# Bargaining Centralisation and Employment Protection

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**Abstract**

We argue that the index of employment protection produced by the Oecd and commonly adopted in the literature does not allow a proper assessment of theoretical predictions. We conduct an empirical investigation by using alternative data and find results that are largely consistent with predictions.

**Keywords**: Firing costs, Wage bargaining, Unemployment
**JEL Classification:** J23, J32, J51

## 1 Introduction

A long-standing proposition in the economics of employment protection is that firing regulations induce two types of costs for firms. The first type is represented by mandatory firing transfers from the employer to the dismissed employee such as severance payments or wages paid during the notice period. The second type is represented by those red-tape expenses that are necessary to comply with procedural duties. Sometimes, economists emphasize the non-transfer nature of the latter by using the term of firing taxes.

The theory on the employment effects of protection is by now well developed and, at least since the work of Lazear (1990), there is a large consensus on the view that the two types of costs impact in different ways on the performance of the labour market. Yet, despite these differences in theoretical predictions, the empirical literature has so far almost universally resorted to the Oecd Epl index, a comprehensive measure of legal provisions which does not separate taxes from transfers. As a consequence, results from this literature appear at best difficult to interpret.

In this paper we depart from the Epl tradition and present an empirical analysis conducted on data that allow a separate measurement for the two types of costs. Thus, the

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main contribution of the paper consists in using information that is particularly suitable to test the predictions of theory.

We postpone the description of data to the next section and use the remainder of this introduction to briefly discuss these predictions.

The main point made in Lazear (1990) is that, in contrast with firing taxes, firing transfers may be undone by market forces and may turn out to be neutral in terms of job creation and aggregate unemployment. Neutrality, however, requires the absence of imperfections in wage setting. In particular, if wages are set through centralised bargaining market forces are hampered and, as a consequence, firing transfers may become detrimental for job creation. This means that the interaction between transfers and wage centralisation is likely to be *negative* for the performance of the labour market (Garibaldi and Violante, 2005).

While Lazear focuses on firing transfers, the analysis on the impact of firing taxes traces back to the classic insider-outsider contribution of Lindbeck and Snower (1988). According to this analysis, firing taxes cause an hold-up problem which is rooted in the bargaining power of the insider. Firms hold up from hiring the outsider because she becomes an insider in the future and will use firing taxes to support high wage claims. In this context, the structure of bargaining can still play a role but the interaction with the degree of centralisation is likely to be *positive* rather than negative. In fact, if wages are centralised and bargained by encompassing unions the insider may have little scope to exploit her bargaining power. In this sense, centralisation could play the role of a commitment device that attenuates the hold-up problem (Piccirilli, 2010).

Summing up, the theory on the impact of employment protection emphasises the distinction between the two costs and the interaction of each cost with the degree of bargaining centralisation. In particular, the interaction between transfers and centralisation is expected to increase unemployment while the interaction between taxes and centralisation is expected to reduce unemployment. Obviously, assessing the empirical performance of these predictions requires the adoption of separate measures for the two costs. Thus, resorting to separate indicators instead of a unique index represents the main advancement made in the paper.

A second novelty of the paper concerns the measurement of the degree of bargaining centralisation. In fact, while the literature has so far adopted *formal* measures of centralisation, in this paper we use a measure that captures the *actual* degree of centralisation. Formal measures are exclusively based on the structure of bargaining (firm-level vs industry-level vs economy-level). However, as we discuss in the next section, similar bargaining structures may conceal different patterns of concentration as for the distribution of wage-setting power.

Apart from the present introduction, the paper is composed of two more sections. In section 2 we present the empirical study while in section 3 we make some concluding remarks.

# 2 Empirical Analysis

## 2.1 Data

To disentangle firing transfers from firing taxes we resort to data produced by the World Bank (WB, Doing Business Project). Since firing regulations vary within each country according to a number of firm and worker characteristics, to obtain comparable cross-country measures the WB evaluates national legislations by referring to a standardized firm-worker pair.[1] The indicators built through this method that satisfy our information requirements are the "difficulty of redundancy index" and the "redundancy cost indicator".

The "difficulty of redundancy index" captures the size of firing taxes as it represents a normalised measure of the stringency of criteria for lawful dismissal as well as of the number of duties necessary to dismiss a worker. The index ranges from a maximum of 100 (redundancies are legally prohibited) to a minimum of 0 (workers can be fired at will without being obliged to inform third parties, to consult third parties, and to receive authorization from third parties).

The "redundancy cost indicator", by contrast, captures the size of firing transfers as it

[1] The calculations made by the World Bank are based on the following "typical" job relationship. The worker is a male, full time, non-executive employee. He earns a wage equal to the country average and lives in the largest business city of the country. The firm is a manufacturing company with at least 60 employees that operates in the largest business city of the country. Also, the firm is a limited liability company whose capital is 100% owned by residents.

represents a measure of severance payments plus payments made during the notice period to the redundant worker. The measure is expressed in terms of weeks of salary. If, for instance, the advance notice is 1 month and severance requires 6 months of wage payments, the resulting cost measure is 30.1 (1 month = 4,3 weeks). The assumption that underlies this measure is that the worker is totally unproductive during the notice period so that the wage paid during this period represents a pure transfer.

In addition to separate information for the two firing costs, to conduct the analysis we need data on the degree of centralisation and, more generally, on the institutional traits of the industrial relations environment. We draw this information from the Ictwss database (J. Visser, 2011) and, more specifically, from two alternative measures of centralisation contained in this dataset.[2] The first measure is denominated *Cent* and can be interpreted as a measure of *actual* centralisation. The second is denominated *Wcoor* and can be interpreted as a measure of *formal* centralisation.

More in detail, *Wcoor* is similar to the popular Oecd index of centralisation in that it is based on the assumption that the degree of centralisation can be measured by looking at the dominant level of bargaining. From this perspective, countries with wages mainly bargained at firm level are considered decentralised while countries with wages mainly bargained at the economy level are regarded as centralised. An intermediate position is taken by those countries where wages are bargained at the level of single industries. For some scholars, however, using the dominant level of bargaining as a proxy for centralisation may cause a measurement error whenever bargaining takes place within single firms or establishments but economy-wide or industry-wide confederations exert a decisive influence over their lower level affiliates (Iversen, 1999). In this case, bargaining is formally decentralised but it turns out to be directed and governed in a centralised or quasi-centralised manner.

The measure denominated *Cent* is built with the purpose of correcting the potential errors of *Wcoor* in capturing the actual degree of centralisation. In fact, the measure consists of a combination of an index of confederation/union concentration (Herfindal) and an index of confederation/union authority over lower level affiliates. Thus, according

[2] Ictwss: Institutional Characteristics of Trade Unions, Wage Setting, and Social Pacts.

to this measure, the degree of centralisation increases not only with respect to formal concentration of bargaining but also with respect to the influence exerted by economy-wide unions.

We perform our empirical analysis by using a panel composed of 26 Oecd countries observed annually over the period 2000-2010.[3] The focus on the last decade is due to the fact that WB data are relatively recent. By contrast, the focus on Oecd countries is due to the limited coverage of the Ictwss database. In this respect, however, restricting the investigation within the set of advanced economies may also be justified along two additional arguments. First, one would face the same limitation with other popular measures of bargaining centralisation and firing costs (those produced by the Oecd itself, for instance). Second, in many non-Oecd economies the measures of firing costs may be distorted due to the low compliance with formal rules.

## 2.2 Method and Results

To assess the empirical consistency of theoretical predictions we estimate an equation that borrows the specification generally adopted in the literature [see Bassanini and Duval (2006), for instance]:

$$u_{i,t} = \alpha_0 + \boldsymbol{\beta}\ \mathbf{X}_{i,t-1} + \alpha_1\ \widetilde{\Delta} F.Tax_i \cdot \widetilde{\Delta} Cent_{i,t-1} + \alpha_2\ \widetilde{\Delta} F.Tr_i \cdot \widetilde{\Delta} Cent_{i,t-1} + \varepsilon_{i,t}$$

In this expression, the dependent variable $u_{i,t}$ represents the rate of unemployment in country $i$ and year $t$. The vector $\mathbf{X}$ contains the measures of firing transfers ($F.Tr$), firing taxes ($F.Tax$), bargaining centralisation ($Cent$) plus a set of additional regressors: output gap, union density, labour taxation, unemployment benefits, product market regulation and a dummy for eastern European countries.[4] The operator $\widetilde{\Delta}$ computes the difference

[3] The countries are the following: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norwey, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom and United States.

[4] The set of additional regressors are the same used in Bassanini and Duval (2006). Interested readers may refer to this paper for details. The dummy "East" denotes four east Europe countries: Czech Republic, Hungary, Poland and Slovak Republic.

Table 4 in the appendix provides the summary statistics for the whole set of variables.

between the current value of a variable and its sample mean. Thus, regressors $\widetilde{\Delta}F.Tax \cdot \widetilde{\Delta}Cent$ and $\widetilde{\Delta}F.Tr \cdot \widetilde{\Delta}Cent$ represent our key interaction terms. Due to the theoretical arguments summarised in the introduction, we expect $\alpha_1$ to be negative and $\alpha_2$ to be positive. Notice finally that to account for delays in the response of unemployment, we lag all regressors by one year.

Since the two key indicators - $F.Tr$ and $F.Tax$ - as well as some other institutional regressors exhibit weak or no time variations, the equation can not be estimated with the method of fixed effects. For this reason, we resort to the method of random effects implemented through a generalized least square procedure (GLS, Swamy-Arora method).[5] We check for correlation between time-varying regressors and country effects by computing the Hausman statistic according to the procedure developed in Arellano (2003, chap. 3). In addition to being particularly suitable in a small sample context, a further point of strength of this procedure is that it allows to correct for heteroskedasticity (White method).

Table 1 and 2 summarise the evidence, table 1 reports results based on the actual measure of centralisation ($Cent$) while table 2 reports results based on the formal measure ($Wcoor$). In both tables we use three different dependent variables: aggregate unemployment, prime-age (25-54) male unemployment and prime-age female unemployment. For the sake of comparison with the literature, for each regression conducted upon separate measures of taxes and transfers we also present the corresponding regression based on the Epl index.[6]

Since our preferred measure of centralisation is $Cent$, we regard results in table 1 as the most relevant. The first three columns of the table show that separating firing taxes from firing transfers leads to estimations that are largely in line with theoretical predictions. The interaction between firing taxes and centralisation is consistently negative and significant for all three regressions. By contrast, the interaction between firing transfers and centralisation is consistently positive although not significant at conventional levels in two regressions. A similar pattern of signs arises in table 2 but in this case the interaction with firing transfers is highly significant while that with firing taxes is not significant.

[5] Random effects estimation is also adopted in Feldman (2009), a study that uses the "redundancy cost indicator" of the World Bank to evaluate the unemployment impact of protection within a rather comprehensive set of countries.

[6] Here we use the Epl index for regular contracts instead of the aggregate Epl index.

The last three columns of each table report regressions based on the conventional Epl index. Since the interaction between Epl and centralisation can be regarded as a convolution of the two separated interactions, the positive sign of coefficients suggests the dominance of the transfer interaction.[7] In any case, using the Epl index entails a loss of information on the mechanisms that convey the overall unemployment impact of protection.

As for the remaining regressors, estimated coefficients in both tables are in general consistent with theoretical priors and with previous empirical findings. For all equations, the Hausman statistics does not contradict the assumption of country effects being uncorrelated with time-varying regressors.

TABLE 1 AND 2 HERE

As a check of robustness, we run the regressions of Table 1 by replacing Ictwss measures of centralisation with those computed by the Oecd. For brevity, in Table 3 we only report estimations for the two key interactions. In the first three columns we use the Oecd centralisation index while, in the last three columns, we use the Oecd coordination index. By construction, these two indexes are highly correlated with *Wcoor*. Thus, it should not be surprising that results in Table 3 replicate the evidence reported in Table 2.

TABLE 3 HERE

## 3 Final Remarks

The theory of employment protection predicts that firing taxes and firing transfers operate through different channels. From this prediction it follows quite naturally that empirical studies should use separate measures for these two components of protection.

Apart from few exceptions, the empirical literature has so far generally adopted the Oecd Epl index. Being computed since the '80, this index is very accurate and has a major point of strength in that it exhibits within-country variations that are very valuable for

[7] Alternatively, the positive sign of the interaction could be interpreted as resulting from *Epl* being more correlated with *F.Tr* than with *F.Tax*. This is not the case, though. The correlation coefficient between *Epl* and *F.Tax* is 0.64 while the coefficient between *Epl* and *F.Tr* is 0.61. Incidentally, the correlation coefficient between *F.Tax* and *F.Tr* is 0.34.

robust inference. The drawback of the index, however, is that it mixes together the two components and prevents detailed inference.

In contrast with the Epl index, the data produced by the World Bank permit the separation of the two components but, since they are much more recent, these data do not exhibit time variations. It seems therefore that empirical research is faced with a discrete trade-off between robustness and theoretical coherence. The Epl index is preferable on the ground of robustness but the World Bank data are more suitable for assessing the empirical consistency of theory.

The analysis contained in this paper has been conceived with the purpose of being as close as possible to the details of theoretical predictions. For this reason we have used the data from the World Bank and, as a consequence, we have preferred theoretical coherence to robustness.[8]

More specifically, in this study we have pursued the objective of assessing the empirical performance of predictions concerning the interaction between centralisation and the two components of protection.[9] In this respect, we have found that centralisation exacerbates the unemployment impact of firing transfers but attenuates that of firing taxes. The first result is consistent with the view that centralisation prevents the undoing of transfers [Lazear (1990), Garibaldi and Violante (2005)]. The second is consistent with the view that centralisation serves as a commitment device that attenuates the hold-up problem rooted in the insider-outsider mechanism [Lindbeck and Snower (1988), Piccirilli (2010)].

A second element of novelty of this study consists in using a measure of actual centralisation of bargaining as opposed to measures of formal centralisation. This distinction turns out to be particularly relevant in those environments where bargaining is formally decentralised but economy-wide unions hold a close control over lower level affiliates.

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[8] However, we are not the first to use the data produced by the World Bank as an alternative to the Epl index. The first study based on these data is Botero *et al.* (2004). For a more recent study see Feldman (2009).

[9] None of the two studies cited in the previous footnote is concerned with the interaction between centralisation and protection. By contrast, the interaction is central in Bassanini and Duval (2006) and Garibaldi and Violante (2005). These papers, however, are based on the Oecd Epl index and do not separate the two components.

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Table 1: The Interaction between Centralisation (Cent) and the two Components of Firing Costs

| | Separated Indicators | | | Oecd Epl Index | | |
|---|---|---|---|---|---|---|
| *Dep.Variable* | Un. | Male Un. | Fem. Un. | Un. | Male Un. | Fem. Un. |
| $\widetilde{\Delta}$F.Tax $\widetilde{\Delta}$*Cent* | -.354** | -.299** | -.396** | | | |
| | (.152) | (.133) | (.141) | | | |
| $\widetilde{\Delta}$F.Tr. $\widetilde{\Delta}$Cent | .542 | .731** | .184 | | | |
| | (.376) | (.347) | (.355) | | | |
| F. Tr. | -.092 | -.068 | -.040 | | | |
| | (.059) | (.053) | (.064) | | | |
| F. Tax | .040 | .026 | .034 | | | |
| | (.024) | (.020) | (.024) | | | |
| $\widetilde{\Delta}$*Epl* $\widetilde{\Delta}$*Cent* | | | | 3.927 | 6.197* | -.675 |
| | | | | (3.821) | (3.586) | (3.209) |
| Epl | | | | -.458 | -.469 | -.388 |
| | | | | (.755) | (.664) | (.689) |
| Cent | -5.373* | -1.490 | -5.712** | -5.948** | -3.611 | -5.739 |
| | (3.221) | (2.949) | (2.946) | (2.815) | (2.464) | (2.410) |
| Union Dens. | .009 | -.005 | -.001 | .031 | .020 | .015 |
| | (.023) | (.019) | (.023) | (.025) | (.021) | (.023) |
| PMR | 2.435** | .817 | 3.451*** | 2.993** | 1.312 | 4.103*** |
| | (1.231) | (1.149) | (1.051) | (1.283) | (1.207) | (1.096) |
| Repl. Rt. | .060*** | .051*** | .037** | .063*** | .053*** | .040** |
| | (.018) | (.015) | (.015) | (.020) | (.017) | (.017) |
| Labour Tax | .091** | .089*** | .087*** | .113*** | .108*** | .110*** |
| | (.034) | (.030) | (.032) | (.038) | (.034) | (.034) |
| Output Gap | .420*** | .453*** | .281*** | .422*** | .456*** | .285*** |
| | (.101) | (.110) | (.083) | (.102) | (.107) | (.085) |
| East | 3.885** | 4.009*** | 2.604 | 2.856 | 3.20* | 1.729 |
| | (2.024) | (1.520) | (2.037) | (2.064) | (1.707) | (1.970) |
| N. Obs. | 260 | 260 | 206 | 252 | 252 | 252 |
| N. Countries | 26 | 26 | 26 | 26 | 26 | 26 |
| $R^2$ | .372 | .430 | .377 | .237 | .237 | .365 |
| Standard Error | 2.859 | 2.768 | 2.771 | 3.177 | 3.323 | 2.854 |
| Wald | 403.6*** | 406.0*** | 377.1*** | 137.7*** | 141.9*** | 114.6 |
| Hausman ($\chi^2$) | 6.72 | 8.35 | 5.11 | 6.26 | 7.33 | 4.35 |

Estimation Method: Random Effects, GLS Swamy-Arora procedure
Robust standard errors in parenthesis; *** 1% significance,** 5% significance, * 10% significance.
$\widetilde{X}$ represents the difference between X and its sample average.
All regressions include year dummies and a constant.

Table 2: The Interaction between Centralisation (Wcoor) and the two Components of Firing Costs

| | Separated Indicators | | | Oecd Epl Index | | |
|---|---|---|---|---|---|---|
| *Dep.Variable* | Un. | Male Un. | Fem. Un. | Un. | Male Un. | Fem. Un. |
| $\widetilde{\Delta}$F.Tax $\widetilde{\Delta}$Wcoor | -.010 | -.016 | -.007 | | | |
| | (.018) | (.018) | (.016) | | | |
| $\widetilde{\Delta}$F.Tr. $\widetilde{\Delta}$Wcoor | .118*** | .122*** | .107*** | | | |
| | (.040) | (.040) | (.037) | | | |
| F. Tr. | .040 | -.038 | .008 | | | |
| | (.057) | (.050) | (.056) | | | |
| F. Tax | .022 | .027 | .013 | | | |
| | (.025) | (.024) | (.024) | | | |
| $\widetilde{\Delta}$Epl $\widetilde{\Delta}$Wcoor | | | | 1.192*** | 1.129*** | .992*** |
| | | | | (.393) | (.405) | (.346) |
| Epl | | | | -.489 | -.535 | -.280 |
| | | | | (.629) | (.551) | (.581) |
| Wcoor. | -.084 | -.202 | .010 | .014 | -.139 | .094 |
| | (.316) | (.358) | (.247) | (.323) | (.366) | (.263) |
| Union Dens. | .025 | .026 | .011 | .025 | .025 | .004 |
| | (.023) | (.020) | (.021) | (.026) | (.022) | (.025) |
| PMR | 2.905** | 1.056 | 4.075*** | 2.968** | 1.278 | 4.112*** |
| | (1.203) | (1.129) | (1.021) | (1.281) | (1.221) | (1.093) |
| Repl. Rt. | .047*** | .039*** | .026* | .070*** | .061*** | .046*** |
| | (.017) | (.014) | (.014) | (.019) | (.017) | (.0158) |
| Labour Tax | .073** | .065** | .075** | 0.101*** | .096*** | .102*** |
| | (.034) | (.032) | (.031) | (.037) | (.034) | (.034) |
| Output Gap | .457*** | .488*** | .310*** | .413*** | .446*** | -.274*** |
| | (.098) | (.103) | (.080) | (.098) | (.102) | (.081) |
| East | 5.056** | 4.291*** | 2.779 | 3.584* | 3.630** | 2.500 |
| | (1.898) | (1.572) | (1.830) | (2.040) | (1.717) | (1.955) |
| N. Obs. | 260 | 260 | 260 | 252 | 252 | 252 |
| N. Countries | 26 | 26 | 26 | 26 | 26 | 26 |
| $R^2$ | .376 | .392 | .481 | .258 | .257 | .378 |
| Standard Error | 2.796 | 2.859 | 2.642 | 3.115 | 3.283 | 2.802 |
| Wald | 446.9*** | 362.7*** | 469.8*** | 156.2*** | 163.3*** | 133.9*** |
| Hausman ($\chi^2$) | 8.88 | 8.60 | 6.04 | 7.92 | 7.70 | 5.36 |

Estimation Method: Random Effects, GLS Swamy-Arora procedure
Robust standard errors in parenthesis; *** 1% significance,** 5% significance, * 10% significance.
$\widetilde{X}$ represents the difference between X and its sample average.
All regressions include year dummies and a constant.

Table 3: OECD measures of centralisation

| | Oecd Centralisation Index | | | Oecd Coordination Index | | |
|---|---|---|---|---|---|---|
| *Dep.Variable* | Un. | Male Un. | Fem. Un. | Un. | Male Un. | Fem. Un. |
| $\widetilde{\Delta}$F.Tax $\widetilde{\Delta}$Centralisation | -.055 | -.060* | -.048 | -.040 | -.043* | -.033 |
| $\widetilde{\Delta}$F. Tr. $\widetilde{\Delta}$Centralisation | .210** | .175** | .186** | .163* | .150*** | .133* |

Table 4: Summary statistics

| *Variable* | N. Obs. | Mean | Std. Dev. |
|---|---|---|---|
| un | 160 | 7.213 | 3.499 |
| maleun | 160 | 5.656 | 3.042 |
| femun | 160 | 6.846 | 3.732 |
| Firing Transfers | 160 | 10.880 | 7.882 |
| Firing Taxes | 160 | 23.769 | 19.343 |
| EPL | 160 | 1.841 | .796 |
| PMR | 160 | 1.482 | .453 |
| Union Density | 160 | 31.3389 | 18.515 |
| W. Coord. | 160 | 2.811 | 1.198 |
| Cent. | 160 | .376 | .159 |
| Replacement Rt. | 160 | 68.295 | 19.385 |
| Labour Tax | 160 | 28.162 | 10.503 |
| Output Gap | 160 | .776 | 2.470 |
| East | 160 | .154 | .361 |