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Introduction

The aim of this paper is to explore how labor market institutions (LMIs) interact. It looks at the theoretical implications for the functioning of the labor market. Despite the vast literature on LMIs, their microeconomic foundations and their effects on labor market performance and outcomes, there is no clear answer on which institutions interact, when and why. Studies exist that emphasize the importance of such interactions from a theoretical point of view in relation to the possibilities of reforms. This paper aims to find basic evidence for the interactions between LMIs. It argues that they can be seen as enablers as well as obstacles for good labor market policies. This is done by leaving the narrow field of labor economics and finding theoretical arguments for a more comprehensive view, while taking into account different levels of analysis.

Labor market institutions are defined by Boeri and Van Ours [2008:3] as “a system of laws, norms, or conventions resulting from a collective choice and providing constraints or incentives that alter *individual* choices over labor and pay”. They also argue that LMIs “interfere with the exchange of labor services for pay. They do so by introducing a *wedge* between the reservation wage of the workers and the value of a job, that is, between labor supply and demand schedules” [Boeri and Van Ours, 2008:14]. The most common examples of LMIs include: minimum wage, wage-setting mechanisms (collective bargaining), payroll taxes, unemployment benefits (UB), employment protection legislation (EPL) and active labor market policies (ALMP). Often mechanisms that regulate entrance to and attainment on the labor market (education and skill formation) are included as well as exit mechanisms from the labor market (retirement programs).

Given that LMIs create a wedge, many economists and politicians are skeptical about the presence of strong LMIs because they see them as causes of labor market inefficiency and unemployment¹. Others, again both politicians and economists, have a more benevolent attitude towards certain LMIs, as they are likely to mitigate risks for workers by offering them greater job and income security [cf. Agell, 1999, 2002]. Most studies, however, argue that the functioning of different LMIs is complex and that their effects are at most ambiguous [cf. Nickell, 1997; Blanchard and Wolfers, 2000; Baccaro and Rei, 2007].

This paper explores the idea that LMIs interact and thereby can contribute to equitable and efficient labor market outcomes: First of all, theoretically by analyzing what the essence of LMIs is: where do they come from, how do they work and in what kind of environment do they function. Second, we analyze empirically by performing some basic correlation tests to identify which LMIs interact. We limit our analysis to the 27 current EU member states. These countries constitute a group of different countries with different welfare and labor market systems, but still subject to similar policy challenges and pressures.

Many previous studies on LMIs only focus on the Old Member States of the EU, or OECD countries. Another stream of literature focuses on (former) transition countries as a distinct and specific species [cf. Ederveen and Thissen, 2007; Failova and Schneider, 2008; Lehman and Muravyev, 2011]. Koster et al. [2011:5] claim that there is “strong evidence that welfare state institutions and employment relations in Western European countries differ fundamentally from those institutions in Central and Eastern European countries”. This study assumes that the basic mechanisms behind LMI interactions in New Member States are no different than in Old Member States, while still accounting for varieties that may exist.

The remainder of this article is organized as follows. Section II describes theoretical issues. Section III describes the method and data. In section IV the outcomes are analyzed and results discussed. Section IV concludes.

A theory of labor market institution interactions

Functions of labor market institutions. Even the most liberal labor market needs institutions to set the rules of conduct. Therefore, a labor market without institutions is impossible to realistically imagine. Although many studies treat LMIs as exogenously given, it is also worth treating them as endogeneities by looking at their origins and rationale [Arpaia and Mourre, 2009:4]. Boeri and Van Ours [2008:18–19] list three arguments for the existence of LMIs, namely that they increase efficiency, promote equity and are the result of policy failures. Each of them is discussed briefly, as they represent in broad lines the different views on LMIs in the literature and they lead up to the discussion of interactions. Note that the different views are not mutually exclusive and may even be complementary.

An LMI can be the result of policy failures that arise when certain minority groups are powerful enough to impose policies that serve mainly them, but whereas the costs are borne by the majority. In this view, LMIs are not created to benefit society as a whole, but the result of social conflict between groups that seek to maximize their rent [Arpaia and Mourre, 2009:5; see also: Saint-Paul, 2000]. The winners in such conflicts are usually the powerful ‘insiders’, who are able to create job and income security for themselves

(often through the presence of strong trade unions), whereas the losers, the ‘outsiders’, are those who are on the fringes of the labor market and have no access to permanent labor contracts or unemployment benefits (for an extensive discussion, see [Lindbeck and Snower, 2001]). High minimum wages and rigid legislation may cause obstacles for employing these often low-skilled or inexperienced workers on permanent contracts. Reform of such dual labor markets is often difficult due to the institutionalized power of the dominant group.

According to the second view, LMIs can contribute to the efficiency of the labor market when the first-best competitive labor market outcome is unattainable due to certain market failures. LMIs can provide a second-best solution. Especially when capital and insurance markets are incomplete, risk-averse workers are not able to sufficiently insure themselves against loss of a job or income. Nor will they sufficiently invest in their own education and training. Another example is that when employers are not wage-takers but wage-setters (having monopsony power), the introduction of a minimum wage can actually increase employment [cf. Dolado et al., 1996; Boeri and Van Ours, 2008, chapter 2]. Strong trade unions can have a positive effect on efficiency by inducing wage compression, especially if bargaining takes place at the national level [cf. Arpaia and Mourre, 2009; Boeri and Van Ours; 2008]

In the third view, LMIs serve equity purposes by contributing to redistribution of the surplus of labor between employers and employees [Boeri and Van Ours, 2008]. They can act as a form of social insurance [Agell 1999, 2002] or social policy [Bonoli, 2003]. The minimum wage is aimed at securing sufficient income when working. Benefits have an insurance function against unemployment. EPL protects workers from losing their jobs. ALMPs aim at helping the unemployed to find appropriate work. The argument against LMIs as instruments for distribution is that they decrease total welfare. Some of the redistributive aims could be reached by direct transfers and taxes. The latter, however, more heavily depend on access to information and are discrete measures that are more easily subject to the whims of policy-makers [Boeri and Van Ours, 2008:19].

The role of interactions. So far we have treated LMIs as individual institutions imposed on a perfect or unregulated labor market. There are two problems with looking at LMIs in this way, if we want to sketch a realistic view of any labor market. Institutions rarely come alone and they are rarely imposed on an unregulated labor market. Table 1 summarizes the arguments for the existence of LMIs; in addition to the point of view of the individual institution, the argument for the existence of institutions as a reaction or complement to an existing LMI (or configuration of LMIs) is added.

With regard to LMIs as a result of policy failure, at least two different types of interactions can be distinguished. First of all, there are complementarities between rent-creating and rent-protecting institutions [Saint-Paul, 1997, 2000]. These can explain, for example, why in many countries where trade unions have a strong role in the wage-setting

TABLE 1. Arguments for the existence of labor market institutions

Argument	Individual LMI	Interacting LMI
Policy failure	Certain minority groups are powerful enough to impose policies that serve them, whereas costs are borne by the whole of society.	1. Complementarities between rent-creating and rent-protecting institutions. 2. LMI 1 created for the <i>insiders</i> , LMI 2 created to address the <i>outsiders</i> .
Efficiency	First-best competitive labor market outcome is unattainable and institutions help attain second-best solutions.	LMI 1 creates inefficient outcomes. LMI 2 is needed to obtain third-best outcomes.
Equity	Contribution to redistributive purposes.	LMI 1 creates inequitable outcomes or chances on the labor market. LMI 2 is needed to correct these.

process, stricter employment legislation is in place. A second option is that policymakers realize that the existence of one LMI favoring the ‘insiders’ has such strong inefficiency effects (e.g. by creating high unemployment) that it is a threat to upholding the *status quo*. Another LMI is then aimed at improving the position of the outsiders. Usually, reforms are implemented that do not hurt the core interest and powerful position of the dominant group. An example here is the creation of ALMPs as a carrot-and-stick method of directing the unemployed to jobs. Another example is the creation of possibilities for more fixed-term contracts as a second tier to stricter EPL, a measure from which “insiders” stay exempt and affects mainly “outsiders” [cf. Blanchard and Landier, 2002].

LMIs have the potential of creating outcomes that are inefficient, inequitable or both for society at large or certain groups. If one LMI or a configuration of LMIs creates inefficiencies, other LMIs can be put in place to correct for such effects. As an example, unemployment benefits are believed to create more unemployment. However, Nordic countries have relatively high replacement rates of unemployment benefits and maintain low unemployment rates, a phenomenon that is often ascribed to the effective combination with other labor market policies. For the equity purposes of LMIs, similar examples can be found. If rigid EPL causes unemployment spells to last relatively long (because of disincentives for employers to hire), then longer duration of unemployment benefits can compensate for the loss of income. In Denmark where EPL is rather flexible, those who are lose their jobs are offered rather generous unemployment benefits and assistance in finding a new job through ALMPs.

Interactions as part of labor market models. Institutions and interactions matter to labor market performance and the possibilities for reform. If we know which combinations work, then why do countries have such differently institutionalized labor markets? Why does Italy combine relatively generous unemployment benefits for insiders with rigid employment protection, whereas in Denmark they are combined with relatively

flexible legislation? Part of the answer to these questions may lie in the following quote of labor economist Richard B. Freeman [1998, p.6]: “To the extent that configurations of institutions or policies matter, the proper comparison across countries is between entire models, not between particular features”. LMI interactions operate within a larger context, which Freeman refers to as a model.

Similar concepts appear in political economy, political science and sociological literature under different names. There is the ‘varieties of capitalism’ literature [cf. Hall and Soskice, 2001], the “worlds of welfare” literature [cf. Esping-Andersen] and the research on mobility regimes [DiPrete et al., 1997], which have in common that they explain why institutions do not always come into being or persist because they are efficient or equitable, but because they are part of a larger whole within which they operate and that codetermines them. It would be wrong to assume that all institutions exist for a clearly defined reason. Sometimes they just exist because the historical processes shaped them to what they are, along with the costs and uncertainties that are connected with reforming them [cf. Streeck and Thelen, 2005].

Types of interactions. There are two terms that are often used in the literature and refer to similar phenomena. It is useful to distinguish the term “interactions” [a term used by, among others: Eichhorst and Konle-Seidl, 2005; Boeri and Van Ours, 2008; Arpaia and Mourre, 2009; Koster et al., 2011] from another term that often appears in the LMI literature, namely “complementarities”. In our definition, the term “interaction” refers to the observation that one institution interacts with another institution. One institution is reacting to or affected by the functioning of another. “Complementarities” are a subcategory of interactions, but they imply that there is a certain direction to the outcomes of the interaction, namely that two (or more) institutions together create more efficient or equitable outcomes than each institution would separately. Or, as Coe and Snower [1997] put it: “A group of policies is complementary when the unemployment effect of each policy is greater when it is implemented in conjunction with the other policies than in isolation” (see also [Hall and Soskice, 2001:17]).

Literature on institutional interactions on the labor market has made great theoretical and empirical advances during the last decades. In spite of this and due to their complexities, complementarities are difficult to capture in a model or extract from empirical evidence [cf. Bassanini and Duval, 2009]. Elmeskov et al. [1998:223–224] show that interactions between several LMIs have significant effects on structural unemployment rates, while Daveri and Tabellini [2000] show how the interaction between tax rates and centralisation levels of collective bargaining matter for unemployment. Saint-Paul [1994, 1997, 2000] points at the complementarities between rent-creating and rent-protecting institutions. Studies by Coe and Snower [1997], Orszag and Snower [1999], B elot and Van Ours [2000] and Bassanini and Duval [2009] emphasise the importance of taking into account complementarities with regard to reforms to improve labor market performance in European and OECD countries.

There is another type of interaction when the inefficiency (or absence) of one institution leads to the increased (and often inefficient) use of another institution. Hall and Soskice [2001:17] mention this possibility as ‘institutional substitution’. Whereas it is not the aim of this paper to focus on substitutions, it is important to realize their implications as being the opposite of complementarities. Blanchard and Landier [2002], for example, analyze how partial labor market reforms in France in the early 1980s make fixed-term employment contracts a substitute for permanent contracts, but in effect making labor market outcomes more inefficient and inequitable. Another example is the implementation of early retirement policies in many continental European countries in the 1980s, making it a substitute to activation policies aimed at older employees [cf. Hemerijck and Eichhorst, 2010].

The literature does not yet offer a systematic mapping of the interactions among all LMIs. Boeri and Van Ours [2008:278] make a selective attempt by presenting a series of scatter plots of pairs of what they consider the most common and important LMI complementarities. As they note, taking into consideration that they discuss 11 LMIs in their book, plotting them all would mean presenting 110 plots for all possible combinations! The approach of this paper is to generalize and offer an overview of as many interactions as possible and find the rationale behind them.

Method and data

In order to detect regularities among LMIs in the 27 EU member states, we test for correlations among them. This method should lead to discovery of which LMI tends to interact with which. There are two main limitations to this method. First, correlation does not say anything *per se* about causation. There is always the possibility of another latent variable causing the correlation. Therefore, careful analysis with the help of theory is needed. Second, the absence of correlation does not mean that interaction is fully absent. There can be cases of complementarities only taking place within certain models (or even countries). Due to the small sample of countries, such differences in variance cannot be accounted for through quantitative analysis, but could be the subject of a more descriptive case-by-case study.

Details on the data are included in the Annex. The data broadly covers the period 2000–2005 for the current 27 EU countries (as much as data is available). The correlations have been calculated as averages for this six-year period. This timeframe has been chosen because it offered the greatest availability of data and six-year averages should be able to account for fluctuations in the business cycle [cf. Nickell, 1997:64]. Data has been collected from different sources because one single and comprehensive source on all LMI data is not yet available. A total of nine LMIs are analyzed with the help of 14 variables. What now follows is a short description of each of the LMIs with their associated indicators and why they matter.

LMIs come in various shapes and sizes and differ in the way they create constraints and incentives that alter individual choices over labor and pay. Therefore, while introducing the LMIs that are included in our model, it may be useful to briefly remind ourselves of the theoretical mechanisms that drive them and the impact each of them has on labor market performance. Again, there are vast amounts of literature on the microeconomic and macroeconomic functioning and impact of each of the institutions, for which there is no room in this paper. Some references to the literature are offered, but not exhaustively. An attempt is made to group the variables according to their main theoretical function, although some LMIs might have more than one effect on labor market performance. The numbers between brackets refer to the variables that are included in the analysis.

A first type of LMI relates to the way wages are determined and to what extent they are the result of collective determination and the influence of trade unions. Our **collective bargaining (1)** variables relate to the strength and functioning of trade unions. First of all, collective bargaining can be measured by the proportion of workers' contracts covered by collective agreements that were bargained over by unions (1a). Second, it matters on which level coordination takes place: national, industry or company level (1b).

Second, some LMIs are direct rigidities. There can be legislation in place that protects employees from employers arbitrarily or unfairly dismissing them. Creating costs for employers to fire people, however, will also make them more reluctant to hire new people in times of uncertainty. This means that during a temporary labor market shock, employment rates may remain stable due to the costs of labor turnover. During a labor market recovery, on the other hand, unemployment can stay high longer because of the uncertainty that employers see themselves faced with [Lindbeck and Snower, 2001]. **Employment protection legislation (EPL) (2)** is measured with the help of a synthetic indicator established by the OECD. It includes measures for the rigidity of firing regulations for individual workers under permanent contract, the rigidity for workers under temporary contracts and the rigidity of collective dismissals [OECD, 2004].

Closely associated with EPL is a set of labor market policies that further influence the flow from unemployment or inactivity to employment. **Unemployment Benefits (3)** form an insurance or income guarantee for those who are left without work. However, benefits increase the reservation wage for which one is willing to work and hence have the potential of making unemployment spells longer [cf. Nickell, 1997:67]. Unemployment benefits have different dimensions to them. A common measure is the general replacement rate (GRR), which indicates the ratio of the employment benefits to previous earnings, making it a measure of generosity (3a). Coverage indicates what proportion of the labor force is eligible for benefits (3b). There is no variable for duration of benefits in our data.

To offset possible negative effects of generous unemployment benefits, **active labor market policies (ALMP) (4)** can be implemented. ALMP usually aim at activating the unemployed through carrot-and-stick methods and guide them towards new jobs, through career guidance, training or subsidized work. ALMP constitute an important

part of the flexicurity model, where they are expected to support workers in the face of flexible protection legislation and increase efficiency in the face of generous unemployment benefits. Flexicurity is a model that seeks to make use of LMI complementarities and therefore constitutes an interesting case for us. An often-applied measure for ALMP, as in our study, is the proportion of GDP that is spent on them.

The next two LMIs influence the levels of disposable income, i.e., they define the “price” at which labor is supplied. **Minimum wages (5)** set a floor below which it is not possible to pay workers. Minimum wages are often set by the central government, collective bargaining organs or some form of collaboration between both. Not every country has a centrally or legally established minimum wage (e.g. Finland). Some countries have a minimum wage that is established at the sector level (e.g. Germany). Critics of a minimum wage claim that it causes unemployment by making labor too expensive, especially among the low-skilled and young people. Empirical evidence, however, is mixed [cf.: Dolado et al., 1996]. A common measure for minimum wage is the ratio of the minimum to the average or median wage. In our study we employ the first measure, also known as the Kaitz-index.

Payroll taxes (6) drive a wedge between the cost of labor to the firm and the net wage that the worker receives. It usually consists of income taxes and social security contributions. Payroll taxes are closely related to the financing of unemployment benefits through social security contributions. A tax wedge that is too high can have a similar effect as a minimum wage and is found to affect in particular the low-skilled in terms of causing unemployment [Góra et al., 2006]. In our study, payroll taxes are measured as the relative tax burden for an employed person with low earnings.

Working time regulations (7) set limits to the quantity of labor supplied. In the 1980s and 1990s many governments believed that reducing working hours could actually create more jobs. Decreasing supply can also mean pressure on wages and thereby cause higher unemployment [cf. Nickell, 1997, p. 60; Boeri and Van Ours, 2008, p. 116]. In our study we include as indicators bargained normal working hours (7a) and actual working hours (7b), both as hours per week for full-time employment.

Education (8) is important as an LMI for different reasons. First of all, it indicates investment in human capital, in knowledge and skills. It largely determines the employment prospects and wage levels of individuals. Better and more education also create positive externalities that benefit the whole of society and the economy. Second, the length of education codetermines the timing of **entrance** to the labor market. In this study we apply two measures of education. The first is the proportion of GDP spent on education (8a). A second measure is to look at how many years pupils are expected to gain education (8b). The latter indicator can also serve as a measure of the timing of entrance to the labor market. The longer one stays in education, the later the entry to the labor market.

Exit (9) from the labor market is defined in this study as taking place through retirement programs. The usual way is to retire at the mandatory retirement age and receive

a public pension for which workers have paid contributions throughout their working lives. Often certain heavy occupations have lower pension ages than those that require less physical work. Early retirement programs have been used as a policy instrument to lift pressure from an oversupply of labor. In our analysis we include a measure for the effective retirement age (9a). To account for the possibility of early retirement schemes, we include the employment rate among the age group 55–64 (9b), although keeping in mind that employment among this group can be low for many other reasons.

Results and discussion

The results of the pair-wise correlation analysis on these LMI indicators are included in table 2. There are a total of 84 possible combinations, out of which 32 are found to be significant: 10 at the .05 level and 22 at the .01 level. One interpretation of this overall result is that indeed there are plenty of interactions, but certainly not all LMIs correlate. If all variables had been correlating, it would have pointed in the direction of one latent variable. These results leave room for further analysis on why certain interactions occur and which can be considered complementarities or substitutes.

Table 3 includes the number of interactions for each of the individual variables. The numbers range from 0 (minimum wage) to 9 (UB coverage and ALMP), with a mean of 5.07. It is worth looking separately at the patterns of interaction for each LMI and variable. It would be attractive to draw easy conclusions from these data, but correlation does not tell us much about causation or its direction. Some of the effects that LMIs might have on each other would have to be speculation, or should be the subject of other more detailed studies.

The strength of collective bargaining, as expected, correlates with many of the other LMIs. After all, in countries where trade unions have a strong position, they often have much to say on labor market policies that affect their constituencies. The stronger the collective bargaining mechanisms, in terms of the worker contracts covered, the higher the level of employment protection legislation and the higher the level and coverage of unemployment benefits. This corresponds to the idea of powerful groups in society creating institutions that are both rent-creating as well as rent-protecting [Saint-Paul, 1997, 2002]. Whereas ALMP may not be directly in the interest of trade unions, spending on it is positively correlated with the coverage of the collective bargaining mechanism. Especially when bargaining takes place at a predominantly national level, it could induce trade unions to accept ALMP as a package deal when strict EPL and generous unemployment benefits are in place [cf. Eichhorst and Konle-Seidl, 2005]. Stronger collective bargaining also comes with fewer working hours, both agreed as well as actual. The predominant level of collective bargaining makes a difference in the generosity and coverage of unemployment benefits and, as we have seen, the spending on ALMP.

TABLE 2. Labor market institution correlation matrix

	1a. Union coverage	1b. Union coordination level	2. EPL	3a. GRR	3b. UB coverage	4. ALMP	5. Minimum wage
1a. Union coverage	1	-,660(**)	,609(**)	,893(**)	,744(**)	,693(**)	,028
1b. Union coordination level		1	-,202	-,600(**)	-,521(*)	-,461(*)	-,091
2. EPL			1	,602(*)	,153	,127	,293
3a. GRR				1	,694(**)	,703(**)	,248
3b. UB coverage					1	,669(**)	,206
4. ALMP						1	,193
5. Minimum wage							1
6. Tax wedge							
7a. Agreed working hrs							
7b. Actual working hrs							
8a. Education expenditure							
8b. School expectation							
9a. Effective retirement							
9b. Employment elderly							

* Correlation is significant at the 0.05 level (two-sided)

** Correlation is significant at the 0.01 level (two-sided)

Sources: Author's own calculations based on: Aleksynska and Schindler [2011], EIRO [2005], Eurostat [2011], OECD [2004].

6. Tax wedge	7a. Agreed working hours	7b. Actual working hours	8a. Education expenditure	8b. School expectation	9a. Effective retirement	9b. Employment elderly
,322	-,553(**)	-,448(*)	,360	,348	-,093	-,011
-,113	,204	,268	-,147	-,324	,042	,072
,262	-,034	-,064	-,107	-,269	,004	-,083
,002	-,599(**)	-,547(**)	,344	,080	,130	,132
,111	-,647(**)	-,456(*)	,601(**)	,445(*)	,235	,357
,214	-,591(**)	-,673(**)	,666(**)	,418(*)	,219	,379
,211	-,110	-,212	,120	-,278	-,132	-,046
1	-,092	,039	,147	,412(*)	-,225	-,157
	1	,427(*)	-,350	-,292	-,152	-,248
		1	-,558(**)	-,301	-,120	-,390(*)
			1	,512(**)	,153	,471(*)
				1	,334	,504(**)
					1	,836(**)
						1

TABLE 3. Number of interactions per variable

Variable	Number of interactions
1a. Union coverage	8
1b. Union coordination level	5
2. EPL	2
3a. GRR	8
3b. UB coverage	9
4. ALMP	9
5. Minimum wage	0
6. Payroll taxes	1
7a. Agreed working hours	6
7b. Actual working hours	7
8a. Education expenditure	6
8b. School expectancy	5
9a. Effective retirement	1
9b. Employment elderly	4
Total	32

EPL as an indicator of direct labor market rigidity does not have as many interactions as one may expect, considering the importance attributed to it in the literature. In line with much of the literature [cf. OECD, 2004; Boeri and Van Ours, 2008; Saint-Paul, 1997, 2002], EPL is positively related to the coverage of collective bargaining and the generosity of UB. There is no proof of correlation with ALMP, an LMI that is often mentioned in combination with EPL and UB. This is most likely so because of the different models that are possible with EPL. For example, Denmark and Sweden both spend relatively high amounts on ALMP, but Denmark has flexible EPL, where Sweden's EPL is rather strict. Then again, Greece has strict EPL combined with low spending on ALMP, whereas the UK combines flexible EPL with low spending on ALMP.

Unemployment benefits generate one of the largest numbers of interactions: 8 for the general replacement rates and 9 for coverage. GRR correlates with the collective bargaining indicators, with EPL, ALMP and both working hours indicators. UB coverage follows a similar pattern, but differs slightly on two points. There is no significant correlation of the latter with EPL. Boeri and Van Ours [2008:281–282] classify UB and EPL as imperfect substitutes and show that they are negatively correlated, although this hypothesis is refuted by byothers, including Elmeskov et al. [1998]. In our data there is no strong proof for either hypothesis.

UB coverage is also positively correlated with the two education variables. A possible explanation is that high-skilled economies (indicated by higher levels of spending on education and longer time spent in school) need to offer their workforce broader insurance if the skills are specific and expensive to invest in. Workers will not invest in expensive and specific skills if they know that they are not insured for unemployment and given the chance to find a job at a similar skill-level. The relationship between the levels of social protection and skill levels has been pointed out by Estevez-Abe, Iversen, and Soskice [2001] as the “welfare-skill formation nexus”. There is evidence for the possibility of LMI complementarities between UB coverage and education.

ALMP correlates with the same variables as UB coverage: collective bargaining, unemployment benefits, working hours and education. Higher spending on ALMP is very likely part of a more coordinated and collective labor market. The absence of interaction with EPL is discussed above. One other absence of interaction worth noting is with the exit variables. Higher spending on ALMP does not significantly increase employment among the elderly and does not cause them to retire at a later age.

Minimum wage is the great outlier in our study, by not interacting with any of the other variables at all. It is unclear if this has to do with the reliability of the data or because of the small sample of countries (15) for which data is available. One could expect that, for example, the strength of union bargaining would have a positive effect on minimum wages – or that a higher minimum wage would make entrance to the labor market more difficult, so that young people would stay longer in education. There is, however, no proof of such interactions.

The second outlier is payroll taxes, with only one significant interaction: school expectancy. Here the effect could work two ways. It can be seen as a confirmation of the hypothesis of Góra et al. [2006] that the tax wedge has a larger distortionary effect on employment in low-skilled countries, while higher-skilled countries can afford higher payroll taxes. The other possible effect is that in countries with higher tax wedges, it is more difficult for newcomers to enter the labor market, so they choose to stay in school longer. For the payroll taxes variable, one might expect more interactions. For example, higher UB replacement rates have to be financed from higher taxes [on interactions between UB and taxes, see: Elmeskov et al., 1998], for which we find no evidence in this study. Stronger trade unions are also often associated with higher taxes, although Daveri and Tabellini [2000] have shown that the level of centralisation of collective bargaining counts, rather than the level of unionisation. In theory taxation can also have effects on employment decisions for the elderly, but this also cannot be proven on the basis of these data.

Working hours (both agreed and actual) generally seem to be part of the same coordinated labor market package, together with collective bargaining, unemployment benefits and ALMP. The more coordinated the labor market, the fewer hours are worked on average per week. Actual working hours have two additional interactions,

as compared with agreed working hours. The first is that the lower the working hours, the higher the spending on education. It is possible that because individual workers get better education and therefore are more highly skilled, they earn more and therefore decide to work less. In other words, for higher-skilled societies, the income effect takes over from the substitution effect. The second correlation is that the lower the working hours, the higher the employment rate among the elderly. It is plausible that working fewer hours makes it more attractive for older workers to stay longer on the labor market.

Education (both in terms of expenditure and school expectancy) does not significantly correlate with the coordinated labor market indicators related to unions, EPL and GRR, but there is significant correlation with UB coverage and ALMP. The relationship with UB coverage is discussed above and the positive correlation with ALMP could be explained by an overall investment in education, i.e. the skill level in the economy and the importance that society attaches to the aims of lifelong learning. Not surprising, perhaps, countries that have higher expenditures on education also have longer school expectancy. Lastly, there is a significant relationship between education and the employment rate among the elderly. It is possible that the longer one stays in school, the longer one lasts on the labor market. A second possibility (not excluding the first) is that those societies with higher skill levels, with for example larger services sectors and less heavy manufacturing jobs, create better opportunities to work longer.

Our exit indicators show little overall correlation with the other variables. The effective retirement ages only correlates with the employment rate among the elderly, as may be expected. As described above, there are correlations of the elderly employment age with actual working hours and the education variables. For the other variables, no overall interaction patterns can be discerned.

When considering those institutions that interact, two main patterns seem to dominate. Roughly speaking, labor market models tend to develop along two axes. The first axis is the level of coordination or collectivism in the labor market. We see a group of variables interacting that include collective bargaining, unemployment benefits, employment protection legislation and active labor market policies. Working time levels are also influenced. These interactions are likely the result of the historical influence of the state and social partners in setting the conditions for labor market policies.

The second axis is related to the skill level in society. Here we detect interactions between education (both spending and school expectancy), ALMP, retirement and to some extent UB coverage and payroll taxes. Highly skilled societies invest more in education, have students who stay in school longer, spend more on ALMP to smoothen transitions between skill-intensive jobs, retire at a later age, are able to raise higher payroll taxes and need broad-coverage unemployment insurance for individuals' investment in human capital². More research would be needed, however, to prove that these propositions hold.

Conclusions

This paper offers very few definite conclusions and many questions for future research. The aim of the study is to offer some theoretical elaboration on the concepts of labor market institutions' interactions and some empirical evidence on their existence across labor markets. It aims to show that interactions are a result of the incompleteness of individual LMIs and an essential mechanism of constituting different labor market models. The empirical part explores what patterns of interactions can be detected across EU member states. It shows that, although the sample includes economies of different sizes, at different stages of development and with different social models in place, certain institutions tend to interact across our sample (whereas others do not). Two patterns of interactions can be detected in our study. The first runs along the lines of the level of coordination or collectivism in the labor market. The second is related to the skill-level in society.

When it comes to the lack of interactions of certain variables, this does not mean that these LMIs (mainly minimum wage, tax wedge and effective retirement age) can be simply disregarded. These LMIs might be labor market model-specific, meaning that their interaction with other LMIs depends on a third LMI or on the overall labor market model in place. This also goes for other missing interactions, such as the widely discussed high EPL – low UB – high ALMP spending complementarities under the flexicurity model. It is beyond the scope of this article to go into all these possibilities, but here there is also certainly more room for further research into model-specific complementarities or substitutes.

There are a few shortcomings to this study. Data availability for some countries and some indicators has proven to be rather limited. In addition, the short period of time that has been studied might raise questions and demands for a more longitudinal study. This was not possible, however, due to the lack of availability of overlapping data series for so many indicators. As already mentioned, taking the EU 27 countries as a sample carries in itself certain problems. Many might prefer choosing OECD countries as a sample or at least countries with similar levels of development. The aim of the study is, however, to provide evidence for the proposition that certain LMI interaction patterns take place across countries, regardless of this development gap. Moreover, with many policy recommendations coming from an EU level and affecting all EU member states (also with regard to labor market policies and reforms) it is important to consider if institutions in all member states would benefit equally from such policies and recommendations.

Notes

¹ For example, Saint-Paul [1994, 1997], Nickell [1997] and Siebert [1997] do not refer to labor market institutions but to rigidities, which has a more negative connotation.

² To control for the quality of education, in addition to spending and duration one could introduce PISA scores for each of the countries into the analysis. Although it is beyond the scope of this article, preliminary correlation analysis shows that student performance on mathematics is significantly correlated to education expenditure and school expectancy as well as UB coverage and collectively agreed working hours (not indicated in table 2). The author would like to thank one of the anonymous reviewers for this suggestion.

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Abstract

The aim of this paper is to explore how labor market institutions (LMIs) interact. First, it looks at the theoretical background and implications for the functioning of the labor market. Second, it offers an empirical overview of which interactions occur on a Europe-wide scale on the basis of pair-wise correlation analysis. It is found that LMIs tend to interact along two axes: one related to the level of coordination in the labor market and the second related to the skill level. Part of the innovation of this paper lies in the use of data – where available – for all 27 EU member states, thereby attempting to bridge the existing divide in the literature between studies performed either on the OECD part of Europe or on the group of former transition economies/new member states.

Key words: labor market institutions, institutional interactions, political economy, pair-wise correlation

ANNEX: data overview

Variable	Source	Description	N	Countries covered (years covered)
1a. Union coverage	EIRO [2005a]	Collective bargaining coverage of work contracts, codified as: 0–25% = 1, 26–50% = 2, 51–75% = 3 and 76–100% = 4.	25	AT, BE, BG, CY, CZ, DE, DK, EE, ES, FI, FR, GR, HU, IE, IT, LT, LV, MT, NL, PL, RO, SE, SI, SK, UK. (2005)
1b. Union coordination level	EIRO[2005a]	Importance of bargaining level, codified as: 1 = intersectoral level, 2 = sectoral level and 3 = company level.	25	AT, BE, BG, CY, CZ, DE, DK, EE, ES, FI, FR, GR, HU, IE, IT, LT, LV, MT, NL, PL, RO, SE, SI, SK, UK. (2005)
2. EPL	OECD [2004], chapter 2.	Summary indicators of the strictness of employment protection legislation, overall EPL, version 2 (p. 117), scale of 0–6.	18	AT, BE, CZ, DE, DK, ES, FI, FR, GR, HU, IE, IT, NL, PL, PT, SE, SK, UK. (late 1990s and 2003)
3a. GRR	Aleksynska and Schindler [2011]	Gross Replacement Rates, defined as levels of statutory entitlements over average wages show what percentage of earnings is replaced by benefits; reported are values after the first year of unemployment, after the second year of unemployment, and a simple average for two years of unemployment.	22	AT, BE, BG, CZ, DE, DK, EE, ES, FI, FR, GR, HU, IE, IT, LT, LV, NL, PL, PT, RO, SE, UK. (2000–2005)
3b. UB coverage	Aleksynska and Schindler [2011]	Unemployment Benefit Coverage: the number of unemployed who receive unemployment benefits over the number of unemployed.	22	AT, BE (est.), BG, CZ, DE, DK, EE, ES, FI, FR, GR (2001–2002), HU, IE, IT (2001–2002), LT, LV, NL, PL, PT, RO, SE, UK. (2000–2005)
4. ALMP	Eurostat [2011]	Public expenditure on labor market policies, by type of action – % of GDP, LMP measures (categories 2–7), which covers activation measures for the unemployed and other target groups including the categories of training, job rotation and job sharing, employment incentives, supported employment and rehabilitation, direct job creation, and start-up incentives.	25	AT, BE (2004–2005), BG (2004–2005), CZ (2002–2005), DE, DK, EE (2003–2005), ES, FI, FR, GR, HU (2004–2005), IE, IT, LT (2003–2005), LU, LV (2003–2005), NL, PL (2005), PT, RO (2003–2005), SE, SI (2005), SK (2004–2005), UK (2004–2005). (2000–2005)
5. Minimum wage	Aleksynska and Schindler [2011]	Ratio of minimum monthly wage in national currency to the average monthly wage in national currency.	15	BE, BG, CZ, EE, ES, FR, GR (2002), HU, IT, LV, NL, PL, PT, RO, UK. (2000–2005)

continued annex

Variable	Source	Description	N	Countries covered (years covered)
6. Tax wedge	Eurostat [2011]	The tax wedge on the labor cost measures the relative tax burden for an employed person with low earnings.	27	AT, BE, BG, CY, CZ, DE, DK, EE, ES, FI, FR, GR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK. (2000–2005)
7a. Agreed working hrs	EIRO [2005b]	Average collectively agreed normal weekly hours.	27	AT, BE, BG, CY, CZ, DE, DK, EE, ES, FI, FR, GR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK. (2005)
7b. Actual working hrs	Eurostat [2011]	Average number of actual weekly hours of work in main job	27	AT, BE, BG (2001–2005), CY, CZ, DE, DK, EE, ES, FI, FR, GR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK. (2000–2005)
8a. Education expenditure	Eurostat [2011]	This indicator is defined as total public expenditure on education, expressed as a percentage of GDP. Generally, the public sector funds education either by bearing directly the current and capital expenses of educational institutions or by supporting students and their families with scholarships and public loans as well as by transferring public subsidies for educational activities to private firms or non-profit organisations. Both types of transactions together are reported as total public expenditure on education.	27	AT, BE (2001–2005), BG, CY, CZ, DE, DK, EE, ES, FI, FR, GR, HU, IE, IT, LT, LU (2001–2005), LV, MT, NL, PL, PT, RO, SE, SI (2001–2005), SK, UK. (2000–2005)
8b. School expectancy	Eurostat [2011]	School expectancy corresponds to the expected years of education over a lifetime and has been calculated adding the single-year enrolment rates for all ages. This type of estimate will be accurate if current patterns of enrolment continue in the future. Estimates are based on headcount data. To illustrate the meaning of school expectancy, let us take an example: school expectancy for the age of 10 would be one year if all 10-year-old students (in the year of the data collection) were enrolled. If only 50% of 10-year-olds were enrolled, school expectancy for the age of 10 would be half a year.	27	AT, BE, BG, CY, CZ, DE, DK, EE, ES, FI, FR, GR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK (2001–2005), UK. (2000–2005)

<p>9a. Effective retirement</p>	<p>Eurostat [2011]</p>	<p>The indicator gives the average age at which active persons definitely withdraw from the labor market. It is based on a probability model considering the relative changes of activity rates from one year to another at a specific age. The activity rate represents the labor force (employed and unemployed population) as a percentage of the total population for a given age. The indicator is based on the EU Labor Force Survey. The survey covers the entire population living in private households. The definitions used follow the guidelines of the International Labor Office.</p>	<p>27</p>	<p>AT (2001–2003, 2005), BE, BG (2002–2005), CY (2001–2004), CZ, DE (2001–2004), DK, EE, ES, FI, FR, GR (2002, 2003, 2005), HU, IE, IT (2001–2003, 2005), LT (2001, 2004, 2005), LU, LV (2001, 2004, 2005), MT, NL, PL, PT, RO (2001, 2003–2005), SE, SI (2002, 2003, 2005), SK, UK. (2001–2005)</p>
<p>9b. Employment elderly</p>	<p>Eurostat [2011]</p>	<p>The employment rate of older workers is calculated by dividing the number of persons aged 55 to 64 in employment by the total population of the same age group. The indicator is based on the EU Labor Force Survey. The survey covers the entire population living in private households and excludes those in collective households such as boarding houses, halls of residence and hospitals. Employed population consists of those persons who during the reference week did any work for pay or profit for at least one hour, or were not working but had jobs from which they were temporarily absent.</p>	<p>27</p>	<p>AT, BE, BG, CY, CZ, DE, DK, EE, ES, FI, FR, GR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK. (2000–2005)</p>