Taxation, labor policies and goods market regulation: effects on wages and productivity

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Abstract

This paper has as main topic an empirical analysis about the influence of some institutional factors - like taxation, active and passive policies on the labor market, the degree of competition in the goods market, the unions' role during wage bargaining - on a dependent variable called *wage gap*. This last variable represents the difference between real wages growth rate and the productivity growth. The study is relied on a Panel relative to 14 OECD countries considering the years from 1983-2003. The estimator utilized is the fixed effects vector decomposition (FEVD). The results obtained displayed that the *wage gap* is mostly affected by taxes, by active and passive policies on the labor market and by the magnitude of the unions. Thus institutions, which have a role on goods and labor market like employment protection legislation (EPL) and the product market regulation (PMR), do not affect the dependent variable. Then, we estimate the sample dividing the countries in two groups depending on the degree of centralization of the bargaining. The results reached do not change: the EPL and the PMR do not have a role in conditioning the *wage gap*.

Keywords: labor and good market regulation, collective bargaining, wage, productivity
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1.Introduction

From the eighties in Italy and in Europe had an important role the reforms, implemented by the governments, which the aim to modify the mechanism of prices' formation, the degree of labor and product market rigidity and the bargaining process between firms and unions.

In the same years, in Europe the "main features of the employment" changed due to the technological progress, the improvement of the international trade and the institutional changes. Thus, these factors had as consequence to consider the coordination between firms and unions the main mean to reach the goal of an implementation of the international competition. The former objective of the coordination was to have a good and strong system of industrials' relations.

Many authors - among others Soskice (1989, 1994) and Freeman and Soete (1994) - in their works highlight the role of the unions and firms during the bargaining process considering the changing in the European economy. Many reforms were carried out by EU governments, following a criterion called "*defensive flexibility*", with the goal to obtain lower wages through the development of the temporary work. The studies mentioned above and others - like Antonelli and Paganetto (1999) - underline the importance, in the European context just described, to rely the reforms and the bargaining process more on the so called "*innovative flexibility*". This kind of flexibility could be implemented with an improvement of the exported goods, an implementation of the public physical capital, the development of the industrials weak areas and a higher human capital obtained through measures on the education system (Biagioli 2003).

The economics literature also focuses on the role of the bargaining - OECD (1997), Boeri et Al (2000) and Caroleo (2003) - and on the degree of the coordination between governments, unions and firms (Kenworthy, 2001 and Vesser, 2006). In the recent literature, it is useful to distinguish between first generation social contracts, set during the seventies, and second generation social contracts, set from the eighties to the nineties. The former reached, in a stagflation context, the purpose to decrease the wages in change of more social public expenditure. The latter, set during the first process of labor market reforms and during the implementation of fiscal consolidation plans, had as object more taxes, less public expenditure in change of real wages and employment stability (Acocella et Al., 2007).

The European Union integration process and the need to put together labor market reforms with measures, which aim to raise the competition on the product market, boost many authors to focus their attention on the results of these reforms and on the interactions between labor market measures and product market ones. Blanchard and Wolfers (2000) underline as the interactions between shocks and institutions could explain, during the seventies and the eighties, the different dynamic of the EU countries unemployment rate although these countries had similar shocks. The two authors display that countries, with institutions that improve the employment rate, obtain a less lasting unemployment with respect to countries with rigid labor market considering both groups of states were hit by similar adverse shocks.

Blanchard and Giavazzi (2003) set up a model, which is able to evaluate the effects of product market and labor market reforms. The model has a monopolistic competition goods market with entry costs, while wages are bargained through a Nash bargaining structure. The two authors take into account the role of the interactions between the two markets: they display that a more flexible labor market and a competitive product market bring to, in the medium run, a productivity growth with positive effects on wages and on the employment rate[2].

Bassanini and Duval (2006) show that a deregulation process in the goods market is sounder in a presence of a flexible labor market or when policies, with the purpose to obtain a less rigid labor market, are implemented. Amable et Al (2007) evaluate the links, considering the regulatory norms, between the labor market structure and the product market structure in order to find the effects of these relations on the employment and unemployment rate. The authors assess that a high level of *employment protection legislation* (EPL) has a positive effect on the employment, thus, deregulation processes in the labor and product market are substitute and not complementary.

Fiori et Al (2012) modify the 2003 Blanchard and Giavazzi's model: they add in this model an endogenous workers' bargaining power. From the results of this model and of the empirical analysis come out that a product market deregulation process brings to a raise in the employment rate even if the labor market is rigid. Besides, a more

[2] Before the outburst of the 2008 crisis the data show that in Europe the flexibility was higher in the labor market, policies with the aim to reduce wages are successfully applied, while the competition in the product market did not display a relevant growth. Thus, the income labor share of GDP went down. The investment did not rise enough to guarantee a wage growth in line with the productivity growth, while during the last recession there was a consistent drop in the investment and of the productivity. These stylized facts are valid for the whole EU and with better evidence in Italy.

competitive product market is better for approving measures with the aim to make the labor market more flexible.

Others authors focus their attention on the role of the productivity and how the institutional factors could affect its trend. Scarpetta and Nicoletti (2003) analyze the differences between the growth of the productivity in USA an in the European Union during the nineties. The two authors display that the United States had a higher productivity growth respect to EU because they realized ICT investment, which the European countries do not realize with the same intensity than the US. Scarpetta and Nicoletti (2003) assess that in this country are been a relevant quantity of ICT investment because it occurred a downward movement of the mark-up as a consequence of a relevant deregulation process of the product market. Thus, firms are able to apply lower prices in the whole chain production. The results of this model are supported by an empirical analysis. Amable (2008) in his work shows that reforms with the purpose to obtain a more competitive product market have a more positive effect on the GDP and productivity growth with a rigid labor market. Bassanini et Al (2009) evaluate, empirically, the effects of the reforms occurred in the labor market on the productivity growth. They highlight that a regulation without strong benefit for dismiss work affects negatively the productivity and the product trend.

This paper has the purpose to evaluate empirically the influence that some variables, which represent institutions (unemployment benefit, active and passive policies on the labor market, the employment protection legislation, the product market regulation and the tax wedge), have on the difference between the real wages growth and the productivity growth - the dependent variable (*wage gap*) -.

The work is divided in five sections. Sections one serves as introduction. In section two are described the data, while in section three is represented the methodology used to make the estimate which is the fixed effects vector decomposition (FEVD) utilized for the first time by Plumper and Troger (2004). The results are evaluated and displayed in section four. The last section, section 5, serves as conclusion.

2. Data

We take our sample from a database realized by Bassanini and Duval (2006) using OECD data. We consider a Panel composed by fourteen countries[3] and we take into account the years 1983-2003.

The estimator used is the FEVD in order t the institutional variables, which vary slowly during time and thus make inefficient pooled OLS and fixed effects GLS estimate methods as underline from Amable et Al (2007). In the next section, the FEVD method is described and explained in detail.

The dependent variable, the *wage gap*, is obtained making the difference between real wages growth rate and labor productivity growth rate. As said before, the aim of the empirical analysis is to evaluate if this variable could be affected by institutions: like the unemployment benefit, the active labor market policies, the EPL; the level of competition in the product market, the taxes and the magnitude of unions. Thus, the independent variables taking into account are: the average unemployment benefit replacement rate (*arr*), the initial unemployment benefit replacement rate (*rr1*), the average duration of the unemployment benefit (*ubendur*), the unemployment rate (*urt1564*), the EPL (*epl*), the labor taxes (*labortax*), the tax wedge (*taxwedge*), the unions density (*undens*), the active labor market policies spending (*almp*) and the PMR (*pmr*)[4].

First, we estimate the data sample considering all the 14 countries. Then, we divide the countries in two groups considering the degree of the centralization of the bargaining measured by an index developed by the OECD (2006). The countries with an index equal or major than 3, value considered as the mean of the last three statistical surveys, are those with the centralized bargaining[5].

[3] The countries are: Australia, Austria, Belgium, Denmark, Finland, France, Germany, Great Britain, Italy, Japan, Netherland, Spain, Sweden and United States.

[44] In appendix all the variables used in the analysis are described in detail.

[5] The country referred to our sample with the centralized bargaining are: Austria, Belgium, Finland, Germany, Netherland, Spain and Sweden.

3. Methodology

The presence of slow changing - time invariant - variables, as institutional factors, the pooled OLS and fixed effects estimation methods turns out to be inefficient because they are not able to take into account the between variance, but only the within variance. Thus with these two estimators is impossible to estimate the slow changing variables as underling from Baltagi (2001).

Plumper and Troger (2004 and 2007) define as time invariant both the variables who are time invariant for definition and those that are time invariant for a certain period of time. Besides, slow changing variables have a very small within variance which a fixed effects estimator does not able to calculate with a sound degree of reliability.

To overcome these troubles during the estimate process in the presence of time invariant variables, like institutions, in literature is used FEVD estimator developed by Plumper and Troger (2004 and 2007) used among others by Amable et Al. (2007) and Amable (2008)[6]. This estimator was object of some critiques from Greene (2011) and Breush and Al. (2011). These authors assess that the FEVD is inconsistent and with a too small standard error. Plumper and Troger (2011) reply that this criticism is obsolete and could be valid only in the presence of an infinite sample. The two authors, also, confirm the 2004 and 2007 results: the FEVD is the most efficient and the less bias fixed effects estimator. In the last years, in many works the FEVD is applied as estimator[7]. This estimate method breaks down the fixed effects unit in two parts, one not explained and one explained by the time invariant variables.

This method consists in three passages: a fixed effects estimate, a regression on the unit effects of the slow changing variables and a fixed effects estimate including the error term of the regression.

Taking into account our sample the time invariant factors are those considered relied on the estimate variance considering each variable for each country, thus the within variance. All the variables with a within variance below 0.1 are considered time invariant. Watching table 1 the slow changing variables are: EPL, PMR, the union density and the tax wedge.

[6] In these works the FEVD is used because is the most efficient method in the presence of factors which represent institutions.

[7] See among others Kang W. and Ratti R. (2013) and Inoue et Al. (2014)

Table 1

time invariant variables

variable		mean	std. dev.	min	max	observations
Urt1564	overall	0.001	0.15	-0.29	1.09	N=280
	between		0.20	0.48	0.79	n=15
	within		0.15	-0.31	1.07	T=18.66
arr	overall	0.31	0.27	-0.15	3.36	N=280
	between		0.10	-0.01	0.40	n=15
	within		0.25	-0.52	3.98	T=18.66
rr1	overall	0.21	0.22	-0.16	3.36	N=280
	between		0.08	-0.015	0.30	n=15
	within		0.20	-0.43	3.07	T=18.66
ubendur	overall	0.01	0.37	-1.15	0.49	N=294
	between		0.35	-1.12	0.01	n=14
	within		0.16	-0.99	0.60	T=21
labourtax	overall	0.35	0.56	-0.89	9.02	N=263
	between		0.10	-0.01	0.42	n=15
	within		0.54	-1.22	8.63	T=17.53
pmr	overall	-0.04	0.05	-0.20	0.05	N=280
	between		0.01	-0.06	-0.03	n=15
	within		0.04	-0.19	-0.02	T=18.66
undens	overall	-0.01	0.35	-0.09	0.34	N=280
	between		0.02	-0.04	0.03	n=15
	within		0.03	-0.11	0.33	T=18.66
almp	overall	0.83	5.00	-1.00	68.31	N=241
	between		1.29	-0.99	4.67	n=15
	within		4.85	-4.84	64.96	T=6.06
epl	overall	-0.08	0.05	-0.39	0.33	N=280
	between		0.12	-0.03	0.02	n=15
	within		0.05	-0.38	0.30	T=18.66
taxwedge	overall	0.00	0.06	-0.21	0.43	N=280
	between		0.02	-0.02	0.08	n=15
	within		0.06	-0.22	0.41	T=18.66

4. Results

In table 2 are shown the results of the estimate make using the FEVD method described in the section before. The first column of the table represents the results obtained considering all the 14 countries, while in the others columns are displayed the results of the estimate of the countries with centralized bargaining and decentralized bargaining. In evaluating the effect of the independent variables on the dependent variable, the *wage gap*, it is important to take into account that a variable with a positive coefficient spreads the *wage gap*, while a negative coefficient reduces it.

Referring to the first column of table 2 the three variables, which represent the passive labor market - *arr*, *rr1* and *ubendur* - are significant. The first one has a positive coefficient, indeed, an high *arr* means that the *wage gap* rises. It is possible that high unemployment benefits, as a form of an alternative income, could push the wages to rise and as consequence, the *wage gap* goes up. Instead, *rr1* and *ubendur* have negative sign: a higher level of the unemployment benefit during the first year or a major lasting of the benefit decrease the *wage gap* because the workers they feel more protect and then they could accept lower wages.

It is possible to watch from table 2 that *almp* is significant with a negative coefficient. Thus, a higher value of this variable affects more the wages than the productivity rate. The variables, which represent the taxation - *labortax* and *taxwedge* - turn out to be significant with negative coefficient. *Undens* is significant with a positive sign: thus bigger unions, in terms of membership, could bargain higher wages and as consequence it is possible a raise in the *wage gap*.

In the countries with a centralized bargaining structure, table 2 column 2, the passive labor policies are no more significant. Instead, the union density - with a positive coefficient- the active labor market policies and the taxes on the incomes' labor - both with a negative coefficient - are significant.

In the countries with a decentralized bargaining structure, table 2 column 3, the passive policies are significant, with the same signs of column 1, but *undens* and *almp* are no more significant.

Table 2

Panel fixed effects regression with vector decomposition

dependent variable:

wage gap

	All countries	**Countries with centralized Bargaining**	**Countries with decentralized Bargaining**
ur1564	0.38	0.84	-0.87
	(0.50)	(0.78)	(-0.57)
arr	21.29 *	979.50	26.34 ***
	(1.94)	(0.25)	(2.58)
rr1	- 21.63 **	-969.34	-26.59 **
	(- 1.98)	(-0.25)	(-2.61)
ubendur	-24.93 *	-977.43	-30.93 **
	(- 1.91)	(-0.25)	(-2.54)
epl	0.21	2.71	- 0.27
	(0.09)	(0.70)	(-0.09)
pmr	1.77	4.51	-0.05
	(0.74)	(1.10)	(-0.02)
undens	10.56 ***	10.64 ***	7.89
	(2.97)	(2..22)	(1.09)
almp	-.075 ***	-0.01 ***	-0.02
	(-3.19)	(- 3.06)	(-0.44)
labortax	- 0.33 *	- 0.37 ***	0.35
	(- 1.72)	(- 1.71)	(-0.09)
taxwedge	-5.37 **	-3.54	-6.19 **
	(-2.36)	(-0.65)	(-2.42)
eta	1.00	1.00	1.00
constant	0.13	0.46	-0.14
	(0.61)	(1.60)	(-0.54)
Number of observations	230	116	118
R-squared	0.22	0.31	0.16

Absolute value of t statistics in brackets.

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively

5. Conclusions

This paper has the goal to analyze what are the institutional factors that affect the difference between the growth rate of real wages and the growth rate of the productivity (*wage gap*). The results obtained from the empirical analysis display that, considering all the 14 OECD countries, the *wage gap* is affected by active and passive labor market policies and not by institutions which regulate the product and labor market like the EPL and the PMR.

Thus, a higher unemployment benefits and huge active market policies reduce the difference between wages and productivity, while a high union density brings to a rise of the *wage gap*. The results of the estimate change dividing the countries in two groups considering the degree of the centralization of the bargaining : the passive policies does not affect the dependent variable while the bargaining process is centralized, instead in case of decentralized bargaining the unemployment benefit and its lasting affects the *wage gap*.

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Appendix A: The independent variables

unemployment rate (*urt1564*): it is considered as the numbers of unemployed workers as share of the labor force (working-age population), in %. Aggregate rates referred to the 15-64 age group.

Average unemployment benefit replacement rate (*arr):* it is average unemployment benefit replacement rate across two income situations (100% and 67% of APW earnings), three family situations (single, with dependent spouse, with spouse in work) and three different unemployment lasting (1st year, 2nd and 3rd years, and 4th and 5th years of unemployment).

Initial (first year) unemployment benefit replacement rate (*rr1*): it is calculated as the average unemployment benefit replacement rate during the first year of unemployment across two income situations (100% and 67% of APW earnings) and three family situations (single, with dependent spouse, with spouse in work).

unemployment benefit lasting (*ubendur*): it is the ratio of average to initial unemployment benefit replacement rate.

tax wedge (*taxwedge*)***:*** it is the tax wedge between the labor cost to the employer and the corresponding net take-home pay of the employee for a single-earner couple with two children earning 100% of APW earnings. The tax wedge expresses the sum of personal income tax and all social security contributions as a percentage of total labor cost.

labor tax wedge following the national accounts (*labortax*): it is the tax wedge calculated following the national accounts principles. Indeed, they are considered all the direct taxes but not the social benefits.

union density (*undens*)***:*** considered as trade union density rate, *i.e.* the share of workers affiliated to a trade union, in %.

public expenditures on active labor market policies (*almp*): they are the public expenditures on active labor market plans per unemployed worker as a share of GDP per capita, in %. The five main categories use in the disaggregated analysis are defined as follows: 1.) public employment services (PES) and administration: placement, counseling and vocational guidance, job-search courses, assistance with displacement costs, administration of unemployment benefits, all other administration costs of labor market agencies including running labor market plans.

2. labor market training: training for unemployed adults and those at risk, training for employed adults (special training plans for youth and disabled are excluded). 3. Youth measures: special plans concerning measures for unemployed and disadvantaged youth, support of apprenticeship and related forms of general youth training. 4. Subsidized employment: targeted measures to promote or provide employment for the unemployed and other priority groups (but not youth and the disabled). 5. Measures for the disabled: special plans about rehabilitation and project to insert work for the disabled.

employment protection index (*epl*): it is an OECD index and it is able to measure the degree of employment protection. The index is built taking into account: a) the employment protection against

the dismiss in particular a1) the difficulty in individual layoffs a2) the bureaucratic barrier that firms have to deal with in case of a worker's lay off a3) the measures to adopt about the advance notice.
b) the difficulty in collective layoffs and c) the norms about temporaries works.

Product market regulation (*pmr*): It is and index that measures the degree of rigidity of product market. The PMR is an institutional variable, which assumes, following the OECD, a value from 0 - which corresponds to a market with a low level of regulation - to 6 - which corresponds to a market with a high level of regulation. The index is calculated referred to seven sectors: gas, electricity, telecommunication, post, air transport, railway transport, and freight transport. The PMR during the years has been updated many times. Now it is based on 18 indicators, which consider: entry barriers, if the networks are privates or publics, the integral vertical processes, the prices control prices, the duties customs, the bureaucratic barriers for the start-up and for the firms , the presence of the public administration in the governance of firms in strategic sectors - like telecommunications - and the presence of the states as stockholder in firms which operate in the business sector.