in countries with high informality levels), reduced investment, and diminished export competitiveness. On the other hand, focusing only on economic factors like export competitiveness could result in wages that are too low, leading to high levels of working poverty, stagnant wages, weak aggregate demand and limited ability to protect workers and their families against low pay or poverty (ILO 2016, ILO 2024). Levels should also be adjusted with inflation to maintain real purchasing power. Yearly adjustments allow for predictability and smooth adjustments, but more frequent adjustments may be required in countries with hyperinflation or accelerating inflation in specific periods. Some countries (e.g., France) allow automatic adjustments when inflation accelerates above a specific threshold. If properly designed and implemented, a minimum wage policy can reduce poverty via the labor income channel as part of a comprehensive poverty-targeting strategy, especially considering that previous evidence shows that labor income in Romania is a significant driver of poverty in the country (World Bank, 2023).

New EU legislation adopted in 2022 establishes that national minimum wages must allow workers to lead a decent life, taking into account the cost of living. According to the directive, minimum wages are deemed adequate if they are fair in relation to the wage distribution in the relevant Member State and if they provide a decent standard of living for workers based on a full-time employment relationship, tailored to each Member State's socioeconomic conditions. To assess adequacy, a basket of goods and services reflecting real prices to assess a decent living standard is instrumental, among other instruments. Other economic factors, like

¹¹ Workers living in households where equivalized yearly disposable income is below 60% of the national household median income level.

purchasing power, long-term productivity, and the wage distribution and wage growth should also be considered.

Setting and adjusting the level is the most challenging part of minimum wage fixing. While minimum wage fixing is always the result of a political process, including the full consultation of social partners, setting the minimum wage should be evidence-based. Typically, minimum income adequacy is based on thresholds determined in two ways: in relative terms as a percentage of average income or in absolute terms through a living wage, corresponding to a minimum standard of living. There was a shift in policy debate in the EU from measuring the minimum level of resources with a goods basket to focusing on the relative standard of living (Atkinson, 2002). Still, recent evidence has aimed to use absolute measures to assess adequacy (Fabo, 2017). When setting wages, it's important to consider not only the adequacy of the minimum wage but also other macroeconomic factors such as economic growth, labor market indicators like employment and unemployment rates, and wage, productivity and labor costs in neighboring or competing countries. Wage setting mechanisms should also promote gender equality, by contributing to reducing gender wage gaps at the bottom of the distribution. For public-sector wages, budget constraints and the size of the public-sector wage bill should also be considered (ILO, 2024).

An important factor in setting wages is assessing the adequacy of the minimum wage. A useful measure of adequacy that reflects workers' needs and living costs is the 'living wage', which needs to be properly defined and accurately measured and operationalized. While there is no global definition of living wages, the ILO has proposed a formal definition, “living wages” are broadly defined as “A wage level, payable in exchange for the work performed during normal hours of work, that is sufficient to afford a decent standard of living for workers and their families” (ILO, 2024). The definition does not indicate how it should be operationalized, or which parameters should be taken into account into this estimate. Living wage initiatives are growing, driven by international and national efforts, with varied concepts. Internationally, multinational enterprises like those in the garment and agri-food sectors, along with platforms such as the Fair Labor Association and the United Nations Global Compact, are promoting living wages through commitments, tools, and certifications like Fairtrade International and Rainforest Alliance. Nationally, movements in countries like the United Kingdom and New Zealand have led to voluntary employer accreditation schemes, such as the Living Wage Foundation, and advocacy by research institutes like Mexico's Centro de Estudios Espinosa Yglesias. Some countries, like Argentina and Vietnam, have also begun incorporating living wage considerations into their minimum wage policies. These efforts aim to balance workers' needs with economic sustainability.

Living wage estimation has gained renewed attention globally, with efforts to establish standardized definitions and measurement methodologies. A comprehensive review of existing approaches highlights the need for a standardized methodology (Anker, 2005; Anker 2011; ILO 2024). In response, several common

concepts and approaches has been proposed in the literature to estimate living wages in several countries, including those in the EU, either using relative or absolute thresholds (Martin, 2014; Anker, 2016; Parker et al, 2016; Schulten & Müller, 2019, ILO, 2024). While the concept of a living wage is widely accepted, challenges remain in its practical application and economic impact assessment, necessitating further research and refinement of estimation methods.

In many countries, the real living wage, or living wage, is not based on a relative measure, as a fixed percentage of a country's mean income, but on an absolute measure of actual living costs. The advantage of an absolute measure is that it clearly indicates whether or not a family's income is sufficient to sustain a minimal level of subsistence. Absolute estimates of workers' needs are necessary. To calculate the living wage using an absolute approach, one generally defines a basic basket of consumption goods and estimates the cost of this basket. In most countries, poverty is measured using consumption, which corresponds to the poverty line and includes the sum of food and non-food components. The food component is estimated using the cost of basic needs method. It represents the cost of a calorie intake of 2,100 kilocalories per person per day, while the non-food component includes the cost of other essentials for clothing, shelter, etc. In some countries, research polls and surveys can inform the exact definition of the basket. For example, the Living Wage Foundation in the UK uses a public consultation method called Minimum Income Standard to inform their living wage.¹²

The minimum income level of a Romanian family should be compared to the amount of income needed to buy a basket of goods and services that a household needs to enjoy a minimum standard of living. The benchmark income for the comparisons is generally created by establishing a basket or basket of minimum goods and services that are costed at current price levels, usually called the minimum consumption basket. The amount of the minimum basket may vary from the minimum food basket necessary for survival to "comprehensive" baskets, which, in addition to food, include the cost of clothing, shelter, education, and health as minimum preconditions for a life with dignity. Following an absolute concept of the poverty line related to the cost of a minimum basket is helpful to determine an adequate level of social benefits or minimum wages even though a relative concept is used in national statistics, given that it is tied to a minimum cost of living rather than a concept of relative position in the income distribution.

The simple approximation to the net monthly living wage¹³ is as follows:

$$MLV = \frac{CB_{pc} * HH \text{ size}}{FT}$$

¹² Living Wage Foundation (2021). The calculation. Link: <https://www.livingwage.org.uk/calculation>

¹³ This can be also calculated using adult equivalent scales.

Where:

MLV: estimate net monthly living wage

CBpc: estimate minimum monthly consumption basket per capita (food +non-food component)¹⁴

HH Size: Estimate average household size

FT: Estimate the average number of full-time workers in the household

This approximation needs to be extended to consider non-labor income sources and part-time vs full-time work. When extending this approach to include non-labor income sources and accounting for work intensity (the average amount of full-time vs. part-time employed household members), the approximation becomes:

$$MLV_a = \alpha \left(\frac{CB_{pc} * HH \text{ size}}{FTE} \right)$$

where

MLVa= estimate net monthly living wage (adjusted)

α = estimate labor income (as a share of overall household income), and

FTE = number of full-time equivalent workers. An FTE of 1.0 is equivalent to a full-time worker, while an FTE of 0.5 signals half of a full-time worker (or a part-time worker).

A target group must be chosen since the monthly living wage estimate varies significantly for households with different household compositions and across the income distribution. The reference household used for our estimates is a “relative” poor household, defined as a household with disposable income lower than 60% of median household incomes. This assumes that the policy objective is to provide a minimum income so the “relative poor household” can afford a minimum consumption basket.

Since there is no official measurement of the representative food basket as a relative poverty line is used in the EU, we use a Romanian food basket recently estimated by the EC under the European Reference budget network. In 2015, the Romanian basket was estimated under the European Reference budget network.¹⁵ The Romanian food basket indicates the monthly budget needed for an adequate food intake

¹⁴ This is equal to the poverty line estimate in countries measuring poverty using consumption, rather than income.

¹⁵ Reference budgets have been developed across the EU by *the Herman Deleeck Centre for Social Policy, University of Antwerp and DG Employment, Social Affairs and Inclusion*, with the purpose of assessing income support – in particular minimum income schemes – in the EU. <https://ec.europa.eu/social/main.jsp?catId=1092&intPageId=2312&langId=en>. Further methodological details are available in Pop and Rat (2016) and Goedeme, Storms, and Bosch, (2015).

by three reference households (consisting of children and people of working age, in good health, without disabilities, and living in Bucharest¹⁶). The basket includes a food budget and kitchen equipment required to prepare, serve, consume, and preserve this food. Furthermore, it considers the necessary budget for physical activity and other food functions, such as its social function. The food basket has been developed per nutritionist recommendations and national dietary guidelines, considering the cultural specificities of Romanian eating habits. The feasibility and acceptability of the basket have been verified through focus group discussions involving citizens with different socio-economic backgrounds. Estimates show that in 2015, the monthly budget required for a healthy diet in Romania was EUR 128 for a single person and EUR 499 for a family of two adults and two children. If the budget needed for physical activity and other food functions (eating out, holidays, etc.) is also considered, the total monthly food budget amounted to EUR 156 for a single person and EUR 578 for a family of two adults and two children.¹⁷ When converted to 2020 Euros using official food CPIs, these monthly food expenditures correspond to 181 EUR for a single person (able or unable to work) and EUR 670 for a family of two adults and two children. These estimates suggest that the average monthly per capita food basket cost in 2020 euros is approximately 126 EUR and 180 EUR when considering non-food components/other functions. This is equivalent to 4.1 EUR per capita per day and 5.9 EUR (considering other functions). Table 1 presents these estimates.

Table 1. Estimates of Food Basket based on European Commission (2015), 2015 and 2020 euros.

Panel a. By Household composition (2015 euros)

	In 2015 Euros
Single Person (Average Monthly, Euros)	128
Single Parent and One child (Average Monthly, Euros)	254
Single parent and Two Children (Average Monthly, Euros)	380
Family of two adults and one child (Average Monthly, Euros)	382
Family of two adults and two children (Average Monthly, Euros)	499
Single Person (Average Monthly, Euros)- Including physical activity and other functions	156
Family of two adults and two children (Average Monthly, Euros)- Including physical activity and other functions	578

Panel b. By Household composition (2020 Euros)

¹⁶ Notice the food basket does not take into account spatial differences in living standards since it was estimated for those living in Bucharest.

¹⁷ Source: EC, Directorate-General for Employment, Social Affairs and Inclusion, “The Romanian Food Basket”, 2015. <https://op.europa.eu/en/publication-detail/-/publication/7cd42604-b82f-11e5-8d3c-01aa75ed71a1/language-en>

	in 2020 Euros
Single Person (Average Monthly, Euros)	148.2
Single Parent and One child (Average Monthly, Euros)	294.0
Single parent and Two Children (Average Monthly, Euros)	439.9
Family of two adults and one child (Average Monthly, Euros)	442.2
Family of two adults and two children (Average Monthly, Euros)	577.7
Single Person (Average Monthly, Euros)- Including physical activity and other functions	180.6
Family of two adults and two children (Average Monthly, Euros)- Including physical activity and other functions	669.1

Panel c. Average Monthly Cost per Capita, 2020 Euros

Currency	Food Basket	Food Basket (with non-food components / other functions)
Euros	126.0	180.6
RON	610	874

Source: Panel a. European Commission (2015). Panel b and c. Own estimates based on European Commission (2015).

The second step involves defining the household type of the target interest group and obtaining EU-SILC survey estimates necessary to estimate living wages. One needs to define what a typical Romanian household living in relative poverty with positive labor income¹⁸ looks like. Based on the 2021 EU-SILC, a household living below the relative poverty line has, on average, 2.51 household members. This allows us to get to the cost of the food basket for a family of this average size or how much is needed to afford a food basket for a typical poor household. Then, we calculate the amount of this household income that needs to come from labor income, given that about 82 percent of overall household income comes from labor income in these families (our estimate based on EU-SILC data). To get the wage per worker estimate, we estimate the number of full-time equivalent workers in these households. These families have, on average, one member working full-time and 0.13 members working part-time (our estimate is based on EU-SILC data) and convert

¹⁸ These statistics are for households living below the relative poverty line whose labor income is strictly positive, and therefore, are affected by changes in wages via their labor income channel. These exclude households with solo pensioners, or other households that receive other sources of income but not earnings. 67% of poor single-person households are households with pensioners, and 42% of poor households are single-person households.

the part-time work into full-time equivalents.¹⁹ In a typical working-age household with two adults, one adult works full-time, and the second adult works part-time for 13% of the full-time equivalent.²⁰

Table 2. Estimates of Living wages, 2020 Euros and RON

	Poverty Line per Household (Euros), monthly	Share of Labor Income	Minimum Labor Income, Euros, Monthly	Minimum Non-Labor Income, Euros, Monthly	Average Number of Household Members that work full time	Average Number of Household Members that work part-time	Required Monthly Minimum Wage (Euros)	Required Monthly Minimum Wage (RON)
Food Basket	316.3	0.82	260.9	55.4	1	0.13	245	1,185
Food Basket (with adjustments)	453.3	0.82	373.9	79.4	1	0.13	351	1,699

Source: Own estimates based on European Commission (2015) and 2021 EU-SILC.

As a third step, we estimate the living wage and compare it with the net statutory minimum wage. The living wage is defined as the monthly wage needed to support an average-sized poor family²¹ out of extreme poverty (defined by the cost of the food basket), considering the labor income shares and the share of part-time/full-time work in an average poor household. Our estimates show that in Romania, this level is approximately 245 EUR (1,185 RON) or 351 EUR (1,699 RON) when considering the non-food component in 2020 currency (Table 2).

This indicates that the net monthly statutory minimum wage (276 EUR) is higher than the living wage necessary to cover food (245 EUR) but not enough to cover the non-food component (351 EUR), which has several economic implications. First, an adequate minimum wage that covers the cost of the basic consumption basket (including food and non-food components) can potentially reduce the need for workers to rely heavily on social assistance programs, as they can meet their basic needs through their earned wages. Second, in the context of working-age households, promoting greater labor market activity is critical. Encouraging more individuals to participate in gainful employment can increase income levels, providing them with a more robust financial foundation to overcome poverty. Not surprisingly, the typical poor household has a labor income share of 15% (including pensioners and other households with 0% labor income share). In

¹⁹ Work intensity in poor households is low. On average, the members of poor households who are of working age (18-59 years old, students excluded) worked for only 54% of the year. Eurostat defines work intensity as the ratio of the total number of months that working-age household members have worked during the income reference year and the total number of months the same household members theoretically could have worked in the same period.

²⁰ The labor activity rate in Romania is low compared to the average EU level. According to the Eurostat for the age group 20 – 64, the labor activity rate is 77% for men and only 59% for women. Only in Italy, and Greece female labor activity rate is lower than in Romania.

²¹ Here, we assume the family of two adults and one child.

comparison, the typical poor household with at least one working member has a labor income share that is substantially higher (82%). Third, a minimum wage surpassing the living wage (including the non-food component) could reduce income inequality by lifting the income of the lowest-paid workers closer to the poverty threshold. This may lead to a more equitable income distribution. Fourth, there might also be concerns about potential job losses or reduced hours if employers find it difficult to afford the higher wage, especially if not aligned with workers' productivity. Striking the right balance between workers' income and job market stability is crucial. Therefore, the impact of an adequate minimum wage on labor market dynamics, such as potential job creation or loss, should be evaluated. Moreover, an adequate minimum wage, enough to cover the cost of the basic consumption basket, should ideally be adjusted periodically to account for inflation and changes in the cost of living, maintaining its purchasing power over time.

There are alternative estimates of consumption baskets for Romania; we did not use these estimates as a reference to the minimum consumption basket due to methodological caveats. Friedrich Ebert Stiftung (2022) publishes estimates of the minimum consumption basket needed for a decent life. In 2022, the estimated monthly value of the basket for a family composed of two adults and one child was 7,112 RON (1,260 in 2020 euros). Using this as a reference for our estimation procedure (using the same labor income share and labor supply parameters used above), the corresponding minimum wage would equal approximately 3,897 RON (805 in 2020 euros) net and approx. 6,687 RON (1,382 in 2020 euros) gross. This value is significantly higher than the average gross salary (approx. 6,500 RON gross in 2022). In addition to this, there are other methodological caveats (see Box 1 for details). Therefore, our research did not use this basket as a reference basket.

Box 1. Friedrich Ebert Stiftung Foundation (FES) Minimum Consumption Basket

The Romanian law regarding the indexing of the minimum wage based on the minimum monthly basket for a decent living relies on the research conducted by the Friedrich Ebert Stiftung Foundation (FES) – The Minimum Consumption Basket for a Decent Living for the Population of Romania (Guga et al., 2018). This research defines expense categories and the necessary quantities of goods and services for various types of families.

The analysis on which the value of the minimum consumption basket is established presents a series of limitations:

- a) **The methodology for calculating the minimum consumption basket for a decent living can generate biased estimates and potentially not representative.** To define the minimum consumption basket for a decent living, group interviews were conducted only in large cities (Braşov, Cluj, Constanţa, Iaşi, Timişoara), with an extremely limited sample: 8-12 employees from various sectors such as public administration, education, public services, trade, industry, IT, and the banking system participated in each group interview. Such a small number of observations collected from only five cities cannot generate relevant and statistically significant results for the entire country.
- b) **The value of the minimum consumption basket for a decent living seems to be overestimated since it exceeds the average net salary recorded in the vast majority of counties in the country.** The most recent update of the minimum consumption basket for a decent living (September 2023) indicates a value of 9978 RON for the reference family consisting of two adults and two children, equivalent to a net salary of 4,989 RON per

adult. As net wage data for 2023 are not yet available, a comparison using 2022 data indicates that the value of the minimum consumption basket exceeds the net salary at the economy level (3,801 RON) in 2022, except for Bucharest and Cluj, all other NUTS 3 regions had an average net wage lower than the value of the consumption basket.

- c) **Prices for the goods included in the basket were not provided by the National Institute of Statistics. Still, they were collected in the five cities from supermarkets and markets (for food, household, and personal hygiene products).** Prices collected from the five cities were also used for other products and services (housing, transportation, cultural activities, etc.).
- d) **The periodic update of the minimum consumption basket for a decent living does not involve indexing with the inflation rate, as it is a consumption basket with different weights compared to the standard basket considered by the National Institute of Statistics for calculating the Consumer Price Index.** Updating the minimum consumption basket is complex and needs to be more predictable. The **National Institute of Statistics** does not provide price indices by categories of goods with this granularity. Additionally, other methods of indexing are applied to specific expense categories.
- e) **Equivalence Scales.** For calculating the value of the consumption basket for families other than the reference one, higher equivalence scales than those used by the OECD and the European Commission were used, leading to a potential overestimation of the consumption basket.
- f) **Significant discrepancies exist between this estimate and the estimate presented in this paper.** The reason for the discrepancy is probably the fact that the “decent” wage is more than the “living” wage. The basket estimated by FES includes, for example, savings close to 10% of total income, vacation, and relatively high spending on clothing, education, and culture. While these estimates may measure a “decent life,” this basket offers a significantly higher standard of living than the usual living wage definition. In our case, the estimate of the corresponding minimum wage is also inflated by the fact that only one of two adults works full-time.

Our main finding, indicating a positive gap between the net statutory minimum wages and the living wage estimate, aligns with earlier assessments. Fabo and Belli (2017) show that the minimum wage adequately encompasses the living wage in the core EU countries when using data from the Wage Indicator Foundation (WI). However, this does not apply to Eastern European countries (Visegrad countries, Bulgaria, and Romania), where the minimum wage falls 10%–60% short of covering even the lower living wage threshold. Further assessments are needed to understand the drivers of this gap.

Finally, the consumption basket can also serve as a baseline to evaluate the adequacy of other social benefits and pensions in addition to the minimum wage. Beyond its primary role in determining the living costs to produce a benchmark for minimum wage settings, the consumption basket can also be a reference point for assessing the adequacy of various social benefits and pensions. By utilizing the consumption basket as a baseline, policymakers can evaluate the adequacy of other forms of social support in meeting the basic needs and expenses of individuals and households. This broader assessment helps ensure that the minimum wage, other social benefits, and pensions align with the living costs, offering a more comprehensive understanding of their adequacy and effectiveness in supporting individuals and families.

III. Identification and Profile of Minimum Wage Workers

Data and methodology to identify minimum wage workers

This research is based on administrative tax data from the Romanian Ministry of Finance. The monthly microeconomic datasets encompass all employees who paid income tax based on their labor income during 2020-2021, comprising the full formal-sector universe. The income tax is deducted monthly from employee salaries by employers. The dataset comprises all salaried employees, excluding self-employed individuals. Our unit of observation is the taxpayer, but details about the employer (firm) are also available. The monthly count of taxpayers ranges from 6.9 million to 7.4 million. The dataset provides comprehensive information from the entire tax form, allowing observation of various characteristics of both employees and firms.

There are several advantages of using tax administrative data instead of household survey data for labor market analysis. The mandatory requirement to participate in administrative data programs is a notable advantage compared to voluntary survey participation. This legal obligation helps mitigate challenges related to non-response, as identified by UNECE (2011) and minimizes concerns about sample selection and non-random attrition. Unlike survey data, administrative records are less prone to selective underreporting, particularly among high-income individuals. Additionally, administrative records offer more detailed and frequent information than census data. While survey data may encounter problems like misreporting and misunderstanding of questions, leading to measurement errors, these issues can also impact administrative data.

However, since the administrative tax data does not include individuals engaged in informal sector employment, this poses a significant challenge in understanding the entirety of the labor market landscape. Not being able to identify informal sector workers from the administrative tax data creates a void in our understanding of a substantial and often economically significant workforce segment. The absence of their representation in the administrative tax data limits our ability to capture this sector's dynamics, challenges, and contributions. Information to identify informal sector workers is available in the EU SILC data; however, the small share of workers earning minimum wage in the household survey limits our analysis with the household survey data.

The administrative tax data set includes relevant income variables, including gross salary, net salary, social security contributions, taxation base, bonuses, vouchers, and COVID-19 incentives. Data on gross salaries is crucial for the identification of minimum-wage workers. Our data source also includes other employee characteristics such as region, age, number of days, and hours worked. However, we do not observe information on educational levels or occupations. We also observe the characteristics of the firms: sector of the economy, number of employees, total turnover, total salary fund, and profits. The construction sector is entitled to additional fiscal facilities; therefore, additional variables identify employees in the construction sector and

firms active in this sector. We observe 4-digit NACE codes identifying the branch of the economy. Unfortunately, our data does not directly identify public-sector workers. However, official statistics indicate that only a small proportion of public employees fall into the category of minimum-wage earners.

Nonetheless, employing the administrative tax datasets to examine employment and unemployment analysis encounters certain obstacles. Firstly, the data is primarily intended for administrative purposes, such as computing social security contributions and worker benefit eligibility, rather than designed for research purposes. Secondly, there is no registered unemployed in the data. It differs from the unemployment definition employed in administrative tax datasets, even if it exists. It diverges from the standard set by the International Labour Office (ILO), as it does not contain the entire universe of unemployed (only those registered), and tracking of the unemployed is limited to the period during which they receive benefits. In Romania, the unemployed do not pay labor income tax and thus are absent in our dataset. Therefore, our analysis focuses on formal employment stocks and flows rather than unemployment.

We exclude missing values from our analysis, as there is insufficient information to impute these values accurately. The gross salary and working time information is missing or equal to zero for some workers. We cannot use such observations in our analysis, as the reasons for the missing variables are unknown. If there is a systemic bias in missing variables (e.g., gross salary information is often missing for low-income earners), our results may also be biased. The share of taxpayers included in the sample (observations with non-missing information on working hours and gross wages) varies between 72% and 87%.

Our first task is to identify minimum wage workers in the tax administration data. We identify minimum wage earners based on the value of the gross wage. As discussed above, in January 2020, three different minimum wage levels existed in Romania. We can directly identify construction sector employees entitled to the highest minimum wage (3,000 RON in 2020) because they are also entitled to special fiscal facilities and thus identified in our data by a special variable. The biggest shortcoming of our dataset is the need for more information on the education level to identify those with higher education. Therefore, we cannot distinguish between taxpayers entitled to a general minimum wage (2,230 RON in 2020) and employees with higher education entitled to a higher minimum wage (2,350 RON in 2020).

We categorize individuals as minimum wage earners in the sample according to the following criteria:

- If they are employed in the construction sector and their earnings fall within the range of 95% to 105% of the established minimum wage for construction sector employees (3,000 RON).
- If they are not employed within the construction sector, their earnings fall within 95% of the general minimum wage (2,230 RON) to 105% of the minimum wage applicable to higher-education employees (2,350 RON). Using the 105% threshold aligns with standard practices in minimum wage literature and

is employed by Eurostat to identify minimum wage earners in the Structure of Earnings Survey. To account for individuals earning less than the minimum wage, we also incorporate a lower threshold, symmetrically set at 95%.

- For part-time workers, the minimum wage value adjusts proportionally based on the number of working hours they engage in.

We may overestimate the number of minimum wage earners because some taxpayers in the first range are entitled only to the basic minimum wage. Unfortunately, our data source does not provide information on the education level.

Results

Despite the challenges posed by the pandemic crisis, Romania's labor market exhibited a relatively resilient performance during the period spanning from 2020 to 2021. Despite the economic activity distortion caused by the COVID-19 crisis, the impact on the labor market was moderate, thanks to support measures adopted by authorities. Labor market adjustments were predominantly made through reduced working hours rather than personnel layoffs. Absences from the workplace were generally temporary amid the moderation of economic activity. In Romania, both direct (technical unemployment) and indirect (liquidity support measures, SME investments, tax deferrals) facilities from authorities limited adverse effects on the labor market, preventing a sharp increase in the unemployment rate. Technical unemployment support allowed job retention, providing employees with financial assistance comparable to that of other EU member states in terms of duration and amount. Notably, the unemployment rate steadily rose from 4.9% in 2019 to 6.1% in 2020, but a positive trajectory was evident in 2021, with unemployment receding to 5.6%. Consequently, with support measures, the workforce experienced a complete recovery in the last quarter of 2021 compared to the pre-crisis situation.

Signs of stability were also observable in the wage distribution. The mean gross wage demonstrated an upward trend, progressing from 4,458 RON in January 2020 to a noteworthy 5,295 RON by the end of December 2020 in nominal terms. Regarding the minimum wage policy, given the high uncertainty triggered by the COVID-19 pandemic and the concentration of layoffs among low-paid workers, the government opted to index the minimum wage by the average annual inflation rate registered over the last 12 months – the latest available data by the end of 2020 (3.1%). The main goal was to maintain the purchasing power of employees. However, due to upward inflationary pressures in 2021, in real terms, minimum wage earners experienced a decline of 2% (the CPI inflation rate reached 5.1% in 2021). The general minimum wage, while escalating from 2,230 RON to 2,300 RON, experienced no change in the minimum wage designated for employees with higher education and those employed within the construction sector. This alignment suggests a prudent attempt to

balance wage adjustments with economic realities, even amid the uncertainties brought about by the pandemic. By mitigating the rise in labor costs for already financially vulnerable firms, the decision aimed to pave the way for a more rapid economic recovery.

In summary, Romania's labor market demonstrated some resilience during the pandemic-triggered crisis, with unemployment rates recovering in 2021 after a moderate increase in 2020. The wage landscape exhibited positive movement, underscored by a gradual rise in the mean gross wage and measured adjustments in the minimum wage to align with prevailing economic conditions. These factors ultimately contributed to the maintenance of stability and progress within the labor market.

How high is the statutory minimum wage relative to the formal wage distribution? Analyzing the wage distribution in January 2020 suggests that the minimum wage's value aligns with the 25th percentile of the entire wage distribution. Table 3 illustrates Romania's gross monthly wage

distribution as of January 2020. Our analysis encompasses solely those observations that possess complete information concerning gross salary and working hours, constituting approximately 89% of the total observations. Notably, the value of the minimum wage for full-time workers (2,231 RON) is approximately aligned with the 25th percentile of the overall distribution. This means a large proportion of the population earns an income below the minimum wage designated for full-time workers. However, a considerable fraction of these individuals may be employed part-time, which could account for the divergence from the full-time minimum wage threshold. Another explanation is that, in specific sectors (e.g., manufacturing), receiving the minimum wage is conditioned by a specific level of productivity (a certain quantity produced per day).

Further analysis reveals spikes in the minimum wage in the wage distribution, which could indicate a binding minimum wage. To evaluate how the statutory minimum wage more effectively influences the wage distribution, we provide the histogram depicted in Figure 3. For clarity, we limit the distribution's representation to the 99th percentile. Evident spikes in the distribution occur precisely at the points corresponding to the minimum wage values.

However, the spikes can also be driven by wage underreporting. Gavaille and Zasova (2023) found evidence that tax evaders are overrepresented among minimum wage earners in Latvia. Robayo-Abril, Balaban

Table 3. Distribution of gross monthly salaries in Romania, January 2020.

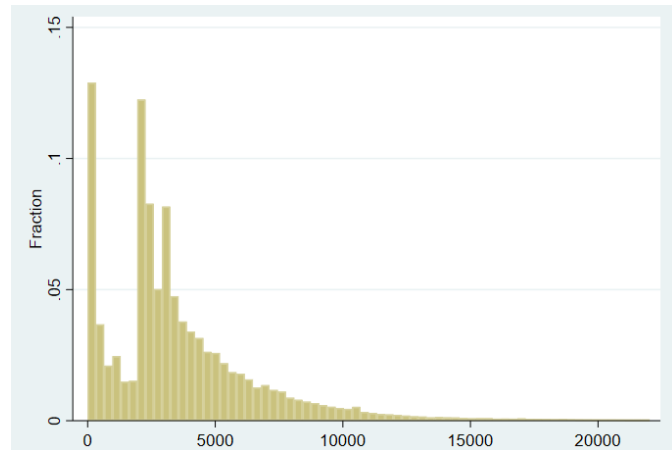
Statistics	Value (RON)
Mean	4,385
P1	129
P5	515
P10	1,054
P25	2,231
P50 (Median)	3,096
P75	5,202
P90	8,310
P95	10,928
P99	22,034

Source: Own estimates based on administrative tax data.

and Wronski (2024) found similar evidence for Romania. The share of minimum wage earners in Romania is estimated based on survey data (where people declare their true income), which is significantly lower than the

estimate based on administrative tax data. This indicates that some minimum wage earners in Romania may receive envelope payments and earn more than the minimum wage. Packard et al. (2012) and Hazans (2011) have highlighted that the impact of increasing the minimum wage on the informal economy is asymmetric among the EU member states. Thus, for the countries in the southern part of the continent and those that have more recently joined, raising the minimum wage leads to an increase in the proportion of workers without a formal employment contract or for those who receive

Figure 3. Gross wage distribution histogram, January 2020.



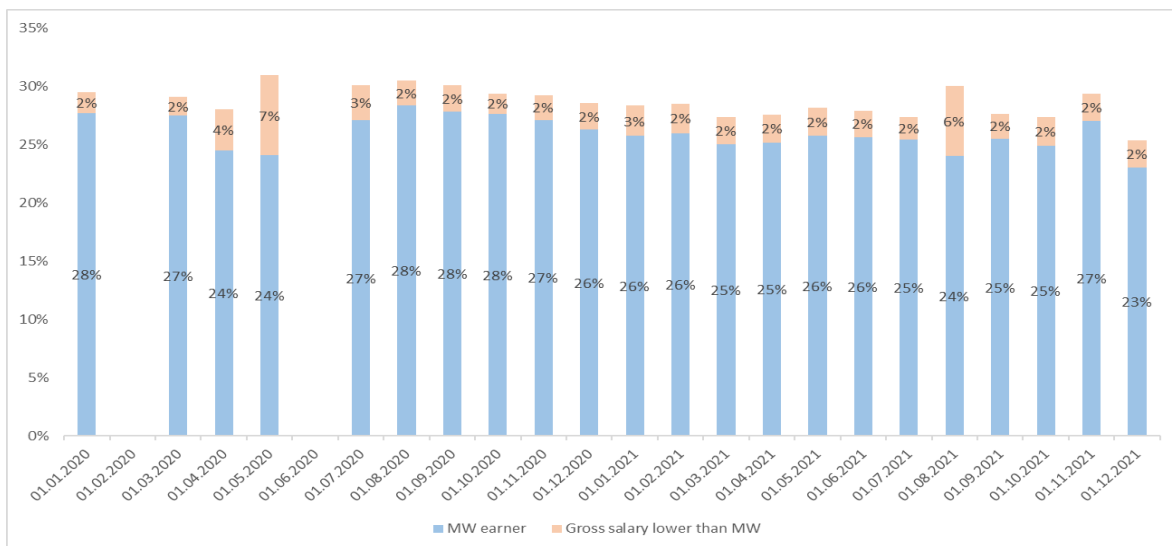
Source: Own estimates based on the administrative tax data

part of their salary in an envelope. On the other hand, for the older EU countries, the increase in the minimum wage has a somewhat negative impact on the informal economy, acting as an efficiency wage and attracting employees back to formal workplaces. Tonin (2013) discovers a robust positive cross-country correlation within the European Union, linking the magnitude of the peak centered on the minimum wage and a survey-derived assessment of the extent of wage underreporting rather than an indication of a binding minimum wage. The findings suggest that a significant portion of individuals earning the minimum wage consists of workers who receive off-the-record wages. This arrangement involves a collaboration between employers and employees to report only the minimum wage officially, thereby reducing tax obligations while evading the scrutiny of tax authorities. This scenario transforms the minimum wage policy into a mechanism for regulatory enforcement by fiscal administrations. The policy effectively compels non-compliant businesses to shift some off-the-record wages into official wages, aligning them with the updated minimum wage threshold.

The share of minimum wage earners has been consistently high and relatively stable over time, with values ranging from 24 to 28 percent over 2020-2021; moreover, 2% of employees receive wages below the minimum wage threshold. In January 2020, 28% of employees were found to be earning the minimum wage, a similar share to other parallel statistics presented by the Ministry of Labor. This proportion of minimum wage earners decreased to 24% by December 2021. Figure 4 shows the percentage of minimum wage earners over time. Additionally, it's worth noting that 2% of employees are earning less than the minimum wage. Using survey data, Goraus-Tańska & Lewandowski (2019) estimated minimum wage violations in Central and Eastern

Europe. Their findings show that from 2003 to 2012, approximately 3% of employees earned less than the minimum wage. Relative to other countries in Central and Eastern Europe, Romania's incidence of minimum wage violations was moderate (with Bulgaria exhibiting an incidence of less than 1%, while Lithuania's was around 7%). Interestingly, their estimation based on EU-SILC (European Union Statistics on Income and Living Conditions) closely aligns with our estimate derived from administrative tax data. This convergence might reflect failure to meet production targets in specific sectors, non-compliance, variations in wage reductions during different types of leave, and potential reporting inaccuracies. Notably, the proportion of employees earning less than the minimum wage experienced an increase during the initial wave of the pandemic (April, May 2020). This upward trend could result from artificial effects stemming from lockdown measures and government-supported economic programs.

Figure 4. The share of minimum wage earners: 2020 – 2021.



Source: Own estimates based on the administrative tax data.

A related study (Robayo-Abril, Balaban & Wronski, 2024) shows that off-the-record payments and instances of tax noncompliance influence the higher prevalence of minimum wage earners, evident in the administrative tax data. The study compares the proportion of individuals earning the minimum wage across different datasets: administrative tax data, EU-SILC data, and EU-SILC data augmented with imputed tax income. The findings indicate the increased occurrence of individuals earning the minimum wage, as observed in the administrative tax data, is influenced by unreported payments and instances of tax noncompliance.

Labor income inequality in Romania is notably pronounced, as exemplified by a Gini index of 0.42.²²

Within this framework, the lower half of the population owns only 18.9% of aggregate labor income, while the middle 40% has a share of 46.8%. Simultaneously, the top 10% of earners account for 25.56% of the overall income distribution. The highest 1% income earners also possess 8.7% of the total labor income.

Minimum wage regulations exert differing effects across distinct sectors of the labor market. Typically, a more significant proportion of individuals earning the minimum wage can be found among younger workers, small enterprises, and sectors characterized by lower skill levels. Evaluating the influence of the minimum wage on the labor market requires a broader perspective that extends beyond average effects, including the repercussions experienced by various market segments. Therefore, analyzing the demographic and employment characteristics of minimum wage earners in Romania as of January 2020 is important to identify which groups could benefit directly from raising the statutory minimum wage.

In January 2020, approximately 28% of the employees earned the minimum wage, while 2% received incomes lower than the minimum wage threshold. Interestingly, the prevalence of minimum wage earners was notably higher among part-time workers, with around 34.7% falling into this category, compared to 25.93% among full-time employees.

Furthermore, more women (30.0%) earned the minimum wage than men (24.3%). This outcome is influenced, at least in part, by the distinct distribution of male and female employees across various sectors of the economy. For instance, in the case of part-time employees, who more frequently earn the minimum wage exclusively, the proportion of women slightly surpasses that of men, with figures of 20.4% for women and 18.4% for men.

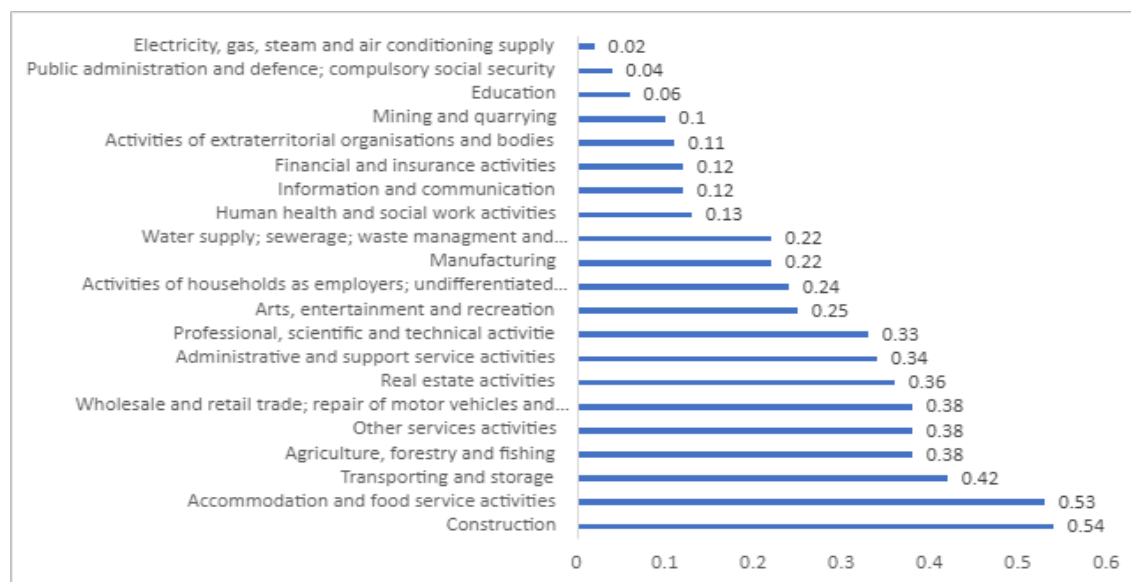
Minimum wage earners are overrepresented in the construction sector. Individuals who are taxpayers within the construction sector earn a higher minimum wage (3,000 RON). Consequently, the proportion of individuals earning the minimum wage within the construction sector exceeds that in other sectors of the economy by more than two-fold. Specifically, a substantial 54.6% of employees eligible for fiscal benefits within the construction industry fall into the category of minimum wage earners. In contrast, among employees not employed in the construction sector, the percentage of minimum wage earners stands at 25.1%. The generous tax incentives granted to the construction sector starting in 2019 could have contributed to reducing the informal economy. Still, ex-post analyses are needed to confirm this hypothesis, given the sector's high volatility and the growth recorded from 2019, which follows three years of decline.

²² This is based on total earnings from labor before tax deductions (gross labor income), based on individual tax records.

The prevalence of individuals earning the minimum wage exhibits significant variation across different sectors of the economy. As mentioned above, this proportion reaches its peak within the construction sector, wherein workers are entitled to a distinct, elevated statutory minimum wage. Notably, 54% of employees in the construction sector find themselves in the minimum wage category. Similarly, the percentage of minimum wage earners surpasses 50% within the realms of accommodation and food service activities. Moreover, in four additional sectors, the proportion of minimum wage earners hovers around 40%: wholesale and retail trade, other service activities, agriculture, forestry, and fishing, as well as transportation and storage. The distribution of minimum wage earners across various economic sectors (according to NACE 2-digit codes) is presented in Figure 5.

The lowest proportion of employees currently earning the minimum wage is in sectors characterized by strong unionization and the dominance of large enterprises²³, as well as in public administration. Only 2% of employees fall into the minimum wage category within the electricity, gas, and steam sectors. Similarly, in public administration, defense, and compulsory social security, the percentage of minimum wage earners stands at 4%. In Romania's education sector, where the majority is publicly oriented, 6% of employees receive the minimum wage. Furthermore, 10% of employees are minimum wage earners in mining and quarrying.

Figure 5. The share of minimum wage earners across the branches of the economy (NACE 2-digit codes).



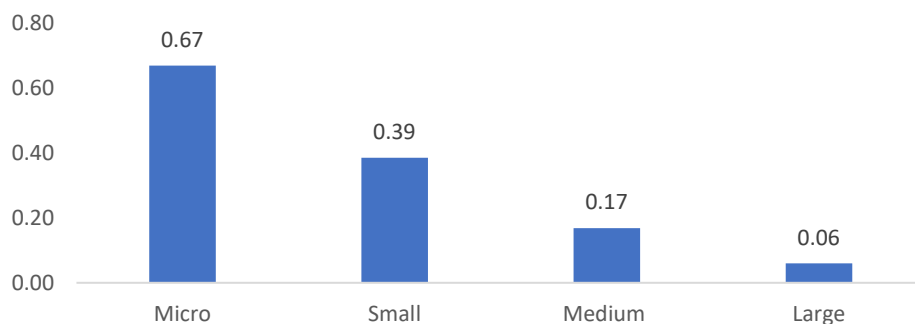
Source: Own estimates based on administrative tax data (January 2020).

²³ We define the size of the enterprise using thresholds sets by the European Commission as follows: micro enterprises employ fewer than 10 persons, small enterprises employ 10 to 49 persons, and medium-sized enterprises employ 50 – 249 persons. Large enterprises employ 250 and more employees.

The size of enterprises plays a pivotal role in determining whether employees earn the minimum wage or higher compensation. Typically, the average wage increases with the firm's size (as discussed in the literature by Oi & Idson, 1999). This trend has also been confirmed in other countries of the region, such as Hungary and Poland (Harasztosi & Lindner, 2019; Chrostek et al., 2022). This pattern is indeed evident in our dataset. In January 2020, the mean gross salary was as follows: 2,311 RON in micro enterprises (nearly aligned with the minimum wage), 3,521 RON in small enterprises, 4,812 RON in medium-sized enterprises, and 5,988 RON in large enterprises.

As the size of an enterprise increases, the proportion of its employees earning the minimum wage diminishes. Specifically, within microenterprises (employing fewer than ten individuals), a substantial 67% of taxpayers fall into the minimum wage category. In small enterprises (with 10 to 49 employees), this percentage is reduced to 39% of minimum wage earners. In medium-sized enterprises (employing 50 to 249 individuals), the figure drops to 17% of employees earning the minimum wage. Finally, in large enterprises (comprising over 250 employees), only 6% are in the minimum wage bracket. Figure 6 shows the share of minimum wage earners across different enterprise sizes.

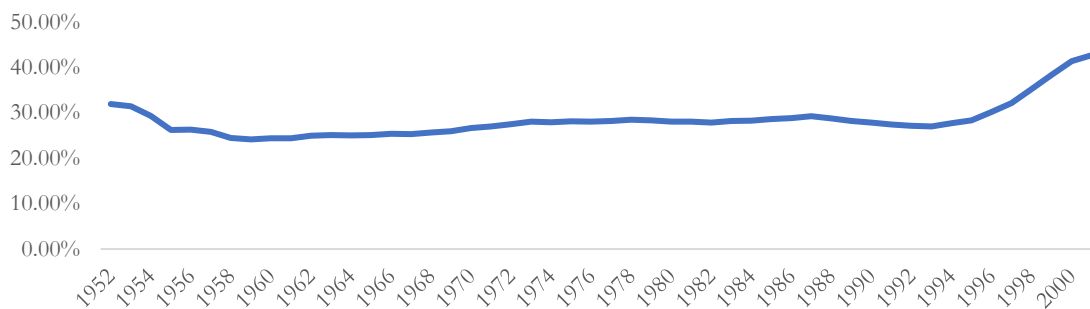
Figure 6. Share of minimum wage earners (as share of Total Earners) by enterprise size.



Source: Own estimates based on administrative tax data. The definitions are as follows: micro enterprises employ fewer than 10 persons, small enterprises employ 10 to 49 persons, and medium-sized enterprises employ 50 – 249 persons. Large enterprises employ 250 and more employees.

Among employees, the highest percentage of minimum wage earners is among the oldest and youngest age groups. A prevalent misconception suggests that individuals earning extremely low wages, those who would experience an increase if the minimum wage were raised, predominantly consist of young workers. Our results show that older workers are also overrepresented in Romania. The disparity in the proportion of minimum wage earners among the youngest employees is particularly interesting. Notably, the percentage of minimum wage earners escalates from 27% among taxpayers born in 1994 (26 years old in 2020) to 43% among those born in 2001 (19 years old in 2020). Figure 7 shows the share of minimum wage earners across birth cohorts.

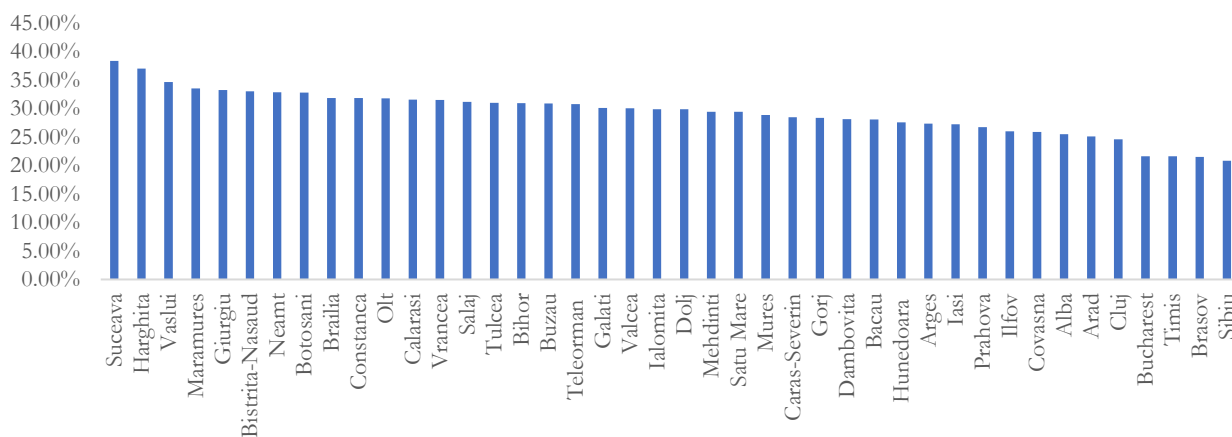
Figure 7. The share of minimum wage earners across birth cohorts



Source: *Own estimates based on administrative tax data*

The distribution of minimum-wage individuals showcases significant disparity throughout the country. In the region exhibiting the highest prevalence of minimum-wage earners (Suceava county—38%), this percentage is nearly twice as high as in the region with the lowest frequency of minimum-wage earners (Sibiu—21%). Figure 8 shows the proportion of minimum-wage earners at the county level (NUTS 3 regions).

Figure 8. Share of minimum wage earners by NUTS 3 regions



Source: *Own estimates based on administrative tax data (January 2020).*

IV. Ex-ante Evaluation of Policy Reform

In this section, we evaluate the potential ex-ante distributional impacts of the alternative minimum wage policy on the labor market outcomes, relying on micro-simulation methodologies and administrative tax data. More precisely, we employ microsimulation techniques to gauge the proportion of individuals who may lose their jobs and the wage increments experienced by those who remain employed. In particular, we simulate the impact of the increase in the minimum wage on wages, employment losses, and the

distributional consequences of the increase (the impact on income inequality and the identification of the winners and losers). We aim to identify effects on the wage distribution if only the minimum wage policy changes, keeping everything else constant; therefore, this exercise aims to identify the potential impacts of the policy, and it is different from a forecasting exercise where the objective is to replicate the actual distributions, given many changes in the economic environment. This part of our research is based on the administrative tax data and the method previously used by Robayo-Abril et al. (2020) to provide an ex-ante evaluation of the impact of the several minimum wage increase scenarios on Romania's labor market outcomes. This approach enables us to estimate the broader economy-wide effects and the more granular micro-level consequences of different policy options.

Methodology and Assumptions

We rely exclusively on administrative tax data for the microsimulation. The administrative tax data comprises a series of 12 monthly datasets. Considering that income evolves throughout the year, we work with one of the year's final months. Hence, we have opted to use data from November 2021. Notably, we exclude December 2021 due to the potential seasonality caused by annual bonuses during that month. Some additional robustness checks were performed using EU-SILC and matched administrative tax data, as presented later in this section.

As mentioned above, the administrative tax data does not provide direct information on the skill level of the taxpayers. Therefore, we use the employer's NACE sectoral code as a proxy for skill level. We assume that people working in the following sectors are skilled workers: information and communication; financial and insurance; professional, scientific, and technical activities; public administration and defense, education; human health and social work activities; arts, entertainment and recreation, activities of extraterritorial organizations and bodies. The remaining taxpayers are classified as unskilled. The share of skilled workers in our sample is 35.97%. In the EU-SILC 2021, where the information on skill level is provided, the share of skilled employees is 32.91%. Therefore, our proxy is close to the true distribution of skilled and unskilled workers in the Romanian labor force. However, the similarity on the aggregate level does not guarantee the similarity on the sector level. In EU-SILC data, we can identify high-skill workers in all sectors of the economy. Using administrative tax data, we can only use the sector as a proxy of skill level and thus assume that skilled workers do not work in some sectors.

In this study, we utilize labor demand elasticities based on international research to model the potential impact of changes in the minimum wage on employment and wages. We quantify the “disemployment” effect by examining the proportion of workers earning wages between the existing and proposed minimum wage who transition to a non-employment status with zero wages (referred to as “losers”).

Additionally, we analyze the group of full-time employees who remain employed and now earn the new minimum wage ("winners"). Part-time workers' data on the number of hours worked may not always be reliable. We assume that employees who earn less than the minimum wage are unaffected by the minimum wage increase. This assumption limits our data sample to 3,942,640 observations. Our focus is specifically on the lower end of the wage distribution, and we do not consider the potential impact on higher-wage workers due to measurement challenges arising from data limitations. For example, the minimum wage policy might increase employers' demand for high-skilled workers, substituting low-skilled labor. Furthermore, a minimum wage hike could exert upward pressure on wages linked or indexed to the minimum wage, particularly in the public sector. It is important to clarify that our analysis solely considers movement along the labor demand curve under various elasticities, excluding shifts in the demand curve.²⁴ Finally, extensive or intensive margin labor supply responses are not considered. These factors may have broader implications for employment, unemployment, and productivity.

Moreover, given the lack of reliable estimates of labor demand wage elasticity for Romania, we base our microsimulations on wage elasticities estimated for other countries. The literature suggests that the elasticity of labor demand, which reflects the responsiveness of firms' employment decisions to wage changes, is high in Eastern European countries. We assume short- and long-run elasticities using results for Eastern Europe from a meta-analysis by Lichter, Peichl, and Siegloch (2013) (Table 4). We assume different elasticities for the skill level (the elasticity of demand for skilled labor is lower than the elasticity of demand for unskilled labor) and short-run and long-run (the elasticity of demand is higher in the long-run). Consistent with economic theory, firms' labor demand responses are more limited in the short run than in the intermediate and long run. Moreover, firms' demand for low-skilled labor is generally more sensitive to wage rate adjustments than the demand for medium- or high-skilled workers, given the ease with which low-skilled tasks can be automated or outsourced to countries with lower income levels.

Table 4. Wage elasticity labor demand

	Short-term	Long-term
Skilled	-0.5	-0.8
Unskilled	-0.7	-1.0

Source: Lichter, Peichl and Siegloch (2013).

²⁴ Higher wages, constituting increased costs, may lead to adverse employment effects, particularly in the long term. Some of these effects might arise from businesses shutting down instead of laying off employees. However, comprehensively assessing the shift in the distribution of businesses proves challenging due to the absence of detailed firm-level data. A more in-depth examination at the firm level is necessary to properly consider and understand this phenomenon.

Tax compliance also can influence how firms react to minimum wage policies. When income underreporting is prevalent around the minimum wage levels, non-compliant firms may convert some of their undeclared wages into official wages to comply with the new minimum wage policy, thereby staying off the tax authorities' radar. This could be important for employment impacts, as unreported wages can serve as a cushion to mitigate the impact of minimum wage increases (Tonin, 2011). Empirical findings for Latvia (Gavoille & Zasova, 2023) indicate that in firms significantly affected by the minimum wage reform, the employment response can be three times greater for compliant firms compared to those evading taxes in the year following the minimum wage increase. While there are some estimates of tax compliance gap across sectors for Romania (Robayo-Abril, Balaban & Wronski), there are no estimates of employment elasticities for compliant and non-compliant firms. Therefore, we did not consider tax compliance status in our simulations.

The aggregate and distributional impacts may depend on whether dismissed workers transition to unemployment or inactivity vs. other formal or informal sector jobs. For example, if dismissed workers move to unemployment or inactivity, the earning losses are at the highest. If they move to other job opportunities with some higher or lower wages than the initial wage, the earning losses are of lower magnitude. As there is no panel or retrospective labor market information in household surveys or the tax administrative data to estimate these labor market transitions, we work with different scenarios that give us upper and lower-bound estimates of the losses.

Then, we use the following algorithm for the microsimulation:

- Estimate an expected wage increase (in percentage) for the employed population, age groups, and employees affected by the minimum wage increase.
- Use the different elasticity values and wage increases estimated in (1) to estimate the probability of job loss.
- To select "job losers" for each individual, we generate a random variable that takes the value of "1" with the probability computed in (1); in other words, we assign non-employment status randomly.
- Compute simulated earnings and unemployment.
- Repeat the procedure 200 times and compute average earnings and job losses across simulations.²⁵

We conduct policy simulations based on two distinct scenarios for the minimum wage increases:

²⁵ The number of replications was limited due to the size of data set. However, Pattengale et al. (2010) discuss the number of bootstrap replications needed and conclude that at least 100 may be necessary.

- **Policy Scenario 1 (Baseline)- Indexation to Inflation**

This scenario entails an increase in the net minimum wage of 13.8% to match the 2022 inflation rate. Consequently, the basic minimum wage rises from 2,300 RON to 2,617 RON, while the minimum wage for the construction sector advances from 3,000 RON to 3,414 RON per month. Under the policy, the minimum to median wage increases from 48% to 55%.²⁶

- **Policy Scenario 2: Convergence to Living Wage Estimate**

This scenario entails an increase in the net minimum wage of 25.4% to match the level of the consumption basket (including the non-food components). The monthly net statutory minimum wage has increased from 276 euros (as of 2020) to 351 euros to account for additional expenses beyond food. This is equivalent to an increase in gross terms reaching 2,826 RON. Therefore, this scenario entails a larger general minimum wage increase than scenario 1.

Simulation Results

We are interested in analyzing the potential impacts of different minimum wage policies on three key aspects: (1) average wages and net labor income gains, (2) employment losses (overall and disaggregated by population subgroups), and (3) measures of labor income inequality. We also characterize the workers most likely to be affected by these policies (winners and losers). The group most likely to be directly affected by the policy are those workers earning between the old and the new minimum wage.

Aggregate and Distributional Impacts

Scenario 1 (Baseline): Indexation to Inflation

Linking the statutory minimum wage to inflation is anticipated to result in moderate employment losses within the group of potentially affected workers, especially in the long term. The impact on the overall employee population is expected to be relatively small, with the youth experiencing larger adverse effects. The simulated impacts of minimum wage adjustment linked to inflation on labor market outcomes are presented in Table 5. About 13.1% of full-time formal employees earn between the old and the new minimum wage, representing the group more likely to be affected by the policy. Among this group, the disemployment effects could be significant. Given the assumed elasticities, close to 5.24% of employees might lose their jobs in the short run, while this share increases to 7.6% in the long run. When looking at the full universe of the formally employed population, the overall employment reduction is quite limited (about 0.7% in the short run and 1.0 % in the long run). In line with previous literature, the job losses are concentrated among the youngest (up to 29 years).

²⁶ Relative to a fixed (unchanged) median wage.

When examining earnings, there are winners and losers within the group of potentially affected employees. Those who remain employed and avoid dismissal are projected to experience significant earnings gains due to higher wages (8.5% in the short run and slightly higher in the long run). However, these gains are expected to be partially counteracted by the earnings decline resulting from the group that experiences job losses, leading to a moderate average net labor income increase in the short term (2.81%). In the long run, the net gains become negligible (0.26%), indicating that more substantial disemployment effects nearly fully offset the positive labor income increases.²⁷ Although the youth demographic is anticipated to benefit more from the increasing wages in the short term, the more considerable employment losses they face result in small net gains, particularly over the long term.

Table 5. Simulated Effect of Minimum Wage Increase on Labor Market Outcomes in Scenario 1 (Inflation-Linked Adjustment)

(13.1% of Full-Time Employees Affected by the Raise)

Group	Percent Increase in mean wage*, short-run (1)	Percent Increase in mean wage*, long-run (2)	Percent Increase in mean net labor income gains**, short-run (3)	Percent Increase in net labor income gains **, long-run (4)	Formal Employment Reduction***: Percentage of Employment Experiencing Job Loss in the Short Run (5)	Formal Employment Reduction***: Percentage of Employment Experiencing Job Loss in the Long Run (6)
All	0.84 (0.83; 0.84)	1.02 (1.01; 1.02)	0.15 (0.04; 0.24)	0.01 (-0.09; 0.12)	0.69 (0.68; 0.69)	0.99 (0.99; 1.00)
Age: up to 29	1.01 (1.01; 1.01)	1.21 (1.21; 1.21)	0.2 (0.02; 0.38)	0.02 (-0.16; 0.20)	0.81 (0.80; 0.81)	1.17 (1.16 ; 1.18)
Age: 30 – 39	0.86 (0.86, 0.86)	1.06 (1.06, 1.06)	0.14 (-0.05, 0.33)	0.02 (-0.18; 0.21)	0.71 (0.71; 0.72)	1.03 (1.03; 1.04)
Age: 40 – 49	0.83 (0.83, 0.83)	1.02 (1.02, 1.02)	0.14 (-0.05, 0.33)	0.01 (-0.18; 0.21)	0.69 (0.68; 0.69)	1 (0.99; 1.00)
Age: 50 – 59	0.74 (0.74, 0.75)	0.89 (0.89; 0.89)	0.14 (-0.08, 0.33)	0.01 (-0.20; 0.22)	0.6 (0.60; 0.61)	0.87 (0.87; 0.88)
Age: 60+	0.79 (0.79; 0.79)	0.96 (0.95; 0.96)	0.14 (-0.48; 0.76)	0.01 (-0.61; 0.63)	0.65 (0.64; 0.65)	0.93 (0.92; 0.94)
Only affected (wage < new MW)	8.50 (8.49– 8.50)	8.50 (8.49– 8.51)	2.81 (2.79 – 2.84)	0.26 (0.24; 0.29)	5.24 (5.23; 5.24)	7.59 (7.58; 7.60)

* Sample restricted to wage earners, assuming all dismissed workers move to unemployment or inactivity.

²⁷ This represents a lower bound, and net gains could be potentially higher, as it is assumed all dismissed workers moved to unemployment or inactivity.

*** Net labor income gains encompass both the losses incurred from job displacements and the earnings increases resulting from higher wages for those who retained their employment. Since it is assumed that all dismissed workers move to unemployment or inactivity, this represents a lower bound of the net gains (or an upper bound of the earning losses). If workers move to formal or informal employment and have a positive labor income, net labor gains could be higher.*

**** This column presents information on the share of full-time employees who become unemployed or inactive after the minimum wage increase. 95% confidence intervals are provided in parentheses.*

Source: Own simulations based on administrative tax data.

Overall, the simulation shows a relatively small reduction in labor income inequality due to the minimum wage increase, as it narrows the wage gap between low-wage and higher-wage workers, promoting a more equitable income distribution. Table 6 presents the impact of a minimum wage (MW) increase on various income inequality indicators. The baseline values represent the conditions before the MW increase, and subsequent columns show simulations after the increase. The impact of labor inequality depends on the final labor market status of the dismissed workers, which can affect their new earnings (or lack of earnings). When dismissed workers move to unemployment or inactivity (Table 6, column 3), we observe moderate declines in labor income inequality driven by a compression in the income distribution. The Gini coefficient, a measure of income inequality, decreases from 0.3560 to 0.3498. The Theil Index and Mean log deviation, which also gauge income inequality, follow a similar trend, indicating a reduction after the MW increase. The income shares for different population percentiles demonstrate minor shifts, with a slight increase in the bottom 50% income share and marginal decreases in the middle 40% and top 10% income shares. On the other hand, dismissed workers can also move to other employment opportunities in the formal or informal sector, becoming new wage earners. If their new wages are, on average, higher than the original, the Gini index can decline even more. When new wages are, on average, smaller, the Gini reduction can be reduced or muted. The extreme scenario occurs when the new wages are negligible or near zero, leading to a higher dispersion of the income distribution (Table 6, column 2). In this case, the reduction in labor income inequality is minimal. This represents the lower bound of inequality reduction.

Table 6. Simulated Distributional Effect of Minimum Wage Increase in Scenario 1 (Inflation-Linked Adjustment)

(13.1% of Full-Time Employees were Affected by the Raise)

Indicator	Baseline (Before MW increase) (1)	Simulation (After the MW increase, sample of wage earners and job losers* (2)	Simulation (After the MW increase, sample of wage earners only** (3)
Gini coefficient	0.3560	0.3557	0.3498
Theil Index	0.2504	0.2502	0.2443
Mean log deviation	0.2037	0.2034	0.1965

Bottom 50% income share	26.44%	26.45%	26.83%
Middle 40% income share	44.33%	44.32%	44.12%
Top 10% income share	29.23%	29.23%	29.06%

Source: Own simulations based on administrative tax data.

*Sample includes wage earners and those who move out of formal employment (assumed to move to other employment opportunities in the formal or informal sector with close to zero earnings). This represents the lower bound of inequality reduction.

**Sample restricted to wage earners, assuming all dismissed workers move to unemployment or inactivity.

Note: The Gini coefficient and Theil Index are measured over labor income and do not include non-labor income sources.

Scenario 2: Convergence to Living Wage Estimate

Aligning the statutory minimum wage with a living wage estimate is expected to result in a substantial short-term increase in average wages. However, it may also lead to notable job losses, particularly affecting low-wage workers and the younger demographic. Table 7 illustrates the results. The increase directly influences a significant portion of full-time employees, accounting for 16.41%. Among those directly affected, formal employment reduction is projected to be significant, around 7.72% in the short run and 11.22% in the long run, with the most significant job losses occurring among the youngest workers. Among all formal sector employees, the minimum wage hike is also expected to result in moderate job losses, affecting 1.44% of full-time employees in the short run and 2.09% in the long run.

While aligning the statutory minimum wage with a living wage estimate offers sizable short-term benefits for a specific group, it poses potential long-term adverse effects on employment, particularly for other demographics. When assessing earnings, there are winners and losers among potentially affected employees. Those retaining employment expect significant earnings gains due to higher wages (13.19%). However, these gains may be offset to some extent by the earnings decline in the group facing job losses, resulting in an average net labor income increase in the short term (4.45%). In the long run, the net gains diminish (0.49%), indicating positive but substantially reduced labor income increases due to more significant disemployment effects. The youth demographic continues to benefit more from the increased wages in the short term. Still, their net gains are minimal, especially over the long term, owing to significant job losses.

Table 7. Effect of Minimum Wage Increase on Labor Market Outcomes in Scenario 2: Convergence to Living Wage Estimate

(16.41% of Full-Time Employees Affected by the Raise)

Group	Percent Increase in mean wage*, short-run (1)*	Percent Increase in mean wage*, long-run (2)*	Percent Increase in mean net labor income gains**, short-run (3)	Percent Increase in net labor income gains **, long-run (4)	Formal Employment Reduction***: Percentage of Employment Experiencing Job Loss in the Short Run (5)	Formal Employment Reduction***: Percentage of Employment Experiencing Job Loss in the Long Run (6)
All	1.58	1.91	0.29	0.03	1.27	1.84
	(1.57;1.58)	(1.90;1.91)	(0.15;0.36)	(-0.07;0.14)	(1.26;1.27)	(1.84;1.84)
Age: up to 29	1.84	2.18	0.37	0.04	1.44	2.09
	(1.82;1.85)	(2.16;2.19)	(0.19;0.56)	(-0.14;0.22)	(1.43;1.45)	(2.08;2.10)
Age: 30 – 39	1.58	1.94	0.27	0.03	1.29	1.87
	(1.57;1.59)	(1.93;1.96)	(0.08;0.46)	(-0.16;0.23)	(1.28;1.29)	(1.86;1.88)
Age: 40 – 49	1.58	1.92	0.28	0.03	1.28	1.86
	(1.57;1.59)	(1.91;1.93)	(0.09;0.47)	(-0.16;0.22)	(1.27;1.28)	(1.85;1.87)
Age: 50 – 59	1.45	1.73	0.28	0.03	1.15	1.67
	(1.44;1.46)	(1.72;1.74)	(0.06;0.49)	(-0.19;0.24)	(1.15;1.16)	(1.66;1.68)
Age: 60+	1.55	1.87	0.29	0.03	1.24	1.80
	(1.53;1.57)	(1.85;1.90)	(-0.33;0.91)	(-0.59;0.65)	(1.23;1.25)	(1.79;1.92)
Only affected (wage<new MW)	13.19	13.19	4.45	0.49	7.72	11.22
	(13.19;13.19)	(13.19;13.19)	(4.44;4.45)	(0.49;0.50)	(7.72;7.73)	(11.21;11.22)

* Sample restricted to wage earners, assuming all dismissed workers move to unemployment or inactivity.

** Net labor income gains encompass both the losses incurred from job displacements and the earnings increases resulting from higher wages for those who retained their employment. Since it is assumed that all dismissed workers move to unemployment or inactivity, this represents a lower bound of the net gains (or an upper bound of the earning losses). If workers move to formal or informal employment and have a positive labor income, net labor gains could be higher.

*** This column presents information on the share of full-time employees who become unemployed or inactive after the minimum wage increase. 95% confidence intervals are provided in parentheses.

Source: Own simulations based on administrative tax data.

In this scenario, the increase in the minimum wage has a more substantial and positive impact on income inequality compared to Scenario 1. This is evident in the reductions of the Gini index and the increases in the bottom 50% income share, as detailed in Table 8. When all dismissed workers move to unemployment or inactivity, the Gini index is expected to decrease substantially, from 0.356 to 0.344, and the bottom 50% income share could increase by 0.7 percentage points. As in Scenario 1, the lower bound of inequality suggests that reduction in inequality can be muted if dismissed workers end up not leaving the labor force but finding new employment opportunities with negligible wages. In this case, the increase in compensation from rising wages among one group is almost fully offset by the decrease in income for those employees who lose their jobs.

Table 8. Distributional Effect of Minimum Wage Increase on Labor Market Outcomes in Scenario 2: Convergence to Living Wage Estimate

(16.41% of Full-Time Employees Affected by the Raise)

Indicator	Baseline Before MW increase	Simulation After the MW increase, sample of wage earners and job losers*	Simulation After the MW increase, sample of wage earners only**
Gini coefficient	0.3560	0.3554	0.3444
Theil Index	0.2504	0.2499	0.2391
Mean log deviation	0.2037	0.2030	0.1904
Bottom 50% income share	26.43%	26.46%	27.16%
Middle 40% income share	44.33%	44.32%	43.93%
Top 10% income share	29.23%	29.22%	28.90%

Source: Own simulations based on administrative tax data.

**Sample includes wage earners and those who move out of formal employment (assumed to move to other employment opportunities in the formal or informal sector with zero earnings). This represents the lower bound of inequality reduction.*

***Sample restricted to wage earners, assuming all dismissed workers move to unemployment or inactivity.*

Note: The Gini coefficient and Theil Index are measured over labor income and do not include non-labor income sources.

Overall, these policy simulations under scenarios 1 and 2 show the minimum wage increase does not result in substantial wage hikes among the formal employee population. Nevertheless, noteworthy wage adjustments can be observed for those employees directly affected by the wage increase (individuals earning more than the 2021 minimum wage but less than the newly simulated minimum wage). However, it is crucial to note that a significant portion of this wage increase is counterbalanced by an income drop of those employees who lose their jobs after the minimum wage increase. Additionally, over the long term, the wage increase tends to be less pronounced than in the short term, primarily due to the heightened elasticity of labor demand. This result could be sensitive to the assumption of non-compliance, as non-compliant firms could, in principle,

respond to the policy by raising wages rather than by reducing employment and to the assumption that wages in higher parts of the distribution are not affected by the policy, which could be important for the public sector.

Moreover, the potential impact of raising the minimum wage on formal-sector employment is noteworthy, but some caveats apply. The extent of the impact on formal jobs hinges on the assumed elasticities. Additionally, it is important to acknowledge that our microsimulation does not encompass potential positive macroeconomic outcomes resulting from a minimum wage hike. This implies a broader increase in household consumption and a potential growth in investments, albeit to a lesser extent, ultimately leading to an increase in GDP. Furthermore, the microsimulation does not factor in the likelihood that individuals who experience job loss might secure new employment opportunities. Consequently, our microsimulation's estimates regarding employment losses are likely toward the upper end of the actual range. Job reductions are most pronounced among younger employees. Moreover, changes in informal sector employment due to the policy are not considered, as workers in firms that do not comply with legal tax obligations are not in the data. This is important as some workers in the formal sector might shift into informal work rather than unemployment, mitigating overall job losses and the impact on unemployment.

Finally, the extent to which the minimum wage raises affect the labor income distribution is sensitive to individuals' labor market transitions after losing their jobs. If individuals transition to lower-quality jobs with significantly lower wages, the influence of the minimum wage hike on labor income inequality²⁸ is negligible. While certain low-income workers experience an income boost, a smaller fraction faces almost a complete loss of income. The minimum wage increase is notably progressive if dismissed workers move to unemployment or inactivity, and the pool of still employed workers is higher paid, on average.

Further studies should evaluate the fiscal implications of raising the minimum wage. On the expenditure side, this can prompt several fiscal considerations for the public sector. These include a potential uptick in the wage bill, considering the current indexation system in the public sector pay system. Additionally, budget reallocations may be necessary to accommodate increased wages for public sector employees. Furthermore, there may be concerns regarding inflationary pressures stemming from higher costs of goods and services provided. Conversely, raising minimum wages could reduce the need for certain social welfare programs, particularly as low-wage workers, who tend to be overrepresented among poor families, earn more income. This, in turn, could translate into government savings concerning social assistance and welfare disbursements. On the revenue side, raising the minimum wage might also yield higher tax revenues for the government, especially given the flat Personal Income Tax (PIT) structure. Nonetheless, this could be fully or partially offset by the potential job losses or reduced working hours, resulting in lower overall tax revenue.

²⁸ This is estimated based on gross labor income in tax administrative data.

Additionally, it is important to consider that the current PTT allowance is tied to the gross minimum wage,²⁹ necessitating careful consideration in any assessment.

Who is more likely to be affected?

We provide additional characterization of the employees potentially impacted by the wage increase in scenario 1 (baseline).

Our results show that the impact of the minimum wage increase differs across groups of employees and sectors of the economy.

The minimum wage increase affects more male than female employees in all age groups; youngest and oldest employees experience higher wage increases or job losses. Table 9 provides information on the proportion of employees affected by the minimum wage hike, categorized by gender and age brackets. The increase in minimum wage has a more significant impact on men than women, with 13.64% of male employees and 12.51% of female employees affected. Among women, the youngest age group is most affected, with 14.5% of female employees aged up to 29 impacted, compared to 11.6% to 12.8% across other age groups. For men, the highest percentages of impacted employees are in the youngest (15.0%) and oldest (14.4%) age categories. Across all age segments, the proportion of affected male employees exceeds that of female employees. As presented above, both wage increases and job losses are higher for the youngest and oldest employees.

Table 9. Share of employees potentially impacted by the minimum wage increase by Sex and Age (Scenario 1),

Group	Men	Women
All	13.64%	12.51%
Age: up to 29	14.96%	14.52%
Age: 30 – 39	13.66%	12.73%
Age: 40 – 49	13.99%	12.37%
Age: 50 – 59	12.31%	11.65%
Age: 60+	14.42%	11.56%

Source: Own estimates based on administrative tax data. This is estimated as the share of men or women of each cohort earning between the old and the new (simulated) minimum wage.

The minimum wage increase can significantly impact the accommodation and food services sector, affecting almost half of employees. In contrast, fewer than 1% of employees in the electricity, gas, steam, and air conditioning supply sectors are potentially affected. Figure 9 illustrates the potential long-run impacts of the minimum wage increase across various economic sectors. Significant impacts are observed in the accommodation and food services sector, wherein almost half (50%) of the employees experience the

²⁹ Workers in the construction sector have been exempt from social health insurance since 2019.

effects of this raise.³⁰ Similarly, a substantial impact is noted for workers directly employed by households (31%). Additionally, the adjustment affects over a fifth (20%) of employees in five other sectors. Conversely, fewer than one in ten workers feel the impact of the minimum wage increase in nine sectors.³¹ Remarkably low, at less than 1%, is the proportion of employees affected by the inflation-linked minimum wage adjustment in the electricity, gas, steam, and air conditioning supply sectors.

Interestingly, the sectors displaying a moderate employment impact tend to experience the most substantial wage hikes. The accommodation and food service sector stands out, boasting the strongest wage increase at 4.96%, followed by activities of households as employers and administrative and support services, with increases of 2.2% and 1.8%. Other sectors experience small wage increases, on average. When considering the net labor income losses in each sector, considering winners and losers, a different picture emerges. Paradoxically, in six sectors³², the net labor income gains following the minimum wage decrease, with the education sector encountering the most significant reduction at -0.3%. Across most sectors, the increase in net income gains remains nearly negligible. This suggests that the employment losses are more or less counterbalanced by the wage increases for those who retain their positions.

The impact of minimum wage increases varies across regions, with Suceava having the highest proportion of potentially affected employees and experiencing more job losses. Suceava and Constanta have the strongest wage increments; wage growth remains small across all scenarios. Figure 10 portrays the potential impacts of the minimum wage increases across distinct regions (NUTS-3) within the country. The proportion of employees affected by this increase fluctuates between 8.9% in Bucharest and 21.8% in Suceava. Remarkably, the regions with a higher share of impacted employees also encounter more pronounced job losses, from 0.65% in Bucharest to 1.69% in Suceava. Notably, Suceava (2.23%) and Constanța (1.83%) boast the most robust wage increments. Conversely, wage increases are relatively small in other regions, with Bucharest experiencing the smallest increase. Nevertheless, wage growth remains contained across all scenarios, and the impacts of job losses are essentially counteracted by wage increases for those who retain employment.

³⁰ This may be an upper bound estimate, considering the low levels of tax compliance in accommodation and food services with a compliance gap of 18% (Robayo, Balaban & Wronski, 2024), as non-compliant firms can have a lower employment response.

³¹ Manufacturing (9.98%); Human health and social work activities (5.86%); Financial and insurance activities (5.42%); Information and communication (4.87%); Public administration and defense, compulsory social security (3.78%); Mining and quarrying (3.64%); Activities of extraterritorial organizations and bodies (3.04%); Education (1.78%); Electricity, gas, steam and air conditioning supply (0.72%).

³² Financial and insurance activities (-0.02%); Wholesale and retail trade; repair of motor vehicles and motorcycles (-0.04%); Administrative and support service activities (-0.12%); Human health and social work activities (-0.17%); Other service activities (-0.22%); Education (-0.33%).

Box 2 explains the robustness checks conducted using EU-SILC and matched administrative tax data for measuring impacts.

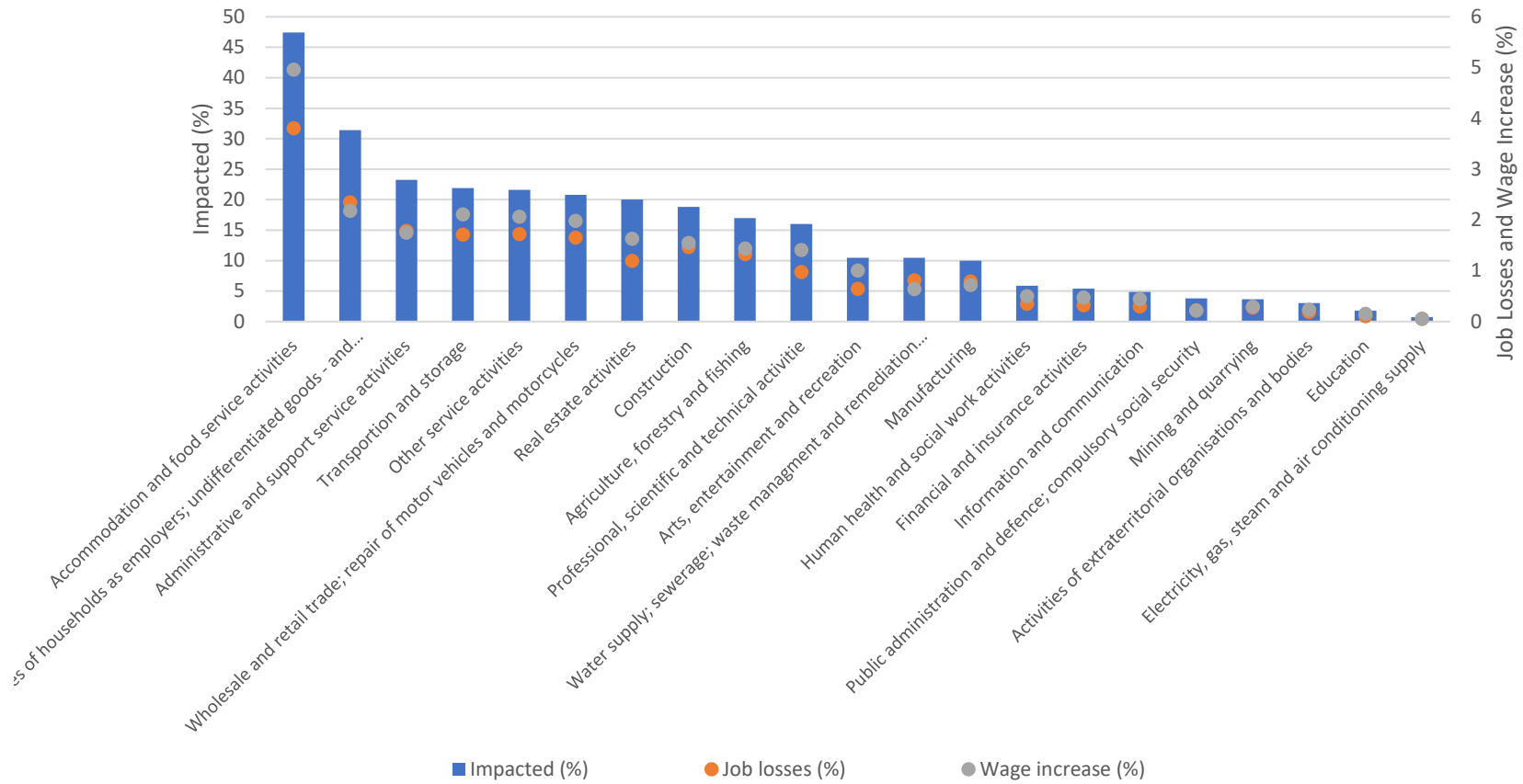
Box 2. Robustness Checks – Using EU-SILC and Matched Administrative tax data and EU-SILC to measure Impacts.

In a related study, Robayo-Abril, Balaban, and Wronski (2024) utilize statistical data matching techniques to align income data from the 2020 administrative tax dataset with the 2021 EU-SILC, referencing the income year 2020. The aim is twofold: to assess tax regulation adherence and to examine possible overestimations in the proportion of individuals earning the minimum wage, as reported in tax records. Their findings highlight a notable disparity in the prevalence of minimum wage earners when comparing data from EU-SILC and tax records.

We explore using linked survey administrative tax data, which could provide valuable insights for several reasons. On the positive side, this approach presents comprehensive coverage of unemployment, capturing the entire labor force and enabling the estimation of unemployment rates, albeit differing from the LFS approach, as the EUSILC is not designed to measure labor market status. Additionally, it considers both employed and informal sector workers, providing a more holistic perspective. The inclusion of income poverty data further enriches the scope of findings. Moreover, this method accounts for a diverse range of worker characteristics, including observable factors like education levels and occupations, allowing for a more refined characterization of the potentially affected group. However, the share of minimum wage workers earning between the current and the proposed minimum wage in the EUSILC is tiny, significantly limiting the sample size for this analysis. The EU-SILC measures income annually. Respondents report their income in a previous calendar year. EU-SILC 2021 provides information on annual income in 2020. The sample includes 5,519 full-time employees who worked for 12 months last year. If we simulate the inflation-linked – adjustment based on the EU-SILC data, the increase in minimum wage affects only 1.31% of full-time employees³³. The number of affected employees is 72., which makes any investigation of the profile of the impact impossible. Given the potential for more significant standard errors in the estimates, this study does not report these estimates.

³³ The share of affected employees is lower firstly because of lower inflation in 2021 than in 2022 (5.1% vs. 13.8%). Moreover, the share of minimum wage earners in the EU-SILC is lower than in the administrative tax data (Robayo-Abril, Balaban and Wronski, 2024).

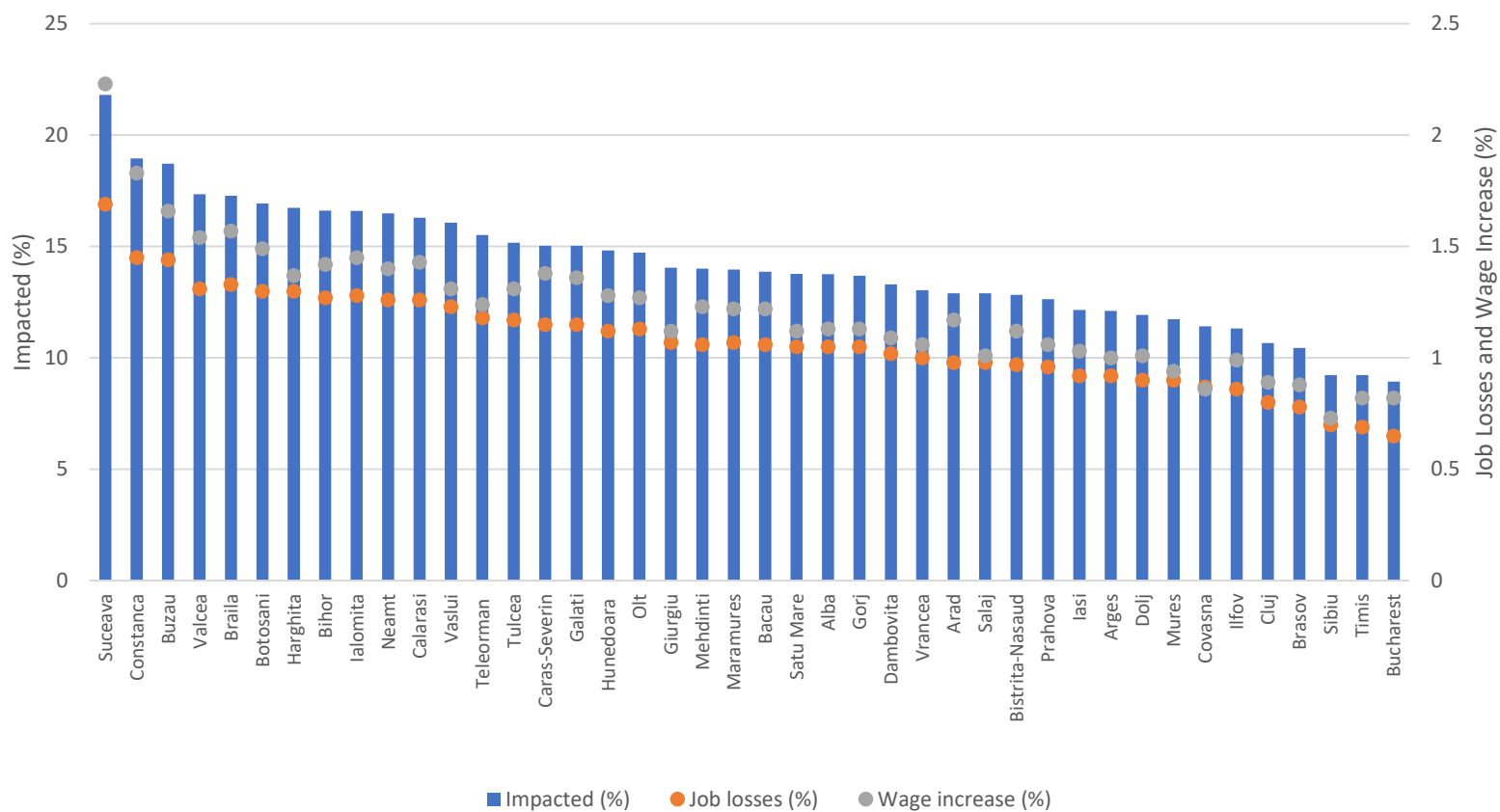
Figure 9. The long-run impact of indexing minimum wage by inflation (Scenario 1) across sectors of the economy.



Source: Own estimates based on administrative tax data and microsimulation model

Note: Sample is restricted to wage earners, assuming all dismissed workers move to unemployment or inactivity.

Figure 10. The long-run impact of the indexation of minimum wage by inflation (Scenario 1) across regions (NUTS-3) of the country.



Source: Own estimates based on administrative tax data and microsimulation model

Note: Sample is restricted to wage earners, assuming all dismissed workers move to unemployment or inactivi

V. Conclusions and Policy Insights

In Romania, the legally mandated minimum wage, established by the government in consultation with trade unions and employer organizations, varies across educational levels and economic sectors. Between 2007 and 2022, the Romanian nominal and real minimum wage experienced a substantial increase. The minimum wage applies to full-time and part-time workers, adjusted proportionally based on working hours. While the minimum wage level is revised annually, the process lacks strict rules for determining the new level even though, over the last years, the government has relied on macroeconomic indicators to justify the minimum wage increases. Since 2019, three different levels have been implemented. The construction sector held the highest level, while education and experience determined rates for other workers. Starting from 2022, the separate minimum wage for employees with tertiary education has been naturally eliminated, as the government has kept it the same since its introduction in 2019. Over the years, Romania's gross minimum wages have significantly increased by an average annual real rate of 10% between 2007 and 2022, with some years experiencing more than 20% growth. This growth is notable compared to Romania's relatively low starting point and has led to substantial progress in real wages. At the outset of this period, Romania had one of the lowest ratios of the minimum wage to the median and mean wages in the EU. However, due to substantial increases in the minimum wage over the last decade, Romania now ranks among the top countries with a high ratio of the minimum wage to the median wage. Meanwhile, the ratio of the minimum wage to the mean wage positions Romania in the middle of the distribution.

Setting and adjusting the minimum wage presents a complex challenge requiring a balanced approach. While the process involves political deliberation and consultation with social partners, evidence-based decisions are crucial. Minimum wages should be established at levels that meet workers' and their families' needs, but also consider potential labor market and poverty impacts. Striking the right balance is essential: setting wages too low offers limited protection against low pay and poverty, while setting them too high can result in poor compliance and adverse employment effects. Regular inflation-adjusted changes provide predictability, but countries with hyperinflation may require more frequent updates. When well-designed, minimum wage policies can be part of a broader strategy to alleviate poverty through increased labor income, especially when the minimum wage approaches or matches living wages.

When setting minimum wage levels, assessing adequacy and living wages is an important factor. In this paper, we construct estimates of real living wages for a representative poor Romanian household, relying on EC estimates of the consumption basket. For effective comparisons, our estimates of living wage are derived from absolute estimates of essential needs rather than relative percentages of median income.

This approach, used to evaluate the adequacy of social benefits and the living wages, defines a minimum consumption basket encompassing goods and services necessary for minimum living standards. A comprehensive basket accounts for various factors beyond basic sustenance. Although the EU relies on relative poverty measures, the absolute concept of the poverty line based on a minimum cost of living is valuable for establishing appropriate social benefits or minimum wages. A food basket reflecting an adequate diet for various reference households is a valuable tool for benchmarking. Estimates based on a Romanian food basket estimated by the EC under the European Reference budget network indicate that in 2020 euros, the food basket's average monthly per capita cost is around 126 EUR, and approximately 180 EUR when factoring in non-food components and other functions.

Given these EC estimates of the food basket, our results show that the net monthly statutory minimum wage in Romania (276 EUR) exceeds the living wage required for food expenses (245 EUR) yet falls short of covering both food and non-food components (351 EUR), holding economic implications. An adequate minimum wage encompassing basic consumption costs could diminish reliance on social assistance, enhance labor market participation, elevate incomes, reduce income inequality, and promote job stability. However, striking a balance between worker income and job market stability is vital, warranting an assessment of its impact on labor dynamics. Periodic adjustments to maintain purchasing power over time is also important.

Drawing from a rich administrative tax database, we show that the minimum wage seems binding in Romania. According to administrative tax data, the proportion of individuals earning the minimum wage slightly surpasses 25%. Yet, a related study (Robayo-Abril, Balaban, Wronski, 2024) demonstrates that this estimate is inflated compared to survey data, including survey data supplemented with estimated tax income. Tax evasion and off-the-books wages could account for the overstated prevalence of minimum wage earners in tax records.

The prevalence of minimum wage recipients exhibits noteworthy variation across several employee categories, economic sectors, geographical regions, and types of firms. Among genders, women outpace men in being minimum wage earners. This trend is also observable among part-time workers compared to their full-time counterparts. The youngest employees stand out, with a higher proportion being minimum wage earners. Across various sectors of the economy, the proportion of minimum wage earners displays substantial diversity. Specific sectors (such as construction, food and accommodation, transport, and storage) witness over 40% of their workforce fall within this category. Conversely, in other sectors (like mining, education, public administration, and electricity, gas, and steam), the proportion of minimum wage earners is below 10%. Microenterprises exhibit a notably elevated share of minimum wage earners, potentially attributed to unreported payments and tax compliance challenges.

Increasing minimum wages can have significant distributional implications. It can shape income dynamics by raising earnings for specific employed individuals but concurrently carries the risk of inducing job cutbacks, especially for younger and older individuals possessing lower skill levels. Given these potential effects, it becomes crucial to comprehensively assess both aggregate and distributional impacts to understand the broader consequences of such wage adjustments.

To assess potential effects on formal employment and the net effect on earnings, we use microsimulation techniques considering different values of own-wage elasticity of labor demand. Our results show that the overall impacts of a minimum wage increase in a baseline scenario are likely modest (according to the literature). However, the impacts on some groups, such as the youth, may be stronger. The share of employees impacted by the minimum wage increase varies across sectors of the economy and the country's regions. The food and accommodation sectors are the sectors of economic activity most impacted, while the impact on electricity, gas, steam, and air conditioning supply is negligible. The share of employees covered by the increase is highest in Suceava and lowest in Satu Mare.

Drawing from microsimulation results, the influence of a hypothetical minimum wage hike on the broader wage structure remains contained, while employment losses are expected to be of larger magnitude. Nevertheless, such a wage increase has the potential to yield substantial pay raises for those directly impacted by the adjustment. The ramifications of heightened minimum wage levels on formal sector employment can also be significant. As for the effect on labor income inequality, the influence of a minimum wage increase is moderate when dismissed workers move to unemployment or inactivity but nearly neutral if workers move to even lower-wage jobs. The positive outcomes resulting from boosted incomes for affected employees are offset by a significant decline in earnings for those who encounter job losses.

Tying the minimum wage to inflation (Scenario 1) is expected to result in a moderate wage increase for workers earning between the current and new minimum wage in the short term. Still, the net gains increase is expected to be negligible in the long run due to significant disemployment effects, especially among the youngest workers. The impact of this policy on labor inequality depends on the labor market transitions of dismissed workers. If workers move to lower-paid jobs, the impact is neutral. However, if workers move to inactivity or unemployment, the impact is slightly progressive, with a slight reduction in labor inequality.

The impact of minimum wage increases varies across regions, with Suceava having the highest proportion of affected employees and experiencing more job losses. In contrast, Suceava and Constanta have the strongest wage increments. Impacts also vary by age, gender, and sector. The minimum wage increase affects more male than female employees in most age groups, except for those aged

29 and under, where women are more affected, and youngest and oldest employees experience higher wage increases and job losses. The minimum wage increase significantly impacts the accommodation and food services sector, affecting almost half of employees. In contrast, fewer than 1% of employees in the electricity, gas, steam, and air conditioning supply sectors are affected. Interestingly, sectors with moderate employment impact tend to experience the most substantial wage hikes. Across all scenarios, wage growth remains close to zero.

Similarly, increasing the statutory minimum wage to a living wage estimate is expected to result in a slight short-term increase in average wages. Still, it could lead to significant job losses, particularly among the youngest workers. The impact of the minimum wage increase on income inequality in this scenario depends on the approach chosen, with a more substantial impact than in Scenario 1, resulting in a reduction in the Gini index and an increase in the bottom 50% income share. However, the policy simulations under both scenarios show that the minimum wage increase does not result in significant wage hikes among the formal employee population, with average wage increases of 0.40% in the short term and 0.04% in the long run.

Several policy recommendations arise from this analysis:

First, the legal minimum wage should be set based on an assessment of its adequacy, among many other factors. It is also critical to analyze the dynamics of the leading macroeconomic indicators to mitigate the potential negative impact on employment. A living wage assessment is a key tool to determine how the existing minimum wage covers the basic consumption basket, encompassing food and non-food essentials. Moreover, evolving, these adjustments should at least be anchored to inflation rates to uphold the purchasing power of individuals. Our results show that increasing the minimum wage to the level of the consumption basket can generate significant income gains for employees who keep their jobs. However, a significant formal employment reduction may also be recorded. Therefore, the government should implement labor market policies to support the transition of those who lose their job back to employment and minimize job mismatches. This approach ensures that the minimum wage remains attuned to the changing economic landscape while safeguarding the real value of earnings.

Second, monitoring the labor market is essential, as well as accurately estimating the wage elasticity of labor demand. The minimum wage can have different effects depending on the country's context at a certain point in time, particularly during different stages of the economic cycle. Therefore, to set a minimum wage and impose an adjustment formula, a detailed monitoring of the labor market and the estimation of the critical parameters that determine the effect of the minimum wage are needed. In this note, we consider several scenarios based on the estimates of the wage elasticity of labor demand from international evidence, which

might not apply to Romania. The economy of Romania—characterized by high levels of informality and low unemployment—might not be comparable to neighboring countries. An introduction of several minimum wage scenarios in local labor markets on a small scale and monitoring of their effects may help to accurately evaluate the potential effect of the minimum wage in Romania in the short and long term. These estimates can then be used to expand the policy at the national level.

Third, a prudent approach involves incrementally increasing the minimum wage to minimize job losses within specific demographics like the youth. Such increments should consider annual inflation rates and the labor market's response following each increase. A considerable surge in the minimum wage can adversely affect lower-productivity segments, especially the young workforce. This becomes particularly significant against the backdrop of the Russian Federation's invasion of Ukraine, wherein businesses are more inclined to cease operations, leading to amplified job losses and diminished job creation due to the prevailing inflationary circumstances.

Lastly, the minimum wage policy might result in unemployment, particularly among specific groups, requiring complementary social safety mechanisms. Utilizing minimum wage hikes for income redistribution is not without its shortcomings. Given Romania's notable poverty rates, more effective targeting of beneficiaries might be achieved through direct redistribution methods such as taxes and focused social support instead of solely relying on minimum wage increments. In a broader context, the minimum wage can be a redistributive tool when accompanied by an unemployment safety net, as highlighted by Cunningham (2007). However, the poverty-focused social assistance program encounters challenges in excluding specific eligible households due to categorical and restrictive filters in the beneficiary selection, ultimately reaching only a limited percentage of households while leaving out a significant portion from the lowest quintile. Therefore, an enhanced social protection strategy for Romania's poor households and vulnerable workers needs a comprehensive blend of policy reform and adjustments.

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