

# ‘Political Economy of wage inequality: Disentangling power resources, wage coordination and egalitarianism

**Tim Vlandas**

[t.r.vlandas@lse.ac.uk](mailto:t.r.vlandas@lse.ac.uk)

European Institute

London School of Economics

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## **Abstract**

Coordinated Market Economies (CMEs) portrayed in the Varieties of Capitalism (VoC) literature as producing more egalitarian outcomes, have become increasingly unequal. In particular, wage inequality between middle income and low income workers is now higher in some CMEs such as Germany than in the UK, a typical Liberal Market Economy. Similarly, the social democratic welfare regime of Denmark now produces more unequal outcomes than Bismarckian welfare regimes in France or Belgium. Panel data regression analysis shows the limits of both the Power Resource approach and VoC in explaining recent trends in wage inequality. Instead, this paper finds robust evidence for an inverted U-shape relationship between wage inequality and wage bargaining coverage. In line with existing literature, high coverage reduces inequality. However, in contrast to conventional wisdom, countries with medium bargaining coverage are more unequal than countries where wages are determined by market forces. Thus, high coordination that is not encompassing applies only to insiders and may therefore result in higher inequality.

**Keywords:** Inequality, Power resources, Varieties of capitalism, egalitarianism.

## Introduction

One of the most profound changes of the past three decades in the developed world is the significant rise in inequality after its relative decline in the post war years (Kenworthy and Pontusson, 2005). These trends in inequality have motivated important works in economics (Atkinson and Piketty, 2007; Leigh, 2007). Despite similar pressures, there remains important cross-national difference in the degree of inequality in European Political Economies. Economic factors alone cannot account for cross national diversity of wage inequality. This is because developed countries exhibit very different patterns of inequality despite common trends in technology, openness and education. In fact, contrary to what one can observe, markets forces alone would predict that inequality between middle and low skill workers should be lower in the US than other EU countries (Blau and Kahn, 1996: 831).

Moreover, there are comparatively few political economy studies of wage inequality between median and low income workers.<sup>1</sup> This type of inequality displays surprising patterns both in cross national terms and over time. More specifically, the difference between European countries in their ratio of gross earnings of the 5th and the bottom decile of full time workers presents us with a puzzle. Coordinated Market Economies (CMEs), which were portrayed as an equally efficient but more egalitarian type of Capitalism compared to their liberal counterparts (Hall and Soskice, 2001), have experienced particularly steep rise in inequality. Most strikingly, Germany is now more unequal than the UK.

This paper argues that this is *ceteris paribus* because coordinating wage setting institutions have become less encompassing. When inclusiveness decreases but coordination remains, workers that are covered by an agreement continue to be well protected, whereas the wages of the growing segment of workers not covered by agreements are comparatively lower. As a result, European countries with coordinated but non-inclusive wage setting institutions exhibit more inegalitarian outcomes than

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<sup>1</sup> A few exceptions include Iversen (1999), Pontusson *et al* (2002) and Rueda (2008)

both countries with more encompassing institutions and those with liberal market economies. This therefore explains why Germany is more unequal than Sweden, a country with encompassing wage bargaining institutions, but also more unequal than a liberal market economy like the UK. Based on time series cross-section regression analysis, the results support the existence of a robust inverted U-shape relation between bargaining coverage and inequality. The findings therefore demonstrate the relevance for equality of inclusiveness of wage bargaining institutions rather than their degree of coordination.

The findings also qualify the importance previously attributed to partisanship in the power resource approach and to coordination in Variety of Capitalism (VoC) in mitigating inequality. More specifically, I find no conclusive results concerning the impact of wage coordination and no statistically significant impact of economic coordination more generally. In other words, when controlling for the inclusiveness of wage bargaining agreements, coordination may not have equalising effects on the income distribution. Similarly, the control of government by the left seems to have little direct influence on inequality. The strength of unions and the existence of various welfare state policies such as minimum wages or decommodifying unemployment benefits continue to play an important role. Last but not least, this paper shows that economic determinants alone explain very little of the cross national variation in wage inequality at the low end of the income distribution. It stresses instead the importance of political and institutional determinants.

The paper is organised as follows. The next section reviews the existing literature on wage inequality as well as dualisation, and discusses current patterns of inequality in Europe. The second section identifies a number of hypotheses concerning the relation between wage setting institutions, welfare state policies and inequality. In the third section, the argument is tested on a time series cross section panel of European countries in the last decades. The last section concludes with some implications for further research on the relation between coordination and egalitarianism, and hence between efficiency and equity.

## **1. The puzzle of inequality at the bottom of the income distribution**

An important literature in economics (1.1) and comparative political economy has looked at wage inequality (1.2). However, patterns of wage inequality over time and across countries challenge the conventional wisdom in this literature (1.3).

### ***1.1. Economic determinants of inequality***

Economics has attempted to explain inequality by analysing supply and demand for workers with different levels of skills. On the demand side, a shift in the demand for skilled workers raises the wage skill premium of skilled workers relative to those of non-skilled workers (Gottschalk and Smeeding, 1997: 647). A first group of authors emphasise the role of technological change (e.g.: introduction of computers) in making skilled workers more productive to employers and hence increasing the demand for skilled workers (Freeman and Katz, 1995; Blau and Kahn, 1996; Goldin and Katz, 1996; Acemoglu, 2002). Changes in the structure of employment, not least deindustrialisation also may have reduced demand for low skill employment (Levy and Murnane, 1992).

On the supply side, an expansion in educated workers should lead *ceteris paribus* to a fall in the wage premium of educated workers (Gottschalk and Joyce, 1995). Rising trade competition may have increased the relative demand for skilled workers as well as the supply of less skilled workers in developed countries (Wood, 1994; Burtless, 1995; Freeman, 1995). Assume a Heckscher-Ohlin model where countries export predominantly goods that rely on their more abundant factor of production. If skilled workers are more abundant relative to unskilled workers in developed countries, then they will export high skill products and import low skill goods. The increase in the supply of low skills goods leads to a lower domestic price for these goods which put downward pressure on unskilled workers' wages. As trade with developing increases, inequality between skilled and unskilled workers in developed countries rise (Wood, 1994: 58-60). To the extent that immigrants are on average less educated than natives,

increases in immigration may put downward pressure on unskilled workers' wages (Borjas et al., 1997: 357; Rueda and Pontusson, 2000: 357).

In sum, trade openness and technological change are seen to increase inequality (Wood, 1994; Burtless, 1995; Gottschalk and Smeeding, 1997; Katz and Autor, 1999; Atkinson, 2003; Gottschalk and Danziger, 2005). Despite this significant scholarly attention, economics explanations fail to fully account for existing inequality. For instance, inequality has increased even within skills group (Gottschalk and Smeeding, 1997: 645). In addition, inequality in literacy seem to explain only a small part of the variation in earnings inequality (Blau and Kahn, 2002; Freeman and Devroye, 2002). Technology and increased trade affect all EU countries and cannot fully explain either variation in inequality (Mahler et al., 1999). The cross national variation in wage inequality therefore requires an institutional explanation (Gottschalk and Smeeding, 1997).<sup>2</sup>

### ***1.2. Political and institutional determinants of inequality***

Thus, important changes in inequality and the relative inability of economics to make sense of the cross national diversity have motivated an emerging literature from a comparative political economy perspective. This was also motivated by the recognition that most Western European countries, market forces may not be the only driving force in the context extensive wage setting institutions. I therefore briefly review the political and institutional factors that have been shown to affect inequality.

#### *Political factors*

In line with other works in comparative politics that have looked at the impact of partisanship on economic outcomes (Hibbs, 1977; Alt, 1985; 1987), the power resource approach (Korpi, 2006) stressed the impact of the ideology of the political party in power on the level of inequality. The causal mechanism through which

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<sup>2</sup> Note that even for changes in inequality within country, institutional change may matter more than other economic factors (for the case of the US, see Gordon, 1996; in Gottschalk and Smeeding, 1997; and Fortin and Lemieux, 1997).

partisanship should affect inequality is unclear. One such channel would be that the left decommodifies labour through more extensive social benefit systems, thereby increasing the reservation wages of workers. As a result, the left can be expected to affect inequality through the expansion of welfare state policies and regulations that reduce inequality. Consistent with this argument, Rueda (2008) finds that policies that can be shown to reduce inequality are themselves undertaken more by left government, other things being equal.

Another way the left may affect distribution is by affecting a number of policies relevant to inequality such as the minimum wage (Dolado et al., 1996). The left may also reduce inequality by expanding the size of the public sector which often entails more egalitarian<sup>3</sup> wage settlements (Kahn, 1999) or influencing private wage agreements. Governments can extend collective bargaining agreements to all workers in an economy and “through arbitration or the imposition of mandatory wage controls” (Wallerstein, 1999: 655). The evidence concerning the impact of the left on the welfare state is inconclusive. While some studies find that the left increases welfare state spending (Garrett, 1998), other authors contend that partisan differences over the welfare state are fading (Huber et al., 1999; Pierson, 2001).

Besides political parties and welfare state policies, early studies of inequality have focused on the role of unions. While in principle, unions could raise inequality by increasing the wage premium for union members only while leaving the wages of non-unionised workers unchanged, empirical evidence suggest that unions overall have equalising effects. More specifically, unions have been found to mitigate inequality both within and across unionised companies (Freeman, 1980; 1982; Swensson, 1989; Freeman, 1993). If unions operate in a democratic fashion, and the median income is lower than that the average income of a unionised worker, lower inequality should be favoured by a majority of unionised workers (Rueda and Pontusson, 2000: 359).

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<sup>3</sup> See for instance Katz and Krueger (1991) on the US public sector.

### *Institutional factors*

However, union density may not be an adequate proxy for the number of workers covered by a wage agreement in countries with low union density but high bargaining coverage. This is for instance the case in France, where union density is very low while coverage is high as a result of agreement extension by the government. Most empirical tests confirm that a high bargaining coverage may mitigate inequality (Freeman and Katz, 1995; Fortin and Lemieux, 1997; Traxler and Brandl, 2009: for a review of the evidence).

At least since Katzenstein (1985; 1987), we know that countries exhibit fundamental differences in the way their institutions are structured and in the way that markets are organised (Soskice, 1990). Most importantly, institutions such as wage bargaining and union centralisation have been shown to have far reaching effects on inequality (Wallerstein, 1999; Card et al., 2003).<sup>4</sup> One can define centralised collective bargaining as a situation “when national union confederation and the national employers’ organisation can influence and control wage levels and patterns across the economy” (Aidt and Tzannatos, 2001: 9). Most of the literature finds that centralised wage setting at the national level reduces inequality more than company level bargaining. Similarly, the extent of involvement and level at which the union confederation is involved in bargaining also affects inequality.

Wallerstein (1999: 673-675) identifies three sets of reason why higher centralisation leads to lower inequality. From an economic perspective, market determined (decentralised) pay agreements may be inefficient in the presence of some strongly unionised industries. For instance, such a set up leads to a misallocation of labour, and an actual employment level inferior to the optimal level. Centralisation may also empower certain workers at the expense of others. The median income workers have an incentive to reduce inequality since this would lead to an increase in their wage (Freeman and Medoff, 1984). Higher centralisation may also increase the ability of

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<sup>4</sup> Though note that bargaining centralisation has been found to be less predominant (Golden and Longredan, 2006) than initially argued by Wallerstein (1999).

workers to impose norms of fairness on the wage distribution and makes it more likely for low wage unions “to demand redistributive measures” (Rueda and Pontusson, 2000: 361). The extent of wage centralization may also mitigate the impact of falls in unionization rates or growing trade openness on inequality (Oskarsson, 2005; Kenworthy, 2007).

The seminal work on VoC has underscored the relation between the type of capitalism and outcomes (Hall and Soskice, 2001). More specifically, CMEs were seen as being as efficient as their liberal counterparts while achieving more egalitarian outcomes. CMEs are characterised by higher employment protection, more developed welfare states, stronger and more encompassing unions as well as more coordinating wage bargaining institutions than LMEs. Seen in this light, they therefore combine all the institutional and political factors that have been shown to reduce inequality.

Rueda and Pontusson (2000) investigate how VoC mediate the influence of various factors on wage inequality. Their analysis confirms wage bargaining centralisation mitigates inequality but the effect is stronger in Social Market Economies (SMEs). In addition to affecting centralisation, the type of capitalism also determines whether partisanship has an effect on inequality. More specifically, they find that left control of government only reduces inequality in LMEs consistent with the notion that governments are more constrained in SMEs (*ibid*: 375-376). Union density is found to reduce inequality in both LMEs and SMEs. (*ibid*: 379).

### ***1.3. Explaining patterns of inequality at the bottom of the income distribution***

One should distinguish between wage income, market income and disposable income. Wage or earnings represent the monetary reward for the provision of labour by workers. Market income also includes non-wage market income such as capital or property gains. Deducing taxes and adding benefits result in disposable income inequality (Beramendi and Cusack, 2009).



Here the focus is on gross wage or earnings inequality. Earnings are the main determinant of overall income for employed workers. Gross earnings inequality also has a crucial impact on the incentives to acquire skills (Blau and Kahn, 1996) and may adversely affect the employment probability of low skill workers (Card and Krueger, 1995; Neumark and Wascher, 1999). The focus on gross earnings is also warranted for the purpose of this paper since the investigation concerns the impact of power resources and wage bargaining institutions on the bargaining power of different workers in gross wage negotiations. Similarly, the question of the effect on inequality of wage setting institutions associated with coordination is most directly relevant to gross wages.

Moreover, the focus is on annual full time wages. To the extent that low income part time workers would by definition be further away from full time middle income workers, focusing on full time wages provides a low estimate of the actual underlying degree of inequality. More specifically, the measure of inequality considered in this paper is compiled by the OECD and is the wage inequality between the 5<sup>th</sup> and the bottom 10<sup>th</sup> gross earnings deciles of full-time dependent employees.

Table 1 summarises the results of previous studies in comparative political economy that have looked specifically at wage inequality the 5<sup>th</sup> and the bottom 10<sup>th</sup> deciles. Iversen's (1999), Pontusson *et al* (2002) and Rueda (2008) results show a strong negative effect of wage bargaining centralisation. Minimum wages, higher government employment and union density reduce wage inequality. Unemployment and corporatism have ambiguous effects with the negative effect being significant only in certain specifications. The coefficient for partisanship, trade, the size of female labour force or private sector services and monetary policy are not significant. Note however that Rueda (2008) does find control of the government by the left affect variables that reduce inequality.

**Table 1: Summary studies of the determinants of inequality between 5<sup>th</sup> and bottom 10<sup>th</sup> deciles**

Variables / Author	Iversen (1999)	Pontusson et al (2002)	Rueda (2008)
Centralisation of wage bargaining	---	---	---
Corporatism			0/-
Left partisanship	0	0	
Union density	0/-	-	
Welfare state generosity			0
Minimum wage			--/-
Monetary policy accommodation	0		
Government employment		---	--/-
Private sector services		0	0
Female Labour force		0	0
Trade from least developed countries		0	0
Total trade	0		
Unemployment	-	0	0/-

Note: +++, ++, +: positive effect at the 1%, 5% and 10% significance levels. ---, --, - negative effect at the 1%, 5% and 10% significance levels; 0 no significant effect. Several results refer to differences between estimation or model specification and indicate lack of robustness.

Source: Iversen (1999), Pontusson *et al.* (2002), Rueda (2008).

In 2005, European countries exhibited significant cross-national variation in this measure of inequality (Table 2). A number of puzzling features are apparent. Denmark, despite its social democratic welfare regime has a higher inequality than countries with Bismarckian welfare regime such as Belgium and France (Esping-Andersen, 1990). Denmark had a higher level of union density than France, Belgium and Norway. The higher inequality of Denmark is therefore surprising given the expectations of Power Resource Approach and the welfare state regime literature that Social democratic welfare regimes with a strong labour movement should have lower inequality (Esping-Andersen, 1990; Korpi, 2006). Denmark also has a higher degree of centralisation than France and Finland, which both have lower inequality and a higher index of wage coordination. Last but not least, one cannot make sense of this

higher inequality in Denmark with either Openness which was higher in Belgium nor with the size of its public sector which was lower in Finland and France.

**Table 2: European wage inequality between 50<sup>th</sup> and 10<sup>th</sup> deciles in 2005**

Country	Wage inequality	Union density	Wage coordination index	Centralisation	Public sector employees	Left share of cabinet	Trade Openness
Germany	1.95	21.64	4.00	0.50	24.54	88.00	76.92
Ireland	1.83	36.81	5.00	0.45	24.55	0.00	151.55
UK	1.82	29.27	1.00	0.30	26.31	100.00	56.17
Greece	1.72	22.98	4.00	0.40	30.45	0.00	53.91
Austria	1.70	33.00	4.00	0.76	24.58	0.00	104.40
Spain	1.67	14.98	4.00	0.46	19.81	100.00	56.64
Netherlands	1.65	21.92	4.00	0.60	28.06	0.00	130.72
Portugal	1.61	n.a	3.00	n.a	22.34	13.00	64.96
Italy	1.61	33.77	4.00	0.35	22.75	0.00	51.96
Denmark	1.53	71.70	3.00	0.44	32.33	0.00	93.07
France	1.47	8.01	2.00	0.24	30.08	0.00	53.35
Norway	1.46	54.87	4.00	0.52	n.a	25.00	72.80
Finland	1.42	72.43	4.00	0.43	30.76	44.00	79.49
Belgium	1.40	52.86	5.00	0.48	32.58	24.00	156.44
Sweden	1.35	76.04	3.00	0.53	34.23	100.00	89.04

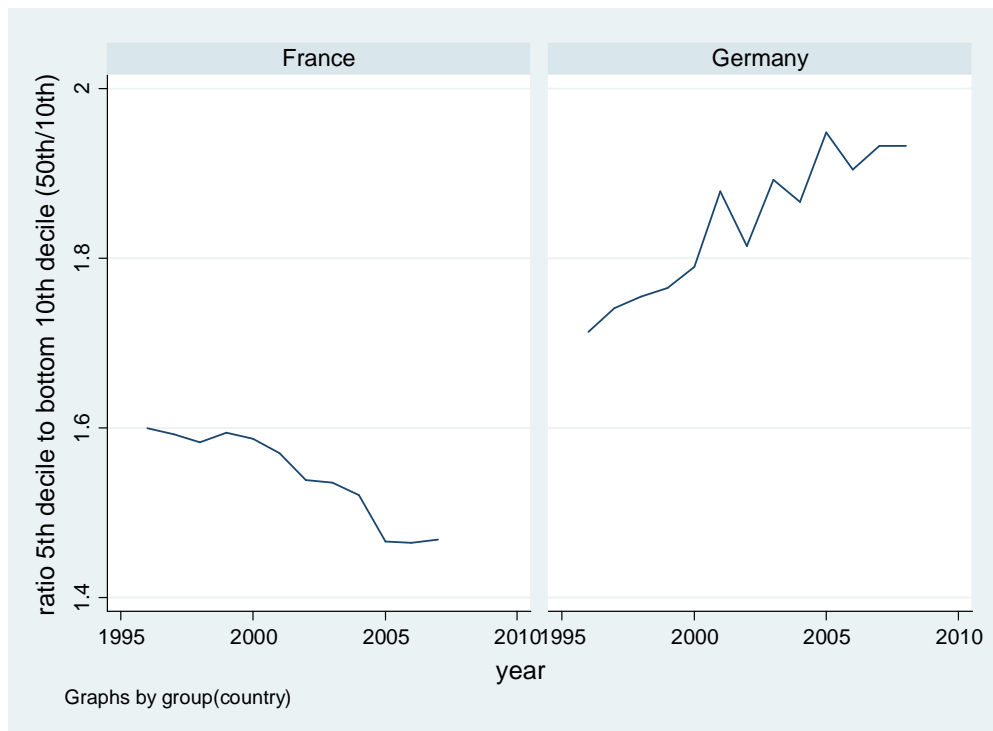
Note: Centralisation and wage coordination are higher for higher values of the index.

Source: See section 3.1 for data sources.

Even more striking, Germany, the archetype of the Coordinated Market Economy (CME), has a higher inequality than Liberal Market Economies (LMEs) such Ireland and the UK. This higher degree of coordination in Germany is reflected by its higher degree of centralisation. Thus, there is surprising variation in wage inequality both within and across welfare regimes and types of capitalism. This variation cannot be easily explained by the findings of the three studies reviewed in Table 1.

Within continental Europe, the opposite evolution of wage inequality in France and Germany is also hard to interpret (Figure 1). Starting from a lower level in 1995, French wage inequality has further decreased, while Germany's wage inequality has been rising. This occurred against the backdrop of a much weaker labour movement in France than in Germany and continuing higher degree of coordination in Germany. This surprising cross national and over time variation therefore raises the question of the political economy determinants of earnings inequality at the bottom of the income distribution.

**Figure 1: Wage inequality between 50<sup>th</sup> and 10<sup>th</sup> deciles since 1995 in France and Germany**



## **2. Power resources, wage coordination, and inclusiveness**

This section sets out three hypotheses concerning the determinants of wage inequality. The first two, which include Power Resource (PR) and VoC approaches, are direct extensions of the existing literature. The third hypothesis considers the relation between coordination and egalitarianism taking the case of wage bargaining agreements coverage.

### ***Hypothesis 1: Power Resource Approach – the strength of the left reduces inequality***

In the PR approach, the strength of the labour movement is a key determinant of positive labour market policies such as generous unemployment benefits and outcomes such as lower unemployment and inequality (Stephens, 1979; Korpi, 1983; Esping-Andersen, 1999; Korpi, 2006). Left wing parties are seen to represent the interests of labour and hence will expand welfare state institutions in a way that is conducive to workers' interests. The effect of these policies that the left generally expands - total social expenditures, benefit generosity, labour market policies, etc – are then seen to lead to more egalitarian distributive outcomes (Bradley et al., 2003). The argument therefore has two observable implications: (1) that the left expands welfare state policies and (2) that this leads to lower inequality.

Though in the PR literature the effect of the left works through welfare state policies, there are two reasons why one should consider the effect of partisanship and welfare state policies separately. First, as I have shown elsewhere (Vlandas, 2013) the left may actually oppose some welfare state policies if they have a detrimental impact on workers. Second, governments in many European countries also have a direct role in the wage setting process (Wallerstein, 1999). If left wing governments prefer lower inequality than right wing governments, then one should expect that left control of the government also has a direct mitigating effect on inequality, separate from that which they have through welfare state policies. Thus, one needs to test for both left control of government and welfare state policies.

In addition to partisanship, union strength can lead to lower inequality through two mechanisms. First, unions have both more preferences for compression of wages and more capacity than isolated individuals to negotiate wages (Freeman and Medoff, 1984; Kenworthy, 2010). The stronger the unions the more they will be able to impose their preferences for low inequality in the wage bargaining process. Second, stronger unions may also successfully push for certain welfare state policies, regardless of the government in power. In both cases, I expect higher union density to have a negative effect on wage inequality. It is important to analyse union strength separately from left control of the government because the two actors may not have the same preferences for welfare state policies (Jensen, 2011).

In sum, the expectations from the PR approach is that more generous welfare state policies, left control of the government and stronger unions lead to lower inequality.

***Hypothesis 2: Varieties of Capitalism – CMEs are more egalitarian than non-CMEs***

Different types of capitalism can be equally efficient but with important differences in terms of social and egalitarian outcomes (Hall and Soskice, 2001). The efficiency of an economy depends on the ability of firms in capitalist countries to solve various coordination problems across spheres of the economy. These spheres include the provision of skills (training), worker-employer relations (industrial relations), internal management practices and access to capital (financial system). Solving problems can be solved either through market or non-market coordination. One should distinguish between CMEs that rely mostly on non-market coordination and LMEs that coordinate through the market. Countries that rely on both market and non-market coordination belong to Mixed Market Economies (MMEs) and are less efficient (Hancke et al, 2007; Hall and Gingerich, 2004).

The high skill and high value added production strategy of CMEs is seen to allow for more solidaristic wage settlements. By coordinating wage bargaining across the economy and raising the skills of low income workers, CMEs manage to mitigate

inequality between median and low income workers. Thus, the expectation from this literature is that CMEs should be associated with more egalitarian outcomes than non-CMEs. Section 1 showed using descriptive data that wage inequality at the lower end of the income distribution is now higher in a number of CMEs than in other MMEs and LMEs. However, a more robust empirical investigation is necessary before this hypothesis can be effectively ruled out.

***Hypothesis 3: Neoclassical Economics - Non-encompassing coordination increases inequality***

The third hypothesis builds on the neoclassic economics' argument that unions win higher wages for their members as opposed to non-members, a process commonly referred to as 'union wage gap' (Borjas, 2005: 428). There is large body of evidence to substantiate the claim that there is a union wage premium (Freeman, 1984; Budd and Na, 1994; Hirsch, 2004). This effect is also likely stronger where union density in the company (Reilly, 1996) or in the economy is high . However, there are two contradicting effects at work. On the one hand, unionised workers earn more, everything else being equal, than their non-unionised counterparts, but on the other hand, unions reduce inequality between their members (Freeman and Medoff, 1984).

If unions are more likely to unionise median and high income workers than low income workers, only unions which cover the vast majority of the workforce have low income workers among their ranks. This assumption is consistent with existing evidence which shows the overrepresentation of the top quintile relative to the bottom quintile is a feature in most other European countries (Becher and Pontusson, 2011: table 2). Perhaps more directly relevant, and further confirming this assumption, Checchi et al (2007: 17, 18) argue that "trade unions mainly attract workers from the intermediate earnings group." Their results show that the probability of membership is lower when income is further away from the median. This effect is stronger for workers with incomes below the median than those above the median. This holds for the vast majority of countries.

However, what matters here is the extent to which workers are covered by wage agreements negotiated by unions rather than whether they are union members *per se*. The reason is that union density represents a lower bound for the number of workers covered by wage agreements and indeed the ‘union wage gain’ does seem to be less important in countries with high bargaining coverage (Bryson, 2007).

If coverage is nil, incomes are by definition the result of market driven forces. For medium levels of coverage, only some –middle or high income – workers are covered, while low income workers are not, thereby resulting in a higher level of inequality. When coverage is very high, all workers are covered and inequality is lower than in the medium coverage case. Should inequality be expected to be lower than in the market driven case? If unions entail any norms of fairness or if high income workers exhibit solidarity with low income workers, then the high coverage case should be characterised by lower inequality than in both the ‘no coverage’ and the ‘medium coverage’ cases.

Thus, this third hypothesis posits an inverted U-shape relation between wage inequality at the lower end of the income distribution and bargaining coverage. In contrast to hypothesis 2, the argument here is that coordination in the absence of inclusiveness, i.e.: middle levels of coverage; results in higher inequality between low and middle income workers than the liberal low bargaining coverage case. In other words, not only do non-encompassing unions create unemployment by not internalising the effects of by wage bargains (for instance using wage coordination, see (Calmfors and Driffill, 1988), but they may also create inequality at the bottom of income distribution. In distinguishing between the coordinating and equalising effects of institutions, I follow the distinction developed by Swank et al (Swank et al., 2008: 8) between coordination, the “extent to which actors rely on non-market coordination”, and egalitarianism, “egalitarian income and employment.” As a result, both “high levels of equality with liberalisation” and “declining solidarity in the context of continued significant coordination” represent possible paths (Thelen, 2012: 137).



### **3. Empirical strategy and results**

In this section, I first discuss the data, estimation method used to test the hypotheses (3.1), and the results (3.2). A number of robustness checks are then carried out (3.3).

#### ***3.1. Data, empirical model, and estimation method***

The estimation method proceeds in two steps. In the first step, I test the hypotheses on a sample of 15 European countries (EU15 minus Luxembourg plus Norway) for all available years up until 2007. The number of years for which OECD data on wage inequality is available in different countries varies extensively. It goes from 4 years (2004 to 2007) for Austria and Greece to 47 years for France. Thus, in a second step, I also test the hypotheses on a smaller sample of 9 EU countries that all have more than 8 observations, and of 6 EU countries that all have more than 20 observations of data availability for dependent variables.

The Power Resource approach (hypothesis 1) expects wage inequality to be negatively associated with left control of the government, union strength and generous welfare state policies. To test for this hypothesis, I include the share of the cabinet controlled by the left in a given year and the size of the union, capture by the share of workers is unionised (union density - see appendix for sources and detailed description of variables). To capture the impact of the welfare state on inequality, I focus on unemployment benefits which are important determinants of the workers' reservations wage. For unemployment benefits, I include the unemployment benefit replacement rate in the first year and benefit duration, which captures the level of benefits available as duration of unemployment increases relative to the initial level of benefits (CEPS-OECD data)

To test whether CMEs have systematically lower inequality than LMEs (hypothesis 2), the analysis relies on two separate proxies. The first proxy is the wage coordination index (Visser, 2009) that ranges from 1 (fragmented company level wage bargaining) to 5 economy-wide bargaining. Second, I include union centralisation in wage

bargaining which captures “both union authority and union concentration at multiple levels” (Visser, 2009).<sup>5</sup>

My third hypothesis relates to the non-linear effect of bargaining coverage on wage inequality. More specifically, I include both a linear and quadratic adjusted bargaining coverage variable, as calculated by Visser (2009), and expect an inverted U-shape relation between bargaining coverage and inequality (i.e.: negative coefficient for the squared term). Thus, the regression that is estimated for  $i$  countries in  $t$  years is:

$$\text{Ineq}_{i,t} = \alpha_{i,t} + \beta_1 * \text{cov}_{i,t} + \beta_2 * \text{covsq}_{i,t} + \beta_3 * \text{ud}_{i,t} + \beta_4 * \text{left}_{i,t} + \beta_5 * \text{coord}_{i,t} + \sum \beta_j * C_{j,i,t} + \varepsilon_{i,t}$$

Where ‘Ineq’ is the dependent variable, ‘cov’ and ‘covsqrt’ are the non-squared and squared bargaining coverage terms, ‘ud’ is union density and ‘left’ is control of the government by the left, ‘coord’ is wage coordination and  $C_{j,i,t}$  is a vector of controls. More specifically, a number of economic controls are included such as unemployment, GDP growth and openness (total trade as a % of GDP). While openness can be expected to increase inequality (Wood, 1994), the expectations for growth and unemployment are less clear. To the extent that unemployment puts downward pressure on low incomes, this could raise inequality. On the other hand, if low income workers are priced out of the labour market as a result of institutions that prevent wages from falling to low (e.g.: minimum wage regulation) then the two might be positively correlated.

Moreover, the analysis also considers a number of other factors that may be relevant for my dependent variable, such as inflation, educational attainment, other measures of inequality, and the presence of statutory national minimum wage. Last but not least, as a proxy for the extent of dualisation between insiders and outsiders in terms of employment protection, I create a new variable calculated as the differences between the indexes of employment protection legislation for regular and temporary workers (OECD statistics). The expectation from both the economics and political science literature is that dualisation should be positively associated with wage inequality.

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5 More formally the index is a (0-1) index given by  $\sqrt{[(C_{\text{authority}} * H_{\text{cf}}) + (A_{\text{authority}} * H_{\text{aff}})]}$ .

A number of preliminary statistical tests were run to identify the correct estimation method. The null hypothesis that all the panels contain a unit root is rejected, so I conclude that non-stationarity is not a problem.<sup>6</sup> On the other hand, Heteroskedasticity<sup>7</sup> and Auto-correlation are present<sup>8</sup> so the appropriate estimation method is robust clustered standard error.<sup>9</sup> Various tests suggest neither country<sup>10</sup> nor time<sup>11</sup> fixed effects should be included. Multicollinearity tests were also undertaken the main independent variables (bargaining coverage, GDP growth, unemployment rate, left share of cabinet, openness, union density, wage coordination and union centralisation). The low variance inflation factor (VIF) were all under 2.5, suggesting multicollinearity is not a concern.

### ***3.2. Regression results***

Table 3 presents the regression results for my sample. Column 1 shows the results for a baseline model.<sup>12</sup> GDP growth has a positive significant effect on the dependent variable indicating that growth increases inequality between low and middle income workers. Higher unemployment is associated with lower inequality, suggesting that unemployment does not increase inequality. This makes sense because under tight labour markets, relatively more skilled workers are likely to get a bigger wage premium. The coefficients for bargaining coverage have the expected signs, confirming the expectation of an inverted U-shaped relation between inequality and coverage.

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6 More specifically, the Fisher unitroot test was used.

7 LR test of heteroskedasticity rejects the null of homoskedastic disturbances.

8 Wooldridge test for autocorrelation rejects the null of no-first order autocorrelation.

9 The stata command that was used in Stata 11 is: xtreg ... , vce (cluster id)

10 Note also that performing a Hausman test suggests that random effects can be used. The test was performed on a regression with wage inequality as the dependent variable and a number of independent variables (bargaining coverage GDP growth, unemployment rate, the degree of openness and the control of the cabinet by the left). More specifically, p-value that was not significant (0.8451) so that the null hypothesis that the coefficients of random and fixed effects are the not different.

11 More specifically, when running the same regression as in footnote 6 but with time dummies, the results fail to reject the null that all years coefficient are jointly equal to zero. Hence no time fixed effects are required.

<sup>12</sup> Note also that column 1's results are the same when fixed effects are included.

**Table 3: Determinants of wage inequality between 5th and bottom 10th deciles - regression results for EU15 sample**

Column	(1)	(2)	(3)	(4)
Coverage	0.007** (0.003)	0.007*** (0.002)	0.010*** (0.003)	0.012*** (0.003)
Coverage (Squared)	-0.00006* (0.000)	-0.00007*** (0.000)	-0.00008*** (0.000)	-.000093*** (0.000)
GDP growth	0.007** (0.003)	0.006* (0.004)	0.007** (0.003)	0.007** (0.003)
Unemp. rate	-0.011*** (0.003)	-0.011*** (0.003)	-0.010*** (0.003)	-0.012*** (0.003)
Openness (% total trade)		0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Left control			-0.00028* (0.000)	-0.00024* (0.000)
Union density			-0.003*** (0.001)	-0.003*** (0.001)
Wage coord. (from 1 to 5)				-0.007** (0.004)
Union centralisation				-0.148 (0.159)
Constant	1.516***	1.475***	1.496***	1.534***
Observations	226	226	214	214
R2 within	0.2848	0.2890	0.2858	0.2971
R2 between	0.0378	0.0233	0.4198	0.4256
R2 overall	0.0887	0.0583	0.4590	0.5091
Nb. Countries	15	15	15	15

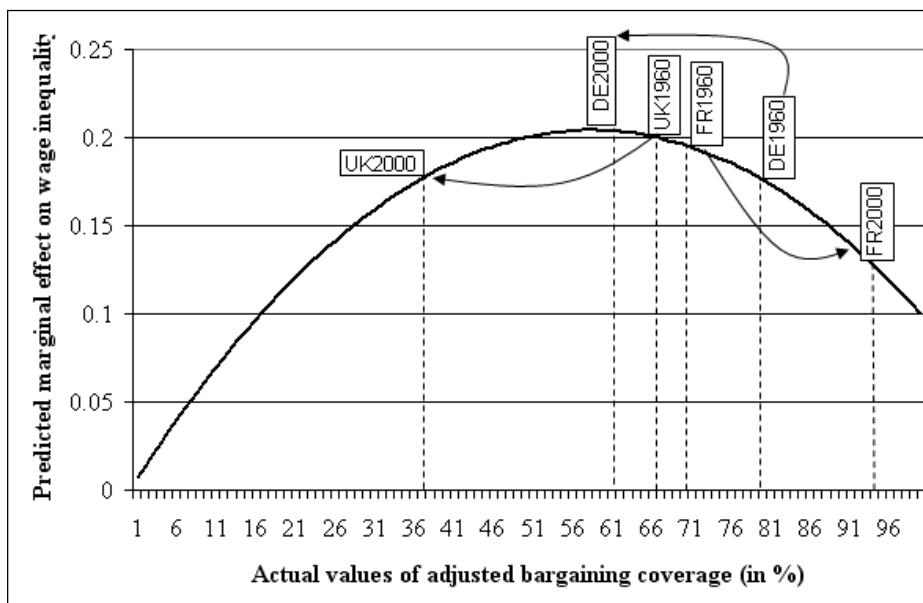
Note: Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Openness does not seem to have any significant impact (column 2). Consistent with hypothesis 1, both Left control of the cabinet and high union density reduce inequality (column 3). Running the regression with the left share of parliament instead of the cabinet yields the same results. To the extent that union density and bargaining coverage are intimately linked, it's important to distinguish the effects of the two variables. As they are both scaled from 0 to 100, we can directly compare the coefficients of the two. Like the coefficient of union density, the coefficient for the quadratic term of bargaining coverage is negative. By contrast, the coefficient for the linear term of bargaining coverage is positive. It is three times bigger in size (0.010) than the coefficient of union density (0.003), so the effect of bargaining coverage trumps that of union density.

Similarly in line with hypothesis 2, higher wage coordination is associated with lower inequality while union centralisation has no statistically significant effect (column 4). Note however that running the regression on an alternative index of coordination developed by Hall and Gingerich (2004) instead of wage coordination does not yield a statistically significant result (not reported here for reasons of space). The inclusion of this fully time invariant coordination index does not alter the significance of bargaining coverage, nor of union density or unemployment rate, GDP positive significant, while union centralisation, openness and left cabinet shares are not significant.

The marginal effect of bargaining coverage on wage inequality is graphed for clarity in Figure 2. The actual levels of bargaining coverage for three countries (Germany, France and the UK) at two different points in times (1960 versus 2000) are also shown. This illustrates how predicted changes in inequality using estimated coefficients from column 1 (table 3) are consistent with actual changes in inequality discussed in section 1.

**Figure 2: Marginal effect of bargaining coverage on wage inequality**



Note: The predicted effect of bargaining coverage on wage inequality is calculated using the coefficient of column 1 from table 1.

To investigate the stability of these results, columns 1 to 6 in Table 4 include proxy for various other features of a country that may have an effect on wage inequality. The significance of the coefficients for bargaining coverage and union density are not affected by inclusion of other variables, whereas both wage coordination and left share of the cabinet lose significance in at least some cases. Openness and union centralisation remain insignificant throughout (except in column 6, where openness becomes significant). In column 1, I test for the inclusion of gross earnings inequality between the top and the bottom deciles. This reveals that higher polarisation between top earners and low income workers is also associated with more inequality between median and low income workers. In column 2, I investigate whether inflation affects distinct income groups differently. The coefficient is not significant suggesting that inflation does not affect inequality.

Column 3 tests for the supply of higher skills in the economy. Previous literature has underscored the possibility that inequality was driven by an increase in the educational attainments of some workers. Following Wallerstein (1999), I use educational attainment of the total population aged 15 and over, expressed as average years of schooling.<sup>13</sup> There does not seem to be any significant impact. Note that studies using more sophisticated measures of education do not find any impact on my measure of inequality (Mahler, 2011).

A particularly important institution for inequality at the lower end of the income distribution is minimum wage regulations. Here the main difference between countries is whether they have national statutory minimum wage, which I code as 1, or not (coded 0), using Visser's (2009) minimum wage setting data. As expected, the existence of national statutory minimum wage has a significant negative impact on inequality (column 4).

In columns 5 and 6, two important measures of unemployment benefits generosity are considered. Unemployment benefit duration does not seem to have any impact. By

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<sup>13</sup> Taken from a dataset collected by R. Barro and J. W. Lee (2000)

contrast, the unemployment benefit replacement rate in the first year has a statistically significant negative effect on inequality. Last but not least, note that a higher direct tax rate (CEPS-OECD data), defined as income tax plus employees' social security contributions divided by household current receipts, reduces gross earnings inequality (results not reported here for reasons of space). This is consistent with Hibbs and Locking's (1996) argument that higher taxes may decrease the cost of lower inequality for high income earners.

**Table 4: Determinants of wage inequality: alternative controls**

Column	(1)	(2)	(3)	(4)	(5)	(6)
Coverage	0.006** (0.003)	0.012*** (0.003)	0.009*** (0.003)	0.010*** (0.003)	0.018** (0.009)	0.016*** (0.003)
Coverage	-0.000468 **	-0.00005***	-0.00008***	-0.00009***	-0.0002***	-0.0001***
(Squared)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP growth	-0.000 (0.001)	0.007* (0.004)	0.007** (0.004)	0.007** (0.003)	0.002 (0.003)	0.002 (0.004)
Unemp. rate	0.000 (0.002)	-0.012*** (0.003)	-0.012*** (0.003)	-0.012*** (0.003)	-0.005 (0.006)	-0.005 (0.005)
Openness (% total trade)	-0.000 (0.000)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)	-0.000 (0.001)	-0.001* (0.000)
Left control	0.00002 (0.000)	-0.00023 (0.000)	-0.00030** (0.000)	-0.00024** (0.000)	0.00000 (0.000)	-0.00006 (0.000)
Union density	0.003*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	-0.003*** (0.001)	-0.005*** (0.001)	-0.004*** (0.000)
Wage coord. (from 1 to 5)	0.002 (0.004)	-0.007* (0.004)	-0.008* (0.005)	-0.008** (0.003)	-0.005 (0.008)	-0.006 (0.006)
Union centralisation	0.080 (0.080)	-0.144 (0.160)	-0.193 (0.161)	-0.158 (0.157)	-0.331 (0.241)	0.118 (0.130)
Inequality (Top 10%/Bottom 10%)	0.383*** (0.057)					
CPI		-0.001 (0.001)				
Education			-0.006 (0.011)			
Minimum wage (dummy 0-1)				-0.047* (0.025)		
Benefit duration					0.058 (0.073)	
Replacement rate						-0.005*** (0.001)
Constant	0.137	1.513***	1.649***	1.620***	1.666***	1.698***
Observations	190	214	189	207	177	177
R2 within	0.8346	0.3025	0.3156	0.2975	0.1163	0.1690
R2 between	0.4290	0.3922	0.4543	0.5024	0.8141	0.8889
R2 overall	0.7366	0.4947	0.5068	0.5918	0.7377	0.8029
Nb. Countries	15	15	13	14	10	10

Note: Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.



### ***3.3. Robustness checks***

Three sets of robustness checks are undertaken. First, I run a jackknife analysis (stepwise country exclusion) on the EU15 sample using the baseline model (i.e.: equivalent to column 2, table 1). This shows that the results for bargaining coverage are robust (see Table 5). Second, since changes in wage inequality are slow moving, I run the analysis using a sample of 3 years period average. Table 6 shows that this does not affect the sign or significance of coefficients for bargaining coverage (column 1) and this holds when fixed effects are included (column 2). Union density retains significance, but the other variables become insignificant (column 3 to 5).

Third, given the important variation in the sample size of the dependent variable in different countries, I also consider various sub-samples that have more balanced panels. I first run the same regression with 9 EU countries that all have more than 8 observations (Belgium, Denmark, Finland, France, Germany, the Netherlands, Norway, Sweden, and UK). The results for this sub-sample are presented in Table 7. The coefficients for bargaining coverage and union density are significant and retain the expected signs in all specifications (Columns 1 to 10). Union centralisation is negative and significant, except where unemployment benefit duration or replacement rates are included (columns 9 and 10). By contrast, wage coordination does not seem to have an effect on inequality in this smaller sample. Similarly, minimum wages lose explanatory power. The association of inequality between the top and bottom deciles with inequality at the low end of the distribution is still statistically significant and positive. The unemployment benefit replacement rates also retain a significant mitigating effect on inequality.

Last but not least, the same regression is carried out with an even smaller sample of 6 EU countries that have more than 20 observations (Denmark, Finland, France, Netherlands, Sweden, and UK). The results that are presented in Table 8. As in the EU9 sample, the findings concerning the effects of bargaining coverage, union density, inequality between top and bottom deciles, union centralisation and replacement rates remain.

**Table 5: Jackknife robustness checks – stepwise country exclusion on EU15 sample.**

<i>Excluding:</i>	<i>Austria</i>	<i>Belgium</i>	<i>Denmark</i>	<i>Finland</i>	<i>France</i>	<i>Germany</i>	<i>Greece</i>
Bargaining coverage (Adjusted)	0.00755*** (0.002)	0.00724*** (0.002)	0.00810*** (0.002)	0.00651*** (0.002)	0.00117 (0.004)	0.00761*** (0.002)	0.00749*** (0.002)
Bargaining coverage (Adjusted, squared)	-0.00007*** (0.000)	-0.00007*** (0.000)	-0.00007*** (0.000)	-0.00006** (0.000)	-0.00001 (0.000)	-0.00007*** (0.000)	-0.00007*** (0.000)
GDP growth	0.00624* (0.004)	0.00600 (0.004)	0.00729** (0.004)	0.00925*** (0.003)	0.00492 (0.004)	0.00375 (0.003)	0.00604* (0.004)
Unemployment rate	-0.01047*** (0.003)	-0.01078*** (0.003)	-0.00908*** (0.003)	-0.01184*** (0.003)	-0.00940*** (0.002)	-0.00981*** (0.003)	-0.01078*** (0.003)
Openness (total trade, % GDP)	0.00028 (0.001)	0.00050 (0.001)	-0.00016 (0.001)	0.00020 (0.001)	0.00055 (0.001)	0.00032 (0.001)	0.00043 (0.001)
Constant	1.46823***	1.48017***	1.51170***	1.51157***	1.56579***	1.46517***	1.45703***
Observations	223	217	203	201	188	209	222
Nb. countries	14	14	14	14	14	14	14

<i>Excluding</i>	<i>Ireland</i>	<i>Italy</i>	<i>Netherlands</i>	<i>Norway</i>	<i>Portugal</i>	<i>Spain</i>	<i>Sweden</i>	<i>UK</i>
Bargaining coverage (Adjusted)	0.00806*** (0.002)	0.00744*** (0.002)	0.00765*** (0.002)	0.00751*** (0.002)	0.00744*** (0.002)	0.00742*** (0.002)	0.00781*** (0.002)	0.01270 (0.025)
Bargaining coverage (Adjusted, squared)	-0.00007*** (0.000)	-0.00007*** (0.000)	-0.00007*** (0.000)	-0.00007*** (0.000)	-0.00007*** (0.000)	-0.00007*** (0.000)	-0.00007*** (0.000)	-0.00010 (0.000)
GDP growth	0.00654* (0.004)	0.00612* (0.004)	0.00672* (0.004)	0.00646* (0.004)	0.00610* (0.004)	0.00602* (0.004)	0.00581 (0.004)	0.00486 (0.004)
Unemployment rate	-0.01072*** (0.003)	-0.01083*** (0.003)	-0.00935*** (0.003)	-0.01088*** (0.003)	-0.01073*** (0.003)	-0.01078*** (0.003)	-0.01266*** (0.002)	-0.01096*** (0.003)
Openness (total trade, % GDP)	0.00052 (0.001)	0.00041 (0.001)	0.00001 (0.001)	0.00037 (0.001)	0.00039 (0.001)	0.00041 (0.001)	0.00031 (0.001)	0.00067 (0.001)
Constant	1.43515***	1.46938***	1.49164***	1.48758***	1.47310***	1.46171***	1.50441***	1.21954
Observations	224	222	197	216	225	223	205	189
Nb. countries	14	14	14	14	14	14	14	14

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 6: Sample with 3 years period average**

Columns	(1)	(2)	(3)	(4)	(5)
Bargaining coverage (Adjusted)	0.00925** (0.004)	0.00992* (0.005)	0.00755** (0.003)	0.01356*** (0.004)	0.01431** (0.006)
Bargaining coverage (Adjusted, squared)	-0.00008** (0.000)	-0.00008* (0.000)	-0.00006** (0.000)	-0.00011*** (0.000)	-0.00012** (0.000)
GDP growth	0.01090 (0.007)	0.00992 (0.008)	0.01300 (0.008)	0.01452* (0.008)	0.01441* (0.008)
Unemployment rate	-0.00685 (0.006)	-0.00783 (0.006)	-0.00701 (0.005)	-0.00492 (0.006)	-0.00513 (0.007)
Openness (total trade, % GDP)			-0.00077 (0.001)	-0.00056 (0.001)	-0.00018 (0.001)
Left share of cabinet				-0.00017 (0.000)	-0.00023 (0.000)
Union density				-0.00368*** (0.001)	-0.00414*** (0.001)
Wage coordination (from 1 to 5)					-0.00466 (0.017)
Union centralisation					-0.10747 (0.265)
Constant	1.40311***	1.35294***	1.49889***	1.44354***	1.50232***
Fixed effects	No	Yes	No	No	No
Observations	93	93	93	93	93
R-squared within	0.2007	0.2050	0.2138	0.1525	0.1364
R-squared between	0.0490	0.0160	0.0478	0.4922	0.5228
R-squared overall	0.0707	0.0319	0.0793	0.4997	0.5435
Nb. countries	15	15	15	15	15

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**Table 7: Determinants of wage inequality between 5<sup>th</sup> and bottom 10<sup>th</sup> deciles - regression results for EU9 sample**

Column	(1)	(2)	(3)	(4)	(5)
Dependent Variable	w5010	w5010	w5010	w5010	w5010
Bargaining Coverage (Adjusted)	0.00735** (0.003)	0.00853*** (0.002)	0.01297** (0.006)	0.02006** (0.009)	0.01375*** (0.003)
Bargaining Coverage (Adjusted, Squared)	-0.00006** (0.000)	-0.00008*** (0.000)	-0.00013** (0.000)	-0.00020*** (0.000)	-0.00012*** (0.000)
GDP growth	0.00717** (0.003)	0.00624 (0.004)	0.00503** (0.002)	0.00114 (0.003)	-0.00007 (0.001)
Unemployment rate	-0.01081*** (0.003)	-0.01087*** (0.003)	-0.00352 (0.005)	-0.00313 (0.006)	0.00118 (0.002)
Openness (% of total trade)		0.00068 (0.001)	-0.00074 (0.001)	0.00083 (0.001)	0.00030* (0.000)
Left share of cabinet			-0.00017 (0.000)	0.00002 (0.000)	-0.00019*** (0.000)
Union density			-0.00493*** (0.001)	-0.00453*** (0.001)	-0.00035 (0.001)
Wage coordination (from 1 to 5)				0.00373 (0.011)	0.01142** (0.005)
Union centralisation				-0.52393** (0.217)	0.14046* (0.072)
Inequality (Top 10%/Bottom 10%) CPI					0.37884*** (0.047)
Education					
Minimum wage (dummy variable)					
Benefit duration					
Replacement rate					
Constant	1.44579*** (0.078)	1.36869*** (0.096)	1.68172*** (0.142)	1.64280*** (0.206)	0.11711 (0.208)
Observations	209	209	202	202	178
R2 within	.	.	.	.	.
R2 between	.	.	.	.	.
R2 overall	.	.	.	.	.
Number of countries	9	9	9	9	9

Note: Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; Countries include Belgium, Denmark, Finland, France, Germany, Netherland, Norway, Sweden, and UK

**Table 7 (continued): Determinants of wage inequality between 5<sup>th</sup> and bottom 10<sup>th</sup> deciles - regression results for EU9 sample**

Column	(6)	(7)	(8)	(9)	(10)
Dependent Variable	w5010	w5010	w5010	w5010	w5010
Bargaining Coverage (Adjusted)	0.01595** (0.007)	0.01877* (0.010)	0.01673** (0.007)	0.01824** (0.009)	0.01606*** (0.003)
Bargaining Coverage (Adjusted, Squared)	-0.00017*** (0.000)	-0.00019** (0.000)	-0.00017*** (0.000)	-0.00018** (0.000)	-0.00014*** (0.000)
GDP growth	0.00327 (0.002)	0.00142 (0.003)	0.00118 (0.003)	0.00247 (0.003)	0.00250 (0.004)
Unemployment rate	-0.00077 (0.007)	-0.00364 (0.007)	-0.00389 (0.006)	-0.00475 (0.006)	-0.00478 (0.005)
Openness (% of total trade)	0.00082 (0.001)	0.00059 (0.001)	0.00107** (0.001)	0.00001 (0.001)	-0.00072* (0.000)
Left share of cabinet	-0.00003 (0.000)	0.00002 (0.000)	-0.00005 (0.000)	-0.00000 (0.000)	-0.00006 (0.000)
Union density	-0.00454*** (0.001)	-0.00447*** (0.001)	-0.00495*** (0.001)	-0.00452*** (0.001)	-0.00395*** (0.000)
Wage coordination (from 1 to 5)	0.00311 (0.012)	-0.00009 (0.009)	0.00620 (0.012)	-0.00394 (0.008)	-0.00610 (0.007)
Union centralisation	-0.45475*** (0.166)	-0.45153** (0.220)	-0.57596*** (0.195)	-0.36801 (0.269)	0.10731 (0.132)
Inequality (Top 10%/Bottom 10%)					
CPI	0.00447 (0.005)				
Education		-0.00341 (0.029)			
Minimum wage (dummy variable)			-0.06027 (0.044)		
Benefit duration				0.04945 (0.076)	
Replacement rate					-0.00488*** (0.001)
Constant	1.71755*** (0.158)	1.70608*** (0.315)	1.77012*** (0.159)	1.66402*** (0.217)	1.69529*** (0.054)
Observations	202	185	202	176	176
R2 within	.	.	.	.	.
R2 between	.	.	.	.	.
R2 overall	.	.	.	.	.
Number of countries	9	9	9	9	9

Note: Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; Countries include Belgium, Denmark, Finland, France, Germany, Netherland, Norway, Sweden, and UK.

**Table 8: Determinants of wage inequality between 5<sup>th</sup> and bottom 10<sup>th</sup> deciles - regression results for EU6 sample**

Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bargaining Coverage ( <i>Adjusted</i> )	0.02006**	0.01172***	0.01309	0.02398*	0.01565*	0.01800	0.01480***
Bargaining Coverage (Squared)	-0.00020***	-0.00010***	-0.00014**	-0.00022**	-0.00016**	-0.00018*	-0.00013***
GDP growth	0.00114	-0.00124	0.00318	0.00207	0.00086	0.00145	-0.00002
Unemployment rate	-0.00313	0.00333	-0.00779*	-0.00947**	-0.00885**	-0.00866*	-0.00736*
Openness ( <i>% of total trade</i> )	0.00083	0.00030	0.00133***	0.00019	0.00109***	0.00058	-0.00010
Left share of cabinet	0.00002	-0.00021**	-0.00020	-0.00020	-0.00015	-0.00006	-0.00008
Union density	-0.00453***	-0.00004	-0.00362***	-0.00501***	-0.00447***	-0.00402***	-0.00368***
Wage coordination ( <i>from 1 to 5</i> )	0.00373	0.00734	-0.00812	-0.00167	0.00112	-0.00904	-0.00425
Union centralisation	-0.52393**	0.18497**	-0.54594***	-0.55985***	-0.56260***	-0.46280**	0.04970
Inequality ( <i>Top 10%/Bottom 10%</i> )		0.39613***					
CPI			0.00416				
Education				0.02740			
Minimum wage ( <i>dummy variable</i> )					-0.05777		
Benefit duration						0.02571	
Replacement rate							-0.00506***
Constant	1.64280***	0.07619	1.81797***	1.39464***	1.81743***	1.70383***	1.73709***
Observations	202	144	168	157	168	151	151
R2 within							
R2 between	.	.	.	.	.	.	.
R2 overall	.	.	.	.	.	.	.
Number of countries	9	6	6	6	6	6	6

Note: Robust standard errors; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; Countries include Denmark, Finland, France, Netherland, Sweden, and UK.

## **Conclusion**

Inequality has attracted scholarly attention from both economics and more recently political science. However, strikingly few political economy studies of inequality at the lower end of the income distribution, have been undertaken, when compared to the number of analyses of other measures of inequality. This is surprising in at least three respects. First, in the context of increased welfare state dualisation, this measure of inequality allows us to consider the determinants of dualisation of outcomes. Second, this type of wage inequality lends itself particularly well to an investigation of the relation between coordination and egalitarian outcomes in Europe.

Third and perhaps most important, one can observe a puzzling cross national variation in European countries of inequality between median and bottom earnings deciles. Whereas the VoC literature had underscored the potential for CMEs to be as efficient as LMEs but retain egalitarian outcomes, Germany is now in some respects more unequal than the UK. Similarly, the PR approach had stressed the successful egalitarian achievements of social democratic Scandinavian countries. However, by 2005 Denmark had become more unequal than France, and Norway more unequal than Belgium (Table 2).

To solve this puzzle, this paper has argued that one needs to distinguish between the degree of coordination of an economy, the effect of social democratic parties in government as well as the policies they support, and the degree of inclusiveness of coordination processes. More specifically, one needs to test for the effect of left control of government in line with the power resource approach (Hypothesis 1) and wage coordination in line with VoC (Hypothesis 2). But it is also important to investigate directly how the degree of inclusiveness of wage bargaining institutions affect wage inequality. Crucially, the effect of coordination may be detrimental to inequality in contexts where the economy is coordinated but not inclusive.

Empirically, this means there should be an inverted U-shape relationship between inequality and bargaining coverage (Hypothesis 3). Where coverage is low, few workers

are covered, so the majority of wage agreements are determined solely by the market. In cases where coverage is medium, an important number of workers are covered by agreements. These workers are able to get better wage claims. To the extent that low income workers are less likely to be covered than median income workers, this results in higher inequality than in the low coverage case. Where bargaining coverage is very high, inequality is low.

Using regression analysis of wage inequality in European countries, wage inequality at the low end of the income distribution is shown to be driven mostly by political and institutional – rather than economic – factors. More specifically, three sets of findings emerge from the empirical tests carried out in this paper.

First, the strength of unions as captured by union density has a negative significant impact in most specifications, lending some support to the PR approach. However, the effect of left control of the government is less stable across specifications. This is consistent with a general trend towards activation (Daguerre, 2007) and dualisation (Emmenegger et al., 2012), where governments of different political leanings converge on a similar activation agenda. However, policies that are traditionally associated with social democrats such as high replacement rates have clear mitigating impact on the wage inequality by increasing the reservation wages of workers. Similarly, institutions such as statutory national minimum wage do play a key role in reducing inequality.

Second, VoC is to some extent confirmed with higher levels of wage coordination being associated with lower inequality (table 3, columns 1 to 8) but this effect loses statistical significance when unemployment benefit systems are controlled for (columns 9 and 10) and when smaller samples of EU countries are considered (table 4 and 5). More encompassing index such as those developed by Hall and Gingerich (2004) are not significant..

Third, the prediction of an inverted U-shape relationship between bargaining coverage and inequality was confirmed across numerous specifications and sample size (table 3 to 7). Thus, economic coordination, which can operate with medium levels of bargaining



coverage, is not synonymous with egalitarianism which requires much more inclusive wage bargaining arrangements.

This paper therefore demonstrates that the link between coordination and egalitarianism is not automatic. On the contrary coordination can actually increase inequality in the absence of inclusive institutions. This has two sets of broader implications for further research. First, this calls for a reconsideration of the link between coordination and the degree of egalitarianism. Second, disentangling the effects of coordination on outcomes from those of inclusiveness may shed new light on the relationship between efficiency and equality.

## Appendix

Variables	Description and source
Wage inequality at the low end of the income distribution (dependent variable)	Earnings - dispersion measures - ratio of the 5 <sup>th</sup> -to-1 <sup>st</sup> - where fifth (or median) and first deciles are upper-earnings decile limits, unless otherwise indicated, of gross earnings of full-time dependent employees. (source: OECD statistics website)
Adjusted Bargaining Coverage	(0-100) = employees covered by wage bargaining agreements as a proportion of all wage and salary earners in employment with the right to bargaining, expressed as percentage, adjusted for the possibility that some sectors or occupations are excluded from the right to bargain (Visser, 2009)
GDP growth	GDP, volume – annual growth rates in percentage (OECD statistics website)
Unemployment rate	Rate of Unemployment as % of Civilian Labour Force (OECD statistics website)
Openness	Trade-to-GDP-ratio (total trade) - Current prices, current exchange rates (OECD statistics website)
Left share of cabinet	Left party cabinet portfolios as a percent of all cabinet portfolios (Source: Swank Electoral, Legislative, and Government Strength of Political Parties by Ideological Group in Capitalist Democracies, 1950-2006: A Database)
Union density	Union Density, net union membership as a proportion wage and salary earners in employment (0-100) = NUM*100/WSEE; where WSEE is Wage and Salary Earners in Employment (1- ∞) = employed wage and salary workers ; and NUM is Net Union Membership (1- ∞) = TUM minus union members outside the active, dependent and employed labour force (Source: Visser, 2009).
Wage coordination	Coordination of wage bargaining is a 1 to 5 index where: 5 = economy-wide bargaining, based on a) enforceable agreements between the central organisations of unions and employers affecting the entire economy or entire private sector, or on b) government imposition of a wage schedule, freeze, or ceiling. 4 = mixed industry and economy-wide bargaining: a) central organisations negotiate non-enforceable central agreements (guidelines) and/or b) key unions and employers associations set pattern for the entire economy. 3 = industry bargaining with no or irregular pattern setting, limited involvement of central organizations and limited freedoms for company bargaining. 2 = mixed industry- and firm level bargaining, with weak enforceability of industry agreements 1 = none of the above, fragmented bargaining, mostly at company

	level (Source: Visser 2009)
Union centralisation	Summary measure of centralisation and coordination of union wage bargaining, taking into account both union authority and union concentration at multiple levels (0-1) = given by $\sqrt{[(C_{\text{authority}} * H_{\text{cf}}) + (A_{\text{ffauthority}} * H_{\text{aff}})]}$ , weighting the degree of authority or vertical coordination in the union movement with the degree of union concentration or horizontal coordination, taking account of multiple levels at which bargaining can take place and assuming a non-zero division of union authority over different levels (source: Visser 2009).
Inequality	Earnings - dispersion measures - ratio of the 9 <sup>th</sup> -to-1 <sup>st</sup> - where ninth and first deciles are upper-earnings decile limits, unless otherwise indicated, of gross earnings of full-time dependent employees. (source: OECD statistics website)
CPI	Consumer Price Index (CPI) (source: OECD statistic website)
Education	This is the educational attainment of the total population aged 15 and over expressed as average years of schooling (Source: cepts-OECD database)
Minimum wage	Recodes Visser's (2009) 8 scale of minimum wage settings into two: the existence (coded 1 - coded 2-8 in Visser's database) or not (coded 0 - coded 0-1 in Visser's database) of a national minimum wage.
Benefit duration	Benefit duration index. This index is constructed as $bd = 0.6 * \text{brr23} / \text{brr1} + 0.4 * \text{brr45} / \text{brr1}$ ; where brr1 is the first year of unemployment benefits and br23 is second and third years of unemployment benefits (averaged over three family situations and two earnings levels, benefits are a percentage of average earnings before tax). This captures the level of benefits available in the later years of a spell relative to those available in the first year. (Source: cepts-OECD database)
Replacement rate	Gross benefit replacement rates data are provided by OECD with one observation every two years for each country. In this case the data refer to the first year of unemployment benefits, averaged over three family situations and two earnings levels. The benefits are a percentage of average earnings before tax (Source: cepts-OECD database).
Direct Tax rate	Direct Tax Rate (%) The direct tax rate is $DT/HCR$ ; With DT equal to income tax plus employees' social security contributions and HCR equal to household current receipts (Source: cepts-OECD database).

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