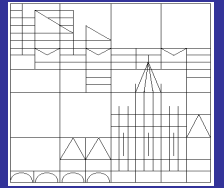




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Has Globalization Affected Collective Bargaining?

An Empirical Test, 1980-2009

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Abstract

Theoretical models predict that globalization changes the nature of collective bargaining. Yet, the extant empirical evidence is inconclusive. We investigate the influence of globalization on three aspects of collective bargaining (degree of decentralization, union density, extent of government intervention) in industrialized and transition countries. Our innovations over the existing empirical literature are (i) the reliance on a more comprehensive dataset (44 countries from 1980 to 2009) and (ii) the use of dynamic panel data estimators. We find that economic globalization has depressed unionization rates, while the extent of decentralization and government intervention in collective bargaining have not been affected.

JEL classification: F66, J5, H11

Keywords: Globalization, collective bargaining, government intervention, trade unions

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1. Introduction

During the past few decades globalization has left its mark on many aspects of the labor market. High-skilled labor has become more mobile (Docquier and Marfouk, 2006; Grogger and Hanson, 2011), employment protection has weakened for regular employees and become stronger for fixed-term staff (Fischer and Somogyi, 2012), and the within-country distribution of household income has become more unequal (Bergh and Nilsson, 2010; Dreher and Gaston, 2008).

A number of theoretical contributions bring forward the idea that globalization also affects the nature of collective bargaining: unionization rates are predicted to decline (Adamson and Partridge, 1997; Ebbinghaus and Visser, 1999), collective bargaining is understood to decentralize (Calmfors et al., 2001; Gaston, 2002; Lindbeck and Snower, 1996), and the extent of government intervention in collective bargaining is expected to change, albeit in an ambiguous way (Hassel, 2006).

While there is little disagreement about these theoretical predictions, the empirical evidence is surprisingly inconclusive. Dreher and Gaston (2007), who use five-year averages for 17 OECD countries over the time period from 1980 to 1999, find that there is no significant contemporaneous relationship between globalization and union density. On the other hand, Scruggs and Lange (2002) find that globalization has reduced union density rates in 16 industrialized democracies between 1960 and 1994, albeit only in a subset of countries.

Several features of existing empirical studies might be responsible for the ambiguity in the results. First, a limited number of countries: only about half of the OECD countries are considered, and transition economies and developing countries are ignored entirely. Second, a limited time period: the data cover only the period until the mid-or late-1990s even though globalization has especially accelerated during the first decade of the twenty-first century (Busemeyer, 2009). Third, the neglect of dynamic effects in the empirical specifications: only contemporaneous effects of globalization on collective bargaining are considered despite the fact that the behavioral responses of employees, employers and especially the government may only be observable with a lag.

We reinvestigate the effect of globalization on collective bargaining and address these shortcomings. First, we use a dataset that covers 44 countries¹ (both industrialized and emerging market countries). Second, we consider the time period from 1980 up until 2009. Third, we rely on dynamic panel data methods that allow us to incorporate delayed effects of globalization on unionization rates. A final innovation is that we do not only study the effect of globalization on union density rates but also globalization's influence on two additional features of collective bargaining: the extent of decentralization and the degree of government intervention.

Our estimation results suggest that globalization has depressed union density rates, while neither affecting the extent of decentralization nor the degree of government intervention in collective bargaining. The observed tendencies towards decentralization are instead driven by increases in population density and deindustrialization. The decline of unionization has been predicted by a number of theoretical models and represents a logical consequence of the tumbling benefits of union membership due to globalization. On the other hand, the finding that globalization does not affect the extent of government intervention is in line with the existing literature that finds no significant effect of globalization on the size and scope of the public sector (Dreher, 2006a; Dreher et al., 2008).

The remainder of the paper is organized as follows. Section 2 surveys the literature on globalization's influence on collective bargaining and public policies and derives several testable hypotheses. Section 3 describes the data. Section 4 provides a graphical analysis, the description of the empirical strategy, and the estimation results. Section 5 concludes.

2. Literature review and hypotheses

Globalization has had a deep impact on markets worldwide. The changing economic environment has coerced various groups and organizations within society to respond to the challenge of globalization. In this chapter, we deliberate on the question how countries around the world have remodeled the structure of collective bargaining in view of continuing economic integration.

There is mounting evidence that high-skilled labor crosses national borders more easily in a

¹ The sample size is determined by data availability for the collective bargaining measures as well as for the control variables. The set of countries included in the dataset includes 31 OECD countries, i.e. all current OECD countries except Iceland, Israel and Turkey plus 13 non-OECD countries, namely Brazil, Bulgaria, China, Cyprus, Indonesia, Latvia, Lithuania, Malaysia, Malta, the Philippines, Romania, Singapore, and South Africa.

globalized world (Docquier and Marfouk, 2006; Egger and Radulescu, 2009; Grogger and Hanson, 2011), while public sector employees, civil servants, and low-skilled workers, i.e. employees who have traditionally been organized in a union, remain mostly immobile. This in turn leads to a decline in the bargaining power of unionized employees, while the vulnerability of unionized workers to global forces has increased (Gaston and Trefler, 1995). According to Bhagwati (2005), “(...) the bargaining power of employers has increased vis-à-vis that of employees because employers can increasingly say in a global economy that they will pack their bags and leave” (p. 46). This effect also exists if firms do not exercise their exit option but only deploy it as a threat.

The changes in the balance of power in collective bargaining logically imply that high-skilled workers and companies are better off, while public sector employees, civil servants and low-skilled workers face a deterioration in their relative employment conditions and wages due to globalization. In the following, we shed further light on the existing evidence regarding the redistributive effects of globalization and governments’ policy responses to globalization.

2.1. Globalization and the size and scope of the public sector

From a theoretical viewpoint, the literature provides two opposing theories as to how governments have responded to the improved bargaining position of mobile companies and the increased vulnerability of immobile labor. The first hypothesis is the *compensation hypothesis* arguing that the government steps in to decrease the vulnerability of employees, i.e. the government introduces public policies that protect employees against negative labor market shocks. On the other hand, the *efficiency hypothesis* suggests that (i) international tax competition exerts downward pressure on tax rates levied on capital and high-skilled labor (“race to the bottom”) and (ii) governments are consequently forced to downsize public spending owing to lower tax revenues implied by the first effect.

Various empirical contributions examine how globalization affects the public sector.² In a seminal cross-country study, Rodrik (1998) finds that countries with open economies tend to have larger governments. Globalization increases macroeconomic volatility and thereby creates the need for the government to intervene. As a consequence, the government offers additional insurance to its citizens via an expansion of the welfare state. Contrary to this seminal work, studies that include data

² For an extensive survey of the early literature see Schulze and Ursprung (1999).

on the 2000s reveal a negative effect of globalization on total public spending (Busemeyer, 2009). As regards tax rates or revenues, the empirical literature provides no evidence for a globalization-induced “race to the bottom” (Dreher, 2006a).

There are several investigations that focus on the redistributive effects of globalization. A first subbranch of this literature analyzes whether globalization has impacted the composition of public expenditures. Leibrecht et al. (2011) examine how globalization has affected the level of social expenditures in different regions in Europe and find that the predictions of the *compensation hypothesis* are fulfilled in Western Europe, while there is evidence in favor of the *efficiency hypothesis* in the Eastern European sample. With regard to other categories of public spending, the existing literature does not uncover any significant results (Dreher et al., 2008).

There are also studies which look at a further disaggregation of one particular spending category. Baskaran and Hessami (2012) focus on the composition of education expenditures and find that globalization has led to more spending for secondary and tertiary education and to less spending for primary education in both industrialized and developing countries. According to the authors, this effect is likely to put students from less wealthy families at a greater disadvantage.

The implication of Baskaran and Hessami’s study (2012) that equity considerations are compromised in a globalized world is in line with the empirical evidence for more within-country inequality due to globalization: Bergh and Nilsson (2010) find that at least certain aspects of globalization increase income inequality, while Dreher and Gaston’s study (2008) shows that more inequality describes particularly well the reality for household incomes in OECD countries.³

2.2. *Globalization and collective bargaining*

The aforementioned literature provides evidence for a positive association between inequality and globalization which may work through different channels. The existing literature shows that decentralization of collective bargaining promotes wage inequality (Golden and Londregan, 2006). Inequality is also likely to increase due to fewer government interventions that serve equity-based objectives. Finally, in particular the lower end of the income distribution is harmed via modest wage

³ These findings are somewhat contradicted by Gaston and Nelson (2004) who provide evidence that under certain circumstances unemployment benefit generosity increases in response to globalization which might alleviate income inequality at least in the short run.

agreements (Blau and Kahn, 1996) due to a decrease in union density rates and less bargaining power of unionized workers. Hence, if globalization induces a decentralization of wage bargaining, a decrease in the extent of government intervention and lower unionization rates, these are three channels that explain the globalization-inequality linkage described in Section 2.1.

2.2.1. Globalization and trade union membership

Globalization reduces the bargaining power of workers as companies threaten to outsource their production to countries where labor is cheaper and the labor market is less regulated.⁴ This development can also be pictured as an increase in the elasticity of demand for labor which reduces the market power of unions (Dumont et al., 2006). In addition, there is evidence on the growing pressure on policymakers to design labor markets in a way that is attractive for investors: Cooke (1997) finds for instance that FDI decisions of US firms are negatively affected by high levels of union penetration and employment protection legislation.

On the other hand, the bargaining power of unionized workers who are immobile (due to public sector employment or low skills) has declined significantly. This weakening of the bargaining power of unions is further aggravated by lower unionization rates due to public policies that lead to a higher prevalence of part-time work and fixed-term contracts (Scruggs and Lange, 2002).

Another reason for lower unionization rates is the limited appeal of union membership in a globalized world. An individual's choice to be a union member can be regarded as a decision that trades off the benefits of union membership against its costs. With constant union dues and a constant level of time and effort required for union activities, a decline in the benefits of being unionized induces some of the members to leave the union or not to sign up for membership in the first place.

Scruggs and Lange (2002) describe various developments that have partially depleted the benefits of union membership. Competitive pressures from low-wage countries reduce the rents to negotiate over (Dreher and Gaston, 2007) and the success of unions in negotiating high wages (Adamson and Partridge, 1997). It has further been argued that employers adopt a more confrontational stance towards unions as they are aware of their higher bargaining power (Ebbinghaus

⁴ An extensive theoretical illustration of this mechanism is provided by Eckel and Egger (2009).

and Visser, 1999). This makes generous wage agreements less probable and renders union membership less attractive. Based on the above considerations, we formulate the following hypothesis:

H1: *Globalization leads to a decrease in union membership.*

Despite its theoretical appeal, the empirical literature does not provide evidence in favor of the first hypothesis. Dreher and Gaston (2007) find no significant effect of globalization on union density rates using the multidimensional index by Dreher (2006b). However, they reveal a significant effect for social globalization and argue that Anglo-saxon ideals of deunionization spread to other countries via a socialization effect similar to the spread of the American lifestyle via McDonald's restaurants. Golden (2000) and Scruggs and Lange (2002) also find that increasing financial openness, FDI and trade openness has not or only under specific circumstances reduced union membership. The study by Scruggs and Lange is limited to a dataset of 16 industrialized countries between 1960 and 1994. We argue that the weak evidence in the existing literature is mostly due to static empirical specifications.

2.2.2. *Globalization and decentralization of collective bargaining*

Gaston (2002) puts forward a theoretical model that emphasizes how collective bargaining is likely to become more decentralized with accelerating globalization. His model addresses the question of optimal union response in a globalized environment, in particular the effect of the threat of outsourcing on domestic wage and employment bargains. Lindbeck and Snower (1996) also theoretically predict that globalization leads to more decentralized bargaining arguing that global firms stress multi-tasking activities by employees. Since centralized wage bargaining would be inefficient under these circumstances, there is a greater reliance on individual contracts.⁵

Ochel (2005) elaborates on the general trend towards decentralization during recent years in Germany. He describes how area-wide collective wage agreements (*Flächentarifverträge*) are no longer important, while agreements at the company level (*Firmentarifverträge*) and at the plant level (*Betriebsvereinbarungen*) have become more widely used. According to Ochel, the importance of the equality of competitive conditions at the national level has decreased due to globalization. It is more

⁵ Note that there are also contributions that make the opposite statement (e.g. Agell, 1999; 2002) with regard to Hypotheses 1 and 2. The idea is that stronger unions and centralized wage bargaining are more helpful in order to protect workers against wage risk.

important for a firm to adjust its wage level to that of foreign competitors rather than to create uniform wages across a domestic sector. For this reason, firms require more scope for wage bargaining at the firm-level (Calmfors et al., 2001).

On the other hand, Wallerstein and Golden (1997) focus on decentralization of collective bargaining in Scandinavia before the mid-90s, but do not observe similar trends as in Germany. Finally, Cooke (1997) provides evidence that FDI decisions of US firms are negatively affected by centralized bargaining structures. This can be viewed as proof of the pressure on policymakers to decentralize bargaining procedures to which policymakers are likely to succumb eventually.

We conclude that the theoretical literature consistently predicts decentralization of collective bargaining in response to globalization, while systematic empirical investigations are scarce and the descriptive evidence differs across countries. This motivates us to test the following hypothesis:

H2: *Globalization leads to decentralization of collective bargaining.*

2.2.3. *Globalization and government intervention in bargaining*

It is not a priori clear how globalization affects the extent of government intervention in collective bargaining as there are opposing arguments (Hassel, 2006). On the one hand, globalization may induce governments to get more involved to protect workers that are otherwise less powerful in a globalized world (see Hypothesis 1). This would be in line with the *compensation hypothesis*:

H3a: *Globalization leads to more government intervention in collective bargaining.*

On the other hand, it might be that the government is threatened by firms that they will outsource their operations and therefore the government feels compelled to increasingly back out of the negotiations. This would be in line with the *efficiency hypothesis*:

H3b: *Globalization leads to less government intervention in collective bargaining.*

Our contribution is to test the two competing hypotheses at the level of bargaining intervention rather than the size of government or welfare state expenditures. The findings are not only relevant for the link between globalization and collective bargaining, but also provide insights that are of interest for the general literature on the validity of the efficiency and compensation hypotheses.

3. Description of data on collective bargaining

The data for all three variables on collective bargaining is taken from the Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS) by Visser (2011). The ICTWSS Database contains annual data for 87 variables for all OECD and EU member states and a few emerging market countries totaling 49 countries over the 1960-2010 period. It is so far the most comprehensive dataset on collective bargaining in terms of country coverage, time coverage, and the number of variables.⁶

The first measure that we use is the union density rate defined as “the net union membership as a proportion of wage and salary earners in employment” (Visser, 2011, p. 18). The data for the *UD* variable is constructed along the lines of Ebbinghaus and Visser (2000) and has been further extended to countries outside of Western Europe as described in Visser (2006).

Second, we include a measure for the centralization of the wage bargaining process. This variable denoted as *Level* is measured on a five-point scale capturing “the dominant level(s) at which bargaining takes place” (Visser, 2011, p. 8). The coding looks as follows: 5 = national or central level; 4 = national or central level, with additional sectoral / local or company bargaining; 3 = sectoral or industry level; 2 = sectoral or industry level, with additional local or company bargaining; 1 = local or company bargaining.

Finally, we include the *Govint* variable which measures the extent of government intervention in the wage bargaining process. The five-point scale for this variable was developed by Hassel (2006), while additional data from Golden and Lange (1996) and Golden et al. (2006) was extended for Visser’s database. The five-point scale measures the following: 5 = the government imposes private sector wage settlements, places a ceiling on bargaining outcomes or suspends bargaining; 4 = the government participates directly in wage bargaining (tripartite bargaining, as in social pacts); 3 = the government influences wage bargaining outcomes indirectly through price ceilings, indexation, tax measures, minimum wages, and/or pattern setting through public sector wages; 2 = the government influences wage bargaining by providing an institutional framework of consultation and information

⁶ Our time series start in 1980 even though globalization data is available as of 1970 and the collective bargaining measures are available as of 1960. We do so to avoid the period of the oil shocks and to have a more balanced panel.

exchange, by conditional agreement to extend private sector agreements, and/or by providing a conflict resolution mechanism which links the settlement of disputes across the economy and/or allows the intervention of state arbitrators or Parliament; 1 = none of the above.

4. Empirical results

4.1. Descriptive analysis

Figure 1 plots each of the measures for the characteristics of collective bargaining against the KOF-index for economic globalization over the time period from 1980 to 2009. The left-hand axis and the solid line refer to the globalization measure, while the dashed line and the right-hand axis refer to the respective collective bargaining measure.

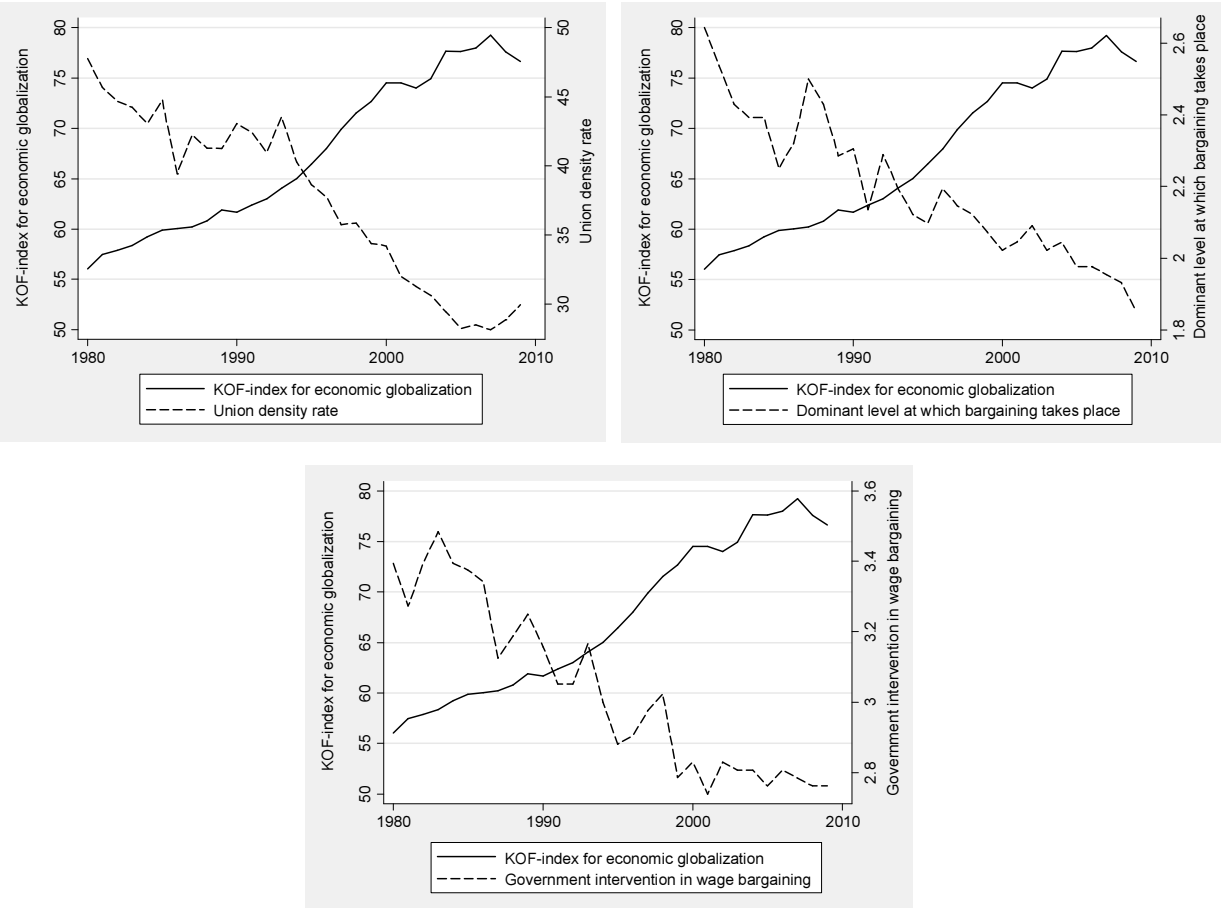


Figure 1. Evolution of economic globalization and characteristics of collective bargaining, 1980-2009

The first conclusion that we can draw is that there has been a clear upward trend in the extent of globalization which has somewhat accelerated in particular since the mid-90s, while at the same time

having lost some momentum in the most recent years. In particular, there has even been a downward movement from 2008 onward that is most likely due to the financial crisis.

During the last three decades the union density rate has declined steadily from about 80% down to approximately 55%. In 2008, there has also been a trend reversal in the union density rate as the negative trend has developed into a weakly positive development during the last few years of the sample period. This provides additional evidence on how unusual the recent financial crisis has been.

Regarding the centralization of collective bargaining, the descriptive evidence points towards a downward trend despite some marked trend reversals in the mid-80s and early-90s. Overall, collective bargaining is nowadays taking place more often at the local or company level. Finally, the third plot at the bottom of Figure 1 illustrates that the government takes an ever more distant approach to collective bargaining. During the last decade, this development has reached a stable level.

Summarizing, the plots in Figure 1 suggest that globalization is associated with lower union density, more decentralized collective bargaining, and a decrease of government intervention in collective bargaining. We can also see that the post-2007 period, i.e. the last three years in our sample period can be considered as outlying observations. This is something that we will take into account in the sensitivity analysis of our estimations (Section 4.4.4.).

4.2. Empirical strategy

The dynamic model that we estimate in this study can be described by the following equation:

$$Coll. bargaining measure_{it} = \beta Globalization_{it} + \gamma Coll. bargaining measure_{it-1} + \mathbf{X}_{it}\boldsymbol{\delta} + \mu_i + \eta_t + \varepsilon_{it}, \quad (1)$$

where the dependent variable is one of the three measures on collective bargaining described in Section 3 of this paper. On the right-hand side, we include a lagged dependent variable to account for inertia in the dependent variables. A second benefit of including a lagged dependent variable is that we indirectly take into account the effect that the lags of the control variables have on the dependent variable without including these lags explicitly. This is common knowledge that can be easily verified by shifting equation (1) back by one period and substituting this expression into the lagged dependent variable in equation (1). The estimations also include country fixed effects μ_i and time fixed effects η_t .

We use either the KOF-index for economic globalization or the trade-to-GDP ratio from the Penn World Tables as a proxy for the extent of globalization. The KOF-index for globalization was developed by Dreher (2006b). We use the 2012 release of the index that covers almost all countries in the world over the time period from 1970 to 2009. There are three subindexes for the economic, social, and political dimension and one overall index which aggregates these three dimensions. We use the economic globalization index rather than the overall index since the hypotheses in Section 2 use economic arguments. In the robustness checks, we also consider other dimensions of the KOF-index.

In order to be consistent with the existing literature, our choice of control variables included in the vector \mathbf{X}_{it} follows the strategy chosen by Dreher and Gaston (2008). As a first control, we include the inflation rate and the unemployment rate to capture the business cycle. The data on these two variables is taken from the World Bank's World Development Indicators (WDI) Database. This choice is based on Wallerstein and Western's (2000) argument that a strong economy should increase union membership. We extend this argument by stating that the state of the economy may also affect the willingness of the government to intervene in collective bargaining as well as the willingness of firms to conduct independent negotiations. Second, we include a measure of the degree of industrialization. While Dreher and Gaston (2008) used the share of employment in the industry from the OECD databases, an equivalent measure for a broader set of countries is not available. For that reason, we use the industry share of GDP from the WDI Database. Third, we include a measure of population density (inhabitants per thousands of square kilometers) as the extent of decentralization of collective bargaining as well as the degree of unionization may be dependent on this variable. This data is also taken from the WDI Database. Finally, we include a dummy for left-wing governments from the Database of Political Institutions (DPI) by Beck et al. (2001) since this may influence the extent of government intervention in collective bargaining or rates of unionization.

Estimating a model that includes a lagged dependent variable as well as fixed effects with the least squares estimator leads to a bias since the within-transformed lagged dependent variable is correlated with the transformed error term (Nickell, 1981). Yet, this bias approaches 0 when the time dimension is large, i.e. the OLS estimator is consistent for large T. Based on Monte Carlo simulations,

Judson and Owen (1999) show that for a time-dimension of at least 30, the OLS estimator performs well compared to the alternatives. When T is smaller than 30, OLS is not recommendable.

Given that in this dataset the time-dimension is on average about 20 given missing observations (see Table 6 in the appendix), we abstain from using the OLS estimator. Instead, we follow Judson and Owen's (1999) recommendation to use the Anderson-Hsiao estimator for an unbalanced panel with $T = 20$ as this best describes the characteristics of our dataset.⁷

4.3. Estimation results

Table 1 presents the results for the baseline estimations. Models 1 to 3 use the KOF-index for economic globalization as the main explanatory variable, while models 4 to 6 employ the trade-to-GDP ratio from the Penn World Tables. For each indicator, three models are tested using the union density rate, the centralization of collective bargaining index, and the government intervention in collective bargaining index as the dependent variable. The large F-statistics for the Kleibergen-Paap weak identification tests at the bottom of Table 1 indicate the strength of the instrument for the first difference of the lagged dependent variable.

The main result in Table 1 is that economic globalization has indeed led to a decline in union density rates as predicted by Hypothesis 1. This effect is significant at the 1% level in model 1 and at the 5% level in model 4, i.e. the result is robust when using a more traditional measure of economic integration. The size of the coefficient in model 1 of -0.094 signifies that with a ten-point increase for the KOF-index of globalization (as observed between the mid-80s and mid-90s in Figure 1) the union density rate has declined by 1%. Overall, the KOF-index has increased between 1980 to 2009 by on average 20 points, while union density rates have on average declined by 20 percentage points. This implies that globalization only partially explains the decline in unionization observed during the past three decades. Increases in population density and deindustrialization appear to have some explanatory power for declining union density rates even though the p-values are just above the 10% threshold.

⁷ The Anderson-Hsiao estimator is an IV estimator on first differences that is implemented as follows. All of the data is differenced. The first difference of the lagged dependent variable, which is endogenous, is instrumented with either the second lag of the level of the dependent variable or the second lag of the difference. The variant of the Anderson-Hsiao estimator that we employ uses the second option. See Roodman (2009) and Anderson and Hsiao (1981) for further details.

The significant time fixed effects (not reported here) show that part of the explanation lies in a general negative time trend that captures developments in other unobserved variables.

Table 1. Baseline estimations: Anderson-Hsiao estimator, 1980-2009, 44 countries

Dependent variable:	<i>Union density rate</i>	<i>Centralization of CB</i>	<i>Government intervention in CB</i>	<i>Union density rate</i>	<i>Centralization of CB</i>	<i>Government intervention in CB</i>
Globalization measure:	KOF-index for economic globalization			PWT trade openness measure		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Economic globalization	-0.094*** (-3.616)	0.002 (0.279)	0.001 (0.062)	-0.018** (-2.357)	-0.001 (-0.247)	0.002 (0.726)
Leftwing government	0.155 (0.958)	0.237*** (3.392)	-0.006 (-0.063)	0.114 (0.709)	0.238*** (3.396)	-0.006 (-0.063)
Population density	0.002 (1.514)	0.000 (0.662)	0.000 (0.268)	0.002 (1.300)	0.000 (0.516)	0.000 (0.487)
Unemployment rate	0.073 (1.303)	-0.029** (-2.000)	0.004 (0.204)	0.061 (1.031)	-0.029** (-2.004)	0.004 (0.205)
Inflation rate	-0.008 (-0.642)	-0.000*** (-2.925)	0.000 (0.112)	-0.013 (-0.992)	-0.000*** (-2.763)	-0.000 (-0.023)
Industry share of GDP	-0.062 (-1.599)	-0.032** (-2.366)	-0.006 (-0.470)	-0.072* (-1.831)	-0.032** (-2.367)	-0.006 (-0.509)
Lagged dep. var.	0.594*** (5.540)	-0.705*** (-10.348)	0.427** (2.026)	0.623*** (5.698)	-0.705*** (-10.327)	0.428** (2.029)
Observations	832	916	939	832	916	939
Number of countries	44	44	44	44	44	44
Kleibergen-Paap	45.411	96.682	29.864	46.335	93.413	29.801
F-statistic (weak id.)						

[1] Even though the same set of countries is used, the number of observations differs across the models due to differing data availability for the three dependent variables.

[2] All estimations include year fixed effects. Country fixed effects are implicitly included through first-differencing.

[3] Hypothesis tests are based on standard errors that are robust to heteroscedasticity

[4] Stars indicate significance at 10% (*), 5% (**) and 1% (***) [5] t-statistics in parentheses

On the other hand, the degree of centralization and the extent of government intervention in collective bargaining appear not to be driven by globalization. This is an important discovery given that Figure 1 tempts us to believe that there is a negative relationship between the two variables if not controlling for other confounding variables. These results suggest a rejection of Hypothesis 2, while it is not distinguishable whether both Hypotheses 3a and 3b are to be rejected or whether both of the described effects hold at the same time and cancel each other out. This finding is, however, in line with the existing literature that uncovers no significant effect of globalization on other measures of government intervention such as public expenditures. Regarding the observed tendencies towards decentralization of collective bargaining observed in Figure 1, we can state that - based on the results for models 2 and 5 - decentralization of collective bargaining is rather driven by right-wing and centrist governments, the business cycle, and tendencies towards deindustrialization.

4.4. Additional specifications

In order to further investigate the robustness of the results presented in Table 1, we have conducted additional estimations that are described in the following.

4.4.1. Alternative globalization measures

Table 2 summarizes the results for a re-estimation of the models in Table 1 using three alternative measures of globalization. Models 7 to 9 use the KOF-index capturing all three dimensions of globalization (economic, social, political), models 10 to 12 use the political dimension only, while models 13 to 15 focus on the social dimension.

It transpires from Table 2 that the results are indeed dependent on the choice of the globalization index. The globalization-unionization linkage predicted by Hypothesis 1 is only valid with regard to economic globalization.

Interestingly, union density rates increase with social globalization as shown by the results for model 13. This stands in opposition to Dreher and Gaston (2008) who provide evidence for a negative effect of the social globalization index on unionization, while in their study economic globalization does not influence unionization. Our interpretation of the positive coefficient that we uncover is that cultural assimilation to Western values in our broader set of countries motivates workers to unionize in order to achieve an improvement of their working conditions.

Finally, the results in Table 2 confirm our prior conclusions on the validity of Hypotheses 2, 3a, and 3b. This means that we reject Hypothesis 2, while we cannot state whether Hypothesis 3a and 3b need to be rejected or whether they are both valid at the same time.

Table 2. Other globalization measures: Anderson-Hsiao estimator, 1980-2009, 44 countries

Dependent variable:	<i>Union density rate</i>	<i>Centralization of CB</i>	<i>Government intervention in CB</i>	<i>Union density rate</i>	<i>Centralization of CB</i>	<i>Government intervention in CB</i>	<i>Union density rate</i>	<i>Centralization of CB</i>	<i>Government intervention in CB</i>
Globalization measure:	KOF-index for globalization (overall)			KOF-index for political globalization			KOF-index for social globalization		
	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15
Globalization	-0.009 (-0.289)	-0.008 (-0.553)	0.004 (0.297)	0.014 (1.085)	-0.001 (-0.259)	-0.000 (-0.037)	0.045** (2.347)	-0.010 (-0.723)	0.005 (0.437)
Leftwing government	0.115 (0.704)	0.238*** (3.411)	-0.006 (-0.065)	0.116 (0.716)	0.237*** (3.394)	-0.005 (-0.061)	0.118 (0.736)	0.238*** (3.403)	-0.006 (-0.065)
Population density	0.002* (1.651)	0.000 (0.532)	0.000 (0.301)	0.002 (1.580)	0.000 (0.649)	0.000 (0.260)	0.002* (1.802)	0.000 (0.352)	0.000 (0.374)
Unemployment rate	0.060 (1.006)	-0.029** (-2.005)	0.004 (0.212)	0.061 (1.012)	-0.029** (-2.000)	0.004 (0.204)	0.061 (1.014)	-0.029** (-2.034)	0.004 (0.220)
Inflation rate	-0.014 (-1.012)	-0.000*** (-3.167)	0.000 (0.137)	-0.013 (-0.954)	-0.000*** (-2.983)	0.000 (0.115)	-0.013 (-0.916)	-0.000*** (-3.388)	0.000 (0.188)
Industry share of GDP	-0.073* (-1.834)	-0.032** (-2.366)	-0.006 (-0.456)	-0.072* (-1.816)	-0.032** (-2.361)	-0.006 (-0.465)	-0.072* (-1.791)	-0.032** (-2.379)	-0.006 (-0.450)
Lagged dep. var.	0.626*** (5.667)	-0.703*** (-10.347)	0.426** (2.016)	0.632*** (5.655)	-0.705*** (-10.336)	0.427** (2.021)	0.628*** (5.699)	-0.702*** (-10.358)	0.426** (2.017)
Observations	832	916	939	832	916	939	832	916	939
Number of countries	44	44	44	44	44	44	44	44	44
Kleibergen-Paap F-statistic (weak id.)	45.578	95.919	29.779	45.810	93.898	29.774	46.288	94.138	29.781

[1] Even though the same set of countries is used, the number of observations differs across the models due to differing data availability for the three dependent variables.

[2] All estimations include year fixed effects. Country fixed effects are implicitly included through first-differencing.

[3] Hypothesis tests are based on standard errors that are robust to heteroscedasticity [4] Stars indicate significance at 10% (*), 5% (**) and 1% (***) [5] t-statistics in parentheses

4.4.2. Influence of the European integration process

In Table 3, we have included two additional explanatory variables that capture the two main stages of the European integration process within our sample period: the signing of the Maastricht treaty in 1992 and the introduction of the Euro in 1999.⁸ The two dummy variables are coded with a 0 before the event and for those countries that never entered this stage, while the value is 1 for those countries that participated as of the year when the event occurred. Hence, the inclusion of the two variables allows us to implement a difference-in-differences approach.

Table 3. Inclusion of EMU stages: Anderson-Hsiao estimator, 1980-2009, 44 countries

Dependent variable:	<i>Union density rate</i>	<i>Centralization of CB</i>	<i>Government intervention in CB</i>	<i>Union density rate</i>	<i>Centralization of CB</i>	<i>Government intervention in CB</i>
Globalization measure:	KOF-index for economic globalization			PWT trade openness measure		
	Model 16	Model 17	Model 18	Model 19	Model 20	Model 21
Economic globalization	-0.094*** (-3.629)	0.001 (0.197)	0.000 (0.044)	-0.018** (-2.352)	-0.001 (-0.237)	0.002 (0.739)
Maastricht treaty	0.565* (1.879)	0.276 (1.400)	0.086 (0.397)	0.511* (1.776)	0.277 (1.401)	0.086 (0.396)
Introduction of Euro	0.208 (0.314)	-0.117 (-1.118)	-0.082 (-0.293)	0.220 (0.328)	-0.117 (-1.121)	-0.086 (-0.307)
Leftwing government	0.160 (0.994)	0.241*** (3.449)	-0.004 (-0.044)	0.119 (0.739)	0.242*** (3.451)	-0.004 (-0.045)
Population density	0.002 (1.579)	0.000 (0.827)	0.000 (0.312)	0.002 (1.360)	0.000 (0.689)	0.000 (0.541)
Unemployment rate	0.077 (1.331)	-0.029** (-2.032)	0.003 (0.165)	0.065 (1.065)	-0.029** (-2.037)	0.003 (0.164)
Inflation rate	-0.009 (-0.685)	-0.000*** (-2.908)	0.000 (0.128)	-0.014 (-1.029)	-0.000*** (-2.747)	-0.000 (-0.010)
Industry share of GDP	-0.061 (-1.584)	-0.033** (-2.399)	-0.006 (-0.480)	-0.071* (-1.817)	-0.032** (-2.403)	-0.006 (-0.521)
Lagged dep. var.	0.593*** (5.515)	-0.704*** (-10.327)	0.427** (2.021)	0.622*** (5.673)	-0.704*** (-10.310)	0.428** (2.024)
Observations	832	916	939	832	916	939
Number of countries	44	44	44	44	44	44
Kleibergen-Paap F-statistic (weak id.)	45.256	96.646	29.697	46.171	93.397	29.636

[1] Even though the same set of countries is used, the number of observations differs across the models due to differing data availability for the three dependent variables.

[2] All estimations include year fixed effects. Country fixed effects are implicitly included through first-differencing.

[3] Hypothesis tests are based on standard errors that are robust to heteroscedasticity

[4] Stars indicate significance at 10% (*), 5% (**) and 1% (***) [5] t-statistics in parentheses

We infer from Table 3 that the signing of the Maastricht treaty brought about a significant increase in union density rates both in models 16 and 19. The significance levels of the effects of globalization on

⁸ The coding of these dummies takes into account that Austria, Finland, and Sweden signed the Maastricht treaty in 1995, while Greece introduced the Euro in 2001.

the three characteristics of collective bargaining are unaffected by the inclusion of the two stages of European Economic and Monetary Union (EMU). Hence, the globalization effect observed in the baseline estimation is not driven by the influence of European integration. Table 3 rather suggests that globalization and European integration have had opposite effects on unionization.

4.4.3. Subset of OECD countries

Previous investigations that have found no effect of globalization on characteristics of collective bargaining have focused exclusively on a small number of OECD countries. To test whether the significant effect of economic globalization on union density rates in our baseline estimations is driven by the observations for non-OECD countries in the sample, we have re-estimated the baseline models excluding the 13 non-OECD countries. The results are collected in Table 4.

Table 4. Only OECD countries: Anderson-Hsiao estimator, 1980-2009, 31 countries

Dependent variable:	<i>Union density rate</i>	<i>Centralization of CB</i>	<i>Government intervention in CB</i>	<i>Union density rate</i>	<i>Centralization of CB</i>	<i>Government intervention in CB</i>
Globalization measure:	KOF-index for economic globalization			PWT trade openness measure		
	Model 22	Model 23	Model 24	Model 25	Model 26	Model 27
Economic globalization	-0.087*** (-2.775)	0.007 (0.872)	0.002 (0.142)	-0.047*** (-3.089)	-0.002 (-0.294)	0.001 (0.141)
Leftwing government	0.195 (1.159)	0.246*** (3.325)	0.044 (0.503)	0.147 (0.904)	0.248*** (3.355)	0.045 (0.513)
Population density	0.013 (0.364)	0.008 (0.691)	-0.002 (-0.086)	0.026 (0.758)	0.007 (0.615)	-0.002 (-0.097)
Unemployment rate	0.152*** (3.250)	-0.047** (-2.078)	-0.010 (-0.418)	0.141*** (3.018)	-0.045** (-2.037)	-0.010 (-0.403)
Inflation rate	0.001 (0.042)	0.000 (0.010)	0.002 (1.174)	-0.007 (-0.376)	0.000 (0.019)	0.002 (1.172)
Industry share of GDP	-0.036 (-0.805)	-0.050** (-2.436)	-0.004 (-0.194)	-0.036 (-0.835)	-0.048** (-2.432)	-0.004 (-0.191)
Lagged dep. var.	0.710*** (6.414)	-0.673*** (-8.380)	0.418* (1.924)	0.699*** (6.427)	-0.670*** (-8.380)	0.419* (1.923)
Observations	694	727	727	694	727	727
Number of countries	31	31	31	31	31	31
Kleibergen-Paap F-statistic (weak id.)	32.147	74.870	27.661	31.467	72.215	27.591

[1] Even though the same set of countries is used, the number of observations differs across the models due to differing data availability for the three dependent variables.

[2] All estimations include year fixed effects. Country fixed effects are implicitly included through first-differencing.

[3] Hypothesis tests are based on standard errors that are robust to heteroscedasticity

[4] Stars indicate significance at 10% (*), 5% (**) and 1% (***) [5] t-statistics in parentheses

We find that the exclusion of non-OECD countries does not lead to conclusions that diverge from our prior findings. The size of the coefficients is also hardly affected by the smaller sample. Overall, the results are robust with regard to the cross-country composition of the sample.

4.4.4. Exclusion of the 2000s

Another difference between our estimations and those in earlier studies is that we include data beyond the end of the 1990s. Hence, the fact that our results are at odds with the conclusions reached in previous investigations may be due to the fact that the significant influence of globalization on union density rates is only observable in the latest decade where the process of globalization was particularly rapid as pointed out by Busemeyer (2009).

Table 5. Shortened time period: Anderson-Hsiao estimator, 1980-1999, 44 countries

Dependent variable:	<i>Union density rate</i>	<i>Centralization of CB</i>	<i>Government intervention in CB</i>	<i>Union density rate</i>	<i>Centralization of CB</i>	<i>Government intervention in CB</i>
Globalization measure:	KOF-index for economic globalization			PWT trade openness measure		
	Model 28	Model 29	Model 30	Model 31	Model 32	Model 33
Economic globalization	-0.139** (-2.229)	-0.001 (-0.079)	-0.009 (-0.380)	-0.028** (-2.317)	-0.001 (-0.210)	-0.001 (-0.222)
Leftwing government	0.144 (0.736)	0.295*** (2.821)	0.049 (0.315)	0.043 (0.238)	0.294*** (2.827)	0.044 (0.285)
Population density	0.002 (1.112)	0.000 (0.334)	0.000 (0.029)	0.003 (1.274)	0.000 (0.349)	0.000 (0.150)
Unemployment rate	0.231*** (3.509)	-0.026 (-1.282)	0.034 (0.916)	0.182*** (2.897)	-0.026 (-1.348)	0.032 (0.838)
Inflation rate	-0.013 (-0.962)	-0.000*** (-2.933)	-0.000 (-0.064)	-0.018 (-1.293)	-0.000*** (-2.858)	-0.000 (-0.047)
Industry share of GDP	-0.016 (-0.264)	-0.024 (-1.132)	-0.015 (-0.610)	-0.031 (-0.534)	-0.024 (-1.127)	-0.015 (-0.594)
Lagged dep. var.	0.595*** (7.796)	-0.536*** (-4.086)	0.759* (1.849)	0.619*** (8.128)	-0.537*** (-4.135)	0.753* (1.835)
Observations	469	496	516	469	496	516
Number of countries	44	44	44	44	44	44
Kleibergen-Paap F-statistic (weak id.)	69.388	31.349	16.165	70.934	30.994	16.097

[1] Even though the same set of countries is used, the number of observations differs across the models due to differing data availability for the three dependent variables.

[2] All estimations include year fixed effects. Country fixed effects are implicitly included through first-differencing.

[3] Hypothesis tests are based on standard errors that are robust to heteroscedasticity

[4] Stars indicate significance at 10% (*), 5% (**) and 1% (***) [5] t-statistics in parentheses

The results provided in Table 5 based on data from 1980 to 1999 suggest the opposite. When only focusing on the first two decades, the coefficient is about 50% larger in absolute terms for the model that tests the influence of the KOF-index for economic globalization on union density rates (model 28

versus model 1) as well as the model that tests the effect of the trade-to-GDP ratio on union density rates (model 31 versus model 4). An explanation for this surprising result is that the latest decade is not only characterized by more rapid globalization but also by the financial crisis and its aftermath (see Figure 1) which apparently weakens the negative globalization-unionization relationship.

To investigate to what extent the recent crisis period affects our results, we have additionally conducted estimations that focus on the period from 1980 to 2006, i.e. excluding the crisis years (results not shown in Table 5). We find that compared to the results in Table 1, the globalization coefficients (-0.097 for KOF-index and -0.023 for trade-to-GDP ratio) are minimally larger, while both effects are significant at the 1% level. In Table 1, this was only the case for the globalization coefficient in model 1. It appears that the inclusion of the recent crisis years slightly weakens the significance and the size of the observed effects even though the changes are negligible.

4.4.5. Summary of the additional results

The estimations in sections 4.4.1. to 4.4.4. yield additional insights regarding the robustness and the heterogeneity of the effect of globalization on characteristics of the collective bargaining process. A first finding is that it is exclusively the economic dimension of globalization that leads to lower rates of unionization. Social globalization has an opposite effect on unionization even though the coefficient is only half as large as the economic globalization coefficient. Second, the significantly negative influence of economic globalization on union density rates is not an artifact of the process of European integration; the signing of the Maastricht treaty as the first step towards monetary unification has rather had an opposite effect on union density rates. Third, our baseline results remain robust even when excluding non-OECD countries or dropping the 2000s from the sample. The most plausible explanation why we find a significantly negative influence of globalization on union density rates in contrast to Dreher and Gaston (2008) is that we estimate a model that allows for dynamic effects. Finally, throughout the additional estimation results we find no evidence for a significant influence of globalization on the centralization of collective bargaining or the extent of government intervention in collective bargaining. This confirms the baseline estimation results on these relationships.

5. Conclusion

This paper investigates how globalization has affected three characteristics of the collective bargaining process: union density rates, centralization of collective bargaining, and the extent of government intervention in collective bargaining. Descriptive evidence would suggest a significantly negative correlation in all three cases. However, our dynamic panel data estimations for 44 countries (31 OECD and 13 non-OECD countries) show that this holds true only partially.

The regression analysis shows that only union density rates significantly decreased due to economic globalization (measured by the KOF-index for economic globalization and the trade-to-GDP ratio), while the other two variables were not affected at all. Moreover, the size of the coefficient leads us to conclude that globalization only explains a certain share of the observed substantial decrease in union density rates over the past few decades. Changes in population density and tendencies towards deindustrialization appear to have made their contribution to lower unionization as well.

We have conducted a number of additional estimations to investigate the robustness of the effects. It is the economic dimension of globalization that drives the effect, while social globalization appears to have had a small effect that runs in the opposite direction. Our results are not an artifact of the influence of the European integration process, the inclusion of non-OECD countries or the inclusion of the latest decade. Finally, the insignificance of the effects on centralization and government intervention in collective bargaining is confirmed in all of the robustness checks.

Over the past few years, the economic literature on globalization has benefitted from the availability of larger datasets and the development of more suitable estimation techniques. Our paper shows that the reliance on these innovations can elicit new answers to old questions. Nevertheless, there remain many avenues for future research. One reason why we do not find a relationship between globalization and the degree of decentralization as well as the extent of government intervention might be the imprecise measures that are available for these aspects of collective bargaining. Alternative indicators of a more quantitative nature should be developed and explored in the future. Second, future research should investigate how changes in the nature of collective bargaining have eventually affected bargaining outcomes. These are some of the key questions that need to be addressed as they have important implications for the redistributive effects of globalization.

Appendix

Table 6. Summary statistics

Variable		Mean	Std. Dev.	Min	Max	Observations
Union density rate	Overall	34.765	21.107	7.3	92	N = 832
	Between		19.808	9.65	89.595	n = 44
	Within		5.490	20.813	68.727	T = 18.909
Centralization of collective bargaining	Overall	2.155	1.150	1	5	N = 916
	Between		1.021	1	4	n = 44
	Within		0.478	-0.653	5.005	T = 20.818
Government intervention in collective bargaining	Overall	2.910	1.100	1	5	N = 939
	Between		0.965	1	5	n = 44
	Within		0.532	1.448	5.525	T = 21.341
KOF-index for economic globalization	Overall	72.147	14.859	29.964	98.876	N = 939
	Between		12.921	40.901	95.754	n = 44
	Within		6.959	51.138	90.364	T = 21.341
PWT trade-to-GDP ratio	Overall	84.622	66.176	9.176	443.175	N = 939
	Between		59.461	19.733	345.234	n = 44
	Within		20.225	13.563	182.563	T = 21.341
KOF-index for globalization (overall)	Overall	73.194	13.055	31.935	92.836	N = 939
	Between		11.167	45.776	89.542	n = 44
	Within		6.285	54.268	87.285	T = 21.341
KOF-index for political globalization	Overall	81.886	14.751	26.711	98.561	N = 939
	Between		13.523	48.974	96.447	n = 44
	Within		7.949	43.262	101.956	T = 21.341
KOF-index for social globalization	Overall	68.112	17.713	11.344	93.255	N = 939
	Between		16.293	22.820	89.417	n = 44
	Within		6.745	42.472	88.881	T = 21.341
Left-wing government	Overall	0.340	0.474	0	1	N = 939
	Between		0.317	0	1	n = 44
	Within		0.371	-0.543	1.266	T = 21.341
Population density	Overall	289.651	905.642	2.001	7125.143	N = 939
	Between		814.767	2.374	5378.46	n = 44
	Within		162.799	-1087.317	2036.334	T = 21.341
Unemployment rate	Overall	7.673	4.533	1.5	31.2	N = 939
	Between		4.167	3	25.147	n = 44
	Within		2.387	-0.574	15.521	T = 21.341
Inflation rate	Overall	7.071	36.441	-9.629	1058.374	N = 939
	Between		14.589	0.720	89.196	n = 44
	Within		34.301	-79.968	976.249	T = 21.341
Industry share of GDP	Overall	31.493	6.297	12.448	49.713	N = 939
	Between		5.922	19.234	46.933	n = 44
	Within		2.963	21.670	45.338	T = 21.341
Maastricht treaty dummy	Overall	0.279	0.449	0	1	N = 939
	Between		0.331	0	1	n = 44
	Within		0.298	-0.413	0.741	T = 21.341
Introduction of Euro dummy	Overall	0.137	0.344	0	1	N = 939
	Between		0.194	0	0.647	n = 44
	Within		0.281	-0.510	0.804	T = 21.341
OECD dummy	Overall	0.774	0.418	0	1	N = 939
	Between		0.462	0	1	n = 44
	Within		0	0.774	0.774	T = 21.341

The above summary statistics are based on the maximum number of observations used in the regressions.

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