

Productivity Growth, Wage Growth and Unions¹

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Abstract

This paper reviews trends in labor productivity, wage growth, unemployment and inequality over the past two decades in nine advanced countries. We focus on the two largest countries in the eurozone, Germany and France, which experienced similar increases in productivity over the past 20 years. In France wages grew in tandem with productivity, inequality declined and unemployment remains stubbornly high. In Germany, in contrast, wages largely stagnated (until 2008), inequality increased (until 2010), but unemployment is now at a record low. This paper argues that the divergent development of Germany and France is in part a consequence of an unprecedented decentralization of the wage-setting process in Germany, from the sectoral level down to the level of the firm or the individual. In contrast, the distinctive characteristics of France's system of industrial relations prevented France from a similar downward adjustment of wages.

1 Introduction

Nearly ten years after the Great Recession, unemployment rates vastly differ across advanced countries. In Germany, unemployment is now at a record low of 4%. In the United Kingdom and the United States, unemployment rates have returned to their low pre-crisis levels, but wage growth has been sluggish. In France, by contrast, unemployment remains stubbornly high at above 9%. The situation looks even more bleak in Italy and Spain where unemployment rates today are 5 and 9 percentage points higher than prior to the Great Recession (OECD, 2018).

In the first part of this paper, we review trends in labor productivity, aggregate wage growth, unemployment and inequality over the past two decades across nine advanced countries. We look at the four largest countries of the eurozone: Germany,

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France, Italy, and Spain; two countries that are generally believed to have very flexible labor markets: the United Kingdom and the United States; and the Scandinavian countries: Sweden, Norway and Denmark.

A comparison between the two largest economies of the eurozone, France and Germany, reveals some striking differences in recent developments. Labor productivity has evolved at a similar pace in the two countries, averaging about 1.5% of growth per year over the last 20 years. However, while mean wages have moved in tandem with productivity in France, mean wages in Germany were barely higher in 2008 than they were in 1995. The differences in wage growth are particularly striking at the bottom of the wage distribution. Whereas wages at the 10th percentile of the wage distribution declined by over 10% between 1995 and 2008 in Germany, they increased by nearly 20% in France. Wages at the 90th percentile, in contrast, rose faster in Germany than in France. Since mean wages grew much faster in France than in Germany despite similar productivity growth in the two countries, unit labor costs (i.e. total wage costs divided by labor productivity, a commonly used measure of competitiveness) improved in Germany relative to France and other countries over the same period. Wage growth has picked up in Germany in the post-recession years, and now closely follows that in France. At the same time, the two countries vastly differ with respect to unemployment: whereas the unemployment rate is at a record low below 4% in Germany, it remains stubbornly high at about 10% in France.

The United States and the United Kingdom experienced healthy productivity growth prior to the Great Recession, averaging about 2% per year between 1995 and 2008. In the post-recession years, however, productivity has largely stagnated in both countries. Whereas wages have decoupled from productivity in the United States and the labor share in GDP declined accordingly, wage growth outpaced productivity growth in the United Kingdom until the Great Recession. The two countries further differ with respect to trends in inequality: whereas in the United States wages grew at the top of the wage distribution (but not at the bottom), inequality remained roughly constant in the United Kingdom.

Spain and Italy have experienced virtually no improvements in living standards (measured as CPI-deflated average total labor compensation per hour worked) neither before nor after the crisis, in large part because of stagnating labor productivity (measured as GDP at fixed prices per hour worked). These two countries are further crippled by exceptionally high unemployment rates.

The three Scandinavian countries are generally characterized by robust productivity growth and relatively low unemployment over the past 20 years, both before and after the Great Recession, and (GDP-deflated) wages have grown at a similar rate as productivity.

Based on these country examinations, it is worth noting that the developments in the nine countries do not all confirm common conceptions that labor markets across the globe are experiencing rising wage inequality (e.g. International Monetary Fund, 2015), and a decoupling of wages from productivity, leading to a decline in the labor share in GDP (Schwellnus et al., 2017). Among the nine countries examined, the labor share consistently declined in only two countries over the last 20 years:

Germany and the United States. In these two countries, wage inequality has increased over the same time period. The increase in inequality was concentrated at the top of the wage distribution (i.e. the 90th percentile rose relative to the median) in the United States, whereas it occurred both at the bottom and the top in Germany (i.e. in addition the median rose relative to the 10th percentile). While wage inequality also increased in Sweden over the same period, it remained roughly constant in Norway and, perhaps surprisingly, the United Kingdom, and declined significantly in France.

In the second part of the paper, we revisit possible explanations for the divergent trends in labor productivity, wage growth, unemployment and inequality observed in the nine countries. We focus on the four largest economies of the eurozone, Germany, France, Italy and Spain, and the role of unions in the wage-setting process. In all four countries, the dominant form of collective bargaining takes place at the sectoral level, where trade unions bargain with employer federations over pay, working hours and working conditions. Union wages typically act as minimum wages, and are often differentiated according to occupation, skill, experience or seniority. Despite these similarities, there are also substantial differences. Most importantly, in Germany, union agreements apply to only those firms that belong to an employer federation. Firms' membership of an employer federation is voluntary. Firms can leave the employer association at their own discretion; they can also decide not to join the employer federation in the first place. Firms in Germany therefore are not forced to recognize union agreements. This is in sharp contrast to the system in France, where the state declares sectoral union agreements as binding for all firms in the sector. Similar extension mechanisms exist de facto in Spain and Italy.

After the fall of the Iron Curtain, the German economy was burdened by the high costs of reunification, and firms had the opportunity to relocate production to Central and Eastern European countries where workers are highly skilled and wages are low. Consequently, it became increasingly costly for firms to recognize sectoral union agreements, and more and more firms opted out. Whereas in 1996, about 80% of workers were covered by union agreements (either at the sectoral or the firm level), by 2016 union coverage rates had fallen to 53%. In firms that opt out of sectoral union agreements, wages are then either set collectively at the level of the firm, through negotiations between the firm and the work council (i.e. workers' representatives in the firm), or through negotiations between the firm and the individual worker. The fall in union coverage rates has thus led to a decentralization of the wage-setting process, from the industry level to the firm or even individual level. This decline also contributed to the low wage growth observed in Germany between 1995 and 2008, in particular at the bottom of the wage distribution.

As more and more firms left sectoral union agreements, trade unions were willing to make concessions unheard of in other countries, in order to prevent a further loss in influence. First, trade unions often agreed to so-called opening clauses that allow firms that are in principle bound by a sectoral union agreement nevertheless to pay wages below the union wage, provided that the work council in the firm agrees. Opening clauses lead to a further decentralization of the wage-setting process, by shifting collective bargaining from the sectoral to the firm level and strengthening the

work council's role in the wage-setting process. Second, trade unions in Germany showed extraordinary wage restraint throughout prolonged periods of time over the past two decades, even in periods of increasing labor productivity and declining unemployment. Opening clauses and the wage restraint shown by unions further contributed to the low wage growth observed in Germany between 1995 and 2008. It is important to emphasize that this process of increased wage decentralization occurred outside the political process, without the intervention of the German government, and has not been met with substantial resistance by trade unions or workers.

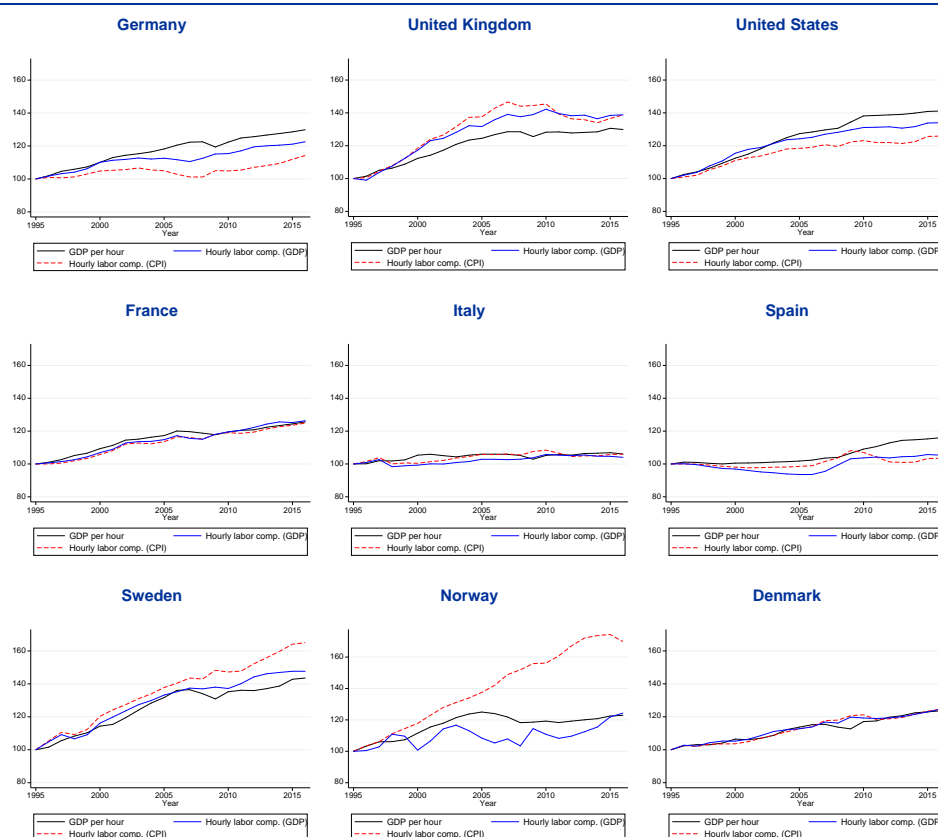
Following the Great Recession, the decline in union coverage in Germany has slowed down. With unemployment rates at a record low in Germany, trade unions have also become more aggressive in their wage demands. In consequence, wage growth has started to pick up, and now evolves at a similar pace as in France. At the same time, France and Spain have recently moved a step closer to Germany's system of industrial relations, by implementing reforms aimed at shifting collective bargaining from the sectoral to the firm level. These reforms were controversial and have been met with some resistance by both trade unions and workers. Whether they will be successful in improving competitiveness and ultimately in bringing down unemployment in these countries remains to be seen.

2 The Facts

2.1 Trends in Labor Productivity

The key determinant of a worker's wage is her productivity. Economic theory emphasizes that firms will continue to hire workers as long as the gains from hiring an additional worker (i.e. the value of the marginal product of labor) exceed the cost of hiring that worker (i.e. her wage). In a competitive labor market, wages should thus be equal to the value of the marginal product of labor. Even in imperfectly competitive labor markets, sustained increases in real wages, and thus improvements in living standards, are possible only through sustained increases in labor productivity.

Chart 1 shows trends in aggregate labor productivity (measured as real GDP per hour worked) and hourly compensation per worker, from 1995 to 2016 for a selected set of countries, and sourced from the OECD Economic Indicators. The nine countries include the four biggest countries of the eurozone: Germany, France, Italy and Spain; two countries considered to have highly flexible labor markets: the United States and the United Kingdom; and the Scandinavian countries: Sweden, Norway and Denmark. Consider first the evolution of aggregate labor productivity in these countries (the solid black line in the chart). Most of the countries considered experienced robust growth in labor productivity in the first half of the period, between 1995 and 2005, averaging 1.7% per year in Denmark; about 2% in France and Germany; about 2.3% in the United Kingdom and Norway; and about 3% in Sweden and the United States. The exceptions are Italy and Spain, which hardly experienced any increase in labor productivity over this period.

Chart 1**Labor Productivity and Total Hourly Labor Compensation Growth, 1995-2016**

Sources: OECD Economic Indicators.

Notes: The graphs plot GDP per hour worked as a measure of labor productivity (black line) and labor compensation per hour worked, deflated using the Consumer Price Index (red line) and the GDP Price Index (blue line) from 1995 to 2016 in nine selected OECD countries. The GDP Price Index reflects changes in the prices of goods and services produced in the country, while the Consumer Price Index measures the retail prices of a fixed basket of goods and services consumed. GDP per hour worked is defined as GDP at fixed prices (deflated by the GDP Price Index) divided by total hours worked of all persons engaged in production. Labor compensation per hour worked is defined as total labor costs – employers' social security contributions in addition to gross wages and salaries – divided by total hours worked by employees.

The picture is markedly different in the second half of the period, between 2005 and 2016. Labor productivity has nearly stagnated in the United Kingdom after the Great Recession. The United States and Norway likewise experienced hardly any increase in aggregate labor productivity in the post-recession years, and in Sweden, productivity growth has significantly slowed down since the Great Recession. The picture looks somewhat more optimistic in Germany and Denmark where labor productivity growth now is roughly back to its pre-recession trend. In France, labor productivity stagnated between 2005 and 2010 but productivity growth has since then picked up once more, averaging about 1.8% per year. The two Southern European countries, Italy and Spain, have not fared much better in the second half of the period compared to the first. Over the past decade, labor productivity grew by 1% in Italy. The only period during which Spain witnessed considerable growth in labor productivity is the Great Recession years when the unemployment rate shot up to 25% (see Chart 3). The productivity increase (measured here as output per hour worked) is therefore primarily a result of a sharp decline in labor input. The productivity increase further reflects compositional changes in employment, resulting in part from a

particularly sharp decline in employment in the construction sector over this period – a sector with relatively low levels of labor productivity (Bonhomme and Hospido, 2017).

It is beyond the scope of this article to provide a detailed analysis of why labor productivity grew at vastly different rates across countries, and slowed down after the Great Recession in some countries, but not in others. The slow productivity growth in Italy and Spain has been extensively analyzed, and its causes are likely structural (as opposed to cyclical) (e.g. Mora-Saguinetti and Fuentes, 2012; Xifre, 2016; Bugamelli and Lotti, 2018). Possible explanations include a reliance on low-productivity sectors, inefficient regulation that hampers the growth of small and median-sized firms, inefficient public administration, a two-tier labor market in which workers on permanent contracts are reluctant to switch jobs even if they are not well suited for the job, and a rigid labor market more generally. In the United Kingdom and United States, different explanations have been proposed for the sluggish productivity growth following the Great Recession. These include reduced investments and reduced reliance on cheap production inputs imported from China and other emerging markets. The change in the composition of firms is likely to be a further factor: with record-low interest rates, less productive firms that would go bankrupt under higher interest rates stay in business (see Tenreyro, 2018, for the United Kingdom, and Manyika et al., 2017, for the United States). In the United States, the decline in productivity growth in the post-recession years has further been attributed to the slowdown in the growth of sectors that significantly contributed to the robust productivity growth prior to the Great Recession, in particular, information technology, retail and wholesale sectors.

More generally, it is important to emphasize that the aggregate trends in labor productivity depicted in Chart 1 reflect, in part, changes in the industry structure. Both the level and the growth rate of labor productivity tend to be higher in the manufacturing sector than in the tradable and non-tradable service sector (e.g. Wöfl, 2003). All else equal, we would therefore expect low growth in labor productivity in countries, or time periods, that are characterized by large declines in manufacturing. However, a differential decline of the manufacturing sector alone cannot explain why labor productivity growth slowed down following the Great Recession in countries such as the United Kingdom and the United States, but not in Germany. In the United States, the employment share in manufacturing decreased from 23.6% in 1995 to 20.3% in 2008 (when labor productivity grew by nearly 3% per year), then sharply dropped during the Great Recession, after which it stabilized at around 19% (when labor productivity barely increased). A similar pattern is observed in the United Kingdom. In Germany – where the share of workers employed in manufacturing is considerably higher than in the United States (27.3% vs. about 19% in 2016) and the United Kingdom – the employment share in manufacturing continued to decline, in the post-recession years, though at a slower pace.⁵ Yet, unlike in the United Kingdom and the United States, labor productivity in Germany continued to increase.

⁵ International Labour Organization, [ILOSTAT database](#).

2.2 Trends in Wage Growth

Does real wage growth track labor productivity growth? Or did wages “decouple” from productivity?

Chart 1 depicts, in addition to trends in labor productivity (GDP per hour worked, in fixed prices), trends in total hourly labor compensation, sourced from the OECD Economic Indicators. The compensation measure includes non-wage components of compensation, such as employers’ social security contributions, to provide a comprehensive measure of workers’ wages and benefits and employers’ labor costs.⁶ The dashed red line in Chart 1 shows labor compensation deflated by the Consumer Price Index (CPI). The CPI is meant to capture changes in a consumer’s cost of living, and is constructed as the level of retail prices of a fixed basket of goods and services, consumed by a representative consumer, at a specific point in time. The solid blue line depicts labor compensation deflated by the GDP deflator (the same deflator we use to construct the time series on real labor productivity). This index reflects changes in the prices of goods and services produced in the country, and unlike for the CPI, the “basket” for the GDP deflator is allowed to change over time with countries’ production patterns. Differences between the two price indices are likely to mostly reflect changes in terms of trade, i.e. changes in a country’s export prices, relative to changes in its import prices.⁷ For simplicity, we will refer to the CPI and GDP deflated total labor compensation as the consumer and producer wage.

Two countries – Germany and the United States – stand out with a noticeable “decoupling” of wages and labor productivity. Over the past two decades, labor productivity rose by about 30% in Germany, whereas the consumer wage increased by only 18%. Over the same period, labor productivity grew by about 40% in the United States, while the consumer wage rose by only 25%. It is worth pointing out that in both countries this decoupling primarily occurred in the years prior to the Great Recession, between 1995 and 2008. Over this period, German workers essentially saw no improvements in their living standards (measured here as the consumer wage) although labor productivity increased by nearly 1.5% per year. Following the Great Recession, consumer wage growth has picked up, and now traces labor productivity growth closely. In the United States, productivity growth outpaced consumer wage growth by about one third between 1995 and 2008. Since 2010, both labor productivity and the consumer wage have largely stagnated. A second point worth emphasizing is that in both Germany and the United States, the decoupling between labor productivity and wage growth is less pronounced when wages are deflated using the GDP price index rather than the CPI. That is, these two countries were somewhat “unfortunate” with respect to their terms of trade in that import prices increased faster than export prices, limiting improvements in living standards to some extent. Yet, in both the

⁶ In the nine countries considered, total compensation (including non-wage components) grew slightly more than wage compensation (excluding non-wage components) over the period considered.

⁷ See e.g. Pessoa and Van Reenen (2013) for a more detailed discussion.

United States and Germany, the producer wage also grew at a slower rate than labor productivity, implying that the labor share in GDP declined in these two countries.⁸

In the other countries considered in this paper, consumer wage growth either closely tracks productivity growth (in France, Italy, Spain and Denmark) or outpaces productivity growth (in the United Kingdom, Sweden and Norway) over the past two decades. In these countries, the labor share of GDP either remained constant or increased.

In Sweden and Norway, the consumer wage growth relative to labor productivity growth over the past two decades is particularly striking – consumer wages rose by 20% more than real labor productivity in Sweden, and by a whopping 40% more in Norway. Producer wage growth and labor productivity growth on the other hand, track each other much more closely. The labor share in GDP therefore remained roughly constant over the past two decades in these two countries. Norway, in particular, experienced an extraordinary improvement in its terms of trade, allowing its citizens to enjoy large improvements in living standards that exceed those implied by the increases in labor productivity.

Turning to the United Kingdom, from 1995 up to the Great Recession, the country witnessed a strong productivity growth, of about 2.3% per year, and an even stronger wage growth (both consumer and producer wages) of about 3% per year.⁹ Following the Great Recession, between 2010 and 2016, productivity growth and producer wage growth largely stagnated, while consumer wage growth fell by about 4%.

The two Southern European countries considered, Italy and Spain, experienced virtually no improvement in living standards over the past decades, due to nearly non-existent productivity growth.

A closer comparison of France and Germany, the two largest economies in the eurozone, reveals a dramatic difference in the development of competitiveness over the past two decades. Between 1995 and 2016, average labor productivity grew at similar rates in the two countries (except from 2006 to 2007 when labor productivity rose by 3% in Germany but slightly declined in France) – compare the solid blue and green lines in Panel A of Chart 2. Inflation, measured as the Consumer Price Index, also evolved at a similar pace in the two countries (the blue and green dashed lines Panel B of Chart 2). The GDP Price Index (the solid blue and green lines in the chart), in contrast, rose faster in France than in Germany. The two countries further radically differ with respect to aggregate wage growth. In Germany, consumer wages were hardly higher in 2008 than they were in 1995 (the dashed blue line in Panel A). In France, in contrast, consumer wages increased by 18% over the same period (the dashed green line in Panel A). The vast difference in wage growth, despite similar growth rates in productivity, implies that from 1995 to 2008, Germany considerably

⁸ Let X denote GDP in fixed prices, Q the GDP price index, N the number of hours worked, and W the nominal hourly wage. The labor share in GDP can then be defined as WN/QX . The labor share will decline if labor productivity X/N (the black line in Chart 1) grows faster than the producer wage W/Q (the blue line in Chart 1).

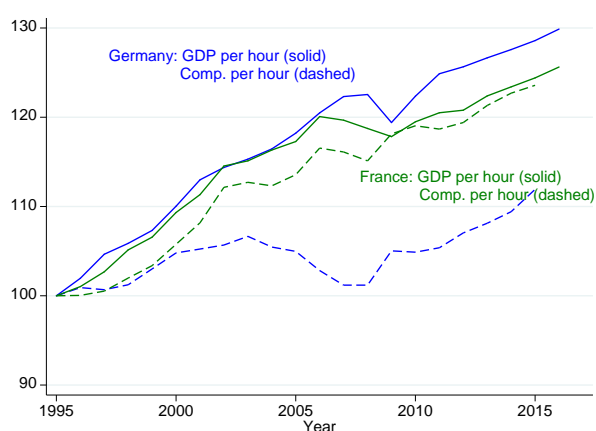
⁹ If a somewhat longer time period starting in 1988 is considered, labor productivity growth and growth in total labor compensation track each other relatively closely (see for example, Pessoa and Van Reenen, 2013, and Machin, 2016).

improved its competitive position relative to France (as shown in Panel C) and other European countries such as Italy and Spain. Whereas unit labor costs (computed as the nominal hourly wage divided by labor productivity), a commonly used measure for a country's competitiveness, rose by 18% in France over this period, they remained roughly constant in Germany.¹⁰ In the post-recession years, wages, productivity and in consequence unit labor costs evolved at a similar pace in the two countries.

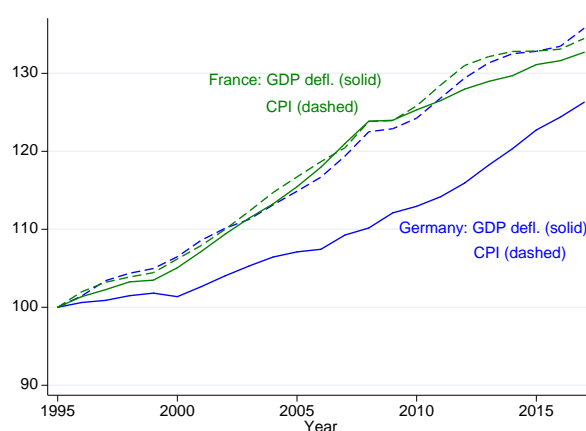
Chart 2

Inflation and Growth in Labor Productivity, Hourly Compensation and Unit Labor Costs in Germany and France, 1995-2016

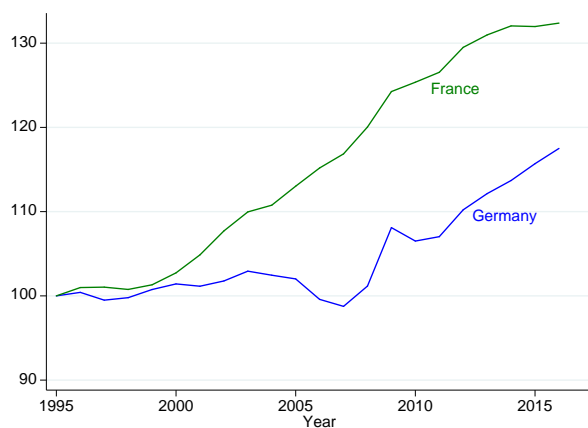
Panel A: Labor Productivity and Consumer Wages



Panel B: GDP Price Index and Consumer Price Index



Panel C: Unit Labor Costs



Sources: OECD Economic Indicators.

Notes: The graphs compare GDP per hour worked as a measure of labor productivity and CPI-deflated total labor compensation per hour worked (Panel A), the Consumer Price Index (CPI) and the GDP Price Index (Panel B), and unit labor costs (Panel C) in Germany (blue lines) and France (green lines) from 1995 to 2016. GDP per hour worked is defined as GDP at fixed prices (deflated by the GDP Price Index) divided by total hours worked of all persons engaged in production. Labor compensation per hour worked is defined as total labor costs – employers' social security contributions in addition to gross wages and salaries – divided by total hours worked of employees. The GDP Price Index reflects changes in the prices of goods and services produced in the country, while the Consumer Price Index measures the retail prices of a fixed basket of goods and services consumed. Unit labor costs are computed as nominal hourly total labor costs multiplied by total hours worked by the employed, divided by GDP (at fixed prices), and measure the average cost of labor per unit of output produced.

¹⁰ Let X denote GDP at fixed prices, W the hourly nominal wage, N the number of hours worked, and Q the GDP price index. Real unit labor costs and the labor share in GDP are then computed as $WN/X=W/(X/N)$ and WN/XQ . It should be noted that differences between Germany and France in changes in the labor share are less pronounced than differences in changes in unit labor costs, since the GDP price index rose faster in France than in Germany.

2.3 Trends in Employment

In a next step, we compare trends in unemployment and employment across the nine countries. Trends in labor productivity (GDP per hour worked) and trends in unemployment are interlinked, and should thus be studied in conjunction. The marginal product of labor is generally thought of as following an inversely u-shaped pattern with respect to labor: at lower levels of production, hiring additional workers will increase the marginal product of labor due to gains from specialization, while at higher levels of production, adding labor will reduce the marginal product. At the same time, the relationship depends on the composition of the population of employed workers. In most countries, the unemployed are on average less skilled than the employed. A decline in unemployment may draw mostly low-skilled workers into work, worsening the skill composition of employed workers, and resulting in a decline in average labor productivity. Finally, supply and demand affect the relationship between labor productivity and unemployment. In a context where unemployment is low and where few workers are available for work, firms need to offer higher wages to attract workers compared to a context where unemployment is high and many workers are looking for jobs.

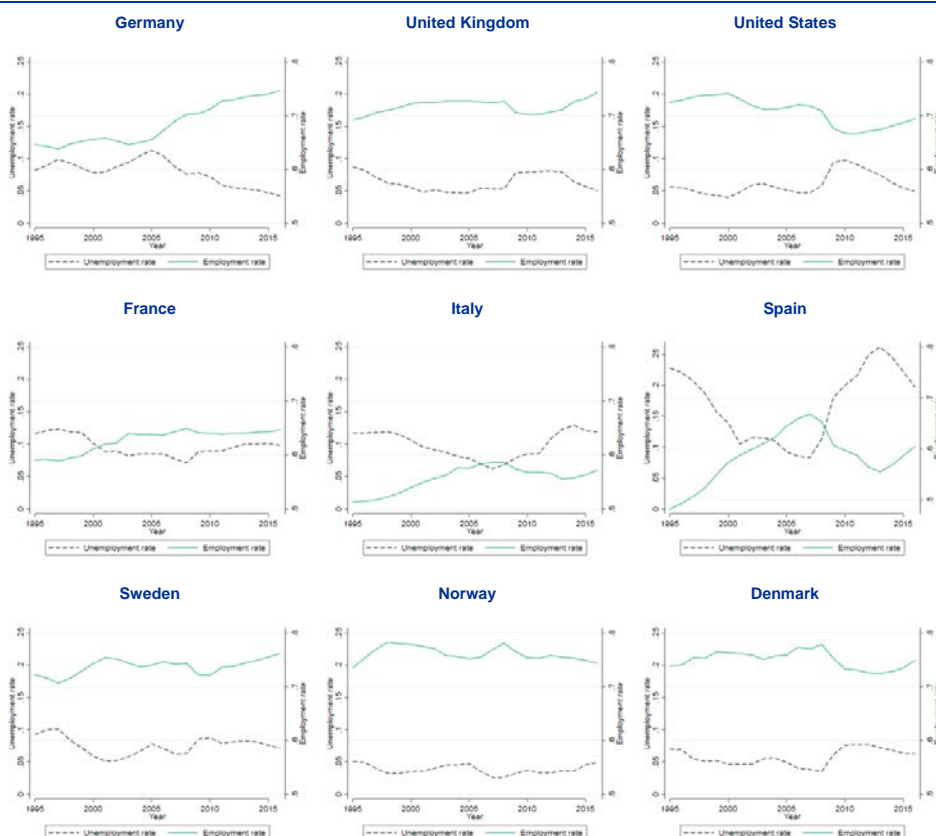
Chart 3 plots the unemployment rate (ILO concept) and the employment rate among those aged 15 or over (including part-time work) over the past two decades in the nine countries considered, sourced from the OECD Economic Indicators.¹¹ The nine countries vastly differ not only with respect to their levels of unemployment, but also with respect to changes in the unemployment and employment rates over time – showing no sign of convergence. The two countries generally considered to have the most flexible labor markets – the United Kingdom and the United States – show, by international comparison, low unemployment rates of around 5% in the years preceding the Great Recession. In both countries, unemployment rates sharply rose during the Great Recession by 3 to 5 percentage points, but have since then converted back to the low levels seen before the Great Recession. Employment rates show a mirror image. Thus, in the United States and the United Kingdom, the stagnation in labor productivity and wages in the post-recession years went hand-in-hand with a decline in unemployment and an increase in employment.

Germany, in contrast, saw persistently high levels of unemployment throughout the mid-1990s and early 2000s, with a peak of 11% in 2005. Since 2005, however, the unemployment rate has continuously declined, and the employment rate has continuously increased, even during the Great Recession. In 2016, unemployment was at a record low level of 4%, a level not seen since the early 1980s. Employment rates were likewise at a record high, about 5 percentage points higher than in the United States, despite the fact that employment rates in the United States exceeded those in Germany by nearly 10 percentage points 20 years ago. Thus, during the post-recession years, Germany saw the best of both worlds: increasing labor productivity and wages, and declining unemployment. It should be noted, however,

¹¹ Employed people are those aged 15 or over who report that they have worked in gainful employment for at least one hour in the previous week or who had a job but were absent from work during the reference week.

that much of the rise in employment reflects increases in part-time work rather than full-time work (Burda, 2016; Carillo-Tudela et al., 2018).¹² In addition, the German labor market success came at the cost of increased inequality, as we will discuss in the next section.

Chart 3
Unemployment and Employment Rates, 1995-2016



Sources: OECD Economic Indicators.
Notes: The graphs plot the unemployment and employment rate between 1995 and 2016 in nine selected OECD countries. The unemployment rate is based on the ILO concept and computed as the number of unemployed people as a percentage of the labor force. The employment rate is the ratio of the employed to the working age population, aged 15 to 64. Employed people are those aged 15 or over who report that they have worked in gainful employment for at least one hour in the previous week or who had a job but were absent from work during the reference week.

Germany's experience sharply contrasts with that of France, Italy and Spain, the other large countries of the eurozone. Even though unemployment in France was not much affected by the Great Recession, it was persistently high at about 9 to 10% throughout the past two decades. The employment rate remained largely flat at 65% between 2004 and 2016 – whereas it increased from about 65% to about 75% in Germany over this period.

¹² Tax-favored part-time jobs in the form of so-called mini and midi jobs increased from around 12% of employees covered by social security at the end of the 1990s to 20% in 2010 (Galassi, 2018). Atypical employment in Germany, defined as employees with fixed-term contracts, the marginally employed, temporary workers and excluding the part-time employed, also increased slightly from around 6% in 1995 to 8% of all employment in 2015 (German Council of Economic Experts, 2018).

Italy and Spain have fared even worse. In both countries, unemployment steadily declined between 1995 and up until the start of the Great Recession – from about 11% to 6% in Italy and from about 22% to 8% in Spain. During the Great Recession, however, it sharply increased to 13% in Italy and 25% in Spain. Although unemployment has started to come down in recent years, it remains much higher than in the years prior to the Great Recession. Among the nine countries considered, Italy and Spain further show the lowest employment rate throughout the past two decades. That is, Italy and Spain are not only crippled by low growth in labor productivity and wages, but also by high and persistent levels of unemployment.

The Scandinavian countries are generally characterized not only by robust productivity and wage growth, but also by relatively high employment rates, above 70% throughout the past two decades – considerably above the employment rates observed in France, Italy and Spain, and of similar magnitude as those observed (today) in Germany, the United Kingdom and the United States. Unemployment is lowest in Norway – at about 5%, and has been persistently low throughout the past two decades, including during the Great Recession. Unemployment has been somewhat higher in Sweden and Denmark, in particular during and after the recession.

2.4 Trends in Inequality

Sluggish mean wage growth, observed in Italy and Spain throughout the past two decades, in Germany from the mid-1990s until the Great Recession, and in the United Kingdom and the United States following the Great Recession, takes on an added significance if it is coupled with increased wage inequality. Chart 4 plots CPI-deflated wage growth at three different points of the wage distribution – the 10th percentile, the median, and the 90th percentile – for Sweden and for five countries for which the authors had access to microdata: Germany (using a 10% random sample of social security records from the Employment History dataset of the Institute of Employment Research (IAB)), France (Labor Force Survey), the United Kingdom (Labor Force Survey), the United States (Current Population Survey), and Norway (Employer-Employee Register). Data for Sweden is obtained from Statistics Sweden. With the exception of Sweden, the analysis is restricted to full-time workers aged 20 to 60.¹³

¹³ The wage measure used in Chart 4 differs from the measure of hourly labor compensation used in Chart 1 in that it does not include non-wage components such as employers' social security contributions. In the case of France, the wage measure further excludes employees' social security contributions. Further, the analysis is restricted to full-time workers. In the case of Germany, the sample is restricted to workers covered by the social security system and thus excludes the self-employed and civil servants. Similarly, the sample for Norway excludes the self-employed.

Chart 4

Evolution of the 10th, 50th, and 90th Percentiles of the Wage Distribution



Sources: Germany: 10% random sample from the IAB Employment History, daily real wage, observations refer to June 30 of each year. France: French Labor Force Survey, hourly real wage net of employees' social security contributions. United Kingdom: UK Labor Force Survey, hourly real wage. US: Current Population Survey, hourly real wage. Norway: Employer-Employee register made available by Statistics Norway, weekly real wages. Sweden: Swedish Wage Survey provided by Statistics Sweden, monthly real wage adjusted to reflect full-time work.

Notes: The graphs plot CPI-deflated wage growth at the 10th percentile, the median, and the 90th percentile of the wage distribution in six selected countries. With the exception of Sweden, the analysis is restricted to full-time workers aged between 20 and 60, and the wage measure (unlike in Chart 1) does not include non-wage components such as employers' social security contributions. For Germany, the sample is additionally restricted to employees covered by the social security system. Similarly, for Norway, the sample excludes the self-employed. We thank Wenchao Jin, research economist at the Institute for Fiscal Studies, and Anna Okatenko, research economist at the Centre for Research and Analysis of Migration, for providing the figures for the United Kingdom and France, respectively.

In Germany, wage inequality increased dramatically from 1995 to 2007, the wake of the Great Recession. Over this period, the real median wage barely showed any improvements. Real wages at the bottom of the distribution declined by 13%, whereas real wages at the top of the distribution increased by 10%. This trend of increasing inequality has come to a halt following the Great Recession: since 2010, workers across all parts of the wage distribution have seen considerable improvements in their

wage, and wages at the bottom of the wage distribution have increased slightly more than wages at the middle and the top of the wage distribution.

Germany's experience sharply contrasts with that of France where wage inequality has declined over the past two decades. In France, real wages at the 10th percentile of the wage distribution rose by more than 20% between 1995 and 2014, compared to 12% at the median and 5% at the 90th percentile. Differences in the evolution of wages between France and Germany are therefore particularly striking at the bottom of the wage distribution. Between 1995 and 2007, wages at the 10th percentile declined by 13% in Germany but rose by 18% in France. At the 90th percentile, in contrast, wage growth was more pronounced in Germany than in France (17% versus 5% between 1995 and 2014). These trends resulted in one of the most egalitarian distributions of wages observed in France since the 1960s.

Like Germany, the United States experienced an increase in wage inequality over the past two decades. Unlike in Germany, however, the increase was concentrated at the top of the wage distribution: while the median and the 10th percentile in the United States have evolved at a similar pace, the 90th percentile has pulled away from the median, in particular in the last decade. Inequality also rose in Sweden, in particular at the top of the wage distribution. Although the United Kingdom is often thought of as a country where inequality has increased – inequality indeed rose throughout the 1980s (Gosling et al., 2000) – since 1995, wages at the bottom, middle and top of the wage distribution have actually evolved at similar rates. Following the Great Recession, workers at all parts of the wage distribution suffered similar declines in their real wage. Despite labor productivity growth of only about 20%, Norway experienced strong real wage growth of at least 50% at all parts of the wage distribution – in large part because of its favorable development in terms of trade.

In Italy, wage inequality has remained roughly constant between 1993 and 2006 (Naticchioni and Ricci, 2009; Jappelli and Pistaferri, 2010). In Spain, wage inequality is strongly counter-cyclical, but does not follow a clear long-run trend (Bonhomme and Hospido, 2016). In Denmark wage inequality has been relatively stable over the last decades, and is among the lowest among OECD countries (Danish Ministry for Economic Affairs and the Interior, 2017).

It is important to emphasize that the changes in wage inequality depicted in Chart 4 are likely to, in part, reflect changes in the characteristics of employed workers over time. If, for example, the share of college graduates among employed workers increases over time, and if wages of college graduates are generally more dispersed than wages of high school graduates, inequality will rise. Similarly, it may predominantly be low-skilled workers who exit the labor market in times of high unemployment – which will tend to increase wages at the bottom of the wage distribution. Conversely, the record low levels of unemployment in Germany may have drawn predominantly low-skilled workers into work – which would tend to lower wages at the bottom of the wage distribution.

3 The Role of Unions in the Wage-Setting Process

Which factors could possibly explain the divergent trends in labor productivity and wage growth, unemployment and inequality observed across the nine countries considered? Clearly, several factors are at play, and a detailed analysis of all possible mechanisms is beyond the scope of this article. In the United States, the decline of the labor share has recently been linked to competitive forces that favor “superstar” firms (Autor et al., 2017; Kehrig and Vincent, 2017; De Loecker and Eeckhout, 2017). Conversely, the sluggish productivity growth in the United Kingdom and the United States in the post-recession years has partly been attributed to low-productivity firms that stay in business because of record-low interest rates, but would have gone bankrupt in times of higher interest rates (e.g. Tenreyro, 2018).

The increase in inequality at the top of the wage distribution observed in the United States and in Germany over the past two decades is typically attributed to skill- or routine-biased technological change that favors high-skilled workers who perform predominantly abstract tasks that are complementary to IT capital (Autor et al., 2003; Autor et al., 2008; Dustmann et al., 2009). Dustmann et al. (2009) further argue that the rise in inequality at the bottom of the wage distribution in Germany is largely accounted for by institutional changes, in particular a decline in unionization.¹⁴ In Italy and Spain, low growth in productivity and wages, coupled with high and persistent unemployment, likely has its roots in structural factors, including a reliance on low-productivity sectors, inefficient regulation, inefficient public administration, a rigid, two-tier labor market, and – in the case of Spain – the boom and bust of the construction sector.

The focus of this paper is on the differential roles that unions play in the wage-setting process in different countries. Specifically, we argue that Germany’s particular system of industrial relations allowed for an unprecedented decentralization of the wage-setting process: while in the early 1990s, wages were predominantly set collectively at the sectoral level, they are now increasingly negotiated at the level of the firm or the individual worker. Coupled with the extraordinary wage restraint that unions showed over long periods throughout the past two decades, this decentralization can in part account for the low mean wage growth relative to productivity growth and the increase in inequality at the bottom of the wage distribution observed in Germany between the mid-1990s up until the Great Recession. In France, by contrast, the system of industrial relations prevented a similar decentralization of the wage-setting process. In consequence, wages grew much faster in France than in Germany, in particular at the bottom of the wage distribution, although labor productivity rose at a similar rate in the two countries. Germany’s improvement in competitiveness (i.e. smaller increases in unit labor costs) relative to France is therefore, at least in part, rooted in the differences in the systems of industrial relations in these two countries. Germany’s increase in competitiveness may also have contributed to its “employment miracle” that brought down unemployment to record

¹⁴ Goldschmidt and Schmieider (2017) focus on outsourcing as an additional driver of the rise in wage inequality in Germany.

low levels. The Hartz reforms, implemented between 2002 and 2005, may be another factor.¹⁵

We first briefly highlight key differences in the system of industrial relations across countries, focusing on Germany and France. In a next step, we build the case that the decentralization of the wage-setting process in Germany contributed to the low average wage increases and rising wage inequality, and hence ultimately its improved competitive position.

3.1 The Institutional Framework and the Dwindling Importance of Unions

Collective bargaining over pay, working hours and working conditions between trade unions on the one hand, and employers on the other hand, may operate at various levels. In the United States and the United Kingdom, collective bargaining typically takes place (if it takes place at all) at the firm level; that is, the trade union negotiates with a single employer. In Continental Europe and the majority of the Scandinavian countries, in contrast, collective bargaining predominantly takes place at the sectoral level; that is, trade unions negotiate with a number of employers, represented by employer federations.

3.1.1 Firm-Level Bargaining in the United States and the United Kingdom

In the United States and the United Kingdom, unions may seek recognition by the firm if they have substantial membership rates. Often, employers “voluntarily” recognize the union once it seeks recognition by the firm, to avoid a legal process. In case the firm resists union recognition, a ballot of employees typically takes place. If enough employees vote in favor of the union, the employer is forced to recognize the union. Once the employer recognizes the union, union wages usually apply to both union members and non-union members. In general, union coverage rates in the United States rates are low; less than 15% of workers were covered by union agreements in 2000 and 2016. In the United Kingdom, union coverage rates declined from about 36% to 26% over the same period (see Table 1).

¹⁵ For example, Fahr and Sunde (2009), Klinger and Rothe (2012), and Krebs and Scheffel (2013) conclude that the Hartz reforms increased employment. Price (2017), and Bradley and Kügler (2018) find small positive employment effects, and show that the reforms led to a more pronounced decrease in wages.

Table 1
Trends in Union Coverage

	early 2000s	2014-2016
Countries with predominantly firm-level bargaining		
United States	14	11.5
United Kingdom	36.4	26.3
Countries with predominantly sector-level bargaining		
Germany (OECD)	67.8	56
West Germany (IAB Firm Panel)	70.2	58.3
East Germany (IAB Firm Panel)	56.7	47.8
France	97.7	98.5
Italy	80	80
Spain	82.9	73.1
Sweden	94	90
Norway	70.5	67
Denmark	85	84

Sources: OECD Economic Indicators, and IAB Firm Panel for West and East Germany.
Notes: The table reports the percentage of workers covered by a collective union agreement in selected OECD countries. It is based on the ratio of employees covered by collective agreements, divided by all wage earners with right to bargaining. For Germany, the table additionally shows the percentage of workers covered by either a sectoral or a firm level agreement based on data from the IAB Firm Panel. Values for the United States, the United Kingdom, Germany, Italy, and Spain refer to 2000 and 2016; values for France and Norway refer to 2002 and 2014; and values for Sweden and Denmark refer to 2000 and 2015.

Both countries have a statutory minimum wage. In the United Kingdom, a nation-wide minimum wage was introduced in 1998. At this time, the ratio between the minimum and median wage was 0.41, and it since increased to 0.45 in 2005 and to 0.49 in 2015. The nation-wide minimum wage in the United States is somewhat less generous with a ratio between minimum and median wage of about 0.37 throughout the past two decades – although some states, and recently cities, have implemented much higher minimum wages. The introduction of the minimum wage in 1998 in the United Kingdom and its subsequent increases may be one reason why wage inequality has stopped increasing since the mid to late 1990s (see e.g. Butcher et al., 2012).

Table 2
Minimum Wage Relative to Median Wages

	1995	2005	2015
United States	0.35	0.32	0.36
United Kingdom	-	0.45	0.49
Germany	-	-	0.47
France	0.52	0.60	0.61
Spain	0.38	0.37	0.37

Sources: OECD statistics.
Notes: The table reports the ratio between the minimum wage and the median wage of full-time employees for the five out of nine countries which have a statutory minimum wage in place. The statutory minimum wage was introduced in the United Kingdom in 1998 and in Germany in 2015.

3.1.2 Germany: Decentralization of the Wage-Setting Process

The German system of industrial relations is not rooted in legislation, nor is it governed by a formal political process. Instead, it is laid out in contracts and mutual agreements

between the three main labor market parties: trade unions, employer federations, and work councils (i.e. workers' representatives in the firm).

The core aspect of the German system is the principle of autonomy of wage bargaining, outlined in the constitution. It implies that negotiations between trade unions and employer federations take place without the government directly exerting influence. As such, union agreements apply only to those firms that belong to an employer federation and that thus recognize union agreements. In firms that recognize unions, union wages apply to all employees, regardless of whether or not they are union members. Firm membership of an employer federation is voluntary. Firms can leave the employer federation at their own discretion; they can also decide not to enter the employer federation in the first place. After opting out of a collective agreement, firms must honor the collective agreement for incumbent employees for a specified period of time, or until a new agreement has been reached at the firm level in cooperation with the work council. At the same time, these firms are immediately free to set wages for new hires (see for example, Carlin and Soskice, 2008, Bispinck et al., 2010, Brändle et al., 2011).

Thus, a key difference between the German system of industrial relations, those in Anglo-Saxon countries, and in particular in a number of countries in Continental Europe, is that the German firms cannot be forced to recognize union agreements. The fact that German firms can vote with their feet and opt out of union agreements altogether fosters negotiations that are usually far more consensus-based and less confrontational than in other countries.¹⁶ Data on strikes are quite revealing in this respect: between 1991 and 1999, Germany lost an average of eleven days of work each year per 1000 employees, and only five days between 2000 and 2007. This contrasts sharply with strike days in France (73 and 103 days over the same time periods) and Italy (158 and 93 days). Even in the United States the number of days of work lost due to strikes per 1000 employees was higher than in Germany (40 and 32 days), despite much lower union coverage rates (Lesch, 2009).

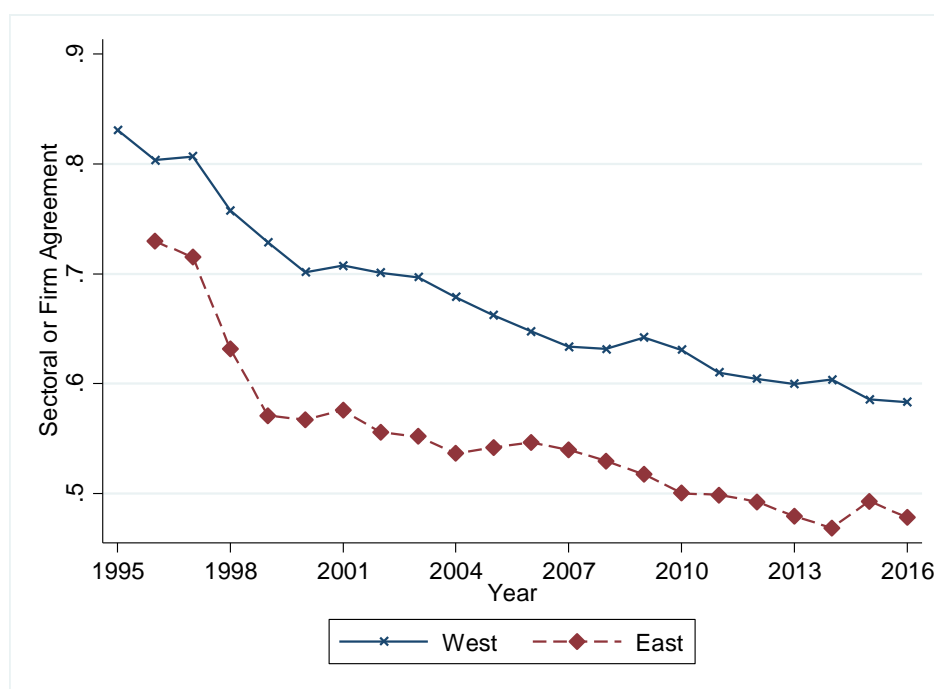
The fact that firms cannot be forced to pay high union wages begs the question why nevertheless many firms choose to do so. One important reason is for firms to save the transaction costs of negotiating wages with each worker individually. Adhering to sector-wide union wages also makes the wage-setting process transparent. Sector-wide union wages may also be considered as “fair payment” or a “social norm”, and it may be costly for firms to deviate from this norm.

Since the early to mid-1990s, Germany has witnessed an unprecedented decline in union coverage rates. In 1995 (the first year for which reliable data are available from the Institute of Employment Research (IAB) Firm Panel): 83% of West German employees were covered by union agreements, 72.2% by a sectoral level agreement and 10.9% by a firm level agreement (see Chart 5). By 2016, union coverage rates in West Germany had fallen to 58%. This decline is primarily driven by firms opting out of sectoral agreements (rather than by larger growth rates of firms that do not recognize

¹⁶ The consensus-based nature of negotiations is further encouraged by the representation of employees in boards, another component of the institutional framework that is unique to Germany.

union agreements). Chart 5 further highlights that union coverage rates are higher in West than in East Germany, and that in both West and East Germany, the decline in union coverage rates was particularly dramatic in the mid-1990s and the early-2000s when aggregate wage growth was particularly sluggish, and wages at the bottom of the distribution dropped sharply. The decline has slowed down substantially since 2010 – after which aggregate wage growth, including at the bottom of the wage distribution, has picked up once more.

Chart 5
Union Coverage Rates in West and East Germany, 1995-2016



Sources: IAB Firm Panel.
Notes: The chart depicts the share of workers covered by either a sectoral or a firm level agreement in West and East Germany.

The fall in union coverage rates has led to a dramatic decentralization of the wage-setting process in Germany, from the industry level to the level of the firm, or even to the individual worker. In addition, wages have become increasingly dependent on the specific economic conditions of the firm through so-called “opening” or “hardship” clauses, even among those firms that continue to recognize sector-wide union agreements. As part of the overall sectoral agreement, firms may use opening clauses to deviate downward from collectively agreed industry-wide standards. Trade unions often agreed to such deviations in order to prevent further firm opt-outs of the sectoral agreements. At first, these opening clauses focused on hours of work, but later they also affected wages. Initially, the opening clauses were only temporary to avoid bankruptcy, but later they were also implemented to ensure competitiveness in more general terms. A firm that makes use of an opening clause negotiates the details concerning pay and working time agreements with the work council. As a consequence, the role of work councils in industrial relations has become increasingly important over the past two decades.

In terms of prevalence, Brändle et al. (2011, Figure 1) report that among industry-wide collective contracts in German manufacturing, less than 5% involved opening clauses for wages in 1995, but this had risen to about 60% by 2004. According to a survey of work councils in 2005, about 75% of firms bound by a sectoral agreements used opening clauses (Bispinck 2007; Bispinck et al., 2010). Take-up rates are somewhat smaller according to the IAB Firm Panel. In 2011, 41% of firms covered by a sectoral agreement were aware of the existence of an opening clause in their industry. Of those, 71% made use of the opening clause. Deviations from the industry-wide agreements in terms of working time are the most common form of opening clause used, but deviations in terms of pay are also widespread.

To summarize, since the mid-1990s Germany has undergone a dramatic decentralization of the wage-setting process, from the sectoral level to the level of the firm or the individual worker. This development is due to firms opting out of sectoral agreements on the one hand, and due to deviations from industry-wide standards through opening clauses among firms bound by sectoral agreements on the other hand. As we argue in Section 3.2 below, this decentralization contributed to low average real wage growth relative to productivity growth, and hence an improvement in competitiveness (measured as a relative reduction in unit labor costs) throughout the mid-1990s and mid-2000s. It is important to emphasize that this process happened without the intervention of the German government. It was only in 2014 that the German government deviated from the principle of autonomy of wage bargaining and introduced a statutory minimum wage that applies to all workers and firms in the economy. The minimum wage was initially set at €8.50 per hour and came into effect in January 2015. The ratio between minimum wage and median wage of 0.46 is substantially higher than that in the United States (0.36), similar to that in the United Kingdom, and substantially lower than the one in place in France (0.61), as shown in Table 2. Recent research suggests that the introduction of the minimum wage in Germany boosted wages in particular at the lower end of the wage distribution (e.g. Ahlfeldt et al., 2018).

3.1.3 Industry-Level Bargaining in Southern European Countries

As in Germany, collective bargaining in France predominantly takes place at the sectoral level. The two countries, however, differ in one key aspect: whereas in Germany negotiations between trade unions and employer federations take place without the government directly exerting influence, the government plays an active role in the wage-setting process in France. Most importantly, the French government declares virtually all collective agreements negotiated between trade unions and employer federations to be binding. That is, union agreements apply to all firms in the sector, regardless of whether a firm belongs to an employer federation. This sharply contrasts with the system in Germany where the recognition of union agreements is left to the firm's discretion. In consequence, union coverage rates in France have been close to 100% throughout the past 15 years (see Table 1). In addition, the French government sets a wage floor through a statutory minimum wage that is binding for (nearly) all workers and firms in the economy. The minimum wage is set a high level by international standards: the ratio between the minimum wage and the median was

0.56 in 2000 and 0.61 in 2015 – substantially higher than in the United Kingdom, Germany and in particular the United States. Increases in the national minimum wage follow an explicit legal rule, are indexed to the change in the inflation rate as well as to the increase in the blue-collar base wage rate, and allow for an additional governmental discretionary increase (Fougère et al., 2016). Minimum wage increases directly affect the wages of about 10-15% of workers, and sectoral agreements build on changes in the minimum wage, which cannot be undercut. The high minimum wage, as well as the extension of union agreements to all firms and workers in the economy, may well have contributed to the strong wage growth throughout the past two decades, in particular at the bottom of the wage distribution (see Chart 4). At the same time, the high minimum wage and the extension of union agreements to all firms may be in part responsible for the persistently high unemployment (see Chart 3).

It is interesting to note that recently, the systems of industrial relations in Germany and France are somewhat converging. Germany introduced, for the first time in its history, a statutory minimum wage in 2015 – albeit not at a level as high as that in France. The Hollande government made a first step in introducing German-style opening clauses in France in 2014, and in 2018, president Macron went a step further with his reforms aimed at liberalizing the labor market. We discuss this point in more detail in Section 4.

In contrast to France, the governments in Italy and Spain do not explicitly intervene in the wage-setting process by extending agreements negotiated between trade unions and employer federations to all firms in the sector. Yet, de facto, union agreements apply in most sectors to all firms. Union wages are considered as “fair payment” and in Italy, workers can go to court to sue firms for higher pay. Whereas in Italy union agreements are binding only for workers on permanent contracts, they apply to all workers, including those on fixed term contracts, in Spain. In both countries, union coverage rates have remained roughly constant at about 80% since 2000 (see Table 1). Spain, but not Italy, further has a statutory minimum wage. The ratio between the Spanish minimum and median wage of 0.37 is, however, low by international standards.

Similar to France, Spain introduced some reforms in 2012 (“Law 3/2012”) that partially decentralized the wage-setting process, from the sectoral to the firm level. To better reflect the economic situation of the firm, firms were given more flexibility to modify sectoral union agreements. The reform further introduced the possibility for firms to opt out of a collective agreement, provided that workers’ representatives agree. Italy, in contrast, has not yet made a major attempt of shifting the wage-setting process from the sectoral to the firm level. Instead, Italy’s reform efforts – in particular “Monti’s Legge Fornero” introduced in 2012 and “Renzi’s Jobs Act” introduced in 2014 – have so far primarily concentrated on making it easier for firms to hire workers on fixed-term contracts (which leads indirectly to a decentralization of the wage-setting process as union agreements only apply to workers on permanent contracts). In addition, the reforms eased some of the restrictions regulating the firing of workers on permanent contracts.

3.1.4 Collective Bargaining in Nordic Countries

Union coverage rates in the Nordic countries are high, with around 70% of the work force covered in Norway, around 80% in Denmark and around 90% in Sweden (see Table 1). Even though the government does not explicitly declare union agreements to be binding for all firms in the sector, the social norm is such that most firms in the sector recognize the agreements. Generally, employer federations and unions closely cooperate and take the general economic situation into account when negotiating. The outcome of the sectoral wage-setting is a minimum wage increase that can be supplemented by further wage increases negotiated at the firm level, which would take into account a firm's profitability and productivity (e.g. Norges Offentlige Utredninger, 2013, for Norway).

3.2 The Case of Germany: Wage Decentralization and Aggregate Wage Growth

As emphasized in the previous section, Germany – as the only one of the nine countries considered – witnessed an unprecedented shift of wage-setting from the sectoral level to the level of the firm or the individual worker. This decentralization occurred because more and more firms opted out of union agreements, and because trade unions agreed to so-called opening clauses that allow firms that recognize a union nevertheless to pay wages below the industry-wide standards. In this section, we argue that this decentralization of the wage-setting process was an important factor behind Germany's low growth of wages relative to productivity, and the strong wage declines at the bottom of the wage distribution throughout the mid-1990s until the mid-2000s.

3.2.1 The Role of De-Unionization

There is ample evidence that unions raise wages, in particular for workers at the bottom of the wage distribution. In Germany, workers who are employed in firms that recognize a sectoral-wide agreement earn 25% higher wages on average than workers who are employed in firms that recognize neither a sectoral nor a firm level agreement, according to the IAB Firm Panel linked to social security records (LIAB), for 1995 to 2012.¹⁷ This large wage differential reflects in part differential characteristics of the two types of firms: firms that are bound by sectoral union agreements are on average larger and operate more often in high-wage industries such as manufacturing and mining than firms bound by neither a sectoral nor a firm-level agreement. However, even conditional on firm size and industry, workers in unionized firms earn up to 15% higher wages than in non-unionized firms.

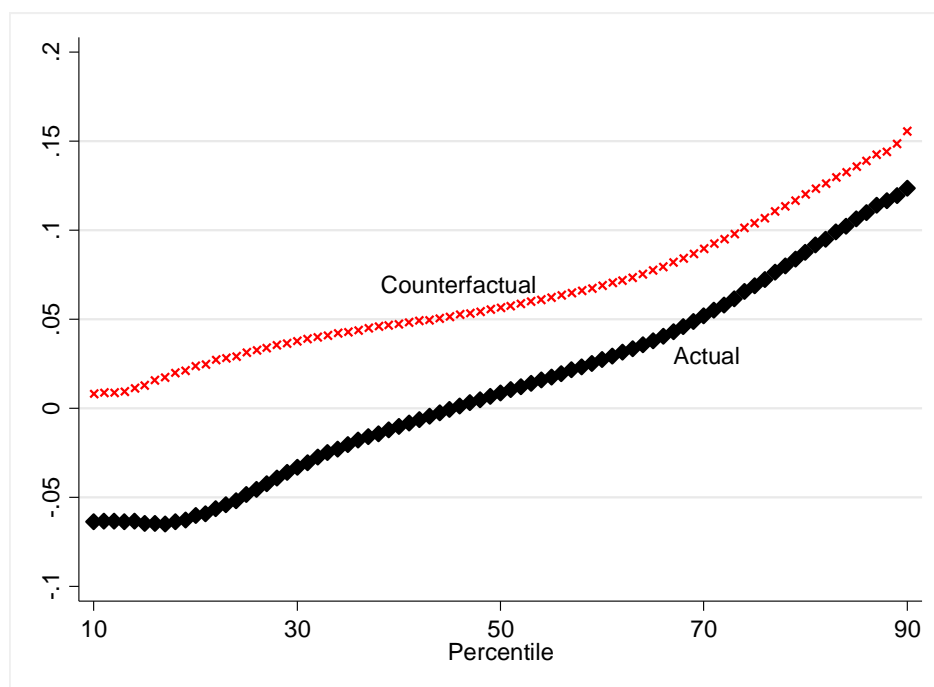
It is therefore natural to ask: to what extent did the decline in union coverage rates contribute to the low wage growth observed in Germany, and hence its improvements

¹⁷ The sample is restricted to full-time workers aged 20 to 60.

in international competitiveness, in particular in the years prior to the Great Recession? We investigate this question in Chart 6. The chart first depicts the observed wage growth between 1995 and 2012 along the wage distribution (the black line). The chart highlights the sharp increase in inequality observed in Germany over this period. Whereas wages at the bottom of the wage distribution declined by more than 5% (the 10th percentile), wages at the top (the 90th percentile) rose by about 12%. The chart further plots the “counterfactual” wage growth that would have occurred if unionization rates had remained at their 1995 levels. To construct this counterfactual wage growth, we use the reweighting approach developed in DiNardo et al. (1996). The chart indicates that wages would have been between 3 and 6% higher in 2012 if unionization rates had not declined. The chart further highlights that counterfactual wage growth exceeds actual wage growth throughout the entire wage distribution, but the difference is particularly pronounced at the lower end. These results should be interpreted with some caution, as they are based on strong assumptions, including the assumption that the wage differential between unionized and non-unionized firms does not change for different levels of unionization. Nevertheless, the findings indicate that declining union coverage rates at least in part account for the low wage growth observed in Germany. It should further be noted that the specific timing of the de-unionization process roughly coincides with the timing of real wage stagnation: the decline in union coverage rates has slowed down since 2010 (see Chart 5), after which wage growth, in particular at the bottom of the wage distribution, finally picked up again (see Charts 1 and 4).

Chart 6

Actual and Counterfactual Real Wage Growth Along the Wage Distribution, 1996-2012



Sources: IAB Firm Panel merged to social security records from the IAB Employment History data file (LIAB; social security records refer to June 30 of each year).

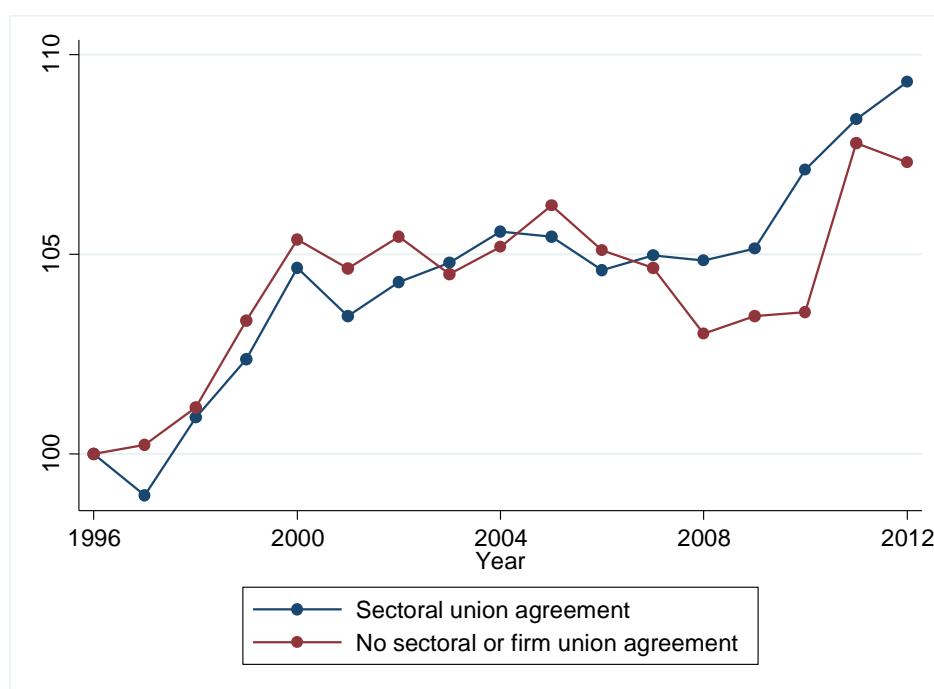
Notes: The chart plots actual and counterfactual real wage growth (CPI deflated) between 1996 and 2012 along the wage distribution. Counterfactual wage growth refers to growth that would have occurred if union coverage rates had remained at their 1996 levels. This counterfactual wage growth is calculated using the reweighting approach by DiNardo et al. (1996). The sample is restricted to full-time workers aged between 20 and 60.

3.2.2 Aggregate Wage Growth in Firms Bound by Sector-Wide Agreements

While the opting out of firms from sectoral agreements played an important role in explaining Germany's low wage growth, it only tells part of the story. Chart 7 highlights that wages barely grew more among firms that are bound by a sectoral agreement compared to firms that are neither bound by a sectoral nor by a firm level agreement between 1996 and 2012.

Chart 7

Real Wage Growth in Firms Bound by Sectoral Union Agreements and in Firms Not Bound by Union Agreements



Sources: IAB Firm Panel merged to social security records from the IAB Employment History data file (LIAB; social security records refer to June 30).

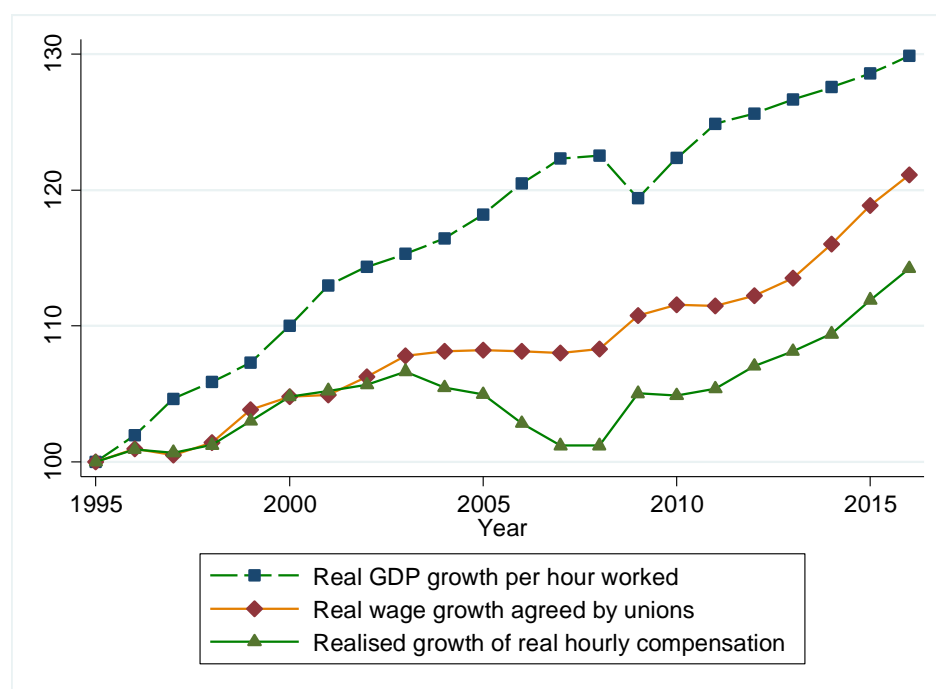
Notes: The chart plots (CPI-deflated) wage growth in firms that are bound by a sectoral union agreement and in firms that are neither bound by a sectoral nor by a firm union agreement.

The similar wage growth in firms bound and not bound by sectoral agreements may in part be because the characteristics of firms not subject to a sectoral agreement have improved over time, as more and more firms opted out of such agreements. Another reason for the low aggregate wage growth in firms covered by sectoral agreements are opening clauses, which allow firms to deviate downward from collectively agreed industry-wide standards. As discussed above, opening clauses have led to a shift of the wage-setting process from the sectoral to the firm level even among firms that recognize sectoral agreements, and have significantly strengthened the role of work councils in industrial relations.

A second reason for the low wage growth that occurred also in firms not bound by sectoral agreements is the extraordinary wage restraint shown by trade unions over the past two decades. Chart 8 plots wage increases accepted by trade unions

(cumulative and CPI-deflated, obtained from the Tarifarchiv of the Wirtschafts- und Sozialwissenschaftliches Institut (WSI), the red line) in conjunction with realized total hourly wage compensation (also CPI-deflated, as in Chart 1, the green line) over the past two decades. The chart first highlights that real wage increases agreed upon by trade unions and employer federations exceed realized wage increases throughout the entire period. One reason for this is that union agreements apply only in firms that choose to recognize them; and a second reason is that even firms that recognize union agreements often have some room for downward adjustments from the sectoral agreements, through opening clauses. Chart 8 further shows that in eleven out of 21 years, trade unions accepted zero real wage increases, as nominal wage increases were just equal to the (CPI) inflation rate. The period between 2003 and 2008 is particularly remarkable. Over this five-year period, wages negotiated between trade unions and employer federations did not increase in real terms – even though productivity increased by six percentage points and unemployment declined from 9.6% to 7.5%. Realized real wages substantially declined, and Germany improved its competitive position – measured as smaller increases in unit labor costs (see Chart 4) – relative to France (and a number of other European countries) primarily over this period. The first significant increase in real union wages occurred from 2008 to 2009 when the Great Recession hit and labor productivity declined. However, this large increase was once again followed by three years of no or small increases. After 2010, when unemployment rates were at a record low, union wage demands have picked up considerably.

Chart 8
 Union Real Wage Growth and Realized Real Wage Growth in Germany, 1995-2016



Sources: Cumulative wage increases agreed between trade unions and employer federations: WSI Tarifarchiv. Realized hourly wage growth and GDP per hour worked: OECD Economic Indicators.
 Notes: The chart depicts GDP per hour worked as a measure for labor productivity (as in Chart 1; the blue squares), and realized growth in total labor compensation per hour (CPI deflated, as in Chart 1; the green triangles). The chart further shows the cumulative wage increases (CPI deflated) agreed between trade unions and employer federations in sectoral union agreements (the red diamonds).

3.2.3 Which Factors Contributed to Wage Decentralization in Germany?

Why did German firms opt out of sectoral union agreements, starting in the early to mid-1990s? Several factors are at play. The German unification provided an unprecedented challenge to the German economy and was in part responsible for Germany's dismal performance throughout the 1990s and early 2000s. Moreover, after the fall of the Iron Curtain, moving production to Central and Eastern European countries – where workers were highly skilled and wages were low – became a possibility for German firms. It thus became increasingly costly for firms to pay high union wages.¹⁸ Finally, East German firms were considerably less likely to recognize union agreements than West German firms, which may have made it more socially acceptable also for West German firms to opt out of union agreements.

Why did trade unions agree to opening clauses and wage increases much below productivity increases, even in times of falling unemployment? In part, unions explicitly agreed to accept lower wages to foster employment growth in the 1990s in response to the new economic realities. But at least as important, Germany's system of industrial relations allows firms to walk away from unfavorable union agreements and indeed, more and more firms did just that. German trade unions were willing to make concessions unheard of in other countries in order not to become further marginalized. At the same time, wage moderation practiced by trade unions is not only an expression of weaker bargaining power, but also reflects unions' objective to contribute to the creation of jobs by restraining wage growth (Wolf, 2000).

Why did the same shifting of the wage-setting process from the sectoral to the firm or individual level not happen in other countries? On the one hand, Germany was considerably more affected by the fall of the Iron Curtain than other countries, not only because of the reunification, but also by being geographically close to the former communist countries in Central and Eastern Europe. Equally important, the German system of industrial relations proved to be much more flexible than many would have expected, by allowing for more decentralized wage-setting without the intervention of the German government. Moreover, the decentralization process – and ultimately the low aggregate wage growth and the increase in inequality – was relatively consensus-based, and it was, at least to some extent, supported by trade unions and works councils. In contrast, the industrial systems of France, Italy and Spain do simply not allow for the same inherent options of flexible adaptation as the German system. There is considerably less scope for a similar decentralization of wage-setting within their systems of industrial relations where union agreements are, either explicitly by the government or de facto by courts, enforced upon most firms in the economy. In these countries, greater wage flexibility will require government interventions – a process that has proved to be politically costly, and that has been met with considerable resistance in the population.

¹⁸ In line with this argument, Burda (2000) predicted that the EU-accession of Central and Eastern European countries would lead to a reduction of labor market rigidities in the old EU member countries (including Germany).

4 Conclusion and Discussion

The economies of Continental European, Nordic and Anglo-Saxon countries have evolved differently over the past two decades.

The two Anglo-Saxon countries considered in this chapter, the United States and the United Kingdom, experienced labor productivity and wage growth throughout the mid-1990s until the mid-2000s. In these countries, unemployment sharply increased during the Great Recession. Both productivity and wages have largely stagnated since the Great Recession, but employment is now back to pre-crisis levels. The three Scandinavian countries, Norway, Sweden and Denmark, are generally characterized by robust productivity and wage growth, as well as relatively low unemployment throughout the past two decades. Neither Italy nor Spain experienced significant improvements in living standards over the past two decades, in large part due to stagnating labor productivity. These two countries are also crippled by exceptionally high unemployment rates that even today are considerably higher than just before the Great Recession.

A comparison between France and Germany reveals some striking differences in recent developments. Labor productivity evolved at a similar pace in the two countries over the past two decades, increasing by about 1.5% per year. Yet, wages evolved very differently. Whereas consumer wages increased roughly in tandem with productivity in France, in Germany consumer wages were no higher in 2008 than they were in 1995. Differences in wage growth between the two countries are particularly striking at the bottom of the wage distribution. In consequence, Germany substantially improved its competitive position – measured as smaller increases in unit labor costs – relative to France (and many other countries) over this period. At the same time, unemployment is now at a record low in Germany (4%) whereas it remains stubbornly high, at about 10%, in France.

We have argued in this paper that the low wage growth in Germany – and hence its increased competitiveness – is in part a consequence of an unprecedented decentralization of the wage-setting process that started in Germany in the mid-1990s, from the sectoral level down to the level of the firm or even the individual worker. This process was made possible by Germany's unique system of industrial relations that allows firms to opt out of sectoral union agreements, and to set wages collectively at the level of the firm instead, through negotiations between the firm and the work council, or individually, through negotiations between the firm and the individual worker.

Starting in the early 1990s, firms have increasingly made use of this option, and union coverage rates dropped from above 80% in 1996 to 58% in 2016. In order to prevent further loss of influence, trade unions responded by showing exceptional wage restraint even in times of robust productivity growth and declining unemployment. Trade unions also agreed to so-called opening clauses that allow a firm bound by sectoral agreements nevertheless to pay wages below the sector-wide union wage, provided that the firm's work council agrees.

Is the increased decentralization of the wage-setting process also responsible for Germany's "employment miracle", and the current record-low unemployment rates? Or are the so-called "Hartz Reforms" of the labor market, implemented by the government under Gerhard Schröder in 2003, responsible, as argued by some economists (see for instance, Rinne and Zimmermann, 2012, 2013)? Among other things, the Hartz reforms allowed for new types of employment with lower tax and insurance payments (mini and midi jobs), and reduced and limited unemployment benefits, in particular of the long-term unemployed. While it is impossible to answer this question conclusively, one possibility is that both increased wage flexibility and the Hartz Reforms contributed to the rise in employment rates. On the one hand, high wage floors may prevent firms from creating low wage jobs; on the other hand, workers have few incentives to accept low wage jobs when unemployment benefits are relatively high.

More generally, it is questionable that it is in a country's interest to improve its competitiveness through low wage growth over a long time period, especially if it goes hand in hand with increasing wage inequality. However, if trade unions play an important role in the wage-setting process and generally demand high wages, some wage restraint over a limited time period may be a beneficial response to economic shocks or to more long-term unfavorable economic developments. The process of wage restraint occurred in Germany in a remarkably consensus-based way, given that it kept real wages for the average German worker almost constant over a fifteen-year period. However, the periods of low wage growth seem to have come to an end, as wage growth has significantly improved in the post-recession years, in particular at the bottom end of the wage distribution. At the same time, the decline in union coverage rates has considerably slowed down, and after years of extraordinary wage restraint, wage demands of trade unions have picked up once more. Moreover, for the first time in its history, the German government deviated from the principle of autonomy of wage bargaining by introducing a statutory minimum wage that applies to all workers and firms in the economy, with only a few exceptions. The introduction of the minimum wage helped to bring up wages, in particular at the bottom of the wage distribution (e.g. Ahlfeldt et al., 2018).

At the same time, there is some evidence that the systems of industrial relations in France and Spain are moving a step closer to that of Germany. The past two French governments have implemented labor market reforms that aimed at shifting the determination of wages and working conditions away from the sector, to the level of the firm. In 2014, Hollande approved a reform that essentially introduced German-style opening clauses that allow firms to pay wages below the sector-wide union wage, in case the firm faces economic difficulties. In 2018, Macron went a step further, by allowing firms to bargain with trade unions or works councils over wages and working conditions regardless of the firm's economic situation, provided that worker representatives in the firm agree. In addition, in the case of a downturn, firms are now able to strike a "rapid, simplified" deal with the trade union or works council to

change wages or working hours to reflect the new market conditions better. Both Hollande and Macron further eased restrictions to fire workers.¹⁹

Spain even went a step further than France. The “Law 3/2012”, implemented in 2012, partially decentralized the wage-setting process, away from the sectoral to the firm level, by giving firms more opportunities to modify sectoral union agreements to reflect the economic situation of the firm better (Gobierno de España, 2012; Banco de España, 2013). The reform further introduced the possibility for firms to opt out of collective agreements, provided that workers’ representatives agree, moving a step closer to Germany’s system of industrial relations. In contrast, Italy’s reform efforts – in particular “Monti’s Legge Fornero” introduced in 2012 and “Renzi’s Jobs Act” of 2014 – have so far primarily concentrated on making it easier for firms to hire workers on fixed-term contracts – which may indirectly lead to a partial decentralization of the wage-setting process, as union agreements only apply to workers on permanent contracts. In addition, these reforms somewhat eased firing restrictions for workers on permanent contracts.

Despite some convergence, these recent developments underscore some crucial differences to Germany: Germany’s system of industrial relations proved to be much more flexible than that of France, Spain and Italy. The decentralization of the wage-setting process, from the sectoral level to the level of the firm and the individual worker, was possible without the intervention of the German government and without any legislative changes. In France, Spain and Italy, in contrast, governments have been required to step in and make legislative changes (possibly) to set a similar wage decentralization process into motion. At least as importantly, in Germany, the shift from sectoral to firm and individual wage negotiations was relatively consensus-based and was generally supported by trade unions and works councils. In France, Spain and Italy, by contrast, the reforms were controversial and have been met with some resistance by trade unions and the population at large. Whether the reforms will be successful in improving competitiveness and ultimately in reducing unemployment in these countries remains to be seen.

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¹⁹ For example, this is reported in the French press by Sud Ouest, “[Les 10 lois que l'on retiendra du quinquennat de François Hollande](#)”, published online on May 12 2017; by France Culture, “[Réforme du code du travail: comprendre ce qui va changer](#)”, published online on September 21 2017; and by L'Express, “[Code du travail: pourquoi votre rémunération pourrait baisser](#)”, published online on September 2 2017.

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