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► An Evaluation of Montenegro's 2022 Minimum Wage and Income Tax Reform

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► 1. Introduction

Between 2018 and 2022, Montenegro introduced a series of significant policy reforms. The reforms affected economic, educational, and social policies, ranging from the introduction of a universal child allowance to major changes in its labor market regulations and tax rules. From an economic policy perspective, the most significant reform package was implemented in January 2022. It was composed of a huge increase in Montenegro's statutory minimum wage, alongside a new income tax regime and the abolishment of mandatory health insurance contributions. According to the Government, the reform package aimed at increasing the living standards of citizens and promoting a more sustainable and inclusive growth model.

This report evaluates the conjoint impact of this reform package (henceforth, the "2022 reform"). Our evaluation is mainly based on two different sets of data. On the one hand, we will use data from Montenegro's Labor Force Survey to describe the labor market conditions during the reform period, and to provide evidence of employment and unemployment rates. On the other hand, we obtained access to rich administrative tax data that covers firm-level information on value-added taxes and corporate profit taxes, as well as individual-level information on monthly income taxes for selected months between 2017 and 2022. This tax data enables us to study the effects of the 2022 reform at the firm-level and the individual-level, respectively.

Following a differences-in-differences approach that compares firms in high- and low-wage sectors (which were differentially affected by the minimum wage increase), we examine not only the reform's impact on corporate profits and turnover but also on the sheer number of formally operating firms. Our analyses yield three main findings:

For sectors where the minimum wage affected more workers and thus had a stronger impact, we find a small decline in the number of formally registered firms (relative to the number of firms in sectors where the new minimum wage had a lower impact).

At the same time, we observe a modest increase in corporate profits and turnovers in sectors that were strongly impacted by the new minimum wage (relative to firms in the other sectors).

These observations are consistent with a differential selection effect, where the reform forced the least profitable firms to exit (at least, the formal part of) the economy.

Based on individual-level earnings data, we implement a novel bunching analysis that assesses the impact of the 2022 reform on taxed earnings, the wage distribution and changes in employment. In addition to discussing the total net-employment effect, the report provides evidence on changes in net-employment (the sum of job gains minus job losses) along the earnings distribution. This allows us to assess which (and how many) jobs have disappeared and in which wage segments new jobs were created. The main findings from these analyses are as follows:

The reform had a strong impact on the earnings distribution. Almost 44 per cent of all wage earners in 2021 were directly affected by the minimum wage increase. Nearly 35 per cent of all jobs were lifted to the level of the new minimum wage.

We find evidence of positive spillovers in the frequency of jobs with earnings above the minimum wage. There is a net growth in the number of jobs with gross earnings roughly between €550 to €1,250.

We do not find any evidence that the reform caused any quantitatively meaningful loss in employment.

The number of full-time equivalent jobs with gross earnings below €1,250 – the range of the wage distribution that was directly and indirectly (via wage spillovers) affected by the reform – remained constant between 2021 and 2022. When we include the job gains observed for high-wage earners above €2,000, we see that total employment levels slightly increased after the reform.

The report details several caveats in the interpretation of these two sets of findings. We also conduct robustness and sensitivity analyses. Finally, we highlight several open questions that we were unable to address in this report and discuss avenues for extending the evaluation strategy to tackle these questions.

The remainder of this report is structured as follows. Section 2 summarizes the main reform steps and describes complementary policy reforms in Montenegro between 2017 and 2022. Section 3 discusses the ILO's objectives as well as the data made available for this evaluation. By comparing the objectives with the available data, we will clarify the focus of this evaluation report.

The main results from our different analyses are contained in Section 4. After studying evidence on aggregated labor market outcomes based on the Labor Market Survey data, Section 4.2 examines firm-level outcomes derived from corporate profit and value-added tax data. Section 4.3 then turns to individual-level data on earnings, obtained from individual income tax records. Complementary findings from these three analyses are relegated to the Appendix.

Finally, Section 5 summarizes and discusses our main findings and offers perspectives on future evaluation strategies.

► 2. Institutional background: Policy reforms in Montenegro, 2017–2022

In 2018, Montenegro faced entrenched economic challenges, including a fiscal deficit amounting to 6.3 per cent of the GDP. Government debt equated 72.6 per cent of the GDP, a 38.4 percentage point increase since 2008. Responding to these challenges, as well as to new difficulties emerging from the COVID-19 pandemic, Montenegro introduced a series of reforms that aimed at stabilizing the country's economy and offering more inclusive economic growth to increase the living standards of its citizens. In 2021, for instance, the Government introduced a universal child allowance for children up to age 6 and free textbooks in primary schools.

From an economic policy perspective, the most significant reform consisted of a sizable increase in the country's statutory minimum wage, paired with a new income tax regime and the abolishment of health insurance contributions. This reform package was announced in May 2021 and came into force in January 2022. Below we will briefly summarize what we will henceforth refer to as the "2022 reform". Given that the minimum wage adjustment is arguably the biggest reform component, we will sometimes refer to it as the "minimum wage reform".

In addition to describing the 2022 reform, we will also highlight further policy reforms affecting the corporate tax regime and VAT rates during our sample period (between 2017 and 2022). Our later analyses will account for these additional reforms.

2.1 The 2022 reform: New income tax and minimum wage levels

The 2022 reform package had three main pillars. **First**, it increased the national minimum wage. The monthly net minimum wage for full-time work went from €250 to €450 (or, in gross terms, from approximately €330 to €530¹). In net terms, this represents an 80 per cent minimum wage increase; in gross terms, roughly a 60 per cent increase. Note that this increase is larger than what is observed internationally for most minimum wage reforms (see Manning 2021).

Second, a new, progressive income tax scheme was applied to earnings and income from self-employment work. The scheme includes a tax allowance, which implies that incomes up to €700 are tax free. Incomes between €700 and €1,000 are taxed at a 9 per cent marginal tax rate; incomes above €1,000 are taxed at 15 per cent marginal tax rate. **Third**, the reform abolished compulsory health insurance contributions by employers and employees. The loss from health insurance payments was replaced by general public revenues.

The ideas behind the reform were twofold. On the one hand, low-income earners working at the minimum wage would see a strong increase in (nominal) earnings. These benefits should be concentrated at the low end of the income spectrum. On the other hand, the second and third elements of the reform imply that the "tax wedge" – the gap between gross and net incomes – should shrink considerably (from around 39 per cent to 20 to 30 per cent, depending on the income range). From the employers' perspective, this should reduce labor costs, thus counterbalancing the increased costs associated with the minimum wage expansion.

2.2 Earlier minimum wage adjustments

It is worth noting that, before the 2022 reform, Montenegro's minimum wage was adjusted several times throughout the period covered by our data. In nominal, net income terms, the minimum wage was stable between 2013 and 2019. In July 2019, the net minimum wage increased from €193 to €222 (or €331 gross). Starting in October 2021, the net minimum wage further increased from €222 to €250 (or €373 gross). In our later analysis, we will account for these earlier adjustments. As compared to the 2022 reform, however, these minimum wage adjustments were relatively small.

¹ Note that the gross values are derived from Montenegro's income tax data (discussed below), comparing January 2021 and January 2022. As noted in Section 2.2, there was a smaller interim adjustment of the minimum wage implemented in the third quarter of 2021.

2.3 Corporate tax reform

The main 2022 labor market and income tax reforms described above coincided with a reform of the corporate tax system. The reform, which came into force in January 2022, implied a structural shift from a single tax rate of 9 per cent for corporate profits to a progressive tax regime. The new tax schedule would apply (i) a marginal tax rate of 9 per cent for taxable profits up to €100,000, (ii) a marginal tax rate of 12 per cent for profits between €100,000 and €1,500,000, and (iii) a top marginal tax rate of 15 per cent for taxable profits exceeding €1,500,000.

2.4 VAT reform

Our sample period is further characterized by a series of VAT reforms. In January 2018, Montenegro raised its general VAT rate from 19 per cent to 21 per cent. At the same time, the reduced rate of 7 per cent to be applied to specific industries, goods and services remained unchanged.

Like many other European economies, these VAT adjustments also included reforms that aimed at supporting specific sectors or consumers during the pandemic. In August 2020, the VAT for accommodation, restaurants, and hospitality services was lowered from 21 per cent to 7 per cent. In June 2021, the threshold for mandatory VAT registration was raised from €18,000 to €30,000 per annum. The latter step aimed at providing relief for small businesses during the pandemic. Our analysis of the VAT data will account for these different reforms.

► 3. Objectives and data

3.1 Objectives

The ILO provided us with guidelines and specific questions to be addressed in the evaluation of Montenegro's 2022 reform. We were asked to explore the reform's impact on (1) business formation, (2) the transition to formal employment, and (3) new employment. Moreover, our evaluation should try to examine the heterogeneous effects of the reform, and isolate the roles played by different elements and their interactions.

Such a comprehensive empirical evaluation of the 2022 reform requires detailed data from various sources. The data should cover a sufficiently long period before and after the introduction of the 2022 reform, and an evaluation would have to pair administrative data on income, employment and business activities with data that would allow us to assess informal labor as well as informal business activities in the pre- and post-reform periods. In a pilot study, we listed these data sources as necessary to conduct a comprehensive evaluation:

- a.** income tax data and social security data for individual tax filers (or families), including information about all income sources (including labor earnings, capital incomes, and income from self-employment), working hours, sectoral information, and demographic characteristics;
- b.** business registrations (via the statistical business registers), corporate tax data, and VAT tax data, with information about registered firms and taxable profits for 2022 and the years leading up to it, plus regional, sectoral, and firm-level information;
- c.** consumption data for individuals from 2022 and several pre-reform years, plus
- d.** regional and aggregate employment statistics, with information by region, industry, sector, and other demographic dimensions;
- e.** tax and law enforcement data, including enforcement activities (such as tax audits, on-site inspections, and desk audits for minimum wage non-compliance); and
- f.** census data and labor force surveys with individual information about employment, working hours, wages, and socio-demographic variables.

In a discussion of the pilot study, we noted that it takes time to collect meaningful data, specifically survey data which might include information about the informal shadow economy. Given the short time period since the introduction of the reform, we already anticipated that we would not be able to collect or obtain meaningful survey data to quantify the 2022 reform's impact on informal labor or transition rates. Moreover, we did not obtain any data on tax or law enforcement activities (item (e)) or on individual consumption expenditures (item (c)). This lack of data limits our ability to speak to several of the original questions of the evaluation. Hence, this report cannot address questions related to the shadow economy in a satisfactory manner. In Section 5 we discuss how one could address these open points in a follow-up report.

Despite these constraints, we nevertheless obtained access to excellent administrative tax data (covering large parts of items (a) and (b)) and labor force survey data. The administrative data is very detailed and covers all relevant tax information relating to formal employment, allowing us to focus on key labor market dimensions. Specifically, we can address questions related to the reform's overall employment effects, its impact on wages and the implications for firms' profits and revenues. The microdata allow us to study wage and employment adjustments along the wage distribution, which enables us to move beyond assessing the overall net employment effect and discuss which pre-reform jobs have disappeared (or undergone major wage adjustments) and in which wage segments the old jobs have re-appeared or in which new jobs have been created. This analysis will also illustrate the scale and heterogeneous effects of the reform on wage distribution.

Finally, note that the report does not attempt to isolate the different reform elements or their interactions. From a methodological perspective, such a separated causal analysis is difficult to achieve simply due to the conjoint nature of the reform.² Additionally, such an analysis would have

² Since all reforms were implemented at the same time, there is very little scope to tease out the isolated impact of the one or the other reform pillar.

required much more time than was available. As we cannot disentangle the different elements of the 2022 reform, we will sometimes refer to it as the minimum wage reform, as this is arguably its biggest reform component.

3.2 Data

In the following section we provide a short description of the data sources that were made available and used for the empirical analysis presented below. The section also addresses various limitations of the data.

Labor Force Survey

We accessed labor market data from Monstat's quarterly Labor Force Survey (LFS). The data is derived from a high-quality, stratified survey (with $N > 2,700$ per quarter).³ It includes rich socio-demographic information (such as age, gender and education levels), and allows us to examine subgroup statistics up to the second quarter of 2023. Yet, like any other survey measure, this data is prone to sampling and non-sampling errors. Non-response issues, for instance, might be a major concern due to the pandemic. In addition, the LFS applies a broad definition of employment,⁴ which makes it hard to compare with the administrative employment statistics. Hence, the estimates for employment and unemployment rates derived from the LFS must be treated with caution. We will therefore use micro-level income tax data (described below) to re-assess any statements on employment levels derived from the LFS data.

Income tax data

The administrative individual-level tax data contains information on personal income taxes and compulsory contributions to the social security system.⁵ It includes the records of roughly 160,000 employees (see Table 2 below), out-of-work individuals who are registered with the Employment Office of Montenegro, as well as the beneficiaries of pension or disability incomes. Self-employed individuals (those who indicate that their primary income derives from self-employed work) are not included. Importantly, the dataset contains information on the monthly labor earnings of all employees and their working hours specified by contract. One important limitation of the data is that it covers, for the years 2017 to 2022, only the months of January, May, September and December. While the data covers all four quarters of a given year, it does not provide us with data from the peak tourist months (June, July and August). Given the key role of the minimum wage regulations for the hotel and tourism sector, this is an important data limitation.

Section 4.3 will focus on the (taxed) labor incomes of all formally employed workers. We will make use of the income tax data to study the distributions of full-time equivalent (FTE) earnings and their evolution over time. It will present a novel analysis to investigate how changes in statutory minimum wages translate into shifts in the earnings distribution. Our approach will also allow us to evaluate the corresponding net-employment effects.

Corporate Profit Tax (CPT) data

We also evaluate data on corporate profit tax returns. The administration collects information on firms' tax liability on an annual basis. Specifically, the data includes detailed statements on the operating profits and losses, cost-related expenditure adjustments, and changes in capital endowments.⁶ Based on this, each individual firm's tax base and ultimate tax liability can be determined. The available dataset includes 45,406 unique firms from 2017 to 2022. Figure 1 presents an overview of the distribution of firms across industry sectors as specified by the standardized NACE Rev. 2

³ Details are provided by Section 2 of the Statistical Office of Montenegro and Employment Agency of Montenegro (2015).

⁴ Employment includes, among others, family workers, persons not working but on suspension leave, and persons in training "receiving a salary in cash or in indirect privileges".

⁵ Montenegro, "Rulebook on the Form, Content, Manner of Compiling and Submitting the Consolidated Form of the Report on calculated and paid Personal Income Tax and Contributions to Compulsory Social Insurance", Official Gazette of Montenegro, No. 76/10, 63/11, 28/12, 8/13, 4/14, 49/14, 1/15, 2/15, 10/16, 08/17, 50/17, 15/19 and 09/2020.

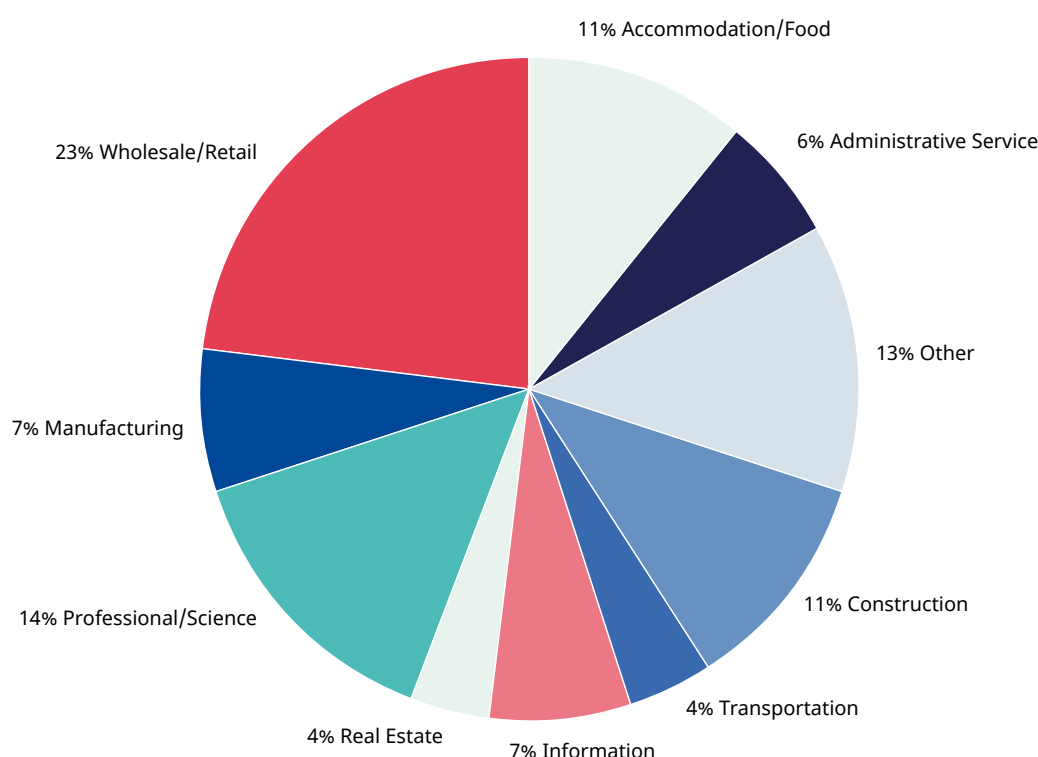
⁶ See Montenegro, "Rulebook on the Form and Contents of the Tax Return for Assessing the Corporate Profit Tax", Official Gazette of Montenegro, No. 08/09, 11/11, 78/17 and 90/17.

classification.⁷ With about 23 per cent, wholesale and retail are the largest sectors, followed by the professional and science sectors (14 per cent) and accommodation and food sectors (11 per cent). More details are provided in Table A.1 in the Appendix.

Value-added tax (VAT) data

To assess firm-level effects, we review monthly filed returns to calculate value-added taxes.⁸ Submission of VAT returns to the tax authority is mandatory for all firms with turnovers above the threshold values discussed in Section 2.4. In particular, the dataset includes information on the value of taxable turnovers, the output VAT on all supplied goods and services, as well as resulting tax payments. Between January 2017 and December 2022, we observe an unbalanced panel of 31,128 firms. The relative size of the sectors in terms of number of firms is similar to the distribution observed in the CPT data (see Figure 1). A detailed overview is presented in Table A.1 in the Appendix.

►Figure 1 – CPT Data: Distribution of firms across industry sectors



The figure presents the distribution of firms across industry sectors (NACE Rev. 2). Percentage shares indicate the size of each sector as measured by a sector's number of firms relative to the overall number of unique firms observed in the CPT dataset between 2017 and 2022.

Source: Author's computation and illustration based on CPT data.

Statistics of income and living conditions - EU SILC

We use the most recent and available EU SILC data (for the year 2021) to calculate the impact, or "bite", of the minimum wage for different sectors. The "bite" of the minimum wage measures the pre-reform share of workers with earnings below the new minimum. EU SILC annually provides data on income, poverty, social exclusion and living conditions. Importantly for our calculations, it includes detailed information on monthly earnings, working hours and industry sectors (NACE Rev. 2 classifications). The data includes 11,099 observations for the year 2021. In our analysis we employ a subsample of 2,910 full-time working individuals to review the earnings structure across industries. An overview is presented in Appendix Table A.2.

⁷ For an overview see Eurostat ([online](#)), *Eurostat Methodologies and Working Papers* (Luxemburg, 2008).

⁸ For details see Montenegro, "Rulebook on the Form and Contents of the Return for Calculation of Value-added Tax", Official Gazette of Montenegro, No. 79/05, 28/06, 64/11, 30/13 and 64/2020.

► 4. Evaluation results

This section presents the main findings of this report. Section 4.1 takes a more descriptive perspective, analyzing aggregate labor market outcomes based on the LFS. Section 4.2 follows a difference-in-differences strategy to examine firm level outcomes (such as profits, turnover, and the number of firms operating in the formal sector), based on administrative tax records. Finally, Section 4.3 analyzes the income tax data to examine the 2022 reform's impact on employment and wages along the earnings distribution.

4.1 Aggregated outcomes from the Labor Market Survey

This subsection examines the employment statistics provided by Monstat's quarterly Labor Force Survey (LFS). We first consider the total employment levels.

Total employment

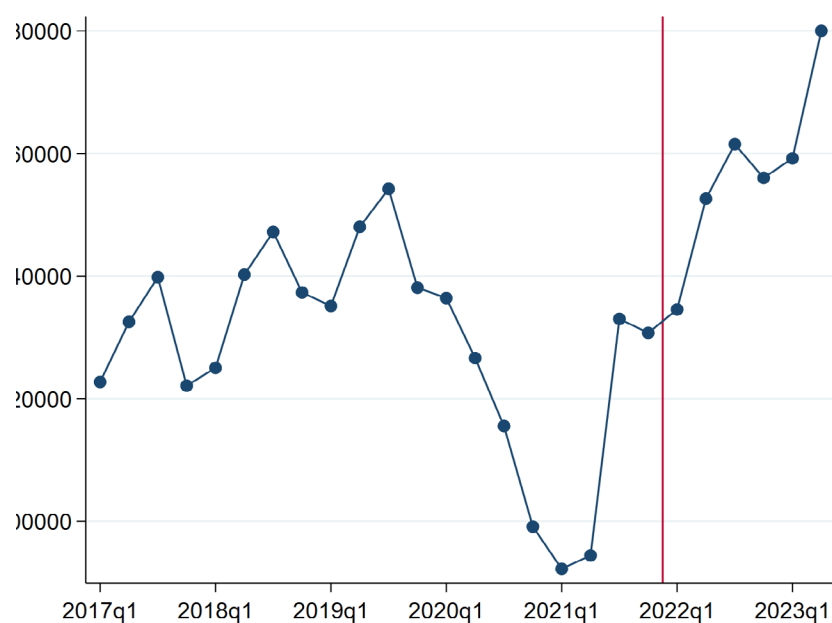
Figure 2 illustrates quarterly trends in total employment. For the pre-pandemic years 2017 to 2019, there is steady employment growth (with strong seasonality). Starting in the second quarter of 2020, the strong impact of the global pandemic becomes visible.⁹ During the pandemic years of 2020 and 2021, total employment drops by almost 50,000 people (or roughly 20 per cent relative to the first quarter of 2020). In the third quarter of 2021, however, there is an enormously steep and fast recovery, with employment levels almost reaching pre-pandemic levels.

The slight dip in the fourth quarter of 2021 is qualitatively in line with the seasonal pattern observed in pre-pandemic cycles, and the data does not indicate any persistent interruption in employment growth. After some modest employment growth in the first quarter of 2022 – the first quarter after the minimum wage reform – there is significant expansion in employment levels during the second and third quarters of 2022, reaching 261,500 employees total (3 per cent above the pre-pandemic peak in the third quarter of 2019). In the second quarter of 2023, the data indicates a new peak with 280,000 people employed.

The observed pattern suggests that the minimum wage reform had no negative impact on total employment. In contrast, employment rates continued to increase after the introduction of the minimum wage. As discussed in Section 3, however, there are numerous reasons why the data from the Labor Force Survey must be interpreted with caution. Even absent any measurement concerns, we must emphasize that it is not possible to draw any conclusions from these aggregate patterns, as any post-pandemic employment recovery without the effects of the 2022 reform cannot be observed.

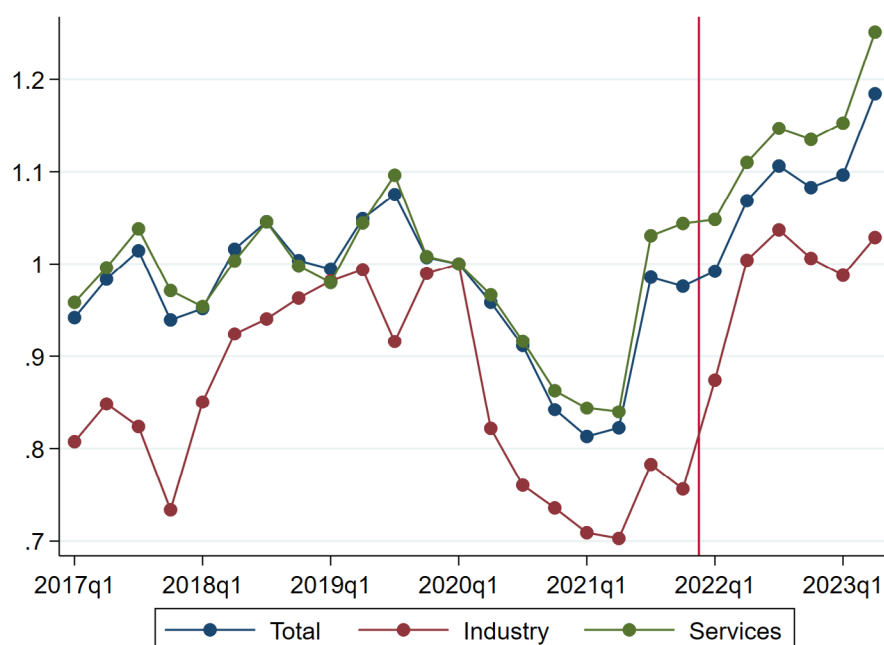
⁹ Note that the direct impact of the pandemic was limited in the first quarter of 2020, as Montenegro was among the last countries in Europe to confirm any Covid cases (the first cases were confirmed on March 17).

►Figure 2 – Trends in total employment



The figure illustrates quarterly data on the number of persons employed. The vertical red line indicates the end of the pre-reform period. Source: Monstat's Labor Force Survey, Table 6-1 (Persons in employment by sectors of activity, region, and sex).

►Figure 3 – Sector-specific trends in employment (relative to the first quarter of 2020)



This figure illustrates quarterly data on the number of persons in employment, normalized by the numbers observed in the first quarter of 2020. The figure illustrates this normalization for (a) total employment, (b) employment in the industry sector and (c) employment in the service sector. The vertical red line indicates the end of the pre-reform period. Source: Author's calculations based on Monstat's Labor Force Survey, Table 6-1 (Persons in employment by sectors of activity, region and sex).

To provide a different view on these numbers, Figure 3 illustrates normalized employment levels (using the first quarter of 2020 as a reference point) and sector-specific trends. Next to total employment (as discussed above), the Figure covers the service and the industry sectors, which account for roughly 75 per cent and 20 per cent of all persons employed, respectively.¹⁰ The illustration documents that the drop in total employment during the pandemic was more pronounced (-30 per cent) and occurred more quickly in the smaller industry sector than in the bigger services sector. The steep post-pandemic recovery is strongly concentrated in the latter sector as well: here we already observe employment levels above the first quarter of 2020 in the second half of 2021. This swift recovery is followed by continued employment growth within the services sector in the post-reform period.

Employment in the industry sector, in contrast, remained more than 20 per cent below pre-pandemic levels during the last two quarters of 2021. The strong recovery only kicked in during 2022, after the reform. In the second quarter of 2022, industry-sector employment reached its pre-pandemic level, and it surpassed its pre-pandemic level by about 3.7 per cent in the third quarter of 2022. As observed in Figure 2, a further significant expansion occurred in the second quarter of 2023.¹¹

Employment rates

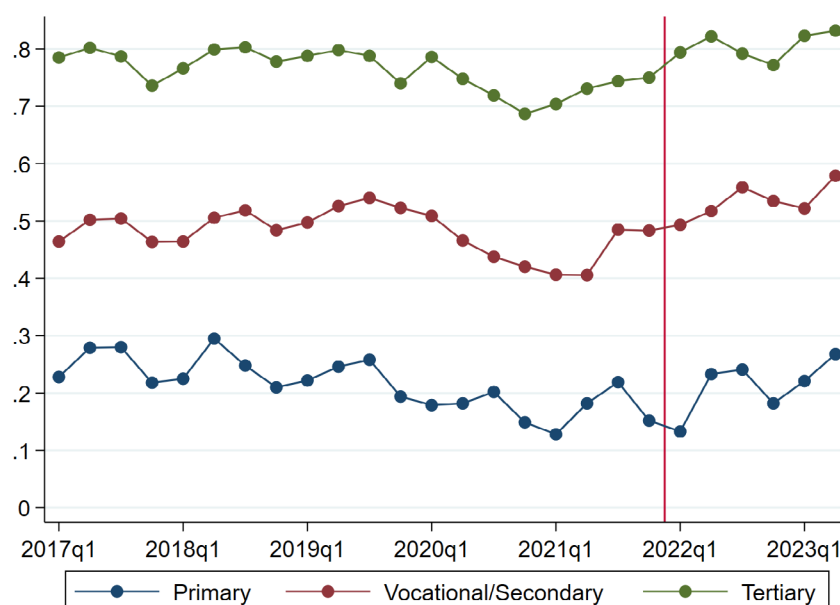
We next examine educational differences in employment and unemployment rates. Note that Monstat computes these rates relative to the total population (for persons 15–74 years old and with a given educational level). This total is divided into groups that are inactive (outside of the labor force), employed and unemployed. We will focus on the latter two groups.

Figure 4 illustrates trends in employment rates for groups with different levels of education: primary, secondary or vocational, and tertiary education. As expected, the figure shows that employment rates are positively correlated with education. A higher level of education is associated with a higher employment rate. The figure also illustrates that, during the pandemic, employment rates dropped by roughly 10 percentage points for all three groups. (In relative terms, this means that employment rates declined more strongly for the groups with lower education.) As for the sector-specific analysis discussed above, we also observe different timings and gradients for the pandemic-related decline and post-pandemic recovery. For all groups, an increase in employment after the introduction of the minimum wage reform is observed.

¹⁰ Employment in agriculture, which only accounts for around 5 per cent of total employment, is not separately illustrated, as it is characterized by strong seasonal fluctuations.

¹¹ In complementary analyses, we examined (among other things) differential trends by gender. Appendix Figure A.1 indicates that, during the pandemic, female employment declined more quickly than male employment. While the recovery started simultaneously for both genders, we observe a stronger growth in female (as compared to male) employment levels in the post-reform period (after the first quarter of 2022). This gender differential is mainly shaped by differential trends in the services sector, where employment levels grew considerably more for females as compared to males.

►Figure 4 – Employment rates by educational level



This figure illustrates quarterly data on employment rates by educational level. It compares individuals with (a) primary, (b) vocational or secondary, and (c) tertiary educational levels, respectively. (The average in the second group is an unweighted average of the different subgroups with intermediate education.) The vertical red line indicates the end of the pre-reform period. Source: Authors' calculations based on Monstat's Labor Force Survey, Table 4-2 (Activity, employment and unemployment rates by school attainment and sex).

►Figure 5 – Yearly differences in employment rates by educational level



This figure illustrates quarterly data on employment rates by educational level. It compares individuals with (a) primary, (b) vocational or secondary, and (c) tertiary educational levels, respectively. (The average in the second group is an unweighted average of the different subgroups with intermediate education.) The vertical red line indicates the end of the pre-reform period. Source: Authors' calculations based on Monstat's Labor Force Survey, Table 4-2 (Activity, employment and unemployment rates by school attainment and sex).

One detail that is hard to observe in Figure 4 is that the different educational groups were experiencing differences in employment trends around the reform date. To highlight these differential trends, we compute seasonally adjusted changes in employment rates. Figure 5 presents the change in the employment rate (within a given educational group) from one quarter in a given year relative to the same quarter in the previous year. This captures the percentage point changes in the employment rates within each group over one year.

Figure 5 reveals a strong post-pandemic growth in the employment rates for the middle (secondary/vocational) and higher (tertiary) education groups. For both groups, the year-to-year change in employment rates turned positive in the third quarter of 2021; in the subsequent periods, this growth accelerated and remained positive through the sample period. Note that there is no visible interruption in the growth of employment rates in the first two quarters of the post-reform period. Moreover, the growth pattern is parallel for those with tertiary and secondary and vocational education. One might argue that the minimum wage reform should have little impact in the former and more impact in the latter group. The pattern suggests, however, that this educational difference did not result in any differential employment growth. On the contrary, we see almost perfectly parallel trends between these two groups between the third quarter of 2021 and the fourth quarter of 2022.

Given that wages are typically lowest for those with the lowest education levels, the group with only primary education is the one where the minimum wage reform should have had the most impact. Yet Figure 5 documents a different pattern for this subgroup. For those with primary education, there was only a modest post-pandemic recovery in the third quarter of 2021. In the fourth quarter of 2021 and the first quarter of 2022, the year-to-year change in employment rates is almost zero. While employment rates increased by about 5 percentage points in the second quarter of 2022, these year-to-year differences are smaller than those observed for the other educational groups. The same holds true for the remaining quarters of 2022.¹² The figure thus suggests that the recovery of employment rates among persons with the lowest educational level might have been slowed down by the 2022 minimum wage reform.

Next, we turn to changes in unemployment. Recall from above that the unemployment rate is computed relative to the total population and not simply mirroring the employment rates.¹³ Appendix Figure A.2 presents employment-specific rates. In line with the group differences in employment rates, we now observe that unemployment rates are higher for those with lower levels of education.¹⁴ Following the analysis from above, we compute the year-to-year differences in these unemployment rates. These percentage point changes in unemployment rates are illustrated in Figure 6.

The pattern observed in this figure differs from the changes in employment rates discussed above. Unemployment rates increased for all groups during the third and fourth quarters of 2020, and started to drop during 2021, the second year of the pandemic. The most pronounced drop is observed for the lowest education group. Moreover, the strong decline in employment rates (with year-to-year differences of roughly 10 percentage points) continued into the first two quarters of 2022. While the decline in unemployment rates was (in absolute terms) less strong for the intermediate education group, the patterns evolve almost parallel to the low education group between the first quarter of 2021 and the second quarter of 2022. Assuming again that the minimum wage has a stronger bite among the lower education group, we would have expected a negative impact from the reform. This is not supported by the survey data, which speaks against a meaningful impact of the minimum wage on unemployment.¹⁵

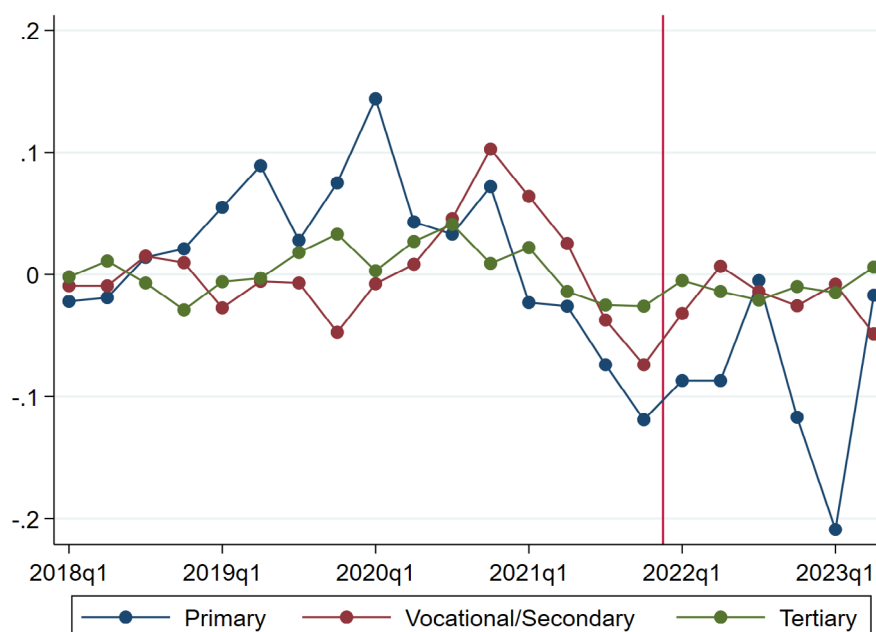
12 Keep in mind that the figure illustrates absolute (percentage point) growth in employment rates. Given the low baseline employment rate in the primary education group, the upward potential is limited. This caveat, however, does not affect the de-facto zero growth observed for this group in the fourth quarter of 2021 and the first quarter of 2022.

13 Put differently, employment and unemployment rates do not add up to 100 per cent. This is the case because both rates are computed relative to the total population (within a given age group), and there is a third, residual group which is outside the active (employed and unemployed) labor force.

14 The figure also shows strong seasonal variation for the low education group, which is not unusual for a group with employment in seasonally fluctuating service and agricultural jobs and unstable ties to the formal labor market. More remarkably, Figure A.2 documents that, during the first year of the pandemic, unemployment rates strongly increased, from 16 per cent in the first quarter of 2020 to almost 26 per cent in the fourth quarter of 2020 for the intermediate education group.

15 A different way of reading the graph would be to highlight the V-shape in the year-to-year changes for the primary and secondary education groups. One might argue that the decline in unemployment rates was reversed in the first quarter of 2022. Note, however, that (a) unemployment rates continued to fall in the first quarter of 2022, and that (b) this might reflect a mean reversal.

►Figure 6 – Year-to-year differences in unemployment rates by educational level



This figure illustrates quarterly data on employment rates by educational level. It compares individuals with (a) primary, (b) vocational or secondary, and (c) tertiary educational levels, respectively. (The average in the second group is an unweighted average of different subgroups with intermediate education.) The vertical red line indicates the end of the pre-reform period. Source: Authors' calculations based on Monstat's Labor Force Survey, Table 4-2 (Activity, employment and unemployment rates by school attainment and sex).

Summary

Overall, the aggregated and group-specific employment and unemployment data do not provide any clear evidence on the impact of the minimum wage reform. The labor market underwent a massive shock during the pandemic, followed by a rapid recovery. The economic fluctuations caused by Russia's war against Ukraine implied further macroeconomic volatility (such as energy price shocks and migration) that influenced labor markets from the second quarter of 2022 onwards. In this context, it is difficult to determine which patterns reflect general, macro trends and which are shaped by the 2022 reforms. The LFS data also needs to be interpreted with caution. Hence, this discussion only illustrates some aspects of the potential effects of the 2022 reforms.

With these caveats in mind, the data indicates that the recovery of employment rates for people with primary educational levels might have slowed down shortly before and after the 2022 minimum wage increase. However, we find no differential trend in unemployment rates for the lower education group as compared to the intermediate group. This suggests that the reform did not increase unemployment for the group with lower education levels. Given that this educational group only accounts for about 5 per cent of the labor force (and less than 15 per cent of the total working age population), one should not overemphasize this evidence. A more refined and reliable discussion on the employment effects of the reform is provided in Section 4.3, which examines administrative income tax data.

4.2 Outcomes from administrative tax data: CPT and VAT

This section extends the previous analysis by shifting our focus to firm outcomes, derived from corporate profit tax (CPT) and value-added tax (VAT) data. In addition to using administrative (rather than survey) data, the section also comes closer to providing a causal analysis. We compare the outcomes for firms which are *more* likely to be affected by the 2022 reforms with those for firms that are *less* likely (or not at all) affected by the reform over time. We will refer to the former as the *treatment*

group and to the latter as the *control group*. Under the assumption that the general time trend is the same for the treatment group and the control group (“common trend” assumption), we can infer the effects of the minimum wage reform by comparing the differences between the outcomes before and after January 2022. It is questionable if this assumption of a common trend is satisfied in our context, as the Covid crisis, Russia’s war against Ukraine and other events might have affected the two groups in different ways. However, it is possible to assess the plausibility of the assumption by comparing the groups before the introduction of the reform. If the pre-reform trends are similar between the two groups, it is plausible that the common trend assumption holds.

4.2.1 Methodology and outcome measurement

Defining treatment and control group

Based on our data sources, the CPT and VAT data, it is not straightforward how to define the treatment and control groups, as we do not directly observe individual wages at the firm level.¹⁶ Our approach thus relies on aggregate employment and wage information at the sectoral level. More specifically, we use two different data sources and methods to classify the firms into the treatment and control groups.

In our first approach, based on the SILC data, we calculate *the share of workers* in each sector who were *paid wages below the 2022 reform minimum wage* in the pre-reform period. Sectors with the largest shares of workers below the 2022 minimum wage form our treatment group. These are the manufacturing, wholesale/retail, accommodation and food, and administrative sectors.¹⁷ Sectors with a lower share of low-wage jobs constitute our control group. In our second approach, we classify the sectors according to the *average wages* paid before the 2022 reform. Specifically, we assign sectors to the treatment group if the average gross wages in a sector were below €600.¹⁸

The first and second approaches place the same sectors in the treatment and control groups. This point is illustrated in detail in Appendix Table A.2, which also documents which sectors are assigned to which group.

Data Sources and Outcomes

Our outcomes are derived from two different data sources. Based on the *CPT data*, we will discuss the reform’s impact on wages, the number of firms, total and average firm profits, as well as the total and average recorded corporate tax payments. This data is recorded annually, so the last pre-reform observation is for 2021 (see the horizontal line in the following figures). Our second source is the *VAT data*. This data, which is recorded monthly, allows us to study the reform’s impact on turnover and profits.

When we consider outcomes such as profits, turnovers, or corporate tax payments, we transform *nominal* into *real* values, consistent with 2019 prices.¹⁹ Hence, in almost all figures presented below (and in the Appendix), the effects of inflation is absorbed by this normalization exercise. There is important exception when we analyze wages. Given that minimum wage laws are based on nominal values, we will typically consider nominal wages (as in the next subsection and in Section 4.3). We will return to a discussion of inflation in Section 4.3.

¹⁶ At a late stage of this evaluation project, we obtained income tax data that allowed us to observe earnings data at the firm level. Combining CPT, VAT and income tax data would have allowed us to analyze within and between the sectors for a more fine-grained assessment. However, this data merging was not feasible within the narrow time frame of this evaluation project.

¹⁷ In our data, we calculate the following shares of “below the 2022 minimum wage” workers: C: Manufacturing (0.45), G: Wholesale/Retail (0.51), I: Accommodation and Food (0.42), and N: Administrative (0.43).

¹⁸ The average pre-reform wages in the four sectors were €585 in C: Manufacturing, €591 in G: Wholesale/Retail, €594 in I: Accommodation/Food, and €534 in N: Administrative.

¹⁹ The inflation adjustment is based on Montenegro’s domestic CPI (Consumer Price Index obtained from Monstat).

4.2.2 Results

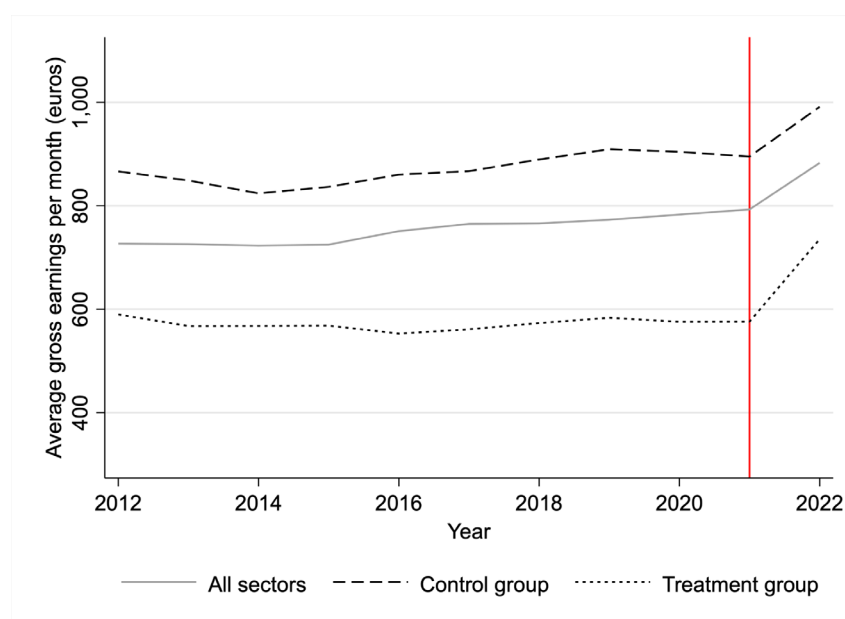
Nominal wages

As a starting point, we consider the minimum wage reform's effect on wages. We focus on nominal wages, as the minimum wage is defined in nominal and not real terms. To do so, we compare the development of average nominal gross wages over time between the treatment and control groups. As mentioned above, firms in both groups will be affected by the 2022 reform. We argue, however, that the bite of the minimum wage – the share affected by the 2022 increase in the minimum wage – is stronger in the treatment group.

Figure 7 indicates that average gross wages in the two groups are relatively stable between 2012 and 2021.²⁰ More importantly, the modest ups and downs observed between 2018 and 2021 tend to occur in similar ways in both groups. Both observations support the common trend assumption. After the 2022 minimum wage reform, we see – as expected – stronger nominal wage increases in the treatment group as compared to the control group. Between 2021 and 2022, average wages increased by 27.8 per cent in the treatment group (from €576 to €736), and only by 10.8 per cent in the control group (or €96).²¹

This finding supports our research design, documenting that the reform had a differential impact. It also illustrates that the minimum wage unambiguously increased nominal wages (a point that is further corroborated and discussed below in Section 4.3). Hence, firms seemed to comply with the new minimum wage regulations. With our data, however, we can neither rule out nor quantify non-compliance.

►Figure 7 – Average gross wages (nominal) over time



Nominal gross average wages by industry sectors. The vertical red line indicates the last period before the reform. Source: Authors' computations based on Monstat data (web), 2012–2022.

Number of firms

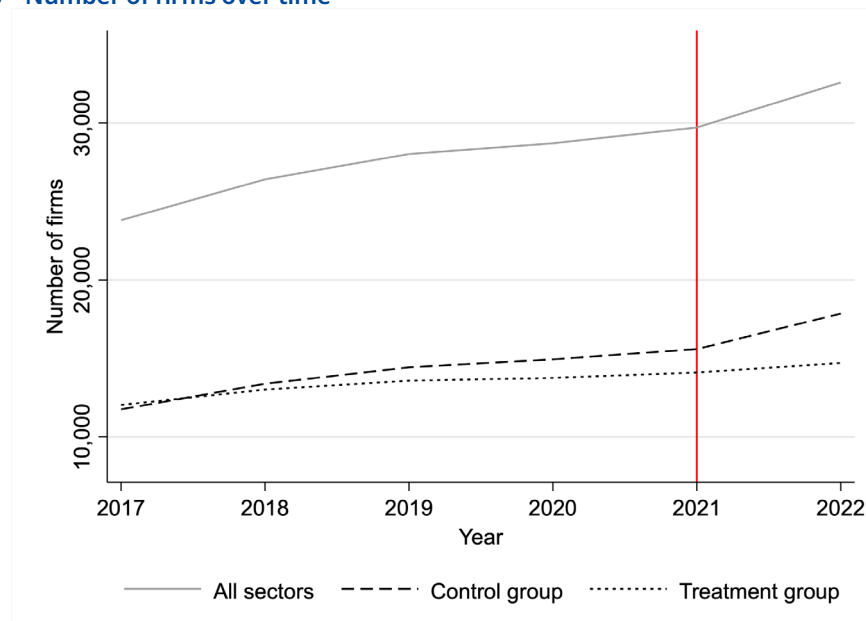
Next, we examine if and how the differential increase in gross wages between the treatment and control groups has affected other firm-level outcome variables. Let us first consider the sheer number of firms. Figure 8 indicates that, already in the pre-reform period, the number of firms (observed in the CPT data) in the two groups followed slightly different trends. The growth in firm numbers in the control group became more pronounced after 2018. After the 2022 reform, the differential trend

²⁰ The figure also documents significant differences in the average wages. These differences, however, (a) emerge through the construction of the groups, and (b) do not present a problem for our approach.

²¹ The picture is very similar when we look at net rather than gross wages (see Appendix Figure A.3).

became even stronger: from 2021 to 2022 there was a sizable increase in the number of firms in the control group, but only a modest increase in the treatment group. Relative to the control group, the number of firms declined in the treatment group. This trend is the first indication that the 2022 reform might have had a negative impact on sectors that were more affected by the reform. In fact, one might interpret the pattern as evidence suggesting that the reform led to fewer firms remaining or starting operations in the formal sector.²²

► Figure 8 – Number of firms over time



The figure illustrates the number of firms observed in the CPT data (all sectors, including the treatment and control group sectors). The vertical red line indicates the last period before the reform. Source: Authors' computations based on Corporate Tax Data, 2017–2022.

Table 1 provides a more detailed picture of the change in the number of firms from 2021 to 2022. In the control group – the sector where the minimum wage reform had a weaker impact – the number of firms grew on average by 14.51 per cent from 2021 to 2022.²³ In the treatment group, there was a much more modest growth of 4.26 per cent. Hence, there is a negative differential of more than 10 percentage points for sectors that were more exposed to the minimum wage reform relative to other sectors.

Table 1 further deconstructs the trend for each of the four sectors in the treatment group. For the accommodation and food sector, we observe the weakest growth rate of 1.55 per cent. This is followed by manufacturing, where firm numbers grew by 1.97 per cent. Hence, for these two sectors, there is a differential to the control group of more than 12 percentage points. For the large wholesale and retail sector, there was a 3.97 per cent growth, implying a growth differential of 10.5 percentage points. Only in the fourth sector, administration, do we see a similar growth rate (14.07 per cent) as in the control group.

²² A similar pattern is observed in Appendix Figure A.4, which considers the number of firms covered by the VAT data. Keep in mind, however, that these data are more difficult to interpret, since the number of VAT filing firms was affected by the 2021 reform of the mandatory VAT reporting threshold (see Section 2.4).

²³ Note that one obtains very similar growth numbers if one excludes single sectors from the control group. This holds, in particular, for the relatively small information and communications sector (ICT), which experienced specific trends after the start of Russia's war of aggression in Ukraine.

►Table 1 – Number of firms by treatment group sector

Number of firms	2021	2022	Difference	Difference (in%)
Control group:	15,585	17,847	2,262	14,51
Treatment group	14,113	14,714	601	4,26
<i>Manufacturing</i>	2,137	2,179	42	1,97
<i>Wholesale/Retail</i>	7,059	7,339	280	3,97
<i>Accommodation/Food</i>	3,297	3,348	51	1,55
<i>Administrative</i>	1,620	1,848	228	14,07

Following the spirit of a differences-in-differences design, the table documents the number of firms in the control and the treatment group in 2021 and 2022 as well as their year-to-year differences. The table further indicates these values separately for the four sectors in the treatment group. Source: Authors' computations based on Corporate Tax Data, 2017–2022.

Profits and corporate tax payments

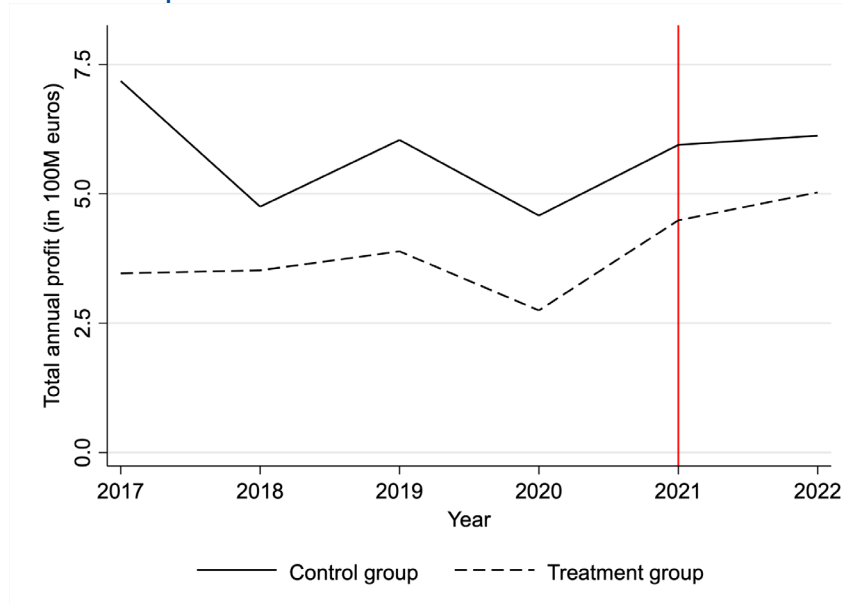
Another important outcome beyond the mere number of firms are the firms' profits and turnovers. We first consider trends in profits (Figure 9) and corporate profit taxes (Appendix Figure A.5).²⁴ During the pre-reform period, we observe more volatility in profits and taxes than what was reflected in the number of firms alone. There was a clear drop in profits in 2020, reflecting the economic consequences of the pandemic. After 2020, we see an increase in profits for both the treatment and control groups. For both groups, we continue to observe a positive trend in profits in the post-reform years. Interestingly, however, the positive trend is somewhat stronger for firms in the treatment group. This is striking, as these firms should also have experienced a larger increase in labor costs as compared to the control group.

One possible interpretation of this pattern and the one observed in Figure 8 above is related to the idea of "differential selection": more profitable firms in the treatment group are more likely to expand (and remain in the formal sector) after the reform. If, vice versa, less profitable firms among the treatment group are more likely to exit the market, this could explain the diverging post-reform trends observed in Figure 9. This would also suggest that the reform's attempt to counterbalance the cost shock for firms by cutting income taxes and abolishing health insurance contributions (the 2022 reform's second and third pillars) was only partially successful. We will return to this subject below.

The post-reform trends depicted in Appendix Figure A.5 are more difficult to interpret. This is due to the corporate tax reform (see Section 2.3), which affected the 2022 outcomes. The shift from a flat to progressive corporate profit tax scheme can explain why the 2021–2022 trends differ between Figures 9 and A.5. Independently of these differences, however, the comparison of the two figures clearly indicates that the corporate tax reform contributed to a significant increase in tax revenues despite relatively modest increases in profits (see Figure 9).

²⁴ The illustrations show a very similar pattern, which is not surprising given that corporate taxes are a deterministic function of profits.

► Figure 9 – Total annual profits



This figure illustrates total annual profits in the treatment and control group sectors, respectively. All values are expressed in real terms (CPI deflated to 2019 prices). The vertical red line indicates the last period (2021) before the reform. Source: Authors' computations based on Corporate Tax Data, 2017–2022.

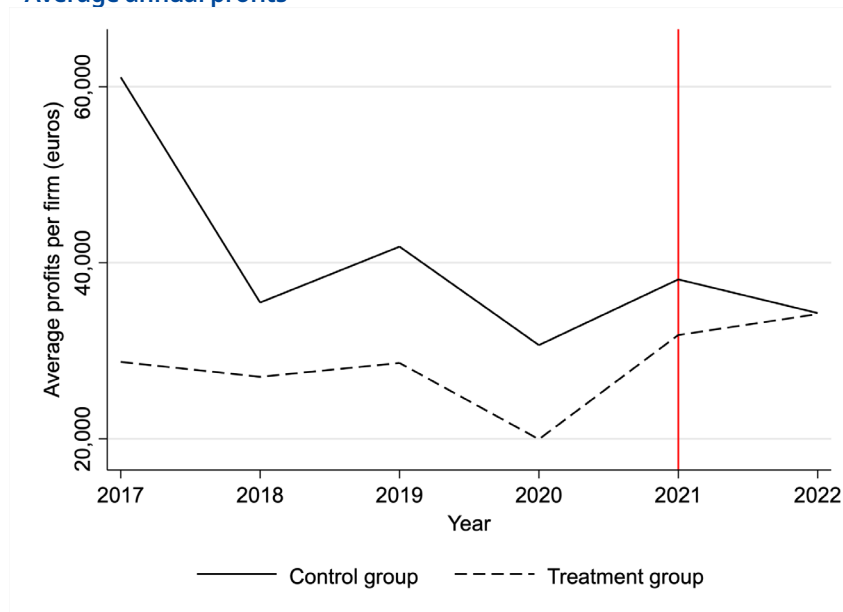
Above we studied *total* profits and total corporate profit taxes. In the next step, we turn to average profits (as well as the average taxes paid) per firm. Note that these averages are much more sensitive to outliers. It is therefore not surprising that Figure 10 and Appendix Figure A.6, which consider average profits and average taxes, indicate more volatility. Except for diverging trends from 2017 to 2018, Figure 10 shows similar trends for both groups between 2018 and 2021. In line with the results documented in Figure 9, we see again an increase in treatment group profits in the first post-reform year 2022. At the same time, average profits decline among control group firms.²⁵

As noted above, this seems inconsistent with the impact of higher wage costs, which should more strongly affect the treatment group. Yet these results are consistent with a pattern that has been documented in the minimum wage literature: large increases in the minimum wage reduce the number of firms in the formal economy, and the firms leaving tend to be smaller and less profitable than those that survive (Dustmann et al. 2022; Luca and Luca 2019).²⁶ This could lead to an increase in average profits. However, one must treat this interpretation with caution, as the year 2022 might also reflect differential trends in post-Covid recovery and sector-specific trends in profits.

²⁵ Appendix Figure A.6 presents a similar pattern. Recall, however, that the same caveats discussed in the context of Figure A.5 apply here. The taxes from 2022 reflect the corporate tax reform, which – given its progressive tax schedule – differentially affected firms in the treatment and control groups.

²⁶ Similar findings have been documented before, as when Germany introduced its minimum wage in 2015 (see Dustmann et al. 2022), or in the context of local, city-wide minimum wage adjustments for the restaurant sector (see Luca and Luca 2019).

► Figure 10 – Average annual profits



The figure illustrates average annual profits in the treatment and control group sectors, respectively. All values are expressed in real terms (CPI deflated to 2019 prices). The vertical red line indicates the last period (2021) before the reform. Source: Authors' computations based on Corporate Tax Data, 2017–2022.

Turnover and VAT payments

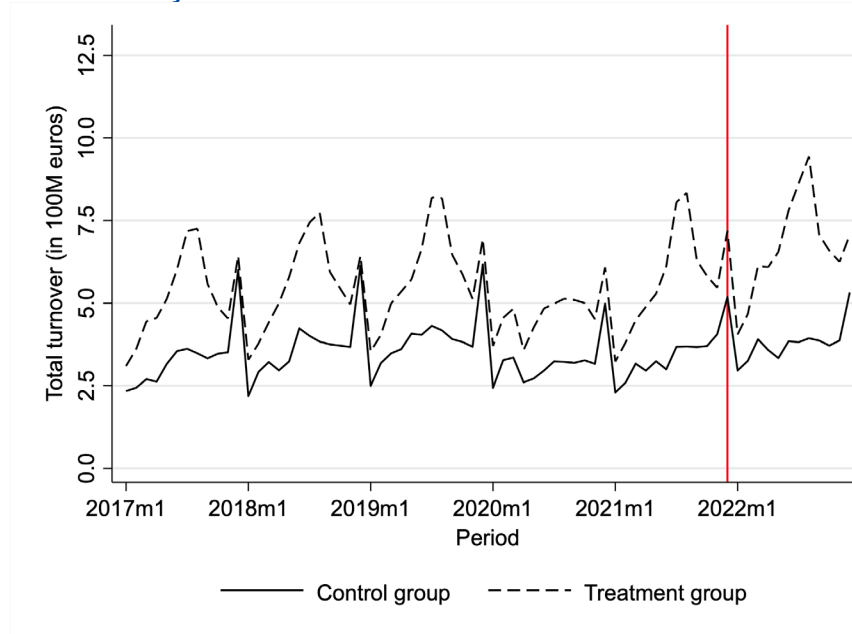
We next examine firms' turnover and VAT payments as reported by the VAT data. As discussed above, this administrative data allows us to observe monthly outcomes. Unsurprisingly, there are strong seasonal patterns. These patterns, however, differ between the treatment and the control groups (see Figures 10 and A.7). This divergence is mainly driven by the food and accommodation sectors (part of the treatment group), which strongly rely on tourism in the summer months.

Figure 11 shows that, in contrast to profits, overall turnover is higher in the treatment group than in the control group. However, the difference hardly changes between 2017 and the end of 2019. The first year of the pandemic clearly impacted turnovers, especially during the summer months (and more strongly in the treatment group, reflecting the drop in tourism). Turnover trends in 2021, in contrast, look very similar to the patterns observed in 2019. In the 2022 post-reform period, one observes no obvious differential changes relative to 2021. Hence, there is no clear evidence indicating that the 2022 reforms affected firms' turnover or output VAT.²⁷

We also examined firms' *average* turnovers and average VAT payments. The resulting patterns, which are presented in Figure 12 and Appendix Figure A.8, corroborate the observations made above: that the 2022 reform did not have a quantitatively meaningful impact on turnovers or output VAT.

²⁷ Appendix Figure A.7 illustrates the corresponding time series for output VAT. Keep in mind that actual VAT payments also reflect the VAT rate adjustments discussed in Section 2.4. In general, however, the figure shows a very similar pattern as the one presented in Figure 11.

►Figure 11 – Total monthly turnover

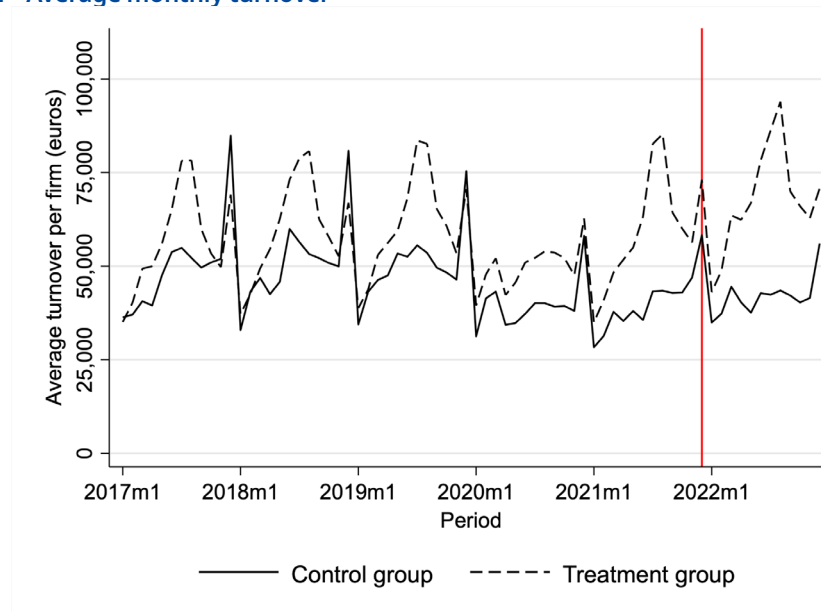


Notes: The figure illustrates the total turnover in the treatment and control group sectors, respectively. All values are expressed in real terms (CPI deflated to 2019 prices). The vertical red line indicates the last period (December 2021) before the reform.

Source: Authors' computations based on VAT data, 2017–2022.

Finally, note that there is a general increase in turnovers in 2022 for both groups, which is visible for the total and average turnovers (as well as for VAT payments). This general upward trend can be due to numerous factors. First, this might simply reflect trends from the post-pandemic recovery (see Section 4.1). Second, firms might partially pass on higher labor costs to consumers; evidence of this phenomenon can be seen in the aftermath of Hungary's minimum wage reform in 2001 (see Harasztosi and Lindner 2019). Moreover, given the decline in the number of treatment group firms after the minimum wage reform, this could also indicate an increased market concentration and, with that, the firms' ability to increase prices. However, this interpretation is less plausible, since turnovers in the treatment group should also have differentially increased, and this is not supported by the data.²⁸

►Figure 12 – Average monthly turnover



The figure illustrates the average turnover in the treatment and control group sectors, respectively. All values are expressed in real terms (CPI deflated to 2019 prices). The vertical red line indicates the last period (December 2021) before the reform. Source: Authors' computations based on VAT data, 2017–2022.

²⁸ One might argue that this effect should be more pronounced in our treatment group (as compared to our control group). While this is in principle correct, the previous literature on the incidence of minimum wage increases has also highlighted the predilection of firms to increase market prices in response to wage shocks (Harasztosi and Lindner 2019). This and other effects might be in play in sectors beyond the treatment and control group sectors.

Summary

In line with the evidence from the aggregated data on employment and unemployment, the analysis of the differences between firms in the sectors more or less affected by the reform does not indicate any sizable impact on these firms. Most importantly, the data reject the hypothesis that the reform caused pronounced damage to firms in terms of lower profits or lower turnover.

However, our analyses unearth a series of suggestive pieces of evidence that point to several smaller adjustments in the economy. First, as we will discuss below, average wages were significantly affected by the reform. Second, there is a declining number of firms in sectors more exposed to the 2022 reforms relative to the growth of firms observed in other sectors. Thirdly, we observe a slightly stronger increase in profits and turnovers in sectors more exposed to the 2022 reforms as compared to other sectors. This observation might be closely related to the second one, which could hint at differential selection: if less profitable firms with lower turnover are more likely to exit the market, at least formally, this could explain both the second and the third observations. This explanation would be consistent with earlier evidence on the impact of minimum wage reforms (see Dustmann et al. 2022; Luca and Luca 2019).

4.3 Wage distribution and net employment effects

Our third set of analyses examines the reform's impact on the wage distribution and changes in net employment along the earnings distribution. More specifically, we make use of the income tax data, which allow us to observe all formally employed (and taxed) income recipients as well as their gross earnings. Based on these data, we will then compare microdata on pre- and post-reform distributions of earnings. Given that our analysis is based on taxed earnings, any reform impact on informal or untaxed labor is not covered.²⁹

►Table 2 – Descriptive income tax data

	2017	2018	2019	2020	2021	2022
Job count (weighted)	145,832	153,175	157,301	154,301	156,752	159,482
Working hours	38,36	38,13	37,93	37,68	37,50	37,28
Full-time share (%)	0.92	0.91	0.91	0.90	0.89	0.88
Nom.FTE earnings (€)	618.37	617.04	633.88	648.53	662.78	782.81
Defl.FTE earnings (2022 €)	753.33	715.07	731.94	750.78	749.21	782.81

The table indicates the number of workhour weighted jobs in an average month, the share of full-time employment contracts, average working hours, as well as nominal ("Nom.") and real ("Defl.") full-time equivalent (FTE) earnings. (In the weighted job count, a 10 or 20 hour-per-week contract would count as 0.25 or 0.5, respectively; a full-time job of 40 hours per week would count as 1. Real earnings, deflated by the consumer price index (CPI), are expressed in 2022 terms.)

Source: Authors' computations based on monthly income tax data, which covers January, May, September, and December of each year.

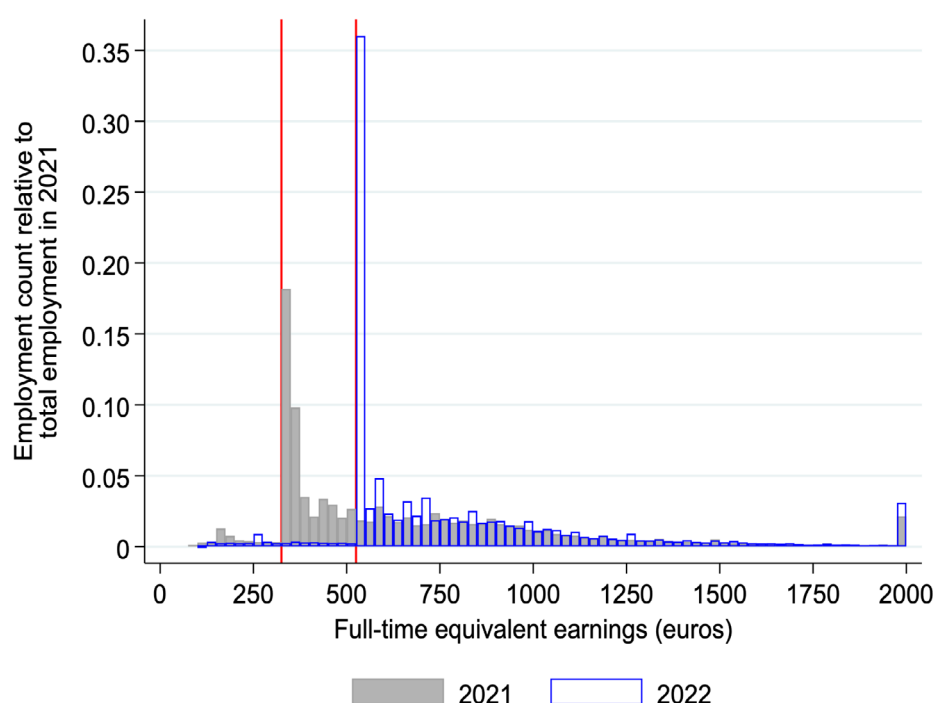
²⁹ Evidence on the impact of minimum wages on earnings in the informal economy in Latin America is discussed in Pérez Pérez (2020).

4.3.1 Descriptive evidence

We will first descriptively examine the income tax data. Table 2 provides some basic employment and wage statistics for the full sample of wage earners for the months (January, May, September, and December) covered by the available data.³⁰ The table indicates a strong growth of full-time equivalent (FTE) jobs between 2017 and 2019. After a drop in 2020, the first year of the global pandemic, the number of jobs recovered. The FTE employment level in 2022 (after the reforms) surpassed the 2019 level.

Table 2 also indicates a high share of full-time jobs, which only slightly declined from 92 per cent to 88 per cent over the sample period. In line with this, we also see a small decline in the average working hours, from 38.36 to 37.28 hours per week. Most importantly, however, the Table reflects the strong impact of the 2022 reform on average FTE wages. Nominal FTE earnings jumped by almost 20 per cent, from €663 in 2021 to €783 in 2022. In light of high inflation, however, the increase was much more modest in real terms.

►Figure 13 – Distribution of gross earnings for 2021 and 2022



This histogram illustrates the distribution of nominal (gross) earnings for 2021 and 2022, respectively. Employment counts are expressed relative to total (FTE) employment within each year. The top income bracket includes all full-term equivalent jobs with gross earnings of €2,000 or more. The red lines surround the income bracket containing the gross minimum wages for the years 2021 (€331.3) and 2022 (€532.5), respectively. Source: Authors' computations based on monthly income tax data, which cover the months January, May, September, and December for each year.

Next, we want to study the evolution of the earnings distribution. Given that statutory minimum wages are defined in nominal terms, we will focus on nominal earnings. (In a sensitivity analysis, we will discuss the case of real earnings.) Our analysis utilizes a method introduced by Harasztosi and Lindner (2019) and Cengiz et al. (2019). These authors have highlighted that statutory minimum wages typically result in what the economics literature calls “bunching” at these wage thresholds: instead of a smooth distribution of wages or earnings, there is an over-abundance of wages or earnings at

³⁰ To account for possible mistakes and to limit the role of extreme values, we winsorized the data, dropping the bottom and top percentiles from the FTE earnings distribution.

exactly the minimum wage (or slightly more). This point is illustrated in Figure 13, which presents the distribution of full-time equivalent (nominal) gross earnings for the available months of 2021 and 2022.

The gray bars, which indicate the distributions of FTE gross earnings for the year 2021, indicate massive bunching around incomes ranging from €325 to 350, which coincides with the gross minimum wage of €331 that applied until September 2021. Around 18 per cent of all earnings covered by the 2021 income tax data are concentrated in this range. Another 10 per cent are concentrated in the next bracket (€350–375), which includes the gross minimum wage of €371 that applied after the adjustment in October 2021.³¹ In contrast to these bunching areas, the rest of the 2021 distribution is spread much more evenly along the earnings range.

For the year 2022, we observe a similar pattern, with the important exception that the minimum wage reform shifted the bunching point: the blue bar now indicates that more than 35 per cent of all FTE gross earnings in 2022 are in the €525–550 range, which encompasses the post-reform gross minimum wage of €533. This descriptive pattern highlights the strong grip of the minimum wage: more than a third of all observed earnings seem to be right at the new statutory minimum wage.

4.3.2 Results

Since Figure 13 presents earnings distributions within each year, one cannot evaluate any reform-induced changes in employment. To examine how net employment numbers have changed, we therefore compute – for each bracket along the gross earnings distribution – the change in the number of FTE employees within a wage given bracket between 2022 and 2021. This simply yields the net increase or decrease in the absolute number of jobs in a given wage bracket.³² We then translate these absolute numbers to changes in employment by comparing the net changes in each bracket with the total number of FTE jobs observed in the baseline year (such as 2021). Figure 14 presents these relative net changes in employment. (For details on this method, see Harasztosi and Lindner 2019; Cengiz et al. 2019.)

Main results

The observed pattern again documents the strong effects of the reform. The sizable negative values of the gray bars in the range with gross earnings between roughly €300 and €525 simply reflect that almost all jobs with earnings in this range -- which fell below the new gross minimum wage -- disappeared. The red line in Figure 14, which captures the cumulative net gains and losses in FTE equivalent jobs, indicates net job losses of almost 44 per cent in the earnings range between zero and €525. In the earnings bracket covering the new gross minimum wage, however, there is a net job gain of almost 35 per cent.³³ As a result, the cumulative employment change jumps from -44 per cent to -10 per cent (relative to the 2021 employment stock). This means that a large share of the “lost” observations (below the new minimum wage) simply reappeared right at the minimum wage.

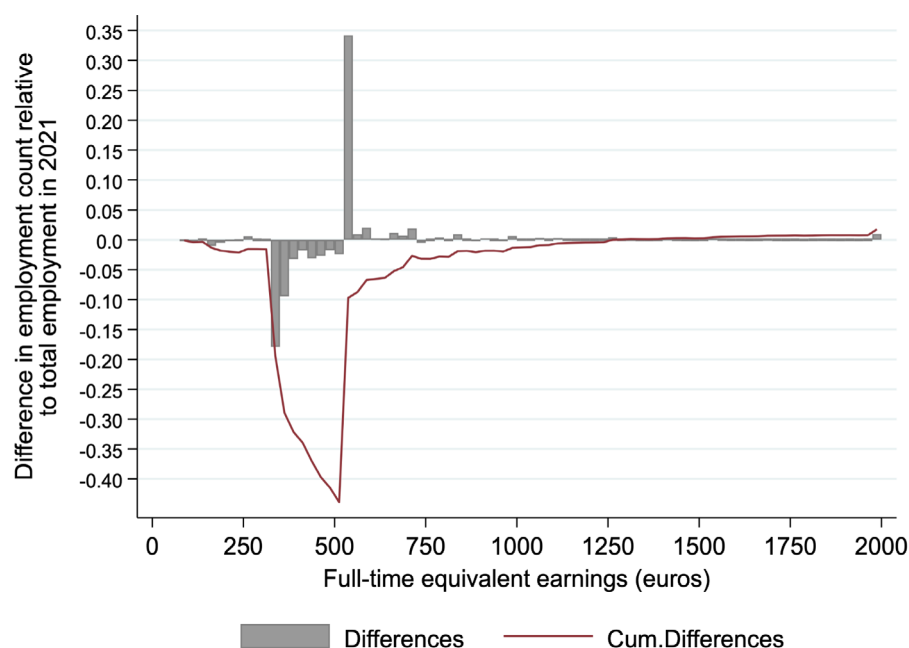
Figure 14 further indicates small but non-trivial net employment gains in the earnings range between €550 and €1,000. As a result, the net employment loss further shrinks, and at earnings of €1,250 it turns positive. Put differently, if we account for all net job losses and all net job gains in the entire earnings range up to €1,250, there are no differences – or no FTE equivalent employment losses – relative to the pre-reform year. This data thus confirms some of the observations made in Section 4.1.

³¹ Keep in mind that our data only includes the months of January, May, September and December. Hence, the 2021 reform in October only affected one out of these four months.

³² Let us emphasize the implications of the net aspect of this difference. Consider, for instance, the earnings bracket in the range of €325–350. When we observe a year-to-year difference of -1,000, this does not directly translate into an actual loss of jobs. It just means that, in this earnings range, there were 1,000 more jobs disappearing than there were created (if any). The disappearing jobs, however, might just reflect that some or even most of the workers received a pay raise, like from €335 to €535. The net losses in the lower income bracket (€325–350) might thus be compensated by net gains in another bracket (in this example, in the €525–550 range).

³³ As compared to other minimum wage reforms in the literature (Harasztosi and Lindner 2019; Cengiz et al. 2019), these are huge numbers, reflecting the massive impact of the reform on the wage distribution.

► Figure 14 – Net differences in FTE employment: 2022 vs. 2021



The gray bars of the figure illustrate, in the spirit of Cengiz et al. (2019), the differences in the number of full-time earners between the years 2022 and 2021 within each income bracket, relative to the overall number of full-time equivalent jobs recorded in 2021. (A negative bar in the range of -0.2 indicates, for instance, that 20 per cent fewer jobs were observed in this income bracket.) The red line indicates the cumulative differences, or the sum of the differences indicated by the gray bars, up to a given point within the earnings distribution. The top bracket includes all full-term equivalent jobs with earnings of €2,000 or more. Source: Authors' computations based on monthly income tax data, which covers the months of January, May, September, and December for each year.

How can we interpret the net employment gains above the new minimum wage in the range of €550 to €1,250? The pattern, which has been observed in several other minimum wage studies (see Autor et al. 2016; Cengiz et al. 2019; Brochue et al. 2023), reflects spillovers of the minimum wage reform in the form of wage increases for workers who already earned wages at or slightly above the new bunching point in the pre-reform period. The causes of these wage spillovers are still not fully understood. But a widely shared interpretation of these spillovers is that they reflect firms' efforts to maintain a certain "wage hierarchy", where some jobs or tasks within a firm are expected to yield sufficiently higher earnings than others. Given that any minimum reform mechanically increases wages at the lower end of the earnings distribution, firms seem pressured to also raise wages above the minimum wage cutoff to reduce the compression of wages and earnings.

A last point worth noting is that the total cumulative net employment change adds up to 1.7 per cent.³⁴ Hence, despite the minimum wage reform, the total amount of FTE jobs grew by almost 2 per cent relative to 2021. Admittedly, the earnings distribution in the baseline year 2021, which serves as our point of reference, might still reflect the effects of the pandemic. However, as we will see below, the general message from our analysis survives a series of robustness checks.

Sensitivity analysis

To assess the robustness of the results captured in Figure 14, we conducted a series of sensitivity analyses. First, we considered the role of the minimum wage adjustment in October 2021. According to our data, this small adjustment only affected the earnings observed for December 2021. To assure the accuracy of this analysis, we re-computed the earnings distributions based on the monthly income tax data for the three other available months in 2022 and 2021.³⁵ The resulting earnings distributions, and the distribution of net employment changes (Figures A.9 and A.10), are almost indistinguishable

³⁴ In the top income bracket, which summarizes all net employment changes for earnings above €2,000, there is further positive growth.

³⁵ Expressed differently, we have excluded the data for the December months of 2021 and 2022.

from those presented above. Hence, the small 2021 minimum wage adjustment plays a negligible role in shaping the pattern documented in Figure 14.

Second, we considered the earnings distribution for the year 2019 as an alternative reference point. This way, we can compare changes in the earnings distribution to a baseline that was not influenced by the pandemic. Nevertheless, Montenegro implemented a reform of the statutory minimum wage in July 2019.³⁶

Following the same method described above, we computed the differences in FTE jobs observed along the earnings distribution. The outcome from this exercise, which is presented in Appendix Figure A.12, is qualitatively similar to the result found in Figure 14. When compared to the 2019 earnings distribution, the 2022 reform led to the disappearance of more than 45 per cent of jobs with gross earnings below €525, out of which the vast majority (35 per cent of all 2019 FTE jobs) reappeared right at the new 2022 minimum wage. Together with wage spillovers in the range of €550 to €1,500, the net employment effect is again close to zero. However, when using 2019 as a comparison group, the cumulative net employment effect remains slightly negative, as long as one excludes jobs with earnings above €2,000. When we include the latter, the net employment effect becomes positive (1 per cent; see Figure A.12 for more information).

Our third sensitivity analysis returns to our initial comparison of the 2021 and 2022 earnings data. However, we now turn our focus from nominal to real earnings. Conceptually, note that this conflicts with the nature of minimum wage laws, which generally define wages in nominal terms. To account for this and to maintain our focus on the new 2020 gross minimum wage, we account for inflation by transferring the 2021 earnings into 2022 prices. (We implement deflation using the annual CPI change from 2021 to 2022.) It is important to acknowledge that this is a fairly theoretical exercise, as we are artificially scaling up the 2021 earnings. The results from this approach must be therefore interpreted with caution.

Reflecting a relatively high inflation rate, this exercise induces a non-trivial upward shift of the 2021 earning distribution. For instance, the €331 nominal gross earnings amounting to the 2021 minimum wage correspond to €374 in 2022 prices. As a result, we obtain different values in the net employment change along the earnings distribution (see Figure A.14). Most importantly, the cumulative employment differences already turn positive for gross wages slightly above the minimum wage at €625. Reflecting wage spillovers, the cumulative differences further increase at the higher earnings levels, reaching a peak with a roughly 5 per cent net gain in FTE jobs in the range of gross earnings up to €1,000.³⁷ This result is reassuring, once more rejecting the conjecture that the 2022 reform had a negative employment effect.

Summary

The evidence derived from the income tax data, which allows us to observe earnings at the individual level, document the massive impact of the 2022 reform on the earnings distribution. In 2021, almost 40 per cent of full-time equivalent jobs paid wages below the new minimum wage. The new statutory minimum wage eliminated jobs with gross earnings of €330 to €500, lifting roughly 35 per cent of jobs to the new minimum wage. In addition, the data documents a net increase in jobs with earnings above the new minimum wage. This wage spillover, which has been documented in several other minimum wage evaluations (Autor et al. 2016; Cengiz et al. 2019; Brochue et al. 2023), seems to reflect the firms' efforts to maintain earning hierarchies in the aftermath of reform-induced wage compression.

Beyond this impact on the wage distribution, the analysis again rejects the idea that the 2022 reform had a strong negative effect on employment. On the contrary, the income tax data documents a slightly positive net change in full-term equivalent earnings between 2021 and 2022 (and between 2019 and 2022). While this result is based on a simple pre- and post-reform comparison, it is consistent with the survey-based results discussed in Section 4.1 and with the modern minimum wage literature (see Manning 2021 for an overview). This literature documents that minimum wage increases typically cause only modest positive or negative changes in total employment. In line with this, our analysis of Montenegro's income tax data indicates that the country's 2022 reforms yielded a significant boost in wages that did not produce any detectable drop in the total number of jobs.

³⁶ This point is reflected in Figure A.11, which shows, for the year 2019, bunching at two earning levels, which correspond to the minimum wages that applied in the first and second halves of 2019.

³⁷ However, by definition, the total net change in FTE jobs – as observed in the highest earnings bracket – must be identical when comparing real and nominal earnings (compare Figure 14 above).

► 5. Concluding Discussion

5.1 Summary of main findings

Main findings

In this report, we have evaluated the impact of Montenegro's 2022 minimum wage and income tax reform. Studying outcomes at the firm and individual levels, we have derived several important findings.

First, the reform had a massive impact on the earnings distribution. Relative to the pre-reform wage distribution, almost 44 per cent of all wage earners were directly affected by the minimum wage increase. Nearly 35 per cent of jobs appeared at the new minimum wage after the reform. Relative to other minimum wage reforms in the literature (see Manning 2021), these are huge numbers. The numbers reflect the ambitious scale of Montenegro's reform, which raised the net minimum wage by 80 per cent (and the gross minimum wage by roughly 60 per cent).

Second, in addition to mechanically lifting the earnings of a large share of low-wage earners, we also observe positive spillovers on jobs with earnings *above* the minimum wage. Firms seemed to respond to wage compression by increasing wages in the income bracket above the minimum wage (for full-time jobs earning between €550 to €1,250). As a result, and in line with similar wage spillovers documented in the literature (Autor et al. 2016; Cengiz et al. 2019; Brochue et al. 2023), there is a net growth in the number of jobs in this wage segment.

Third, despite the sizable effect on earnings, we find absolutely no support for the argument that the reform produced a detectable loss of employment. Comparing the years 2021 and 2022, the number of taxed full-time equivalent jobs in the segment of the income distribution that was directly or indirectly (via wage spillovers) affected by the reform remained constant. Given that the number of high-income earners slightly increased, the total employment effect of the reform was positive.

Turning to firm-level outcomes, our fourth finding indicates that the number of firms in sectors more strongly impacted by the minimum wage slightly declined (relative to the number of firms in sectors where the reform had a weaker impact). Fifth, we also observe an increase in the firms' average profits and turnovers in these sectors (relative to firms in the other sectors). Both the decline in the number of firms and the simultaneous increase in average profitability might be due to less profitable firms with lower turnover being more likely to exit the market (at least formally) in response to the reform. This differential selection effect would also be consistent with the results documented in previous minimum wage studies (see Luca and Luca 2019). It is important to keep in mind, however, that the exit of less productive firms creates potential for growth in the mid-term: as documented in Dustmann et al. (2022), workers from less productive firms might join more productive firms, thus creating potentially positive reallocation effects.

Limitations

Throughout this report, we were transparent in highlighting its limitations. While the main findings survive a series of robustness exercises, it is nevertheless important to reiterate the main limitations.

Some limitations relate to contextual factors. The global economic crisis and the numerous technological adjustment processes that occurred during the Covid pandemic also affected Montenegro. For the two pre-reform years of 2020 and 2021, many outcomes studied in our evaluation might therefore be driven by the pandemic (and the post-pandemic recovery).

We also faced constraints related to data and research design. While we are grateful for having obtained income tax data, the data arrived at a very late stage in this evaluation project. Hence, we did not have the opportunity to merge firm-level data and income tax data, which would have allowed us to determine the reform's impact at the individual firm level. This also meant that the research design in Section 4.2 was constrained to a comparison between sectors and did not include a comparison

between firms within a given sector. This would have also enriched the research design of Section 4.3, which is constrained to a pre- and post-reform comparison. Finally, the monthly income tax data did not include the summer months. Thus, our assessment of the reform's impact on the jobs in the tourism sector in Section 4.3 was limited.

5.2 Possible extensions

The analyses presented in this report could be extended in numerous directions. First and foremost, a comprehensive set of income tax data covering all 12 months of the year and a longer period after the 2022 reform would allow for a series of more refined results. This would allow us to address several of the limitations highlighted above.

Second, one would need slightly different data to expand the scope of the evaluation. The ILO provided us with specific questions to be addressed in this evaluation (see Section 3.1). In addition to those answered above, this also included questions on the reform's impact on informal labor as well as on the transition from informal to formal employment. We acknowledge that these are interesting and important points. One empirical strategy to address these would rely on survey strategies that aim at quantifying informality. In addition to surveying a random set of the population, one could also employ surveys that target former workers of firms that disappeared from the official records. This would allow us to derive conclusions on the reform's impact on the transition between the formal and the informal economy. One could also follow workers within formally operating firms to understand how much of the reform's productivity gains are associated with an increase in informal unpaid working hours. This would enable us to quantify non-compliance with minimum wages.

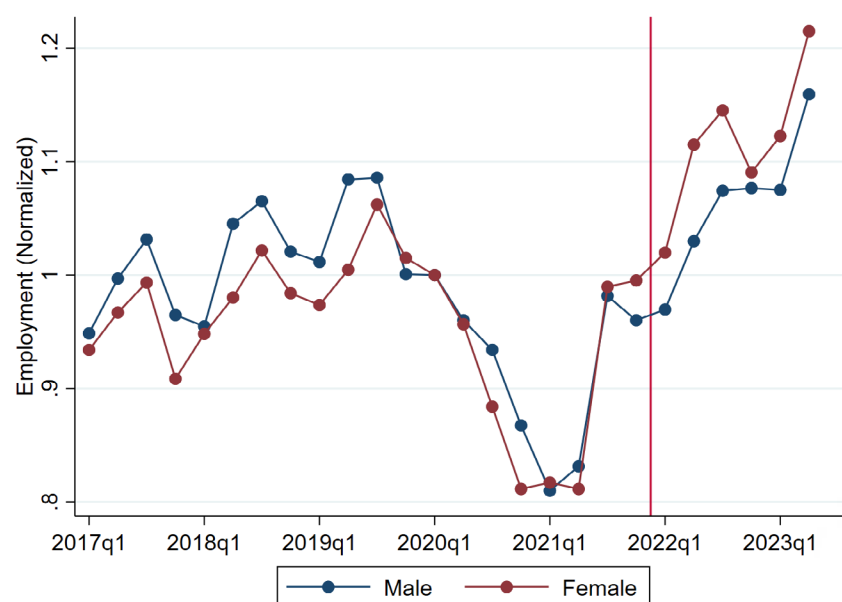
► References

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► Appendix

Complementary figures

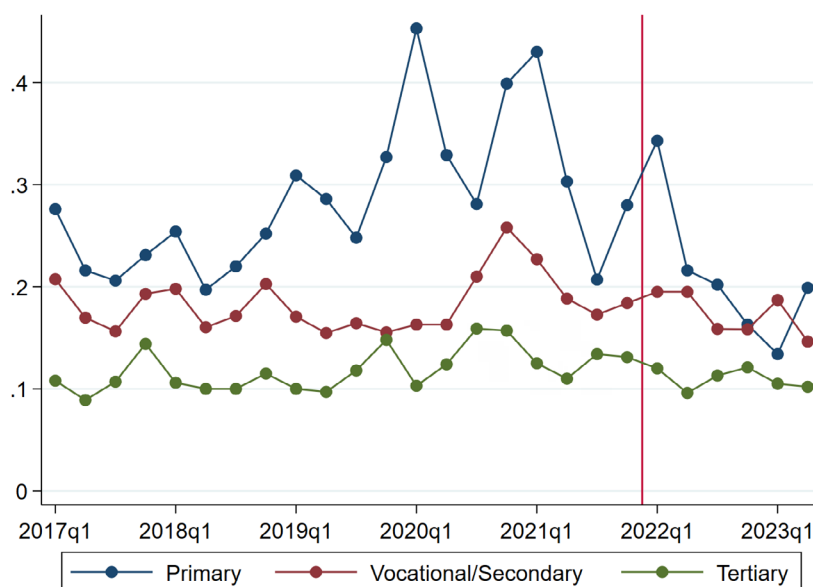
► Figure A.1 – Gender-specific trends in employment
(normalized relative to the first quarter of 2020)



The figure illustrates quarterly data on the number of males and females in employment, normalized by the numbers observed for the first quarter of 2020. The vertical red line indicates the end of the pre-reform period.

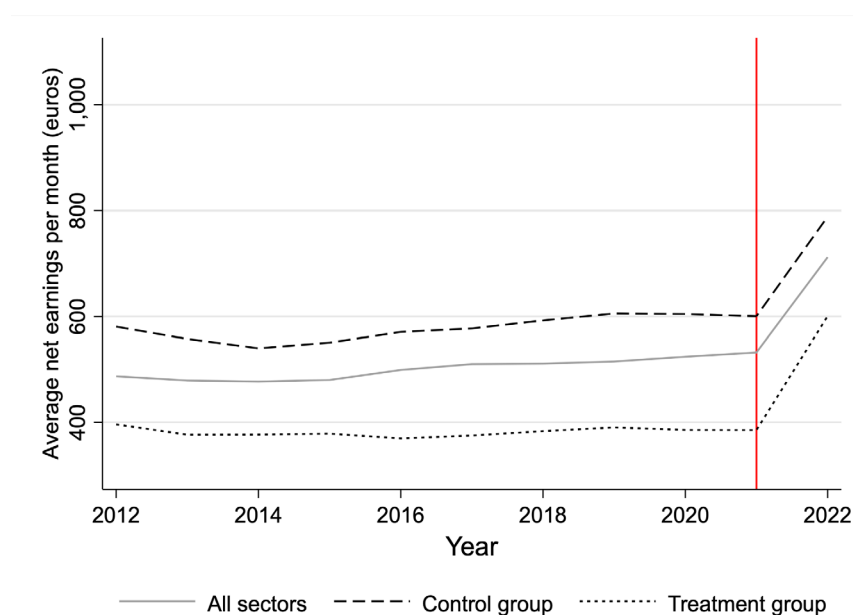
Source: Authors' calculations based on Monstat's Labor Force Survey, Table 6-1 (Persons in employment by sectors of activity, region and sex).

► Figure A.2 – Unemployment rates by education



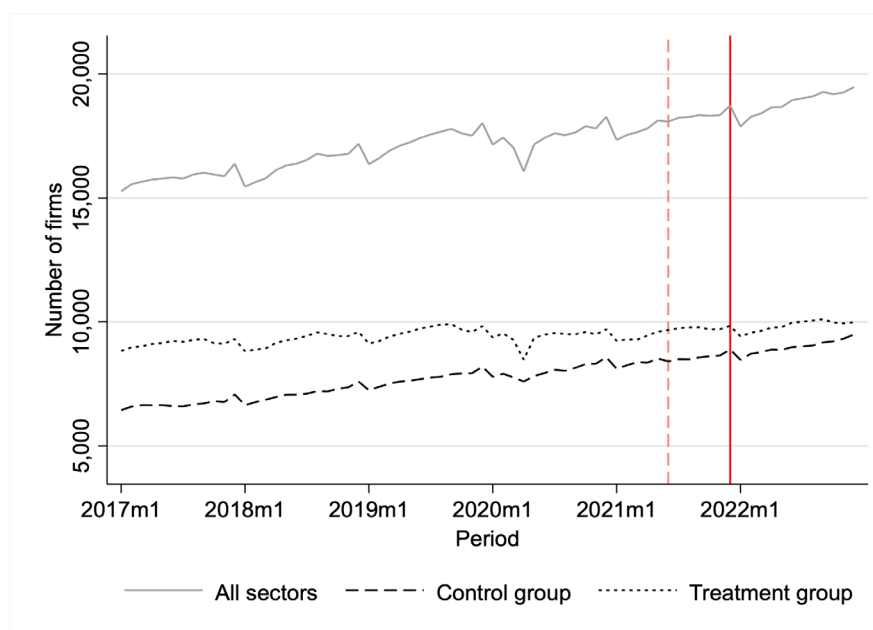
The figure illustrates quarterly data on unemployment rates by educational level. It compares individuals with (a) primary, (b) vocational or secondary, and (c) tertiary educational levels, respectively. (The average in the second group is an unweighted average of different sub-groups with intermediate educational levels.) The vertical red line indicates the end of the pre-reform period. Source: Authors' calculations based on Monstat's Labor Force Survey, Table 4-2 (Activity, employment and unemployment rates by school attainment and sex).

►Figure A.3 – Average net wages over time



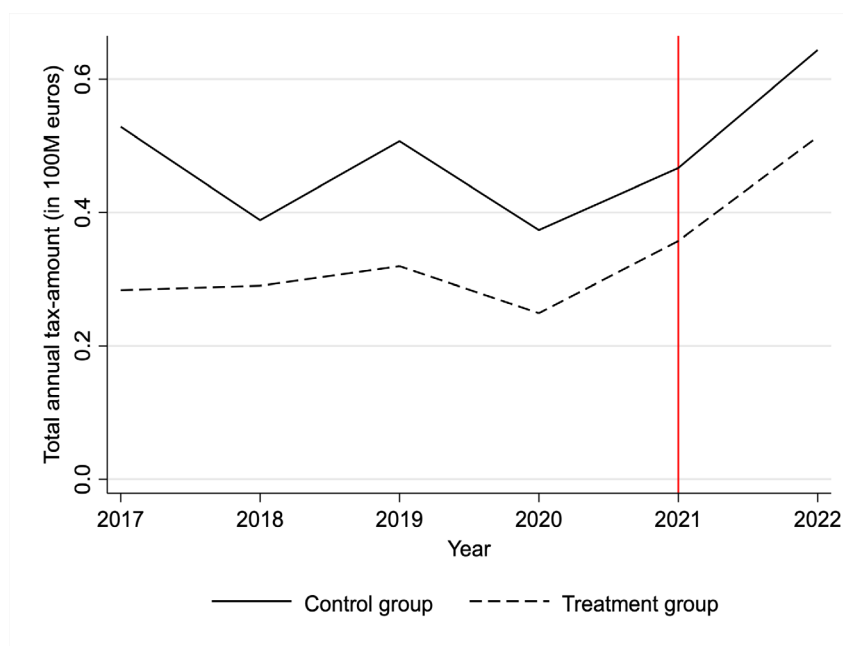
Average (nominal) net wages by industry sectors. The vertical red line indicates the last pre-reform period.
Source: Authors' computations based on Monstat data, 2012–2022.

►Figure A.4 – Number of firms in VAT data



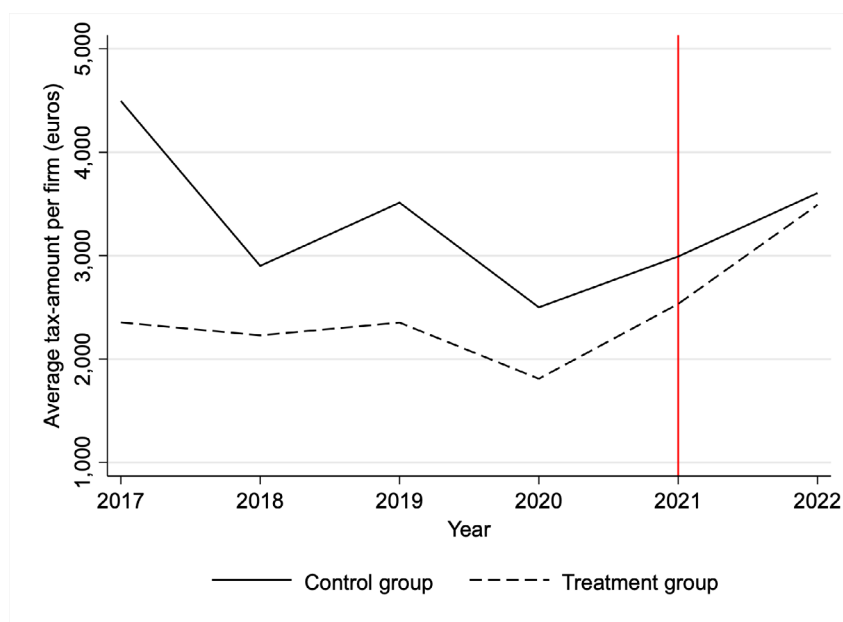
The figure illustrates the number of firms observed in the VAT data (in all sectors, as well as the treatment and control group sectors). The numbers differ from those displayed in Figure 8, since not all firms are obliged to register for VAT filing. The vertical red line indicates the last period before the reform. Source: Authors' computations based on VAT Data, 2017–2022.

► Figure A.5 – Total annual corporate taxes



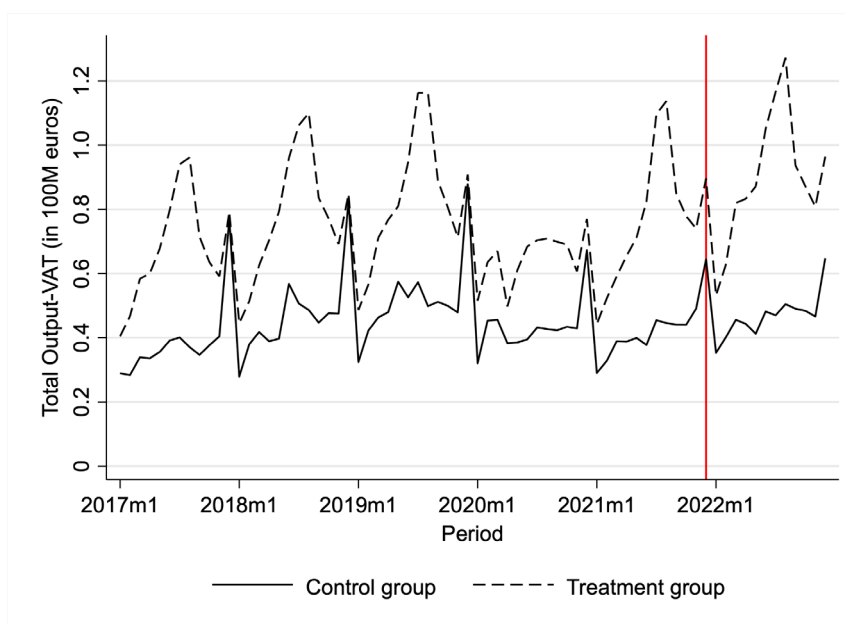
The figure illustrates total annual corporate profit taxes in the treatment and control group sectors, respectively. All values are expressed in real terms (CPI deflated to year 2019 prices). The vertical red line indicates the last period (2021) before the reform. Source: Authors' computations based on Corporate Tax Data, 2017–2022.

► Figure A.6 – Average annual corporate taxes



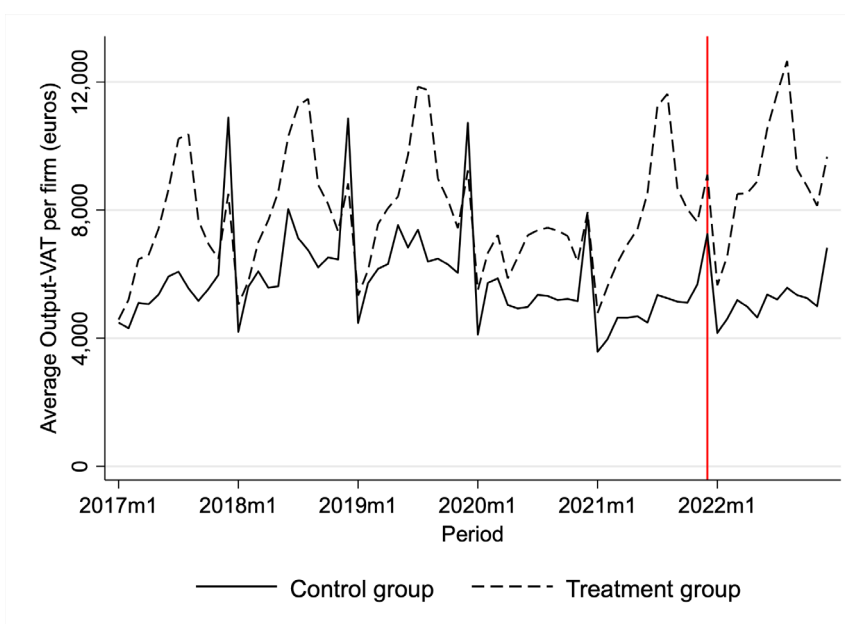
This figure illustrates average corporate taxes in the treatment and control group sectors, respectively. All values are expressed in real terms (CPI deflated to year 2019 prices). The vertical red line indicates the last period (2021) before the reform. Source: Authors' computations based on Corporate Tax Data, 2017–2022.

►Figure A.7 – Total monthly output VAT



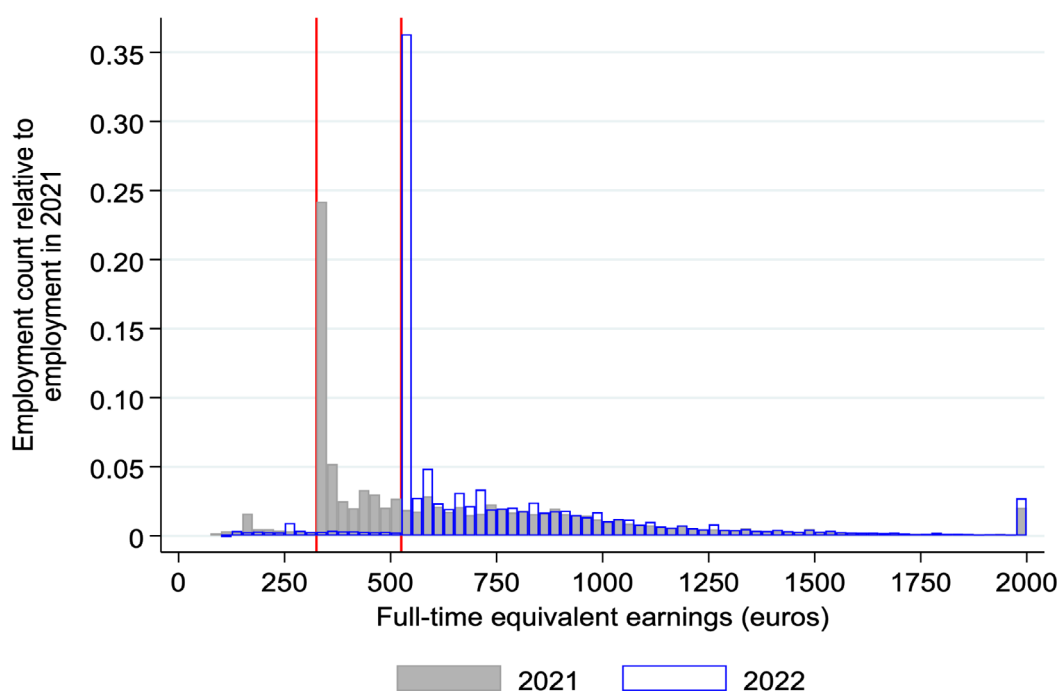
The figure illustrates the total monthly output VAT on supplies made, based on line 20 of the VAT rulebook, in the treatment and control group sectors, respectively. All values are expressed in real terms (CPI deflated to year 2019 prices). The vertical red line indicates the last period (December 2021) before the reform. Source: Authors' computations based on VAT data, 2017–2022.

►Figure A.8 – Average monthly output VAT



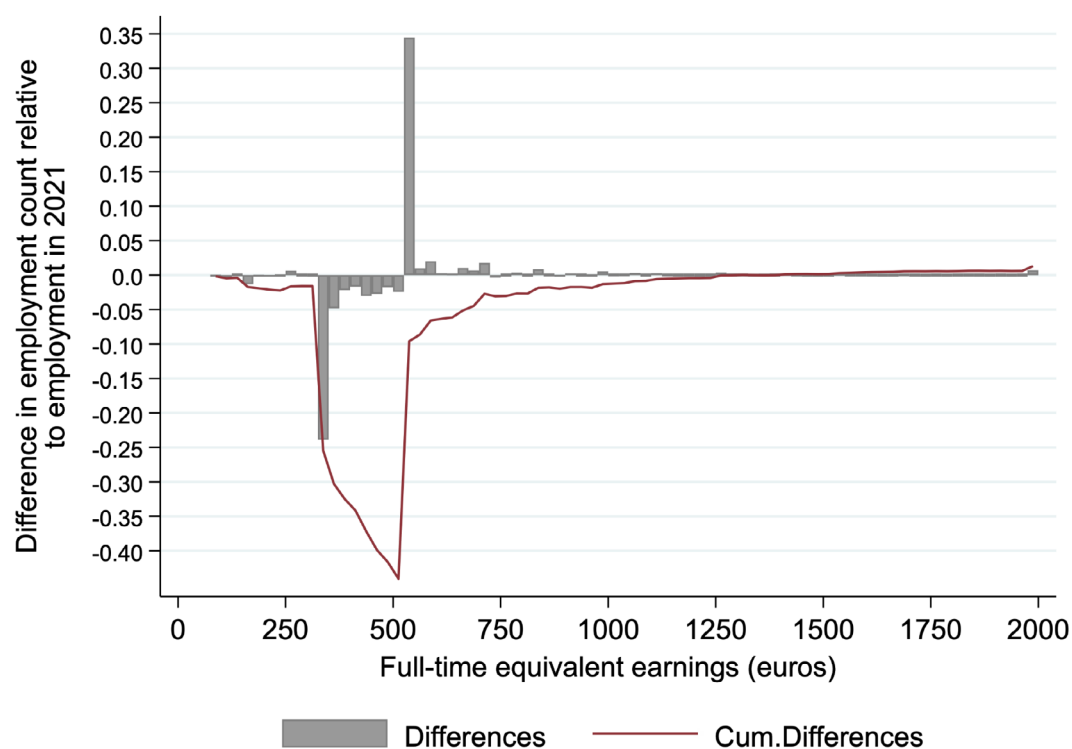
This figure illustrates the total monthly output VAT on supplies made, based on line 20 of the VAT rulebook, in the treatment and control group sectors, respectively. All values are expressed in real terms (CPI deflated to year 2019 prices). The vertical red line indicates the last period (December 2021) before the reform. Source: Authors' computations based on VAT data, 2017–2022.

► Figure A.9 – Distribution of gross earnings for January, May, and September 2021 and 2022



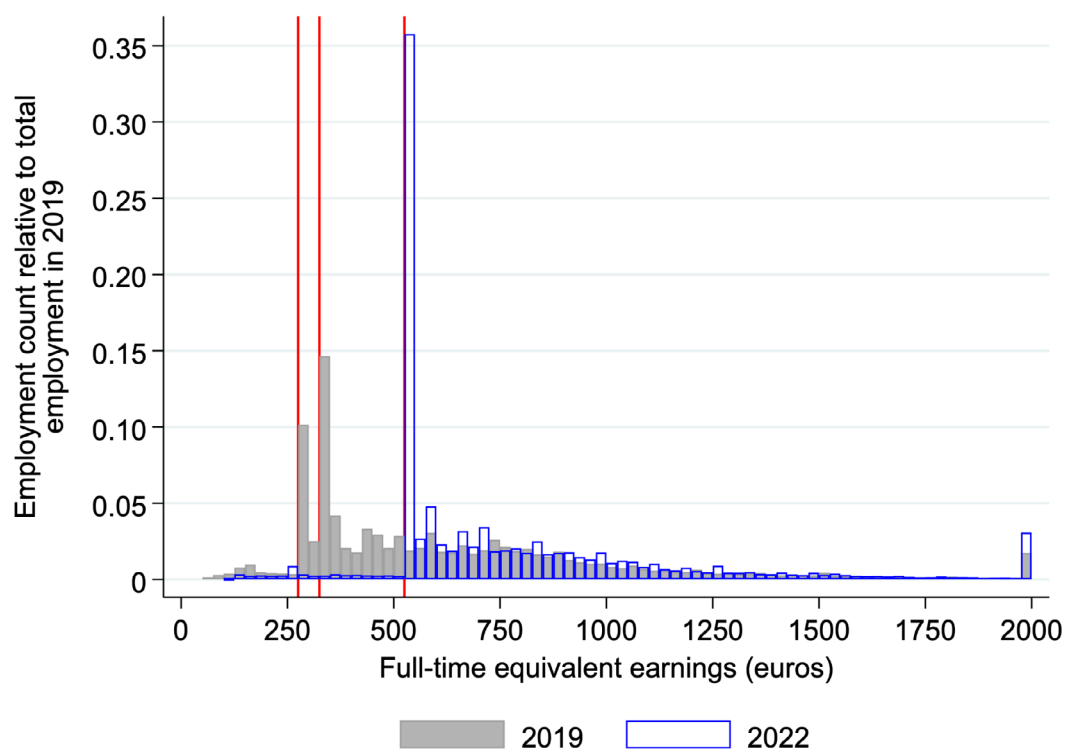
Notes: The histogram illustrates the distribution of nominal (gross) earnings for the months of January, May, and September in 2021 and 2022, respectively. Employment counts are expressed relative to total (FTE) employment observed for the three months of each year. The top bracket includes all full-term equivalent jobs with gross earnings of €2,000 or more. The red lines indicate the wage brackets containing the gross minimum wages in the years 2021 (€331.3) and 2022 (€532.5), respectively.

► Figure A.10 – Net differences in FTE employment:
2022 vs. 2021 (only January, May, and September)



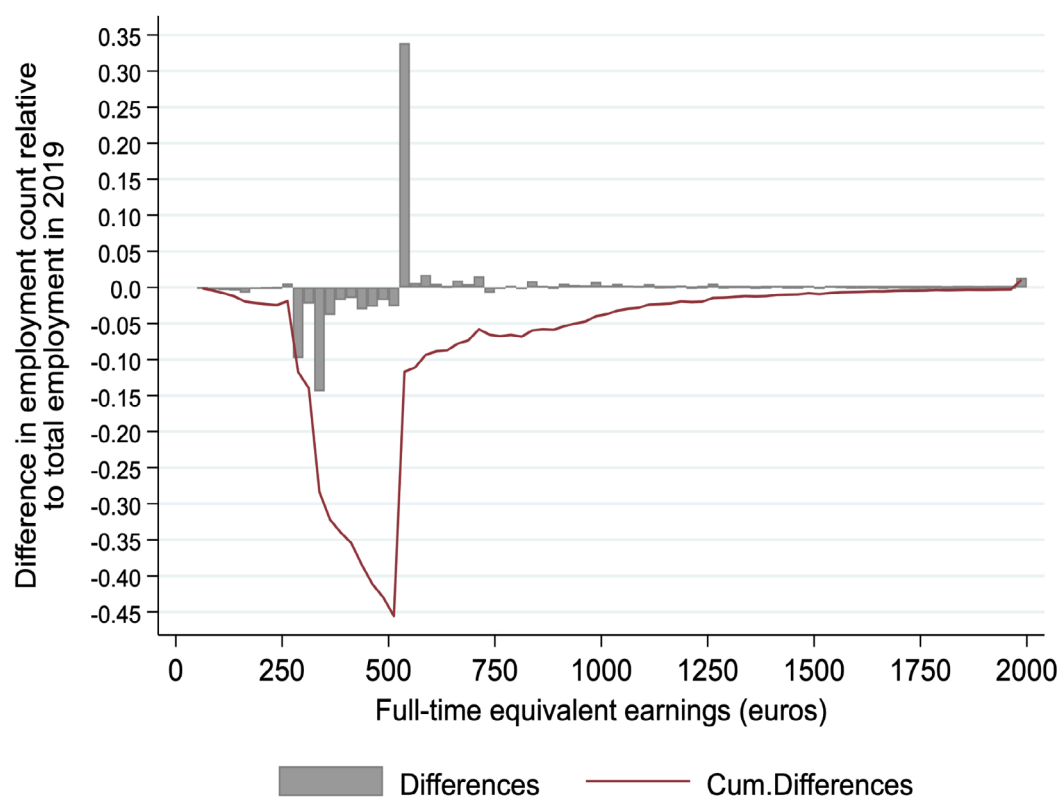
Notes: The gray bars of the figure illustrate the differences in the number of full-time earners observed in the months January, May and September 2022 and January, May, and September 2021 within each income bracket (relative to the overall number of full-time equivalent jobs recorded in January, May, and September 2021). The red line indicates the cumulative differences, meaning the sum of the differences indicated by the gray bars up to a given point within the earnings distribution. The top income bracket includes all full-term equivalent jobs with earnings of €2,000 or more.

► Figure A.11 – Distribution of gross earnings for the years 2019 and 2022



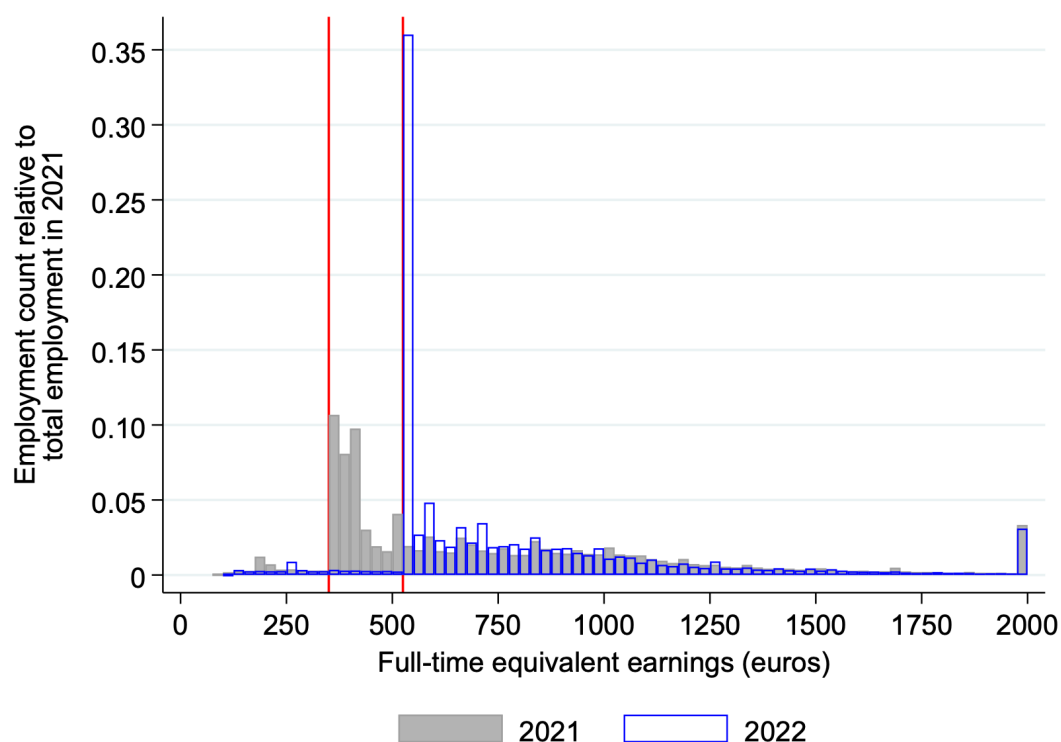
Notes: The histogram illustrates the distribution of nominal gross earnings for the years 2019 and 2022, respectively. Employment counts are expressed relative to total FTE employment within each year. The top income bracket includes all full-term equivalent jobs with gross earnings of €2,000 or more. The red lines indicate the income brackets containing the gross minimum wages of the year 2019 (€288.1 and €331.3) and 2022 (€532.5), respectively.

► Figure A.12 – Net differences in FTE employment: 2022 vs. 2019



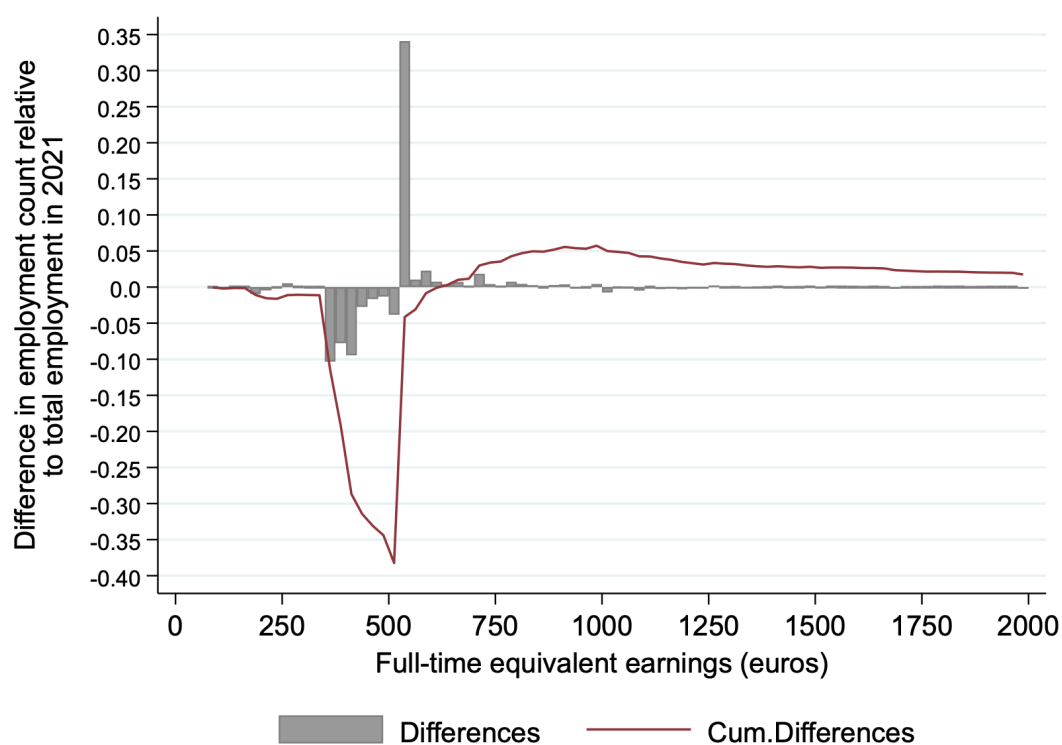
Notes: The gray bars of the figure illustrate the differences in the number of full-time earners observed in the years 2022 and 2019 within each income bracket (relative to the overall number of full-time equivalent jobs recorded in 2019). The red line indicates the cumulative differences, meaning the sum of the differences indicated by the gray bars up to a given point within the earnings distribution. The top income bracket includes all full-term equivalent jobs with earnings of €2,000 or more.

► Figure A.13 – Distribution of real gross earnings for the years 2021 and 2022



Notes: The histogram illustrates the distribution of real gross earnings for the years 2021 and 2022, respectively. All earnings are expressed in 2022 prices (based on the annual CPI index). Employment counts are expressed relative to total FTE employment within each year. The top income bracket includes all full-term equivalent jobs with gross earnings of €2,000 or more. The red lines indicate the income brackets containing the gross minimum wages in the years 2021 (€374.5, as expressed in 2022 prices) and 2022 (€532.5), respectively.

►Figure A.14 – Net differences in FTE employment for deflated earnings, 2022 vs. 2021



Notes: The gray bars of the figure illustrate the differences in the number of full-time earners observed in the years 2022 and 2021 within each (deflated) income bracket, relative to the overall number of full-time equivalent jobs recorded in 2021. The red line indicates the cumulative differences, meaning the sum of the differences indicated by the gray bars up to a given point within the (deflated) earnings distribution. The top income bracket includes all full-term equivalent jobs with (deflated) earnings of €2,000 or more (in 2022 prices).

Complementary Tables

► Table A.1 - Overview of VAT and corporate tax data

	VAT Data		Corp.Tax Data	
	Observations	Share (%)	Observations	Share (%)
Control Group:				
A: Agriculture	369	1.19	493	1.09
B: Mining	85	0.27	89	0.20
D: Electricity/Gas	113	0.36	139	0.31
E: Water supply	118	0.38	139	0.31
F: Construction	3993	12.63	4755	10.37
H: Transportation	1643	5.28	1979	4.36
J: Information/Communication	1256	4.03	2961	6.52
K: Financial/Insurance	131	0.42	213	0.47
L: Real Estate	1499	4.82	1954	4.30
M: Professional/Science	4213	13.53	6546	14.42
O: Public Administration	12	0.04	7	0.02
P: Education	98	0.31	434	1.44
Q: Health/Social Work	77	0.25	656	1.44
R: Arts/Entertainment	357	1.15	1073	2.36
S: Other Service	519	1.67	2838	6.25
T: Households	1	0.00	1	0.00
U: Extraterritorial	1	0.00	2	0.00
Treatment Group:				
C: Manufacturing	2503	8.04	2981	6.57
G: Wholesale/Retail	8353	26.83	10597	23.34
I: Accommodation/Food	4438	14.26	5049	11.12
N: Administrative Service	1409	4.53	2500	5.51
Total	31128	100.00	45406	100.00

Source: Authors' computation and illustration, based on CPT and VAT data.

► Table A.2 - Sectors assigned to the treatment and control groups

	EU-SILC(2021)		Monstat (2021)	
	< Min.Wage Share	Observations	Gross wage	Net wage
Control Group:				
A: Agriculture	0.33	36	668	452
B: Mining	0.15	28	1068	716
D: Electricity/Gas	0.09	61	1381	924
E: Water supply	0.36	118	733	492
F: Construction	0.32	160	706	474
H: Transportation	0.25	221	767	514
J: Information/Communication	0.10	79	1033	693
K: Financial/Insurance	0.05	58	1441	967
L: Real Estate	0.16	12	954	640
M: Professional/Science	0.26	91	676	453
O: Public Administration	0.19	417	901	603
P: Education	0.19	275	822	551
Q: Health/Social Work	0.27	210	968	650
R: Arts/Entertainment	0.42	99	634	425
S: Other Service	0.50	48	675	452
T: Households	1.00	2	-	-
U: Extraterritorial	0.36	8	-	-
Treatment Group:				
C: Manufacturing	0.45	173	585	392
G: Wholesale/Retail	0.51	612	591	395
I: Accommodation/Food	0.42	148	594	395
N: Administrative Service	0.43	54	534	359
Total	0.33	2910	712	532

Notes: All gross and net wages are expressed in euros. Cross-sectional weights applied to SILC data. These categories are based on the NACE Rev.2 industry sector classification. **Source:** EU-SILC and Monstat, 2021.



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