Estimating the Wage Premium to Supervision for Middle Managers in different contexts: evidence from Germany and the UK

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Abstract

The analysis of wage distribution has attracted scholars from different disciplines seeking to develop theoretical arguments to explain the upward or downward trend. In particular, how middle management wage premium changes in different contexts is a relatively neglected area of research. This study argues that wage distribution changes in different contexts, representing different forms of capitalism. To shed light on this, we considered the size and the shape of the wage premium to supervision paid to middle managers in Germany and the UK. We find evidence of two forms of context: middle managers are paid differently for the same task according to the economy where they work; of this amount, about half of the difference is related to the context. We frame the analysis within the literature on Variety of Capitalism.

Keywords: Wage Premium; Context, Germany, Middle Managers, UK, Variety of Capitalism.

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INTRODUCTION

Recent studies on remuneration have concentrated on two groups: blue-collar or menial workers (Dencker and Fang 2016) and CEOs or senior managers (Deng and Gao 2013). Research has thus neglected an important aspect, namely skilled middle managers, who constitute a significant portion of the labour force (McNulty and Brewster 2019). From their viewpoint, some countries are more attractive than others, which affects the overall performance of economies (Özçelik et al. 2019). Self-reported earnings satisfaction is one area that has been explored, albeit modestly. In addition to this work on subjective perceptions, there is a need for objective measures to explain the different remuneration of middle managers in different contexts. That is, there is a lack of research into why they find one labour market more appealing than another. This particular focus is relevant, in that studies on different countries and industries show the great importance of supervisors in shaping the perceptions of employees and organisational functioning (Škerlavaj *et al.* 2016).

This article refers to the varieties-of-capitalism (VoC) literature on the economics of industry organisation and firms' strategic choices in countries with different forms of capitalism (Hall and Soskice 2001). This literature suggests that economic and cultural diversity generates dissimilarity in employment relations. Following Hall and Soskice (2001), this article studies Germany and the United Kingdom as examples of alternative models of capitalism and industrial relations: the former a Coordinated Market Economy (CME), the latter a Liberal Market Economy (LME). Both labour markets, for different reasons, have been quite attractive to immigrant workers. Both have been open to waves of skilled migrants, acknowledging their value for firms, regions and the nation. The proportion of highly educated immigrants is higher in the UK than in most of other European countries (Bryson and White 2019).

This article contributes to the literature in three ways. It estimates the distributions of middle managers' wages in the two countries and analyses how each shapes remuneration and the wage premium to supervision (WPS). Middle managers are defined as employees with responsibility for organising and monitoring others. Statistics on Income and Living Conditions (EU-SILC 2009) data are used to estimate the wage distribution that would prevail if, other parameters equal, no employees were middle managers and compare it with the actual distribution, thus computing the WPS in the UK and Germany at all deciles. The portion of this difference that depends on the national context is measured, generalising the approach of Blau and Kahn (1996), which studies international differences between the average of the wage distributions, to the entire wage distribution. This is a good method for estimating the effect of context on the WPS. This article is the first to follow the data analysis process set out below, taking a new approach to analysing remuneration practices through the VoC lens.

The second contribution is new empirical evidence, extending and further supporting VoC theory. This study develops a new tool to examine the impact of context on employees' remuneration and sets out new evidence supporting Hall and Soskice (2001), suggesting that context does indeed shape the wage distribution, over and above individual, job and firm characteristics; specifically, this analysis contributes to the VoC debate on governance in Germany and Britain.

The third contribution is to the literature on the middle management wage premium. A number of scholars have looked into the sources of international differences in CEO compensation, including those between Germany and the UK (Bruce et al. 2005; Fernandes et al. 2013; Gomez-Mejia et al. 2005), but this is the first empirical evaluation of WPS differences. The questions raised may be relevant for two reasons. First, the resources going to supervisory employees represent an opportunity cost where they could be allocated to

more profitable activities (perhaps higher wages to other workers). Secondly, it contends that the WPS is determined by context variables such as labour market institutions, corporate structure, and firm organisation (Acemoglu and Newman 2002).

The rest of the article is structured as follows. The next section discusses the literature and describes the data and the procedures. The concluding section sets out the key findings, with discussion of theoretical and policy implications.

EXISTING RESEARCH

Middle Managers and Wage Premium

Studies of employee remuneration have mainly taken two directions. On the one hand, the literature has identified individual characteristics shaping the distribution of wages (DiNardo *et al.* 1996). On the other, researchers have focussed on the determinants of employee compensation, especially at the top of the hierarchy (Jensen and Murphy 1990). In this, the role of the WPS is a relatively neglected area of research. This is an important gap to fill because, as theory suggests, the WPS is likely to affect wage inequality (Rueda and Pontusson 2000). The remuneration of CEOs and top executives is known to be less strongly affected by the context (Greckhamer 2016), as their compensation is dominated by the variable component, whereas the WPS represents a fixed component. As noted, the WPS also represents an opportunity cost where resources could be directed to more productive uses (Bernhardt 1995). And most importantly, it is driven by the broader economic context (Acemoglu and Newman 2002).

Varieties of Capitalism: Germany vs. the UK

Research on employment relations has used the VoC framework to understand patterns of HRM practices in different labour markets (Kalleberg 2009). The original approach of Hall and Soskice (2001) distinguishes two archetypes of market economy, CME and LME, the

essential difference being the mode of coordination that employers favour. Germany and Britain are used as examples of alternative types of capitalism or contexts (Baccaro and Howell 2017). The UK is an LME, stock-market-centred and characterised by shareholder-favouring firms and institutions. Hall and Soskice (2001) describe a fluid UK labour market where workers can be dismissed at short notice, enabling British firms to sustain losses of market share. In this type of economy, firms coordinate their activities primarily via hierarchies and competitive market arrangements, and equilibrium outcomes are given by supply and demand conditions in competitive markets. The UK financial services industry has been dominant for decades, making market competition more important than regulation and emphasising financial incentives for managers. Overall, British companies are more concerned with profits and dividends than their German counterparts (Vitols 2001).

Germany is characterised instead by employee-favouring firms within a corporate culture in which employees perceive the company as a community, with the State assigned to regulate and promote cooperation. Germany operates as a CME, characterised by the role of the government as producer of public goods; it has retained its traditional manufacturing sector while developing a context that supports science-based start-ups. The labour market is marked by strong social insurance and protection, commitment to standards and stable employment relations. Firms depend on non-market relationships for coordination with other actors, and the context accordingly fosters long-term employment strategies, making lay-offs a less common response to declining returns. These features are evident in the Hartz reforms and the representation of German workers on corporate supervisory boards (Eichhorst and Marx 2011) .

More recently, scholars have analysed the tendency to convergence among different types of economy. The liberalisation thesis posits that the two archetypes are not actually that dissimilar, with LME features penetrating the CMEs (Streeck 2008). Recent work on VoC

and worker mobility similarly points to these changes. Even so, Hall and Thelen (2009) tend to agree that significant differences between LMEs and CMEs persist. Recent research suggests that for studies of employment relations the VoC framework is still valid (Hassard and Morris 2018; Hertwig et al. 2018; Kornelakis 2014). For example, Farndale et al. (2017) offer evidence of substantial variation in HRM practices between the two types of economy. Compensation practices, such as the wage premium, are regulated at national level (Festing 2012), with very considerable differences. In line with this literature, the present article acknowledges that wage bargaining and compensation practices are severely constrained at institutional level, with fundamental differences rooted in the different nature of LMEs and CMEs. Discretion in compensation and inequality are expected to be less pronounced where there is more regulation (Thelen 2001), as in CMEs; greater discretion is expected in LMEs. Research shows that the UK labour market is associated with de-regulation and polarisation (Sisson et al. 2018).

It is here hypothesised that British middle managers should earn a higher WPS than their German counterparts, and that the difference increases with rank. Similarly, the distribution of the WPS should be considerably more unequal in the UK (Rueda and Pontusson 2000). The following hypotheses are accordingly formulated:

Hypothesis 1a: The WPS helps shape the distribution of wages in Germany and the UK.

Hypothesis 1b: The middle management WPS is higher in the UK than in Germany.

Hypothesis 1c: The difference between the WPS in UK and Germany increases as wage levels rise.

The question, then, is how much of the difference in WPS is due to the different contexts. Compensation practices are shaped by corporate governance mechanisms, which are path- and context-dependent (Brewster et al. 2008). The VoC framework posits that firms are embedded in their national environment and emphasises institutional interaction effects.

Thus, firms' decisions and practices are affected by multiple factors. Different types of economy display diverse patterns of HRM in response to local institutional factors (Jackson and Deeg 2008). Firms are affected by the local norms and culture, to which their practices must conform (Farndale et al. 2017). This suggests the following hypothesis:

Hypothesis 2a: The context helps shape the WPS.

A second body of literature, rooted in labour economics, helps in understanding the features of the British and German labour markets and addresses the research question proposed here. Specifically, the evidence shows that the British labour market is now characterised by marked polarisation between high-paid and lower-paid positions (Goos and Manning 2007; Salverda and Mayhew 2009), which digitisation has accentuated. Germany is considered the archetype of a continental "European" welfare state, where employment protections are stronger. Brücker et al. (2014) find that there is less wage flexibility in Germany than in Britain. Specifically, the WPS is determined by contextual factors, such as labour market institutions, corporate structure, and firm organisation (Acemoglu and Newman 2002).

This article draws on these two lines of research, one maintaining that LMEs and CMEs produce country-specific norms and corporate behaviour, the second shedding light on the specific characteristics of each type:

Hypothesis 2b: The effect of the context on the WPS to middle managers is greater in Germany than in the UK for low wages.

METHODS

Dataset

The question of empirical measurement of the WPS has been relatively unexplored, owing chiefly to the absence of datasets permitting international comparisons and the lack of a common European definition of middle manager (Baker and Holmström 1995).

The present study exploits the cross-sectional EU-SILC dataset for 2009,[1] which is widely used to test predictions derived from socio-economic theories in different economies (Bünning and Pollmann-Schult 2016; Dotti Sani and Scherer 2018; Sánchez-Mira and O'Reilly 2019). The survey uses common questionnaire, guidelines, definitions and procedures for all the EU economies and weights the data to account for unit non-responses and other problems of attrition. The results reported here reflect these weighted data. This study, indeed, is a good example of the advantages the dataset offers, insofar as both the sampling strategy and the definition of middle manager are common to the two countries. In line with the theoretical definition in Leonard (1987), Acemoglu and Newman (2002), and Beaudry and Francois (2010), EU-SILC defines middle manager as an employee with:

> formal responsibility for supervising a group of other employees … directly, at times doing some of the work they supervise … The supervisor or foreman takes charge of, directs the work and controls that it be properly done (EU-SILC, 2009:195).

The survey also provides information on many characteristics of the job (permanent/temporary, full-time/part-time), firm (size, sector of activity), and individual (age, citizenship, gender, education, skills). Several covariates serve to control for omitted-variable bias and self-selection. Despite the large number of variables, fewer than 1% of the observations are lost.

The dependent variable is the (natural) logarithm of monthly gross wages. Table 1 reports preliminary evidence for the three sets of variables. The final sample consisted of 8,588

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[1]EU-SILC provides detailed information on both Germany and the UK, among other countries. The data were collected through interviews, asper the Commission regulation on sampling and tracing rules (No. 1982/2003 of 21 October 2003). For all components the longitudinal data are drawn from a nationally representative probability sample of the resident population in private households. All private households and all persons aged 16 and over within the household are eligible. Representative probability samples have to be achieved both for households, which form the basic units of sampling, data collection and data analysis, and for individuals in the target population. The sampling frame and methods of sample selection must ensure that every individual and household is assigned a known, non-zero probability of selection. The cross-sectional sample sizes were calculated so as to achieve a sample of 121,000 households in Europe. The national allocation aims at ensuring a minimum precision level. For a detailed technical account of the sampling process for all the economies surveyed, and for Germany and the UK in particular, see https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions and here https://circabc.europa.eu/sd/a/3249af08-02d3-4f53-bd0d-aaeae0b2663e/KS-RA-10-021-EN-N_web%20(2).pdf.

employees in Germany and 6,609 in the UK. Britain had a higher percentage of middle managers. In Britain middle managers earned an average €3,474.70 a month, other employees €1,920.11. The corresponding figures for Germany were €2,924.85 and €1,627.57.

Please insert Table 1

The data indicate that middle managers are younger than other employees in the UK, older in Germany. They also showed more men in middle management positions in Germany, and smaller differences in education and skills between middle managers and other employees. Finally, most individuals were employed in firms with more than 10 employees. By sector, German middle managers were relatively concentrated in manufacturing, mining and electricity, while their sectoral distribution in the UK was more uniform.

The Distribution of Wages in Germany and the UK

The differences between the wages of middle managers and other employees were also evident in the wage distributions in the two economies (Figure 1). These distributions were estimated in a fully nonparametric framework, which allowed for analysis without imposing any shape at the outset; this approach is particularly effective in describing the characteristics of the sample, letting the data speak for themselves.

The wage distribution of middle managers proves to dominate that of other employees, in both economies and at all wage levels. This does not differ greatly from the findings of studies based on average wages: middle managers earn more than other employees, and the difference is greater at higher deciles of the distribution.

Please insert Figure 1

Measuring the National WPS

The differences between the distributions shown in Figure 1 cannot be taken as a measurement of the WPS for middle management. They were constructed using a single characteristic as discriminant, namely "being a middle manager", but these results also capture other characteristics likely to differ between middle managers and other employees, such as skills, gender, education, and sector of activity. Thus the difference between the two distributions in Figure 1 cannot be ascribed solely to the middle manager position, which is the focus of this study.

What is needed is a decomposition method to gauge the effect of the middle managerial position only, keeping other variables constant. A number of methods have been developed to decompose changes or differences in the mean of an outcome variable with many possible independent variables. The most important is probably their extension to distributional parameters other than mean and variance. These techniques are of interest here, as the premium will presumably be different in the two economies and at different quantiles of the earnings distribution for each, depending importantly on the context.

Di Nardo, Fortin and Lemieux (1996) suggest comparing the actual distribution of wages with the distribution that would prevail if, all things being equal, none of the individuals were a middle manager.[2] There are different methods to obtain this distribution. This article adopts Inverse Probability Weighting (IPW), first proposed by Di Nardo, Fortin and Lemiex (1996). The procedure for decomposing changes in the density of wages was a generalisation of Oaxaca's decomposition of changes in means. The decompositions were based on simple counterfactual densities such as "what would the density of wages have been if no employee was managing others, other things equal?" This "counterfactual" density can be determined by a "reweighting" function that estimates the probability of being a manager as a function of all the other characteristics to be kept constant. The difference between the actual and the

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[2]Details of the methodological approach adopted in this article are available in the Appendix.

counterfactual density of wages is exactly the amount that the economy pays simply for being employed as middle manager, defined here as the WPS.

It is worth highlighting some limitations of this approach. The version of the EU-SILC dataset we have adopted is cross-sectional and, therefore, it lacks variation over time, which would be of help in assessing the direction of causality. Another limitation is that the method adopted here is preferable if the aim is to decompose the overall difference in the wage distributions into the explained and unexplained components. This suggests a limitation of the methodology relating to the aggregate nature of the measure of the role of context in the UK and Germany. In other words, even holding the large set of covariates considered constant, if any other relevant variable is missed its effect will end up in the WPS. To get a measure of the WPS that can be regarded as robust to the absence of potentially important confounders, a rich set of covariates has been developed, and the results are checked for robustness using a full IV approach.

Comparing WPS in different countries

Comparing Germany and Britain required the same specifications as the probit model used to reweight the observations. Hence, the general-to-specific approach was not applied, as this would have made the set of regressors economy-specific. Instead, the joint significance of four sets of variables was tested:

(i) individual characteristics: education (4 categories: lower secondary or less, upper secondary, post-secondary, at least tertiary); work experience (and its square, cube and quartic); gender; marital status; and citizenship (2 dummies: national/non-national, European/non-European);

(ii) job characteristics (part time, full time, fixed-term, permanent);

(iii) firm characteristics (size measured by 3 dummies, 13 economic sector dummies);

(iv) individual skills (4 dummies measuring the skills required for the task).

The variables described in (i), (ii), (iii) and (iv) help deal with data heterogeneity, and control the results for education and work experience, gender, marital status, citizenship, job characteristics, firm characteristics and skills of the employee. The rationale for these sets of variables consists in the need to check for selection mechanisms into supervisory jobs, which Marsden (1990) among others suggest may be present to differing extents in the British and German job markets. This is a crucial point. If, for example, education, experience or individual skills of supervisors and other employees differ systematically, the former will self-select into more rewarding tasks. Hence, if these variables are not appropriately controlled for, the measure of the WPS applied here would be a combination of the reward for individual education, experience and skills, and of the WPS.

More specifically, the variables in (i) control the estimated probabilities for selection mechanisms associated with work experience. It is known that job regulations in Germany emphasise work experience, and seniority is typically rewarded with career advancement (Eyraud et al. 1990). Germany is an example of an occupational labour market, while the UK accords greater importance to generic tertiary skills and occupational mobility. The variables in (ii) help control the estimates for different job characteristics. The share of temporary employment and that of part-time employment relative to overall employment are known to be two of the most relevant variables for identifying VoC typologies (Lallement 2011). The variables in (iii) are introduced as differentiating variables, as in Goergen et al. (2012), allowing to control for firm size and sector. Individual skills are also controlled for using the variable in (iv), as labour mobility between firms is greater in countries like the UK than in Germany, where workers find it harder to transfer their skills to another firm, so that career advancement is gained mostly within rather than between firms. In Britain, by contrast, job regulations are expected to emphasise workers' skills and the inter-firm labour market. Such differences in mobility is likely to affect advancement in supervisory roles, so it has been

checked whether individual skills, not context, are responsible for international differences in the WPS. Following Picchio and Mussida (2011), to control for individual skills the present study uses the International Standard Classification of Occupations (ISCO-88) These variables are associated with the type of job chosen by the individual.[3] The categories range from relatively low-skilled jobs, such as plant and machine operators and assemblers, to higher-skilled jobs, such as professionals, legislators and senior officials, and CEO/non-CEO positions. The variables refer explicitly to the skill level:

> The basis for the classification in the ISCO-88 scheme is the nature of the job itself and the level of skills required. A job is defined as the set of tasks and duties to be performed. Skills are the abilities to carry out the tasks and duties of a job. Skills consist of two dimensions: skills level and domain specialization (EU-SILC 2009:183).

These variables have been adopted in empirical research and refer explicitly to the skill level required for the job (Böckerman and Maliranta 2013; Ortega 2009; Pemner and Lawrence 2004) , ranging from the relatively low-level skills needed to perform simple and routine physical or manual tasks (level 1) to those necessary to perform such tasks as operating machinery and electronic equipment (level 2) to higher-level skills required for professionals, legislators, and senior officials (level 3) and, finally, high-level skills such as literacy, numeracy and excellent communication (level 4).

Measuring the Effect of the Context on the WPS

The theoretical literature sees the WPS as influenced by context variables (Acemoglu and Newman 2002). To study the extent to which context shapes the wage distribution, one needs

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[3]The literature suggests that skills should be measured using panel data (Fortin, Lemieux, and Firpo, 2011). In the present case, however, this is not feasible, in that the EU-SILC survey data are cross-sectional. In this framework panel data are unattractive also since: 1) the probability model is non-linear, so the assumption of separability is unlikely to hold; and 2) disentangling individual effects is problematic, as individual fixed effects can be computed only if the individual has had both statuses (supervisor and non-supervisor) during the sample period.

a measurement of how much a German middle manager would earn, everything else equal, if he or she were doing the same job in the UK. The measurement selected is the difference between actual earnings of a German middle manager and potential earnings in the UK. The procedure begins with an estimate of the distribution that would have prevailed if, all other things equal, all German employees had been working in the UK.

The key element was the re-weighting function for the German observations, as before, but taking "being a German employee" as dependent variable. The second step was estimating how much a German middle manager would earn in the UK. These weights were derived from the interaction between those used in measuring the WPS for Germany and those for the probability of being a German employee. This gave the appropriate reweighting function. Applied to the sample of German employees, this would yield the premium that German middle managers would have gotten in the UK. The difference between the actual WPS and that obtained using the counterfactual distribution gives the effect of the context. Note that because this is taken as the difference between the WPS actually earned and the theoretical WPS earned in the UK, the effect of potential self-selection into management positions is likely to be further attenuated.

EMPIRICAL RESULTS

Table 2 presents the results of the auxiliary probit regression. Column (a) refers to Germany, with as independent variables individual, job, and firm characteristics, plus variables controlling for individual skills, added to the model reported in Column (b). The joint significance of variable groups was tested for, using the F-statistic (*p*-values in brackets).

Table 2 about here

The model adapted reasonably well to the data, and all three groups of variables were statistically significant. The pseudo-R² is about 9%, not greatly different from other studies using similar datasets. More than 60% of the predictions turned out to be correct. Column (b) shows that the set of variables controlling for individual skills was statistically significant. The pseudo-R² increases to 10.5% and the percentage of correct predictions to 73.9%. Columns (c) and (d) report the results of the same analyses for the UK. Again the model fits the data well. Added to the set of regressors, the variables proxying for skills also raised the pseudo-R² (from 9.4% to 16.6%) and the percentage of correct predictions (from 66.6% to 71.0%). This specification has been preferred in calculating the set of weights and performing the exercise.

Does the WPS differ between Germany and the UK?

Figure 2 reports both the actual and the counterfactual wage distributions for the UK and for Germany. Some statistics based on these distributions are reported in Table 3. The Kolmogorov-Smirnov test (top panel) rejects the hypothesis of equality of actual and counterfactual distributions for both economies. This implies that the WPS does indeed affect the distribution of wages significantly (Hypothesis 1a). The bottom panel presents the WPS measurement, Figure 3 the results at the mean and at different quantiles of the distribution. At the mean wage in Britain, the WPS was nearly 26% (€899.70) compared with 16% in Germany (€467.90). And the WPS also differed at different deciles of the earnings distribution. The WPS curve was U-shaped in both countries, but the minimum was near the 40th percentile in the UK and the 80th in Germany. That is, the WPS for middle managers tended to increase inequality more in Britain than in Germany, where the WPS is lower for all the deciles (Hypothesis 1b). Moreover, the difference in WPS for the two economies tended to increase over all the deciles. The evidence, that is, supports Hypothesis 1c, namely that the difference between the two countries is sharper for middle managers at higher grades.

Please insert Figures 2 and 3

Please insert Table 3

How much of the difference between the WPSs is due to context (type of capitalism)?

To answer this question, a probability model was estimated, with probability of being a German employee as dependent variable. Table 4 reports the results of an auxiliary regression showing that, as above, the preferred model included skills as explanatory variables. This model was used to recover the set of weights with the results for the distribution presented in Figure 4. Panel 1 reports the distribution of wages that would have prevailed if German employees had been working in the UK. Panel 2 reports the distribution with no middle managers and the distribution with no middle managers *and* with German employees working in the UK.

Please insert Table 4

Please insert Figure 4

These distributions allowed calculation of the effect of the context at different wage levels (Table 5). On average, German middle managers, given their characteristics, would earn 7.9% more working in the UK. Hence, the data suggest that 50% of the WPS in Germany depended directly on the context. The decile-by-decile analysis shows that context affects WPS throughout the distribution, but less strongly at the higher deciles (Hypothesis 2a). This accords with the thesis that the German context moderates wage inequality, an impression reinforced by comparison with the British context (Hypothesis 2b). Note that up to the 40th percentile German middle managers would have had a higher WPS than their British counterparts had they been working in the UK.

Please insert Table 5

As noted, the control variables serve to deal with the problem of data heterogeneity and self-selection. However, the decision to supervise other employees may also depend on confounders that could be omitted, above all the extra pay remunerating supervisory responsibilities. That is, another possible control for self-selection and omitted-variable bias is simply the wage attached to the supervisory role. The effect of wages on the forecasting ability of the reweighting functions, either taken as predetermined or, as suggested by Currie and Madrian (1999), instrumented using individual health, has been estimated. The results do not alter the conclusions on the impact of the context on WPS. (To save space, they are available only in the Appendix).

DISCUSSION

The significant empirical findings here contribute to the literature on varieties of capitalism and their impact on the wage premium for supervision, with implications for theory and policy. The data corroborate the thesis that the remuneration of middle managers differs substantially between types of economy, reflecting key contextual characteristics. Some contend that country classifications by VoC category may not fit the real-world data (Amable 2008). This inquiry identifies two stylised facts showing that Britain and Germany do correspond to the LME and CME ideal-types (Hall and Soskice 2001) and, more, it provides strong empirical evidence, extending our understanding of how wage compensation practices depend on institutional context. The data indicate that the WPS for middle managers differs between the two economies both in magnitude and in the shape of the curve, owing in part to the context. The British WPS increases quite steadily from the bottom to the top of the wage distribution, producing considerable inequality, whereas the German WPS has a more balanced impact. In keeping with the VoC hypothesis, these differences reflect the divergent models of LMEs and CMEs. In Britain the WPS was greater at higher earnings deciles, in harmony with the description of British capitalism as incentive-based, while for German

middle managers it was greater at the lower end and increased less sharply, producing a less unequal distribution that could be interpreted as protecting middle managers early during their careers.

The findings make it clear that one paradigm prevails in Germany, another in the UK. There is evidence of some diffusion of market liberalisation in Germany, corresponding more to the LME than the CME model (Jackson and Sorge 2012); overall, however, the data show that managerial remuneration practices differ significantly between the two countries, with implications for the mobility of skilled workers and countries' ability to attract them.

Some interesting policy implications emerge. The German economy is confirmed as more protective, as argued by Dore (2000). Workers at early career stages enjoy a certain degree of job security, in keeping with models of political economy that see mitigation of inequality as a virtue of modern democracy (Iversen and Soskice 2006). However, this result could be seen in the light of the work of Streeck (1997; 2008), who posits the universal evolution of capitalistic society, in particular Germany, towards disorganisation. He points to the transformation of German capitalism, now far removed from the original model of pure coordinated market economy, having moved towards ever greater earnings differentiation. In his view (Streeck 2014), a dogmatic view of the various capitalisms as non-converging cannot grasp the complex dynamics that are re-shaping European labour markets. The British economy, by contrast, rewards management careers more generously, with higher earnings premiums for managers at the higher deciles.

To curb the "brain drain" towards LMEs, CME policy makers could encourage higher remuneration for middle managers in the top income quantiles. However, the mobility of skilled workers has become a controversial, political issue. While migration carries clear systemic benefits in terms of human and financial capital, it generates discontent among the

locals who compete for the same jobs. This competition has triggered social tensions that policy makers have countered by erecting barriers to mobility.

The study also contributes methodologically, developing a new method for estimating the effects of context in determining WPS, validating Blau and Kahn (1996), and extending the analysis of the international difference in the average wage distribution to differences in the entire distribution. The hypothesis examined is: What would be the result in Germany if its middle managers were working in the UK? This question is successfully answered, but the analysis is cross-sectional, which prevents any inference concerning changes in either the German or the British context over time. For example, Streek and Thelen (2005) discuss the transformation of the institutional context in developed economies in recent years. Thelen (2014) describes recent changes that make the German model less egalitarian, notwithstanding the persistence of such practices as offering greater job security in exchange for lower wages (Hall and Thelen 2009). Thelen also highlights the trend towards diversity within national systems (Palier and Thelen 2010) with the institutionalisation of new forms of dualism. Data either having greater cross-sectional scope or allowing a historical review would provide more insight.

The findings also carry implications for the possible impact of Brexit on the UK's ability to retain or attract skilled foreigners, suggesting that there will not necessarily be a diaspora of supervisors: other conditions equal, the British labour market offers them greater incentives. However, whether Britain's WPS edge over Germany will be sufficient to retain present supervisors or attract new ones depends on a series of tangible and intangible factors. The former are the extent to which immigration policy favours their entry and the ability of the major economic actors to influence political choices towards social inclusiveness. The latter are the shared social values that could make foreigners perceive Britain as open and welcoming.

This analysis raises questions for further research. First, the comparison here is between ideal-types of CME and LME. But data for all the EU economies are available, so if the difficulties of comparing such a heterogeneous set of economies can be overcome, the analysis could be extended to all the types of economy within the EU, interpreting the results within the VoC framework. Second, this analysis could be replicated also using longitudinal datasets, to study the impact of contextual changes on the WPS. The joint presence of time-varying data, cross-sectional EU data, and data on change in British immigration policy would be invaluable. If Brexit eventually comes about, then once its terms and conditions are established and recorded in the EU-SILC data, an inquiry along the present lines will shed light on the impact on the WPS and the subsequent attractiveness of the British system.

These are not the only unexplored aspects. Some questions not considered here suggest potential avenues for future research. For instance, different forms of capitalism should presumably produce different forms of wealth and different societal structures. While the results here indicate that German middle managers would earn higher WPS if they worked in the UK, it is impossible to speculate on the degree of satisfaction or happiness of a German-raised person working in Britain, or vice versa. Finally, the results cannot be readily generalised to other European countries: the ideal-types may fit the British and German economies fairly well, but they are not necessarily applicable elsewhere. Research is needed on other economic settings and frameworks, such as the emerging market economy model of Eastern Europe.

CONCLUSIONS

Empirical research on varieties of capitalism has made substantial progress, with interesting results that corroborate this approach (Witt and Jackson 2016). Most of the work bears on the relationship between context and firms' comparative advantage (Schneider and Paunescu 2012). This article has sought to advance our knowledge of the state employment

relationship in different contexts, focussing on the labour force component of middle managers. Very little work has tried to determine the portion of the difference in the wage premium to supervision between Britain and Germany depends on the institutional context. The data help to account for national differences in remuneration while also highlighting some contrasting patterns.

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Table 1. Sample Characteristics

This table reports information on our sample's job characteristics (average wage, % of middle managers, % of individuals with a permanent position, a full-time position), their individual characteristics (average age, % of males, marital status, local status, education achieved, skill level), and the firm's characteristics (% with more than 10 employees, economic sector). It also shows the number of observations in the Germany and the UK.

Economy			Germany		United Kingdom	
Variable		Sample	Middle Managers	Other Employees	Middle Managers	Other Employees
Job Characteristics						
Wage (euros)			2924.85	1627.57	3474.70	1920.11
Middle managers				74.66	38.74	61.26
Permanent position			91.08	95.22	95.55	98.52
Full-time position			63.99	86.40	70.86	88.98
Individual Characteristics						
Age (average)			45.18	44.78	43.78	44.33
Gender (male)			66.50	42.65	55.08	43.57
Married			92.40	62.29	62.29	65.39
Local			97.68	98.25	94.74	95.55
Education	Primary		0.41	0.62	0.00	0.00
	Lower secondary		1.70	5.77	5.00	13.73
	Upper secondary		34.88	49.33	48.71	58.48
	Post-secondary (not tertiary)		7.58	8.56	3.63	4.30
	Tertiary		55.42	35.71	42.66	23.49
Skills	Level 4		63.28	45.66	71.99	32.06
(ISCO-88)	Level 3		17.97	27.99	16.91	39.00
	Level 2		12.22	12.09	5.23	7.93
	Level 1		6.53	14.25	5.86	21.02
Firm Characteristics						
Firm size (% > 10 employees)			84.01	80.54	86.21	82.74
Sector of economic activity						
Agriculture and fishing			1.14	1.06	0.69	0.7
Manufacturing, mining, electricity			20.77	26.84	15.91	14.92
Construction			4.65	6.94	5.04	6.33
Wholesale, retail trade, repair services			14.47	13.97	14.05	10.23
Hotels and restaurants			1.47	2.25	2.15	3.01
Transport, storage and communication			6.16	5.51	6.92	5.16
Financial intermediation			6.24	5.61	4.69	4.84
Real estate, renting, business activities			9.01	8.46	10.5	11.99
Public administration and defence			9.17	6.99	10.08	12.03
Education			6.08	4.27	13.44	11.25
Health and social work			14.13	12.45	12.62	14.77
Other			6.71	5.65	3.93	4.77
Number of Observations						
				8588		6609

Figure 1. Wage Dstribution in the UK and Germany

This figure reports the total distribution of wages for both the UK and Germany (Panels 1 and 3, respectively) and then the distributions for middle managers and other types of employees in each country (Panels 2 and 4, respectively). The distributions were estimated by applying the Gaussian kernel and the Silverman rule for the bandwidth.

The UK

Panel 1   Panel 2
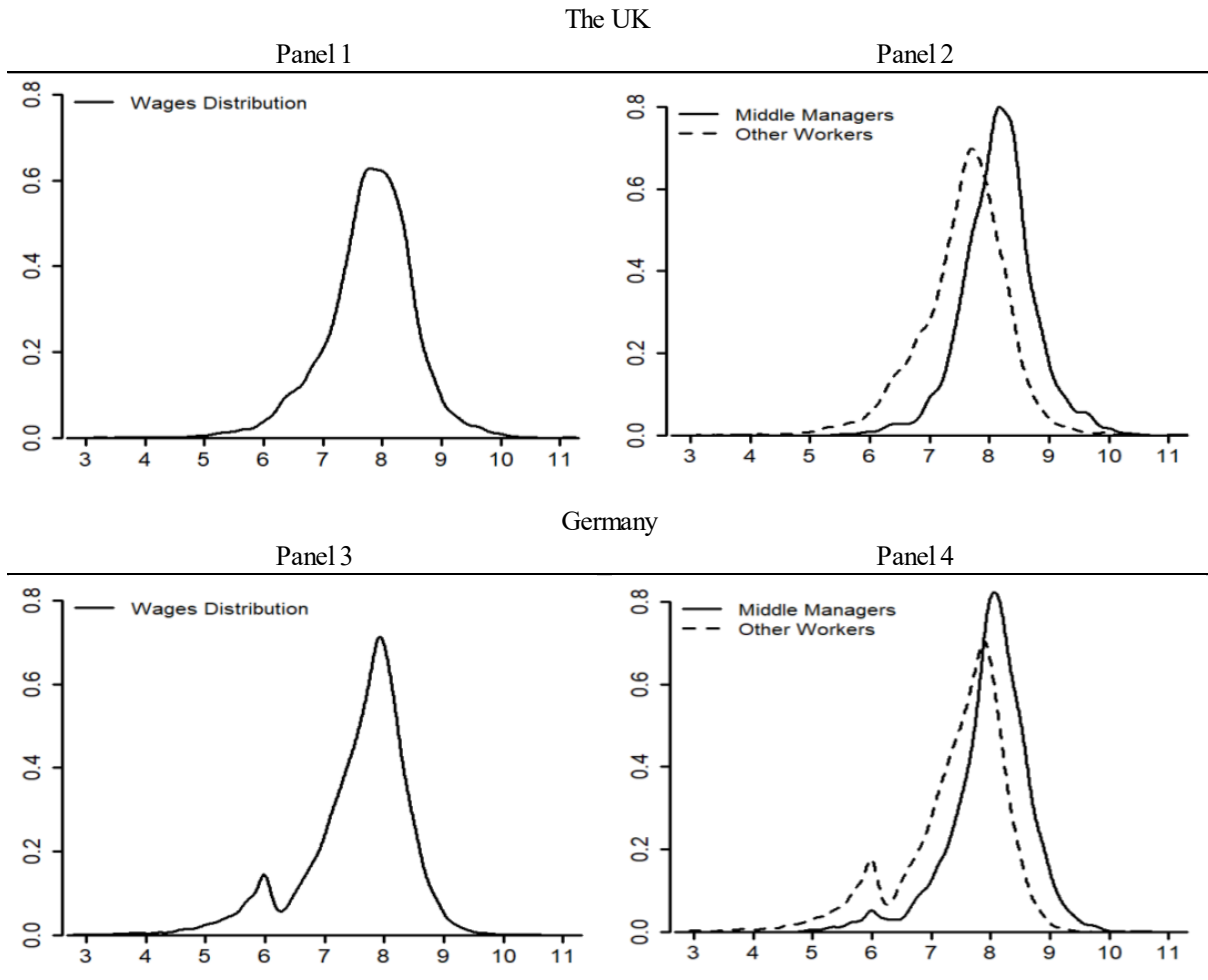
Germany

Panel 3   Panel 4

Table 2. Results with Joint Exclusion for Auxiliary Probit Regressions

The Table reports the results from the joint exclusion for the probit model's estimation that an employee is middle manager for both Germany and the UK.

Joint Exclusion of the Following Characteristics:	Sample Model	Gemany		UK	
		(a)	(b)	(c)	(d)
i. Individual (gender, marital status, local, education, exp, exp^2, exp^3, exp^4)		112.2 (0.000)	142.32 (0.000)	90.61 (0.000)	57.63 (0.000)
ii. Job (part/full-time, temp/perm)		166.09 (0.000)	150.36 (0.000)	229.10 (0.000)	150.58 (0.000)
iii. Firm (4 dummies for the firm size, 13 dummies for the economic sector)		73.13 (0.000)	97.55 (0.000)	84.87 (0.000)	101.81 (0.000)
iv. Skills (4 dummies for the skills associated with the type of occupation)			76.87 (0.000)		408.26 (0.000)
Pseudo-R^2		0.090	0.105	0.094	0.166
Correct Predictions (%)		62.1	73.9	66.6	71.0

Figure 2. Wage Premium for Middle Managers in the UK and Germany

This figure reports the actual and counterfactual wage distributions for the UK, with a smoothed difference, and reports the same for Germany. The distributions were estimated by applying the Gaussian kernel and the Silverman rule for the bandwidth to the samples.

The UK

Panel 1   Panel 2

Germany
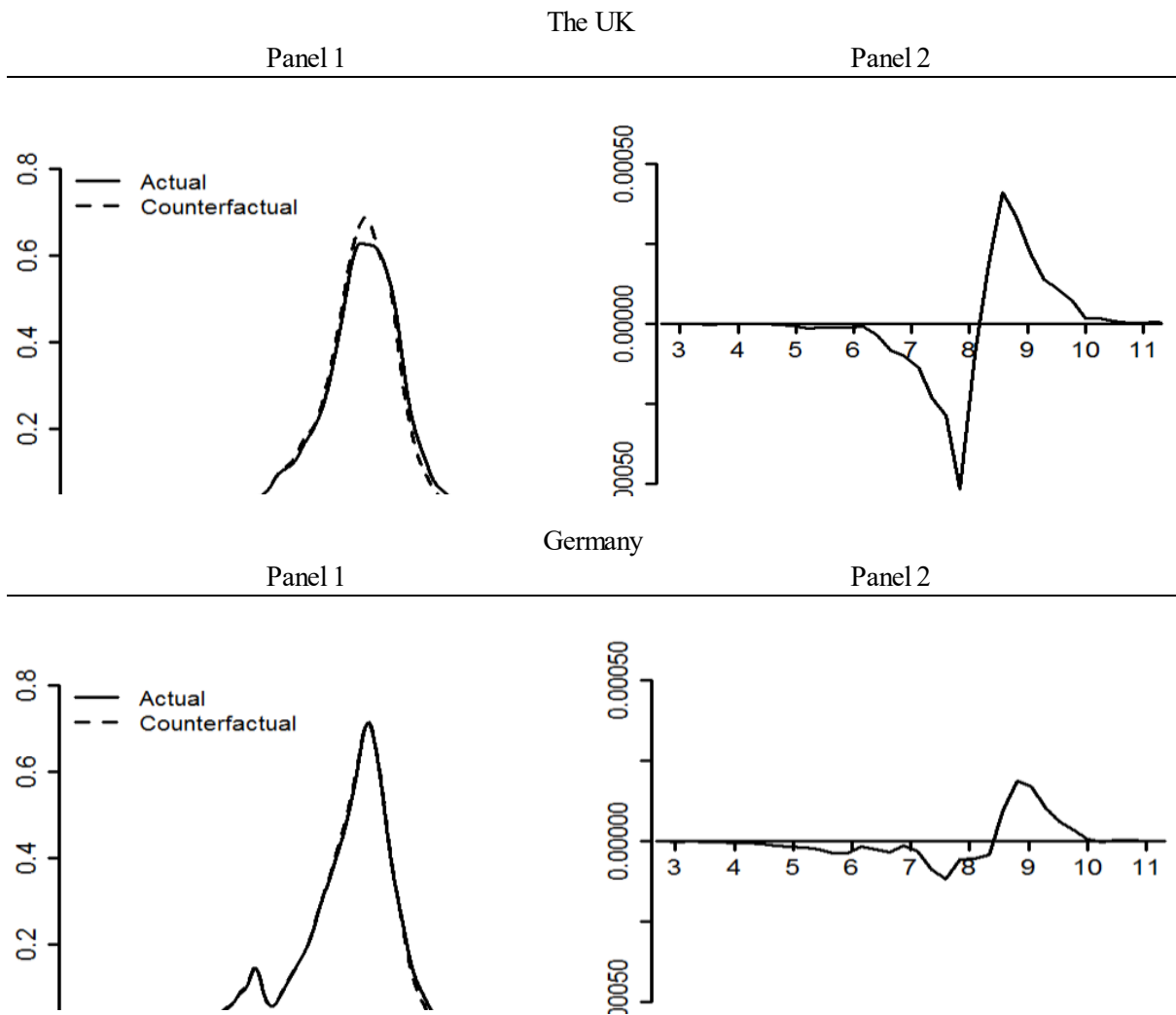
Panel 1   Panel 2

Table 3. Wage premium for Middle Managers in Germany and the UK

This table reports the Kolgomorov and Smirnov statistic for equality of actual and counterfactual distributions of wages, and the WPS measured at the mean, and at the deciles of the wage distribution. p-values were associated with the null hypothesis of equality of distributions.

Country	Germany	United Kingdom	
Kolgomorov-Smirnov Statistic	0.0625	0.0833	
p-value	(0.018)	(0.000)	
Wage Premium At			UK - Germany
Mean	0.160	0.259	0.100
Decile			
0.1	0.231	0.265	0.034
0.2	0.195	0.277	0.081
0.3	0.154	0.239	0.084
0.4	0.148	0.221	0.073
0.5	0.135	0.226	0.091
0.6	0.120	0.246	0.125
0.7	0.118	0.259	0.141
0.8	0.130	0.262	0.131
0.9	0.164	0.284	0.120

Figure 3. Wage Premium for Middle Managers in Germany and the UK at the mean and at different deciles of the wage distribution

This figure reports the WPS measured at the mean, and at the deciles of the wage distribution.
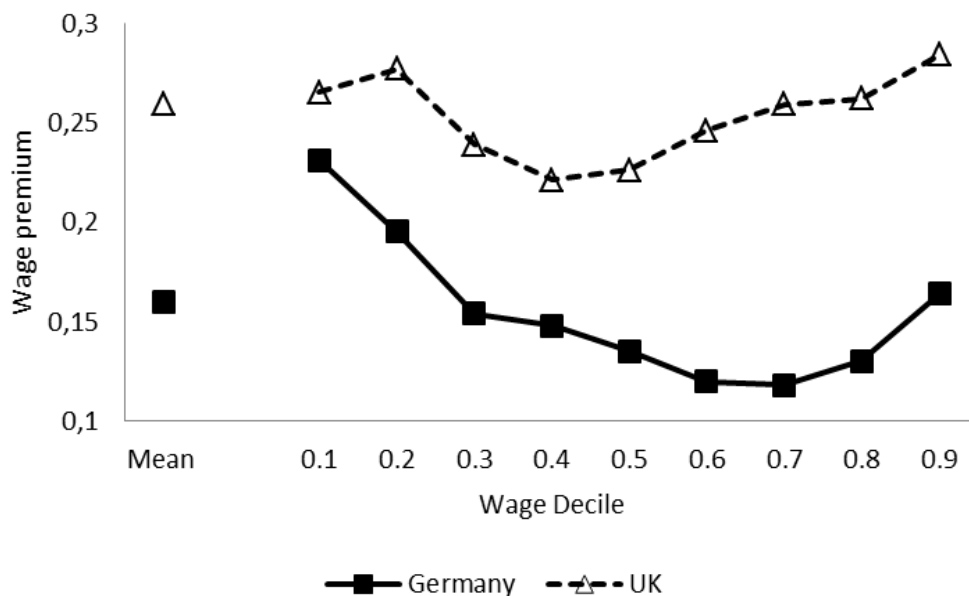
Table 4. Results from Joint Exclusion For Auxiliary Probit Regressions

This table reports results from the joint exclusion for the probit model's estimation that an employee is German.

Joint Exclusion of the Following Characteristics:	Sample Model	All Individuals	
		(a)	(b)
i. Individual (gender, marital status, national or EU citizenship, education, exp, exp^2, exp^3, exp^4)		1234.9 (0.000)	1220.6 (0.000)
ii. Job (part/full-time, fixed-t./perm)		234.7 (0.000)	259.4 (0.000)
iii. Firm (4 dummies for the firm size, 13 dummies for the econocmic sector)		268.3 (0.000)	246.7 (0.000)
iv. The skills (4 dummies for the skills associated with the type of occupation)			97.6 (0.000)
Pseudo-R^2		0.189	0.197
Correct Predictions (%)		58.9	59.9

Figure 4. The Impact of the UK Context on the WPS in Germany

Panel 1 reports the actual distribution of wages and the distribution that would have prevailed if the German employees had been working in the UK. Panel 2 reports the counterfactual distribution if none of the employees had been a supervisor (solid line), and the counterfactual distribution if none of the employees had been a supervisor and the German employees had been working in the UK.
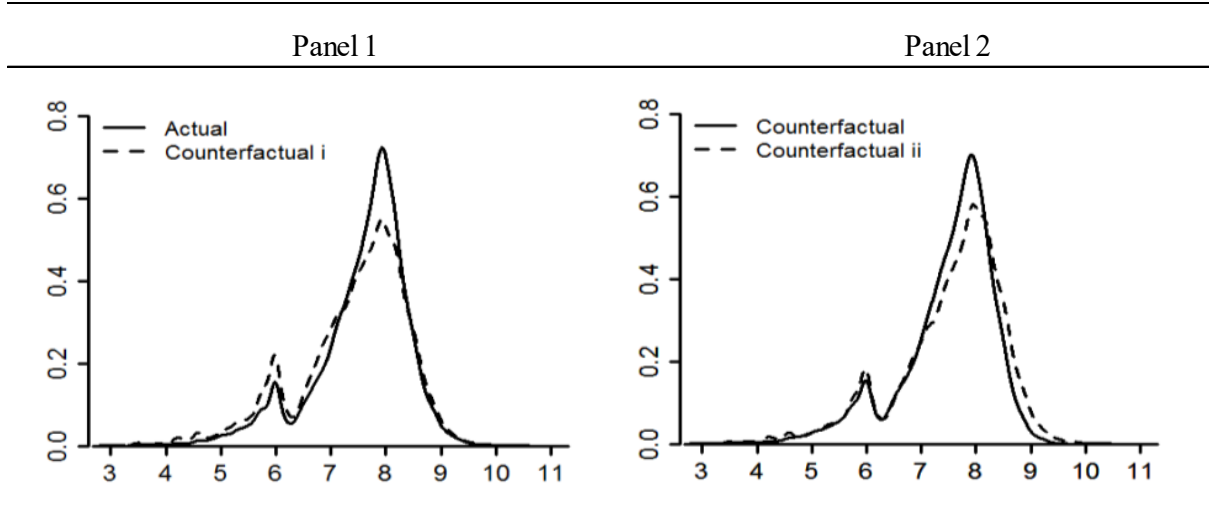
Panel 1	Panel 2

Table 5. The Impact of the UK Context on the WCS in Germany

This table reports the wage compensation to management found for middle managers measured at the mean and at the deciles of the wage distribution.

Sample	Germany	Germany Counterfactual	Impact of the UK Context in Germany	Impact of the UK Context in Germany (% of the WCS)
Average Compensation	0.160	0.239	0.079	49.4
Wage Premium at Decile:				
0.1	0.231	0.406	0.175	75.8
0.2	0.195	0.287	0.092	47.2
0.3	0.154	0.264	0.110	71.4
0.4	0.148	0.237	0.089	60.1
0.5	0.135	0.205	0.070	51.9
0.6	0.120	0.174	0.054	45.0
0.7	0.118	0.168	0.050	42.4
0.8	0.130	0.189	0.059	45.4
0.9	0.164	0.228	0.064	39.0

Methodological Appendix

In what follows, we present some technical details of the approach we adopt. A.1. summarizes and provides some examples of the non-parametric estimate approach for the distribution of wages; A.2. summarizes the inverse probability weighted approach, which allows us to answer some "what" questions related to the economies; A.3. discusses the choice of the set of regressors to model the probability of being a middle manager for international comparison and presents some empirical exercises; A.4. presents some empirical exercises; and A.5. discusses estimations of "what if" questions related to the economies analysed and a reference economy.

A.1. Non-parametric approach to estimating the distribution of wages

The appeal of estimating and comparing the distribution (of the *ln* of) wages relies especially on the possibility of theorizing directly about the entire distribution of wages, which, in turn, negates the need for a representative agent.

Distributions can be estimated using parametric and nonparametric frameworks. However, the former typically make use of only a given number of moments (usually the first two - the conditional mean and the variance), while the latter allows for analysis of the entire distribution of the variables of interest. The use of a nonparametric approach when estimating distributions allows us to go beyond the idea of a representative agent. This explains its appeal in analyses of behaviour in large and heterogeneous samples of individuals, as in our case.

Following Silverman (1986), let us define a wide class of nonparametric density estimators (the Rosenblatt-Parzen kernel density estimator) as:

(1) $\qquad \hat{f}_{N,h}(w) = \frac{1}{N} \sum_{i=1}^{N} \frac{1}{h} K\left(\frac{w - w_i}{h}\right),$

where N is the number of observations, w is the ln of wage and h is the bandwidth. $K(.)$ is the

kernel density function which satisfies:

$$(2) \qquad \int_{-\infty}^{\infty} K(p)dp = 1.$$

Many alternative kernel functions can be used, each of which offers different advantages and

disadvantages, especially in terms of efficiency and smoothing power. In our analysis, we make use

of the Gaussian kernel, which is the height of the standard normal distribution evaluated at $(w - w_i)$

given the bandwidth h. We use the Gaussian kernel because of its property of monotonicity of peaks

and valleys with respect to changes in the smoothing parameter (Sheather, 2004).

h is the crucial decision in the estimation of distributions using a nonparametric approach. A

number of bandwidth selectors is available. In what follows, we report the results based on the

average of the optimal rule of thumb proposed by Silverman (1986) since it is generally

acknowledged to be the best performing, especially when the kernel density function applied to the

data is Gaussian, as in our case. It should be noted that, given the large numbers in our sample, the

choice of kernel function and bandwidth selector are unlikely to affect the results significantly.

Marron and Schmitz (1992) suggest that comparisons across distributions should be made under the

condition that the same kernel $K()$, and the same smoothing parameter h are adopted in Eq. (1).

In Figure A.1., Panels 1 and 2 report the results for the sample of employees and the subsample of

middle managers and productive employees in the UK. Panels 3 and 4 report the results for

Germany.

A.2. Answering "what if" questions: the semi-parametric approach to estimate distributions
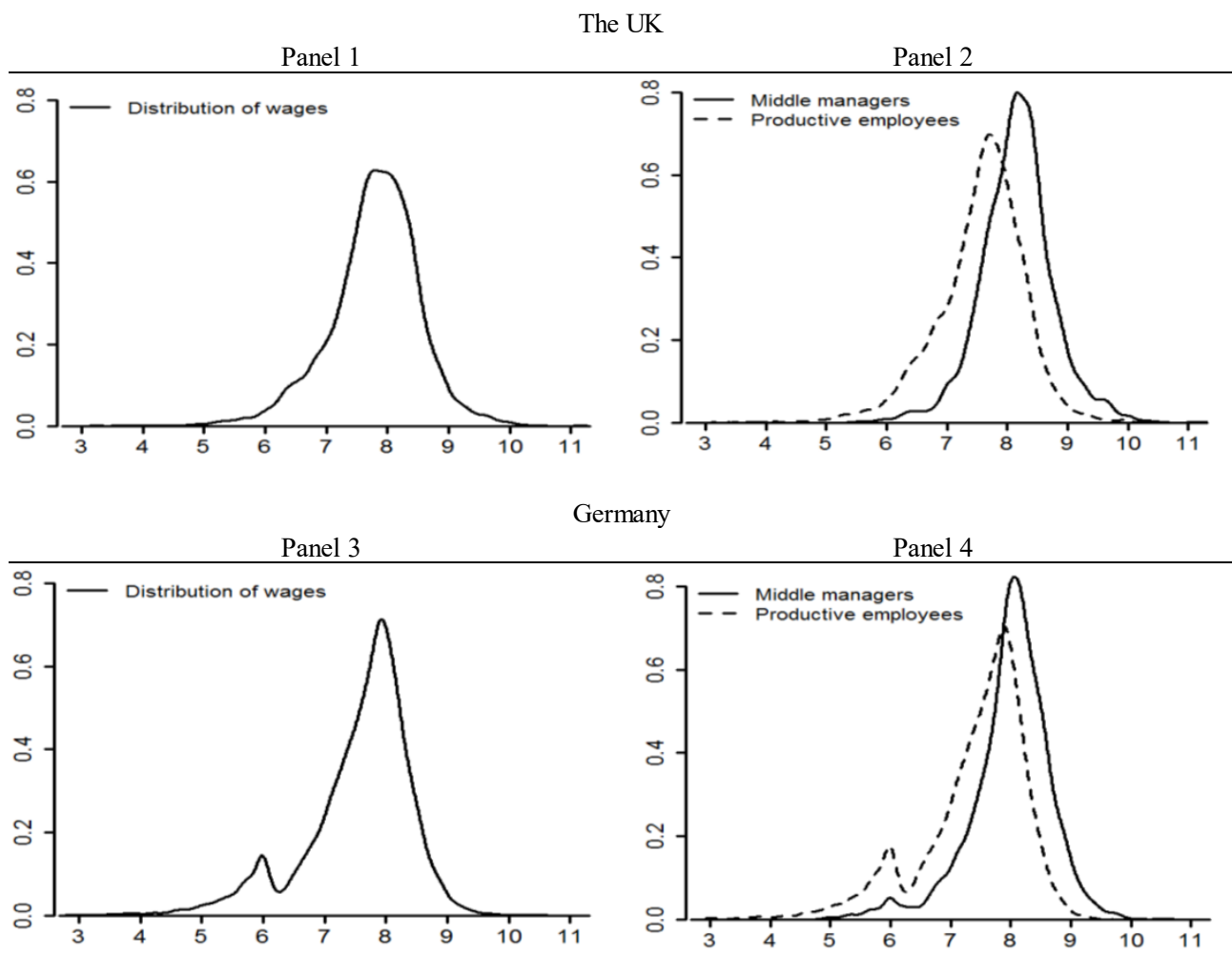
The differences across the distributions in Panel 2 (and Panel 4 for Germany) cannot be taken as

being the premiums for middle management in the UK and Germany, because they do not take

account of the difference in the personal characteristic endowments of middle managers with respect to the control group. In other words, use of the fully nonparametric density estimation approach makes it difficult to perform hypothesis testing exercises.

Therefore, as suggested by DiNardo, Fortin and Lemieux (1996), we compare the estimate of the nonparametric distribution of wages with the distribution estimated under some "what if" questions, the so-called counterfactual distributions, that is, the distributions that would have prevailed in the economy if the impact of "being a middle manager" were removed.

Figure A.1. The distribution of wages in the UK and Germany across subsamples

The Figure reports distribution of wages in UK and Germany (Panels 1 and 3, respectively) and for the subsample of middle managers and productive employees (Panels 2 and 4, respectively). The distributions are estimated applying the Gaussian kernel and the Silverman rule for the bandwidth.

Since Oaxaca (1973) and Blinder (1973), a number of methods have been proposed to decompose differences in the means of an outcome variable that are attributable to a number of independent variables. We are interested in the distribution of wages and rely on methods for decomposing distributional parameters other than the mean. In our work, we adopt the Inverse Probability Weighting (IPW) originally proposed by DiNardo, Fortin and Lemieux (1996) in the context of the gender wage gap literature. This method is preferred if the aim, as in our case, is decomposition of the overall difference in the distribution of the outcome variable into its explained and unexplained components, which is described as aggregate decomposition. Its main advantage lies in its simplicity. Let:

$$(3) \quad f(w) = \int g(w|x)l(x)dx$$

be the actual distribution of wages, where w is the wage, $g(w|x)$ is the conditional density of wages and $l(x)$ is the density of the vector of x characteristics, among which the dummy variable m is equal to 1 if the individual is a middle manager and zero otherwise. The approach consists of comparing the distribution in Eq. (1) with the distribution of wages that would prevail if, other things being equal, none of the individuals was a middle manager:

$$(4) \quad f^{nm}(w) = \int g^{nm}(w|x)l(x)dx,$$

where nm denotes 'not managers' and $g^{nm}(w|x)$ is the conditional density of wages associated to this group of observations. The wage premium to management is taken as the horizontal difference between the distributions in Eq. (1), the actual distribution of wages, and Eq. (2), the counterfactual distribution of wages, that is, the distribution of wages that would prevail if none of the individuals was a middle manager, *other things being equal*. This condition is obtained by using in Eq. (2) the density of the vector of x characteristics $l(x)$ associated to the entire sample

instead of $l(x|m=0)$, and the density of the x characteristics associated to the subsample of observations for which $m=0$.

The distribution in Eq. (2) is obtained following DiNardo, Fortin and Lemieux (1996), who suggest exploiting Bayes law to obtain its estimate:

(5) $l(x) = l(x|m=0) \dfrac{pr(m=0)}{pr(m=0|x)}$,

where $pr(m=0)$ and $pr(m=0|x)$ are the unconditional and conditional probabilities respectively of not being a middle manager. Use Eq. (3) in Eq. (2) to obtain:

(6) $f^{nm}(w) = \int \theta(x) g^{nm}(w|x) l(x|m=0) dx$,

where:

(7) $\theta^{nm}(x) = \dfrac{pr(m=0)}{pr(m=0|x)}$.

The authors note that Eq. (4) is the distribution of wages associated to the nm subsample up to the unknown re-weighting function, $\theta^{nm}(x)$. This reweighting function is the crucial element in the decomposition of the distribution of wages and is built by estimating a probit model to obtain the conditional probability of supervising other employees given x:

(8) $pr(m=1|x) = \varphi(x)$,

and using the predicted values:

(9) $\hat{\theta}^{nm}(x) = \dfrac{1 - \hat{p}(m=1)}{1 - \hat{p}(m=1|x)}$,

where $\hat{p}(.)$ is the fitted probability.

Eq. (7) gives the estimate of $\theta^{nm}(x)$ needed to reweight the distribution of wages for the subsample of employees who are not middle managers in Eq. (2). These weights are used to compute the otherwise fully non-parametric Rosenblatt-Parzen kernel density estimator:

$$(10) \quad \hat{f}_{N,h}(w) = \frac{1}{N} \sum_{i=1}^{N} \frac{\hat{\theta}^{nm}(x)}{h} K\left(\frac{w - w_i}{h}\right).$$

The decomposition is performed for the UK and Germany separately. Comparison of these results provides evidence in favour of or against our hypothesis (1).

A.3. Adapting the method to international comparisons: which control variables?

Apart from using the same kernel and the same smoothing parameter for the two samples, the decomposition exercise requires the same specification of the probit model in Eq. (8) for the UK and Germany. Therefore, in estimating the models, we do not apply a general-to-specific approach since this is likely to make the reduced form economy-specific, and we test the joint significance of the following groups of variables:

(v)   variables for individual characteristics: education (4 categories: at most lower secondary school, upper secondary, post-secondary education, at least tertiary); work experience (and its squared, cubic and quartic values); gender; marital status; and two dummies for citizenship type (national/non national, European/non-European);

(vi)   variables associated with job characteristics (part time, full time, temporary, permanent);

(vii)   variables associated with firm characteristics (size measured by 3 dummy variables, sector of economic activity based on 13 dummy variables);

(viii) variables for individual skills (4 dummy variables measuring the skills required for the task).

The variables described in (i), (ii) and (iii) are drawn from DiNardo, Fortin and Lemieux (1996). Combined with the regressors described in (iv), they help to deal with the likely heterogeneity in the data and potential self-selection mechanisms. For instance, if the individual skills of middle managers and other employees differ systematically because the former self select into more rewarding tasks (Card, 1999), then the measure we estimate is an unknown combination of the premium to management and the reward for individual skills endowments. The decision to supervise other employees or not depends upon the abilities required for the particular responsibility, which will result in skilled individuals systematically self-selecting into that job (Cameron and Heckman, 1998).

The literature on the gender wage gap suggests that this problem should be handled by adopting a panel data approach (Fortin, Lemieux and Firpo, 2010). However, in our context, this is not feasible since the EU-SILC survey data are cross sectional. In our context, using panel data would be unattractive also because: 1) the estimating probability model is non-linear so the assumption of separability is unlikely to hold; and 2) disentangling individual effects is problematic since individual fixed effects can be computed only if the individual experiences both statuses (being a supervisor and not being a supervisor) over the (eventually available) time span. Therefore, we follow Picchio and Mussida (2011) and use the International Standard Classification of Occupations (ISCO-88). These variables are associated with the type of job chosen by the individual. The categories range from jobs that require a relatively low level of skill, such as plant and machinery operators and assemblers, to jobs that require professional skills such as legislators and senior officials, and CEO/non-CEO positions. The variables refer explicitly to the skill level required for the job:

> the basis for the classification in the ISCO-88 scheme is the nature of the job itself and the level of skills required. A job is defined as the set of tasks and duties to be performed. Skills are the abilities to carry out the tasks and duties of a job. Skills consist of two dimensions: skills level and domain specialization (EU-SILC 2009).

We take the number of accurate predictions for the different models as the criteria for choosing among the alternative reduced form models. We note that, because the counterfactual wage premium is computed as the difference between premiums, the potential residual bias due to self-selection mechanisms is further dissipated unless there are reasons to expect that skilled individuals working in the UK self-select into jobs differently from German individuals.

A4. Wage as a proxy for ability, and endogeneity

The four sets of variables described in (i), (ii), (iii) and (iv) help to deal with the likely heterogeneity in the data, and self-selection mechanism. We note that the decision to supervise other employees depends also upon the wage paid for this responsibility. In turn, this may result in skilled individuals systematically self-selecting into that job (Cameron and Heckman, 1998). Hence, another variable that could be used to control for self-selection into middle management jobs is the wage attached to the job. It is worth studying the impact of wage on the forecasting ability of the reweighting functions when added to the set of regressors. Results reported in Table A1 are for the auxiliary probit regression when (the log of) wage is added to the set of regressors.

Table A1. Results on auxiliary probit regressions: the role od wage

The Table reports the results from estimation of the probit model for Germany and the UK.

Test for joint exclusion of the characteristics of:	Sample Model	Germany		The UK	
		(a)	(b)	(c)	(d)
i. The individual (gender, marital status, national, EU citizenship, education, exp, exp^2, exp^3, exp^4)		43.91 (0.000)	61.83 (0.000)	33.65 (0.000)	24.50 (0.000)
ii. The job (part/full time, temp/perm)		13.96 (0.000)	19.1 (0.000)	23.87 (0.000)	32.80 (0.000)
iii. The firm (4 dummies for the size of the firm, 13 dummies for the sector of activity)		144.11 (0.000)	153.11 (0.000)	128.93 (0.000)	123.81 (0.000)
iv. The skills (24 dummies for the skills associated ot the type of occupation)			28.16 (0.000)		182.92 (0.000)
v. (log of) wage		157.01 (0.000)	116.18 (0.000)	309.14 (0.000)	156.75 (0.000)
Pseudo-R^2		0.121	0.126	0.1589	0.192
Percentage of correct predictions		0.646	0.661	0.691	0.717

Table A1 Columns (a) and (b) report the results for Germany. As above, we test for the joint significance of groups of variables using the F-statistic (p-values are in brackets). Column (a) reports the results for the model with wage included in the sets of variables for individual, job and firm characteristics. As expected, wage is statistically significant. If both the set of ISCO variables and the log of wage are included in the estimated models (Column b), the F-statistics associated to the statistical significance of (the log of) wage and the joint statistical significance of the coefficients of the ISCO dummies, reduce relative to their counterparts in Column (b) Table A1 in the main part of the paper. This is likely due to correlation between the ISCO variables and the log of wages, suggesting that the former, as expected, help to control for the self-selection mechanism. However, with respect to the results for our preferred model

reported in Column (b) in Table A1, both these models have a significantly lower percentage of correct predictions; recall, that this is what these auxiliary regressions are meant to help with. In Table A1, Columns (c) and (d) report the results applied to the UK observations. The pattern is similar to the pattern for Germany. As before, adding the (log of) wage to the set of regressors reduces the percentage of correct predictions and, in the case of the UK, also the pseudo-R^2 of the model. The results in Column (d) show that the set of ISCO variables is correlated to wage and they have higher F-statistics.

The evidence that the models that include in the set of regressors the log of wage, have a lower percentage of correct predictions, suggesting the use of the models where this variable is excluded from the set of regressors. This adds to the problem of finding a credible instrumenting strategy for wage. Wage is likely to be jointly determined with the probability of being a supervisor and, therefore, its use is conditional on the availability of the set of instruments to be used in the instrumental variables approach (Currie and Madrian, 1999). The problem lies in identifying one or more credible instruments. This is difficult in our context because the instrument must be valid (and the same) for the two economies under investigation.

The literature suggests adopting variables measuring individual health. It is suggested that poor health has substantive effects on compensation and labour market participation. It has been suggested also that the relationship between health status and the task the individual performs is not strong, the idea being that health is likely to affect all the tasks the individual chooses, in a similar manner (Currie and Madrian, 1999). In the EU-SILC survey, physical well-being is measured by limitation on activities due to health problems, and general health (including health status and chronic illness or condition) and is summarized by a variable that

takes values from 1 to 5, with higher values indicating poorer health. The variable is not statistically significant in the probit model, suggesting that the exclusion restriction is likely to hold. Moreover, correlation analysis supports this conclusion since the variable is found to be highly correlated to the wage and uncorrelated to the probability of being a supervisor. Table A2 reports the results with individual health status used as an instrument for (the log of) wage.

Table A2. Results on auxiliary probit regressions: instrumenting wage

The Table reports the results from estimation of the probit model for Germany and the UK.

Test for joint exclusion of the characteristics of:	Sample	Germany		The UK	
	Model	(e)	(f)	(m)	(n)
i. The individual (gender, marital status, national, EU citizenship, education, exp, exp^2, exp^3, exp^4)		18.38 (0.031)	18.67 (0.028)	34.83 (0.000)	23.35 (0.000)
ii. The job (part/full time, temp/perm)		6.93 (0.031)	5.17 (0.075)	26.41 (0.000)	26.47 (0.000)
iii. The firm (4 dummies for the size of the firm, 13 dummies for the sector of activity)		70.81 (0.000)	68.26 (0.000)	89.84 (0.000)	100.62 (0.000)
iv. The skills (24 dummies for the skills associated ot the type of occupation)			3.23 (0.198)		15.86 (0.000)
v. (log of) wage		20.76 (0.000)	12.44 (0.000)	0.16 (0.687)	0.53 (0.468)
Pseudo-R^2 Percentage of correct predictions		0.646	0.504	0.658	0.686
H_0: (log)wage is exogenous χ^2-stat		0.010	0.260	0.146	0.084

Table A2 Column (a) reports the results for Germany. Wage is statistically significant at the 1% s.l. The Hausman and Wu test for exogeneity rejects the null hypothesis that the variable can be treated as exogenous. The percentage of correct predictions is lower than that

reported for our preferred model. The results in Column (b) show that, if the set of dummies controlling for unobserved skills is added to the set of regressors, the percentage of correct predictions reduces further, and the coefficient associated to (the log of) wage also reduces. The test for exogeneity does not reject the null that wage can be treated as exogenous. Columns (c) and (d) report results for the UK observations. If we instrument the (log of) wage we find that the null hypothesis of the Hausman and Wu test is not rejected. This suggests that, despite the proposal in Currie and Madrian (1999), the necessary exclusion restriction is unlikely to hold for both the UK and Germany. The log of wage is not statistically significant.

A.5. Answering "what if" using questions related to the economies with the UK as the reference economy

To test hypothesis 2, we need a measure of how much a German middle manager would earn if, all other things being equal, s/he was performing the same task in the UK. This amount, when compared to the management premium actually earned, will reveal the impact of the German compared to the UK institutional background.

Fortin, Lemieux and Firpo (2010) conduct this exercise in two steps. The first step consists of estimating the counterfactual distribution that would prevail if German employees were working in the UK, all else being equal:

$$(11) \quad f^{Ger/uk}(w) = \int g^{Ger}(w|x) \ell(x|Ger = 0) dx.$$

As above, the key element in comparing across samples (in this case, countries) is the reweighting function, which keeps all the conditioning variables as in the UK. Then, the reweighting factor for the observations in Germany is:

$$(12) \quad \theta^{Ger/UK}(x) = \frac{pr(x|UK=1)}{pr(x|UK=0)} = \frac{pr(UK=1|x)}{pr(UK=0|x)} \times \frac{pr(UK=0)}{pr(UK=1)}.$$

They suggest implementing the decomposition by pooling the data for Germany and the UK, and running a probit model for the probability of being employed in the Germany given the set of characteristics x:

$$(13) \quad pr(UK=1|x) = \omega(x).$$

and, using the sample proportions $\hat{p}(Ger)$ and $\hat{p}(Ger)$, they construct the distribution of wages that would have prevailed were all the German employees working in the UK:

$$(14) \quad \hat{\theta}^{ger/uk}(x) = \frac{\hat{p}(UK|x)}{\hat{p}(Ger|x)} \times \frac{\hat{p}(Ger)}{\hat{p}(UK)}.$$

where two unconditional probabilities of the first ratio, $\hat{p}(GER)$ and $\hat{p}(UK)$, are equal to the percentage of observations for the German economy over the percentage of observations for the UK economy. This vector of weights, when applied to the sample of German employees, gives:

$$(15) \quad f^{Ger/UK}(w) = \int \theta^{Ger/UK}(x) g^{Ger}(w|x) l(x|Ger=0) dx,$$

which is an estimate of the wage distribution that would prevail in Germany under UK institutions. The first step in the exercise provides an evaluation of the role of institutional background, that is, how much any German worker would earn in the UK. A similar exercise can be found in DiNardo, Fortin and Lemieux (1996) for the case of the gender wage gap. It focuses on a single economy and constructs counterfactual distributions at different points in time. The impact of a particular factor on changes to the wage distribution over time is constructed by considering the counterfactual state of the world where the distribution of this factor remains fixed across time. Blau and Kahn (1996), again in the context of the gender wage gap literature, propose a comparison across economies. As in our case, they adopt the UK economy as the benchmark and investigate what would be the average wage premium for a German woman working in the British institutional context.

The second step consists of estimating how much a German middle manager would earn in the UK, other things being constant. This vector of weights comes from the interaction of the vector of weights in Eq. (12) and Eq. (7), from which we deduce the reweighting function (Blau and Kahn, 1996; Gottschalk and Joyce, 1998; Katz and Autor, 1999):

$$(16) \quad \hat{\theta}^{ger/uk\ and\ nm}(x) = \hat{\theta}^{ger/uk}(x)\hat{\theta}(x) = \frac{\hat{p}(UK|x)}{\hat{p}(Ger|x)} \times \frac{\hat{p}(Ger)}{\hat{p}(UK)} \times \frac{1 - \hat{p}(m=1)}{1 - \hat{p}(m=1|x)}.$$

which, when applied to the sample of German employees, gives:

$$(17) \quad f^{Ger/UK\ and\ nm}(w) = \int \theta^{Ger/UK\ and\ nm}(x)g^{Ger}(w|x)l(x|Ger=0, m=0)dx,$$

This provides the premium that would be paid to German middle managers working in the UK. The counterfactual wage premium to management is taken as the horizontal difference between the distributions in Eq. (1), the actual distribution of wages in Germany, and Eq. (15). In turn, the difference between the wage premium German middle managers are paid and the counterfactual wage premium they would receive if UK institutions prevailed, provides a measure of the role of the institutional context in the German economy.

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