Wage Flexibility and Labour Market Institutions: A Meta-Analysis

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ABSTRACT

Wage Flexibility and Labour Market Institutions: A Meta-Analysis[*]

Evidence during the nineties about the response of real wages to shocks highlights that this response is substantially lower in European countries than in the United States and that there are important differences among European countries. Which are the reasons that explain these different reactions? In this paper, we apply meta-analytical techniques in order to provide a quantitative summary of the available evidence regarding the influence of labour market institutions on real wage flexibility. We find that the design of the study affects the obtained results, and that in more deregulated labour markets with a lower presence of trade unions, this response is particularly larger.

JEL Classification: J30, J50

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I. INTRODUCTION AND OBJECTIVES

Inside a currency union, the exchange rate can only be used to win competitiveness against third countries but not against other countries participating in the union. In this context, one of the possible alternative adjustment mechanisms to asymmetric shocks is the role of wage flexibility as a shock absorber (Friedman, 1953). In the context of the European economic and monetary union, the role of wage flexibility is even more important due to the limitations of the other two main alternative adjustment mechanisms: migrations and fiscal transfers (see European Commission, 1997). Moreover, the economic implications of adopting the fiscal objective of zero budget balance in the medium term (as required by the Stability and Growth Pact –SGP-) for the different countries of the Euro area implies that with a given interest rate and a fixed nominal exchange rate, again, the adjustment mechanism comes down to the prescription of "wage flexibility" (see Allsop and Artis, 2003).

Wage flexibility is defined as the speed with which real wages react to macroeconomic condition and it is measured as the responsiveness of real wages to shocks, usually measured as unemployment variations. Several empirical studies carried out during the nineties have concluded that there is an insufficient response of nominal and real wages to shocks (Decressin and Fatás, 1995), in particular when compared with other monetary unions such as the United States (Blanchard and Katz, 1992). Recent studies such as Blanchard and Wolfers (2000) or Bertola *et al.* (2001) have highlighted the role of institutions as potential explanatory factors of these differences. In fact, other contributions (i.e, European Commission, 2003, Kandil, 2006 or Duque et al., 2006) analysing data after the structural reforms carried out in the nineties in most European countries have found that these differences are now lower than before.

Taking this into account, the objective of this paper is twofold: first, to provide a quantitative summary of the available evidence of the reaction of real wages to unemployment and, second, to analyse the influence of labour market institutions on the adjustment through wages to shocks.

With this aim, meta-analytical techniques are applied. Meta-analysis is a research methodology that is used to bring together findings from previous research on a given issue or topic, undertaken by different researchers in a succinct and systematic way. In

fact, meta-analysis is considered a rigorous alternative to the usual narrative literature review. The main aim of this technique is thus to offer an analytical framework for research synthesis, usually based on comparative case studies, with the purpose of integrating the findings by different authors. Next, the results from the meta-analysis are used in order to analyse the influence of labour market institutions on the elasticity of real wages to unemployment.

The rest of the paper is structured as follows: the second section describes the design of the meta-analysis, next, the third section presents the empirical results, and, last, the paper concludes summarising the main findings.

II. DESIGN OF THE META-ANALYSIS

This section describes the different steps in the design of the meta-analysis. The first step consists of identifying the variable of interest of the analysis, next, it is necessary to identify and gather the various studies providing estimates of real wage flexibility, and last, information about the potential explanatory factors of the variable of interest must be compiled. Next, each of these steps is briefly described.

2.1. *Identification of the variable of interest*

Regarding the identification of the variable of interest, we focus our attention on real wage flexibility, as it can be understood as an indicator of adjustment to shocks throughout the labour market in the various economies. In particular, we think it is an appropriate summary of the interactions between wages and shocks. In order to set up the required database, real wage flexibility will be defined as the estimates of the elasticity of real wages to unemployment.

2.2. *Selection of studies*

A first decision regarding the selection of these studies is related to the fact that we decided to focus only on works using a macroeconomic approach as we focus on the

analysis of labour market from this perspective[2]. The idea is therefore that we will select all studies when an estimate of the elasticity of real wages to unemployment is provided. It is worth mentioning that this elasticity can be defined as a short-run or long-run elasticity. These two different definitions will be controlled later in our analysis. Whenever possible, we will also collect information about the precision of these estimates (i.e. the standard error of the estimate or the t-student statistic to derive it). With regard to the geographical area considered in the study, we limited our analysis to those works considering one or more OECD countries[3].

In order to look up the studies with these characteristics, we used Econlit as our primary bibliographical source. However, we complemented it using secondary sources (references in the different studies given) and web searches. It is worth mentioning that we selected published and unpublished works (i.e. working papers or communications to conferences) in order to avoid the potential effects of "publication bias" in our analysis. The studies used in the meta analysis are quoted in annex 1. As far as the time span is concerned, we considered studies published from 1960 to the middle of 2006. However, the earliest study in our database was published in 1983 and the most recent one in 2003. Another issue to consider is whether we will include single or multiple values of the elasticity for each study. In our context, we chose to include all the estimates available in each study as the objective is merely to explain the differences in the previous results and to provide guidelines for our empirical research.

2.3. Explanatory variables

In the meta-analysis literature, the set of explanatory variables is usually divided into three blocks - the control variables, the variables related with the design of the study and the moderator variables.

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[2] Nijkamp and Poot (2005) and Dickens et al. (2006) provide excellent summaries of the available evidence at the micro level. In the first study the extensive international research on the responsiveness of wages of individuals to changing local labour market conditions (wage curve) is summarised, while the second focuses on the analysis of the determinants of changes in the individuals' earnings in 31 different data sets from sixteen countries.

[3] The number of studies analysing real wage flexibility from a macroeconomic approach for non-OECD studies is very scarce. However, there are recent studies for the EU new member states using individual or district data on earnings such as Iara and Traistaru (2004) or Galuscak and Munich (2005).

As regards the first set of variables, control variables are usually related to aspects such as the publication year, the type of publication (journal article, book chapter, report, etc.), the number of pages of each study or the number of citations received (which can be obtained from the ISI Web of Science only when the study has been published in a journal included in the Social Science Citation Index). With the sole exception of the year of publication (which could be an indicator of the state of the empirical technology when the work was done), they can be interpreted as indicators of quality of the study.

The second set of variables included some characteristics related to the design and the implementation of the empirical study that can explain the differences in the results by different authors. In our context, this list includes the following:

i.   *The territory considered and the sample used*

The first aspect to take into account is the considered territory and the sample used. We defined a dummy variable for each territory considered (in the case of regions we also assigned each region to the country to which they belong in a different dummy variable), while with the sample, we recorded the first and the last year of the sample. The dimension of the territory (supranational, national and regional) was also considered.

ii.   *The econometric specification*

As Broersma and Den Butter (2002) point out, traditional empirical studies on wage formation consider different variables (inflation, unemployment, productivity) to explain the determinants of the change in the wage rate (Phillips curve specification) or to explain the wage level (wage curve specification). As mentioned above, while the Phillips curve specification is based on the theoretical model of Phelps (1968), where wages are set by firms, in the wage curve approach, wages are the outcome of a bargaining process between firms and unions. From a theoretical perspective, there is nowadays some preference among economists for using a wage curve specification rather than the Phillips curve. However, some recent works such as Hsing (2001) or European Commission (2003) prefer to use a Phillips curve specification. In any event,

it is important to stress that the results are quite similar when taking the different countries and time periods considered into account.

In the general static specification of the macroeconomic wage curve specification, real wages of country i at time t is explained using the following expression:

$$(1) \quad \log(RW)_{i,t} = c_0 + c_1 \cdot \log(U_{i,t}) + controls_{i,t} + u_{i,t},$$

where $RW_{i,t}$ is the level of real wages, $U_{i,t}$ the unemployment rate in country i at time t, and, $u_{i,t}$ is a random error term which is supposed to follow a normal distribution. Additional control variables usually included productivity, measures of competition and expected future prices. The variables enter the relationship in logs. In the Phillips curve specification, the variables are similar to those in the wage curve specification, but both are included in differences instead of in levels. It is worth mentioning that some authors do not include productivity or prices as explanatory variables while others also include lagged values of wages in order to take the effects of wage persistence into account in the analysis. In equation (1), the coefficient c_1 provides information about the reaction of real wages to an increase in unemployment, and from, an empirical point of view, it measures real wage flexibility.

Variations of the basic specification include the possibility of working with error correction mechanisms where the growth rate of wages is explained using lagged values of the growth rate of wages and the growth rate of unemployment as well as the long-run relationship between the two variables (in levels).

For this reason, we defined some dummy variables trying to reflect all these possibilities: growth rate/level of wages, growth rate/level of the unemployment rate, and the fact of including control variables in the wage equation (productivity, inflation, wage persistence).

iii.   Econometric methods and techniques

Apart from differences in the econometric specification, the various authors may use different estimation methods and techniques. We defined two particular variables that reflect the differences in terms of the econometric methods and techniques applied. The

first one is related to the consideration of a single territory or a pool of territories, while the second is related to the estimation technique applied (OLS, IV, SURE, etc). Both aspects are of course clearly interrelated.

iv. *The data set*

The data set used can also be a potential source of differences between studies. We considered the following information: the data source[4], the frequency of the data, and the exact definition of wages and the unemployment rate.

The last set of variables in the meta-analysis data set is called moderator variables, and it is related to other characteristics that have not been controlled until now, such as example, the size of the different territories (in terms of population, GDP, etc.) or other factors such as their institutional characteristics. This set of variables is also usually replaced by the introduction of fixed effects that would include all observable and non-observable differences.

III. EMPIRICAL RESULTS FROM THE META-ANALYSIS

3.1. Descriptive statistics

After developing each of the steps described in the previous section, our database comprised 27 studies (2 books, 14 journal articles and 11 working papers) with 608 estimates of real wage elasticity or real wage rigidity. For 362 of these estimates, the standard error or the t-student was also provided. Table 1 summarises the number of elasticities obtained from each study and the number of citations received by each of these studies is also provided. By far the most frequently cited study is the one by Layard *et al.* (1991), with the picture provided by their estimates being that of consensus among researchers. It is also worth mentioning that the study by Payne (1995) has provided a high number of estimates (150) due to the consideration of the

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[4] As highlighted by an anonymous referee, one difference between meta-analyses in Medicine and Social Sciences with meta-analyses in Economics is that in the first, different datasets are used (i.e., independent field studies and experiments) while in the second, studies often use closely related data sources. However, in our dataset we can find different data sources as there are several institutions providing estimates for the main economic variables (i.e, national sources, Eurostat, OECD, IMF, etc.).

state-level dimension for the US. These estimates are related to 23 countries, 71 regions and 4 supranational entities. It is also worth mentioning that the 200 regional estimates were collected from only 3 studies, considering only three countries - Germany (11 regions), the UK (10 regions) and the US (50 states). The 7 supranational estimates were collected from 4 studies and involve 4 different definitions - OECD countries, the EU, the Euro area and five EU countries (Germany, France, Italy, Netherlands and the UK).

-Table 1 about here-

Table 2 provides some descriptive statistics of the estimates of real wage flexibility in our database. According to this table, the most flexible countries are Sweden, Norway, Turkey, Japan and Switzerland. There is an intermediate group formed by the Netherlands, France, Australia, Germany, Portugal, Belgium, Ireland, Italy, Luxembourg, Finland, Greece and Austria, while the less flexible ones are New Zealand, the United States, the United Kingdom, Denmark, Canada, and Spain. As it can be seen from this table, when considering the most recent studies on the topic, differences between some European countries and the United States are now lower than before.

-Table 2 about here-

If we compare these results with the only work we know that has carried out a quantitative summary of previous work, that by Heylen (1993), we can see that there are some similarities but also some differences. Heylen (1993) calculates an average of real wage flexibility for different countries using information from a considerably lower number of empirical works. In Figure 1, the relative position of the 18 countries considered by Heylen (1993) in terms of real wage rigidity are compared with the ranking obtained from the average of estimates of real wage flexibility in these countries from our database.

Although there is a positive and significant relationship between the two rankings (after transforming them adequately, as one is related to flexibility and the other to rigidity), changes for some of the countries considered are important. This is true of Ireland, France, Germany and the Netherlands. Why are these results so different? Has the situation changed in these countries? It this result related to the fact that we included more recent studies in our database? We will now try to answers these questions using different quantitative approaches.

-Figure 1 about here-

An important methodological problem in meta-analysis is the possibility of "publication bias". This occurs if only statistically significant results with the "correct" sign are being published. One reason might be that the editors of journals prefer to publish these "correct" results. This is one of the reasons why we tried to include not only published, but also unpublished studies (i.e. working papers). However, this does not guarantee that this problem is not present in our sample. In fact, authors may be reluctant even to circulate work if they have certain results which are not in line with previous research. With the aim of analysing the existence of publication bias in our sample, we applied a standard tool called "funnel plots". This consists of plotting the value of the variable of interest (in this case, wage flexibility estimates) against its standard error (Figure 2). The idea is to search for asymmetries in these figures. Asymmetry will indicate that studies with unequal precision disproportionately find either small or large results. In fact, without any publication bias, a symmetric funnel shape would emerge with a vertical line of symmetry at the location of the true parameter.

-Figure 2 about here-

Looking at the scatter plot in figure 2 and the estimated regression line, it seems clear that there is a positive relationship between the standard error and the estimated value of wage flexibility. In the absence of any selective reporting, this line should be horizontal,

as the estimated elasticity should not vary in proportion to its standard error. However, if there is a tendency only to report results where the t-ratio is around 2 or greater, the reported estimated elasticity will increase as the standard error increases in order to maintain a t-ratio at or above 2.

The evidence of publication bias should be taken into account when looking at the various studies on this topic. The predominance of results indicating a certain reaction of wages to unemployment is clear as the results predicted by economic theory. However, results indicating a non-significant relationship between wages and unemployment are certainly worrying from a policy-making point of view. Our empirical research should try to shed light on this issue.

3.2. Results from the meta-regression

We now present the results of meta-regressions, i.e. we estimate various regression models where the endogenous variable is the absolute value of wage flexibility and the explanatory variables are a set of variables (usually dummy ones) that reflect various study characteristics. The results of these regression models will help to identify the explanatory factors in the different results in the empirical literature on adjustment through wages and prices in the labour market.

An important issue regarding meta-regressions concerns the weight that should be given to the different publications. The quality of the various studies is not the same and, for that reason, one would like to make adjustments for quality differences. However, it is very difficult to do this without introducing subjective judgement. For this reason, we decided to use the inverse of the standard error of the estimates as weights, although this will imply that only 341 observations will be available as some studies do not report these values. Another issue that needs to be highlighted is the existence of collinearity. As mentioned above, the correlations between several potential explanatory variables are quite high and, as a consequence, the number of explanatory variables in the different models will of necessity be reduced to avoid problems derived from collinearity.

Before showing the results of the meta regressions, it is worth mentioning that when using all the observations available for real wage flexibility, the inclusion of fixed

effects for each of the considered studies explains 26% of the variance of the absolute value of real wage flexibility. Moreover, the inclusion of country-fixed effects explains 34% of the variance of the absolute value of real wage flexibility. If we combine both sets of variables, they explain 48% of the variance of the endogenous variable.

Table 3 about here

The results of six different explanatory models of the absolute value of wage flexibility are shown in Table 3. All the estimates were obtained by applying weighted least squares using the inverse of the standard error of the estimates as weights. Taking this into account, the number of available observations is 341. It is worth mentioning that models 1, 2 and 3 are identical to models 4, 5 and 6 with the only difference that in the latter, country-fixed effects were included as explanatory variables.

From the results in this table, we can see how the dummy variable related to the fact that the study is a journal article is positive and significant at the usual levels in models 2, 3 and 4. This result is in line with previous evidence and reinforces the existence of publication bias in our data set.

The dummy variable related to territory (region) show negative values in the models where it is introduced. This result implies that when working with more disaggregated models, the value of real wage flexibility will be lower than at country level. However, when this variable is replaced by the variable related to the consideration of a single or a pool territory, this new variable is not significant.

As the choice of the database is clearly related to the level of territorial detail considered, we replaced the variables associated to territory in models 2 and 5 with those associated with the various databases. In both models, the use of national sources instead of using OECD data provides significantly different values of wage flexibility. However, these results should be taken into account due to the high correlation between the use of certain data sources and the geographical scope of the analysis. In particular, studies using regional data tend to use national sources while studies analysing several countries use OECD or Eurostat data. Moreover, only most recent studies tend to use

Eurostat data, so probably no systematic effect could be attributed to the use of different data sources.

The evidence regarding the use of annual data or half-year instead of quarterly data does not provide any robust conclusion, as in some models the associated dummy variables are not significant and there are even some sign changes. However, the opposite happens when using hourly wages instead of annual or weekly wages. The value of the elasticity increases. This fact is in line with the results in the wage curve literature as highlighted by Card (1995).

The specification of levels or growth rates for wages and unemployment do not provide significantly different results after controlling for other variables. While the use of standardised unemployment does not seem to affect the results, the use of information concerning employees' compensation instead of wages is statistically significant. As expected, the use of ordinary least squares (OLS) or restricted least squares instead of other more complex and appropriate techniques significantly affects the estimates, although in some models this variable is not statistically significant. The introduction of control variables for inflation and wage persistence only seems to be relevant when the time period analysed is not controlled.

Finally, we prepared a set of dummy variables related to the fact that information from the 60s, 70s, 80s, 90s, and 00s is included in the sample. As we can see from the table, the dummy variables for the 70s, 90s and 00s are significant. While the sign of the coefficients are negative for the first two variables, the sign for the third is positive.

In short, we ascertained that choosing a particular database with a certain frequency and definition of variables and a given level of territorial detail, using a certain econometric technique or including some control variables, can have significant effects on empirical results.

3.3. Evidence on the role of institutions

In this section, we provide evidence on the role of institutions in explaining cross-country variations in the reaction of real wages to unemployment. The idea is that the value of elasticity of wages to unemployment can be explained by the institutional

setting. Taking into account the results by previous authors, we will considered the role of trade union densities, coverage, centralisation and coordination of bargaining, employment protection legislation, benefit replacement rates, active labour market policies and the tax wedge. The main source for these institutional data is the OECD Employment Outlook, but, in some cases, we had to merge information from this database to other such as Nickell and Nunziata (2001) or Nickell *et al.* (2003).

Two different approaches are going to be used. Firstly, we will consider the effects of the different institutional variables on the average value of the elasticity of wages to unemployment in the various studies) within the framework of a multiple linear regression model. Secondly, we will carry out a similar analysis, but this time controlling for the different characteristics of the studies that have been identified as relevant in the previous subsection. In particular, a two stages procedure has been applied: first, we have recovered the value of the country's various dummy variables in model 6 (which included fixed effects) and we have then specified a linear regression model with these coefficients as endogenous variables and the institutional features as explanatory variables.

In both cases, the institutional variables have been measured as means over the whole period. The results of estimating these two models by Ordinary Least Squares are shown in Table 4. It is worth mentioning that although nineteen countries have been included in the analysis, the number of observations in each of this regression is 15 due to gaps in the institutional database.

-Table 4 about here-

Both sets of results show the relevance of institutions in explaining the different responses of real wages to changes in unemployment. After eliminating the distorting effect of study characteristics, the model's goodness of fit clearly improves, reaching a value of 0.70. As far as the effects of different institutions are concerned, a higher presence of trade unions (union density) and employment protection legislation have a negative impact on the response of real wages to a change in unemployment. The co-ordination variable enters the equation with the opposite sign implying that a higher

level of co-ordination will improve the response of real wages to labour market conditions. Centralisation in collective bargaining has the expected negative effect in both models, while employment protection legislation is only significant (also with a negative sign) in the second. The tax wedge is also significant with a negative sign in the first model, which implies that higher values of this variable reduce the wage response to unemployment changes, while more active labour market policies (measured as training programs) seem to extend the reaction. However, the share of public employment services has a negative effect on both models. Other variables such as the benefit replacement rate or the bargaining coverage do not have any significant effect.

IV. CONCLUSIONS

This section summarises the main conclusions of our empirical analysis. A first conclusion is that, to our opinion, the prevailing view about differences in the reaction of wages to unemployment has been strongly influenced by the seminal contribution of Layard *et al.* (1991), but the picture provided when other studies are considered is slightly different.

Second, some characteristics of the studies carried out by previous authors such as the territory considered, the database used, the frequency of the data, the definition of some variables and the use of certain econometric techniques and methods are clearly interrelated.

Next, we have found that evidence of publication bias should be taken into account when looking at the different studies on this topic. The preference for results indicating a certain reaction of wages to unemployment is clear, as are results predicted by economic theory. However, results indicating a non-significant relationship between wages and unemployment are certainly worrying from a policy-making point of view. In this sense, the results of the meta-regressions permits us to state that choosing a particular database with a certain frequency and definition of variables and a given level of territorial detail, using a certain econometric technique or including some control variables, can have significant effects on empirical results. It is therefore important to

take all this into account in order to design empirical analysis of this issue properly and to check the robustness of the results with different specifications and data sets.

Last, evidence on the role of institutions in explaining wage responses to labour market conditions show that a higher presence of trade unions (union density) and employment protection legislation implies a lower response. Other significant variables include bargaining co-ordination, active labour market policies, the degree of centralisation and the tax wedge, while other variables such as the benefit replacement rate or bargaining coverage do not seem to have significant effects.

As a final summary, it is possible to conclude that adjustment to shocks in European labour markets (which are characterised by a low mobility) is clearly influenced by institutions. In more deregulated labour markets which also have a lower presence of trade unions, the response of real wages to unemployment is particularly larger. However, the policy implications from the results are not straightforward: It is important to analyse why labour market institutions are as they are and whether there may be other reasons apart from the unfavourable impact on adjustment mechanisms which keep them as they are (European Commission, 2004). In fact, the central question is how labour market institutions should be designed in order to secure benefits, while as far as possible avoiding the distortions that provide little benefit in terms of social protection. An additional aspect to tackle into consideration is the stability of the goodness of institutions over time. In particular, the best performing institutions over a certain period of time may not necessarily be the same ones in the future.

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APPENDIX: LIST OF STUDIES INCLUDED IN THE META-ANALYSIS

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Figure 1: Comparison of the estimates of real wage flexibility by country with the summary analysis by Heylen (1993)
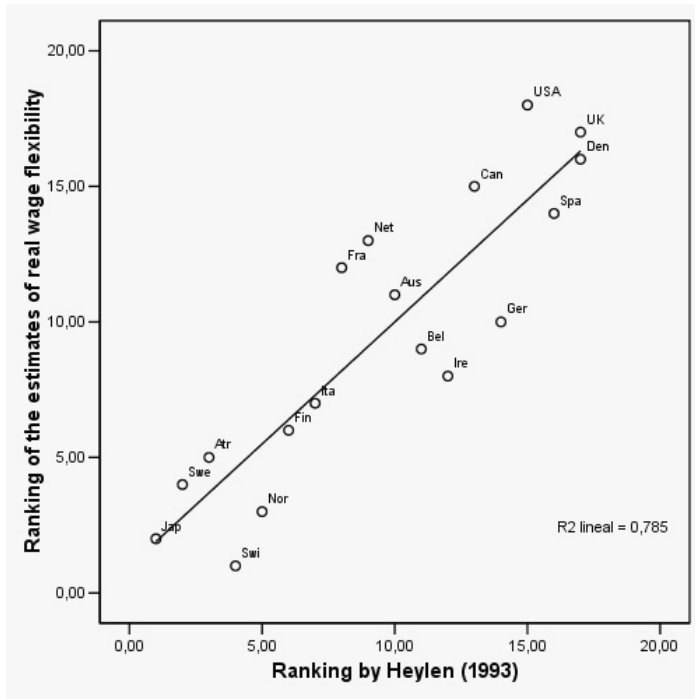
Figure 2: Relationship between the absolute value of wage flexibility and the standard error of the estimates
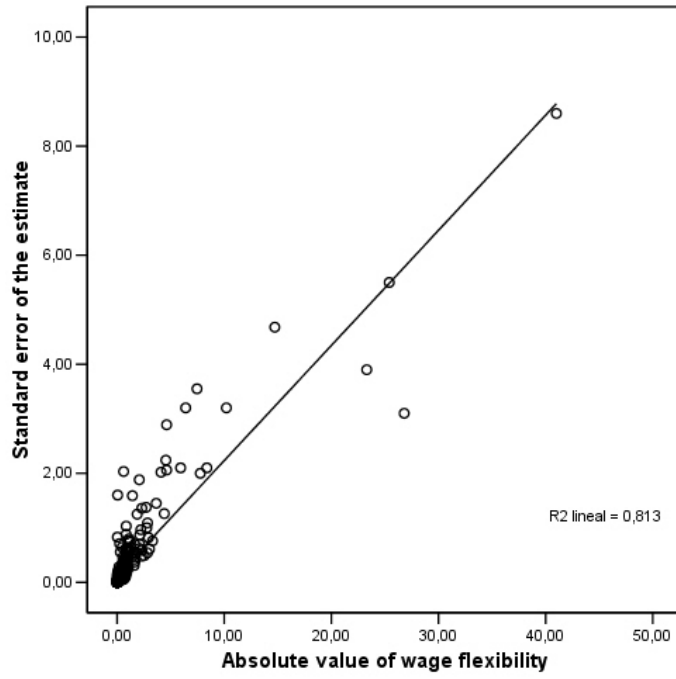
Table 1: Summary of the different studies included in the meta-analysis

Study	Number of estimates	Number of citations*
Alogoskoufis and Manning (1988)	16	46
Anderton and Barrell (1995)	10	5
Anderton et al. (1992)	6	1
Baddeley et al. (2000)	22	4
Bean et al. (1986)	28	99
Bentolila and Jimeno (1995)	1	2
Berthold et al. (1999)	32	0
Cadiou et al. (1999)	8	1
Elmeskov and MacFarlan (1993)	27	13
Elmeskov and Pichelmann (1993)	76	2
European Commission (2003)	30	0
Fabiani and Rodríguez-Palenzuela (2001)	14	0
Goubert and Omey (1996)	7	0
Grubb et al. (1983)	21	73
HM Treasury (2003)	6	0
Hyclak and Johnes (1989)	31	10
Hyclak and Johnes (1992)	10	15
Layard et al. (1991)	18	689
McMorrow and Roeger (2000)	11	1
Nymoen and Rodseth (2003)	4	0
OECD (1999)	15	9
Payne (1995)	150	3
Prasad and Thomas (1997)	2	11
Roeger and in't Veld (1997)	16	3
Turner et al. (1996)	7	3
Tyrväinen (1995)	10	8
Viñals and Jimeno (1998)	30	0

Source: Own elaboration.

* The number of citations was obtained from ISI Web of Knowledge at the beginning of 2006.

Table 2: Descriptive statistics of the real wage flexibility estimates

| Real wage flexibility | Observations | Average | Standard deviation | Coefficient of variation | Ranking | Comparison with Heylen (1993) | |
						Our ranking	His ranking
Australia	9	-0.99	1.54	154.96%	9	8	9
Austria	16	-2.17	2.46	113.22%	18	14	16
Belgium	16	-1.07	0.81	75.69%	12	10	8
Canada	13	-0.59	0.58	97.11%	5	4	6
Denmark	17	-0.38	0.46	123.15%	4	3	2
Finland	11	-1.41	2.02	142.58%	16	13	13
France	22	-0.94	0.99	105.71%	8	7	11
Germany	23	-1.04	1.10	106.44%	10	9	5
Greece	4	-1.62	2.00	123.28%	17		
Ireland	9	-1.11	0.95	85.28%	13	11	5
Italy	22	-1.12	1.25	111.97%	14	12	12
Japan	15	-7.44	11.45	153.93%	22	17	18
Luxembourg	2	-1.13	0.13	11.94%	15		
Netherlands	15	-0.74	1.01	137.12%	7	6	10
New Zealand	7	-0.17	0.33	191.10%	1		
Norway	10	-2.68	3.33	124.20%	20	16	14
Portugal	9	-1.06	0.89	84.08%	11		
Spain	14	-0.61	0.77	126.62%	6	5	3
Sweden	16	-2.67	3.18	119.19%	19	15	17
Switzerland	9	-7.50	10.19	135.96%	23	18	15
Turkey	5	-6.75	5.44	80.62%	21		
UK	26	-0.37	0.51	138.75%	3	2	1
US	20	-0.36	0.31	86.43%	2	1	4

Table 3: Results of the meta-regression

Estimates of wage flexibility	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
Weights: Inverse of std error of estimates	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
Intercept	-0.57	0.02	2.37	0.00	0.76	0.15						
Journal article (WP, Book)	0.02	0.73	0.92	0.00	0.20	0.08	0.01	0.86	0.98	0.00	0.15	0.22
Region (Country)	-1.26	0.00			-1.49	0.00	-1.27	0.00			-1.44	0.00
Single territory (Pool)			0.23	0.24					0.11	0.65		
National sources (OECD)			-0.80	0.01					-0.84	0.02		
Eurostat data (OECD)			1.18	0.00					1.16	0.00		
Annual data (Quarterly)	0.43	0.00	-0.69	0.04	-0.14	0.62	0.37	0.01	-0.75	0.05	-0.17	0.57
Half-year data (Quarterly)	0.03	0.60	-0.76	0.02	0.22	0.06	0.05	0.50	-0.76	0.04	0.19	0.15
Hourly wage (Annual wage)	1.15	0.00			1.39	0.00	1.21	0.00			1.43	0.00
Growth rate of wages (level)			0.06	0.43					0.06	0.51		
Growth rate of unemployment (level)			0.06	0.60					0.01	0.91		
Compensation of employees (other)			-1.88	0.00					-1.94	0.00		
Standardised unemployment (other)			0.16	0.66					0.19	0.62		
Ordinary least squares (other)	0.31	0.01	0.07	0.40	-0.29	0.28	0.25	0.06	0.07	0.42	-0.29	0.29
Restricted least squares (other)	1.01	0.04	1.31	0.01	0.53	0.29	1.00	0.05	1.22	0.02	0.56	0.28
Control for inflation (no control)	0.27	0.06			-0.28	0.29	0.21	0.17			-0.29	0.29
Control for wage persistence (no control)	0.28	0.04			-0.24	0.36	0.24	0.11			-0.21	0.45
Control for productivity (no control)	0.03	0.72			-0.01	0.91	0.03	0.74			-0.01	0.92
Number of observations	0.00	0.37	0.00	0.63			0.00	0.43	0.00	0.65		
60s included in the analysis					-0.02	0.47					-0.01	0.51
70s included in the analysis					-0.40	0.00					-0.36	0.01
80s included in the analysis					0.19	0.00					0.19	0.01
90s included in the analysis					-0.21	0.00					-0.21	0.00
00s included in the analysis					0.58	0.00					1.11	0.03
Unweighted R^2	0.16		0.16		0.17		0.28		0.29		0.28	
Weighted R^2	0.24		0.21		0.28		0.26		0.23		0.29	
Country Fixed effects	No		No		No		Yes		Yes		Yes	

Table 4: Elasticity of real wages to unemployment and labour market institutions

	Real wage flexibility	Real wage flexibility (after controlling for study characteristics)
Constant	2.02	0.01
	(2.15)	(0.08)
Trade union density	-0.83	-0.88
	(1.58)	(2.19)
Coordination in wage bargaining		0.31
		(2.65)
Centralisation in wage bargaining	-0.35	-0.28
	(2.09)	(1.97)
Employment Protection legislation		-0.35
		(2.25)
Tax wedge	-3.79	
	(2.54)	
Public employment services	2.37	2.25
	(1.52)	(2.09)
Public employment training	0.35	0.55
	(2.09)	(1.99)
R-Squared	0.46	0.70

R-squared: Adjusted R-Squared. Absolute t-values in parenthesis. Trade union density is measured as the share of workers organized in unions, benefit replacement rates as the percentage of earnings of unemployment benefits and active labour market policies are expressed as expenditure shares in nominal GDP. Employment protection legislation, bargaining coordination and bargaining centralization are measured on a rank scale where higher numbers refer to stronger regulation. For example, bargaining coordination is scaled in the [1;5] interval, where 1 is bargaining at the individual firm level, with no coordination by higher-level associations, and 5 is coordination by top-level confederations of unions and employers' associations where even the government can impose a wage freeze.