Firms' Risk Adjustments to Minimum Wage: Financial Leverage and Labor Share Trade-off

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Abstract

This paper evaluates the impact of the German minimum wage policy on firms' financial leverage, using firm-level variation in treatment intensity. The results show that the minimum wage reduces financial leverage by 0.5 to 0.9 percentage points (1–2% of the mean). Mechanism analysis indicates that the minimum wage increases firms' labor share, reflecting higher operating risk and firms substitute it by deleveraging. The rise in labor share is closely tied to changes in production: on the input side, there is no significant capital–labor substitution; on the output side, value added rises and is redistributed more toward labor. Firms' risk substitution behavior enhances firm resilience following the reform and during the pandemic. Overall, while the minimum wage benefits workers by allocating more earnings to the labor force, it also introduces greater operating risks and encourages conservative financial behavior among firms.

JEL Classification: J30, J31, J38, G32

Keywords: minimum wage, financial leverage, labor share, risk substitution, DiD

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1. Introduction

In recent decades, scholars have paid attention to the relationship between corporate financial decision-making and labor market frictions. Labor, as a crucial production factor, possesses unique characteristics. For instance, labor differs from capital in terms of adjustment costs; it is influenced by labor market regulations such as employment protection laws and labor unions. Higher labor costs and associated adjustment costs can increase firms' risks during financial distress, thereby accelerating financial difficulties. Thus, in addition to the traditional determinants, labor market frictions have a significant impact on firms' capital structure decisions.

The existing literature on labor and corporate finance predominantly concentrates on employment protection laws (Serfling, 2016; Simintzi et al., 2015), while research on minimum wage and financial leverage remains scarce.[1] This study analyzes the effects of the German statutory minimum wage on firms' capital structure and presents evidence of risk substitution behavior that may strengthen firms' resilience and influence economic decision-making. This mechanism also has broader implications for the stability of the credit market.[2] Firms exposed to the minimum wage may face increased labor costs. If these firms cannot pass on all of the increased costs to consumers, they will suffer from decreased profits and a higher labor share, defined as the ratio of labor costs to value-added. An increased labor share can lead to greater business risks because labor costs cannot be fully adjusted during economic downturns (Favilukis et al., 2020), thereby increasing expected costs during financial distress. Meanwhile, higher financial leverage also escalates firms' business risks, making them more likely to default in adverse conditions due to fixed interest payments in each period. Labor share and financial leverage may, therefore, act as substitutes. To mitigate the risks exacerbated by the minimum wage, firms may choose to decrease their financial leverage ex-ante.[3]

[1] Financial leverage is an indicator of a firm's capital structure. In this paper, financial leverage is defined as the ratio of total debts to total assets.

[2] Firms' capital structure is related to managers' incentive problems, with higher financial leverage mitigating agency costs (Grossman and Hart, 1982) and thereby affecting firms' investment and performance (Harvey et al., 2004). The financial leverage of non-financial firms is also important for credit market stability. For example, lower financial leverage among firms reduces the probability of default and enhances overall financial market stability.

[3] Previous studies have laid theoretical foundations regarding the impact of labor forces on firms' capital structure. Favilukis et al. (2020) use a dynamic stochastic general equilibrium (DSGE) model with heterogeneous firms to demonstrate that labor market frictions result in firms responding slowly to adjustments in labor costs. Therefore, high labor costs and sticky wages increase the likelihood of firms defaulting when facing negative shocks. Firms with a high labor share, therefore, tend to opt for a lower financial leverage ratio. Berk et al. (2010) also develops a model

This paper examines the effect of the minimum wage on financial leverage by studying the implementation of the German statutory minimum wage policy in 2015. It utilizes a dataset that links firm financial information with administrative employment records in Germany. The identification method is a detrended difference-in-differences approach, with a continuous treatment measure at the firm level, known as the bite variable. This measure is calculated as the proportion of workers paid below the minimum wage before the policy implementation. I find that firms' financial leverage decreases by about 0.5 to 0.9 percentage points due to the average treatment level of the minimum wage. These results align with literature about other labor market regulations such as employment protection laws reduce financial leverage as shown in Serfling (2016) and Simintzi et al. (2015).[4] Further analysis of firms' capital structure suggests that the minimum wage contributes to an increase in total assets, mainly through fewer dividends and higher retained earnings that enhance cash holdings, while at the same time reducing debt financing, thereby lowering financial leverage.

Furthermore, I examine the underlying mechanism, focusing on whether the minimum wage increases firms' labor share and whether firms substitute for the additional risk induced by this increase. While previous studies using quasi-experimental designs have focused on employment protection laws and firing costs, accurately measuring such costs and determining the extent to which the law increases these costs remains challenging. In contrast, this paper directly tests how the minimum wage influences labor share and total labor costs. The analysis shows that labor share increases by approximately 0.5 to 1.6 percentage points. This finding supports substitution theory by quantifying the first-order adjustments within firms.

To understand the change in labor share, I examine how the minimum wage affects firms' production inputs and outputs, which are closely tied to the mechanisms driving labor share adjustments. The minimum wage represents an exogenous increase in the price of labor. Whether labor

that describes the relationship between human capital costs and financial leverage, suggesting that labor-intensive firms will borrow less.

[4]Serfling (2016) finds that following the adoption of the good faith exception, both book and market leverage ratios decline, with reductions of 1.5 and 1.0 percentage points respectively, representing decreases of 6.1% and 3.6% relative to their respective sample means. Simintzi et al. (2015) examine the impact of employment protection laws on firms' financial leverage across multiple countries, finding that increased employment protection significantly reduces leverage by approximately 187 basis points. Kim (2020) shows that firms tend to increase their use of debt financing as the size of the local labor market grows. A larger labor market reduces the costs associated with workers' job loss, thereby lowering expenses related to financial distress. For a comprehensive summary of papers on labor regulations and firms' capital structure, please see Matsa (2018).

costs rise as a proportion of total output depends on how firms adjust their input mix and whether output changes. For example, from the input side, if firms substitute labor with capital in response to higher labor costs, the labor share could even decline.

Firms reduce employment after the minimum wage reform, but there is no significant increase in capital investment. This finding aligns with Bossler et al. (2020), who also report no effect of the German minimum wage on firms' capital investment behavior.[5] To quantify the degree of substitution between labor and capital, I further estimate the elasticity of substitution by comparing changes in wages and the capital–labor ratio. The results suggest that labor and capital are complements, with an estimated elasticity of substitution of 0.28. This pattern of input adjustment is consistent with the observed increase in labor share.

Moreover, I examine firms' outputs and their distribution to assess how the minimum wage affects total output and contributes to a higher labor share. The results show that the minimum wage increases total value added, while profits decline and total labor costs rise. The negative profit effects are also found in other studies, either internationally (Alexandre et al., 2022; Draca et al., 2011) or in Germany (Bossler et al., 2020). This suggests that firms absorb part of the wage increase through reduced profits, yet overall output still increases. This pattern may reflect gains in labor productivity or price adjustments in the product market (Harasztosi and Lindner, 2019; Leung, 2021; Renkin et al., 2022; Link, 2024). The output is distributed more toward labor and less toward capital, suggesting that the minimum wage redistributes value added in favor of the workforce.

As a consequence of risk substitution, firms may effectively manage their overall business risk. To examine this, I conduct a firm exit analysis, which suggests that risk substitution plays an important role in enhancing firms' resilience following the introduction of the minimum wage and during the first year of the pandemic. Specifically, the results indicate that minimum wage treatment dampens the positive effect of financial leverage on firms' exit probability, implying that by reducing leverage, firms improve their ability to withstand exit risk.

[5]Specifically, Bossler et al. (2020) use the IAB Establishment Panel covering the years 2010 to 2015. They find no capital investment adjustment in the affected establishments and a very small reduction in human capital investment. Additionally, they show no effects of the minimum wage on productivity but observe a reduction in profitability. Gustafson and Kotter (2023) find that the minimum wage leads to a decline in capital investment among firms in the United States.

The channels through which the minimum wage affects financial leverage may extend beyond risk substitution. Firms may increase tangible investment for labor–capital substitution, enhancing collateral and credit access, while banks may tighten lending in response to higher borrower risk. Further analysis show that collateral effects are negligible, and the decline in leverage likely reflects a combination of firms' risk substitution and possible bank-side credit constraints.

In terms of heterogeneous effects, firstly, it is found that firms tend to reduce long-term debts instead of short-term ones, which is plausible since long-term debts require longer periods of interest payments and entail greater economic uncertainties with prolonged durations. Secondly, a firm's ability to adjust its labor flexibly is critical in determining its reaction to an increasing labor share. A more flexible labor composition—characterized by occupations that are easier to outsource, lower-skilled jobs, or fixed-term positions—leads to a smaller reduction in financial leverage. Lastly, firms' market power also leads to heterogeneous effects. Small firms and tradable firms tend to have less market power, as they face greater challenges in transferring increased labor costs to prices. As a result, the labor cost increase driven by the minimum wage poses a higher risk to them, leading to stronger deleveraging behavior.

Overall, this paper makes several contributions to the existing literature. First, it expands the current body of research on labor costs and capital structure. While a significant amount of literature examines the impact of labor frictions in various forms on financial leverage, the impact of the minimum wage on financial leverage is a novel question that remains understudied.[6] The minimum wage is a widely used policy tool that plays a crucial role in increasing wages. By focusing on the minimum wage, this paper demonstrates how a fundamental labor market regulation affects firms' capital structure. Moreover, the findings are relevant beyond the minimum wage context. They speak to a broader class of exogenous wage or employment cost shocks, such as payroll tax changes, adjustments in social security contributions, or mandatory collective bargaining outcomes, that similarly alter firms' labor cost and may trigger adjustments in their financing

[6]To the best of my knowledge, there is only one existing paper that examines the effects of the minimum wage on financial leverage. In an early working paper (Gustafson and Kotter, 2017) version of Gustafson and Kotter (2023), the authors found that minimum wage increases in the US significantly reduce firms' net leverage. However, these findings are not included in the published version (Gustafson and Kotter, 2023). My paper differs substantially from Gustafson and Kotter (2017). First, while the minimum wage in the US is state-specific, it is nationwide with a uniform threshold in Germany. Second, I employ a different methodology. I use a continuous treatment measure, whereas they calculate the change in the minimum wage as the treatment measure. Lastly, I investigate the effects of the minimum wage on the labor share as the primary channel through which the policy impacts financial leverage. In contrast, Gustafson and Kotter (2017) does not explore this mechanism.

behavior. Second, I examine the mechanism linking the minimum wage to financial leverage by quantifying its effect on the labor share, addressing a limitation in previous studies that are unable to directly measure firing costs. In addition, I incorporate an analysis of firms' production inputs and outputs to provide a more comprehensive understanding of how the minimum wage influences production decisions and, ultimately, capital structure. Third, this paper also examines the relationship between firms' risk substitution behavior and their likelihood of survival, exploring the beneficial effects of risk substitution on firms. Lastly, the most comprehensive dataset available for Germany is used to study the firm-level response to the minimum wage. Other data sources, such as survey data, typically only collect information on a subset of the employees within a firm. The treatment intensity is often approximated using industry or regional-level variations based on the location of a firm's headquarters, leading to an imprecise measure. By calculating firm-level exposure with individual wage information for nearly all employees within a firm, the treatment variable is less prone to measurement error.

The paper proceeds as follows. Section 2 provides theoretical explanations of how the minimum wage affects firms' financial leverage. Section 3 introduces the institutional background of the minimum wage and describes the dataset. The empirical strategy is presented in Section 4. Section 5 reports the main findings on the impact of the minimum wage on financial leverage, including a series of robustness checks. Section 6 investigates the underlying mechanisms. Heterogeneous effects are examined in Section 7. Section 8 concludes.

2. Theoretical background

In the traditional corporate finance literature, firms' financial leverage ratio depends on the tax benefits and costs of financial distress. Specifically, commonly considered determinants of financial leverage include tax deductions, firm size, tangibility, and profitability (Antoniou et al., 2008).[7] In the past few decades, the labor force has increasingly been recognized as a significant factor that can impact a company's capital structure. From a theoretical background, labor frictions affect a

[7] In general, the tax rate is positively related to financial leverage, as higher tax rates increase the benefits of debt borrowing due to tax deductibility of interest expenses. Firm size and tangibility also positively correlate with financial leverage because larger firms and firms with more tangible assets have a greater capacity to borrow. According to the pecking order theory, profitability negatively affects financial leverage, as firms increase debt borrowing when they lack sufficient internal resources. There are other factors that influence financial leverage; for a comprehensive summary, see Antoniou et al. (2008) and Parsons and Titman (2009).

firm's financial leverage in two ways. The positive effect is established by Matsa (2010), where a firm's optimal capital structure is chosen as a strategic response to workers' bargaining power from the union. Higher liquidity will encourage workers to raise the demand for wage growth. Firms, therefore, tend to use more debt financing to reduce future cash flow and to strengthen firms' bargaining position against employees.

Leverage substitution.—The negative effect is attributed to the substitution effect of operating and financial leverage (Mandelker and Rhee, 1984; Mauer and Triantis, 1994; Chen et al., 2019; Sarkar, 2020). Operating leverage is defined as the sensitivity of a firm's profits to changes in sales or the proportion of fixed costs to total costs (Hillier et al., 2010).[8] Regardless of the various methods used to measure operating leverage, the concept remains straightforward: firms with higher operating leverage are more sensitive to economic shocks. The leverage substitution theory suggests that both higher operating leverage and higher financial leverage increase the expected costs of financial distress. This is because higher operating leverage results in greater fixed costs, whereas higher financial leverage leads to higher coupon payments. Therefore, a trade-off exists between operating and financial leverage.

Relative labor expenses and labor inflexibility give rise to a special form of operating leverage known as labor-induced leverage or the labor share (Donangelo et al., 2019; Gourio, 2007).[9] In response to macroeconomic changes, labor costs cannot be fully adjusted in a flexible manner, and revenue and labor costs do not move in lockstep. Consequently, profits decline when a shock hits the firm. A higher labor share and labor rigidity make profits more sensitive to shocks, which aligns with the concept of operating leverage.

The minimum wage, labor share, and financial leverage.—The effect of the minimum wage on firms' financial leverage may work through the substitution theory. The legislation is an exogenous, compulsory policy that does not target union strength. The strategic channel proposed by Matsa (2010) does not play a role because firms must comply with the law regardless of their level of debt financing.

[8] Two commonly used measures of operating leverage are (1) the change in EBIT/the change in sales or output and (2) fixed costs/(variable costs+fixed costs).

[9] At the aggregate level, the labor share represents the ratio of returns to labor over the total output, such as GDP. In this paper, the labor share is a firm-level measure and denotes the proportion of labor costs to value-added. In the context of the theory part, the labor share primarily emphasizes the operating burden induced by labor expenses.

Moreover, it is possible that the minimum wage policy is associated with higher labor-induced operating leverage (hereafter referred to as the labor share), leading firms to substitute these operating risks by deleveraging. The minimum wage policy may increase firms' total labor costs and, consequently, the labor share.[10] In addition, the minimum wage strengthens downward wage rigidity in Germany,[11] preventing firms from adjusting wages below the minimum wage without violating the law. To compensate for the anticipated risks resulting from the rise in the labor share, firms tend to decrease their financial leverage.

Other channels through which the minimum wage affects financial leverage.—Besides the leverage substitution theory, it is conceivable that the minimum wage impacts firms' financial leverage through alternative channels. Firstly, the rise in labor costs may prompt capital-labor substitution, leading firms to increase investments in assets, particularly fixed or tangible assets. This increase in tangible assets is typically associated with a positive correlation to financial leverage (Ozdagli, 2012). This is because these assets can serve as collateral, enabling firms to secure higher levels of debt. Moreover, lenders may demand lower premiums when debt is backed by collateral (Antoniou et al., 2008), thereby making debt a favorable option for firms.

Secondly, the loan supply might be influenced by the minimum wage. Banks evaluate various firm characteristics to assess creditworthiness, and the effects of the minimum wage on these characteristics are mixed. While the minimum wage could enhance firms' tangible assets, potentially leading to an increase in loan supply, it also imposes a greater operational burden and reduces profitability, which are negative indicators for banks. Consequently, the overall effect on loan supply remains ambiguous.

[10] However, it is also possible that firms will adjust employment and use machines to replace labor, thereby offsetting the increased labor costs due to the minimum wage. Theoretically, it is unclear whether the minimum wage increases or decreases the labor share. According to a report by OECD (2018), in the short run, the minimum wage may elevate the labor share, but in the medium or long run, it may induce capital-labor substitution, thereby reducing the labor share. In Appendix A, a simple theoretical framework is provided, showing how an increase in wage affects the labor share. The direction of the effects depends on the elasticity of substitution between labor and capital. Empirically, Petreski and Pehkonen (2023) found that the minimum wage in North Macedonia increases the labor share in labor-intensive sectors but decreases it in capital-intensive sectors.

[11] Although wages are often considered rigid in Germany (Franz and Pfeiffer, 2006), Jung and Schnabel (2011) find that a wage premium exists for some plants under collective agreements in Western Germany. This wage premium, referred to as a "wage cushion," represents the difference between actual and contractual wages. The size of the wage cushion depends on factors such as labor demand and supply, as well as business cycles. Therefore, plants may adjust wages downward by reducing the wage cushion if labor supply exceeds demand or firms encounter adverse shocks.

In summary, the theoretical prediction of the minimum wage's effect on financial leverage is inconclusive. While the leverage trade-off theory predicts negative effects, other channels suggest a potential positive or uncertain relationship between the minimum wage and financial leverage. This paper aims to empirically investigate the direct effect of the minimum wage on financial leverage and to explore the mechanism, focusing on whether the minimum wage increases firms' labor share.[12]

3. Background and data

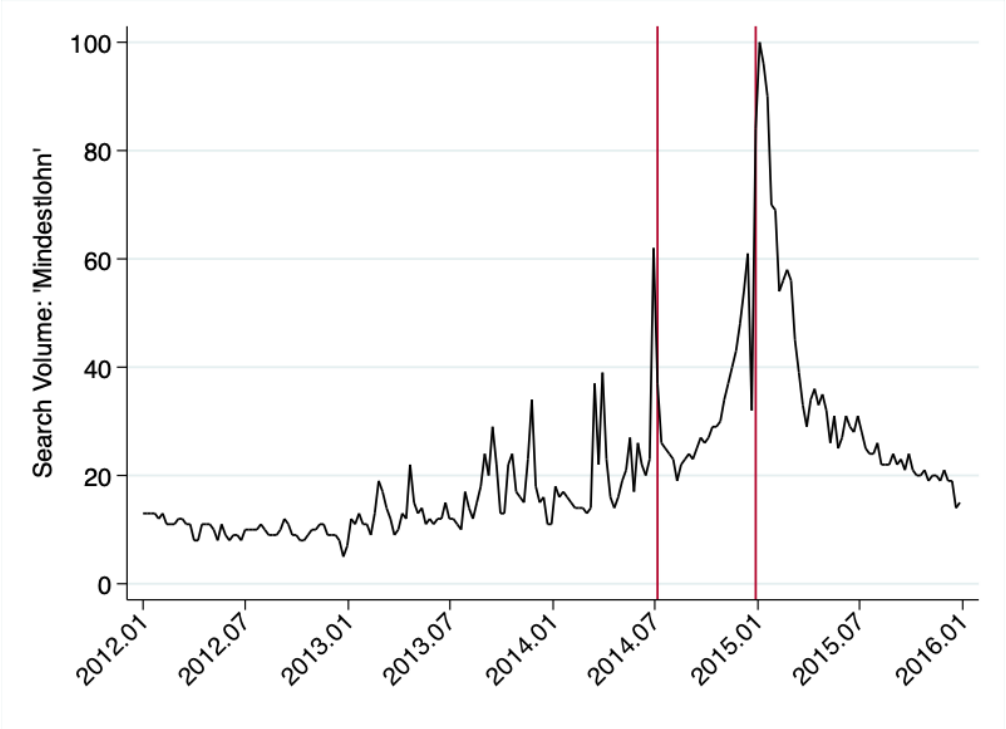
3.1. Institutional background

Timeline of the minimum wage.—On January 1, 2015, Germany implemented its first statutory minimum wage, setting a minimum gross hourly wage of 8.5 euros. Prior to the implementation of the minimum wage, there may have been anticipation of the law in the preceding years. In late 2013, following the general election, the CDU (Christian Democratic Union of Germany)/CSU (Christian Social Union in Bavaria) and the SPD (Social Democratic Party) formed a grand coalition, with the SPD advocating for the minimum wage. In July 2014, the minimum wage law was passed by the German Bundestag. Figure 1 illustrates the search volume for the term "Mindestlohn" (minimum wage) in Germany from January 2012 to January 2016. The search volume exhibits two notable spikes: the first in July 2014, when the law was officially passed, and the second in early 2015. This graph suggests that the policy was anticipated at least several months before its implementation. Consistent with this, data from the 2014 wave of the IAB Establishment Panel show that around 7 percent of firms had already adjusted wages prior to the official start date.

Since 2015, the minimum wage has been increased in the subsequent years. For instance, on January 1, 2017, it was adjusted to 8.84 €, and on January 1, 2019, it was increased to 9.19 €. Recently, it has been increased to 12 €, effective from October 1, 2022, and to 12.41 € from January 1, 2024. This study focuses exclusively on the initial implementation of the minimum wage in

[12]It should be noted that this paper does not identify the causal mediation effects, namely the indirect effect of the minimum wage on financial leverage via labor share. While the treatment itself (minimum wage policy) is a quasi-natural experiment, it is crucial to note that the mediator (labor share) and the outcome variable (financial leverage) are endogenously correlated, given the presence of unobserved confounders and the reverse causality issue. The complex relationship between operating leverage and financial leverage is modeled in Sarkar (2020). A thorough review of causal mediation analysis in economics can be found in Celli (2022).

Figure 1: Search volume of "Mindestlohn" (Minimum wage) in Germany from Google Trends, 2012.01-2016.01



Notes: The figure depicts the weekly Google search volume for the term "Mindestlohn" (minimum wage) in Germany. The volume is normalized to its peak search volume, indexed as 100. The x-axis marks the beginning of each month. The first vertical red line indicates the date when the minimum wage was passed by the German Bundestag (July 2014), while the second vertical red line marks the week when the minimum wage was implemented (January 2015).
Data: Google Trends, 2012-2016.

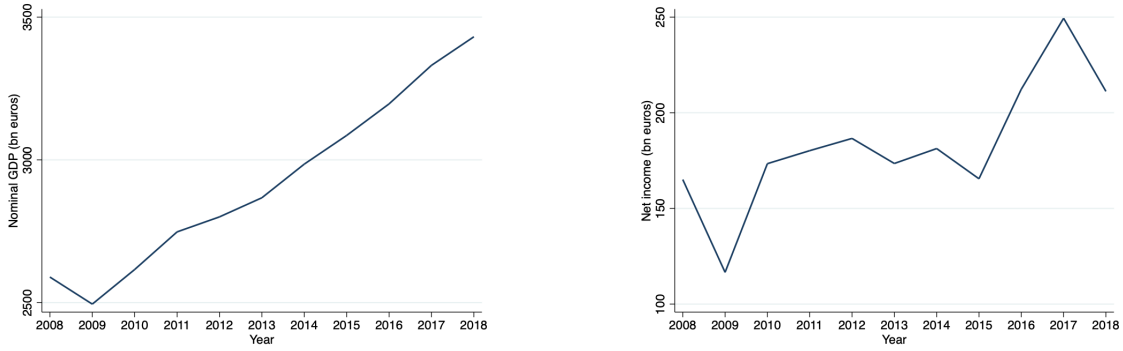
2015 and does not consider subsequent increases from 2017 onward. The primary reason is that the first implementation represents the most significant treatment effect, with the minimum wage rising from zero to €8.50. In contrast, subsequent increases during the observed sample period were merely adjustments for inflation and had only a negligible effect on the real minimum wage threshold.

Scope of application.—Prior to 2015, Germany had only a few sector-specific minimum wage regulations in place. The new nationwide minimum wage is applicable to nearly all employees in the country, with a few exceptions. These exemptions include young workers under the age of 18, apprentices, interns, long-term unemployed individuals in the initial six months of starting work, and volunteers. Several industries, such as the meat industry, hairdressing, agricultural,

and forestry industries, are allowed a transitional phase, with hourly wages required to be at least 8.5 € as of January 1, 2017. However, the number of employees who are exempted or affected by the transitional regulations was less than 1% of all employees in 2015. Additionally, in April 2014, approximately 11.3% of jobs were found to be paid below the minimum wage (Mindestlohnkommission, 2016). According to the Federal Statistical Office of Germany (Destatis), by April 2015, this figure had decreased to about 2.7%, and it has continued to decline over time. This trend suggests that the rate of non-compliance is relatively low.

3.2. Macroeconomic environment

Figure 2: Macroeconomic environment, 2008-2018



(a) Nomial GDP of Germany

(b) Net income of German non-financial corporations

Data: Statistisches Bundesamt; Deutsche Bundesbank, financial statement statistics.

In the years preceding the introduction of the minimum wage, the German economy had steadily recovered from the 2008–2009 global financial crisis. As shown in Figure 2a, between 2010 and 2015 GDP growth remained positive, supported by strong exports, solid industrial production, and resilient domestic demand (OECD, 2016). The labor market also performed remarkably well, with the unemployment rate declining to around 6 percent. During this period, German firms recovered and maintained stable profitability, as illustrated in Figure 2b. Small and medium-sized enterprises (SMEs) retained profits as financial assets, expanded reserves, and continuously strengthened their equity positions (Schwartz, 2014).

After 2015, Germany's GDP growth remained stable, suggesting a period of continued macroeconomic strength. The minimum wage was thus introduced under generally favorable economic

conditions. In this context, firms may have accumulated liquidity buffers before the reform, enabling subsequent adjustments in their financial leverage.

3.3. Data

The data used in this analysis are linked data (Diegmann et al., 2024) combining the Amadeus data from Bureau van Dijk (BvD)[13] with the employee history file (Beschäftigten-Historik, BeH) and the establishment history panel (Betriebs-Historik-Panel, BHP) from the Institute for Employment Research (IAB).[14] The linking procedure is conducted using a record linkage key that matches firms from the Amadeus with establishments from the BHP. The linkage key is provided by the IAB and generated based on the firm's name and address (Diegmann et al., 2024). This dataset includes three-dimensional information: employee-level records from the BeH, establishment-level characteristics from the BHP (Ganzer et al., 2022), and firm-level variables from the Amadeus.

The employee-level data (BeH) are derived from records of the German social security system and contain information on the total workforce of regular workers, as well as on marginally employed workers in Germany. The recorded information includes employees' gender, age, education, occupation, employment type, yearly working days, and daily wages. The establishment-level data (BHP) are generated based on the BeH and show the attributes of each establishment, such as the location, industry classification, and the number and age structure of employees in the establishment. The Amadeus dataset collects firms' characteristics from their financial statements and annual reports, covering publicly listed and private firms in Europe, with only German firms retained. The firm-level data include rich variables such as firms' ownership, industry, debt and asset amounts, and earnings before interest and taxes.

This dataset is the first in Germany to merge firm information and administrative employment records on a large scale. Unlike other survey datasets that cover only a subset of workers within a firm, this dataset includes the entire workforce of each establishment. This feature allows for accurate measurement of the impact of the minimum wage policy at the firm level. Compared to regional-level measures of policy intensity, the firm-level impact variable offers two advantages. Firstly, within the same county, firms are affected differently by the minimum wage policy,

[13] A description of the data coverage and collection procedures in Amadeus is provided in Appendix B.1.
[14] The Amadeus data is downloaded from WRDS platform.

which can only be captured by considering industry and firm heterogeneity when measuring the treatment variable. Secondly, regional-level treatment variables are typically headquarter-based (Gustafson and Kotter, 2023), making it challenging to capture how multi-establishment firms are affected when their establishments are located in several regions.

3.4. Sample restrictions and variables

The sample construction process involves several steps. Firstly, firms in the Amadeus with available data from any of the years between 2011 and 2018 are retained.[15] For sample cleaning, the following criteria are implemented: firms in industries that are exempted from minimum wage rules are excluded.[16] Financial firms are also excluded due to their different capital structure. Observations with unconsolidated financial information are retained, meaning financial reports that are not integrated with the company's subsidiaries, as the focus is on individual firms and labor costs are calculated for individual firms accordingly. Observations with financial reports following German generally accepted accounting principles (GAAP) are kept, whereas those following international financial reporting standards (IFRS) are excluded to ensure the consistency of financial information across firms. Firms not observed after 2014 are excluded,[17] and observations with missing information and nonsensical values, such as negative asset variables, debts, sales, cash, employment costs, or value-added, are removed.

Subsequently, the remaining firms are matched with the BHP and the BeH datasets, aggregated at the firm-year level. The final sample under analysis constitutes an unbalanced panel, comprising 184,831 firm-year observations from 27,488 distinct firms.

Financial variables.—Nominal financial variables, including assets, debts, income, and cash, are adjusted for inflation based on 2015 prices. All BvD financial variables are winsorized at the 1st and 99th percentile values for each year. In the main analysis, following Erel et al. (2015), the total financial leverage (hereafter referred to as financial leverage) is defined as the sum of long-term

[15] The year is determined based on the variable CLOSEDATE. If the closing date falls after June 1, the year component of the closing date is used; otherwise, the preceding year is applied.

[16] These exempted industries have NACE codes 11, 12, 13, 14, 15, 16, 17, 21, 22, 23, 24, 101, 131, 132, 133, 139, 141, 142, 143, 782, 783, 813, and 960.

[17] This restriction is implemented for two reasons: firstly, because they do not contribute to the treatment effect, and secondly, because the IAB imposes a restriction on the maximum number of workers that can be provided in the data product, necessitating the exclusion of these firms.

debts and short-term liabilities over total assets. In the robustness check, alternative definitions of financial leverage are examined.

Labor-related variables.—The BeH dataset includes information on workers' gross daily wages, as well as the start and end dates of their employment spells. However, the wage information is top-coded at the social security ceiling. Although censored wages do not directly impact the treatment measure, as only low-wage workers are affected by the minimum wage, they can influence the calculation of total labor costs. To address this issue, daily wages are imputed using the Stata package provided by Dauth and Eppelsheimer (2020). Furthermore, the employment history data, organized as employment spells, are transformed into a yearly panel. During this transformation, only the main job with the highest wage is retained in the sample.

Between 2011 and 2014, the BeH dataset includes a variable denoting total working hours, sourced from employers reporting to the German Social Accident Insurance. However, these reported working hours are subject to significant measurement error primarily due to differences in reporting schemes. In this study, I utilize a corrected version of daily working hours, as described by Vom Berge et al. (2023). Following the correction, the mean working hours in the IAB data closely align with those calculated using the German Structural Earnings Survey (SES), which provides higher-quality data on hours worked. The hourly wages are calculated as the daily wages divided by the daily working hours.

The treatment intensity of the minimum wage on a firm is measured as the *Bite*, representing the share of workers whose gross hourly wages were below the minimum wage before the policy introduction. In order to rule out the potential anticipation effect, the *Bite* variable is measured based on wages in 2013. This measure remains constant for a firm over time. When calculating the *Bite*, groups exempt from the minimum wage, such as workers under 18, interns, and apprentices, are excluded. To calculate overall labor costs, workers' annual total wages are aggregated at the firm level, including all employees. Subsequently, the firm's total annual labor costs are adjusted for inflation to the 2015 Euro value.

The labor share is defined as the proportion of labor costs to firms' value-added (Donangelo et al., 2019; Jäger et al., 2021; Favilukis et al., 2020), where value-added is the sum of labor costs and earnings before interest, taxes, depreciation, and amortization (EBITDA). Since the linked data includes two sources of annual labor cost variables, and IAB labor information is likely more

accurate than the BvD information, I use the labor-related variables from the IAB and the financial data from the BvD. The formula for labor share is

$$\text{Labor share} = \frac{\text{Labor costs (IAB)}}{\text{Labor costs (IAB)} + \text{EBITDA(BvD)}}.$$

Moreover, as robustness evidence, I also add the results when using the labor costs and value-added variables directly from the BvD to calculate the alternative measure of labor share.

$$\text{Labor share (BvD)} = \frac{\text{Labor costs(BvD)}}{\text{Value-added(BvD)}}.$$

An overview of variables' definitions can be found in Appendix B.3.

3.5. Summary statistics

Table 1: Cross-sectional summary statistics, year 2013

	mean
Treatment intensity	
- Bite	0.102
- Minimum wage affected firm (Bite>0)	0.706
Firm located in Eastern Germany	0.191
Single-establishment firm	0.779
Firm size: < 50	0.309
Firm size: $50 - 249$	0.566
Firm size: $>= 250$	0.125
Corporation	0.807
Partnership	0.163
Other legal forms	0.030
Observations	27,488

Notes: Except for the variable *Bite*, all variables are dummy variables. The standard deviation for *Bite* is 0.174.
Data: Linked data of BeH, BHP, and Amadeus, 2013.

Treatment intensity.—Table 1 lists cross-sectional descriptive statistics of firms in the year 2013. The average treatment intensity across all firms is 10.2%. To simplify the interpretation of later regressions, the estimated effect sizes are interpreted as the magnitude resulting from a 10-percentage point increase in the bite variable. Additionally, 70.6% of firms have at least one sub-minimum

wage worker before the policy's introduction. At the worker level, 8.6% of all workers were paid below the minimum wage, slightly lower than the approximately 10-percentage point reported in other papers (Mindestlohnkommission, 2016; Bossler and Schank, 2023).[18]

Sample representativeness.—Regarding the composition of firms, approximately 77.9% of all firms have only one establishment, 14.2% have two establishments, and the remaining 7.9% have three or more establishments. Each year, the sample comprises about 3.8 to 4 million employees, corresponding to roughly 10% of the German workforce. Regarding firm size, the final sample underrepresents small firms because approximately 97% of all registered enterprises in Germany in 2013 were small enterprises with fewer than 50 employees.[19]

There are two reasons why the number of small firms is very limited in the sample. First, sole proprietorships are not included. This legal form represents firms founded by one person, making up over 65% of all registered enterprise entities in 2013. However, excluding sole proprietorships is not an issue because they are not relevant to the research question per se; this category mostly includes freelancers, self-employed individuals, and sole traders. Second, small firms have more missing values in the BvD data. According to German business law (§ 267 Abs. 1 HGB and § 326 Abs. 1 HGB), small corporations (Kleine Kapitalgesellschaften) are only required to disclose balance sheet information and notes on the accounts.[20] The absence of small corporations is not a crucial problem either; as pointed out in section 7, small firms react most to the minimum wage, and this underrepresentation only leads to an underestimation of the actual effects.

Despite the unbalanced size distribution, my sample includes 68 publicly listed firms as well as private firms.[21] Except for financial sectors, sectors B to S are all covered, and the sample is

[18] The slightly lower proportion of sub-minimum wage workers in the sample reflects the underrepresentation of small firms, which tend to hire more minimum wage workers. According to Bossler et al. (2024), small establishments (with fewer than ten regular workers) have an average minimum wage worker share of 27.3% in 2014. In contrast, larger establishments (with ten or more regular workers) have a share of 11.7% minimum wage workers in the same year. The following paragraphs of this section will discuss the issue of underrepresentation in detail.

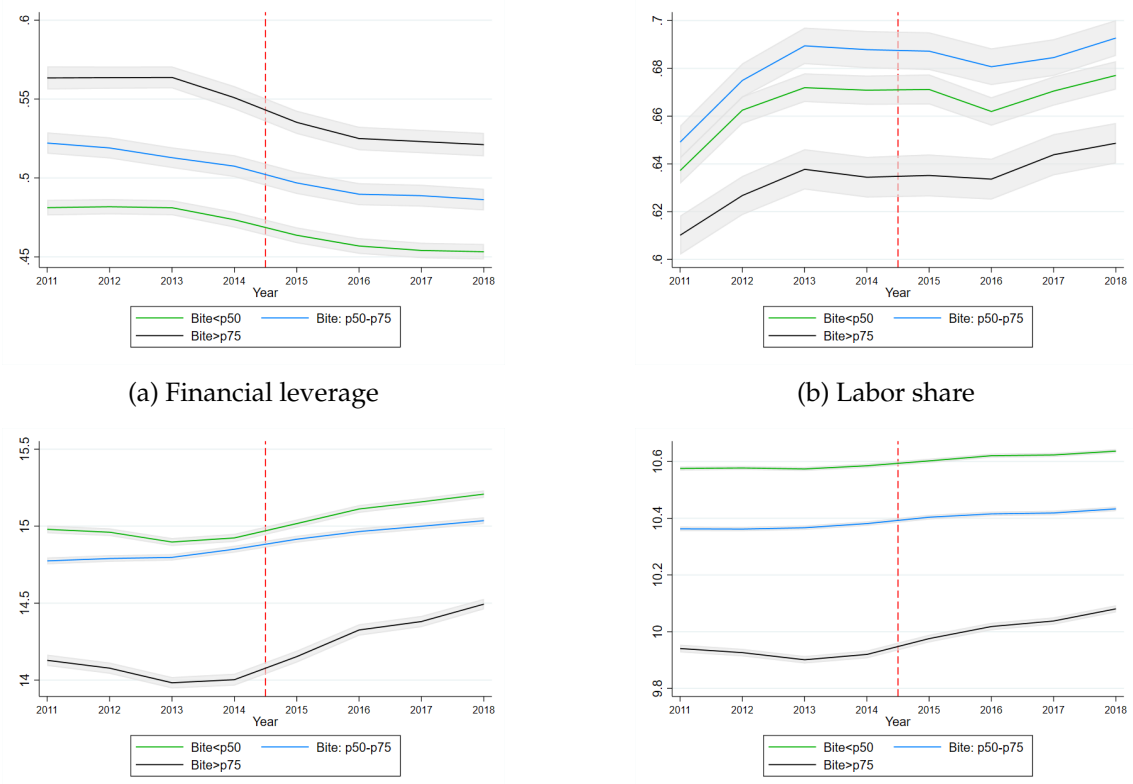
[19] According to the Structural Business Statistics Database (Eurostat), the number of enterprises in Germany ranged from 2.2 to 2.6 million from 2012 to 2018. The total number of employees in Germany ranged from 37.0 million to 40.6 million, according to the Federal Statistical Office of Germany. Thus, the sample covers approximately 10% of all employees but only 1% of all enterprises. This underrepresentation is due to the inclusion of only a small share of micro and small firms.

[20] Small corporations are defined as corporations with total assets up to EUR 6,000,000, sales revenue up to EUR 12,000,000 (in the 12 months before the reporting date), and a maximum of 50 employees on average per year.

[21] There were over 400 listed firms in Germany during the sample period. However, firms with consolidated financial information are excluded, resulting in the removal of the majority of these firms. Consequently, the final dataset contains only 68 listed firms.

representative of the distribution of firms in the 16 federal states. The Appendix Figures B2 and B3 illustrate the distribution of the sample across sector-size cells and state-size cells.

Figure 3: Development of financial leverage, labor share, and labor costs over time



(a) Financial leverage

(b) Labor share

(c) Log of total labor costs

(d) Log of labor costs per worker

Notes: The figure depicts the trends in the mean of firms' financial leverage, labor share, log of total labor costs, and log of labor costs per worker for three subgroups with varying bite levels. p25, p50, and p75 denote the 25th, 50th, and 75th percentiles of the bite variable in 2013. The bite values for the three groups are as follows: Bite $<$ p25 (0-0.03), Bite: p50-p75 (0.03-0.10), and Bite $>$ p75 (0.10-1). The gray shadow represents 95% confidence intervals of the mean. The vertical red line indicates the year 2015, which marks the introduction of the minimum wage.
Data: Linked data from BeH, BHP, and Amadeus, 2011-2018.

Development of main variables.—Figure 3a illustrates the mean financial leverage from 2011 to 2018 for firms categorized into low, medium, and high bite levels. The plot highlights that the financial leverage increases with higher bite levels, indicating that firms with lower wages rely more on external financing. Notably, the financial leverage across all three groups decreases over

the entire sample period.[22] In particular, in 2015, firms with a bite larger than 10% experience a significant decline in financial leverage, suggesting the minimum wage may reduce firms' financial leverage.

Figure 3b depicts the trend in average labor share over time.[23] Overall, firms with a middle level of bite exhibit the highest labor share. A slight increase in labor share is observed for all three groups from 2015 to 2018, with a drop in labor share for low-bite firms in 2016. The treatment effect is not immediately apparent from Figure 3b. However, this descriptive graph only illustrates the raw distribution of treatment levels and does not account for factors such as industry-specific or regional-specific shocks. Turning to labor costs, Figures 3c and 3d illustrate the mean of the log of annual labor costs and the log of labor costs per worker over the sample period. It is apparent that firms with higher bite levels exhibit lower total labor costs as well as labor costs per worker. From 2011 to 2014, firms with low and medium bite levels demonstrate relatively stable development in labor costs per worker, with high-bite firms even experiencing a decline. Plausibly, following the minimum wage intervention, high-bite firms exhibit a steeper growth in both total labor costs and labor costs per worker compared to the other two groups. These figures provide initial descriptive evidence suggesting that the minimum wage may influence firms' labor costs. Appendix B.4 provides summary statistics for all variables, separated by pre-policy and post-policy periods.

4. Method

4.1. Difference-in-differences estimation

This paper employs a difference-in-differences approach (Card, 1992; Caliendo et al., 2018):

$$y_{jt} = \delta_0 + \sum_{k \neq 2013} \delta_k * Bite_j * Year_{k,t} + \sum_{k \neq 2013} \gamma_k * Year_{k,t} + \phi * Bite_j + \alpha_j + \theta_{c,t} + \lambda_{s,t} + \epsilon_{jt}, \quad (1)$$

[22] The continued decline in financial leverage after 2010 likely reflects Germany's favorable macroeconomic environment, with solid growth and high corporate profitability that increased firms' internal liquidity and reduced reliance on external borrowing. Basel III regulations may have reinforced this trend by tightening lending conditions.

[23] The aggregate labor share in the sample ranges from 62.8% to 66.1%. According to the Penn World Table version 10.01, the aggregate labor share for Germany from 2011 to 2018 ranges from 61.6% to 64.1%, measured as the ratio of labor compensation to GDP. The difference in labor share values between my sample and the Penn World Table may be due to different sample restrictions, as the Penn World Table covers all ranges of industries and employees. However, the trend in Figure 3b aligns with the trend in the Penn World Table shown in Appendix Figure B1.

where y_{jt} represents the firm-level outcome variables for firm j at year t, such as a firm's financial leverage. The $Bite_j$ is defined as the proportion of minimum wage workers in firm j in 2013. This year was chosen to rule out potential anticipation effects, as the policy was already expected by the end of that year (Caliendo et al., 2018). The coefficients of interest are δ_k, where δ_{2011} and δ_{2012} indicate the placebo effects and whether the parallel trend assumption is satisfied. δ_{2014} displays the anticipation effect, and δ_{2015} to δ_{2018} represent the treatment effects in subsequent years. α_j denotes the firm-fixed effects, which control for firm-specific constant characteristics that would affect the leverage ratio, such as firm culture. The estimated effect is then identified from within-firm variations. To rule out the influence of the sector-year-specific change in financial leverage, I also control for fixed effects of two-digit industry-year dummies ($\lambda_{s,t}$). It is also possible that the local economic situations may affect firms' behaviors; therefore, county-year fixed effects $\theta_{c,t}$ are added.

The outcome variables may develop differently for firms with different wage levels already before the minimum wage policy. After inspecting the bite-specific trend (see section 4.2), a predetermined trend is subtracted from the outcome variables. This detrended method has been adopted in several minimum wage studies (Meer and West, 2016; Monras, 2019; Bossler and Schank, 2023; Dustmann et al., 2021). It is achieved by using the data from the years 2011 to 2013 and running the regression

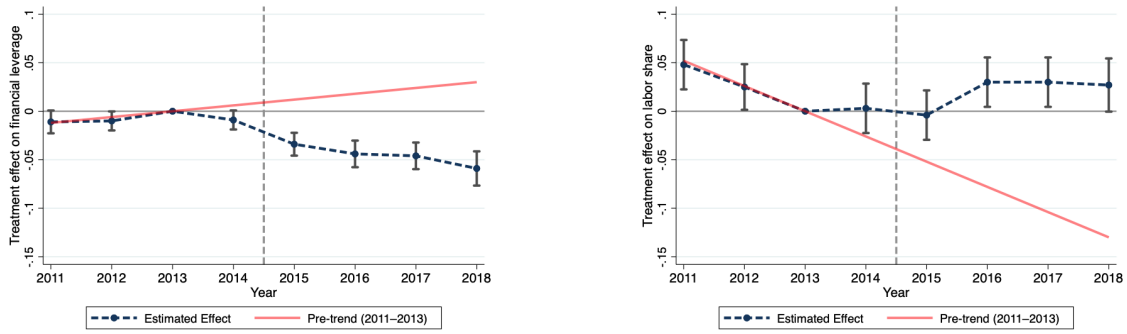
$$y_{jt} = \beta_0 + \beta_1 * Bite_j * T + \beta_2 * Bite_j + \alpha_j + \theta_{c,t} + \lambda_{s,t} + u_{jt}, \tag{2}$$

where the estimated predetermined treatment-specific trend is $\hat{\beta_1} * Bite_j * T$, with $T = t - 2010$. The estimated trend is subtracted from the y_{jt} in Equation 1. To remedy the serial correlation of observations from the same firm, standard errors are clustered at the firm level.

4.2. Detection of the pre-intervention trend

The difference-in-differences approach relies on the parallel trend assumption. This assumption implies that, without a minimum wage intervention, the financial leverage of firms with different treatment intensities would have developed in a parallel manner over the entire period. When controlling for a bite-specific trend in Equation 1, the identification method is now based on the assumption that the predetermined bite-specific trend would have persisted had there been no

Figure 4: Coefficients of $Bite_j * Year_{k,t}$ in non-detrended DiD regressions



(a) Financial leverage

(b) Labor share

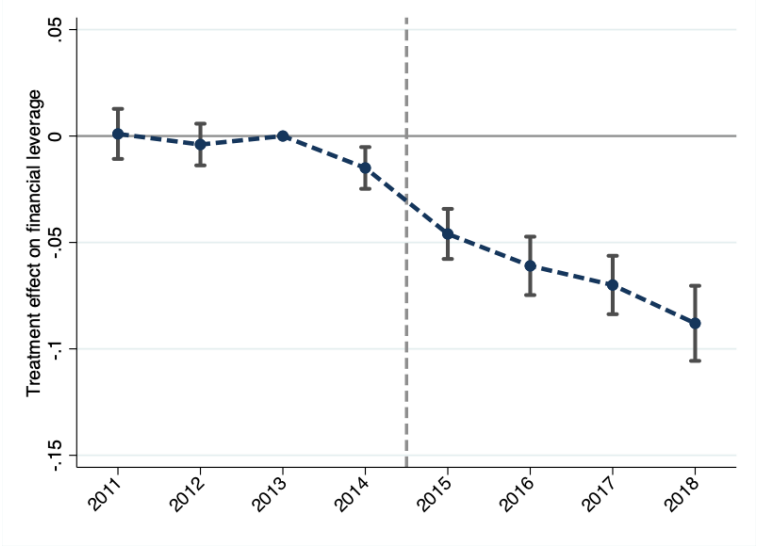
Notes: The figure displays the non-detrended difference-in-differences (DiD) regression coefficients of $Bite_j * Year_{k,t}$ with 95% confidence intervals. The dependent variables include (a) Financial leverage and (b) Labor share, with the year 2013 serving as the reference year. A linear trend based on the pre-policy years (2011–2013) is also shown in the figures and extended to the subsequent period (red line). The regression results corresponding to this figure are presented in Appendix Table E1.
Data: Linked data from BeH, BHP, and Amadeus, 2011-2018.

minimum wage policy. Thus, the estimates of δ_{2015} to δ_{2018}, after subtracting the trend, represent the treatment effects.

To demonstrate the importance of employing detrended regressions, I analyze the results from simple DiD regressions without controlling for trends. Figure 4 displays the coefficients and confidence intervals of $Bite_j * Year_{k,t}$ from the Equation 1. The graph in Figure 4a indicates a slightly increasing bite-specific trend in firms' financial leverage prior to the introduction of the minimum wage. This suggests that, even before the policy introduction, firms with a higher bite experienced a greater increase in financial leverage compared to those with a lower bite. Similarly, a decreasing trend is observed for the labor share, with the labor share of high-bite firms decreasing from 2011 to 2013. From both graphs, it is evident that the pre-policy trends reverse or halt after 2013, suggesting that in addition to the trend, the minimum wage has effects on these variables. The graphical presentation of non-detrended regressions emphasizes the importance of including a predetermined bite-specific trend in the DiD regression. Therefore, in the following analyses, this trend is subtracted from the outcome variable in all regressions.

5. Results

Figure 5: Minimum wage effect on firms' financial leverage



Notes: The figure shows the detrended DiD regression coefficients of *bite* × *year dummies* with a 95% confidence interval.
Data: Linked data of BeH, BHP, and Amadeus.

Figure 5 presents the DiD coefficients of $Bite_j * Year_{k,t}$ with 95% confidence intervals. The figure shows that the reduction in financial leverage has been evident since 2015, attributable to the impact of the minimum wage. The anticipation effects of the minimum wage are found to be smaller in magnitude compared to the treatment effects observed in other years. With regards to a 10-percentage point increase in the bite variable, firms' financial leverage decreases by 0.5 to 0.9 percentage points,[24] which corresponds to 1 to 2 percent of the average financial leverage. The empirical results confirm that firms reduce their external financing rate in response to the minimum wage. Additionally, firm financial leverage displays a continuous decline from 2015 to 2018. This observation may be attributed to the ongoing increase in the labor share or the fact that high-bite firms did not complete the deleveraging process in the short term, but rather over a medium to long-term period. As shown in Section 7.1, the adjustment primarily occurs through cuts in long-term debt, which cannot be adjusted immediately after the reform.

Examinations on financial leverage changes.—According to the definition of financial leverage, changes in the leverage ratio stem from alterations in both debts and total assets. Therefore, I

[24]The effect is calculated as 0.1*0.046 and 0.1*0.088.

Table 2: Minimum wage effects on log total debts and log assets

Panel A: assets and liabilities					
	Log total debts	Log total assets	Log fixed assets	Log current assets	Log cash
	(1)	(2)	(3)	(4)	(5)
Bite*Post	-0.079**	0.081***	-0.001	0.088***	0.271***
	(0.027)	(0.015)	(0.027)	(0.019)	(0.058)
Observations	184,702	184,702	184,702	184,702	184,702
Panel B: income and equity					
	EBIT /Assets$_{pre}$	Net income /Asse ts$_{pre}$	Capital inj. /Assets$_{pre}$	Retained earn. /Assets$_{pre}$	Dividend /Assets$_{pre}$
	(1)	(2)	(3)	(4)	(5)
$Bite * Post$	-0.024***	-0.023***	0.0003	0.024*	-0.029***
	(0.006)	(0.005)	(0.003)	(0.010)	(0.004)
Observations	159,591	159,591	159,591	159,591	130,519

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. A predetermined bite-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively. The full regression results are presented in Appendix Table E3.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

investigate the impact of the minimum wage on total debts and total assets separately. Given that the focus is not on year-by-year dynamic treatment effects, I estimate a difference-in-differences specification using a single post-treatment indicator that combines the years 2015 to 2018, while keeping all other variables unchanged. Panel A, Columns 1 and 2 of Table 2 outline the regression results, demonstrating a decrease in debt borrowing and an increase in total assets.

The increase in total assets may be due to an increase in fixed or current assets. However, there is no observed impact of the minimum wage on fixed assets, as displayed in column 3 of Panel A, Table 2. The surge in total assets primarily stems from the expansion of current assets, which includes, for instance, cash in hand, bank balances, trade receivables, and other liquid assets. Notably, a substantial increase in cash is found, as depicted in Panel A, Column 5. Thus, the reduction in debts is partly credited to the decline in total debts and also to the expanding current assets, especially cash reserves.

Adjustments in profits and retained earnings.– As fixed assets remain largely unchanged while debt financing decreases, the expansion of cash holdings on the asset side raises the question of how firms finance the additional liquidity. From a balance-sheet perspective, the increase in cash must therefore correspond to adjustments on the financing side, particularly within equity and income accounts. To investigate this mechanism, I examine whether firms' profitability, retained earnings, and dividend payouts respond to the reform.[25]

Panel B, Columns (1) and (2) indicate that the minimum wage reduces firms' profitability, measured as EBIT and net income normalized by pre-policy asset levels to account for initial size differences. Net income flows into the equity side of the balance sheet, yet firms can either retain these earnings or distribute them as dividends. Panel B, Colums (3) to (5) of Table 2 present results for capital injections, retained earnings, and dividend payouts. It shows that while capital injections remain unchanged, more affected firms distribute fewer dividends and retain more earnings, even though their profits relatively decline. This pattern explains the rise in cash holdings and reflects a precautionary motive: more exposed firms rely on internal funds, reduce external borrowing, and build liquidity buffers to hedge against heightened risks. The pattern is also consistent with the pecking-order theory: firms first rely on internal funds (retained earnings), then turn to external debt, and resort to outside equity only as a last option.

Robustness checks.—I conduct several robustness checks to validate the main findings on the effects of the minimum wage on financial leverage.

First, I employ alternative measures of treatment intensity. One measure is a working hours weighted gap variable, calculated as:

$$gap_{j,2013} = \frac{\sum_{i \in j} h_{i,2013} \max\{0, 8.5 - wage_{i,2013}\}}{\sum_{i \in j} h_{i,2013} wage_{i,2013}}, \tag{3}$$

where $h_{i,2013}$ denotes worker i's weekly working hours in 2013, and $wage_{i,2013}$ is their hourly wage. This gap measure captures the necessary wage increase required for firms to comply with the minimum wage. Additionally, the bite variable averaged over the period 2011–2013, along with the average gap variable used by Dustmann et al. (2021), are utilized to verify the robustness of

[25]The data distinguish between capital injections by shareholders and other shareholders' funds. Retained earnings are proxied by (Other shareholders' funds). Dividend payouts are approximated as (Net income − ΔOther shareholders' funds). All variables are normalized by firms' pre-treatment asset levels to ensure comparability across firms and over time.

the main results. Furthermore, I apply a binary measure to estimate the average treatment effect among treated firms, addressing potential weighting issues associated with continuous treatment measures (Callaway et al., 2024). The estimated effects, provided in Appendix C.1, align closely with the primary findings.

Second, in addition to the primary definition of financial leverage as total debts divided by total assets, I also evaluate the robustness of the minimum wage effects using alternative measures of financial leverage. These include using the change in financial leverage as the dependent variable, incorporating provisions into total debt, restricting leverage to long-term debt, and netting out cash holdings from total debt. Results reported in Appendix Table C2 indicate that all alternative leverage measures decline in response to the minimum wage policy.

Third, I conduct additional robustness checks using various sample restrictions and alternative specifications. For instance, I cross-check employee counts between the IAB employment dataset and the BvD dataset, retaining only firms with a high matching rate of employees across these two sources. Additionally, I focus on private firms to mitigate concerns related to differences between private and public firms. Separate analyses are also conducted for firms headquartered in eastern and western Germany. The results are consistent across both regions. I also recalculate bite and other labor-related variables using only non-imputed wages to rule out any distortion from wage imputation. Further checks include adding firm-level controls to the DiD regressions, and separately excluding county-year fixed effects or industry-year fixed effects from the specification. The results of these analyses are presented in Appendix C.3 and are consistent with the main results.

Fourth, I examine potential spillover effects of the minimum wage on firms that initially did not employ any sub-minimum wage workers. To this end, I include interaction terms between the regional bite and year dummies in the regression model. The corresponding results, presented in Appendix C.4, provide no evidence of spillover effects on either financial leverage or labor share.

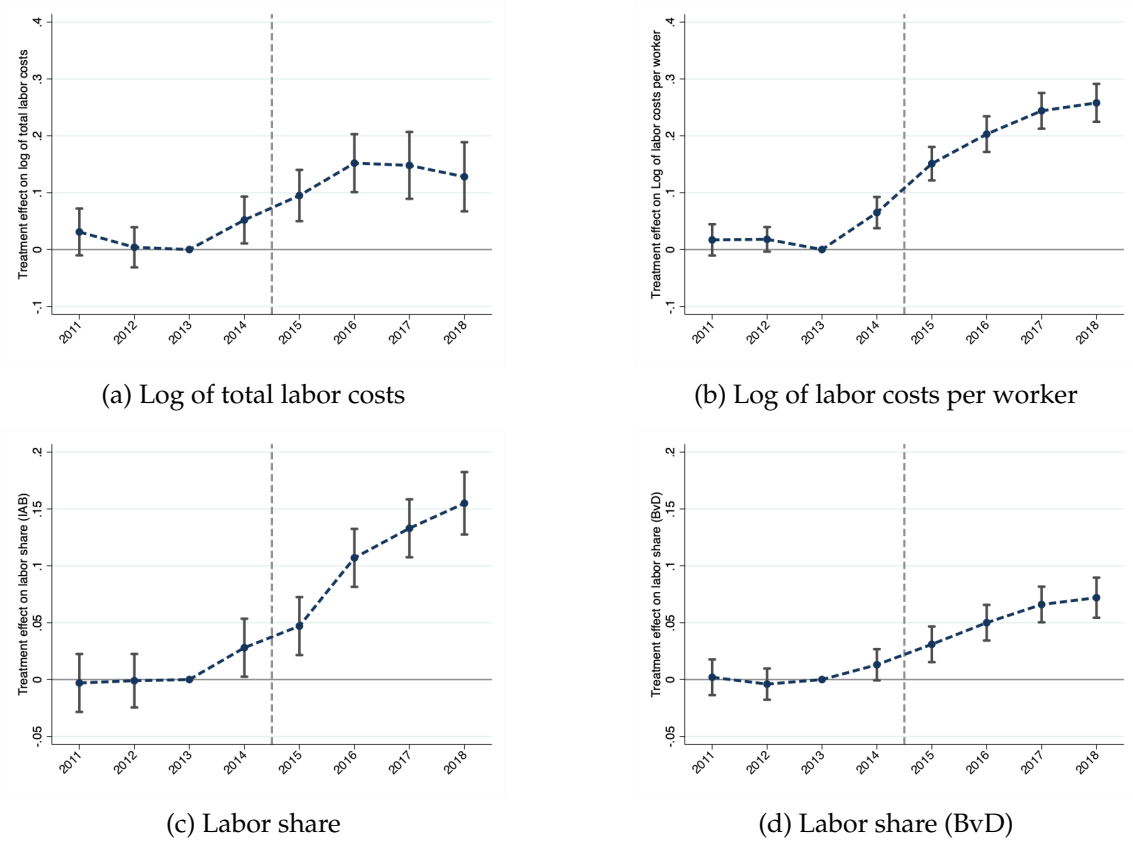
Lastly, in Appendix C.5, I discuss potential threats to identification stemming from concurrent policies and broader economic conditions. In Appendix Table C10, I additionally control for the interactions between pre-reform leverage dummies and year fixed effects, as well as interactions between firm-size dummies and year fixed effects. These controls flexibly absorb any time-varying shocks that differentially affect firms according to their initial leverage or size. In addition, I con-

duct a placebo exercise that artificially assigns the reform to 2012; the placebo coefficients are statistically indistinguishable from zero, further suggesting that the main results are not driven by coincidental macroeconomic or policy trends.

6. Mechanism analysis

6.1. Labor share

Figure 6: Minimum wage effects on labor-related outcomes



(a) Log of total labor costs

(b) Log of labor costs per worker

(c) Labor share

(d) Labor share (BvD)

Notes: The figure displays the detrended difference-in-differences (DiD) regression coefficients of $Bite_j * Year_{k,t}$ with 95% confidence intervals. The dependent variables include: (a) Log of total labor costs, (b) Log of labor costs per worker, (c) Labor share calculated as total labor costs divided by the sum of total labor costs and EBITDA, (d) Labor share (BvD) calculated as total labor costs divided by value-added. The year 2013 serves as the reference year. The regression results corresponding to this figure are presented in Appendix Table E2.
Data: Linked data from BeH, BHP, and Amadeus, 2011-2018.

In this section, I examine the mechanism underlying firms' deleveraging, with a focus on the leverage substitution channel. Specifically, I investigate whether the minimum wage leads to an increase in firms' labor share.

Figure 6 presents the estimated treatment effects on labor-related variables, while Figure 6a illustrates the effects on total labor costs. The effect size can be quantified as follows: for a 10-percentage point increase in the bite, the total labor costs increase by approximately 1% to 1.5%. Similarly, Figure 6b displays that labor costs per employee increase by about 1.5 to 2.6%.

Regarding the labor share measured by IAB data, it increases by 0.5 to 1.6 percentage points for a 10-percentage point increase in the bite, while there are smaller increases in the labor share (BvD), potentially due to the inclusion of wages of workers in foreign countries in the BvD data. An anticipation effect is observed for all four variables in the year 2014.[26] Furthermore, the effect sizes on labor share become larger from 2016 to 2018, suggesting that the minimum wage continuously impacts firms' labor share rather than having only a short-term effect. This finding supports the theory that the minimum wage increases firms' labor share, leading to a decrease in their financial leverage. It also aligns with the results in Section 5, which show a continuous reduction in firms' leverage over time. Various robustness checks on the effects of the minimum wage on labor share, based on the same set of specifications used for financial leverage, are presented in Appendix C.

Other channels.—Regarding other potential channels, although theory suggests that higher labor costs could increase fixed assets and thereby enhance collateral value, the results show no significant effect of the minimum wage on fixed assets (Column (3), Panel A, Table 2). This indicates that the asset-collateral channel does not play a role. Hence, the increase in the labor share likely represents the main mechanism through which the minimum wage influences financial leverage, while a potential influence from the bank supply side cannot be ruled out given data limitations.

Production inputs and capital-labor substitution.—To better understand the change in labor share, I integrate the analysis with a theoretical model presented in Appendix A and examine in detail how the minimum wage affects firms' production inputs and outputs, ultimately leading to changes in labor share. In this model, the minimum wage is treated as an exogenous shock that raises workers' wages. Under the scenario where the marginal product equals wages, the shock

[26] Previous studies have yielded inconclusive results regarding the anticipation effects of the German minimum wage on wages. Caliendo et al. (2018) find no anticipation effects on hourly wages, whereas Bossler and Schank (2023) identify small anticipation effects on monthly wages.

Table 3: Minimum wage effects on labor-related outcomes and log EBITDA

	Log employment (1)	Log (fixed assets/empl.) (2)	Log (labor costs/empl.) (3)	Log value added (4)	Log EBITDA (5)	Log total labor costs (6)
Bite $*$ *Post*	-0.082***	0.059*	0.212***	0.090***	-0.172***	0.130***
	(0.020)	(0.028)	(0.014)	(0.019)	(0.032)	(0.025)
Observations	184,702	184,702	184,702	183,037	169,645	184,702

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. A predetermined bite-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively. The full regression results are presented in Appendix Table E4.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

increases labor share if the elasticity of substitution between labor and capital (σ) is smaller than one, indicating that labor and capital are complements. In such cases, firms do not substitute labor with capital. Second, if there is bargaining over employment, namely, if firms face difficulties in reducing employment to equate wages with the marginal product of labor, then the labor share will be even higher than it is in the first scenario. In both scenarios, the effect's direction of a wage increase on labor share depends on whether σ is larger than one.

Therefore, in this section, I investigate how the minimum wage affects firms' production inputs and whether capital–labor substitution takes place. Although the data does not directly provide indicators for firms' capital investments, we can approximate it using the logarithm of fixed assets. Fixed assets include capital stock, such as properties and equipment, which result from the investment. Estimates from column 3 of Table 2 suggest that firms are not significantly increasing their investment in fixed capital in response to the minimum wage. Moreover, column 1 in Table 3 demonstrates that employment decreases by 0.82% for a 10-percentage point increase in the bite.[27] Column (2) of Table 3 shows that the minimum wage increases the capital–labor ratio, measured as the log of fixed assets per employee. In summary, firms respond to the minimum wage by re-

[27] This estimate corresponds to a reduction of approximately 20,000 to 40,000 jobs out of a workforce of around 3.8 to 4 million in my sample for each year, implying that the minimum wage reduced employment by about 0.5% to 1%. Existing literature finds a negligible employment effect (Dustmann et al., 2021; Bossler et al., 2024) at the regional level. However, the insignificant effect at the regional level could result from worker reallocation (Dustmann et al., 2021), implying that employment reduction at affected firms is possible. Appendix Table D1 reports the employment regression at the regional level. No significant reduction in employment is found, which is consistent with other studies. Hence, the firm-level coefficient of –0.082 should be viewed as an upper-bound estimate of the minimum wage effect on aggregate employment.

ducing employment but do not increase investment in fixed capital, resulting in a modest rise in the capital–labor ratio. However, as shown in column (3) of Table 3, this increase is smaller than the rise in wages induced by the minimum wage.

Given the observed changes in the capital–labor ratio and wages, we can calculate the elasticity of substitution between labor and capital, assuming the price of capital remains constant, and first-order conditions hold:

$$\sigma = \frac{d \ln(\frac{K}{L})}{d \ln(\frac{w}{r})}.$$

The change in $\ln(\frac{K}{L})$ is measured as 0.059 from Table 3 and the change in $\ln(\frac{w}{r})$ is measured as 0.212 from column 3. Thus, σ is equal to 0.28.[28] This value, being less than one,[29] indicates that labor and capital are complements. This empirical finding is consistent with the theoretical framework and points out that, at least in the sample period, we do not observe that capital substitutes labor.

Production output and its distribution.— The theoretical model in Appendix A describes how a wage shock affects the labor share under given technologies and prices. However, it does not account for that in practice, the minimum wage may (i) improve productivity by motivating workers or (ii) enable cost pass-through to prices. These possibilities also warrant an empirical examination of overall output responses to the minimum wage.

Column (4) of Table 3 reports an increase in firms' total value added following the reform. Columns (5) and (6) suggest that the minimum wage increases returns to labor (measured by total labor costs) while reducing returns to capital (measured by EBITDA). This pattern suggests that profits absorb part of the wage shock, while output even rises—potentially due to productivity gains or price adjustments. Thus, the minimum wage results in a larger overall output and reallocates a greater share to workers.

6.2. Firms' likelihood of survival

To assess the broader implications of firms' deleveraging in response to the minimum wage, I examine how financial adjustment affects firm survival. Both a higher labor share and higher

[28] The results are consistent with recent studies that obtain that σ is less than unity in most developed countries. Both Mućk (2017); Bellocchi and Travaglini (2023) estimate the value of σ in Germany to be around 0.5.

[29] Since the two estimates are obtained independently, I use the delta method to approximate the standard error of the ratio (0.133). The resulting z-statistic is –5.41, with a p-value < 0.001, rejecting the null hypothesis that the elasticity equals one.

Table 4: Minimum wage bite and firm exit

	Exit (=1)	Exit (=1)(without covariates)
	(1)	(2)
Bite	0.046**	0.078***
	(0.015)	(0.015)
Avg. fin. leverage	0.020***	0.042***
	(0.006)	(0.005)
Avg. fin. leverage $*$ *Bite*	-0.048*	-0.070**
	(0.023)	(0.023)
Avg. cash	-0.034***	
	(0.009)	
Avg. ROA	-0.083***	
	(0.011)	
Avg. total assets	-0.003**	
	(0.001)	
Avg. log empl.	-0.016***	
	(0.001)	
Constant	0.154***	0.013***
	(0.018)	(0.003)
Observations	26,033	26,033

Notes: The dependent variable for both columns is a dummy variable indicating whether all of a firm's establishments exit the market between 2016 and 2020. County and industry fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

financial leverage can increase the likelihood of firm default, as each contributes to greater business risk. However, if firms trade off between these risks, they may adopt more conservative financial strategies that enhance resilience.

$$Pr(Exit_j = 1) = \beta_0 + \beta_1 * Bite_j + \beta_2 * Avg.fin.leverge_j + \beta_3 * Bite_j * Avg.fin.leverge_j + \mathbf{X}_j'\boldsymbol{\gamma} + \varepsilon_j, \tag{4}$$

I perform cross-sectional regressions as in equation 4. The dependent variable indicates whether a firm exited the market between 2016 and 2020.[30] Control variables $\mathbf{X}_j$ are measured as average

[30]This variable is based on the year of the firm's last appearance in BHP data. Since the sample consists of firms that operated at least until 2015, it is impossible to conduct a placebo test to assess whether the minimum wage has an impact on firms' exit probability before 2015. The information on a firm's last appearance is derived from the variable *lzt_jahr*. I use the year of the last remaining establishment's appearance as the firm's exit year. The reason for exit could be either the closure of all the firm's establishments or a change in its legal form. However, the dataset

values during the pre-policy period. We may expect a higher exit rate among firms with higher financial leverage. Additionally, if an increase in the minimum wage raises the labor share, we may also expect a higher probability of exiting for firms with a higher bite. However, due to deleveraging to the minimum wage of firms, the interaction between leverage and bite may mitigate overall risk and improve survival outcomes.

In Table 4, the coefficients on *Bite* and *Avg.leverage* indicate that firms with higher bite or higher financial leverage are more likely to exit the market, consistent with theoretical expectations. Specifically, a 10-percentage-point increase in bite is associated with a 0.46-percentage-point increase in the probability of exit. The negative interactive effect demonstrates that the minimum wage treatment mitigates the positive impact of financial leverage on a firm's likelihood of exiting. This finding supports the notion of a trade-off between minimum wage treatment and financial leverage, suggesting that firms effectively manage their overall risk and indicating that such trade-off behavior enhances firms' survival prospects in the subsequent year—a period that includes a year marked by the pandemic, during which firms faced significant shocks.

The results from Table 4 can also provide insights into potential selection bias. The estimated extent of deleveraging would be biased if firms that exit the market do not reduce their financial leverage or even increase it, suggesting that minimum wage worsens their financial condition. The risk of default is particularly severe for firms already in financial distress. Thus, the larger the bite, the more financially constrained firms should be more likely to default, which would be reflected by a positive coefficient for the interaction term $Avg.\,fin.\,leverage * Bite$. However, my results do not support this expectation. Thus, firm exits do not bias the main findings of this study.

7. Heterogeneities

7.1. Heterogeneities: long-term debts

Firms can borrow long-term debts (maturing in more than one year) and short-term debts (maturing within one year). The duration of debts is relevant when assessing the risks associated with borrowing. As pointed out by Yazdanfar and Öhman (2015), long-term debt is particularly risky

does not provide information on the specific reasons for the disappearance of these establishments. Therefore, the analysis is to provide suggestive evidence of the correlation between financial leverage, minimum wage, and firms' exit probability.

Table 5: Minimum wage effects on long/short term liabilities

	Log long-term debts	Log short-term liabilities
	(1)	(2)
Bite $*$ *Post*	-0.735***	0.161
	(0.187)	(0.130)
Observations	184,702	184,702

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. A predetermined bite-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively. The full regression results are presented in Appendix Table E5. *Data*: Linked data of BeH, BHP, and Amadeus, 2011-2018.

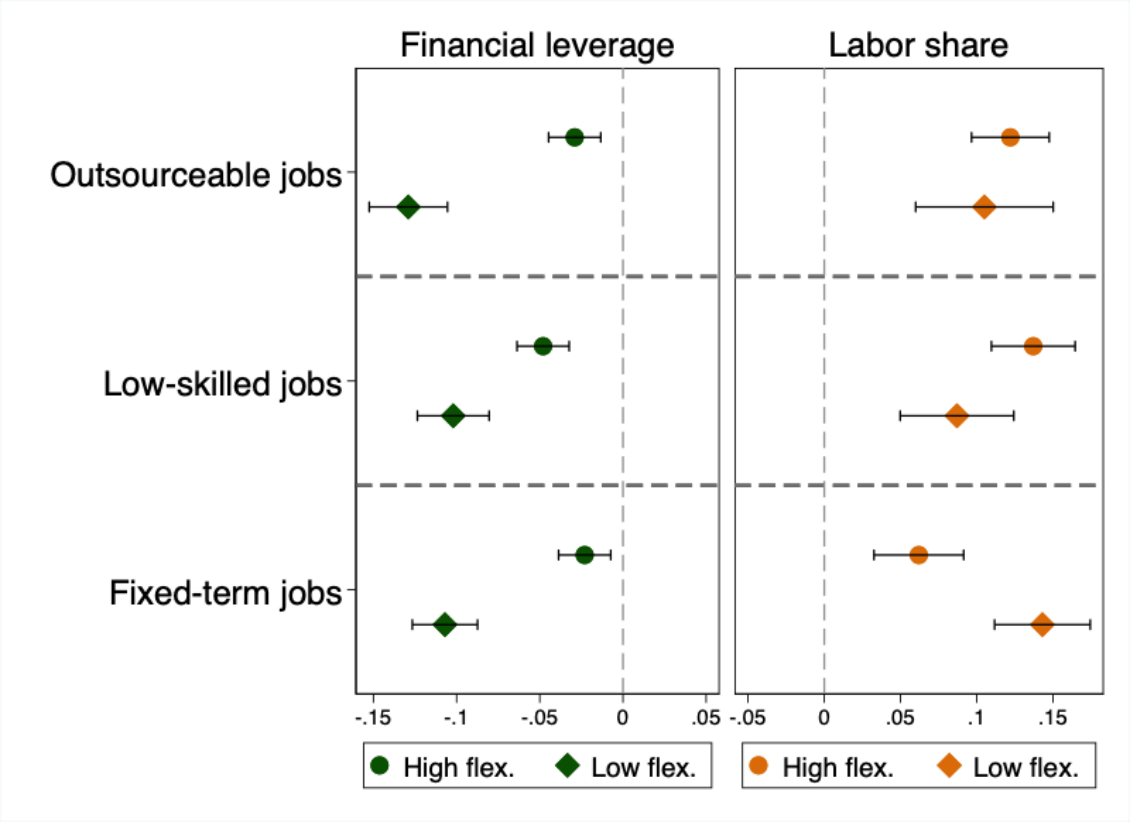
because it is more likely that firms will encounter negative shocks over the long term, such as obtaining lower profits but still having to pay the interest on their long-term debt (Favilukis et al., 2020). In contrast, firms face less uncertainty in the short run. Therefore, in response to increasing labor share, firms may tend to reduce their long-term debt first to mitigate risks in the longer term.

Table 5 examines the minimum wage effects on log long-term debts and short-term liabilities separately. The coefficient on long-term debt is significantly negative, whereas no statistically significant effect is observed for short-term liabilities. This finding supports the hypothesis that firms primarily reduce risky long-term debt, indicating that the minimum wage influences not only the overall debt level but also the composition of firms' debt structure. Moreover, this result is consistent with the main findings that firms' financial leverage continues to decline even several years after the minimum wage introduction. Because long-term debt can typically be repaid only as existing obligations mature, the deleveraging process may unfold gradually over several years.

7.2. Heterogeneities: firms flexibility in adjusting labor

High labor share amplifies business risks due to the inflexibility of adjusting employment and the rigidity of adjusting wages. However, due to the different compositions of labor or occupations, labor costs for some firms may be less inflexible than others. For example, under negative shocks, firms may find it advantageous to outsource certain tasks. Outsourcing allows firms to avoid maintaining a large in-house labor force and provides them with greater flexibility in adjusting

Figure 7: Minimum wage effects on financial leverage and labor share, regarding different labor flexibility



Notes: The figure displays the detrended difference-in-differences (DiD) regression coefficients of $Bite_j * Post$ with 95% confidence intervals. The dependent variable on the left side of the figure is financial leverage, while on the right side it is labor share, with the year 2013 serving as the reference year. The upper panel splits the sample based on whether firms have a higher (circles) or lower (diamonds) share of outsourceable jobs. The middle panel divides the sample according to firms with a higher (circles) or lower (diamonds) share of low-skilled workers. The lower panel represents the sample split based on firms with a higher (circles) or lower (diamonds) share of fixed-term jobs. The regression results corresponding to this figure are presented in Appendix Table E6.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

their production scale to respond to changes in the economic landscape rapidly. Consequently, outsourcing might serve to counteract the operating risks brought about by the minimum wage. Similarly, firms with a higher share of low-skilled jobs may have greater flexibility in adjusting their workforce, as low-skilled jobs are easier to replace and require less training or firm-specific experience. Likewise, firms with a higher share of fixed-term jobs also benefit from greater flexibility, as these positions are easier to adjust compared to permanent contracts.

In this section, I distinguish between firms with a large share of outsourceable occupations, low-skilled jobs, or fixed-term jobs, and those with a small share of these job types. The hypothesis is that the former possess greater flexibility in labor adjustments, and for the same level of impact, they engage in less deleveraging.[31]

Following Goldschmidt and Schmieder (2017), my focus primarily rests on low-wage outsourcing occupations, namely food, cleaning, security, and logistics occupations, as the minimum wage has the most substantial impact on these low-wage jobs. Moreover, I exclude potential business service firms that provide outsourcing services.[32] Low-skilled workers are defined as those performing unskilled or semiskilled tasks.[33] Firms are split based on whether their share of one of these job types exceeds the sample median value of the year 2013.[34]

Figure 7 shows the estimated impact of the minimum wage on financial leverage (left panel) and labor share (right panel), distinguishing between firms with higher and lower flexibility in adjusting their labor force. Coefficients denoted by circles (diamonds) represent subsamples with higher (lower) flexibility—specifically, firms with a higher (lower) share of one of the three job types.

The upper panel shows that firms with greater outsourcing potential and labor flexibility exhibit a significantly lower response in their financial leverage compared to those with less flexibility. Quantitatively, a 10-percentage point increase in the minimum wage bite results in a mere 0.29 percentage points decrease in financial leverage for highly outsourceable firms, whereas firms with

[31] The effects of the minimum wage may also vary between firms with a higher or lower share of flexible job types due to (1) nonlinear impacts of the minimum wage bite or (2) different effects at various quantiles of the financial leverage distribution. Appendix Table D3 presents descriptive statistics for subsamples with higher or lower shares of flexible jobs. While the average pre-policy financial leverage is similar across these groups, the average level of the minimum wage bite differs significantly. Firms with a higher share of low-skilled jobs, fixed-term jobs, and outsourceable occupations exhibit a much higher bite level. To explore this, I conduct regressions using dummies representing different bite levels to examine its nonlinear effects on financial leverage. The results indicate that the smaller effects observed in firms with a higher share of flexible occupations cannot be attributed to their pre-policy bite levels. For a detailed comparison, please refer to Appendix D.4.

[32] The occupations eligible for outsourcing are classified using a 3-digit occupation code, while business service firms are categorized based on the 3-digit industry code. All classification codes are provided by Goldschmidt and Schmieder (2017). The occupational code, initially based on the KldB 1988 standard, is converted to KldB 2010. Outsourceable occupations fall within categories 514, 541, 631, 632, 633, 831, 832, 942, 946, 223, 273, 292, 293, 341, 513, 516, 521, 525, 531, and 913. The industry code for business service firms providing food, cleaning, security, and logistics services is initially based on the wz2003 standard and is converted to wz2008. These business service firms fall within categories 562, 812, 801, 802, 803, 749, 493, 494, 522, 521, 781, 782, 783, 799, and 853.

[33] The classification of skill requirements and fixed-term jobs is based on the KldB2010 code, and both variables are provided in the dataset. The sample used is the same as the baseline sample.

[34] The median values are as follows: share of outsourceable jobs is 13.2%, low-skilled jobs is 7%, and fixed-term jobs is 10%.

fewer outsourceable occupations experience a more substantial 1.29 percentage points decrease. Additional findings on labor share demonstrate a similar increase in the operational burden for these two types of firms. Therefore, the difference in coefficients observed in financial leverage regressions cannot be attributed to disparities in the effects of the minimum wage on labor share. Similarly, in the middle panel, firms with a higher share of low-skilled jobs exhibit less deleveraging, despite a larger increase in labor share. In the lower panel, firms with a higher share of fixed-term jobs show a smaller increase in labor share, with the coefficient about 40% of that for firms with a lower share. In contrast, the reduction in financial leverage is disproportionately smaller, at only 20%. Across all three measures of labor flexibility, the results consistently show that the reduction in financial leverage is significantly correlated with the inflexible nature of the labor force. The correlation is weakened when labor can be easily adjusted.

7.3. Heterogeneities: market power

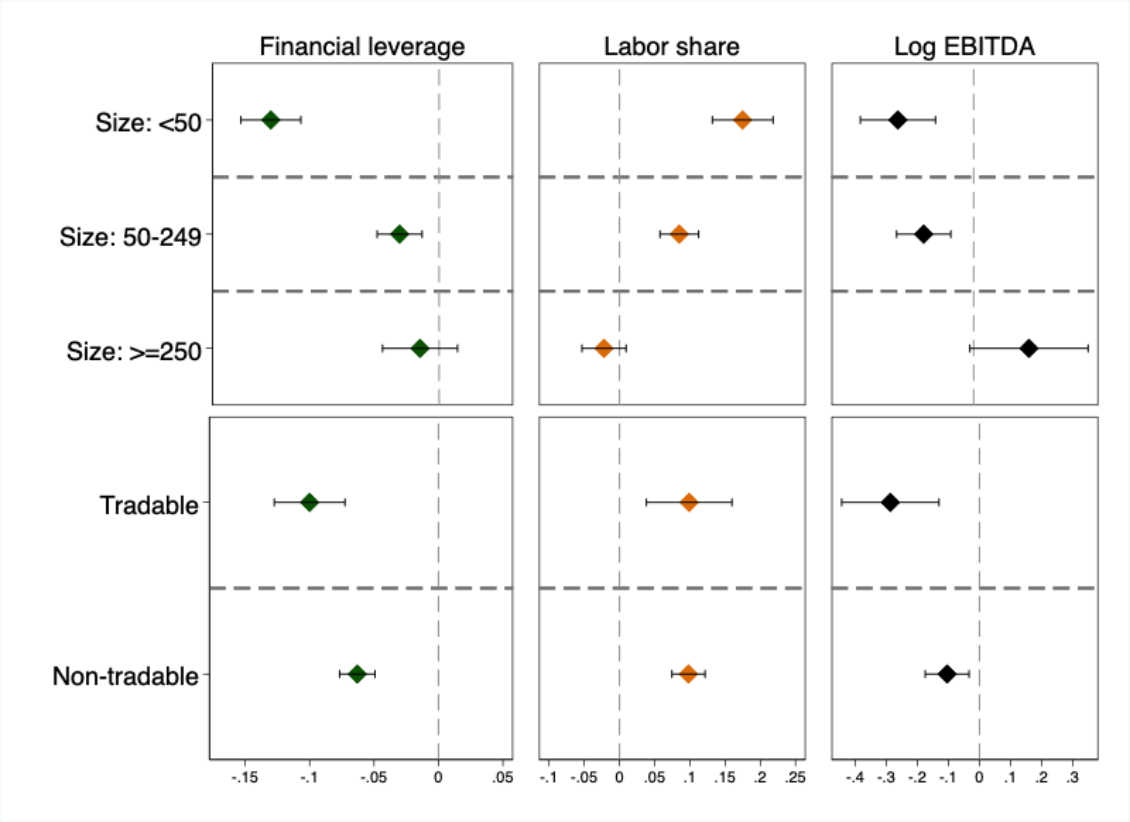
The analysis of the minimum wage's impact on the labor share reveals that it reduces firms' EBITDA while increasing total labor costs, resulting in a rise in the labor share. This effect may vary depending on firms' market power. Firms with greater market power can pass higher labor costs onto prices, allowing them to sustain profit levels with minimal impact on EBITDA. Consequently, these firms may experience a smaller increase in labor share and a more modest reduction in financial leverage.

However, firms with greater market power may also experience only moderate disemployment effects, potentially leading to larger increases in total labor costs. Thus, it remains uncertain whether these firms will have a smaller increase in labor share and a less pronounced reduction in financial leverage. These potential heterogeneous effects will be analyzed empirically.

In this section, I differentiate firms based on their market power. First, I examine whether firms of different sizes respond differently to the minimum wage. Smaller firms, are assumed to be with less market power, often struggle to pass rising labor costs onto prices, making it more challenging to sustain pre-policy profit levels.[35] Secondly, firms are categorized into tradable and non-tradable

[35] As discussed in Footnote 31, the heterogeneous effects of the minimum wage on firms with different levels of market power may also stem from variations in pre-policy bite levels or financial leverage. Appendix Table D4 presents the mean values of these two variables for subsamples divided by firm size and sector (tradable versus non-tradable). While bite levels do not differ substantially, small firms and tradable firms exhibit significantly higher financial leverage. To investigate the minimum wage's effect on the distribution of financial leverage, I employ unconditional

Figure 8: Minimum wage effects on financial leverage, labor share and log EBITDA, regarding different market power



Notes: The figure displays the detrended difference-in-differences (DiD) regression coefficients of $Bite_j * Post$ with 95% confidence intervals. The dependent variable on the left side of the figure is financial leverage, in the middle it is labor share, and on the right side it is log EBITDA, with 2013 serving as the reference year. The upper panel divides the sample based on whether firms belong to the tradable or non-tradable sector, while the lower panel categorizes firms by size. The regression results corresponding to this figure are presented in Appendix Table E7.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

sectors. Firms in the tradable sector face intense domestic and international competition, which constrains their ability to pass rising labor costs onto prices. By contrast, firms in the non-tradable sector typically possess greater market power, enabling them to raise prices while maintaining profit margins. In Appendix D.6, I further explore heterogeneity by splitting industries based on the Herfindahl-Hirschman Index (HHI) and examining whether the effects of the minimum wage differ between firms in high- and low-concentration industries, where higher concentration reflects greater market power.

quantile regressions (Firpo et al., 2009). As shown in Appendix Figure D1, the heterogeneous effects cannot be explained by distributional impacts of the minimum wage.

The analysis is conducted again by splitting the sample in terms of sectors[36] and firm sizes in 2013. The upper panel of Figure 8 demonstrates how the minimum wage affects financial leverage depending on firm sizes. Significant effects are observed for firms with fewer than 50 employees and for firms with 50-249 employees. Effect sizes decrease as firm sizes increase. Since the sample is underrepresentative of small firms, the estimates for the entire sample underestimate the true deleveraging effect. Appendix Table D2 presents the weighted regression using size-sector weights and estimating the effect of the minimum wage on firms' financial leverage. The effect size is significantly larger than those reported in the main results.

When examining the labor share results, it becomes evident that small firms are more profoundly affected by the minimum wage, whereas the minimum wage has no effect on firms with more than 250 employees. These findings reveal that risks induced by the minimum wage are more pronounced in small firms, consequently incentivizing them to engage in greater deleveraging efforts. In terms of EBITDA, smaller firms—often with less market power—experience a sharper decline in earnings compared to medium-sized and large firms.

The lower panel of Figure 8 shows that both tradable and non-tradable firms experience a similar increase in the labor share, but for different reasons. For non-tradable firms, the increase mainly reflects a stable profit level, as the minimum wage has only a modest effect on EBITDA. In contrast, tradable firms experience a sharp decline in EBITDA, which mechanically raises the labor share through a denominator effect. Non-tradable firms, with greater market power, are better able to preserve profitability by adjusting prices, while tradable firms face stronger competitive pressures that constrain their ability to do so. Consequently, the decline in financial leverage is smaller among non-tradable firms.

In summary, firms with greater market power are better able to absorb the impact of the minimum wage, resulting in smaller profit declines, milder increases in the labor share, and a more moderate reduction in financial leverage.

[36] I classify firms into tradable and non-tradable sectors. Industries are classified as tradable sectors if exports exceed 10% of their gross value added. These include manufacturing, agriculture, mining, and specific service industries, such as wholesale trade (WZ2008, 46), transport services (49-51, 522), and machinery leasing (77).

8. Conclusion

I investigate the impact of the minimum wage on firms' financial leverage by using the firm-establishment-employee linked data and the difference-in-differences estimation method with firm-level variations of the minimum wage exposure. Firms face a trade-off between financial leverage and the increasing labor share resulting from the minimum wage, both of which amplify the expected costs of financial distress. To mitigate the risks caused by the rising labor share, firms reduce their financial leverage.

I find that the average minimum wage treatment level leads to a decrease in the financial leverage by 0.5 to 0.9 percentage points and to an increase in the labor share by 0.5 to 1.6 percentage points. Descriptively, in my sample period, the mean of financial leverage experiences a reduction of 2 percentage points between pre- and post-intervention, while the labor share increases by 1 percentage point.[37] Comparing the developments in financial leverage and labor share at the aggregate level with the average minimum wage effects, the minimum wage contributes a non-negligible part to the deleveraging trend and the increasing labor share in Germany in recent years.

I further examine the mechanism and find that the minimum wage reduces debt financing while increasing cash holdings through lower dividend payouts and higher retained earnings. Regarding the labor share, the elasticity of substitution between labor and capital is estimated at 0.28, suggesting labor and capital are complements. Additionally, changes in the labor share result in increased total labor costs but decreased profits, indicating a shift toward labor in firms' total value-added.

Furthermore, heterogeneous effects indicate that firms tend to decrease long-term debts instead of short-term debts due to the higher risks associated with long-term debts. The flexibility of adjusting labor is crucial for firms responding to rising labor share. A more flexible labor composition, including outsourced occupations, reduces leverage substitution behavior. Furthermore, firms with greater market power, such as large firms and those in the non-tradable sector, deleverage less because they can more easily pass on costs to prices, mitigating the risks associated with the minimum wage.

[37] See Appendix Table B1.

In summary, these results establish that firms' corporate decisions are responsive to labor market policies. The minimum wage benefits employees overall, with increased total value-added and more earnings shifted to the labor force. However, for firms, the minimum wage makes them less flexible in adjusting costs and imposes larger operating burdens. Consequently, they exhibit more conservative behavior to offset the associated risks. This risk substitution contributes to improving firms' resilience after the introduction of the minimum wage and during the first year of the pandemic. These findings are derived from an examination of the impact of the German minimum wage; they may also be applicable to countries with characteristics similar to Germany's, such as those with strong employment protection laws and high compliance rates with such policies. However, caution is warranted when extrapolating these findings to countries with weak employment protection, where the minimum wage may prompt significant capital-labor substitution, potentially leading to different conclusions. Furthermore, the mechanism examined in this study, in which exogenous increases in labor costs influence firms' capital structure, may also be relevant in the context of other labor cost shocks. Examples include increases in payroll taxes, changes in employer social security contributions, and mandatory wage hikes resulting from collective bargaining agreements. These shocks similarly affect firms' cost structures and may prompt comparable financial adjustments.

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Online Appendix for

Firms' Risk Adjustments to Minimum Wage: Financial Leverage and Labor Share Trade-off

by
Ying Liang

Content

A. Theoretical framework: minimum wage and labor share

In this section, I use the framework developed by Bentolila and Saint-Paul (2003), which is also employed by Petreski and Pehkonen (2023) to analyze the impact of the minimum wage on the labor share.

Starting with the simple scenario, firms face an increasing wage level due to the minimum wage, and they have the option to adjust employment so that the equilibrium condition still holds that the real wage is equal to the marginal product of labor. The CES (constant elasticity of substitution) production function is defined as

$$Y_j = \left[\alpha(A_j K_j)^{\epsilon} + (1-\alpha)(B_j L_j)^{\epsilon}\right]^{\frac{1}{\epsilon}}$$

where Y_j denotes output, K_j is quantity of capital input, and L_j is quantity of labor. A_j represents capital-augmenting technical progress. B_j is labor-augmenting technical progress. α is the share parameter and ϵ the substitution parameter. Labor share is defined as the share of total labor income to output:

$$LS_j = \frac{w_j L_j}{Y_j p_j}$$

Firms solve the profit maximization problem:

$$\max \pi_j = Y_j p_j - w_j L_j - r_j K_j$$

w_j and r_j are the prices of labor and capital, namely wage and interest. p_j is the price of output. Take the partial derivative with respect to L_j:

$$\frac{w_j}{p_j} = B_j^{\epsilon}(1-\alpha)\left(\frac{L_j}{Y_j}\right)^{\epsilon-1}$$

$$\frac{L_j}{Y_j} = \left(\frac{w_j}{p_j}\right)^{\frac{1}{\epsilon-1}} B_j^{\frac{\epsilon}{(1-\epsilon)}} (1-\alpha)^{\frac{1}{1-\epsilon}} \tag{A1}$$

Insert Equation A1 to the definition of labor share:

$$LS_j = \frac{w_j L_j}{Y_j p_j} = (\frac{w_j}{p_j})^{\frac{\epsilon}{\epsilon-1}} B_j{}^{\frac{\epsilon}{(1-\epsilon)}} (1-\alpha)^{\frac{1}{1-\epsilon}} \tag{A2}$$

Take the partial derivative of labor share with respect to real wage:

$$\frac{\partial LS_j}{\partial \frac{w_j}{p_j}} = \frac{\epsilon}{\epsilon-1} (\frac{w_j}{p_j})^{\frac{1}{\epsilon-1}} B_j{}^{\frac{\epsilon}{(1-\epsilon)}} (1-\alpha)^{\frac{1}{1-\epsilon}} \tag{A3}$$

The direction of the partial derivative depends on $\epsilon/(\epsilon-1)$. The elasticity of substitution between labor and capital is $\sigma = 1/(1-\epsilon)$. If $\epsilon \in (0,1)$, $\sigma > 1$ and labor and capital are substitutes. In this case, the increase in wage leads to decreased labor share. If $\epsilon \in (-\infty, 0)$, $\sigma < 1$ and labor and capital are complements. In this case, the increased wage results in increased labor share.

However, if firms are not able to adjust employment fully, then there would be a wedge between the marginal product of labor and real wages. Bentolila and Saint-Paul (2003) also discussed the situation where firms and workers bargain over both wages and employment. In this case, employment is set such that the marginal product of labor is equal to its opportunity cost ($\frac{\bar{w}_j}{p_j}$):

$$\frac{\bar{w}_j}{p_j} = B_j^{\epsilon}(1-\alpha)(\frac{L_j}{Y_j})^{\epsilon-1}$$

Assume workers' bargaining power is θ, with a Nash-bargaining model, the real wage is then the weighted average of opportunity costs and the average labor product:

$$\frac{w_j}{p_j} = \theta\frac{Y_j}{L_j} + (1-\theta)(B_j^{\epsilon}(1-\alpha)(\frac{L_j}{Y_j})^{\epsilon-1})$$

Denote the labor share in Equation A2 as LS_j and the new labor share in bargaining set-up as LS_{new},

$$LS_{new} = \theta + (1-\theta)LS_j = LS_j + (1-LS_j)\theta$$

The labor share becomes larger if workers bargain employment with firms. Moreover, introducing the bargaining power of workers over employment does not affect the conclusion from Equation A3 that the effect's direction of increase in real wages on labor share depends on σ.

B. Data coverage and description

B.1. Amadeus data coverage

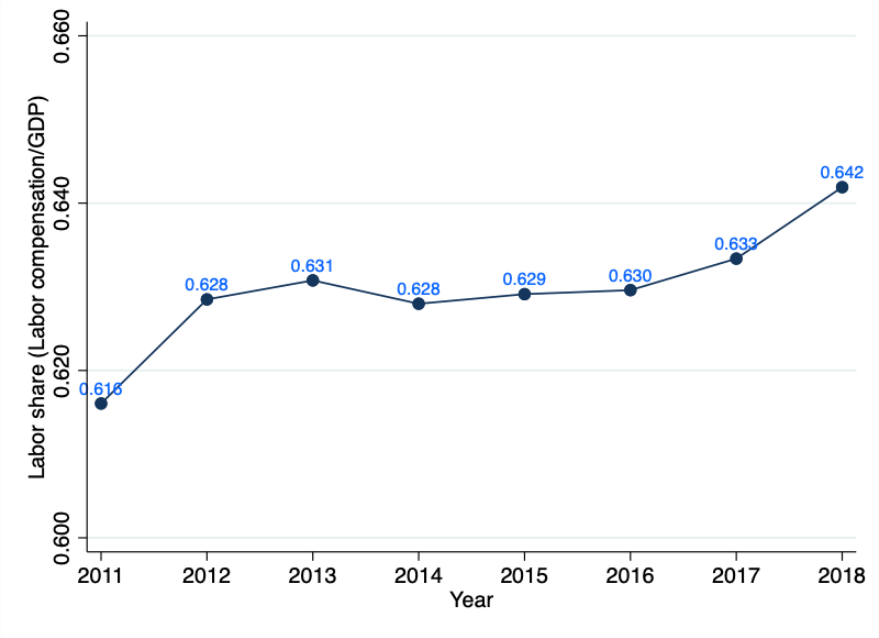
Amadeus provides firm-level financial data on incorporated German entities, specifically corporate enterprises (AG, GmbH) and cooperatives (e.G.). Private businesses such as sole proprietorships are not included, as they are not legally required to file annual accounts. The depth of available financial information varies by firm size and legal obligation: while small firms are only required to publish balance sheets and accompanying notes, larger firms and cooperatives typically disclose full financial statements, including income statements. Filings are submitted via official channels: large firms file with the Bundesanzeiger, smaller firms with the register courts, and cooperatives with the cooperative register. The filings are not standardized in format, but are collected and harmonized by Creditreform and Creditreform Rating AG before being incorporated into Amadeus. After submission, records generally appear in the database within a few weeks to a few months.

Amadeus focuses exclusively on active firms and does not retain historical records for firms that have become inactive. Bureau van Dijk applies standard exclusion rules: firms for which no financial data is available for four consecutive years are retained but flagged (with consolidation status set to "n.a."), while those with no data for six consecutive years are removed entirely. Consequently, the database offers a relatively clean snapshot of the active corporate sector but may suffer from survivorship bias in longer panels.

After basic cleaning (e.g., removing observations with missing values in key variables and restricting the sample period), the matching rate between Amadeus and the IAB Establishment History Panel (Betriebs-Historik-Panel) via the linked firm identifier is approximately 81%.

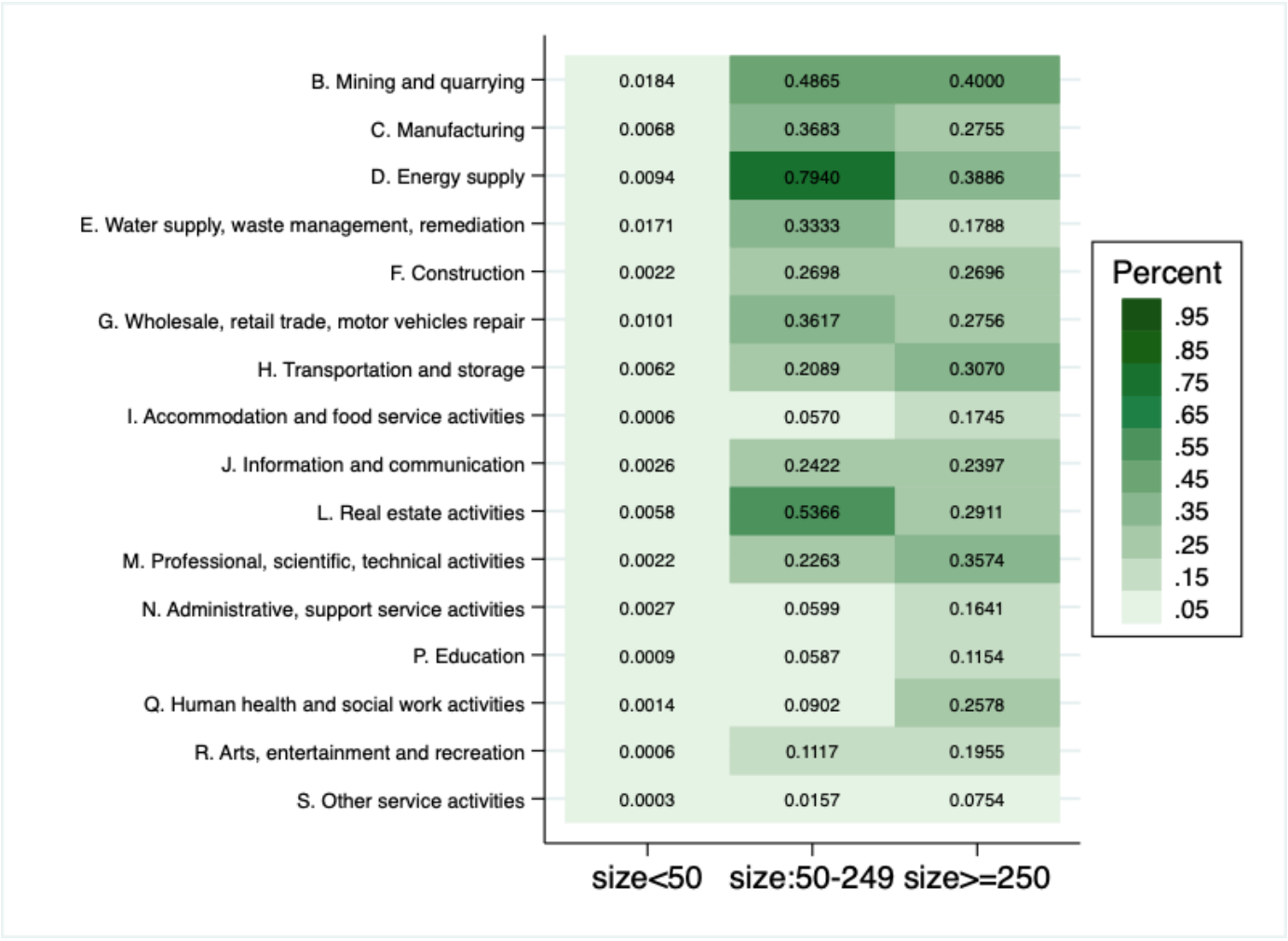
B.2. Sample representativeness

Figure B1: Development of aggregate labor share in Germany



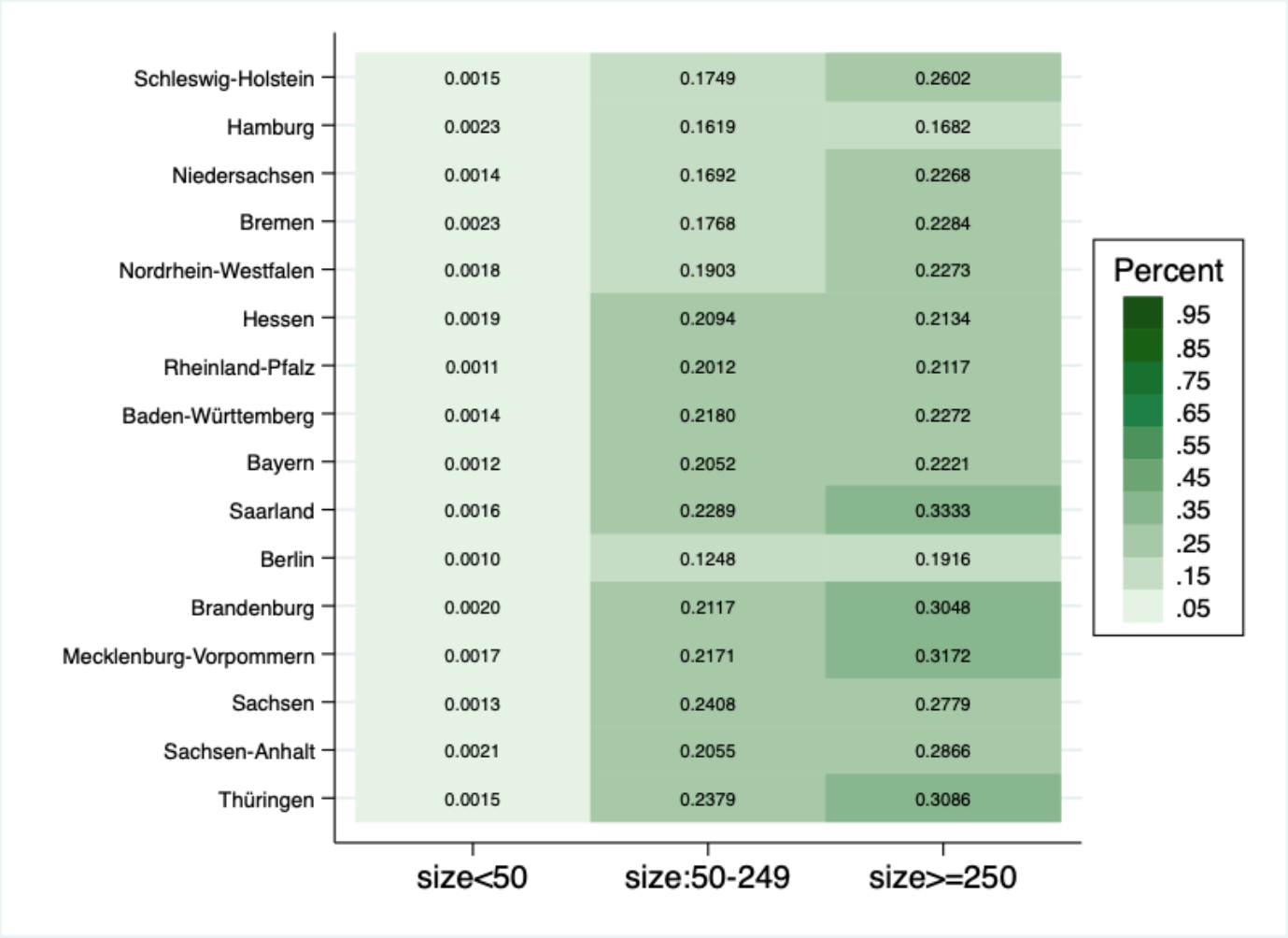
Notes: The figure displays Germany's aggregate labor share (labor compensation/GDP). All industries are included.
Data: Penn World Table version 10.01.

Figure B2: Sample proportion to population, in sector-size cells



Notes: The figure displays the ratio of the number of firms in the sample (2018) over the number of firms in the population (2019). Sector K financial firms are dropped from the sample as well as from the population data. Cells for sector O (Public Sector) are not shown in the figure, as the number of public firms in some cells is below the threshold required for publication due to IAB data protection rules. Population data are from the German Business Register, extracted form GENESIS-Online database. The year 2018 is not available in the GENESIS database. Thus, the closest year, 2019, is chosen.
Data: Linked data from BeH, BHP, Amadeus(2018), and GENESIS-Online database.

Figure B3: Sample proportion to population, in state-size cells



Notes: The figure displays the ratio of the number of firms in the sample (2018) over the number of firms in the population (2019). Sector K financial firms are dropped from the sample as well as from the population data. Population data are from the German Business Register, extracted form GENESIS-Online database. The year 2018 is not available in the GENESIS database. Thus, the closest year, 2019, is chosen.
Data: Linked data from BeH, BHP, Amadeus(2018), and GENESIS-Online database.

B.3. Variables definitions

Table B1: Vairables definitions and sources

Variable	Definition	Original variables used	Source
Financial leverages			
Financial leverage	$\frac{\text{(long-term debts+short-term liabilities)}}{\text{total assets}}$	$\frac{\text{(LTDB+CULI)}}{\text{TOAS}}$	BvD
Broader fin. leverage	$\frac{\text{(long-term liabilities+short-term liabilities)}}{\text{total assets}}$	$\frac{\text{(NCLI+CULI)}}{\text{TOAS}}$	BvD
Long-term leverage	$\frac{\text{(long-term debts)}}{\text{total assets}}$	$\frac{\text{(LTDB)}}{\text{TOAS}}$	BvD
Net leverage	$\frac{\text{(long-term debts+short-term liabilities-cash)}}{\text{total assets}}$	$\frac{\text{(LTDB+CULI-CASH)}}{\text{TOAS}}$	BvD
Labor related variables			
Labor share	total labor costs/value-added	$\frac{\text{(TLC)}}{\text{TLC+EBTA}}$	BvD,IAB
Total labor costs per worker	total labor costs/employment		IAB
Total labor costs(TLC)	total annual gross wages		IAB
Employment	number of workers		IAB
value-added	total labor costs + EBITDA	TLC+EBTA	BvD, IAB
Capital-labor ratio	fixed assets/employment	$\frac{\text{(FIAS)}}{\text{number of workers}}$	BvD, IAB
Outsourceable occupations	food, cleaning, security, and logistics occupations (Goldschmidt and Schmieder, 2017)		IAB
Bite	share of sub-minimum wage workers, based on gross hourly wages		IAB
Gap	$\frac{\sum_{i\in j} h_{i,2013} Max\{0,8.5-wage_{i,2013}\}}{\sum_{i\in j} h_{i,2013} wage_{i,2013}}$		IAB

Notes: Total labor costs, total labor costs per worker, employment, bite, outsourceable occupations, and gap variables are self-calculated from the IAB data.

Table B2: Variable's definitions and sources, cont'd

Variable	Definition	Original variables used	Source
Other variables			
Total debts	Long-term debts and short-term liabilities	LTDB+CULI	BvD
Long-term liabilities	long-term debts and provisions	NCLI	BvD
Short-term liabilities	short-term debts, trade payables, and other current liabilities	CULI	BvD
Total assets	fixed assets+current assets	TOAS	BvD
Fixed assets	tangible assets+intangible assets	FIAS	BvD
Tangible assets	physical assets, such as property, equipment, and inventory	IFAS	BvD
Intangible assets	non-physical assets, such as patents and trademarks	TFAS	BvD
Current assets	cash, trade receivables and other current assets	CUAS	BvD
Cash	cash-in-hand, central Bank balances, bank balances and cheques	CASH	BvD
EBITDA	earnings before interest, taxes, depreciation and amortization	EBTA	BvD
Net income	profit/loss - minority interest	PL	BvD
EBIT	earnings before interest and taxes	EBIT	BvD
ROA	EBIT/total assets	$\frac{(\text{EBIT})}{\text{TOAS}}$	BvD
Capital injection	additional equity financing provided by shareholders	CAPI	BvD
Retained earnings	accumulated profits from previous periods that remain within the firm	OSFD	BvD
Dividends	profits paid out to shareholders	PL-ΔOSFD	BvD

Notes: Total labor costs, total labor costs per worker, employment, bite, and gap variables are self-calculated from the IAB data.

B.4. Summary statistics table

Table B1: Summary Statistics

	Pre-period: 2011-2014					Post-period: 2015-2018				
	mean	sd	p25	p50	p75	mean	sd	p25	p50	p75
Financial Leverage variables										
Financial leverage	0.508	0.274	0.286	0.507	0.720	0.482	0.272	0.258	0.473	0.690
Financial leverage (broad def.)	0.629	0.264	0.434	0.650	0.830	0.604	0.268	0.399	0.616	0.808
Long-term leverage	0.154	0.211	0.000	0.056	0.238	0.132	0.188	0.000	0.038	0.202
Net leverage	0.376	0.354	0.126	0.403	0.648	0.346	0.352	0.097	0.368	0.614
Labor-related variables										
Labor share	0.657	0.320	0.469	0.669	0.826	0.667	0.320	0.480	0.679	0.833
Log average annual labor costs per employee worker	10.365	0.498	10.124	10.396	10.656	10.427	0.467	10.189	10.447	10.704
Log total annual labor costs	14.686	1.363	14.123	14.800	15.440	14.898	1.294	14.335	14.982	15.613
Log employment (IAB)	4.321	1.222	3.761	4.431	5.030	4.471	1.179	3.951	4.544	5.147
Log value-added (IAB)†	15.264	1.164	14.712	15.297	15.905	15.454	1.103	14.897	15.462	16.076
Log capital-labor ratio	10.357	1.820	9.246	10.330	11.319	10.432	1.793	9.363	10.427	11.358
Share of outsourceable workers	0.227	0.247	0.051	0.135	0.308	0.241	0.256	0.058	0.146	0.333
Other variables										
Log total debts	15.392	1.497	14.638	15.435	16.215	15.532	1.457	14 .759	15.560	16.354
Log long-term debts	9.407	6.860	0.000	13.032	14.822	9.153	6.966	0.000	12.855	14.832
Log short-term liabilities	14.302	3.450	14.028	14.992	15.823	14.861	2.474	14.265	15.158	15.980
Log total assets	16.292	1.314	15.657	16.190	16.944	16.503	1.232	15.839	16.380	17.114
Log fixed assets	14.678	2.026	13.531	14.821	15.903	14.901	1.961	13.824	15.034	16.075
Log tangible assets	14.275	2.166	13.020	14.489	15.638	14.480	2.118	13.284	14.702	15.812
Log intangible assets	8.915	4.345	7.690	10.032	11.712	9.235	4.205	8.042	10.297	11.938
Log current assets	15.715	1.297	15.103	15.725	16.413	15.925	1.228	15.300	15.904	16.579
Log cash	13.072	2.316	11.865	13.476	14.719	13.309	2.316	12.182	13.758	14.928
Log EBITDA†	14.117	1.423	13.398	14.155	14.954	14.290	1.382	13.560	14.314	15.110
Log EBIT†	13.702	1.520	12.903	13.779	14.642	13.871	1.497	13.059	13.940	14.803
ROA†	0.087	0.123	0.025	0.067	0.136	0.084	0.119	0.023	0.064	0.120
Log net income	13.126	1.660	12.299	13.303	14.181	13.342	1.617	12.534	13.509	14.362
Observations	95,239					89,592				

Notes: Appendix B.3 contains variables' definitions. "Observations" indicates the number of observations in the main sample. † denotes variables that have missing values and the number of observations is smaller than it is in the main sample.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

C. Robustness checks

C.1. Alternative treatment measures

The gap variable is also defined at the firm level, as shown in Equation 3, and quantifies the extent to which a firm's total wage bill would need to increase for all workers to reach the minimum wage threshold of 8.50 €. Additionally, I use the average gap (Dustmann et al., 2021) and average bite variables as further measures of treatment intensity.

$$Average\ gap = \frac{1}{3}\sum_{2011}^{2013} gap_{j,t}$$

$$Average\ bite = \frac{1}{3}\sum_{2011}^{2013} bite_{j,t}$$

The gap variable is sensitive to very low hourly wages, as such low wages can lead to outliers with extremely large gap values. Moreover, the gap variable aggregated at the firm level involves more measurement error than at the regional level, especially in small firms with only a few employees. Due to the two reasons mentioned above, the gap and the average gap are winsorized at the 99th percentile for each year.

Appendix Table C1, columns (1) and (2), reports the effects of the minimum wage on financial leverage and labor outcomes using the gap measure. Interaction coefficients range from -0.14 to -0.31. With a mean gap of approximately 0.02 in 2013, financial leverage decreases by 0.28 to 0.62 percentage points, while labor share increases by 0.19 to 0.58 percentage points.

Columns (3) and (4), using the average bite with a mean of approximately 0.10, show a reduction in financial leverage of 0.45 to 0.83 percentage points. Columns (5) and (6), using the average gap with a mean of approximately 0.024, indicate a 0.2 percentage point decrease in financial leverage.

Recent literature (Callaway et al., 2024) highlights important caveats regarding the use of Difference-in-Differences (DiD) with continuous treatment measures. Specifically, the Two-Way Fixed Effects (TWFE) coefficient can be represented as a weighted integral of average level treatment effects, but these weights sum to zero. Consequently, the coefficient should not be interpreted directly as an average treatment effect. To address this weighting issue, the average treatment effect among treated units can be obtained by conducting a binary DiD estimation using a treatment dummy

equal to one for any unit receiving a positive treatment dose. Accordingly, I apply a similar binary measure, defining the treatment dummy as equal to one if the bite variable is positive across all years from 2011 to 2013. Column (7) shows an average treatment effect of approximately -0.3 to -0.6 percentage points on financial leverage among treated firms, and column (8) indicates a roughly one percentage point increase in labor share. These results align closely with the main findings using the continuous bite measure, confirming their robustness.

Overall, I find a negative effect of the minimum wage on financial leverage and a positive effect on labor share across all treatment measures. While the magnitude of the effects varies slightly, the main conclusions remain robust.

Table C1: Minimum wage effect on financial leverage and labor costs, using other measures of treatment

	Gap		Average Bite		Average Gap		Binary Bite	
	Financial leverage (1)	Labor share (2)	Financial leverage (3)	Labor share (4)	Financial leverage (5)	Labor share (6)	Financial leverage (7)	Labor share (8)
$Treatment * Year_{2011}$	0.013	0.021	-0.001	0.003	-0.002	0.006	0.001	0.000
	(0.023)	(0.047)	(0.007)	(0.013)	(0.008)	(0.021)	(0.002)	(0.004)
$Treatment * Year_{2012}$	-0.018	0.020	-0.003	-0.005	-0.017*	-0.007	0.001	-0.006
	(0.017)	(0.042)	(0.005)	(0.011)	(0.008)	(0.011)	(0.002)	(0.004)
$Treatment * Year_{2013}$				Reference				
$Treatment * Year_{2014}$	-0.044**	0.078	-0.016**	0.035**	-0.020*	0.050*	-0.003*	-0.001
	(0.015)	(0.042)	(0.005)	(0.012)	(0.008)	(0.020)	(0.002)	(0.004)
$Treatment * Year_{2015}$	-0.138***	0.095*	-0.045***	0.044***	-0.048***	0.041***	-0.004*	-0.002
	(0.018)	(0.041)	(0.006)	(0.012)	(0.010)	(0.011)	(0.002)	(0.004)
$Treatment * Year_{2016}$	-0.209***	0.224***	-0.062***	0.096***	-0.070***	0.084***	-0.006**	0.010*
	(0.022)	(0.040)	(0.007)	(0.012)	(0.012)	(0.011)	(0.002)	(0.004)
$Treatment * Year_{2017}$	-0.240***	0.267***	-0.065***	0.114***	-0.075***	0.097***	-0.006*	0.010*
	(0.025)	(0.043)	(0.008)	(0.013)	(0.012)	(0.013)	(0.002)	(0.005)
$Treatment * Year_{2018}$	-0.306***	0.296***	-0.083***	0.125***	-0.097***	0.101***	-0.007**	0.005
	(0.029)	(0.050)	(0.009)	(0.013)	(0.015)	(0.012)	(0.003)	(0.005)
Constant	0.495***	0.663***	0.496***	0.667***	0.494***	0.664***	0.497***	0.665***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
Observations	184,702	184,702	180,063	180,063	180,063	180,063	184,702	184,702

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. Treatment intensity is the gap for columns (1) and (2), the average bite for columns (3) and (4), the average gap for columns (5) and (6), and the binary treatment for columns (7) and (8). A predetermined treatment-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

C.2. Alternative measures of financial leverage

In the main results, the aggregate effects of the minimum wage on financial leverage are found to increase over time. To assess the robustness of these findings, I re-estimate the model using the change in financial leverage as the dependent variable. Since this specification captures the incremental change in leverage, there is no need to remove the bite-specific trend from the DiD regression. Accordingly, the non-detrended DiD model is employed. The results reported in Column (1) show that the treatment effects on changes in financial leverage are consistently negative in the post-policy years, which aligns with the main finding of an increasing effect magnitude over time.

Further robustness checks are conducted using other alternative definitions of financial leverage, as the classification of debt in the leverage ratio can be subject to interpretation. First, I adopt a broader concept of liabilities and define financial leverage as

$$\text{Broader financial leverage} = \frac{\text{Total liabilities}}{\text{Total assets}}.$$

Total liabilities are the sum of long-term liabilities and short-term liabilities, where, in addition to the long-term debts, the provisions are included as part of the long-term liabilities. Even though provisions are counted as liabilities, they pose less risk than debts to firms and are firms' internal estimates. Therefore, they are not included in the main analysis. However, it is still worth examining whether financial leverage decreases after the minimum wage introduction when considering a broader definition of liabilities. Second, I define the liabilities in a narrower sense, namely, only including long-term debts; correspondingly, the financial leverage is

$$\text{Long-term leverage} = \frac{\text{Long-term debts}}{\text{Total assets}}.$$

Third, I also use the net leverage ratio as a dependent variable, which measures the leverage ratio net of firms' cash holdings. This measure thus also accounts for the change in cash reserves. It is defined as:

$$\text{Net leverage} = \frac{\text{(Total debts-cash)}}{\text{Total assets}}.$$

Columns (2) to (4) of Appendix Table C2 report the treatment effects on other measures of financial leverage. Concerning the broader financial leverage, the treatment effects are almost the same as in the main results, showing that including the provision does not alter the main conclusion. The effects on long-term leverage are smaller in size but still significant. The decrease in net leverage also suggests that firms continue to deleverage when we take into account the level of cash holdings.

Table C2: Minimum wage effect on different financial leverages.

	Δ Financial leverage	Total liabilities/ total A.	Long-term debts/ total A.	(Total debts-cash)/ total A.
	(1)	(2)	(3)	(4)
$Bite * Year_{2011}$		0.002	-0.006	-0.000
		(0.006)	(0.008)	(0.008)
$Bite * Year_{2012}$	-0.007	-0.004	-0.005	-0.003
	(0.006)	(0.005)	(0.007)	(0.007)
$Bite * Year_{2013}$		Reference		
$Bite * Year_{2014}$	-0.018**	-0.012*	-0.012	-0.016*
	(0.006)	(0.005)	(0.007)	(0.007)
$Bite * Year_{2015}$	-0.027***	-0.042***	-0.025***	-0.034***
	(0.006)	(0.006)	(0.007)	(0.008)
$Bite * Year_{2016}$	-0.023***	-0.056***	-0.027**	-0.038***
	(0.006)	(0.007)	(0.008)	(0.009)
$Bite * Year_{2017}$	-0.015*	-0.066***	-0.040***	-0.043***
	(0.006)	(0.007)	(0.008)	(0.009)
$Bite * Year_{2018}$	-0.022***	-0.086***	-0.033*	-0.053***
	(0.006)	(0.008)	(0.009)	(0.011)
Constant	-0.005***	0.618***	0.145***	0.365***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	156,431	184,702	184,702	184,702

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. A predetermined bite-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

C.3. Alternative sample restrictions

Restriction on unsuccessful matching.—The linkage between IAB employment data and BvD financial data provides an opportunity to analyze all workers within a firm. However, unsuccessful matches could occur, such as when not all establishments of a firm are successfully matched (Antoni et al., 2018). If the final sample includes only a small proportion of employees from a firm, the bite variable would be imprecisely measured.

The BvD data does not provide information about the number of establishments a firm has, making it difficult to validate the matching quality. An alternative approach is to compare the employee count information in the two datasets. The IAB employment variable measures the number of employees registered in the German social security system, whereas the BvD variable includes employees both domestically and abroad (Jäger et al., 2021).[38] Since firms that do not adhere to German local accounting standards are excluded, the sample mostly comprises firms operating primarily in Germany. If the IAB employment variable is substantially lower than it is in the BvD dataset, it may indicate a significant loss of workers in the matched sample. To address this concern, a robustness check is conducted by excluding firms where the share of IAB employment is less than 30 percent of the BvD employment. The results are presented in Appendix Table C3, showing findings closely aligned with the main results.

Private firms only.—The main sample includes both private and public firms, although there are only 68 public firms. Given that public firms have access to stock markets and may behave differently from private firms, potentially influencing the results, I also perform a robustness check using only private firms. Appendix Table C4 presents the results, which are consistent with the main findings.

Western and Eastern Germany.—There are more sub-minimum wage workers in Eastern Germany than in Western Germany. Moreover, the economic conditions differ across the two regions, which may lead to heterogeneous effects of the minimum wage. Therefore, I conduct separate

[38] However, when comparing the two variables, there are observations where employment in IAB exceeds employment in BvD. Due to the accuracy of the IAB data and the definition of the two employment variables, this suggests significant measurement errors in the employment information provided by the BvD. Additionally, only workers in Germany are relevant to the minimum wage policy. Therefore, employment data from IAB is used for the main analysis.

analyses for firms located in Eastern and Western Germany. The results, presented in Table C5 and Table C6, show that the main findings are not driven exclusively by either region.

Non-imputed wages.—Furthermore, the wage imputation procedure may alter the minimum wage effects on labor-related outcomes. Because it directly changes the top-censored daily wages and consequently affects the value of total labor costs, labor costs per worker, and labor share. I also conducted robustness checks using non-imputed wages. The results are similar to the main results and are presented in Appendix Table C7.

Other specifications.—The main specification does not include firm-level control variables, which may also influence firms' capital structure. The exclusion is intentional, as these covariates may themselves be affected by the minimum wage, and controlling for post-treatment variables could bias the estimated treatment effects. Nevertheless, in Table C8, columns (1) and (5), I include ROA, cash ratio, tangibility, and total assets—commonly used firm-level controls in the corporate finance literature. The remaining columns test specifications that omit certain fixed effects from the main model. The results across all specifications yield similar effect sizes, supporting the robustness of the main findings.

Table C3: Minimum wage effect on financial leverage and labor costs, additional sample restriction: drop if the linking rate$<$0.3

	Financial leverage (1)	Labor share (2)	Log total labor costs (3)	Log labor costs/worker (4)
$Bite * Year_{2011}$	0.002	-0.001	0.031	0.016
	(0.007)	(0.013)	(0.021)	(0.014)
$Bite * Year_{2012}$	-0.003	0.002	0.010	0.019
	(0.005)	(0.012)	(0.017)	(0.011)
$Bite * Year_{2013}$			Reference	
$Bite * Year_{2014}$	-0.015**	0.031*	0.067**	0.066***
	(0.005)	(0.013)	(0.021)	(0.014)
$Bite * Year_{2015}$	-0.049***	0.054***	0.184***	0.198***
	(0.006)	(0.013)	(0.023)	(0.016)
$Bite * Year_{2016}$	-0.070***	0.115***	0.184***	0.198***
	(0.007)	(0.013)	(0.026)	(0.016)
$Bite * Year_{2017}$	-0.077***	0.145***	0.170***	0.224***
	(0.008)	(0.014)	(0.029)	(0.016)
$Bite * Year_{2018}$	-0.097***	0.174***	0.160***	0.247***
	(0.009)	(0.014)	(0.030)	(0.017)
Constant	0.497***	0.674***	14.802***	10.387***
	(0.000)	(0.001)	(0.001)	(0.001)
Observations	178,745	178,745	178,745	178,745

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. A predetermined gap-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

Table C4: Minimum wage effect on financial leverage and labor costs, additional sample restriction: private firms only

	Financial leverage (1)	Labor share (2)	Log total labor costs (3)	Log labor costs/worker (4)
$Bite * Year_{2011}$	0.001	-0.003	0.031	0.016
	(0.006)	(0.013)	(0.021)	(0.014)
$Bite * Year_{2012}$	-0.004	-0.001	0.003	0.018
	(0.005)	(0.012)	(0.018)	(0.011)
$Bite * Year_{2013}$			Reference	
$Bite * Year_{2014}$	-0.015**	0.029*	0.052*	0.065***
	(0.005)	(0.013)	(0.021)	(0.014)
$Bite * Year_{2015}$	-0.046***	0.049***	0.096***	0.151***
	(0.006)	(0.013)	(0.024)	(0.015)
$Bite * Year_{2016}$	-0.061***	0.108***	0.153***	0.203***
	(0.007)	(0.013)	(0.026)	(0.015)
$Bite * Year_{2017}$	-0.069***	0.133***	0.148***	0.243***
	(0.007)	(0.013)	(0.030)	(0.016)
$Bite * Year_{2018}$	-0.087***	0.156***	0.128***	0.257***
	(0.009)	(0.014)	(0.031)	(0.017)
Constant	0.497***	0.667***	14.777***	10.385***
	(0.000)	(0.001)	(0.002)	(0.001)
Observations	184,313	184,313	184,313	184,313

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. A predetermined gap-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

Table C5: Minimum wage effect on financial leverage and labor costs, additional sample restriction: Western Germany only

	Financial leverage (1)	Labor share (2)	Log total labor costs (3)	Log labor costs/worker (4)
$Bite * Year_{2011}$	0.001	-0.008	0.023	0.018
	(0.008)	(0.016)	(0.026)	(0.017)
$Bite * Year_{2012}$	-0.003	-0.010	0.006	0.025
	(0.006)	(0.014)	(0.021)	(0.013)
$Bite * Year_{2013}$			Reference	
$Bite * Year_{2014}$	-0.009	0.039*	0.065**	0.084***
	(0.006)	(0.015)	(0.025)	(0.017)
$Bite * Year_{2015}$	-0.040***	0.045**	0.101***	0.160***
	(0.007)	(0.016)	(0.028)	(0.018)
$Bite * Year_{2016}$	-0.049***	0.115***	0.153***	0.210***
	(0.008)	(0.016)	(0.030)	(0.018)
$Bite * Year_{2017}$	-0.062***	0.149***	0.166***	0.252***
	(0.009)	(0.017)	(0.037)	(0.020)
$Bite * Year_{2018}$	-0.082***	0.174***	0.153***	0.276***
	(0.010)	(0.017)	(0.038)	(0.021)
Constant	0.500***	0.674***	14.822***	10.426***
	(0.000)	(0.001)	(0.002)	(0.001)
Observations	150,013	150,013	150,013	150,013

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. A predetermined gap-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

Table C6: Minimum wage effect on financial leverage and labor costs, additional sample restriction: Eastern Germany only

	Financial leverage (1)	Labor share (2)	Log total labor costs (3)	Log labor costs/worker (4)
$Bite * Year_{2011}$	0.001	0.001	0.040	0.011
	(0.012)	(0.024)	(0.038)	(0.023)
$Bite * Year_{2012}$	-0.006	0.018	-0.001	0.005
	(0.009)	(0.023)	(0.034)	(0.020)
$Bite * Year_{2013}$			Reference	
$Bite * Year_{2014}$	-0.032***	0.005	0.021	0.017
	(0.009)	(0.022)	(0.037)	(0.026)
$Bite * Year_{2015}$	-0.064***	0.054*	0.066	0.125***
	(0.011)	(0.023)	(0.043)	(0.028)
$Bite * Year_{2016}$	-0.089***	0.088***	0.141**	0.189***
	(0.013)	(0.022)	(0.054)	(0.031)
$Bite * Year_{2017}$	-0.089***	0.101***	0.087	0.221***
	(0.014)	(0.021)	(0.048)	(0.029)
$Bite * Year_{2018}$	-0.110***	0.112***	0.051	0.213***
	(0.017)	(0.023)	(0.052)	(0.026)
Constant	0.479***	0.638***	14.574***	10.211***
	(0.001)	(0.002)	(0.003)	(0.002)
Observations	34,316	34,316	34,316	34,316

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. A predetermined gap-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

Table C7: Minimum wage effect on financial leverage and labor costs, no wage imputation

	Labor share (1)	Log total labor costs (2)	Log labor costs/worker (3)
$Bite * Year_{2011}$	-0.003	0.031	0.017
	(0.014)	(0.021)	(0.013)
$Bite * Year_{2012}$	0.005	0.003	0.016
	(0.013)	(0.018)	(0.011)
$Bite * Year_{2013}$		Reference	
$Bite * Year_{2014}$	0.026	0.055**	0.062***
	(0.014)	(0.020)	(0.014)
$Bite * Year_{2015}$	0.055***	0.105***	0.157***
	(0.014)	(0.023)	(0.015)
$Bite * Year_{2016}$	0.113***	0.159***	0.204***
	(0.013)	(0.026)	(0.016)
$Bite * Year_{2017}$	0.138***	0.161***	0.249***
	(0.014)	(0.030)	(0.016)
$Bite * Year_{2018}$	0.161***	0.142***	0.257***
	(0.015)	(0.031)	(0.016)
Constant	0.653***	14.705***	10.313***
	(0.001)	(0.001)	(0.001)
Observations	184,702	184,702	184,702

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. A predetermined bite-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

Table C8: Minimum wage effect on financial leverage and labor share, other specifications

	Financial leverage				Labor Share			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Bite * Year_{2011}$	-0.002	0.000	0.001	0.000	-0.002	-0.002	0.000	0.001
	(0.006)	(0.006)	(0.006)	(0.006)	(0.012)	(0.013)	(0.013)	(0.012)
$Bite * Year_{2012}$	-0.005	-0.005	-0.003	-0.004	0.005	-0.006	0.003	-0.002
	(0.005)	(0.005)	(0.005)	(0.005)	(0.011)	(0.011)	(0.012)	(0.011)
$Bite * Year_{2013}$	Reference							
$Bite * Year_{2014}$	-0.017***	-0.016**	-0.015**	-0.016**	0.016	0.023*	0.025*	0.023*
	(0.005)	(0.005)	(0.005)	(0.005)	(0.012)	(0.012)	(0.012)	(0.012)
$Bite * Year_{2015}$	-0.051***	-0.042***	-0.046***	-0.043***	0.031**	0.047***	0.044***	0.045***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.012)	(0.012)	(0.013)	(0.012)
$Bite * Year_{2016}$	-0.072***	-0.063***	-0.059***	-0.063***	0.071***	0.108***	0.103***	0.105***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.012)	(0.012)	(0.012)	(0.012)
$Bite * Year_{2017}$	-0.086***	-0.072***	-0.067***	-0.072***	0.071***	0.135***	0.120***	0.126***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.012)	(0.013)	(0.013)	(0.012)
$Bite * Year_{2018}$	-0.106***	-0.090***	-0.086***	-0.090***	0.092***	0.165***	0.143***	0.159***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.013)	(0.013)	(0.014)	(0.013)
Constant	0.401***	0.496***	0.496***	0.504***	2.158***	0.668***	0.666***	0.674***
	(0.048)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	No	No	No	Yes	No	No	No
County-year FE	Yes	Yes	No	No	Yes	Yes	No	No
Industry-year FE	Yes	No	Yes	No	Yes	No	Yes	No
Observations	184,702	184,703	184,702	184,703	184,702	184,703	184,702	184,703

Notes: Difference-in-differences regressions. The dependent variable in columns (1) to (4) is financial leverage (total debts/total assets) and in colunms (5) to (8) is labor share. A predetermined bite-specific trend is subtracted in all regressions. Firm controls in columns (1) and (5) include the logarithm of total assets, the ratio of tangible assets to total assets (tangibility), the cash assets ratio (cash ratio), and ROA. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. The number of observations deviates from the summary statistics since singletons are dropped. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

C.4. Spillover effects

Engbom and Moser (2022) find that in Brazil, firms paying above the statutory minimum also increased wages in order to preserve their position in the inter-firm pay hierarchy. While no study has directly identified spillover effects to non-treated firms (i.e., firms with zero bite) in Germany, there is evidence that the minimum wage reform raised wages even around the median of the wage distribution, suggesting potential indirect effects beyond the treated group (Bossler and Schank, 2023).

In my analysis, I use a firm-level treatment variable, which captures both the direct and within-firm spillover effects of the minimum wage. For example, changes in firms' total labor costs may reflect wage adjustments not only for directly affected workers but also for those earning just above the minimum wage. However, spillover effects between firms within the same region are not captured by this design. Importantly, such spillovers do not pose a threat to identification, as they would only bias the estimated treatment effects toward zero, implying that the estimates should be interpreted as a lower bound of the true effects. Nevertheless, to assess whether such between-firm spillovers are empirically relevant, I conduct a robustness check by additionally controlling for interaction terms between regional bite, constructed from the Structure of Earnings Survey (SES), and year dummies. The SES provides high-quality information on wages and working hours, allowing for a more accurate measure of average regional exposure to the minimum wage. The results are reported in Appendix Table C9.

Columns (1) and (2) show that the coefficients on the *Regional Bite* $*$ *Year Dummies* are insignificant across all years for the outcomes financial leverage and labor share. This suggests that, conditional on firms' own exposure, we do not detect meaningful within-region spillover effects for these two outcomes. Furthermore, the estimated effects of the firm-level bite remain very similar to the main specification, supporting the robustness of the baseline results.

Interestingly, the regional spillover effects are also insignificant for per-worker labor costs, but become significantly positive for total labor costs. This pattern may reflect an increase in employment among non-treated firms located in highly exposed regions. The result is consistent with a reallocation mechanism, where low-wage workers displaced from highly affected firms are absorbed by less-exposed firms within the same region.

Table C9: Minimum wage effect on financial leverage and labor costs, controlling for spillover effects

	Financial leverage (1)	Labor share (2)	Log total labor costs (3)	Log labor costs/worker (4)
$FirmBite * Year_{2011}$	0.002	0.002	0.027	0.018
	(0.006)	(0.013)	(0.021)	(0.013)
$Firm\ Bite * Year_{2012}$	-0.003	0.005	0.002	0.019
	(0.005)	(0.012)	(0.018)	(0.011)
$Firm\ Bite * Year_{2013}$		Reference		
$Firm\ Bite * Year_{2014}$	-0.015**	0.027*	0.052*	0.066***
	(0.005)	(0.012)	(0.021)	(0.014)
$Firm\ Bite * Year_{2015}$	-0.046***	0.044***	0.098***	0.154***
	(0.006)	(0.013)	(0.023)	(0.015)
$Firm\ Bite * Year_{2016}$	-0.059***	0.102***	0.157***	0.205***
	(0.007)	(0.012)	(0.026)	(0.016)
$Firm\ Bite * Year_{2017}$	-0.067***	0.122***	0.155***	0.243***
	(0.007)	(0.013)	(0.030)	(0.016)
$Firm\ Bite * Year_{2018}$	-0.085***	0.145***	0.138***	0.258***
	(0.008)	(0.014)	(0.031)	(0.016)
$Regional\ Bite * Year_{2011}$	-0.012	-0.037	0.068	-0.039*
	(0.015)	(0.026)	(0.040)	(0.019)
$Regional\ Bite * Year_{2012}$	0.002	-0.044	0.064	-0.005
	(0.013)	(0.026)	(0.034)	(0.016)
$Regional\ Bite * Year_{2013}$		Reference		
$Regional\ Bite * Year_{2014}$	-0.013	-0.044	0.089**	-0.006
	(0.012)	(0.025)	(0.032)	(0.017)
$Regional\ Bite * Year_{2015}$	-0.006	-0.009	0.074*	-0.006
	(0.014)	(0.028)	(0.037)	(0.018)
$Regional\ Bite * Year_{2016}$	-0.006	0.010	0.095*	-0.030
	(0.016)	(0.028)	(0.041)	(0.019)
$Regional\ Bite * Year_{2017}$	-0.000	-0.053	0.112*	-0.020
	(0.017)	(0.030)	(0.047)	(0.021)
$Regional\ Bite * Year_{2018}$	-0.008	-0.043	0.159**	0.025
	(0.019)	(0.031)	(0.050)	(0.020)
Constant	0.496***	0.660***	14.776***	10.380***
	(0.001)	(0.002)	(0.003)	(0.002)
Observations	184,702	184,702	184,702	184,702

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. Predetermined firm-level and regional-level bite-specific trends are subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

C.5. Concurrent policies

Table C10: Rule out potential effects from concurrent policies

	Control $Pre - leverage * Year$		Control $Pre - size * Year$		Control both		Placebo test	
	Financial leverage (1)	Labor share (2)	Financial leverage (3)	Labor share (4)	Financial leverage (5)	Labor share (6)	Financial leverage (7)	Labor share (8)
$Bite * Year_{2011}$	0.001	-0.003	0.002	-0.004	0.001	-0.003	0.001	-0.000
	(0.006)	(0.013)	(0.006)	(0.006)	(0.012)	(0.013)	(0.005)	(0.011)
$Bite * Year_{2012}$	-0.006	-0.002	-0.003	-0.002	-0.005	-0.003	Reference	
	(0.005)	(0.012)	(0.005)	(0.012)	(0.005)	(0.012)		
$Bite * Year_{2013}$	Reference						0.004	0.014
							(0.005)	(0.011)
$Bite * Year_{2014}$	-0.008	0.031*	-0.013**	0.030*	-0.008	0.030*	-0.007	0.056***
	(0.005)	(0.012)	(0.005)	(0.012)	(0.005)	(0.012)	(0.006)	(0.013)
$Bite * Year_{2015}$	-0.035***	0.051***	-0.044***	0.048***	-0.034***	0.048***	-0.035***	0.070***
	(0.006)	(0.013)	(0.006)	(0.013)	(0.006)	(0.013)	(0.006)	(0.013)
$Bite * Year_{2016}$	-0.048***	0.098***	-0.061***	0.096***	-0.047***	0.094***	-0.048***	0.139***
	(0.007)	(0.012)	(0.007)	(0.012)	(0.007)	(0.012)	(0.007)	(0.013)
$Bite * Year_{2017}$	-0.054***	0.129***	-0.070***	0.127***	-0.053***	0.124***	-0.053***	0.163***
	(0.007)	(0.013)	(0.007)	(0.013)	(0.007)	(0.013)	(0.008)	(0.013)
$Bite * Year_{2018}$	-0.065***	0.150***	-0.086***	0.150***	-0.064***	0.146***	-0.069***	0.188***
	(0.008)	(0.014)	(0.008)	(0.014)	(0.018)	(0.014)	(0.009)	(0.013)
Constant	0.495***	0.666***	0.495***	0.666***	0.495***	0.666***	0.497***	0.669***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
Pre lvg quartile-year FE	Yes	Yes	No	No	Yes	Yes	No	No
Size-year	No	No	Yes	Yes	Yes	Yes	No	No
Other FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	179,473	179,473	179,473	179,473	179,473	179,473	182,459	182,459

One potential threat to identification is the presence of other policies that affect financial leverage and may also be correlated with the firms' bite variable. Firstly, in September 2013, the election led to a new coalition government in Germany, resulting in a series of policy changes beyond the stationary minimum wage policy. However, the most significant reforms, such as the Energy Transition (Energiewende) promoting the shift to renewable energies, are unrelated to the treatment measure of the minimum wage. Moreover, controlling for industry-year fixed effects rules out potential effects from industry-specific policies.

Secondly, changes in taxation rates can influence firms' financial leverage. Yet, between 2013 and 2015, there were no major reforms concerning the corporation tax rate, particularly no specific policies targeting low or high-wage firms. Moreover, municipalities in Germany have the authority to set their own local business tax rates, but the adjustments could occur in any year and are not specific to the year 2015 or to firms based on their wage structure. Therefore, the observed effects are unlikely to stem from spurious correlations arising from concurrent policies.

Lastly, various credit market policies were implemented between 2010 and 2015, which may have affected firms' capital structure. From 2014 onward, the European Central Bank's accommodative measures, particularly the TLTROs and the quantitative easing (QE) program launched in 2015, lowered funding costs and likely eased lending conditions. As a result, debt borrowing may have increased during 2014 and 2015, potentially encouraging high-bite firms to rely more on debt to cope with rising labor costs.

However, between 2012 and 2013, euro-area banks tightened credit standards and began implementing the initial phase of Basel III in response to the lingering sovereign debt crisis. Basel III then was gradually implemented in the years that followed. These tighter credit standards may have particularly constrained firms that already had high financial leverage (seen as riskier borrowers) and SMEs (Marek and Stein, 2022).

A potential threat to my identification is that firms with a larger minimum-wage bite also started the sample period with higher leverage (see Figure 3a). One might worry that the observed post-2015 deleveraging among high-bite firms simply reflects a general tendency for highly leveraged firms to reduce debt, or results from tightening credit conditions rather than the minimum wage reform. Moreover, since small firms tend to have higher bite levels, the estimated minimum wage effects might also reflect the deleveraging of SMEs in response to Basel III.

To rule out these possibilities, I first rank firms by their pre-reform financial leverage in year 2013 and assign them to leverage-quartile dummies. I then include the full set of Quartile $\times$ Year$_t$ interactions, which flexibly absorb any time-varying shocks such as regulatory, macroeconomic, or financial factors that vary in intensity across the leverage distribution. Similarly, firms are sorted into pre-reform size groups, and I include interactions Size groups $\times$ Year$_t$ to control for policies or shocks that differentially affect firms of different sizes.

Columns (1) and (2) of Appendix Table C10 shows the results when controlling for pre-reform leverage quartiles interacted with year dummies. The estimated effect on financial leverage decreases by about 0.2 percentage points compared to the main results, which is reasonable given the positive correlation between bite and leverage and the likelihood that some of the minimum wage effect is absorbed by the added interaction terms. However, a substantial reduction in leverage and an increase in labor share remain. In Columns (2) and (3), I control for firm size interacted with year dummies; the results remain almost identical to the main findings. These results suggest that policies like Basel III, which target highly leveraged firms or SMEs, are unlikely to be driving the observed reduction in leverage and the rise in labor share following the minimum wage reform.

Furthermore, to address the possibility of unknown concurrent policies, I conduct a placebo test by artificially assigning the minimum wage reform to 2012. Columns (7) and (8) present the results using this placebo specification, where 2013 becomes the first placebo treatment year. The absence of any significant effects in 2013 supports the conclusion that the main results are not driven by other simultaneous policy changes or macroeconomic developments.

D. Heterogeneities

D.1. Employment regression at the regional level

The table below presents the regional-level employment regression results. The regression equation is:

$$y_{rt} = \delta_0 + \delta_1 * Bite_r * Post_{r,t} + \delta_2 * Bite_r * Year_{r,2014} + \phi * Bite_r + \epsilon_{rt},$$

where y_{rt} denotes the log employment aggregated at the county level, the *Bite* variable is defined as the share of workers earning less than 8.5 € per hour in 2013 within a county r. Additionally, A predetermined bite-specific trend is subtracted from the dependent variable. The regional bite is measured using both the linked data used in this study and the Structure of Earnings Survey (SES). The results based on these two measures are presented separately in Columns (1) and (2) of the following table. Consistent with previous studies on the German minimum wage, the findings indicate that the policy did not lead to a reduction in employment at the regional level.

Table D1: Minimum wage effect on employment

	Log employment (IAB bite)	Log employment (SES bite)
	(1)	
$Bite * Year_{2011}$	-0.000	-0.000
	(1.331)	(0.862)
$Bite * Year_{2012}$	-0.006	-0.059
	(1.331)	(0.862)
$Bite * Year_{2013}$	Reference	
$Bite * Year_{2014}$	0.059	0.005
	(1.331)	(0.862)
$Bite * Post$	0.015	0.148
	(1.052)	(0.681)
Constant	9.125***	9.073***
	(0.121)	(0.094)
Observations	3,200	3,200

Notes: Difference-in-differences regressions. The dependent variable is log employment at the regional level. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018. SES, 2014.

D.2. Minimum wage effect on financial leverage, weighted regression

The following regression is a weighted regression. The weighting factor is derived from the stratification of three size groups and 16 sectors, consistent with the cells in Appendix Figure B2. It is calculated by dividing the number of firms in the population within each cell by the number of firms in the sample for the corresponding cell. The population data, showing the firm distribution in 2019, are sourced from the German Business Register and extracted from the GENESIS-Online database. Since data for 2018 are not available in the GENESIS database, the closest available year, 2019, is used.

Table D2: Minimum wage effect on financial leverage, weighted regression

	Financial leverage
	(1)
$Bite * Year_{2011}$	0.032
	(0.023)
$Bite * Year_{2012}$	-0.023
	(0.0242)
$Bite * Year_{2013}$	Reference
$Bite * Year_{2014}$	-0.057**
	(0.015)
$Bite * Year_{2015}$	-0.132***
	(0.019)
$Bite * Year_{2016}$	-0.190***
	(0.024)
$Bite * Year_{2017}$	-0.252***
	(0.025)
$Bite * Year_{2018}$	-0.333***
	(0.031)
Constant	0.482***
	(0.002)
Observations	184,702

Notes: Weighted difference-in-differences regressions. The dependent variable is the firm's financial leverage. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

D.3. Descriptive statistics for subsamples

Table D3: Descriptive statistics for subsamples: flexibility in adjusting labor

	Low-skilled jobs		Fixed-term jobs		Outsourceable jobs	
	High share (1)	Low share (2)	High share (3)	Low share (4)	High OS (5)	Low OS (6)
Bite	0.123	0.064	0.105	0.082	0.116	0.064
Financial leverage	0.502	0.506	0.500	0.507	0.512	0.489

Notes: The table above presents the mean of pre-policy financial leverage and bite in different subsamples as denoted in each column.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

Table D4: Descriptive statistics for subsamples: market power

	Firm Size			Tradable Sector	
	Small (1)	Medium (2)	Large (3)	Tradable (4)	Non-tradable (5)
Bite	0.114	0.085	0.091	0.088	0.095
Financial leverage	0.540	0.504	0.440	0.542	0.495

Notes: The table above presents the mean of pre-policy financial leverage and bite in different subsamples as denoted in each column.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

D.4. Nonlinear effects of the minimum wage on firms' financial leverage

Appendix Table D3 indicates that the mean of the bite variable is significantly higher for firms with a larger share of low-skilled jobs, fixed-term jobs, and outsourceable occupations. However, their pre-policy financial leverage is similar across all these subsamples. This suggests that varying bite levels may cause heterogeneous effects of the minimum wage on firms with differing abilities to adjust their labor force. To explore this further, I examine the nonlinear effects of the minimum wage on firms' financial leverage. Instead of using a continuous bite variable, I employ dummy variables to represent different bite levels. The treatment is split into five categories: 0, (0–0.1], (0.1–0.3], (0.3–0.7], and (0.7–1]. These dummies are then interacted with year dummies (years before 2015) and a post-policy dummy (post-2014). The base category is defined as $Bite = 0$ and same as before, the year 2013 is used as the reference year.

Table D5 demonstrates that the effect of the minimum wage on financial leverage is larger at higher bite levels, consistent with findings using the continuous bite measure. Firms with a higher share of low-skilled jobs, fixed-term jobs, and outsourceable occupations fall within the category where $Bite\ dummy\ 2 = 1$, suggesting they should experience a larger decrease in financial leverage than those fall within $Bite\ dummy\ 1 = 1$. However, as shown in Figure 7, these firms actually deleverage less. This indicates that differences in bite levels do not drive the heterogeneous effects of the minimum wage based on their ability to adjust labor composition flexibly.

Table D5: Minimum wage effect on financial leverage

	Financial leverage
	(1)
Bite dummy 1 $(0-0.1) * Post$	-0.004*
	(0.002)
Bite dummy 2 $(0.1-0.3) * Post$	-0.008*
	(0.0033)
Bite dummy 3 $(0.3-0.7) * Post$	-0.020***
	(0.004)
Bite dummy 4 $(0.7-1) * Post$	-0.082***
	(0.008)
Observations	184,702

Notes: Difference-in-differences regressions. The dependent variable is the firm's financial leverage. A predetermined treatment categories-specific trend is subtracted. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

D.5. Unconditional quantile regressions on financial leverage

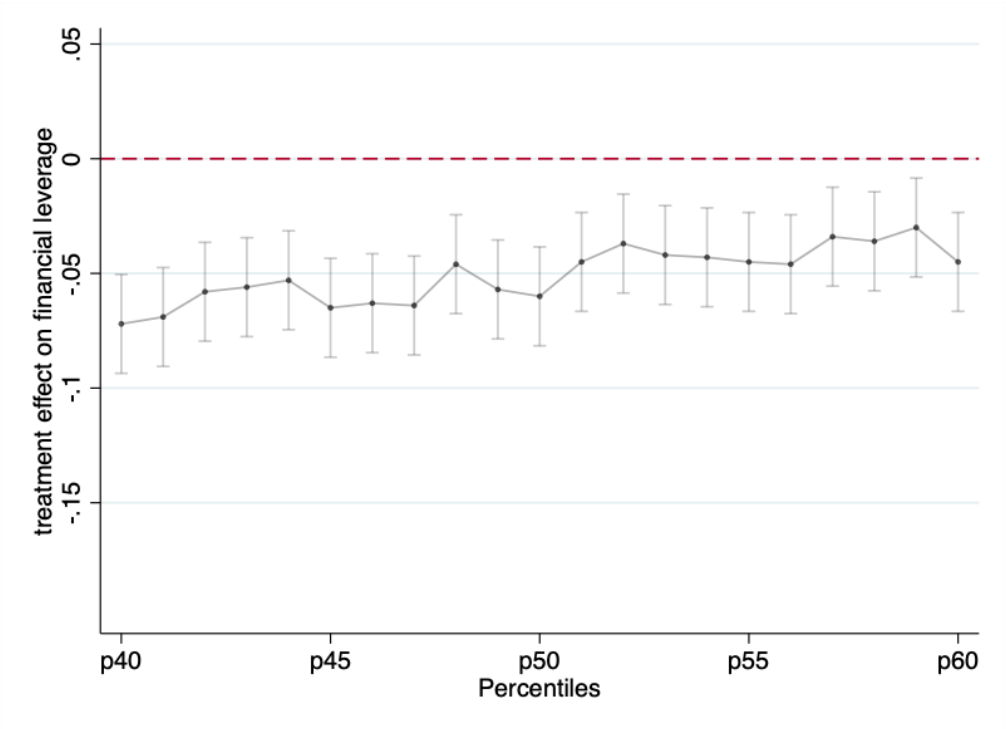
As shown in Appendix Table D4, the mean pre-policy financial leverage varies across firms of different sizes and whether they operate in tradable or non-tradable sectors. For small firms with fewer than 50 employees and those in the tradable sector, the mean pre-policy financial leverage is 0.54, approximately at the 55th percentile of the financial leverage distribution. For non-tradable firms, the pre-policy financial leverage level is around the 50th percentile. In contrast, for the largest firms with more than 250 employees, it is closer to the 45th percentile. Their bite levels, however, do not vary significantly, averaging around 0.1.

These heterogeneous effects, based on firms' market power, could result from differential minimum wage impacts across different parts of the financial leverage distribution. To explore this further, I employ unconditional quantile regressions (Firpo et al., 2009). The regression equation is

$$RIF(y_{jt}, \tau) = \delta_0 + \delta_1 * Bite_j * Post_{j,t} + \delta_2 * Bite_j * Year_{j,2014} + \phi * Bite_j + \alpha_j + \theta_{c,t} + \lambda_{s,t} + \epsilon_{jt},$$

where the dependent variable is a recentered influence function (RIF) of financial leverage for different percentiles, and a predetermined bite-specific trend is subtracted from the dependent variable. The following figure illustrates the treatment effects of the minimum wage on the 40th to 60th percentiles of financial leverage using unconditional quantile regressions. The mean of the coefficients for $Bite * Post$ is -0.060 for the 40th to 50th percentiles and -0.042 for the 51st to 60th percentiles. Therefore, the larger treatment effect observed among small firms and firms in the tradable sector is not driven by distributional effects on financial leverage, as their pre-policy financial leverage lies in the higher percentiles of the distribution.

Figure D1: Unconditional quantile regressions on financial leverage, the 40th to 60th percentiles



Notes: The figure displays the detrended RIF difference-in-differences (DiD) regression coefficients of $Bite * Post$ with 95% confidence intervals.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

D.6. Heterogeneous effects based on market power (HHI)

Table D6: Minimum wage effects on financial leverage and labor share.
Full regression table for Figure 7.

	High HHI		Low HHI	
	Financial lvg	Labor share	Financial lvg	Labor share
	(1)	(2)	(3)	(4)
$Bite * Year_{2011}$	0.001	-0.002	0.003	-0.007
	(0.016)	(0.032)	(0.008)	(0.017)
$Bite * Year_{2012}$	0.014	-0.018	-0.007	0.009
	(0.011)	(0.032)	(0.006)	(0.015)
$Bite * Year_{2013}$	Reference			
$Bite * Year_{2014}$	0.001	-0.002	-0.019**	0.041**
	(0.014)	(0.032)	(0.006)	(0.016)
$Bite * Post$	-0.036*	0.041	-0.074***	0.140***
	(0.016)	(0.031)	(0.008)	(0.013)
Constant	0.493***	0.639***	0.506***	0.661***
	(0.001)	(0.002)	(0.000)	(0.001)
Observations	36,361	36,361	118,027	118,027

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. The sample is split based on sectors' HHI. A predetermined bite-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

E. Full regression tables

Table E1: Minimum wage effects on financial leverage and labor share, non-detrended. Regression table for figure 4.

	Financial leverage	Labor share
	(1)	(2)
$Bite * Year_{2011}$	-0.011	0.048***
	(0.006)	(0.013)
$Bite * Year_{2012}$	-0.010	0.024*
	(0.005)	(0.012)
$Bite * Year_{2013}$	Reference	
$Bite * Year_{2014}$	-0.009	0.003
	(0.005)	(0.013)
$Bite * Year_{2015}$	-0.034***	-0.004
	(0.006)	(0.013)
$Bite * Year_{2016}$	-0.044***	0.030*
	(0.007)	(0.013)
$Bite * Year_{2017}$	-0.046***	0.030*
	(0.007)	(0.013)
$Bite * Year_{2018}$	-0.059***	0.027
	(0.009)	(0.014)
Constant	0.498***	0.660***
	(0.000)	(0.001)
Observations	184,702	184,702

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. A predetermined bite-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

Table E2: Minimum wage effects on labor-related outcomes.
Regression table for figure 6.

	Labor share (1)	Labor share(BvD) (2)	Log total labor costs (3)	Log labor costs/worker (4)
$Bite * Year_{2011}$	-0.003	0.002	0.031	0.017
	(0.013)	(0.008)	(0.021)	(0.014)
$Bite * Year_{2012}$	-0.001	-0.004	0.004	0.018
	(0.012)	(0.007)	(0.018)	(0.011)
$Bite * Year_{2013}$		Reference		
$Bite * Year_{2014}$	0.028*	0.013*	0.052*	0.065***
	(0.013)	(0.007)	(0.021)	(0.014)
$Bite * Year_{2015}$	0.047***	0.031***	0.095***	0.151***
	(0.013)	(0.008)	(0.023)	(0.015)
$Bite * Year_{2016}$	0.107***	0.050***	0.152***	0.203***
	(0.013)	(0.008)	(0.026)	(0.016)
$Bite * Year_{2017}$	0.133***	0.066***	0.148***	0.244***
	(0.013)	(0.008)	(0.030)	(0.016)
$Bite * Year_{2018}$	0.155***	0.072***	0.128***	0.258***
	(0.014)	(0.009)	(0.031)	(0.017)
Constant	0.667***	0.719***	14.776***	10.386***
	(0.001)	(0.000)	(0.002)	(0.001)
Observations	184,702	160,140	184,702	184,702

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. A predetermined bite-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

Table E3: Minimum wage effects on log total debts and log assets.
Full regression table for Table 2.

Panel A: assets and liabilities					
	Log total debts	Log total assets	Log fixed assets costs	Log curret assets	Log cash
	(1)	(2)	(3)	(4)	(4)
$Bite * Year_{2011}$	0.024	0.021	0.010	0.017	-0.017
	(0.027)	(0.016)	(0.027)	(0.018)	(0.066)
$Bite * Year_{2012}$	0.010	0.024*	-0.020	0.038*	-0.026
	(0.022)	(0.012)	(0.021)	(0.016)	(0.057)
$Bite * Year_{2013}$			Reference		
$Bite * Year_{2014}$	-0.027	0.005	0.006	-0.001	0.182***
	(0.023)	(0.011)	(0.019)	(0.015)	(0.055)
$Bite * Post$	-0.079**	0.081***	-0.001	0.088***	0.271***
	(0.027)	(0.015)	(0.027)	(0.019)	(0.058)
Constant	15.451***	16.385***	14.776***	15.806***	13.170***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.004)
Observations	184,702	184,702	184,702	184,702	184,702
Panel B: income and equity					
	EBIT /Assets$_{pre}$	Net income /Assets$_{pre}$	Capital inj. /Assets$_{pre}$	Retained earn. /Assets$_{pre}$	Dividend /Assets$_{pre}$
	(1)	(2)	(3)	(4)	(5)
$Bite * Year_{2011}$	0.002	0.003	0.0004	0.004	
	(0.006)	(0.005)	(0.002)	(0.007)	
$Bite * Year_{2012}$	0.002	0.003	0.001	-0.003	0.001
	(0.005)	(0.004)	(0.002)	(0.006)	(0.004)
$Bite * Year_{2013}$			Reference		
$Bite * Year_{2014}$	-0.006	-0.006	-0.001	0.009	-0.009
	(0.005)	(0.004)	(0.002)	(0.005)	(0.005)
$Bite * Post$	-0.024***	-0.023***	0.0003	0.024*	-0.029***
	(0.006)	(0.005)	(0.003)	(0.010)	(0.004)
Constant	0.093***	0.059***	0.078***	0.338***	0.033***
	(0.0004)	(0.0003)	(0.0003)	(0.001)	(0.000)
Observations	159,591	159,591	159,591	159,591	130,519

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. A predetermined bite-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

Table E4: Minimum wage effects on labor-related outcomes and log EBITDA.
table for Table 3.

	Log employment (1)	Log (fixed assets/empl.) (2)	Log (labor costs/empl.) (3)	Log value added (4)	Log EBITDA (5)	Log total labor costs (6)
$Bite * Year_{2011}$	0.015	-0.007	0.017	0.015	-0.012	0.031
	(0.017)	(0.028)	(0.014)	(0.021)	(0.037)	(0.021)
$Bite * Year_{2012}$	-0.014	-0.006	0.018	0.048**	0.035	0.004
	(0.016)	(0.023)	(0.011)	(0.017)	(0.033)	(0.018)
$Bite * Year_{2013}$			Reference			
$Bite * Year_{2014}$	-0.015	0.009	0.068***	0.013	-0.029	0.053*
	(0.015)	(0.022)	(0.014)	(0.016)	(0.032)	(0.021)
$Bite * Post$	-0.082***	0.059*	0.212***	0.090***	-0.172***	0.130***
	(0.020)	(0.028)	(0.014)	(0.019)	(0.032)	(0.025)
Constant	4.391***	10.387***	10.386***	15.344***	14.186***	14.776***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
Observations	184,702	184,702	184,702	183,037	169,645	184,702

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. A predetermined bite-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

Table E5: Minimum wage effects on long/short term liabilities.
Full regression table for Table 5.

	Log long-term debts	Log short-term liabilities
	(1)	(2)
$Bite * Year_{2011}$	0.017	0.170
$Bite * Year_{2012}$	-0.037	-0.003
	(0.168)	(0.154)
$Bite * Year_{2013}$	Reference	
$Bite * Year_{2014}$	-0.291	0.201
	(0.167)	(0.146)
$Bite * Post$	-0.735***	0.161
	(0.187)	(0.130)
Constant	9.263***	14.528***
	(0.012)	(0.009)
Observations	184,702	184,702

Notes: Difference-in-differences regressions. The dependent variables are displayed above each column. A predetermined bite-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.
Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.

Table E6: Minimum wage effects on financial leverage and labor share.
Full regression table for Figure 7.

	Financial lvg		Labor share	
	High flexibility (1)	Low flexibility (2)	High flexibility (3)	Low flexibility (4)
Outsourceable jobs				
$Bite * Year_{2011}$	0.002	0.004	0.003	-0.018
	(0.009)	(0.012)	(0.017)	(0.026)
$Bite * Year_{2012}$	0.001	-0.008	0.014	-0.023
	(0.007)	(0.010)	(0.015)	(0.025)
$Bite * Year_{2013}$		Reference		
$Bite * Year_{2014}$	-0.009	-0.035***	0.043**	0.022
	(0.007)	(0.010)	(0.016)	(0.025)
$Bite * Post$	-0.029***	-0.129***	0.122***	0.105***
	(0.008)	(0.012)	(0.013)	(0.023)
$Constant$	0.504***	0.482***	0.656***	0.669***
	(0.001)	(0.000)	(0.001)	(0.001)
Observations	87182	85999	87182	85999
Low-skilled jobs				
$Bite * Year_{2011}$	0.003	0.001	0.001	-0.016
	(0.008)	(0.011)	(0.017)	(0.021)
$Bite * Year_{2012}$	0.001	-0.010	0.009	-0.004
	(0.007)	(0.009)	(0.015)	(0.022)
$Bite * Year_{2013}$		Reference		
$Bite * Year_{2014}$	-0.009	-0.031***	0.048**	0.007
	(0.006)	(0.009)	(0.016)	(0.022)
$Bite * Post$	-0.048***	-0.102***	0.137***	0.087***
	(0.008)	(0.011)	(0.014)	(0.019)
$Constant$	0.498***	0.494***	0.677***	0.659***
	(0.001)	(0.000)	(0.001)	(0.001)
Observations	92429	92231	92429	92231
Fixed-term jobs				
$Bite * Year_{2011}$	0.002	0.003	-0.006	-0.002
	(0.009)	(0.010)	(0.017)	(0.021)
$Bite * Year_{2012}$	0.002	-0.006	-0.017	0.018
	(0.006)	(0.008)	(0.015)	(0.020)
$Bite * Year_{2013}$		Reference		
$Bite * Year_{2014}$	-0.008	-0.027***	-0.005	0.059**
	(0.007)	(0.008)	(0.016)	(0.020)
$Bite * Post$	-0.023**	-0.107***	0.062***	0.143***
	(0.008)	(0.010)	(0.015)	(0.016)
$Constant$	0.496***	0.497***	0.684***	0.649***
	(0.001)	(0.001)	(0.001)	(0.001)
Observations	94320	90346	94320	90346

Notes: Difference-in-differences regressions. A predetermined bite-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.

Table E7: Minimum wage effect on financial leverage and labor share. Full regression table for Figure 8.

	Firm size: <50	Firm size: 50-249	Firm size: >=250	Tradable	Non-tradable
	(1)	(2)	(3)	(4)	(5)
Financial leverage					
$Bite * Year_{2011}$	0.012	-0.002	0.011	0.003	0.001
	(0.012)	(0.009)	(0.017)	(0.016)	(0.007)
$Bite * Year_{2012}$	-0.001	-0.003	0.009	0.001	-0.005
	(0.009)	(0.006)	(0.012)	(0.012)	(0.006)
$Bite * Year_{2013}$			Reference		
$Bite * Year_{2014}$	-0.039***	-0.004	-0.012	-0.040***	-0.014*
	(0.009)	(0.007)	(0.012)	(0.012)	(0.006)
$Bite * Post$	-0.132***	-0.031***	-0.015	-0.100***	-0.063***
	(0.012)	(0.009)	(0.015)	(0.014)	(0.007)
$Constant$	0.521***	0.499***	0.436***	0.533***	0.487***
	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)
Labor share					
$Bite * Year_{2011}$	-0.019	0.004	0.003	-0.028	-0.000
	(0.028)	(0.016)	(0.018)	(0.038)	(0.014)
$Bite * Year_{2012}$	-0.000	0.005	-0.013	0.033	-0.007
	(0.026)	(0.013)	(0.016)	(0.034)	(0.013)
$Bite * Year_{2013}$			Reference		
$Bite * Year_{2014}$	0.058*	0.023	-0.019	-0.007	0.030*
	(0.026)	(0.014)	(0.017)	(0.036)	(0.014)
$Bite * Post$	0.175***	0.085***	-0.022	0.099**	0.098***
	(0.022)	(0.014)	(0.016)	(0.031)	(0.012)
$Constant$	0.511***	0.708***	0.781***	0.623***	0.677***
	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
Observations	47134	110217	24809	34482	149993
Log EBITDA					
$Bite * Year_{2011}$	0.001	0.020	-0.112	-0.023	-0.011
	(0.071)	(0.049)	(0.105)	(0.090)	(0.041)
$Bite * Year_{2012}$	0.044	0.035	0.033	-0.022	0.052
	(0.059)	(0.046)	(0.099)	(0.088)	(0.036)
$Bite * Year_{2013}$			Reference		
$Bite * Year_{2014}$	-0.089	-0.029	0.135	-0.120	0.013
	(0.060)	(0.043)	(0.094)	(0.078)	(0.036)
$Bite * Post$	-0.241***	-0.159***	0.176	-0.287***	-0.104**
	(0.061)	(0.044)	(0.096)	(0.080)	(0.036)
$Constant$	13.595***	14.215***	15.192***	14.114***	14.204***
	(0.005)	(0.003)	(0.007)	(0.005)	(0.002)
Observations	42633	102053	22385	31892	137535

Notes: Difference-in-differences regressions. A predetermined bite-specific trend is subtracted in all regressions. Firm fixed effects, county-year, and industry-year fixed effects are controlled. Firms are assigned to the county where their largest establishment is located. Industries are categorized with a two-digit industry code. Firm-level clustered standard errors are in parentheses. *, **, and *** denote statistical significance at 5%, 1% and 0.1%, respectively.

Data: Linked data of BeH, BHP, and Amadeus, 2011-2018.