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You Can't Always Get What You Want? Collective Bargaining Demands and Outcomes

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ABSTRACT

Trade union demands are a key input for collective bargaining negotiations (CBNs). However, there is little quantitative evidence on these demands and how they shape CBN outcomes. We digitize novel data on union demands for wages and non-wage amenities to examine the relationship between demands and outcomes in German CBNs from 1993 to 2019. We find CBNs cover a rich set of non-wage amenities in addition to wages. We show how these objectives are traded off against each other in the demands made by unions and in the outcomes of CBNs. We further investigate how CBNs reflect macroeconomic and labor market conditions.

1 | Introduction

Collective bargaining negotiations (CBNs) are a key pillar of labor markets characterized by trade unions and sectoral bargaining. A large body of literature has studied bargaining agreements, and in particular their pecuniary contents. However, there is relatively little quantitative, systematic evidence about the substantive content of bargaining demands and outcomes, nor the non-wage amenities discussed in CBNs (Jäger et al. 2024).

This paper addresses this gap, leveraging novel data on demands and outcomes in German CBNs over the three decades since reunification. Specifically, we examine the relative composition of CBN demands and outcomes, as well as how these have changed over time. We further characterize CBNs both in terms of wage and non-wage amenities, and explore how these dimensions are traded off against each other. Finally, we investigate if and how negotiations are associated with current macroeconomic and labor market conditions.

The German system of collective bargaining has often been viewed as a case study in how labor market institutions can offer a more flexible alternative to legislative intervention in

counterbalancing possible monopsony power of employers. However, union coverage declined sharply from over 70% in the early 1990s to around 40% in the third decade of the 21st century, making Germany uniquely suited for examining the evolution of CBN demands and outcomes over time (Dustmann et al. 2014; Jäger et al. 2022). The novel dataset we gather contains details on wage and non-wage amenities shaping union demands and negotiation outcomes. This information allows us to shed new light on bargaining parties' preferences and trade-offs, how these have changed over time, and the market forces shaping negotiations. Drawing on a descriptive analysis of this data and using post-reunification Germany as our laboratory, we document three key findings.

First of all, we find that whilst wage-related items are the most prominent feature of CBNs, demands as well as outcomes cover a considerably wider range of issues than just wage increases. For instance, roughly 40% (30%) of CBN demands (outcomes) contain at least one amenity clause concerning health (e.g., sick pay and sick leave), training (e.g., apprenticeship training provision and up-skilling measures), working time (e.g., hours worked and part-time retirement), holiday conditions (e.g., leave allowance and holiday pay) or pensions. Furthermore, taking a

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broader definition of wage demands, unions also frequently formulate non-numerical demands such as regional leveling-up of wages, and absolute minimum wage demands.

Secondly, we document that bargaining parties appear to be trading off wage and amenity clauses when formulating demands and agreeing outcomes. For instance, we find that the inclusion of a working time demand is associated with a reduction in the nominal wage growth demanded of just over a third of a percentage point (mean nominal wage growth demanded is 5.52%). On the other hand, the stipulation of a health clause is associated with a reduction in agreed nominal wage growth of around a third of a percentage point (mean nominal wage growth agreed is 2.82%). Overall, this suggests that the implicit trade-off between wages and non-wage amenities is indeed a key part of CBNs.

Finally, we illustrate several ways in which negotiations are associated with current macroeconomic and labor market conditions as well as public policy. With regards to consumer prices, wage demands appear to put relatively more weight on past than current and future inflation, whilst negotiated outcomes appear to be, at least over the medium term, more forward-looking. Furthermore, both demands and outcomes evolve procyclically, rising as the unemployment rate falls and vice versa. The responsiveness of demands to the cycle illustrates that unions show flexibility by adjusting their demands to economic conditions, as suggested in Dustmann et al. (2014). We also see that tighter local labor markets are associated with higher nominal wage demands and outcomes, and that higher employee mobility rates are associated with higher demands and outcomes (Autor et al. 2023; Moscarini and Postel-Vinay 2023; Dustmann et al. 2026). In terms of the institutional drivers of CBNs, we document that union demands for certain non-wage amenities such as sick pay become more prevalent alongside public policy changes concerning these issues. One such example is a 1996 reform which reduced the statutory replacement rate for sick pay. In the aftermath of the reform, unions bargained heavily to ensure that covered workers still received a higher replacement rate. Overall, we thus establish that CBN demands and outcomes are clearly associated with the macroeconomic backdrop, current labor market conditions and contemporaneous public policy changes.

Our findings contribute to three main strands of literature. First, they relate to the large literature on the effects of collective bargaining on workers and firms. The vast bulk of this work has focused on the impacts of collective bargaining on wages (Lewis 1983; Card 1996; Beauregard et al. 2025), economic inequality (Farber et al. 2021), and firm outcomes (Wang and Young 2024). We contribute to this literature by studying the evolution of wage and non-wage bargaining outcomes over time, as well as the demands that shaped them.

Second, our work relates to the literature on the bargaining process. The primary focus of much of the structural and empirical bargaining literature has often been on bargaining outcomes (Calmfors and Driffill 1988; Taschereau-Dumouchel 2020), rather than worker side demands in negotiations. Depending on whether different worker groups are considered to be complements or substitutes, more moderate or more aggressive bargaining strategies may be optimal for unions (Lipset et al. 1956; Bhuller et al. 2022). However, in order to evaluate and understand unions'

bargaining behavior, it must first of all be systematically documented. Our contribution here is thus to open up the black box of negotiations to reveal what was initially demanded by unions, and how this correlates with outcomes. We then also examine how union demands are shaped by macroeconomic factors such as inflation (Hall and Milgrom 2008), labor market tightness, and public policy (Kaplan and Naidu 2025). The literature exploring the role of unions in both responding to and fuelling inflation via pay settlements has a long history (Rees 1959; Blanchflower and Oswald 1994; Blanchflower et al. 2007), which has been re-examined more recently following price rises after the COVID-19 pandemic (Lorenzoni and Werning 2023). The richness of our data allows us to separately examine the relationship between union demands and inflation as distinct from the relationship between final CBA wage outcomes and inflation.

Finally, we contribute to a growing literature on the importance of non-wage amenities. This has been examined in more general settings, suggesting significant willingness of workers to pay for non-wage amenities (Mas and Pallais 2017; Dube et al. 2022)—but historically less so in unionized environments. Notable exceptions include Buchmueller et al. (2002) who study health insurance and Alesina et al. (2005) who examine working time. More recently this literature has begun to expand considerably and papers have studied amenities including workplace safety (Johnson 2020), fringe benefits like pension contributions (Knepper 2020), and female-friendly work environments (Corradini et al. 2025). Furthermore, Biasi et al. (2025) document that unions negotiating in markets with higher inequality tend to emphasize non-wage amenities more, to avoid the more divisive effects of redistributive wage changes. Lagos (2026) shows that Brazilian unions make use of higher bargaining power to demand both higher wages and more non-wage amenities. In a similar vein, Arold et al. (2025) find that Canadian unions secure stronger earnings and non-wage amenities when labor demand is stronger, and substitute non-wage amenities for wages when the latter face higher income taxes. Our contribution is to provide novel and direct evidence on the non-wage amenities that unions demand, and how these are traded off against wage demands in negotiations.

The rest of the paper is structured as follows. Section 2 provides a brief overview of collective bargaining models as a prism through which to view the subsequent data analysis. It also describes the German institutional background and the data sets used. Section 3 summarizes the prevalence and contents of wage and non-wage clauses in demands and outcomes, as well as how these are traded off against each other. Section 4 then examines to what extent demands and outcomes are associated with current macroeconomic and labor market conditions. Finally, Section 5 concludes with a brief discussion.

2 | Background

2.1 | Collective Bargaining in Theory

The economic literature has primarily distinguished two theoretical models of collective bargaining.¹ In an efficient bargaining (EB) model, unions and employers negotiate over both wages and employment (McDonald and Solow 1981). In contrast, a

right-to-manage (RTM) model assumes that they primarily bargain over wages, while employers set employment levels conditional on those wages (Nickell and Andrews 1983). In the latter, unions impact employment levels indirectly through wage demands and negotiations. If the bargained wage is above a level which clears the market, this results in equilibrium unemployment. Therefore, if unions have misaligned incentives and are not mindful of potential labor rationing when deciding their negotiation strategy, this can have dampening effects on labor demand (Azkarate-Askasua and Zerecero 2025).²

Alongside the objectives and remit of negotiations, the degree of centralization and coordination is an important dimension, which also varies considerably across countries. First of all, collective bargaining may occur at levels ranging from the national to individual firm level (Calmfors and Driffill 1988). Secondly, even if bargaining is somewhat decentralized across different regions and sectors, national unions may still coordinate their efforts and share knowledge across these individual bargaining units. This may result in so-called “pattern bargaining,” in which many other bargaining units follow the demands and agreements of a single bargaining unit which moves first (Jäger et al. 2024).

2.2 | Collective Bargaining in Germany

Collective bargaining in Germany is a decentralized process, with agreements being primarily negotiated at the sector-region level. The historical roots of this system date back to the period immediately after World War I, when the 1918 Stinnes–Legien agreement formalized the bargaining process between previously regionally organized employers and industrially organized trade unions (Silvia 2013). In practice, unions negotiate the contents of collective bargaining agreements (CBAs) with employer associations.

While the exact process of formulating CBA demands differs across unions, union members, union representatives and works councils typically hold firm-level discussions that inform the bargaining demands of the unions’ Collective Bargaining Committee (*Tarifausschuss*) months before the existing agreement expires (Müller and Schulten 2019). The Collective Bargaining Committee consists of union representatives from the most important firms and the local union branches, which establishes a negotiating body (*Verhandlungskommission*) that negotiates the demands with the employer side. Wage demands are often based on the expected rate of inflation, labor productivity and a component aimed at redistributing rents. Bargaining demands usually also include non-wage elements such as working time reductions, occupational health and safety, and vocational education and training (Müller and Schulten 2019). After an existing CBA expires, the so-called peace obligation no longer holds and union demonstrations and short warning strikes can signal the union membership’s support for the demands put forward.

Once an agreement is reached, it is typically applied to all member firms of the employer association.³ Only workers who are members of the unions signing the CBA are legally entitled to the wages and any non-wage amenities agreed in the CBA, but

very often employers extend both to non-union members too. Hirsch et al. (2022) document that around 9% of workers at establishments covered by a CBA were not paid according to the CBA in 2018, as reported by employers. There is also no legal obligation for employers to participate in sectoral collective bargaining. In fact, over time an increasing number of firms have opted out of the process, causing the share of workers covered by a sectoral bargaining agreement to fall from 67% in 1996 to 41% in 2024 (Hohendanner and Kohaut 2025). Firms that have opted out of sectoral collective bargaining can either operate without a CBA or negotiate a separate agreement which only applies to them. In 2024, 8% of workers were covered by such firm-level agreements (Hohendanner and Kohaut 2025).⁴

German CBAs contain clauses relating to an array of issues. First of all, they define a remuneration structure which covered firms must adhere to at a minimum. By the “favorability principle” (*Günstigkeitsprinzip*), firms can pay above these stipulated wages but do not have to. Often, pay groups are tiered by skill, occupation or experience. Such a “Salary CBA” (*Lohn- und Gehaltstarifvertrag*) usually runs for 1 or 2 years, and when a new agreement is reached a percentage wage uplift for all groups is typically stipulated.⁵ However, CBAs can also define minimum non-wage standards for covered firms. Agreements over job amenities such as working time, holiday allowances and training provisions are usually ratified in an “Umbrella CBA” (*Manteltarifvertrag*) which runs for longer than 1 or 2 years.⁶ At any one time, CBNs may thus concern wage and non-wage amenities, but not necessarily both. For the remainder of the paper, we thus define CBN outcomes (demands) as all wage and amenity clauses contained in the outcomes (demands) associated with one or more CBAs bargained over at the same time by a single bargaining unit. In other words, if bargaining parties reach both a Salary as well as an Umbrella Agreement, we analyze the clauses contained in both as one observed CBN outcome, with the same logic applied to demands.

2.3 | Data

Our primary data source is monthly reports of CBN demands and outcomes provided by the collective bargaining archive (*WSI Tarifarchiv*) of the German Institute of Economic and Social Research (*Wirtschafts- und Sozialwissenschaftliches Institut, WSI*), which we manually digitized. The WSI’s monthly reports summarize trade union demands and negotiated CBAs for unions operating under the umbrella of the German Confederation of Trade Unions, provided that a specific bargaining unit (defined by the range of sectors and federal states covered) includes at least 1000 workers if in former West Germany, or 500 workers if in former East Germany. Each monthly WSI report includes the demands put forward by the unions in the negotiations and the agreements that are available as of the report’s editorial deadline (typically mid-month). For the purpose of this project, we digitized data spanning from January 1993 to December 2019.

Table 1 provides summary statistics of the data. The dataset we use for the analysis is an unbalanced panel, as records of demands do not exist for every outcome, and vice versa. Overall, we have 3537 observations of CBN demands and 8192

TABLE 1 | Summary statistics of CBA demands and outcomes.

	<i>N</i>	Contains % increase	Nominal wage growth, %	Real wage growth, %	States	Sectors	Non-wage amenity
Demands	3537	0.71	5.52	3.84	3.72	3.12	0.40
Outcomes	8192	0.95	2.82	1.10	2.94	2.73	0.30

Note: The table shows the total number of observations, share containing a percentage wage increase as well as the averages of nominal and real wage growth, number of federal states covered, number of three-digit sectors covered, and number of non-wage amenity clauses included in (non-firm) collective bargaining demands and agreements. The sample period is 1993–2019. Similar information at the firm level can be found in Table B.1. For the purposes of this table, the following topic clauses are counted as non-wage amenity clauses: Health, Training, and Working Time. *Source:* Own calculations based on data from WSI Tarifarchiv.

observations of CBN outcomes for the period 1993–2019. The observations of CBN outcomes are summaries of the final CBA agreements, rather than the full agreements themselves. As explained in Section 2.2, collective bargaining in Germany is decentralized and carried out within units at the sector-region level. Accordingly, both demands and outcomes are recorded at the bargaining unit level in our data. By design, one demand or agreement may thus affect one or more federal states as well as one or more three-digit industries. In our data, the average number of states covered by a CBN demand (outcome) is 3.72 (2.94), with an average of 3.12 (2.73) three-digit sectors covered in a demand (outcome). This suggests an iterative process whereby demands are initially made at a relatively aggregate level focusing mostly on the headline wage increase and then negotiations proceed to more specific outcomes, as reflected by the lower number of sectors and regions covered in outcomes than demands. More generally, the composition of demands and outcomes in terms of one-digit industries covered is similar.⁷ We drop demands and outcomes relating to firm-level bargaining as firm agreements are much less common in our data, representing fewer than 10% of either demand or outcome observations.⁸

As expected, the most prevalent item of interest in CBNs is wage growth. In our sample, 71% of demands observed explicitly mention a specific percentage increase, with this number increasing to 95% in outcomes.⁹ Average nominal wage growth demanded is 5.52% (3.84% real), whilst the average nominal wage growth outcome is 2.82% (1.10% real). Furthermore, the data covers other pecuniary items, such as one-time payments and minimum wage floors. However, it also allows us to go beyond the simple numeric dimension of CBNs, with further information on items demanded and agreed being captured in text. We leverage this text using regular expression keyword search to construct an array of dummy variables regarding non-wage amenities, such as working time, pensions, holiday conditions, health benefits or training provision. Overall, 40% (30%) of CBN demands (outcomes) contain at least one of these five clauses across the period 1993–2019. Furthermore, we are able to create dummies for unions demanding items such as job preservation efforts or member-only benefits. Finally, we can also capture the prevalence of more vague union demands, asking for “noticeable wage increases”, for example, rather than specifying a desired numeric increase. A more detailed explanation of the construction of these variables can be found in Appendix 1.

Beyond our main data source on collective bargaining demands and outcomes, we draw upon data on regional unemployment and registered vacancies from the Federal Employment Agency (*Bundesagentur für Arbeit*). To describe the macroeconomic

backdrop, we further utilize indicators such as the consumer price index (CPI), real GDP and unemployment provided by the Federal Statistical Office of Germany (*Destatis*) and extracted via the Federal Reserve Bank of St. Louis and the OECD. We also use administrative Linked-Employer-Employee-Data of the Institute of Employment Research (LIAB) to construct measures of labor market tightness that factor in employee mobility in the spirit of Autor et al. (2023).¹⁰

3 | Collective Bargaining Demands and Outcomes

Our analysis of CBN demands and outcomes distinguishes two key dimensions: wages and non-wage amenities. We first of all examine each in isolation, before exploring how bargaining parties may be trading these off against each other when formulating demands and in reaching final outcomes.

3.1 | Wages

Whilst CBNs cover a much broader set of issues than just compensation, wage-related items are the most prominent feature in both demands as well as outcomes. Figure 1 illustrates the frequency of wage growth demands and outcomes in CBNs. While unsurprisingly, wages demanded are on average considerably higher than outcomes, they are similarly dispersed. Moreover, unions rarely ask for wage increases that imply real wage losses when taking inflation into account. Across our sample of demands, there are only two instances where real wage demands imply a real loss and both are only marginally negative.¹¹

As outlined in Table 1, 95% of outcomes and 71% of demands in our sample specify a percentage wage increase. However, many of the remaining demands also stipulate some form of qualitative wage demand. Overall 14% of demands contain at least one form of non-numeric wage demand. These can comprise less specific non-numeric demands (e.g., wage increases that “preserve living standards” or are “noticeable” to workers), *leveling up* of wages across former East and West German states, or explicit pattern bargaining (i.e., following the outcomes of another bargaining unit).¹² Table 2 illustrates the prevalence of such non-numeric demands across the entire sample, which can also be included alongside a numeric increase, not just instead of one. We see that 9% of wage demands contain not only a percentage increase, but also specify a minimum demand in absolute terms. In other words, they ask that all workers receive $x\%$ but this increase may never fall below an absolute floor, set at amount € y . Such lower bound

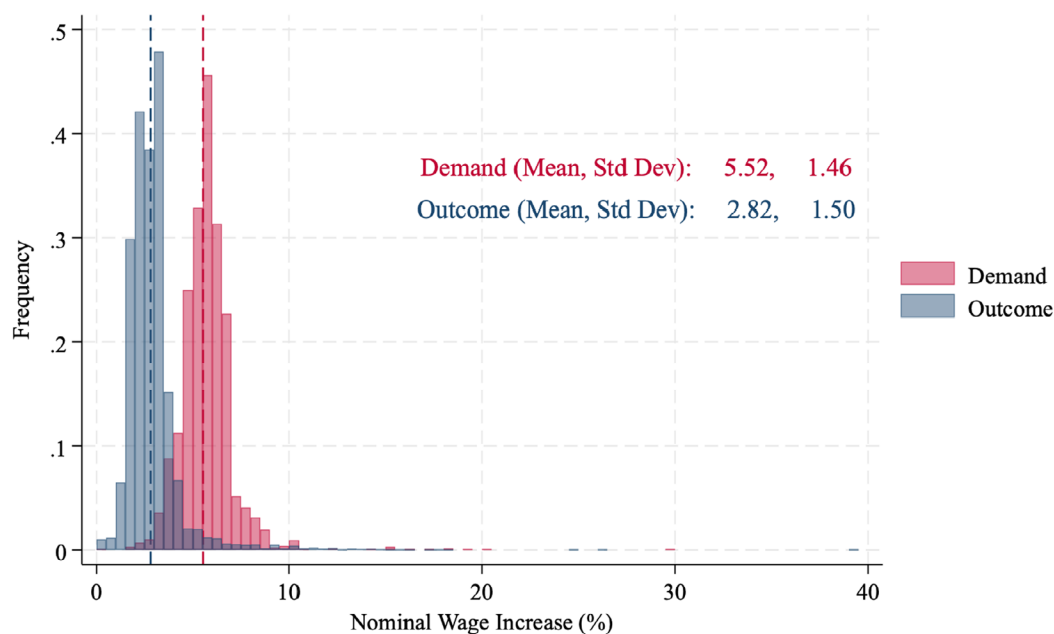


FIGURE 1 | Histogram of nominal wage growth in demands and outcomes. The figure shows the histogram of wage growth contained in demands (red) and outcomes (blue). The x-axis shows wage growth in percentage points, while the y-axis shows the frequency of observations. The text annotation shows mean and standard deviation. Figure C.2 provides the equivalent illustration in real terms. *Source:* Own calculations based on data from *WSI Tarifarchiv*.

TABLE 2 | Wider wage-related clauses in CBA demands and outcomes.

	Non-numeric demand	Leveling up	Pattern bargaining	Minimum demand	Wage floor	One-time payment
Demands	0.14	0.07	0.03	0.09	0.02	0.01
Outcomes	.	.	.	.	0.04	0.28

Note: The table illustrates the prevalence of wage-related clauses across bargaining demands and outcomes for the sample period 1993–2019. A non-numeric demand is one qualitatively describing the nature of a wage increase, rather than presenting a numeric one. Leveling up refers to clauses regarding equalization between East and West German states. Pattern bargaining occurs when demands are explicitly defined as following those of another bargaining unit. A minimum demand is present when a percentage increase demand also stipulates an absolute floor demand. Clauses for one-time payments and wage floors stipulate that these be enacted. *Source:* Own calculations based on data from *WSI Tarifarchiv*.

wage demands benefit in particular the lowest-paid workers. Similarly, 4% of demands in our sample mention (increased) wage floors, a clause that is equally prevalent in outcomes.¹³ On the other hand, a striking feature of bargaining outcomes is that just under one third contain a one-time payment, whereas these can be found in a mere 1% of demands.

In order to better understand how bargaining demands map to outcomes, we now restrict our sample to demands and outcomes which we can successfully match to each other (one-for-one). We can merge 77% of the demands in our sample to an outcome.¹⁴ Proceeding with this restricted sample, Figure 2 documents a strong positive correlation between CBN wage demands and outcomes, with a correlation coefficient of 0.57. Yet, demands at the top tail of the distribution have a much weaker relationship with outcomes, as suggested by the quadratic line of best fit. It is striking that most of the higher real wage demands (i.e., exceeding 10%) come from bargaining units representing East German states, perhaps reflecting relatively ambitious demands made soon after reunification. Equally the few bargaining units that achieved substantially larger real

wage outcomes than they demanded also represent former East German states.

Moving back to our unrestricted sample, Figure 3 shows the time series of nominal wage demands and outcomes. The red dashed line represents the average annual wage growth demanded by unions during CBNs, while the blue solid line shows the average wage growth outcome. The gray short-dashed line indicates the aggregate federal unemployment rate. Both wage demands and outcomes are procyclical (rising when unemployment falls and vice versa), and unsurprisingly, wage growth demands exceed wage growth outcomes for the entire period. Interestingly, when we look at the wedge between wage demands and outcomes, we find that it is counter-cyclical, meaning that the wedge (demands minus outcomes) is smaller when unemployment is lower (see Figure 4). The responsiveness of both demands and the wedge shows that union demands are flexible to current macroeconomic conditions, and that the negotiation process adds a further layer of flexibility to final outcomes. Overall, this suggests that the dynamics of the CBN process adapt to the underlying economic

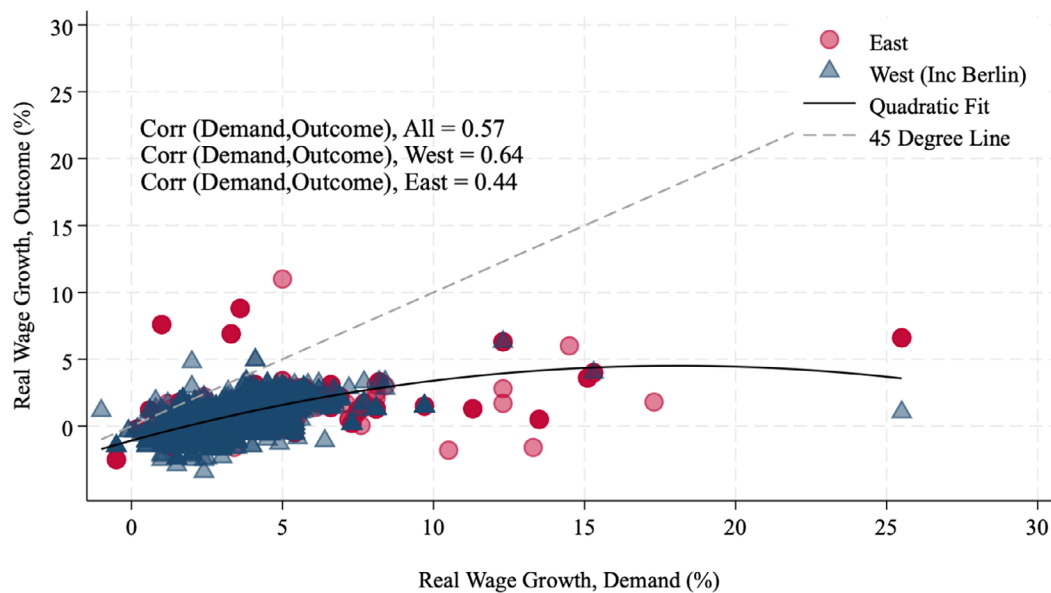


FIGURE 2 | Real wage growth in demands vs. outcomes—matched sample. The figure shows the scatter plot of real wage growth demands (x-axis) and outcomes (y-axis) in CBNs. The sample is restricted to instances where we can merge one demand to one outcome by bargaining unit name, federal states covered and year. The dashed line represents the 45-degree line, indicating where demands equal outcomes. The text annotation shows the correlation coefficient for the variables indicated. Figure C.4 provides the equivalent illustration for nominal wage growth. *Source:* Own calculations based on data from *WSI Tarifarchiv*.

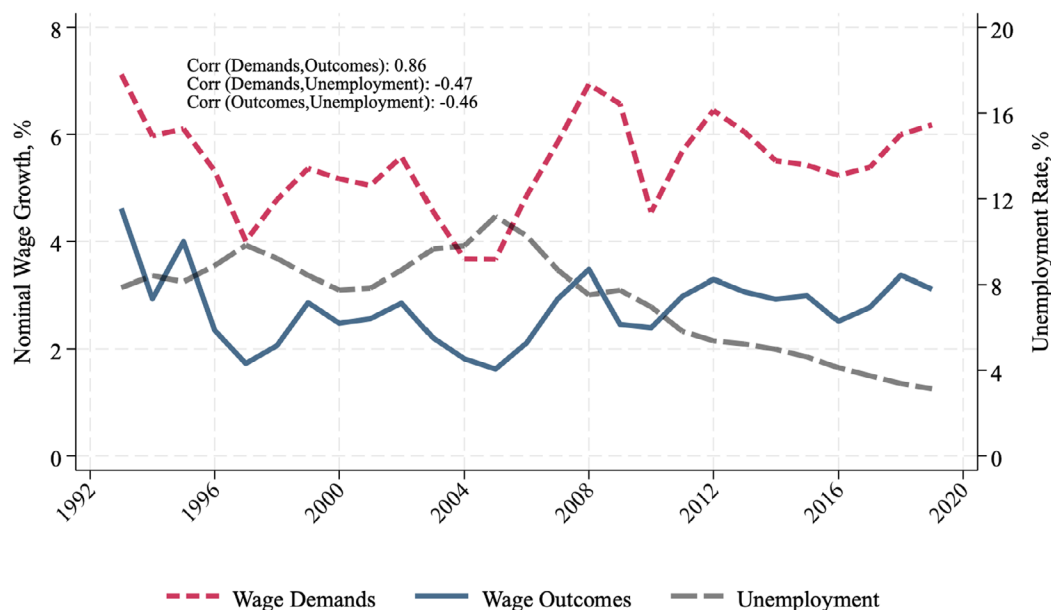


FIGURE 3 | Time series of nominal wage demands and outcomes. The figure shows average annual nominal wage growth stipulated in demands (red dashed line) and negotiated outcomes (blue solid line). This is contrasted with the federal unemployment rate (gray dashed line). The text annotation shows the correlation coefficient for the variables indicated. Figure C.5 illustrates the equivalent for real wage growth. *Source:* Own calculations based on data from *WSI Tarifarchiv* and the OECD.

conditions, with both higher outcomes and smaller negotiation wedges in booming labor markets.

Figure 5a,b depict average real wage growth demanded and achieved, split by federal states. We see that real wage growth demands and outcomes appear highest in federal states located in former East Germany. One explanation for this pattern may be found in the 1990s—the period immediately after

reunification—which was characterized by wage catch-up between former East and West German states. This is also evidenced by the prevalence of *leveling up* wage demands discussed earlier. If we focus on the period between 2000 and 2019, the overall pattern remains but is much less pronounced.^{15, 16}

Figure 6 shows average real wage growth achieved in CBNs by broad sector. We find some suggestive evidence in favor of

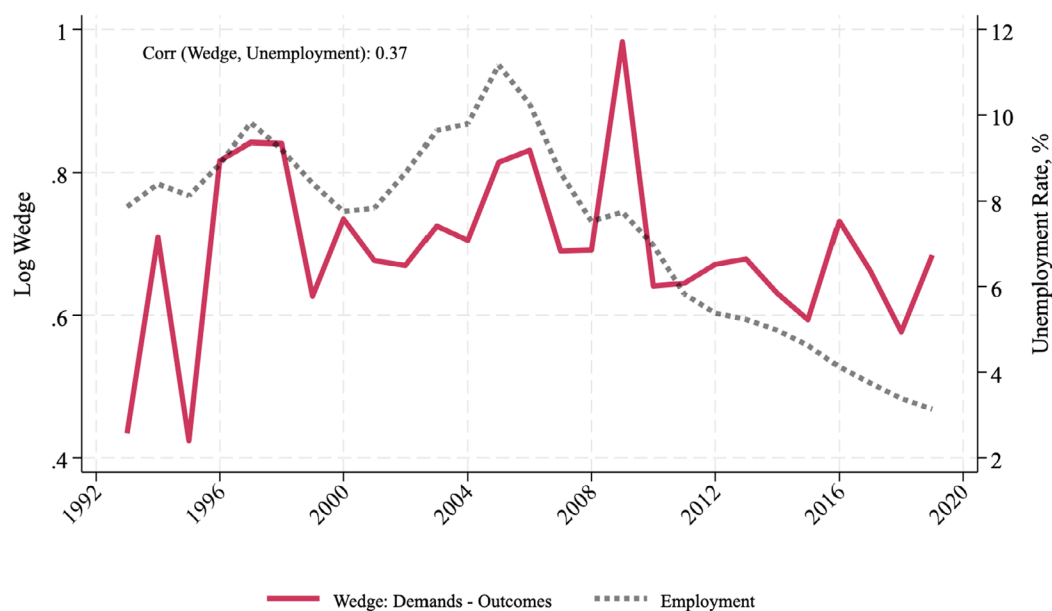


FIGURE 4 | Time series of demand-outcome wedge. The figure shows the average annual nominal wage growth wedge defined as the natural logarithm of wage growth demands minus the natural logarithm of wage growth outcomes. This is contrasted with the federal unemployment rate (gray short-dashed line). Wage demands and outcomes are averaged across bargaining units for each year. The text annotation shows the correlation coefficient for the variables indicated. *Source:* Own calculations based on data from *WSI Tarifarchiv* and the OECD.

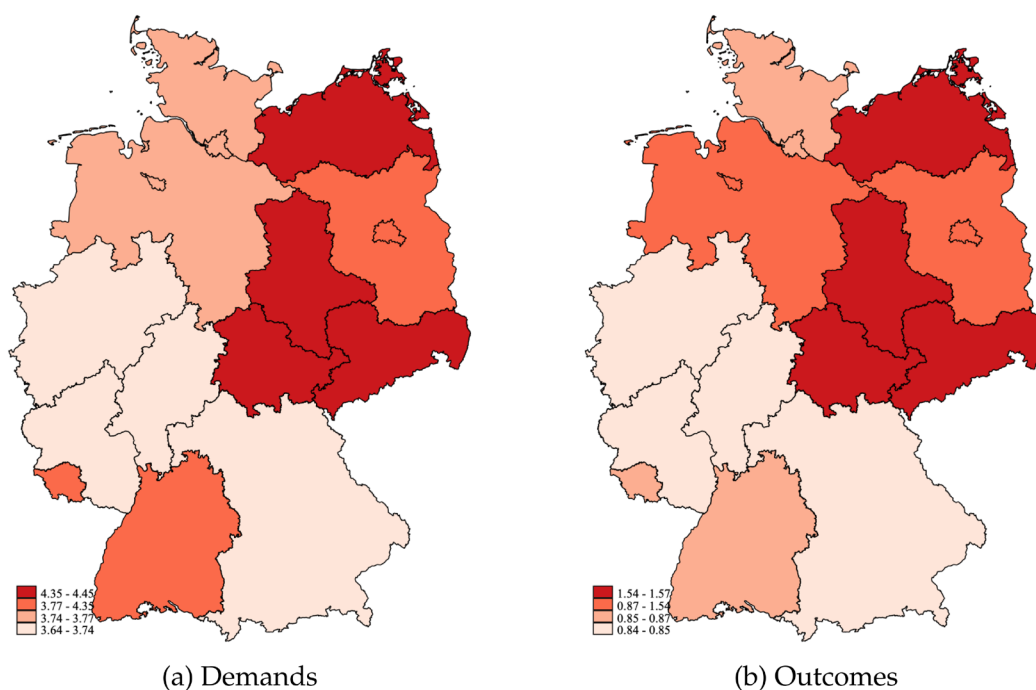


FIGURE 5 | Real wage growth, %, by federal state. The figure shows average real wage growth demanded (a) and achieved (b) in collective bargaining negotiations, split by federal state and for the period 1993–2019. We assign bargaining agreements to the federal states covered and then calculate an average across all demands and agreements that apply to a given federal state in a given year. Figure C.6 presents the same evidence excluding the 1990s. *Source:* Own calculations based on data from *WSI Tarifarchiv*.

pattern bargaining hypotheses that emphasize the role of the Metal sector. In particular, we find that real wage growth outcomes in the Metal sector are on average higher than in other sectors, and that they also appear to lead the overall economy in terms of timing, for example the peaks and troughs of the wage growth cycle in the Metal sector tend to occur earlier.

Overall, we can thus establish two key insights regarding the pecuniary dimension of CBNs. First of all, wage-related items are the most prominent feature in both demands as well as outcomes. On the union side, these pecuniary demands are broader than just wage increases. Specifically, they also frequently formulate non-numeric demands such as regional *leveling-up*, absolute

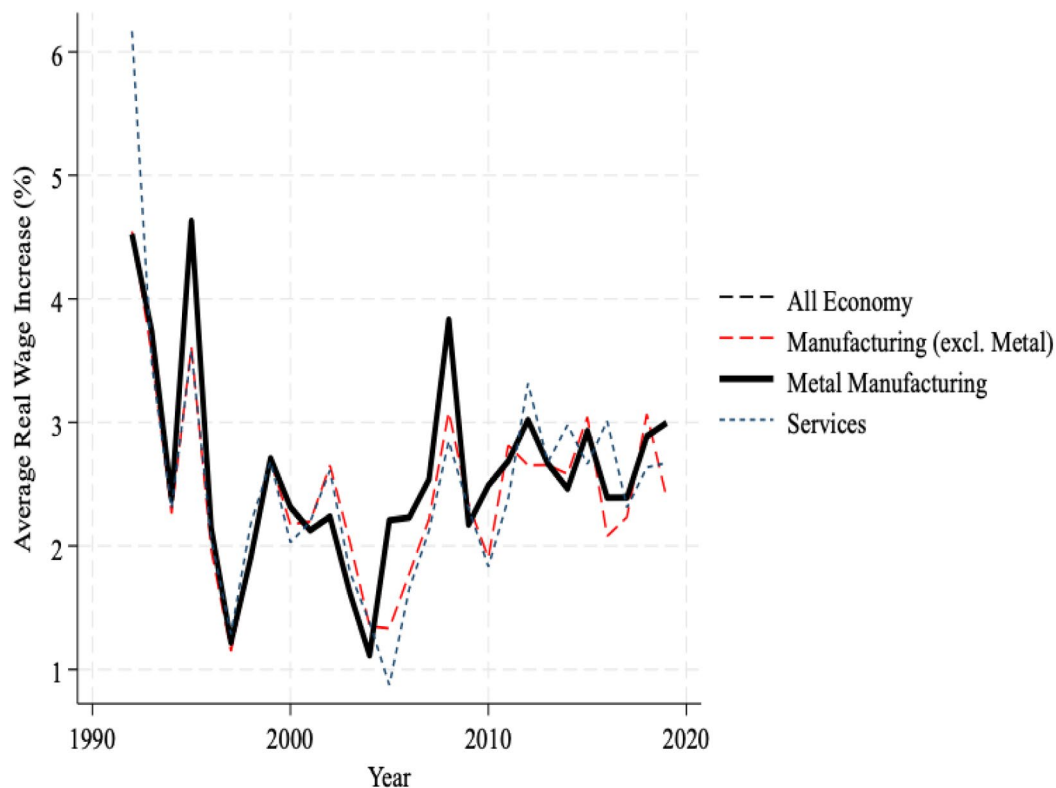


FIGURE 6 | Wage growth outcomes by broad sector. The figure shows average annual real wage growth achieved in collective bargaining negotiations, split by the broad sectors indicated. The Metal sector consists of the two-digit sectors corresponding to Manufacturing (Metal) and Manufacturing (Tools). The Manufacturing sector (excluding Metal) contains all observations in the one-digit Manufacturing sector that are not in the Metal sector. The Services sector includes the following one-digit sectors: Wholesale and Retail Trade; Hospitality; Transport, Storage and Communication; Finance and Insurance; Real Estate and Housing; Public Administration; Education; Health; and Other Services; and Private Households. *Source:* Own calculations based on data from *WSI Tarifarchiv*.

minimum wage demands, and wage floors. On the other hand, demands virtually never contain one-time payments, while these are highly prevalent in negotiated outcomes. Secondly, there is a strong positive correlation between wage increases demanded and agreed in CBNs. In turn, both are negatively correlated with the unemployment rate, with the wedge between them (demands minus outcomes) positively correlated. This suggests that bargaining dynamics broadly reflect the underlying economic conditions, with both higher negotiation demands and outcomes as well as narrower negotiation wedges in booming labor markets.

3.2 | Non-Wage Amenities

A key strength of our data is that we can also shed light on the non-wage clauses demanded and agreed in CBNs. Figure 7 illustrates the prevalence of different types of such clauses. Figure 8 illustrates the share of demands and outcomes that contain at least one of these clauses over time. Overall, this once more underscores that collective bargaining negotiations cover a wider range of issues than just wages.

Yet, as with wage demands, non-wage demands formulated by unions are broader and more nuanced than simply more conventional job amenities. For instance, just over 3% of the demands contained in our sample stipulate clauses benefiting only union members. These can range from one-time payments to extra days of leave. Furthermore, 5% of demands specify clauses for job

preservation and employment protection. Figure 9a shows the prevalence of such a demand over time as well as growth in real GDP per capita. There are two noticeable spikes in the time series, one in the late 1990s, when outsourcing production to Eastern Europe became a viable alternative for German employers (Dustmann et al. 2014), and the other in the immediate aftermath of the Great Recession. More generally, it appears that union demands are sensitive not only to labor market pressures but also to policy changes. Figure 9b traces out the prevalence of pension demand clauses over time. There is a remarkable spike that occurs in parallel to the 2001 pension reform (*Altersvermögensgesetz*), which introduced *Entgeltumwandlung*. This policy legally entitled employees to claim a tax-free allowance for investing some of their pay in a company pension. Before and after this reform, collective bargaining demands contain clauses regarding this particular scheme but also retirement provisions more generally. A similar pattern can be found with regards to the time series of health clauses (see Figure 9c). It exhibits a spike in 1996, when the conservative-liberal government had reduced the legal replacement rate of sick pay from 100% to 80%— which was widely opposed by unions across the country. A key goal for unions in that year's bargaining rounds was consequently to ensure that covered workers still received a sick pay replacement rate of 100%. In December 1996, this was achieved through a pilot agreement for metal workers in the state of Lower Saxony.¹⁷ Overall, these examples thus suggest that union demands can respond in a timely fashion not only to labor market pressures but also to policy changes concerning the legal framework around job amenities.

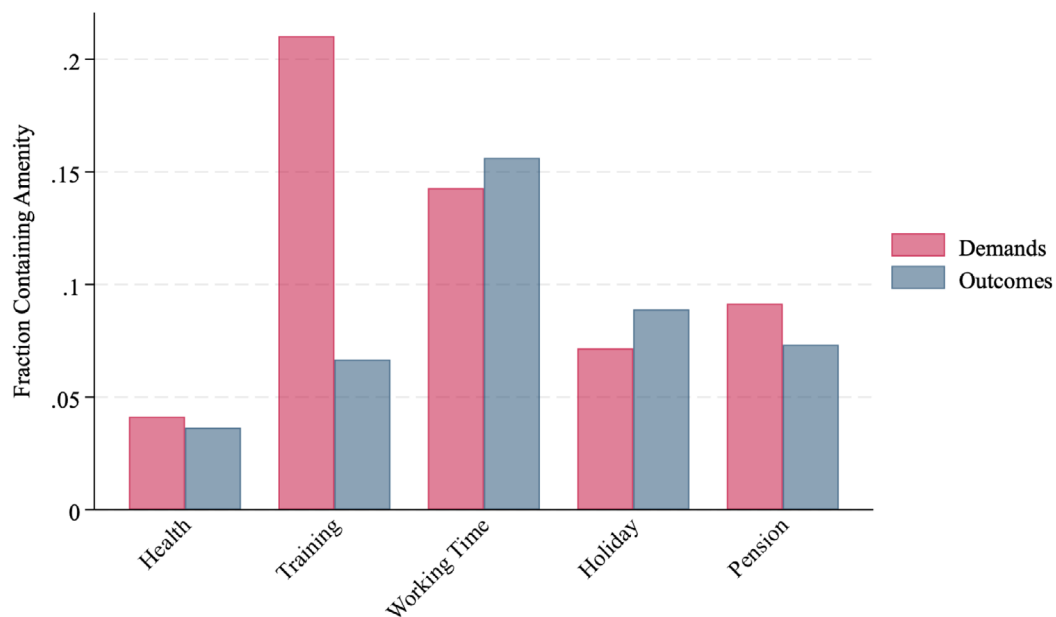


FIGURE 7 | Non-wage amenity clauses in demands and outcomes. Note: The red bars show the fraction of all demands made by unions that contained the respective type of non-wage amenity (NWA). The blue bars show the fraction of final CBAs that include provision of the indicated NWAs as an outcome, and are defined analogously to the demands. The sample period is 1993–2019. A sample of keywords used to construct these dummy variables can be found in Appendix 1. Figure C.7 presents the same evidence for matched demands and outcomes only. *Source:* Own calculations based on data from *WSI Tarifarchiv*.

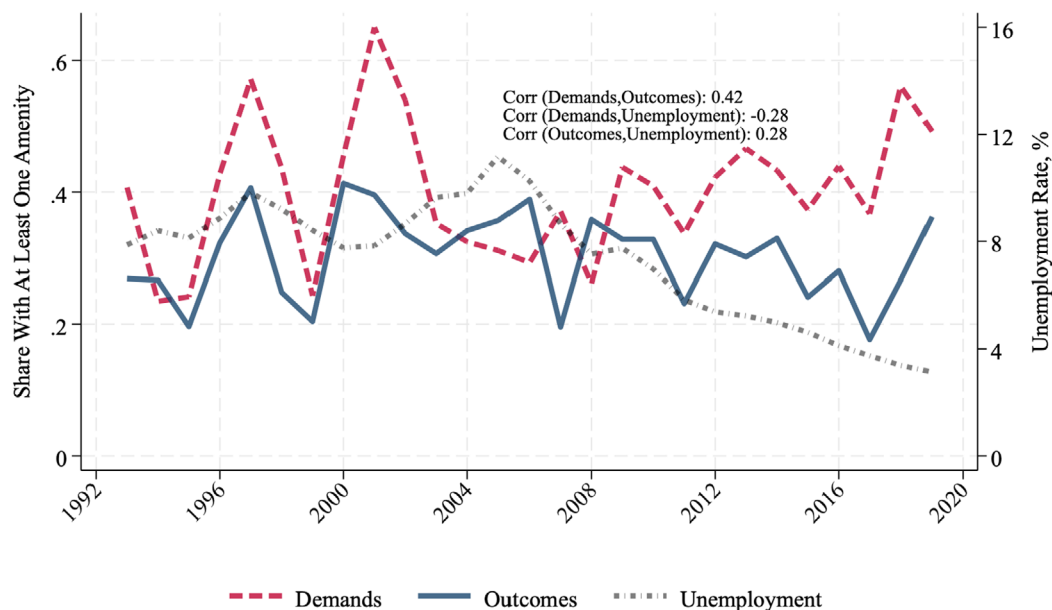


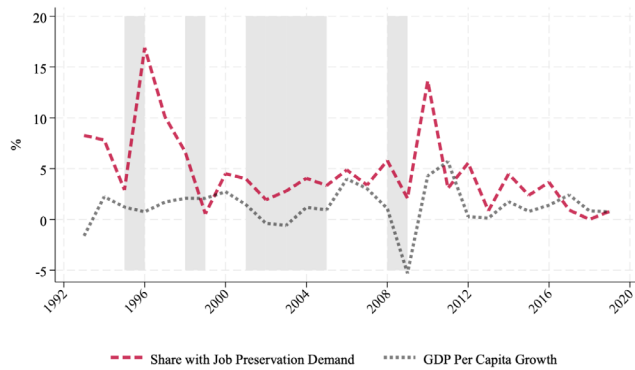
FIGURE 8 | Demands and outcomes with at least one amenity clause. The figure illustrates the annual share of demands and agreements that contain at least one of three non-wage clauses (health, training and working time, holiday, or pensions) for the period 1993–2019. This is contrasted with the federal unemployment rate (gray dashed line). *Source:* Own calculations based on data from *WSI Tarifarchiv* and the OECD.

We explore the role of different factors shaping CBN demands and outcomes further in Section 4.

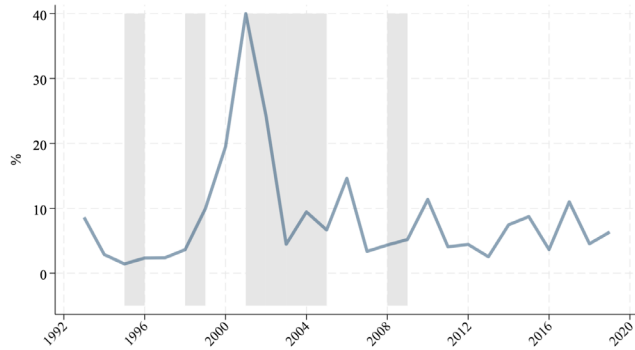
3.3 | Trading Off Wages and Non-Wage Amenities

Having established that both the wage and non-wage dimensions are important in German CBNs, we now assess how they are related to each other. Given that wage and non-wage

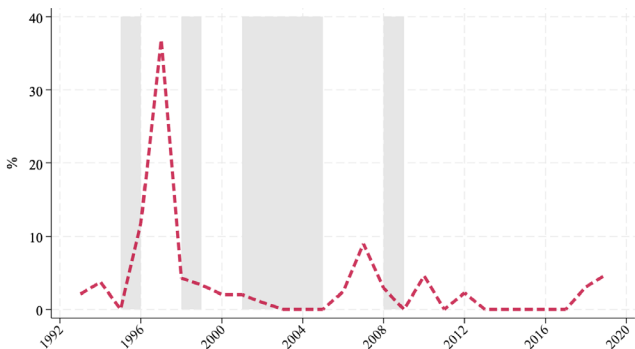
components are endogenous both to each other and to external conditions, this exercise is done at the level of descriptive correlations rather than identifying causal impacts. Standard theories of compensating differentials suggest that workers might be willing to accept lower wages in return for better working conditions (Rosen 1986). We assess this hypothesis by examining the relationship between wage and non-wage amenity clauses in a multiple regression framework. The regression equations are shown below, where b is bargaining unit (a combination of



(a) Job Preservation



(b) Pension



(c) Health

FIGURE 9 | Prevalence of various non-wage demands across time. The figure shows the shares of collective bargaining demands containing clauses regarding job preservation (a), pensions (b) and health (c). Panel (a) further depicts annual real GDP growth; shaded areas indicate recessions. *Source:* Own calculations based on data from *WSI Tarifarchiv* and the Federal Reserve Bank of St. Louis.

sectors and regions covered), t is year, the superscripts d and o indicate whether a variable or parameter applies to demands or outcomes, $\Delta w_{b,t}$ is percentage wage growth, $\mathbf{a}$ is vector of binary amenity dummies indicating whether each of the amenities in Figure 7 as well as a dummy for one-time payments is included, and μ_s and γ_t are one-digit industry and year fixed effects.¹⁸

$$\Delta w_{b,t}^d = \alpha^d + \beta_a^d \mathbf{a}_{s,r,t}^d + \mu_s^d + \gamma_t^d + \epsilon_{b,t}^d \quad (1)$$

$$\Delta w_{b,t}^o = \alpha^o + \beta_a^o \mathbf{a}_{s,r,t}^o + \mu_s^o + \gamma_t^o + \epsilon_{b,t}^o \quad (2)$$

We restrict the sample to demands and outcomes that contain at least one amenity. This is because we know that due to longer lasting Umbrella CBAs, amenities may not be part of the bargaining set in every negotiation.

If workers were willing to trade off a particular amenity for wage growth, we would expect a negative coefficient for the relevant amenity dummy in our regression framework for demands. The blue markers in Figure 10 reveal that this is indeed the case for certain amenity clauses, but crucially not for all. In fact, working time is the only significant negatively associated amenity on the demand side, suggesting that unions trade working time demands off against wage growth. Specifically, results indicate that for the inclusion of a working time clause, unions trade off 0.37 percentage points of nominal wage growth (mean nominal wage growth demanded is 5.52%). Examining the other amenity variables, the coefficients for pension and training clauses are also negative, albeit not statistically significant. Furthermore, it is perhaps unsurprising that the coefficients for one-time payments and health clauses are imprecisely estimated, as these clauses are not very common in CBN demands. On the other hand, non-significant positive estimates for extra pay and holiday clauses suggest that these may be complementary to wage demands.

Focusing instead on CBN outcomes, the red markers in Figure 10 illustrate that the presence of health clauses (recall that these mainly cover sick pay) is associated with a reduction in realized nominal wage growth of 0.34 percentage points (mean nominal wage growth agreed is 2.82%). It also appears intuitive that the coefficient for one-time payments is negative (albeit not significant), as such a clause may be offered to workers in lieu of a (higher) percentage pay increase. In turn, the results for extra pay and holiday clauses mirror those seen on the demand side, again indicating that these may be complements to wage increases. Overall, however, this suggests that the implicit trade-off between wage and non-wage amenities is indeed a key part of collective bargaining negotiations. One caveat here is that it is possible that industry-specific time shocks may cause joint movement in both wage and non-wage demands and outcomes. This complicates interpreting the estimated coefficients as representing compensating differentials alone so we see this exercise as more descriptive in nature.

Our analysis thus far has established that CBN demands and outcomes cover more than just wages, as well as how bargaining parties trade non-wage amenities and wages off against each other. In the next section we investigate what other factors may be shaping CBN wage demands and outcomes.

4 | Macroeconomic and Labor Market Conditions

One important consideration likely is the macroeconomic backdrop. In order to understand how unions may factor inflation and unemployment into their demands, and how these may be reflected in negotiated outcomes, we estimate the following regression:

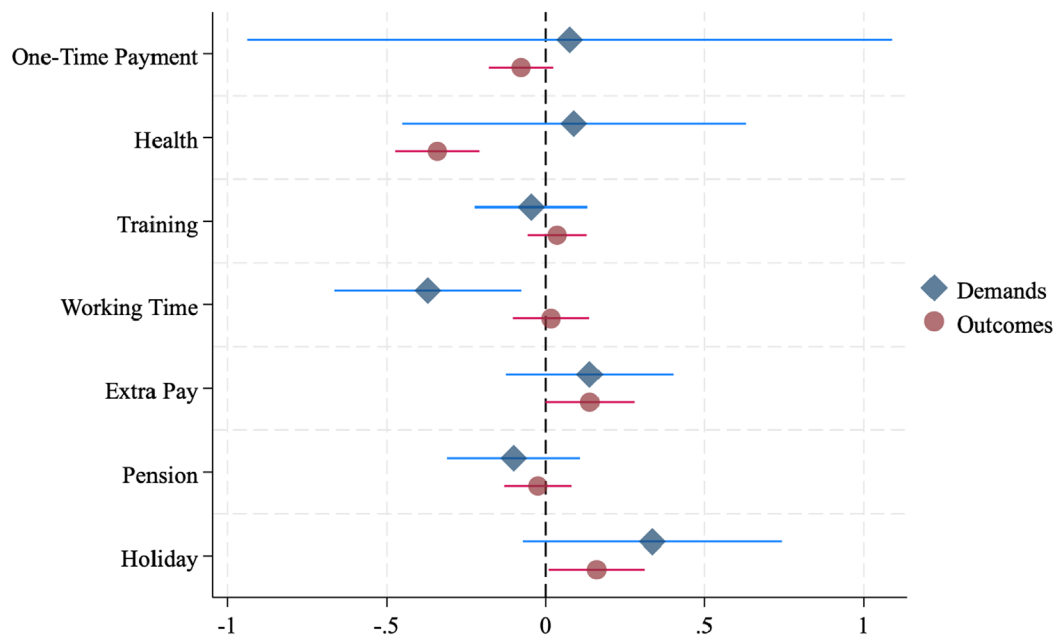


FIGURE 10 | Trading-off wages and amenities. The points shown in the figure are the coefficients from a regression of wage growth demands (outcomes) on dummies to indicate whether a particular amenity featured in demands (outcomes). We regress wage growth demands (outcomes) on all of the amenities shown, as well as fixed effects for year and one-digit industry. The sample period is 1993–2019. The figure plots the vector of parameters β^d and β^o respectively along with their 95% confidence intervals. *Source:* Own calculations based on data from *WSI Tarifarchiv*.

$$\Delta w_{b,t} = \alpha + \beta_{-1}CPI_{t-1} + \beta_0CPI_t + \beta_1CPI_{t+1} + \gamma U_t + \epsilon_{b,t} \quad (3)$$

where $\Delta w_{b,t}$ is the wage demand or outcome in bargaining unit b in year t , CPI_{t-1} is the CPI in year $t - 1$ and CPI_{t+1} is the CPI in year $t + 1$, and U_t is the federal unemployment rate at baseline. The inclusion of lags and leads of the CPI allows us to see whether wage demands and outcomes tend to be relatively more backward or forward looking. Table 3 shows the results of this regression for both wage demands and outcomes. We see that in relative terms wage demands appear to put more weight on past than future inflation, suggesting demands are more backward looking than outcomes. Both are negatively associated with unemployment, suggesting lower wage demands and outcomes in slacker labor markets. Outcomes are significantly associated with future inflation but this is not true of demands.

In addition to the broader macroeconomic backdrop, collective bargaining negotiations may of course also be impacted by more regional forces such as labor market tightness. In order to assess their potential importance, we draw on state level vacancy and unemployment data provided by the German Federal Employment Agency (*Bundesagentur für Arbeit*) for the period 2001–2019. In the first instance we quantify labor market tightness as the ratio of vacancies to unemployment. For each bargaining unit we calculate annual average labor market tightness across the federal states covered, weighting by employment in any given federal state. We then regress nominal wage growth on labor market tightness. Specifically, we estimate the following baseline regression equation:

$$\Delta w_{b,t} = \alpha + \beta_0 VU_t + \beta_1 VU_{t-1} + \mu_s + \epsilon_{b,t} \quad (4)$$

TABLE 3 | Annual inflation, wage demands and outcomes.

	(1)	(2)
	Wage demands	Wage outcomes
CPI_{t-1}	0.504*** (0.048)	0.243*** (0.019)
CPI_t	-0.012 (0.062)	0.260*** (0.028)
CPI_{t+1}	0.089 (0.052)	0.065** (0.024)
Unemployment, %	-0.239*** (0.010)	-0.185*** (0.007)
Constant	6.256*** (0.088)	3.224*** (0.070)
Observations	2527	7785
R-squared	0.240	0.165

Note: The table reports the results of a bargaining unit-level regression of nominal wage growth on current CPI inflation as well as one-year leads and lags for the sample period 1993–2019. We furthermore control for the federal unemployment rate at baseline. Column (1) reports results for wage demands, column (2) for wage outcomes. Robust standard errors are reported in parentheses. Table B.2 presents the same regression results using quarterly leads and lags of CPI. *Source:* Own calculations based on data from *WSI Tarifarchiv* and the OECD. Standard errors in parentheses.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

where $\Delta w_{b,t}$ is the wage demand or outcome in bargaining unit b in year t , VU_t and VU_{t-1} are average regional tightness in years t and $t - 1$, respectively, and μ_s is a one-digit industry fixed effect.

TABLE 4 | Regional labor market tightness, wage demands and outcomes.

	Wage demands			Wage outcomes		
	(1)	(2)	(3)	(4)	(5)	(6)
VU_t	2.296*	3.087*	-1.009**	2.498*	3.550*	-0.552***
	(0.258)	(0.315)	(0.338)	(0.167)	(0.213)	(0.229)
CPI, %	0.248*	0.244*	0.000	0.298*	0.297*	0.000
	(0.062)	(0.062)	(.)	(0.026)	(0.025)	(.)
Constant	4.745*	4.619*	5.646*	1.794*	1.661*	2.626*
	(0.113)	(0.118)	(0.064)	(0.044)	(0.046)	(0.035)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	No	Yes	No	No	Yes	No
Year FE	No	No	Yes	No	No	Yes
Adj. R^2	0.08	0.22	0.50	0.14	0.19	0.38
Observations	1282	1240	1282	2733	2697	2733

Note: The table reports the results of a bargaining unit-level regression of nominal wage growth demanded and agreed on regional labor market tightness in the same year and the year prior, measured as the average ratio of vacancies to unemployment across the federal states covered, for the sample period 2002–2019. Averages are weighted for employment in the respective federal states in that year. All columns control for one-digit industry fixed effects. Columns (2) and (5) introduce region fixed effects, whilst columns (3) and (6) introduce year fixed effects. Robust standard errors are reported in parentheses. Source: Own calculations based on data from WSI Tarifarchiv and the Federal Employment Agency (*Bundesagentur für Arbeit*). Standard errors in parentheses.

* $p < 0.001$.

** $p < 0.01$.

*** $p < 0.05$.

TABLE 5 | Employee and unemployed labor mobility, wage demands and outcomes.

	Demands			Outcomes		
	(1)	(2)	(3)	(4)	(5)	(6)
Log EE (r,s)	0.160***	0.174***	0.205***	0.060***	0.061***	0.164***
	(11.401)	(12.292)	(13.712)	(5.861)	(5.990)	(13.716)
Log UE (r,s)	-0.157***	-0.170***	-0.142***	-0.092***	-0.082***	-0.130***
	(-11.288)	(-12.021)	(-10.238)	(-8.838)	(-7.919)	(-11.641)
Unemployment, %	-0.148***	-0.143***	-0.130***	-0.196***	-0.194***	-0.199***
	(-35.234)	(-34.161)	(-30.762)	(-58.645)	(-59.324)	(-53.889)
CPI, %	1.927***	1.956***	1.935***	2.107***	2.116***	2.257***
	(45.705)	(46.614)	(45.710)	(67.772)	(69.347)	(65.214)
Constant	6.202***	6.187***	6.462***	3.407***	3.451***	3.857***
	(139.813)	(139.167)	(108.501)	(105.416)	(108.240)	(77.790)
Sector FE	No	No	Yes	No	No	Yes
Region FE	No	Yes	Yes	No	Yes	Yes
Adj. R^2	0.1224	0.1341	0.1888	0.1601	0.1929	0.2398
Observations	23,249	23,249	17,572	41,327	41,327	26,934

Note: The table reports the results of a sector and state level regression of nominal wage growth demanded (columns 1–3) and outcomes agreed (columns 4–6) on federal unemployment rates, sector-state unemployment exit rates and sector-state establishment mobility rates—see main text for definitions. Sectors are defined at a three-digit level for wage growth (demands and outcomes) and a two-digit level for UE/EE mobility rates. Columns (2) and (5) introduce region fixed effects, whilst columns (3) and (6) additionally include one-digit sector fixed effects. Standard errors are reported in parentheses. Source: Own calculations based on data from WSI Tarifarchiv, the Federal Employment Agency (*Bundesagentur für Arbeit*), and Linked-Employer-Employee-Data of the Institute of Employment Research (LIAB). t statistics in parentheses.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Based on this regression specification, columns (1) and (4) of Table 4 illustrate that for CBN demands and outcomes, tighter labor markets appear to be associated with higher nominal wage growth. This result is robust to also including a fixed effect for the region covered by the CBN (columns (2) and (5)), indicating that it is also variation in tightness within covered regions, rather than simply between them, that is associated with higher nominal wage demands and outcomes. However, once we include a year fixed effect (columns (3) and (6)), the relationship breaks down and the tightness coefficient becomes negative. This suggests that what may be driving earlier results is variation in tightness across and not within years, which is intuitive as the lion's share of variation in tightness in our sample occurs between years as well.

However, measuring tightness using the ratio of vacancies to unemployment implicitly assumes that all slack in the labor market (i.e., under-utilized labor supply) is accounted for by the unemployed. A more recent literature—for example, Autor et al. (2023) and Moscarini and Postel-Vinay (2023)—highlights that such slack can also come from employees seeking better matches. In turn, this would suggest that wage bargaining demands and outcomes are influenced not only by the outside options of the unemployed but also those of employed workers. We test this by running the following regressions shown in Equations (5) and (6).

$$\Delta w_{r,s,t}^d = \alpha + \beta_0^d U_t + \beta_1^d \log(UE)_{r,s,t} + \beta_2^d \log(EE)_{r,s,t} + \epsilon_{r,s,t}^d \quad (5)$$

$$\Delta w_{r,s,t}^o = \alpha + \beta_0^o U_t + \beta_1^o \log(UE)_{r,s,t} + \beta_2^o \log(EE)_{r,s,t} + \epsilon_{r,s,t}^o \quad (6)$$

Here $UE_{r,s,t}$ is constructed using the LIAB administrative data and is an approximation of the probability that an unemployed worker in region r finds employment in sector s and region r in year t .¹⁹ $EE_{r,s,t}$ is also derived from the LIAB data and is an approximation of the probability that an employee in state r has moved establishments into sector s in year t .²⁰

Table 5 shows the results of these regressions with the first column mimicking the wage demand regression presented in Equation (5). The second column then adds state fixed effects, and the third column further adds one-digit industry fixed effects. The fourth, fifth and sixth column repeat the same analysis for wage outcomes rather than wage demands. The federal level unemployment coefficient is always negative, reiterating the importance of macroeconomic conditions in determining wage demands and outcomes. Local conditions also matter, however—with the coefficient of $\log(EE)_{r,s,t}$ always positive for demands and outcomes, providing suggestive evidence that workers ability to move jobs into a given sector and state is associated with positive pressure on collectively bargained wage demands and outcomes. In contrast, the coefficient of $\log(UE)_{r,s,t}$ is negative across all specifications. We interpret this as a rejection of the hypothesis that the outside options of the unemployed are associated with positive pressure on wage settlements in a given sector and state. Overall the results point to the importance of

TABLE 6 | Employee and unemployed mobility, amenity demands and outcomes.

	Demands			Outcomes		
	(1)	(2)	(3)	(4)	(5)	(6)
Log EE (r,s)	0.031*** (6.648)	0.037*** (7.783)	0.029*** (5.107)	0.022*** (6.024)	0.022*** (5.952)	−0.025*** (−5.815)
Log UE (r,s)	−0.046*** (−9.742)	−0.051*** (−10.534)	−0.043*** (−8.067)	−0.071*** (−19.464)	−0.072*** (−19.533)	−0.037*** (−9.198)
Unemployment, %	0.001 (0.575)	0.001 (1.072)	0.004* (2.517)	0.002 (1.844)	0.002 (1.934)	−0.012*** (−9.276)
CPI, %	−0.221*** (−16.340)	−0.219*** (−16.177)	−0.261*** (−17.019)	−0.132*** (−11.551)	−0.130*** (−11.399)	−0.005 (−0.405)
Constant	0.554*** (39.183)	0.563*** (39.667)	0.576*** (26.285)	0.322*** (27.450)	0.314*** (26.683)	0.281*** (14.948)
Sector FE	No	No	Yes	No	No	Yes
Region FE	No	Yes	Yes	No	Yes	Yes
Adj. R ²	0.0124	0.0157	0.0347	0.0296	0.0311	0.1216
Observations	32,971	32,971	24,725	48,593	48,593	32,499

Note: The table reports the results of sector and state level regressions for demands (columns 1–3) and outcomes agreed (columns 4–6) where the dependent variable indicates whether the demand or outcome included at least one amenity clause (covering working time, health, pensions, training, or holiday conditions). The independent variables are federal unemployment rates, sector-state unemployment exit rates and sector-state establishment mobility rates—see main text for definitions. Sectors are defined at a three-digit level for wage growth (demands and outcomes) and a two-digit level for UE/EE mobility rates. Columns (2) and (5) introduce region fixed effects, whilst columns (3) and (6) additionally include one-digit sector fixed effects. Standard errors are reported in parentheses. *Source:* Own calculations based on data from *WSI Tarifarchiv*, the Federal Employment Agency (*Bundesagentur für Arbeit*), and Linked-Employer-Employee-Data of the Institute of Employment Research (LIAB). *t* statistics in parentheses.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

considering employees' outside options to move establishments in measures of labor market tightness. This importance of the outside option of job moves for employees is also suggested by Autor et al. (2023) and Moscarini and Postel-Vinay (2017).

There is less of a clear-cut relationship between amenity demands and outcomes and unemployment, as shown in Table 6 and also suggested in Figure 8. Here we repeat the regressions above but with a dependent variable that indicates whether a CBN demand or outcome includes at least one of a working time, health, training, pensions or holiday clause. However, employee mobility rates do positively predict amenity outcomes and there is, for most specifications, a strong negative association between inflation and amenity demands and outcomes in contrast with the positive association for wages. This suggests, albeit tentatively, that in times of high inflation, CBNs focus more on wage increases than amenities—an intuitive but, to the best of our knowledge, novel finding.

So far we have focused on the market drivers of wage growth demands and outcomes in CBNs. However, negotiations likely also reflect changes to relevant institutions. For example, we already saw in Section 3.2 that demands for health-clauses in CBAs increased at the same time as legislation decreasing sick-leave replacement rates was passed. Here we consider another

important part of the institutional environment: what fraction of firms in a (two-digit) sector and federal state are covered by a CBA (the coverage rate). Table 7 shows results from regressing wage demands (columns 1–4) and outcomes (columns 5–8) on coverage and relevant controls. Both wage demands and outcomes are positively associated with coverage; however, the potential endogeneities are particularly significant here—for example, overly high wage demands and outcomes may lead to a decline in coverage, meaning OLS estimates are downwardly biased estimates of the causal impact of coverage on wage growth. Equally, a productivity shock could boost both coverage and wage growth (outcomes and demands), leading to an upward bias in OLS estimates. We leave it to future research to investigate this causally. We see a qualitatively similar positive relationship between amenity demands and outcomes and coverage—see Table 8.

Overall, we can establish some key insights from our analysis in this section. Primarily, CBN demands and outcomes are clearly associated with both the macroeconomic backdrop as well as local labor market conditions. Furthermore, employees' ability to move establishments—a measure of their outside options within employment—is associated with higher wage growth demands and outcomes in contrast to their outside options in unemployment.

TABLE 7 | CBA coverage by sector, wage demands and outcomes.

	Demands				Outcomes			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Coverage (r,s)	0.082*** (3.384)	0.048* (1.970)	0.150*** (5.609)	0.077** (2.849)	0.138*** (8.901)	0.132*** (8.386)	0.212*** (12.402)	0.223*** (12.984)
Unemployment, %	−0.155*** (−38.580)	−0.142*** (−33.882)	−0.143*** (−34.030)	−0.131*** (−31.786)	−0.214*** (−82.490)	−0.209*** (−77.225)	−0.212*** (−77.847)	−0.206*** (−77.012)
CPI, %	1.822*** (36.565)	1.779*** (35.558)	1.781*** (35.696)	1.555*** (31.639)	1.315*** (39.142)	1.277*** (37.762)	1.287*** (38.144)	1.199*** (36.545)
Log EE (r,s)		0.191*** (13.379)	0.201*** (13.796)	0.239*** (15.742)		0.044*** (4.997)	0.051*** (5.661)	0.081*** (8.487)
Log UE (r,s)		−0.156*** (−11.477)	−0.159*** (−11.506)	−0.164*** (−11.827)		−0.075*** (−8.961)	−0.076*** (−8.857)	−0.039*** (−4.435)
Constant	6.017*** (186.294)	6.388*** (120.802)	6.386*** (118.921)	6.653*** (110.583)	3.782*** (176.206)	3.663*** (112.751)	3.676*** (112.014)	4.040*** (107.741)
Sector FE	No	No	No	Yes	No	No	No	Yes
Region FE	No	No	Yes	Yes	No	No	Yes	Yes
Adj. R ²	0.1283	0.1380	0.1446	0.1982	0.2525	0.2580	0.2636	0.3012
Observations	15,967	15,766	15,766	15,764	22,805	22,515	22,515	22,425

Note: The table reports the results of a sector and state level regression of nominal wage growth demanded (columns 1–3) and outcomes agreed (columns 4–6) on sector-state CBA coverage rates (fraction of firms covered), federal unemployment rates, federal consumer price inflation, sector-state unemployment exit rates and sector-state establishment mobility rates—see main text for definitions. Sectors are defined at a three-digit level for wage growth (demands and outcomes), and a two-digit level for coverage rates and UE/EE mobility rates. Columns (2) and (5) introduce region fixed effects, whilst columns (3) and (6) additionally include one-digit sector fixed effects. Standard errors are reported in parentheses. *Source:* Own calculations based on data from *WSI Tarifarchiv*, the Federal Employment Agency (*Bundesagentur für Arbeit*), and Linked-Employer-Employee-Data of the Institute of Employment Research (LIAB). *t* statistics in parentheses.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

TABLE 8 | CBA coverage by sector, amenity demands and outcomes.

	Demands				Outcomes			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Coverage (r,s)	−0.014 (−1.450)	−0.022* (−2.236)	−0.008 (−0.748)	−0.027* (−2.357)	0.024** (2.716)	0.027** (3.125)	0.033*** (3.526)	0.007 (0.713)
Unemployment, %	0.003* (2.084)	0.007*** (4.498)	0.008*** (4.769)	0.006*** (3.481)	−0.014*** (−9.643)	−0.010*** (−6.874)	−0.010*** (−6.647)	−0.013*** (−9.291)
CPI, %	−0.315*** (−15.033)	−0.322*** (−15.279)	−0.325*** (−15.459)	−0.286*** (−13.576)	0.189*** (9.651)	0.157*** (8.131)	0.157*** (8.137)	0.124*** (6.694)
Log EE (r,s)		0.038*** (6.422)	0.049*** (8.144)	0.037*** (5.651)		0.004 (0.852)	0.006 (1.137)	0.003 (0.581)
Log UE (r,s)		−0.049*** (−8.598)	−0.056*** (−9.683)	−0.047*** (−7.865)		−0.081*** (−18.029)	−0.086*** (−18.987)	−0.056*** (−11.995)
Constant	0.647*** (50.098)	0.618*** (30.147)	0.643*** (31.039)	0.619*** (24.977)	0.570*** (45.946)	0.159*** (8.569)	0.134*** (7.195)	0.328*** (15.405)
Sector FE	No	No	No	Yes	No	No	No	Yes
Region FE	No	No	Yes	Yes	No	No	Yes	Yes
Adj. R^2	0.0102	0.0137	0.0196	0.0364	0.0056	0.0533	0.0606	0.1306
Observations	21,720	21,504	21,504	21,466	28,120	27,786	27,786	27,693

Note: The table reports the results of sector and state level regressions for demands (columns 1–3) and outcomes agreed (columns 4–6) where the dependent variable indicates whether the demand or outcome included at least one amenity clause (covering working time, health, pensions, training, or holiday conditions). The independent variables are sector-state CBA coverage rates (fraction of firms covered), federal unemployment rates, federal consumer price inflation, sector-state unemployment exit rates, and sector-state establishment mobility rates—see main text for definitions. Sectors are defined at a three-digit level for amenity demands and outcomes, and a two-digit level for coverage rates and UE/EE mobility rates. Columns (2) and (5) introduce region fixed effects, whilst columns (3) and (6) additionally include one-digit sector fixed effects. Standard errors are reported in parentheses. Source: Own calculations based on data from *WSI Tarifarchiv*, the Federal Employment Agency (*Bundesagentur für Arbeit*), and Linked-Employer-Employee-Data of the Institute of Employment Research (LIAB). t statistics in parentheses.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

5 | Discussion and Conclusion

Collective bargaining negotiations are a key pillar of labor markets characterized by trade unions and sectoral bargaining. A large body of literature has studied bargaining agreements, and in particular their pecuniary contents. However, there is relatively little quantitative, systematic evidence about the substantive content of bargaining demands, as well as the non-wage amenities featured in CBNs (Jäger et al. 2024). This paper addresses this gap, leveraging novel data on German CBN demands and outcomes over the three decades since reunification. We document three key findings.

First of all, we find that whilst wage-related items are the most prominent feature of CBNs, demands as well as outcomes cover a considerably wider range of issues than just wage increases. For instance, roughly 40% (30%) of CBN demands (outcomes) contain at least one amenity clause concerning health (e.g., sick pay and sick leave), training (e.g., apprenticeship training provision and up-skilling measures), working time (e.g., hours worked and part-time retirement), holiday conditions (e.g., leave allowance and holiday pay) or pensions. Furthermore,

taking a broader definition of wage demands, unions also frequently formulate non-numerical demands such as regional *leveling-up* of wages, absolute minimum wage demands and wage floors.

Secondly, we document that bargaining parties appear to be trading off wage and amenity clauses when formulating demands and agreeing outcomes. For instance, we find that the inclusion of a working time demand is associated with a reduction in nominal wage growth demanded of 0.37 percentage points (mean nominal wage growth demanded is 5.52%). On the other hand, the stipulation of a health clause is associated with a reduction in agreed nominal wage growth of around a third of a percentage point (mean nominal wage growth agreed is 2.82%). Overall, this suggests that the implicit trade-off between wage and non-wage amenities is indeed a key part of collective bargaining negotiations.

We illustrate several ways in which negotiations are associated with current macroeconomic and labor market conditions as well as public policy. With regards to consumer prices, wage demands appear to put relatively more weight on past than

current and future inflation, whilst negotiated outcomes appear to be, at least over the medium-term, more forward-looking. Furthermore, both evolve counter-cyclically with respect to the unemployment rate, and tighter local labor markets are associated with higher nominal wage demands and outcomes. Finally, we document that union demands for certain non-wage amenities such as sick pay become more prevalent alongside public policy changes concerning these issues. One such example is a 1996 reform, which reduced the statutory replacement rate for sick pay. In the aftermath, unions bargained heavily to ensure that covered workers still received a higher replacement rate. Overall, we thus establish that CBN demands and outcomes are clearly associated with the macroeconomic backdrop, current labor market conditions and contemporaneous public policy changes.

Finally, our results also offer important insights for collective bargaining theory, as they show both wages and employment enter into negotiations. However, employment considerations enter via job preservation demands, rather than demands relating to the stock of employment. These job preservation demands mainly feature in negotiations during periods of higher unemployment and outsourcing pressures. This suggests a union objective function of maximizing the rewards of employment (as in right-to-manage) subject to preserving the jobs of incumbent employees. The latter constraint, while always present, tends to bite more in periods of economic hardship. This view of collective bargaining sits between the right-to-manage and efficient bargaining models and bears some similarity to insider-outsider theories (Carruth and Oswald 1987; Lindbeck and Snower 2001). Our results may also be viewed against the backdrop of findings by Azkarate-Askasua and Zerecero (2025), who illustrate that unions can (partially) undo market power misallocation and serve as a substitute for labor market competition, so long as they take possible labor rationing into account.

Overall, this paper thus offers interesting lessons for labor market policy and the design of labor market institutions. However, our results also point to interesting perspectives for further exploration. An intuitive next step would be to investigate the role of product and labor market power using data that is regionally granular and available across longer periods of time. In a similar vein, future research could make use of data on strikes to explore the impact of strike prevalence on demands and outcomes in collective bargaining.

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for detailed data sources. Alice Kügler acknowledges financial support from ESRC New Investigator grant ES/R011443/1.

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Ethics Statement

The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The collective bargaining data we digitized for this project is sourced from the collective bargaining archive (*WSI Tarifarchiv*) of the German Institute of Economic and Social Research (*Wirtschafts- und Sozialwissenschaftliches Institut, WSI*). The source documents can be found at <https://www.wsi.de/de/monatsberichte-15268.htm>. Other data used is either publicly available directly or by application: see main text for detailed data sources.

Endnotes

- ¹ For a more in-depth review see for instance Farber (1986).
- ² There is also a dynamic game theoretic literature that posits the bargaining game as a multi-round event with asymmetric information, which helps to rationalize the occurrence of strikes—see Fudenberg and Tirole (1983) and Tracy (1987).
- ³ Across time, employer associations began to offer membership without collective bargaining coverage (*Ohne Tarifbindung*), meaning that in some cases members (of the employer association) also do not need to adhere to the CBA.
- ⁴ Even in firms not covered by a CBA, the contents of a CBA may still have an impact, however. For example, in 2020, 31% of firms not covered by a CBA adopted at least some of the conditions specified in the relevant CBA when structuring their employment contracts (Ellguth and Kohaut 2021). This could be because the employer voluntarily aligns their employment contracts with the relevant CBA. Employers who opt out of a CBA after it comes into force remain bound by its terms for the duration of the agreement.
- ⁵ Larger overhauls of the remuneration structure and assignment of workers to groups are typically stipulated in a so-called Framework CBA (*Rahmentarifvertrag*), which is set for longer periods.
- ⁶ For a more detailed discussion of the German system of collective bargaining and industrial relations more generally, see for example Jäger et al. (2022).
- ⁷ See Appendix 2 Figure C.1.
- ⁸ Appendix 3 Table B.1 provides equivalent descriptives for these firm-level CBNs, illustrating that they are qualitatively comparable to our primary sample.
- ⁹ 14% contain a non-percentage wage demand which is either an absolute amount or a qualitative description. We discuss the composition of wage demands in detail in Section 3.1.
- ¹⁰ Ruf, Kevin; Schmidlein, Lisa; Seth, Stefan; Stüber, Heiko; Umkehrer, Matthias; Griebemer, Stephan; Kaimer, Steffen (2021): “Linked-Employer-Employee-Data of the IAB (LIAB): LIAB longitudinal model 1975–2019, version 1”, Research Data Centre of the Federal Employment Agency at the Institute for Employment Research (IAB), DOI: [10.5164/IAB.LIABLM7519.de.en.v1](https://doi.org/10.5164/IAB.LIABLM7519.de.en.v1). Data access was provided via on-site use at the IAB and subsequently remote data access.

- ¹¹ See Appendix 3 Figure C.2.
- ¹² In total, we search for 72 separate expressions relating to the qualitative nature of wage demands when coding our non-numeric demands. This is informed by inspection of the full text description of the demand.
- ¹³ This explicitly excludes the federal minimum wage introduced in 2015 as well as increases in its level.
- ¹⁴ See Appendix 1 for a more detailed explanation of the merge. Figure C.3 illustrates that mean nominal wage growth is very similar in the restricted and unrestricted samples, both for demands and outcomes.
- ¹⁵ See Appendix 3 Figure C.6.
- ¹⁶ Note also that we are not weighting for the number of workers covered by a given agreement in a given federal state, as we do not observe the number of workers covered separately by region within an agreement. The broad trend of higher demands and increases in former East Germany remains irrespective of weighting.
- ¹⁷ See for example: Tagesschau, 5th December 1996 (report in German).
- ¹⁸ Note the amenity categories are not mutually exclusive, since a CBN can include many amenities simultaneously in demands or outcomes, so there is no omitted category but rather a series of dummy variables indicating inclusion of each amenity category.
- ¹⁹ More precisely, it is a ratio where the numerator is the total count of consecutive spells in year t where individuals start in unemployment and end in employment in sector s and region r . The denominator is defined as the total number of unemployment spells in region r in year t .
- ²⁰ More precisely, it is a ratio where the numerator is the total count of spells where workers start employed in any sector and region and then move establishments into sector s and region r in year t . The denominator is defined as the total number of spells of employment in region r during year t .

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Appendix 1

Construction of Text Dummies

In order to construct dummy variables regarding non-wage amenities and other patterns we proceed using regular expression keyword search. For dummy variables contained in both CBN demands and outcomes we apply the same list of keywords, ensuring symmetric construction. Table A.1 illustrates a sample of keywords for each variable as well as whether it is contained in both demands and outcomes or one or the other. In some cases, we also rule out certain keywords. For example, the wage floor dummy is switched off if the text relates to the introduction of the federal minimum wage, which we do not want to capture with this variable.

Merge of Demands and Outcomes

Our strategy for merging demand observations to outcomes has three key steps. The first step is that we expand the demands and outcomes data so that each federal state covered (for a given bargaining unit and year) has a separate observation (row) in our expanded dataset. This is done because, in our original unexpanded data, each demand typically covers a larger number of federal states than each outcome. The second step is a fuzzy match on bargaining unit name, and an exact match on individual federal

TABLE A.1 | Amenity keywords.

	Sample keywords	Demands	Outcomes
Panel A: Wages			
One-time payment	Lump sum, one-time payment	Yes	Yes
Wage floor	Minimum wage introduction, wage floor	Yes	Yes
Panel B: Amenities			
Extra pay	Night shift pay, performance pay, overtime	Yes	Yes
Health	Illness, health, sick day	Yes	Yes
Holiday	Holiday allowance, holiday pay	Yes	Yes
Pensions	Pension, retirement provision	Yes	Yes
Training	Apprenticeship quota, upskilling	Yes	Yes
Working Time	3[0–9]-hours, part-time retirement	Yes	Yes
Panel C: Union demands			
Job preservation	Employment protection, job guarantee	Yes	No
Leveling up	East- to the west-level, east adjustment	Yes	No
Member perks	Advantages for union members	Yes	No
Non-numeric demand	Stable real wage, purchasing power	Yes	No
Pattern bargaining	Same demand as, analog to industry X	Yes	No

Note: The table gives a sample of translated keywords employed in a regular expression approach to constructing amenity dummy variables. In the implementation, we use German keywords.

state and year. This deals with inexact naming conventions for bargaining units. We manually inspect the fuzzy matches made by the rec2link command in Stata and drop any false matches. The third and final step is that, for any unmatched outcomes from the above stage, we then match them to (also unmatched) demands from the previous year, again with a fuzzy match on bargaining unit (with inspection) and an exact match on federal state. This is done because an outcome for a CBN may be agreed with a year's lag from when the original demand was made. We can match 77% of all demands using this strategy.

Table A.2 (Table A.3) compares the merged sample of demands (outcomes) to the non-merged demands (outcomes). The differences between the merged and non-merged samples are generally not statistically significant with the exception of the count of amenities in demands and outcomes and the fractions of demands that come from Eastern German states only. While these differences are statistically significant, they are not large in magnitude.

TABLE A.2 | Merge comparison: demands.

	(1)	(2)	(3)
	Not Merged	Merged	Difference (1)–(2)
Wage growth, %	5.31 (1.31)	5.61 (1.60)	–0.30*** (0.04)
Amenities, count	0.60 (0.84)	0.62 (0.85)	–0.02 (0.02)
Fraction East	0.28 (0.45)	0.25 (0.43)	0.03*** (0.01)
<i>N</i>	2747	9376	12,123

TABLE A.3 | Merge comparison: outcomes.

	(1)	(2)	(3)
	Not Merged	Merged	Difference (1)–(2)
Wage growth, %	2.78 (1.58)	2.77 (1.25)	0.01 (0.02)
Amenities, count	0.56 (0.87)	0.72 (0.98)	–0.16*** (0.01)
Fraction East	0.25 (0.43)	0.25 (0.43)	0.00 (0.01)
<i>N</i>	13,781	9376	23,157

Appendix 2: Additional Tables

TABLE B.1 | Summary statistics of CBA demands and outcomes at firm level.

	<i>N</i>	Contains % increase	Nominal wage growth, %	Real wage growth, %	Non-wage amenity
Demands	350	0.76	5.52	3.95	0.46
Outcomes	782	0.90	2.65	0.90	0.29

Note: The table shows the total number of observations, share containing a percentage wage increase as well as the averages of nominal and real wage growth, and number of non-wage amenity clauses included in firm-level collective bargaining demands and agreements (CBAs). The sample period is 1993–2019. For the purposes of this table, the following topic clauses are counted as non-wage amenity clauses: Health, Training, and Working Time. *Source:* Own calculations based on data from *WSI Tarifarchiv*.

TABLE B.2 | Quarterly inflation and wage outcomes.

	(1)
	Wage Outcomes
CPI_{t-1}	0.486*** (0.048)
CPI_t	0.521*** (0.046)
CPI_{t+1}	0.261*** (0.047)
Unemployment (%)	-0.156*** (0.008)
Constant	3.432*** (0.074)
Observations	7773
R-squared	0.103

Note: For the sample period 1993–2019, the table reports the results of a bargaining unit-level regression of agreed nominal wage growth on current *quarterly* CPI inflation as well as one-year leads and lags. We furthermore control for the federal unemployment rate at baseline. Robust standard errors are reported in parentheses. Table 3 presents the same regression results using *annual* leads and lags of CPI. Source: Own calculations based on data from WSI Tarifarchiv and the OECD. Standard errors in parentheses.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Appendix 3: Additional Figures

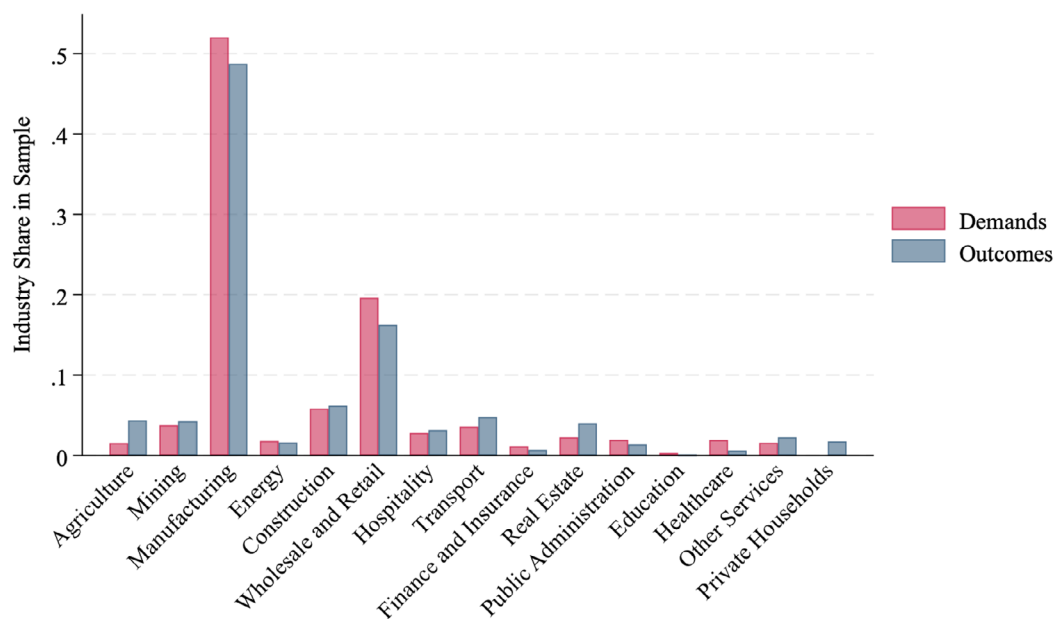


FIGURE C.1 | Sample composition by one-digit industries. The figure illustrates the shares of different one-digit industries in (non-firm) CBN demands and outcomes between 1993 and 2019. Own calculations based on data from WSI Tarifarchiv.

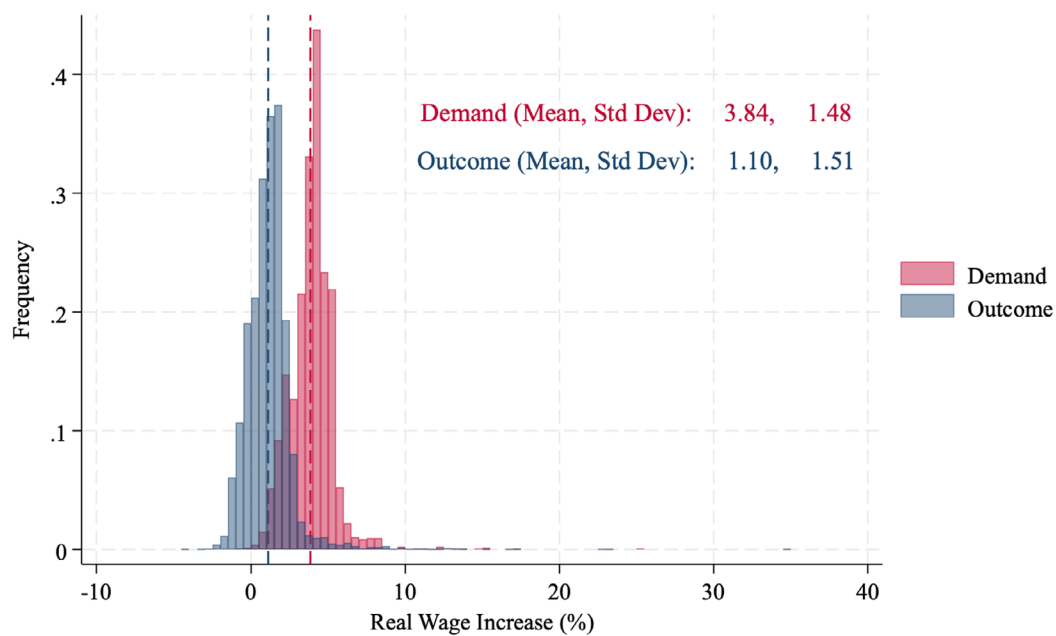


FIGURE C.2 | Histogram of real wage growth in demands and outcomes. The figure shows the histogram of real wage growth contained in demands (red) and outcomes (blue). The x-axis shows the real wage growth in percentage points, while the y-axis shows the frequency of observations. The text annotation shows mean and standard deviation. Figure 1 provides the equivalent illustration in nominal terms. *Source:* Own calculations based on data from *WSI Tarifarchiv*.

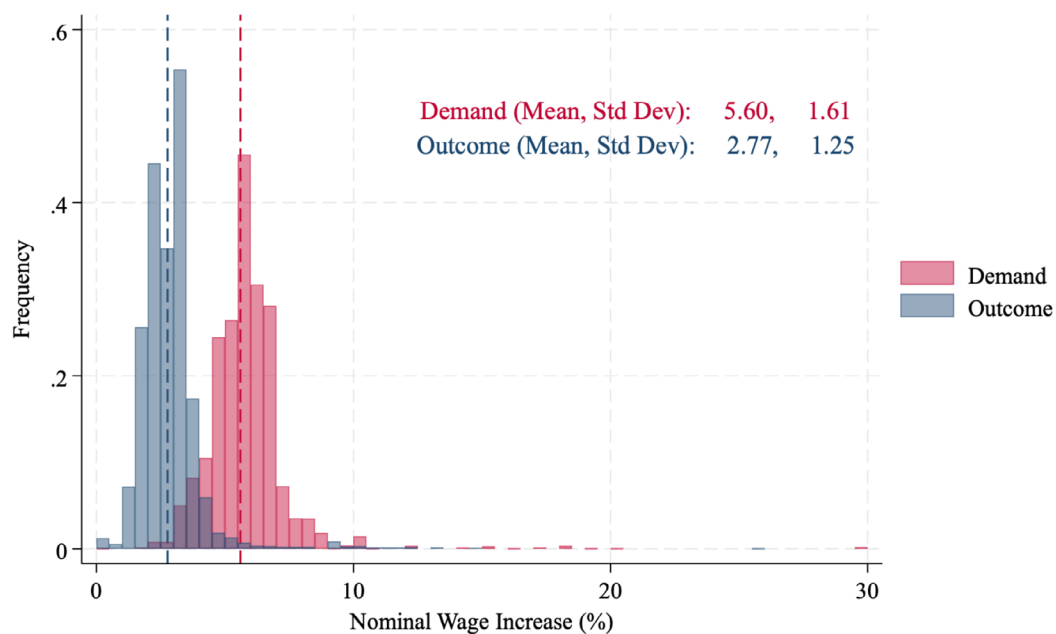


FIGURE C.3 | Histogram of nominal wage growth in matched demands and outcomes. The figure shows the histogram of nominal wage growth contained in matched demands (red) and outcomes (blue). The x-axis shows the nominal wage growth in percentage points, while the y-axis shows the frequency of observations. The text annotation shows mean and standard deviation. Figure 1 provides the equivalent illustration, not restricting to a matched set of demands and outcomes. *Source:* Own calculations based on data from *WSI Tarifarchiv*.

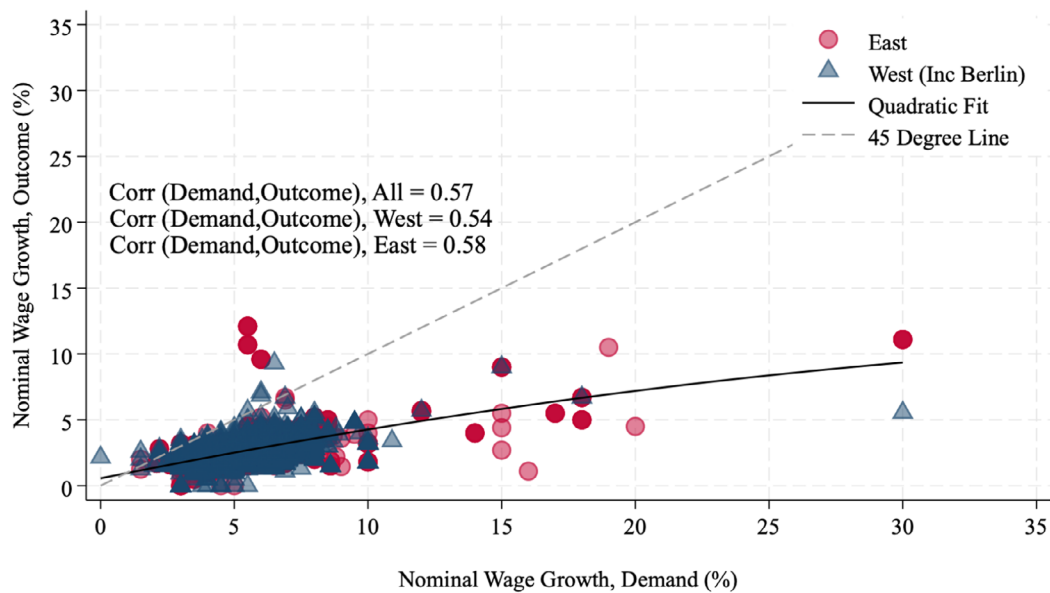


FIGURE C.4 | Nominal wage growth in demands vs. outcomes—matched sample. The figure shows the scatter plot of nominal wage growth demands (x-axis) and outcomes (y-axis) in collective bargaining agreement negotiations. The sample is restricted to instances where we can merge one demand to one outcome by bargaining unit name, federal states covered and year. The dashed line represents the 45-degree line, indicating where demands equal outcomes. The text annotation shows the correlation coefficient for the variables indicated. Figure 2 provides the equivalent illustration for real wage growth. Own calculations based on data from *WSI Tarifarchiv*.

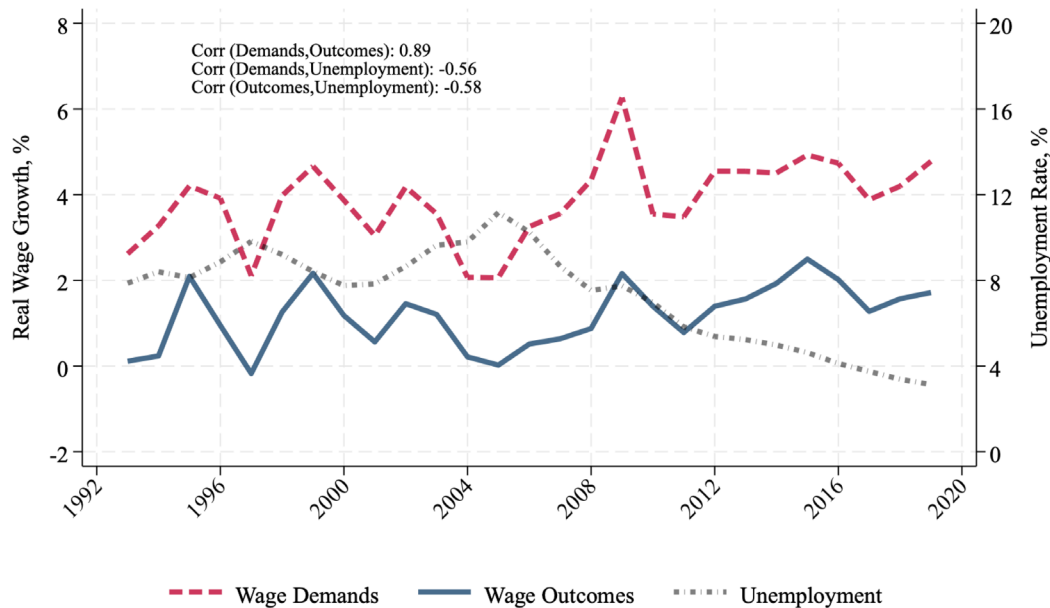


FIGURE C.5 | Time series of real wage demands and outcomes. The figure shows average annual real wage growth stipulated in demands (red dashed line) and negotiated outcomes (blue solid line). This is contrasted with the federal unemployment rate (gray dashed line). Real wage demands and outcomes are derived from nominal wage growth variables which are deflated by annual CPI. The text annotation shows the correlation coefficient for the variables indicated. Figure 3 provides the equivalent illustration for nominal wage growth. *Source:* Own calculations based on data from *WSI Tarifarchiv* and the OECD.

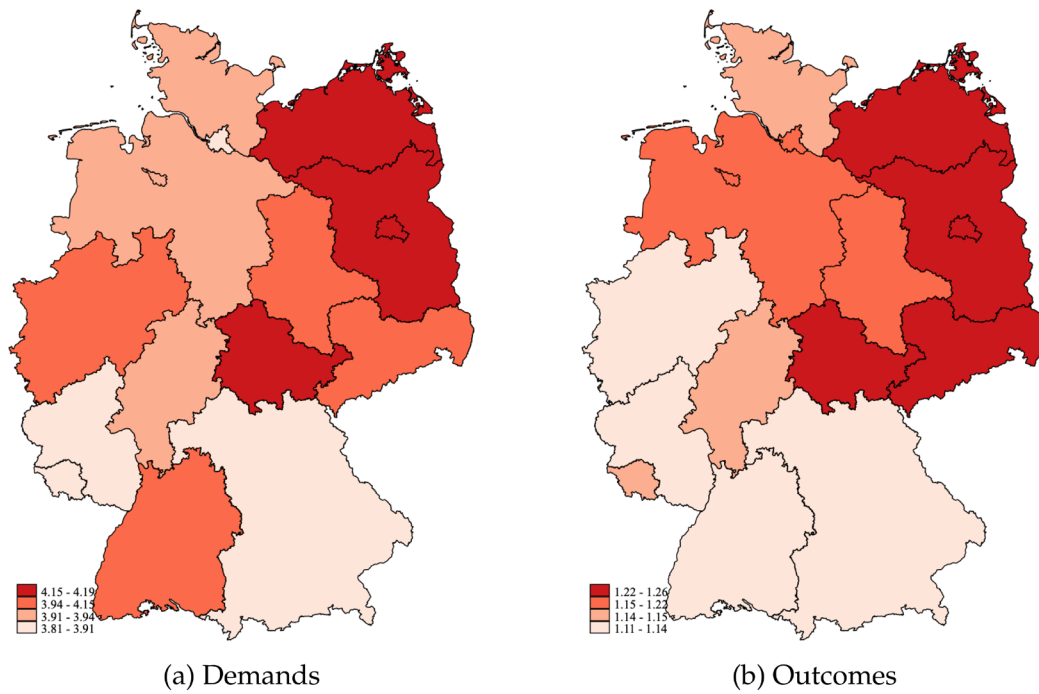


FIGURE C.6 | Real wage growth, %, by federal state—excluding post-reunification adjustment. For the period 2000–2019, the figure shows average real wage growth demanded (a) and achieved (b) in collective bargaining negotiations, split by federal state. We assign bargaining agreements to the federal states covered and then calculate an average across all demands and agreements that apply to a given federal state in a given year. *Source:* Own calculations based on data from *WSI Tarifarchiv*.

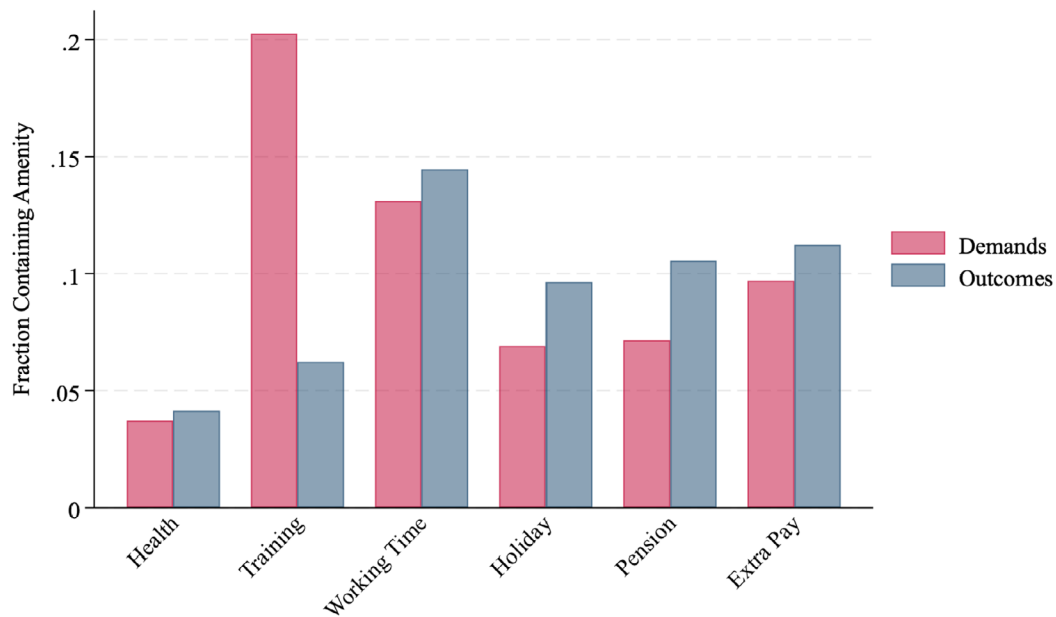


FIGURE C.7 | Non-wage amenity clauses in matched demands and outcomes. The red bars show the fraction of demands made by unions that contained the respective type of non-wage amenity (NWA). The blue bars show the fraction of final CBAs that include provision of the indicated NWAs as an outcome and are defined analogously to the demands. Our sample contains only demands matched to outcomes and vice-versa. The sample period is 1993–2019. A sample of keywords used to construct these dummy variables can be found in Appendix 1. *Source:* Own calculations based on data from *WSI Tarifarchiv*.