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**Determinants of Wage (Dis-)Satisfaction**

Trade Exposure, Export-Led Growth, and the Irrelevance  
of Bargaining Structure

Lucio Baccaro and Erik Neimanns



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## Abstract

Although the determinants of wage militancy and moderation have been studied extensively by comparative political economists, so far the literature has focused on the macro level of analysis. As a result, there has been no attempt to analyze the determinants of individual-level attitudes towards wages. Based on two waves of the International Social Survey Programme, in this paper we fill this gap. We examine to what extent workers internalize the imperatives of competitiveness, and whether wage bargaining institutions facilitate this internalization, as suggested by a large literature on neocorporatism. Surprisingly, we find that the structure of wage bargaining (more or less coordinated or centralized) has no relationship with wage satisfaction or dissatisfaction at the individual level. Instead, wage dissatisfaction decreases strongly when workers are individually exposed to trade and countries rely heavily on export-led growth. Our results point to the need to rethink the determinants of wage moderation.

**Keywords:** collective bargaining, export-led growth, trade exposure, wage moderation, wage preferences

## Zusammenfassung

In der Vergleichenden Politischen Ökonomie wurden die Bestimmungsfaktoren von Lohnzurückhaltung und Arbeitskämpfen für die Durchsetzung von Lohnforderungen umfassend untersucht. Diese Forschung bewegte sich jedoch bislang auf der Makroebene, sodass es keine Versuche gab, Einstellungen zu Löhnen auf der individuellen Ebene zu untersuchen. Unter Verwendung von zwei Erhebungen des International Social Survey Programme adressieren wir in diesem Beitrag diese bestehende Forschungslücke. Wir untersuchen, in welchem Maße Arbeitnehmende die Erfordernisse von internationaler Wettbewerbsfähigkeit internalisieren und ob, wie die umfassende neokorporatistische Forschung suggeriert, stärker koordinierte und zentralisierte Institutionen von Lohnverhandlungen diese Internalisierung befördern. Überraschenderweise zeigen sich keine Zusammenhänge zwischen der Struktur der Lohnverhandlungen und individueller Lohnzufriedenheit und -unzufriedenheit. Stattdessen zeigt sich jedoch eine geringe Unzufriedenheit mit dem eigenen Lohn, wenn die eigene Beschäftigung vom Außenhandel abhängt und wenn Exporte ein starker Wachstumstreiber des jeweiligen Landes sind. Unsere Ergebnisse weisen auf die Notwendigkeit hin, die Bestimmungsfaktoren von Lohnzurückhaltung neu zu überdenken.

**Schlagwörter:** exportgetriebenes Wachstum, internationaler Handel, kollektive Lohnverhandlungen, Lohnpräferenzen, Lohnzurückhaltung

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# Determinants of Wage (Dis-)Satisfaction: Trade Exposure, Export-Led Growth, and the Irrelevance of Bargaining Structure

## 1 Introduction

The determinants of “wage moderation,” or its opposite, “wage militancy” have been extensively researched by comparative political economy. A large literature has studied cross-country differences in wage bargaining structures, trying to discern those that are most (or least) conducive to wage restraint. Surprisingly, individual-level attitudes towards wages have been neglected so far. Yet, it seems plausible that wage moderation as an aggregate outcome is more likely to emerge when workers are satisfied with their wages and thus less likely to mobilize to increase them.<sup>1</sup>

In this paper, we study the determinants of wage satisfaction and dissatisfaction at the individual level by analyzing two waves of the International Social Survey Programme (ISSP 1999; 2009), supplemented by macro-level data from various sources. Our goal is to understand to what extent workers internalize two kinds of economic constraints: the microeconomic risk of job loss for workers exposed to international trade, and the macroeconomic requirement to keep wage growth in check if a country relies heavily on export-led growth. Furthermore, we aim to ascertain whether the internalization of constraints is facilitated by more coordinated or centralized wage bargaining structures, as suggested by the vast literature on (neo-)corporatism.

We find that the workers’ attitudes to wages are significantly and substantially shaped by the above-mentioned constraints. Wage dissatisfaction decreases with trade exposure at the individual level and with reliance on export-led growth at the country level. Interestingly, the wage-moderating effect of export-led growth applies not just to workers who directly benefit from increased cost competitiveness but also to other workers as well. However, we do not find any direct or moderating effect of wage bargaining structure. This implies either that corporatist institutions affect aggregate wages without modifying the wage preferences of workers, as suggested by a portion of the literature, or that the corporatist literature has exaggerated the importance of bargaining structure.

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1 In this paper, we use “wage moderation,” “wage restraint,” “wage satisfaction,” and their opposites, “wage militancy” and “wage dissatisfaction,” interchangeably. We also use “wage preferences” and “wage attitudes” interchangeably.

The paper is organized as follows. We first review the existing comparative political economy research on wage moderation and workers' preferences, and formulate hypotheses about how trade exposure, growth models, and wage bargaining institutions affect individual attitudes to wages. Then we present our empirical setup and empirical tests. In the conclusion, we highlight the implications of our findings for the literature on wage bargaining and growth models.

## 2 Determinants of wage moderation

A rich literature in comparative political economy has examined the determinants of "wage restraint." The bulk of the literature has focused on wage bargaining institutions, sometimes in interaction with the central bank's behavior. In this literature, wage moderation improves the trade-off between inflation and unemployment (see Tarantelli 1986; Flanagan, Soskice, and Ulman 1983). If nominal wages are set by multiple wage setters, and if none of them is sufficiently large to internalize the costs of wage militancy (Olson 1965), each will have incentives to push for higher wages. Yet, because the same reasoning applies to all actors, the ultimate outcome will be a tendency for nominal wages to increase everywhere. Whether this tendency translates into higher inflation or higher unemployment will depend on the response of the central bank. If the central bank accommodates, there will be higher inflation. If the central bank does not accommodate, there will be higher unemployment (Hall and Franzese 1998; Iversen 1999).

However, if wage bargaining is centralized or coordinated, the wage setters will face different incentives. In particular, unions will understand that a wage push is likely to produce negative outcomes and will therefore exercise self-restraint. Empirical research based on these theoretical premises has found that centralized or coordinated wage bargaining is associated with lower inflation and/or unemployment.<sup>2</sup> Research has also shown that wage growth is lower under centralized or coordinated bargaining (e.g., Baccaro and Simoni 2010).

A general feature of the existing literature is its focus on macro characteristics. This focus makes it difficult to understand the mechanisms through which wage moderation emerges (or fails to emerge) as an aggregate outcome. If bargaining coordination

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2 See, in a very long list, Cameron 1984; Calmfors and Driffill 1988; Soskice 1990; Scharpf 1991; Garrett 1998; Hall and Franzese 1998; Iversen 1999; Soskice and Iversen 2000; Traxler, Blaschke, and Kittel 2001; Franzese 2002; Kenworthy 2002; Mares 2006. This literature has also discussed at length which type of bargaining structure is "optimal," i.e., associated with lowest inflation and/or unemployment. Calmfors and Driffill (1988) argued that both decentralized and centralized bargaining structures have good macroeconomic performances, while Soskice (1990) argued that decentralized bargaining is inefficient and found a monotonic relationship between bargaining coordination and macroeconomic outcomes.

leads to wage moderation, does this happen because bargaining coordination leads individual workers to develop more moderate wage preferences, or because union leaders are able to suppress “deviant” preferences and impose moderate bargaining agendas?

In response to these questions, the literature on neocorporatism has offered interesting, but so far largely untested conjectures. A portion of the literature has argued that corporatist institutions enable organizational leaders to effectively suppress or sideline “militant” worker preferences (Schmitter 1974; Streeck 1988, 1994; Pemberton 1988; Przeworski 1985). According to this literature, wage moderation does not emerge because the wage preferences of workers become more moderate, but because the preferences of interest group leaders prevail, enabling them to pursue policies that conflict with the preferences of a large portion or even the majority of the membership (Pizzorno 1978). Another stream of literature has argued instead that union leaders in centralized unions shape workers’ preferences and make them more moderate through the circulation of information and persuasive argument (Baccaro 2003; Culpepper 2008).

In this paper, our focus is on workers’ individual attitudes towards wages. We start from the assumption that wage attitudes depend on the perceived costs of wage militancy for the worker, and that workers who are exposed to international trade are less likely to express wage dissatisfaction. In formulating this hypothesis, we build on a portion of the neocorporatist literature, which distinguishes between exposed and non-exposed sectors. It argues that unions in sectors exposed to international competition are directly affected by the consequences of wage militancy, since the resulting cost increase is likely to have negative consequences for firm competitiveness and lead to reduced product and labor demand and lower employment. Firms in exposed sectors are for the same reason more likely to resist unions’ wage militancy. Instead, unions in non-exposed sectors face less stringent competitiveness constraints, and firms are more likely to be able to accommodate higher costs by increasing prices. For public sector unions in particular, employment may be entirely disconnected from market conditions. For all these reasons, wage moderation is more likely to emerge in exposed sectors than in non-exposed ones (Crouch 1988; Franzese 2001; Garrett and Way 1999; Hancké 2013; Johnston and Regan 2016). The wage moderating effect of trade exposure is likely to apply to the individual level as well, as suggested by the literature on the effects of trade openness (e.g., Mayda and Rodrik 2005; Walter 2017; Busemeyer and Garritzmann 2019). According to this literature, individuals demand policies that reduce labor market risks and the potential adverse economic consequences associated with trade openness.<sup>3</sup> Based on the above, we hypothesize that workers exposed to trade put their jobs at risk if nominal wage growth is excessive. Thus, they internalize this constraint and are more likely to suppress attitudes of wage dissatisfaction.

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3 The literature on the effects of globalization on individual-level preferences has studied preferences towards issues such as free trade (Mayda and Rodrik 2005) or social policies (Walter 2017; Busemeyer and Garritzmann 2019). To the best of our knowledge, to date no study has examined how globalization affects individual preferences towards wages.

*Hypothesis 1: The more workers are exposed to international competition, the lower their wage dissatisfaction.*

However, the egocentric effect of trade exposure does not exclude sociotropic considerations. Here we build on the recent literature on growth models (Baccaro and Pontusson 2016; Stockhammer 2015; Lavoie and Stockhammer 2012). This literature casts doubt on the notion that wage moderation is unconditionally conducive to higher growth. Especially for large economies, wages are an important determinant of aggregate demand, and wage moderation may lead to excess savings and stagnation. However, in export-led economies wage moderation leads to real exchange rate depreciation (provided the exchange rate is not fully flexible). If the economy is sufficiently open and the sensitivity of exports to wage and price differences sufficiently large, any negative effect of wage moderation on domestic demand is more than compensated by the stimulation of exports (Bhaduri and Marglin 1990). In a recent analysis, Johnston (2021) finds that wage moderation is associated with higher growth and lower unemployment only for countries pursuing export-led growth, but not for countries relying on domestic demand.

The growth model literature suggests that wage moderation is a prerequisite for export-led growth (Baccaro and Pontusson 2016). We thus hypothesize that in countries relying on export-led growth, a generalized “wage consciousness” emerges, which leads workers to internalize the need for wage moderation. The mechanisms may be multiple. Workers may be influenced by the dominant discourse in the country. The more a country relies on export-led growth, the more likely it is that the public discourse centers around concerns for international competitiveness (Howarth and Rommerskirchen 2013, 2017; Meteling 2016; Ferrara et al. 2021). Most workers are unlikely to have a full understanding of how changes in wages translate into macroeconomic outcomes such as inflation, levels of unemployment, or growth. In the absence of a full understanding of such complex economic interrelationships, workers may react to cues provided by political elites, transmitted via the media (e.g., Zaller 1992; Lenz 2009; Barnes and Hicks 2018; O’Grady 2017). They may also respond to persuasive communication by union leaders. Considering all interrelations and spillovers, workers may think that they are net beneficiaries of wage moderation even when they are employed in sectors in which wage moderation is not crucial for firm competitiveness. This implies that in countries strongly dependent on export-led growth, a favorable attitude towards wage moderation should also be manifest among workers who are not directly affected by the beneficial consequences of wage moderation, such as non-exposed workers.

*Hypothesis 2: Individual wage dissatisfaction declines with greater country dependence on export-led growth.*

*Hypothesis 3: Specifically, for workers not exposed to international competition, wage dissatisfaction declines with greater country dependence on export-led growth.*

Finally, we explore the impact of bargaining structure. The corporatist literature reviewed above suggests that a coordinated bargaining structure (Soskice 1990), or a centralized bargaining or union structure (Golden, Wallerstein, and Lange 1999), reduces individual wage dissatisfaction, leading workers to internalize the negative externalities of wage militancy. This effect may apply to union members only or to all workers if bargaining has spillover effects for non-union workers as well. Additionally, a more coordinated or centralized bargaining structure may facilitate the internalization of competitiveness concerns for workers exposed to trade (Crouch 1988; Franzese 2001; Garrett and Way 1999; Frieden and Rogowski 1996). Moreover, it may be hypothesized that faced with low wage growth, workers may be less dissatisfied when wage bargaining is more coordinated or centralized. This leads us to formulate the following additional hypotheses:

*Hypothesis 4: Wage dissatisfaction is lower in coordinated/centralized bargaining structures.*

*Hypothesis 4a: The wage dissatisfaction of union members is lower in coordinated/centralized bargaining structures.*

*Hypothesis 4b: The wage dissatisfaction of workers exposed to international competition is lower in coordinated/centralized bargaining structures.*

*Hypothesis 4c: The wage dissatisfaction caused by low wage growth is lower in coordinated/centralized bargaining structures.*

### 3 Data and models

Our data come from two waves of the ISSP Social Inequality module conducted in 1999 and 2009, which we complement with various country-level data. We focus on advanced OECD countries included in at least one ISSP wave. In total, our sample includes 19 countries with 31 country-year observations and 14,945 individuals.<sup>4</sup>

#### Dependent variable

To operationalize our dependent variable we use the following survey question from the ISSP:

“Would you say that you earn: 1: Much less than [you] deserve; 2: Less than [you] deserve; 3: What [you] deserve; 4: More than [you] deserve; 5: Much more than [you] deserve”

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4 The countries are Australia, Austria, Belgium (Flanders only), Denmark, Finland, France, Germany, Iceland, Italy, Japan, Korea, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

We dichotomize responses to this item distinguishing between respondents who are dissatisfied with their wage (categories 1 and 2) from those that are satisfied with their wage (categories 3 to 5). Dichotomization of the dependent variable eases the presentation of the results. However, running multilevel ordered logistic regression models with the original coding of the dependent variable does not alter the findings (Table A.8 in the online appendix). We include only employed individuals in the sample.

We consider our measure an acceptable proxy of attitudes towards wage satisfaction and dissatisfaction. Research in economics has found that wage attitudes are largely shaped by whether individuals consider their wages as being fair (for a review: see Fehr, Goette, and Zehnder 2009). A perception of earning less than one deserves should thus be associated with preferences for higher wages to address this perceived unfairness. Summary statistics show that 57 percent of respondents in our sample state that they earn less or much less than they deserve, which we interpret as wage dissatisfaction (see Table A.1 in the online appendix). Below, we explain how we operationalize our independent variables to take into account the fact that our dependent variable may be interpreted as relative to a reference group. In the online appendix A.1 we also explain how we cross-validated our measure against other measures of wage (dis-)satisfaction using the WageIndicator Survey (Tijdens et al. 2010).

## Main independent variables

### *Constructing a measure of occupational trade exposure*

One of our key independent variables is individual-level exposure to trade. The ISSP does not include information on the sector in which the worker is employed. Thus, we combine the individual-level data on occupations in the ISSP with individual-level data on occupation by sector of employment from the European Social Survey (ESS 2008), and with sector-by-country data on trade exposure from the OECD STAN database (OECD 2019).<sup>5</sup> Using ESS data, we calculate the probability for each occupation (ISCO88, at the 4-digit level) of being located in a specific sector (NACE rev.1.1 at the highest level of aggregation: fifteen sectors). Then we calculate the trade exposure of each sector defined as: (Exports+Imports)/Output. We use 5-year averages of sectoral trade exposure for the years preceding the fielding of the ISSP (1994–1998 and 2004–2008). In this way, we create a measure which attributes to each individual a probability distribution of being employed in certain sectors based on the person's occupation, and

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5 We use the 2008 wave of the ESS as the wave closest to the ISSP 2009 wave. For the calculations we include only those twelve countries that are also included in both ISSP waves in 1999 and 2009 (AT, BE, CH, DE, DK, ES, FI, FR, NO, PT, SE, UK).

then weighs this probability distribution by the sectoral trade exposure.<sup>6</sup> The formula we use is the following:

$$\text{Occupational trade exposure}(i, o) = \sum_{s=1}^n \pi(o, s) * (\text{Sectoral trade exposure}(s))$$

where  $i$  indexes individuals,  $o$  occupations,  $s$  the  $n$  sectors, and  $\pi(o, s)$  is the probability of being employed in a particular occupation and sector. The measure captures the trade risk of a particular occupation as opposed to the trade risk of the sector in which the individual is currently employed. We think it is preferable to the latter because it takes into account that individuals in particular occupations are employable in different sectors.

Online appendix Table A.2 shows that our measure of occupational trade exposure produces systematic variation in trade exposure across occupational categories (Table A.2 displays summary statistics at the ISCO88 1-digit level). Exposure varies between zero for service workers and an average value of 0.33 for “plant and machine operators and assemblers.” As a robustness check, we replicated the analysis using the “offshorability index” developed by Blinder (2009). This index measures the potential for an occupation to be moved abroad based on its technological characteristics and was used, among others, by Walter (2017) to assess the impact of globalization on individual preferences. Using the offshorability index as an alternative measure produces similar findings to the main analysis (see Table A.4 in the online appendix). However, the risk associated with trade exposure seems more general than the risk of offshoring. A worker may be affected by foreign competition whether or not the job is offshorable. Therefore, we consider our measure of occupational trade exposure as more suitable for the context of this study.

We use two different versions of our measure of occupational trade exposure: one continuous, the other discrete. As our first measure, we use a logarithmic transformation (to reduce the influence of outlying values) of the continuous occupational trade exposure measure illustrated above, and control for the worker being employed in the public sector using self-reported information from the ISSP survey. Our second measure combines trade exposure and public sector employment into a categorical variable, which distinguishes among sheltered public, sheltered private, and exposed workers. Due to the probabilistic construction of our measure of occupational trade exposure only 13 percent of respondents have zero trade exposure, but many occupations have values of exposure close to zero. For this reason, we code occupations with below-median exposure as sheltered and with above-median exposure as exposed (this median value of exposure is 0.0063). The large majority of public sector workers fall below this threshold. We code the remaining public sector workers with above-median occupational trade

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6 See Mayda and Rodrik (2005) for a similar but less precise approach. Mayda and Rodrik match each occupational category to a specific sector based on information from secondary data. They then assign values of sectoral trade exposure to the corresponding occupations to construct a measure of trade exposure at the occupational level. However, by assigning each occupation to a specific sector, Mayda and Rodrik are unable to consider the probability distribution of occupations across sectors, which likely increases measurement error.

exposure as exposed workers. These workers are likely to be employed in state-owned enterprises, which are often organized similarly to private sector companies, or to work in public sector occupations which are in common with exposed sectors, and thus in principle subject to similar labor market risks.

### *Constructing a measure of export-led growth*

Another key predictor in our analysis is the country-level reliance on export-led growth. A common approach to operationalizing export-led growth is to calculate the contribution of net exports (i. e., the difference between exports and imports) to GDP growth (e. g., Baccaro and Pontusson 2016). However, this approach underestimates the actual growth contribution of exports because it subtracts the whole volume of imports from exports. In reality, imports are mostly used for consumption and investment purposes, and only a portion of imports is used for the production of exports. To obviate this shortcoming we proceed as follows: In a first step, we calculate the import-adjusted volume of exports. This is the volume of exports minus the volume of imports used in the production of exports. Data on exports comes from the AMECO database (AMECO 2019); data on the import-content of exports comes from the OECD Input-Output Tables (OECD 2019). The import-adjusted contribution of exports to growth is then calculated as the annual change of import-adjusted exports weighted by the share of import-adjusted exports in GDP at  $t-1$  (data on GDP from AMECO 2019). We then calculate the share of import-adjusted growth contribution of exports in total growth.<sup>7</sup> See the online appendix A.2 for a detailed exposition of the way this measure is calculated.<sup>8</sup> The final formula is the following:

$$\text{Import-adjusted export-led growth} = \frac{P_t^e IE_t - P_{t-1}^e IE_{t-1}}{P_t Y_t - P_{t-1} Y_{t-1}}$$

Where  $P^e$  is the price of exports,  $P$  is the price of GDP,  $IE$  is import-adjusted exports, and  $Y$  is GDP. To avoid an excessive influence of year-to-year fluctuations, we calculate 5-year averages for the periods preceding data collection in the ISSP (i. e., 1994–1998 and 2004–2008). Table A.1 in the online appendix lists the shares of (import-adjusted) export-led growth by country. This is lowest in the US (with a value of 0.17) and below average in the Anglo-Saxon and Southern European countries. Switzerland has the highest contribution of exports to GDP growth (0.87), and export-led growth is above-average in the Continental European and Scandinavian countries (see Figure 1 below).

7 The measure of GDP growth we use is based on current PPP, i. e., expresses cross-country values in a common currency.

8 As a robustness check, we also use the absolute growth contribution of exports (without dividing for total growth). This alternative model leads to very similar findings (Table A.9 in the online appendix). Moreover, results do not change if we divide the absolute growth contribution of import-adjusted exports by a measure of GDP growth based on national currency as opposed to PPP.

### *Wage bargaining structure and controls*

We operationalize bargaining structure by including several measures of wage bargaining structure from the Visser (2019) database: coordination and centralization of wage setting (*coord* and *level*), and centralization of union organization (*cent*).

We also control for union membership status using individual data from the ISSP since some literature suggests that union members are more dissatisfied than non-members (Bryson, Cappellari, and Lucifora 2004; Hadziabdic 2020).

Additionally, we control for a range of confounding factors at the individual and at the country level. The coding of these variables is described in detail in online appendix Table A.3. At the individual level, we include variables related to the demographic and socio-economic situation of an individual to control for their potential association with both trade exposure and wage preferences. We control for age, age-squared (to check for a non-linear impact of age), gender, part-time versus full-time work, individual income, and educational attainment.<sup>9</sup> In robustness models, we include alternative versions of some individual-level control variables to account for the relative character of our measure of wage preferences: Since the question about attitudes towards wages may be interpreted by the respondent as relative to a reference group, we calculated a relative education measure (indicating respondent's over- or undereducation relative to other respondents in the same occupation, at the ISCO 1-digit level), and a measure of income difference relative to respondents with a) the same educational attainment, and b) the same occupation (at the ISCO 1-digit level). These additional models lead to the same findings as the main analysis, which makes us more confident about using our dependent variable being a valid proxy of wage (dis-)satisfaction.

To be able to identify the effect of export-led growth on wage preferences, we need to hold constant a range of confounding factors at the country level. Bivariate correlations reveal a tight negative association between average real wages at the country level and wage dissatisfaction ( $r = -0.63$ ;  $p = 0.004$ ) meaning that wage dissatisfaction is lower where the average real wage is higher. We thus include average real wage levels, as well as their change in the years preceding the surveys, as control variables. Wage dissatisfaction might also be stronger if incomes are distributed more unequally, since income inequality violates fairness norms (Fehr, Goette, and Zehnder 2009). Thus, we control for inequality in market and disposable incomes. Furthermore, wage expectations can be associated with the country's economic situation. Wage dissatisfaction should be more widespread if the country experiences strong economic growth, if high inflation threatens the purchasing power of wages, and if national or education-specific unem-

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9 In additional models, we also controlled for whether a respondent has supervisory responsibilities since this might also affect their wage preferences. These additional models do not alter our main findings. Because the variable on supervisory responsibilities is not available for all countries, we do not include it in the final analysis.

ployment is low, implying a more favorable labor market situation for workers. Euro-zone membership could be expected to reduce wage demands because it eliminates the option of currency devaluation to compensate for adverse consequences of high wage settlements on competitiveness. The euro was in the process of introduction during the first ISSP wave in 1999 but the exchange rate parities had been fixed the year before. We control for all of these potential confounding variables in separate models.

### Estimating equation and estimators used

We run multilevel logistic regression models to account for the nested structure of our data. Because individuals are nested in country-years, which are nested in countries, we include country and country-year random intercepts.<sup>10</sup> We include macro-level variables as country-average values over the two periods and as deviation from these values in the specific period of observation (Bell and Jones 2015; Fairbrother 2014). This specification has several advantages. Compared to standard random effects models it avoids the assumption that cross-sectional and longitudinal relationships are the same. Including country-averages of the macro-level variables controls for possible correlation between time-invariant covariates and country random intercepts. At the same time, this specification is more flexible than the country fixed effects model specifications because it is not limited to longitudinal relationships only. By distinguishing country averages and period-specific deviations, we can thus distinguish between long-term effects of macro variables (captured by the variables in levels) and short-term effects (captured by changes). Finally, we include a year dummy to control for time effects that are common across countries.

## 4 Results

We begin by examining the individual predictors of wage dissatisfaction. We then move to the impact of export-led growth at the country level, including the cross-level interaction between export-led growth and occupational trade vulnerability. Finally, we analyze the effects of various dimensions of bargaining structure, including cross-level interactions with union membership and occupational trade vulnerability, respectively.

The multilevel logistic regression results in Table 1 provide robust support for the hypothesis that working in an occupation exposed to international trade is associated with lower wage dissatisfaction (hypothesis 1). This finding applies to both the continuous

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10 The results hold if we add the lower level components of our cross-level interaction terms, occupational trade exposure and union membership, as random slopes (cf. Heisig and Schaeffer, 2019).

Table 1 Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; maximum likelihood estimates

	M1	M2	M3	M4
Dependent variable: Wage dissatisfaction				
Occupational trade exposure (log)	-0.034*** (0.006)			
Public sector	0.050 (0.043)			
Occupational exposure: Public sheltered (Reference group: Exposed)		0.292*** (0.047)	0.292*** (0.047)	0.445*** (0.124)
Private sheltered		0.102* (0.045)	0.100* (0.045)	-0.078 (0.110)
Union member	0.200*** (0.043)	0.196*** (0.043)	0.196*** (0.042)	0.194*** (0.043)
Age	0.064*** (0.010)	0.064*** (0.010)	0.064*** (0.010)	0.064*** (0.010)
Age squared	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Female	0.083* (0.039)	0.101** (0.039)	0.102** (0.039)	0.100* (0.039)
Individual income	-0.250*** (0.010)	-0.250*** (0.010)	-0.249*** (0.010)	-0.248*** (0.010)
Employed part-time	-0.624*** (0.053)	-0.619*** (0.053)	-0.617*** (0.053)	-0.613*** (0.053)
Education: Upper secondary (Reference group: Below upper sec.)	-0.192*** (0.053)	-0.182*** (0.053)	-0.191*** (0.053)	-0.188*** (0.053)
Above upper secondary	-0.078 (0.057)	-0.059 (0.057)	-0.070 (0.057)	-0.068 (0.057)
Tertiary	-0.103 (0.055)	-0.082 (0.054)	-0.093 (0.054)	-0.092 (0.054)
Year=2009 (Reference: 1999)	0.223 (0.146)	0.223 (0.147)	0.297* (0.132)	0.292* (0.132)
Export-led growth (mean)			-1.348*** (0.359)	-1.390*** (0.369)
Export-led growth (delta)			-0.174 (0.646)	-0.174 (0.649)
Public sheltered * Export-led growth (mean)				-0.349 (0.259)
Private sheltered * Export-led growth (mean)				0.412 (0.232)
Constant	0.507* (0.236)	0.212 (0.234)	0.772** (0.267)	0.790** (0.270)
Random intercept variance (country)	0.033 (0.058)	0.032 (0.060)	0.007 (0.032)	0.006 (0.032)
Random intercept variance (country-year)	0.136* (0.062)	0.139* (0.063)	0.106* (0.042)	0.107* (0.043)
N	14,945	14,945	14,945	14,945
N countries	19	19	19	19
N country-years	31	31	31	31

Standard errors in parentheses; \*\*\* p<0.001, \*\* p<0.01, \* p<0.05.

and the categorical operationalizations of occupational trade exposure (see Models 1 and 2). Average marginal effect estimates based on Model 1 suggest that compared to workers without any trade exposure, the probability of wage dissatisfaction for individ-

uals at the 90th percentile of exposure is 7.47 percentage points lower.<sup>11</sup> The magnitude of this effect is comparable to an upward shift of individual income of approximately 1.5 income deciles. Average marginal effect estimates based on Model 2 suggest that compared to individuals in sheltered private sector occupations, the likelihood of individuals working in exposed occupations to express dissatisfaction with their wage decreases by 2.25 percentage points. Compared to sheltered public sector workers, the difference is 6.37 percentage points. It seems that working in the sheltered public sector is associated with a higher likelihood of being dissatisfied with one's wage.

Several of the individual-level control variables in Table 1 are also significantly related to wage preferences. Being a trade union member is associated with a higher likelihood of being dissatisfied with one's wage. Age has a curvilinear relationship: Both labor market entrants and workers close to retirement age are more likely to be satisfied with their wages compared to middle-aged workers. Women are more dissatisfied with their wages than men. This finding is surprising because women have been found to be willing to accept lower wage offers than men (Säve-Söderbergh 2007; Bowles and Babcock 2012). The wage dissatisfaction of women may be a reaction to discriminatory wage practices. In contrast, part-time work, which is more common among women, is associated with lower dissatisfaction. If working part-time is dropped from the model, being female becomes insignificant.<sup>12</sup> Furthermore, wage dissatisfaction is lower for individuals with higher income. The effect of educational attainment is non-linear, with individuals below upper secondary education having the highest level of dissatisfaction and individuals with upper secondary education being most satisfied.

In the next step, we evaluate the impact of export-led growth (hypothesis 2), starting with a graphic representation of the bivariate relationship at the country level. Figure 1 displays a clear negative association between export-led growth and wage dissatisfaction. The bivariate correlation coefficient is  $-0.71$  ( $p = 0.001$ ). Dissatisfaction is highest in Portugal, a country with below-average export-led growth with more than 70 percent of workers being dissatisfied with their wages, and is lowest in Switzerland, a country with a strong export contribution to growth and less than 40 percent of workers being dissatisfied.

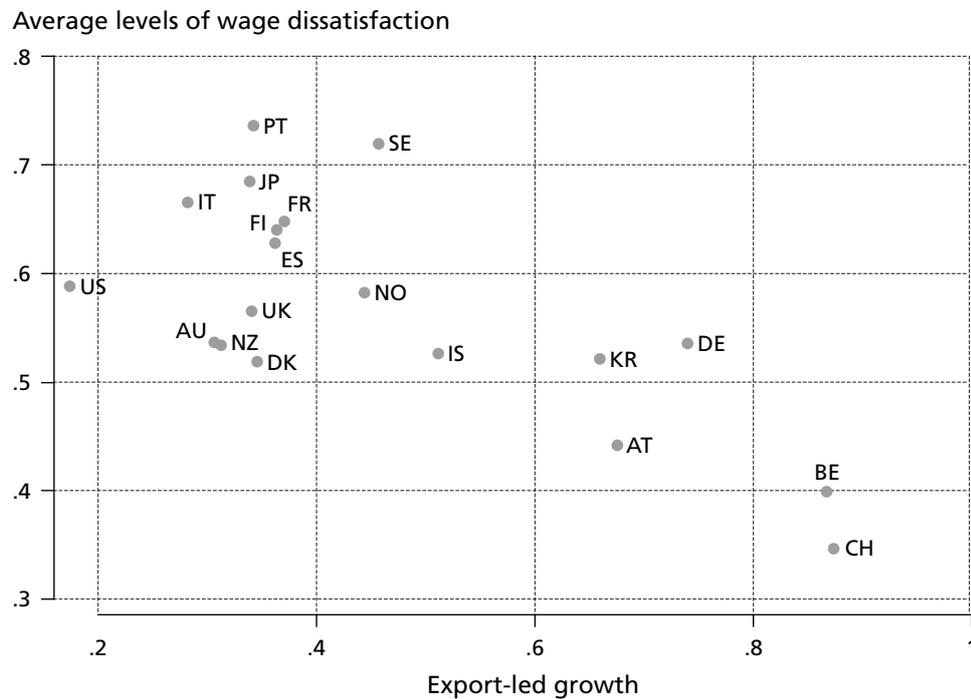
Models 3 and 4 in Table 1 add our macro-level measure of export-led growth to the logistic regression models. The core finding is that a higher reliance on export-led growth is associated with more moderate wage preferences (Model 3). What matters is cross-national variation in export-led growth, which is highly statistically significant, while variation in export-led growth over time is also negatively signed but does not reach

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11 This and the following references to effect sizes are based on average marginal effect estimates of the multilevel logistic regression results.

12 Vice versa, if being female is dropped from the model, part-time work remains significantly negatively related to wage dissatisfaction.

Figure 1 Export-led growth and country-average levels of wage dissatisfaction



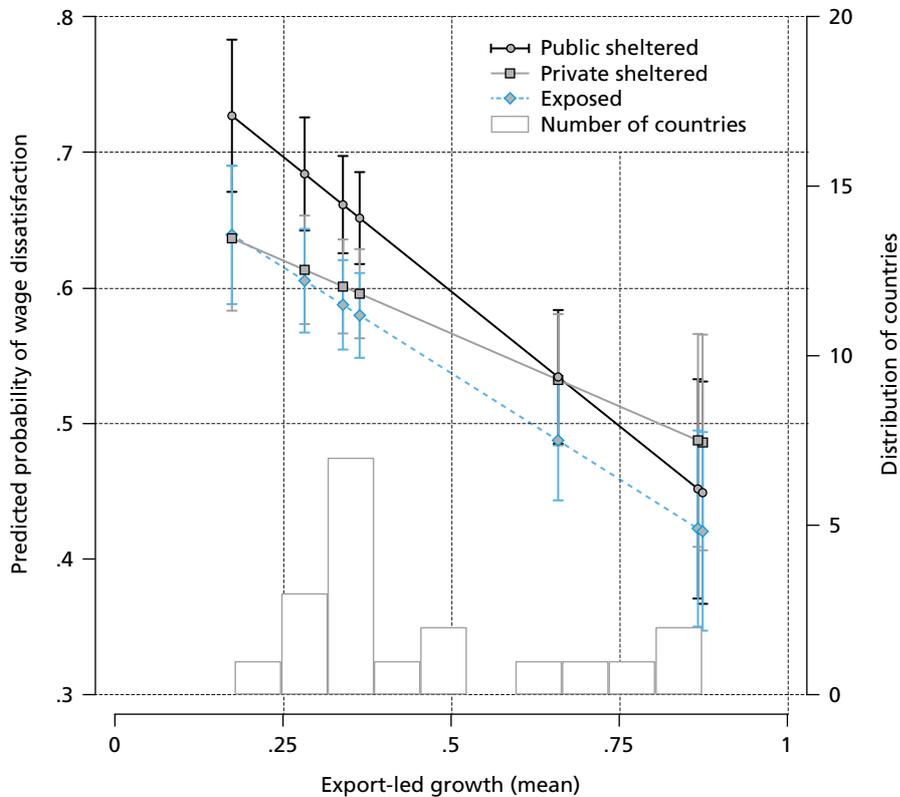
Note: Survey weights used.

conventional levels of statistical significance. The effect of export-led growth is substantial in size. The simulated difference in the predicted probability of wage dissatisfaction between countries with a very low (the US) and a very high level of export-led growth (Switzerland) amounts up to 20.83 percentage points. It seems that the more exports contribute to GDP growth, the more satisfied individuals are with their wages, controlling for other individual determinants of wage (dis-)satisfaction.

In additional models, we tested for the influence of country outliers. We replicated Model 3 dropping one country at a time. The effect of export-led growth remains robust at least at the 99 percent level of significance and the simulated difference in the predicted probability of wage dissatisfaction between the countries with the lowest and the highest levels of export-led growth varies between 17.73 and 24.23. These results suggest that the negative effect of export-led growth on wage dissatisfaction is not driven by particular country outliers.<sup>13</sup>

13 When using the operationalization of export-led growth based on GDP growth measured in national currency as opposed to PPP, Japan becomes a country outlier with exceptionally high levels of export-led growth. The effect of export-led growth holds in these alternative models, but becomes stronger when Japan is excluded (Table A.9 in the online appendix).

Figure 2 Predicted probabilities of wage dissatisfaction, by export-led growth and occupational trade exposure



Note: Predicted probabilities and 95 percent confidence intervals based on Model 4 in Table 1. Predicted probabilities are shown for export-led growth at the following levels: minimum value, 10th, 25th, 50th, 75th, 90th percentile, and maximum value.

To evaluate the claim that competitiveness concerns are internalized also by individuals in sheltered sector occupations (hypothesis 3), we introduce a cross-level interaction between occupational trade exposure and export-led growth (Model 4). Wage dissatisfaction declines with greater export-led growth orientation not only for exposed workers but also for public sector and private non-exposed workers. In fact, the insignificance of the interaction terms suggests there is no difference in the impact of export-led growth for these three types of workers. In other words, reliance on export-led growth and occupational exposure operate additively on wage attitudes. Figure 2 plots predicted probabilities of wage dissatisfaction by export orientation and occupational exposure (based on Model 4 in Table 1). It shows that our hypothesis 3 is corroborated: wage preferences are more moderate in countries that rely more extensively on export-led growth also for workers not exposed to international competition.

Models 1 to 9 in Table 2 test whether the negative effect of export-led growth holds when controlling for various macro variables: real average wage levels, changes in real average wages, GDP growth, (education-specific) unemployment, inflation, eurozone membership, and disposable and market income inequality (the full results are reported

Table 2 Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; effects of macro-level covariates; maximum likelihood estimates

	Export-led growth (mean)	Export-led growth (delta)	Macro-level control (mean)	Macro-level control (delta)	N countries	N country- years
M1 Real average wage levels	-1.073*** (0.309)	0.123 (0.685)	-0.000** (0.000)	-0.000 (0.000)	19	31
M2 Changes in real average wages	-1.334*** (0.362)	-0.155 (0.628)	0.312 (1.960)	2.588 (2.592)	19	31
M3 GDP growth	-1.589*** (0.384)	0.069 (0.588)	-0.068 (0.074)	0.243 (0.139)	19	31
M4 Unemployment rate	-1.228*** (0.337)	0.033 (0.617)	0.027 (0.022)	-0.071 (0.045)	19	31
M5 Inflation	-1.441*** (0.370)	-0.488 (0.649)	-0.041 (0.078)	0.158 (0.131)	19	31
M6 EMU membership	-1.470*** (0.359)	-0.219 (0.640)	0.170 (0.132)		19	31
M7 Education-specific unemployment rate	-1.201** (0.400)	-0.034 (0.694)	0.026 (0.016)	-0.032 (0.029)	16	26
M8 Disposable income inequality	-1.341*** (0.407)	-0.295 (0.673)	0.058 (0.094)	0.003 (0.018)	19	31
M9 Market income inequality	-1.187*** (0.353)	-0.426 (0.675)	0.077 (0.079)	0.025 (0.016)	19	31

Standard errors in parentheses; \*\*\* p<0.001, \*\* p<0.01, \* p<0.05.

Note: Regression models include the same individual-level variables as Table 1, Model 2. For full regression results, see Table A.5 in the online appendix.

in Table A.5 in the online appendix). Across model specifications, the effect of export-led growth is robust and strongly statistically significant. Compared to the strong and persistent effects of export-led growth, the remaining macro-level variables matter little in influencing wage preferences and the effect estimates are insignificant for most variables. The only significant effect appears for long-term wage levels, with higher average wage levels reducing wage dissatisfaction.

Finally, we assess the influence of wage bargaining structure (hypotheses 4 to 4c). The models in Table 3 keep the individual-level predictors from the previous models and add the macro-level measure of wage bargaining coordination (Model 1), its interaction with union membership (Model 2), with occupational trade exposure (Model 3), and with country-level wage change (Model 4). Results for the additional indicators of wage bargaining structures, wage bargaining centralization, and union centralization, are included in the online appendix (Table A.6). We do not find support for hypotheses 4 to 4c. Contrary to hypothesis 4, the effect estimates of wage bargaining coordination are statistically insignificant. Contrary to hypothesis 4a, there is no evidence that the wage dissatisfaction of union members is lower in countries with more coordinated wage bargaining. In fact, the interaction between bargaining coordination and union membership is insignificant and even positively signed. Contrary to hypothesis 4b, the wage dissatisfaction of exposed workers (the reference category) is not significantly lower in countries with more coordinated wage bargaining. Post-estimation Wald tests show that differences in wage dissatisfaction of exposed workers are statistically insignificant across levels of bargaining coordination. Model 3 in Table 3 even suggests that public sector workers are *more* dissatisfied in countries with higher bargaining coordination. Contrary to hypothesis 4c, there is no evidence that the wage dissatisfaction caused by low wage growth at the country level is contained at higher levels of bargaining coordination. Again, Wald tests show no significant effects. In a similar vein, we do not find support for hypotheses 4 to 4c by using the alternative indicators of wage bargaining structures (Table A.6 in the online appendix).<sup>14</sup>

In light of our findings for export-led growth and non-findings for wage bargaining structures, export-led growth seems to be the decisive country-level factor shaping individual attitudes towards wages. In additional models, we include both sets of variables simultaneously to further evaluate their relative importance.<sup>15</sup> Table A.7 in the online appendix reinforces the above findings. Holding wage bargaining structures constant, the effect estimates of export-led growth remain significant and hardly change in size.

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14 The interaction between wage growth and union centralization is statistically significant in Table A.6, Model 8. However, graphical inspection suggests that this result is driven by Austria with its exceptionally high level of union centralization. If Austria is dropped from the models, the interaction becomes insignificant.

15 However, wage bargaining coordination and export dependence are positively correlated ( $r = 0.53$ ,  $p = 0.02$ ) and this makes it more difficult to disentangle their respective effects on wage (dis-)satisfaction. We also tested the interaction between export-led growth and bargaining coordination and found that it is not statistically significant (Table A.7, Model 4, see online appendix).

Table 3 Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; effects of wage bargaining coordination; maximum likelihood estimates

	M1	M2	M3	M4
Dependent variable: Wage dissatisfaction				
Occupational exposure: Public sheltered (Reference group: Exposed)	0.292*** (0.047)	0.295*** (0.047)	0.069 (0.088)	0.291*** (0.047)
Private sheltered	0.102* (0.045)	0.102* (0.045)	0.045 (0.080)	0.104* (0.045)
Union member	0.198*** (0.043)	0.078 (0.079)	0.204*** (0.043)	0.197*** (0.043)
Age	0.064*** (0.010)	0.064*** (0.010)	0.064*** (0.010)	0.064*** (0.010)
Age squared	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Female	0.101** (0.039)	0.100* (0.039)	0.099* (0.039)	0.101** (0.039)
Individual income	-0.250*** (0.010)	-0.249*** (0.010)	-0.249*** (0.010)	-0.250*** (0.010)
Employed part-time	-0.620*** (0.053)	-0.618*** (0.053)	-0.618*** (0.053)	-0.619*** (0.053)
Education: Upper secondary (Reference group: Below upper sec.)	-0.182*** (0.053)	-0.180*** (0.053)	-0.182*** (0.053)	-0.181*** (0.053)
Above upper secondary	-0.059 (0.057)	-0.056 (0.057)	-0.061 (0.057)	-0.058 (0.057)
Tertiary	-0.082 (0.054)	-0.080 (0.054)	-0.080 (0.054)	-0.082 (0.054)
Year=2009 (Reference: 1999)	0.213 (0.143)	0.213 (0.143)	0.218 (0.141)	0.275 (0.158)
Wage bargaining coordination (mean)	-0.261 (0.277)	-0.357 (0.282)	-0.400 (0.283)	-1.174 (0.838)
Wage bargaining coordination (delta)	1.020 (0.884)	0.996 (0.887)	1.008 (0.878)	0.698 (0.951)
Union member * Bargaining coordination (mean)		0.253 (0.139)		
Public sheltered * Bargaining coordination (mean)			0.454** (0.152)	
Private sheltered * Bargaining coordination (mean)			0.117 (0.146)	
Changes in real average wages (mean)				-10.793 (11.213)
Changes in real average wages (delta)				2.538 (3.105)
Wage bargaining coordination (mean) * Changes in real average wages (mean)				18.197 (16.044)
Constant	0.355 (0.261)	0.385 (0.262)	0.410 (0.262)	0.851 (0.603)
Random intercept variance (country)	0.041 (0.062)	0.040 (0.062)	0.042 (0.061)	0.025 (0.063)
Random intercept variance (country-year)	0.119* (0.059)	0.119* (0.059)	0.117* (0.058)	0.122 (0.064)
N	14,945	14,945	14,945	14,945
N countries	19	19	19	19
N country-years	31	31	31	31

Standard errors in parentheses; \*\*\* p<0.001, \*\* p<0.01, \* p<0.05.

In contrast, bargaining coordination, bargaining centralization, and union centralization are not significantly related to wage dissatisfaction.

## 5 Concluding discussion

This paper has shed light on the determinants of individual attitudes of wage satisfaction and dissatisfaction. In so doing, it has contributed to two literatures: the literature on the institutional determinants of wage moderation, by exploring the so far neglected dimension of individual preferences, and the new literature on growth models, by investigating their relationship with workers' wage preferences.

Our main intent was to assess the extent to which workers internalize the systemic constraint of competitiveness, both at the individual and at the country level. For this reason, rather than only considering the impact of bargaining structure as in the previous macro-level literature, we also examined the impact of occupational exposure to trade and country reliance on export-led growth.

Our results indicate that workers employed in occupations exposed to international trade are less likely to express wage dissatisfaction. In other words, wage satisfaction is enhanced by a heightened risk of job loss if the requirements of competitiveness are violated.

Wage preferences are also influenced by sociotropic concerns about the drivers of growth in the country as a whole. If a country relies heavily on export-led growth, workers are less likely to express wage dissatisfaction, even when they do not benefit directly from the competitiveness-enhancing effects of wage moderation. We conclude that export-led growth comes with a generalized "wage moderation consciousness." Workers seem to internalize the systemic importance of wage restraint for the country's growth. This finding suggests that export-led growth creates its own supporting attitudes, which facilitate its reproduction as a growth regime.

Surprisingly, wage bargaining institutions are not associated with wage dissatisfaction according to our analysis. One would expect, based on the previous literature, that wage preferences would be more moderate when wage bargaining is coordinated or centralized or union structure centralized. However, we do not find any evidence either of a direct effect of wage bargaining structure on wage preferences or of a moderating effect on the attitudes of union members or workers exposed to trade competition.

There are two possible explanations for this null finding: First, the effect of bargaining institutions may have been exaggerated by the previous literature because previous research did not control for export-led growth, which seems to be the decisive factor and

is positively correlated with wage coordination. Second, bargaining institutions may affect wage moderation without modifying worker preference, as suggested by the early literature on corporatism, which argued that corporatist institutions allow union leaders to ignore or suppress the preferences of workers (Schmitter 1974). Obviously, the absence of a *general* cross-country effect of wage bargaining does not exclude possible *localized* effects in specific sectors or regions or countries.

Our findings invite further research in several directions: First, we should explore through which mechanisms reliance on export-led growth moderates workers' wage expectations. One may hypothesize that the effect is linked to the dominant discourse diffused by the media, or to political party cues that workers follow. Second, future research should return to the macro analyses of the determinants of wage moderation, and test whether the effect of bargaining institutions on average wage moderation at the country level holds when the average wage preferences of workers are controlled for. If bargaining institutions remain a significant predictor controlling for average wage preferences of workers, this would indicate that bargaining institutions affect wage moderation without inducing a change in individual preferences, for example by moderating the bargaining policies of unions. Furthermore, it would be interesting to examine in future research whether there are patterns to workers' wage (dis-)satisfaction, e. g., whether it is broadly distributed in some countries vs. polarized in others, and whether such patterns are related to different growth models.

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