

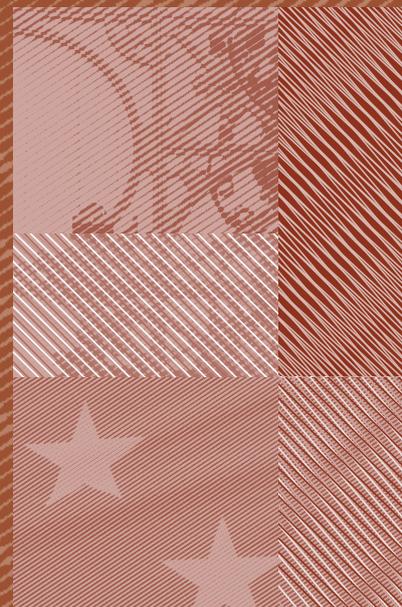
**THE FISCAL AND MACROECONOMIC
EFFECTS OF GOVERNMENT WAGES
AND EMPLOYMENT REFORM**

2016

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Abstract

This paper examines the overall macroeconomic impact arising from reform in government wages and employment, at times of fiscal consolidation. Reform of these two components of the government wage bill appeared necessary for containing the deterioration of the public finances in several EU countries, as a consequence of the financial crisis. Such reforms entailed in some instances, but not always, the implementation of cost cutting measures affecting the government wage bill, as part of broader consolidation packages that typically hinged more heavily on other fiscal instruments, like public investment. While such measures have adverse short-term macroeconomic effects, public wage bill restraining policy changes present the idiosyncrasy that they can yield medium- to longer-term benefits due to possible competitiveness and efficiency gains through their impact on labour market dynamics. This paper provides some evidence of such medium- to long-run effects, based on a wealth of micro and macro data in the euro area and the EU. It concludes that appropriately designed government wage bill moderation could indeed produce positive dividends to the economy, which depend on certain country-specific conditions. These gains can be reinforced by relevant fiscal-structural reforms.

Keywords: public employment, public wages, labour market, fiscal policies, fiscal consolidation.

JEL classification: H50, E62, J45.

Resumen

Este artículo examina el impacto macroeconómico de la implementación de reformas en el ámbito de los salarios y el empleo público, en particular en momentos de consolidación fiscal. La reforma de la masa salarial de las Administraciones Públicas (AAPP) ha formado parte de las estrategias de respuesta a las consecuencias de la crisis de deuda soberana en numerosos países de la Unión Europea. Dichas reformas implicaron, en algunos casos, la introducción de medidas de ahorro, como parte de paquetes de ajuste fiscal que habitualmente han pesado más sobre el uso de otros instrumentos presupuestarios, en particular, la inversión pública.

En general, las medidas de ajuste fiscal, de acuerdo con los modelos y estimaciones de multiplicadores fiscales disponibles, habrían tenido efectos adversos sobre el crecimiento económico en el corto plazo. No obstante, en el caso concreto de las orientadas a contener la masa salarial de las AAPP, dado que su impacto incide de manera directa en la dinámica del mercado de trabajo, parte de estos efectos de corto plazo se podrían compensar, de acuerdo con la evidencia disponible, a través de las potenciales ganancias de competitividad y eficiencia que pudieran producirse. En este artículo se proporciona evidencia de estos efectos de medio y largo plazo, sobre la base de información macro y microeconómica para el área del euro y la Unión Europea en su conjunto. Se concluye que, para que estos efectos mitigadores aparezcan, las políticas de reforma de la masa salarial de las AAPP deben diseñarse con una orientación de medio plazo (reformas estructurales). Asimismo, se discute el modo en que dichos efectos dependen de circunstancias idiosincrásicas de los países (tales como el marco institucional).

Palabras clave: empleo público, salarios públicos, mercado de trabajo, política fiscal, consolidación fiscal.

Códigos JEL: H50, E62, J45.

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Non technical summary

The government wage bill can be broken down into two elements: government employment and compensation per government employee (wages). In the euro area, the government wage bill accounts for almost a quarter of total government expenditure and around 10% of GDP, hence its relevance from a macroeconomic standpoint. Restraint of the government wage bill played a role in the recent fiscal consolidation episode, with actions on this front being part of broader policy packages that typically hinged more heavily on other fiscal instruments, like public investment. These policy measures have to be assessed against the significant episode of stress that affected the public budgets of a number of EU countries during the sovereign crisis period.

Changes to the government wage bill need to be assessed in comparison with developments in the private sector. Regarding wages, the growth per government employee was higher compared to the private sector in the initial phase of the crisis (2007-2010), as the latter was hit more immediately by the economic recession. The cumulative excess was then mostly reversed over 2010-2014 by public wage containment policies, including wage freezes, but also nominal reductions in salaries and benefits in some cases. There was substantial heterogeneity across EU countries in the evolution of public wages and employment.

The recent cost-cutting public wage bill measures were mainly driven by fiscal consolidation requirements. It has been argued that these adjustments may have entailed costs in terms of output losses and higher unemployment. However, such adverse macroeconomic effects are largely felt, if anything, in the short run.

Notwithstanding the direct adverse short term macroeconomic effects, there are benefits from government wage bill reform that go beyond the objective of fiscal consolidation. Under certain macroeconomic and institutional conditions, a rationalisation of government wages and employment policies can generate favourable labour market effects in the medium to longer term through competitiveness and efficiency gains. Competitiveness gains materialise through the spillovers effects of public wage moderation on the determination of private sector wages. There is scope for public wage adjustments in the case of positive differentials compared to private wages, which go beyond what could be explained by differences in workers' characteristics, such as the level of education. Efficiency gains from public employment reform arise when public sector activity partially competes with the private sector (in the production of individual, non-collective public goods, like in the education or health sectors). A decrease in public hours worked to produce substitutable products can lead to the private sector crowding out public jobs. Nevertheless, when public sector activity complements private sector productivity (through the provision of collective goods, like the judicial system), such policies would only affect positively private employment if targetted to increasing the efficient provision of such public goods.

An important aspect of the debate on public wage bill restraint concerns how long such policies can be sustained over time. In countries where fiscal consolidation needs are still high,

recent government wage bill savings would need to be preserved. Additional margins of short-term adjustment include the moderation of still high public-to-private wages gaps, or a possible continuation of the downsizing trend in public employment, depending on the country specific situation. In any case, as regards restraint of real public wages, historical experience shows that catching-up processes in good economic times tend to partially or completely offset crisis related budgetary savings. As regards falls in public employment, a significant portion of the savings observed during the consolidation period hinged on workers with temporary contracts. Thus, the employment adjustment was more of a cyclical-like reaction than a permanent reduction, a fact which is emphasised in this paper.

Finally, the paper argues that reforms affecting public sector personnel are most effective and have more sustained effects when the measures implemented are of a structural nature, beyond those aimed at immediate public deficit reduction, such as the ones resulting from broad-based ongoing public spending reviews in several EU countries. Structural measures impinge on government efficiency and thus on overall economy productivity. Some examples are human management/pay reforms, improvements in wage bargaining mechanisms within the government sector, or measures to streamline the size and scope of government.

1 Introduction

Government wages and employment are the two components of the so called “government wage bill”, which accounts for almost a quarter of total public spending in the EU. Public wage expenditure also plays an important role in aggregate demand, as the government wage bill accounts for around 10% of GDP¹. These figures reflect the importance of the government as an employer: around 20% of the labour force in the EU is employed in the government sector. Thus, the public wage bill is an important consolidation instrument when fiscal rebalancing is needed. In fact, empirical evidence shows that reductions in the public wage bill are robustly associated with the success of fiscal consolidation episodes. Over the recent period of fiscal retrenchment (2010-2014) the adjustment of the euro area aggregate government wage bill accounted for 10% of the improvement in the structural general government balance-to-GDP ratio. In any case, there was a large cross country heterogeneity of policy responses regarding government wage bill reductions. Moreover, many governments opted for consolidating strongly through other fiscal instruments, with a particular recourse to cuts in public investment.

It is widely acknowledged in the literature that fiscal adjustment tends to generate direct adverse short-term economic impacts. In the particular case of the public sector wage bill, though, these tend to be milder compared to other fiscal instruments². This is so because the short-term negative impact is mitigated by indirect favourable labour market effects in the medium-term. Public wage moderation impinges on the overall cost-competitiveness of the economy through linkages with private sector wage setting³, in particular when positive public private wage gaps⁴ are reduced. Moreover, targeted adjustment of public employment may spur private employment⁵.

Sustained containment of the public wage bill is more likely to be achieved and maintained by countries that adopt a wide range of structural reforms beyond measures aimed at immediate public deficit reduction⁶. Structural measures impinge on government efficiency and thus on overall economy productivity. Some examples are human management/pay reforms, improvements in wage bargaining mechanisms within the government sector, or measures to streamline the size and scope of government. However, a careful analysis of public sector performance and efficiency is warranted since some empirical evidence shows that public spending on health and education positively impact economic growth⁷.

1 On data sources and definitions see Appendix I. The cut off date for information included in this paper was October 2015.

2 See for instance Alesina et al. (2002) and Hernández de Cos and Moral Benito (2016).

3 See for instance Alesina et al. (2002), Afonso and Gomes (2008), Lamo, Pérez and Schuknecht (2012), Marzinotto and Turrini (2016) or Holm Hadulla, et al. (2010).

4 See, among others, Campos et al. (2015).

5 See for example Stepanyan and Leigh (2015), Algan et al. (2002), Lamo, Moral Benito and Pérez (2016).

6 See for instance IMF (2015) and Forni and Novta (2015)

7 Afonso and González Alegre (2011). It must be noted that around two thirds of government wage spending in the euro area takes place in these two areas of government.

This paper reviews and provides evidence on these interrelated issues. The main contribution is the comprehensive set of micro and macro data used to support the analyses (see appendixes I, II and III).

Section 2 provides stylised facts on the role public wages and employment policies played during the most recent consolidation period in the euro area and the EU. It also discusses the supporting role of fiscal-structural policies when governments adopt consolidation measures through their wage bill. Section 3 analyses the possible channels of transmission of government wage bill policies into the economy. Section 4 sets out conclusions and provides key policy messages.

2 The role of the government wage bill in the recent fiscal consolidation episode

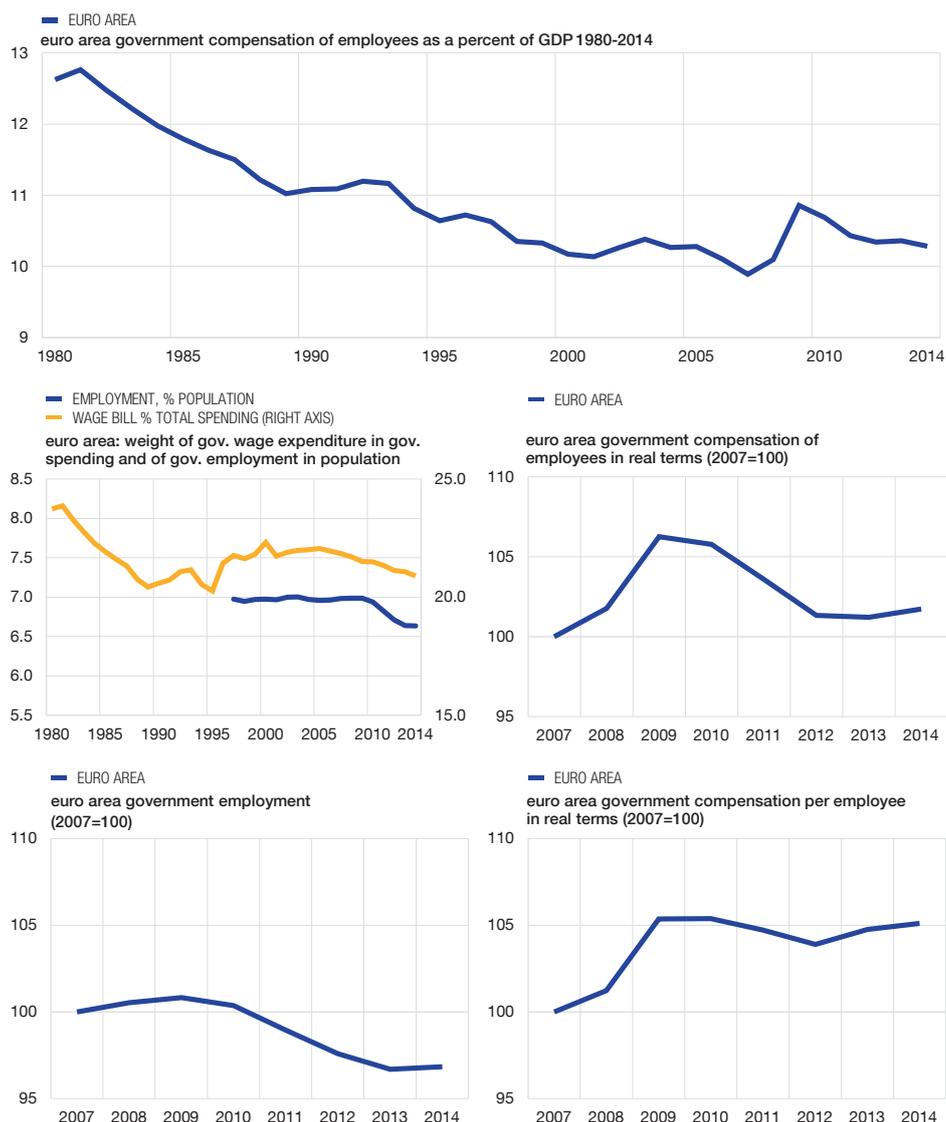
This section describes the recent developments of the public wage bill from an aggregate perspective. This includes comparisons with medium term trends (since the early 1980s), with private sector developments, and with alternative fiscal consolidation instruments. Section 2.1 focuses on the euro area as a whole, given the availability of historical aggregates. Section 2.2 turns to individual country data, as the evolution of public wages and employment shows a significant heterogeneity across countries.

2.1 Euro area aggregate trends

Until the beginning of the crisis (Chart 1), the aggregate euro area public wage bill as a fraction of GDP had been on a declining trend since the early 1980s. This trend had closed the historical gap with the US ratio by the beginning of the 2000s. The declining trend was only halted with the onset of the crisis, not only because of the fall in GDP (the denominator) but also because of positive year on year real growth rates of government wage bill spending up until 2010. The latter is to a large extent due to the generalised implementation of fiscal stimulus plans in the EU at the beginning of the crisis, under the umbrella of the so called European Economic Recovery Plan (see Bouthevillain et al., 2009). In fact, fiscal austerity plans started to affect the government sector wage bill from an aggregate point of view only as of 2010.

Between 2010 and 2014, there was a partial correction of the increase in the initial phase of the crisis. In particular, euro area aggregate government wage expenditure fell in 2010 2012 in real terms and, as a consequence, the cumulative real increase between 2007 and 2014 was contained to slightly below 2%. In turn, as a percent of total public spending, government wage expenditure continued on the pre crisis declining trend, while public employment fell as a percentage of the population after remaining broadly stable during the previous decade. From an aggregate perspective, the change in 2010 in government wage bill dynamics was mainly due to the decline in public employment. While over 2007 2010 real public wages per employee and public employment grew by 5.3% and 0.4%, respectively, between 2010 and 2014 employment fell and public wages were kept broadly constant in real terms. Thus, overall, between 2007 and 2014 public employment dropped by 3.2%, while public wages increased by more than 5% in real terms.

Compared to the private sector, euro area aggregate public wage dynamics over 2007 2014 were more expansionary while public employment losses were larger in percentage terms (Chart 2). Indeed, between 2007 and 2014 the wage bill in both the public and private sectors evolved in a broadly similar way, in cumulative terms, but the evolution of its two components –employment and wages– was quite different. Real wages grew more strongly in the public than in the private sector until 2010 (5.3% vs. 2.4%, in cumulative terms). However, since 2010 real public wages recorded a slight loss of below 0.5% compared to an increase of some 2% in the private sector. Overall, aggregate data show that the euro area government wage differential with respect to the private sector increased from 20% in 2007 to 25% in 2009, and subsequently fell

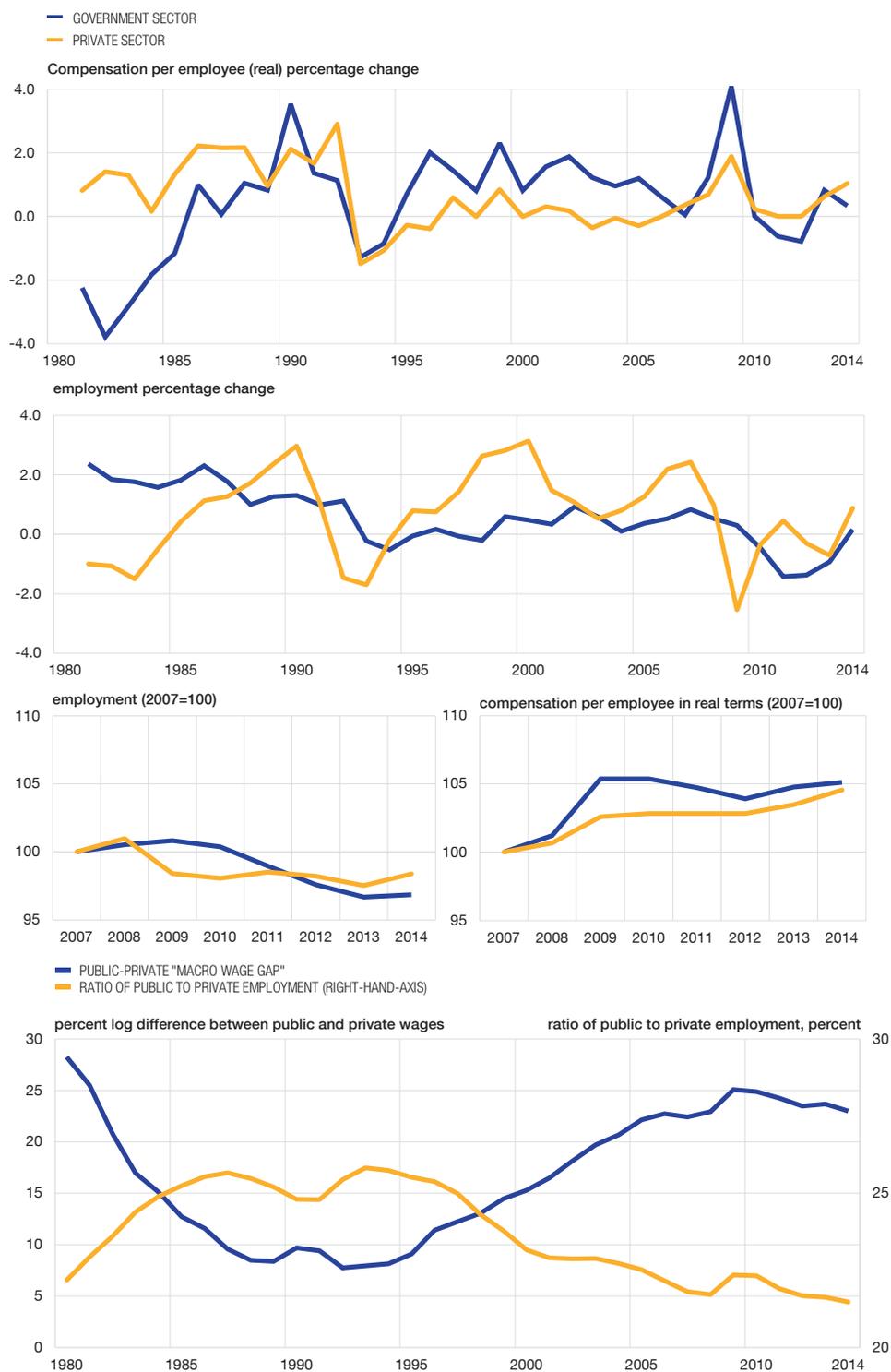


SOURCES: Authors' calculations based on data from the national accounts and national sources (ESCB national central banks databases), and ECB's AWM database.

NOTE: The private consumption deflator is used to deflate nominal compensation of government employees. Total public spending.

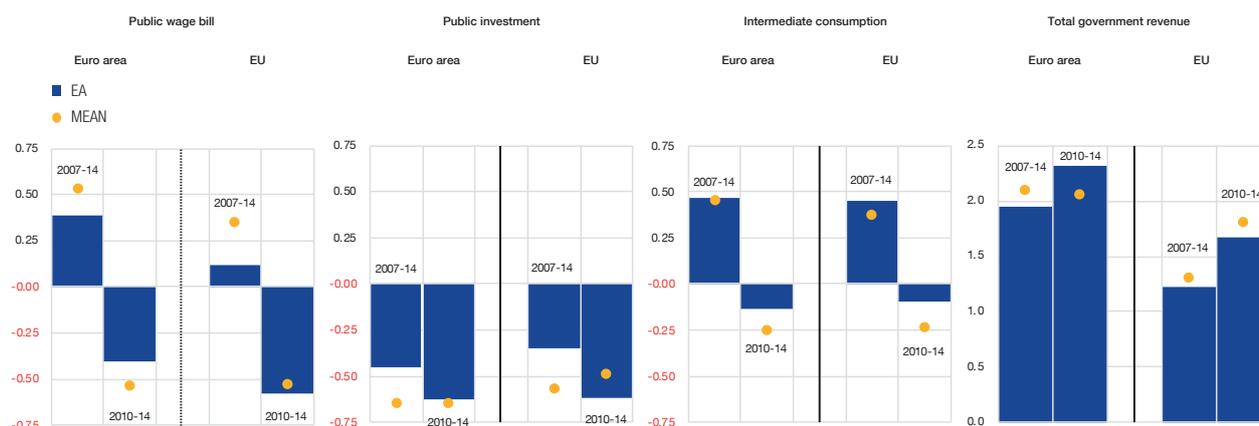
to 23% in 2014 owing to fiscal consolidation measures (Chart 2, lower panel). From a medium term perspective, these measures halted the upward trend in relative public-to-private wages witnessed since the beginning of the 1990s (when the gap was smallest, at just over 5%).

As regards employment, total cumulated losses were higher in the public sector over 2007-2014, due to the adjustment in the second part of the period. In historical terms, this was the most significant reduction of government employment in the last three decades. The reduction since the 2009 peak level of public employment was 3.5%, while in the previous episode that took place between 1992 and 1998, coinciding with the run up to the EMU period, it amounted to less than 1%. In fact, from an aggregate euro area perspective, the level of



SOURCES: Authors' calculations based on data from the national accounts and national sources (ESCB national central banks databases), and ECB's AWM database.

NOTE: The private consumption deflator is used to deflate nominal compensation of employees.



SOURCES: Authors' calculations based on the data from the national accounts and national sources (ESCB national central banks databases).

government employment has remained almost constant at about 22 million persons since the beginning of the 1990s up to 2014, while private sector employment grew in the same period by some 20%. This explains the significant fall in the share of public employment vis-à-vis private employment in the last two decades (Chart 2, lower panel).

Compared to other fiscal instruments, the containment of the public wage bill played a subdued role in the period of fiscal retrenchment (2010-2014) from a euro area and EU point of view (Chart 3). Nevertheless, there was large cross-country heterogeneity in the implemented public employment and wage policies, as analysed in Section 2.2 below. The adjustment of the euro area aggregate government wage bill accounted for 10% of the improvement in the structural general government budget balance-to-GDP ratio between 2010 and 2014 (15% for the EU as a whole). This share contrasts in particular with the role played by public investment (which represents a smaller part of overall expenditure)⁸, which accounted for almost 20% of the fiscal correction, and also with the contribution of the remaining expenditure (excluding social payments), mainly other capital expenditure and subsidies.

2.2 Cross country heterogeneity in the evolution of the public wage bill

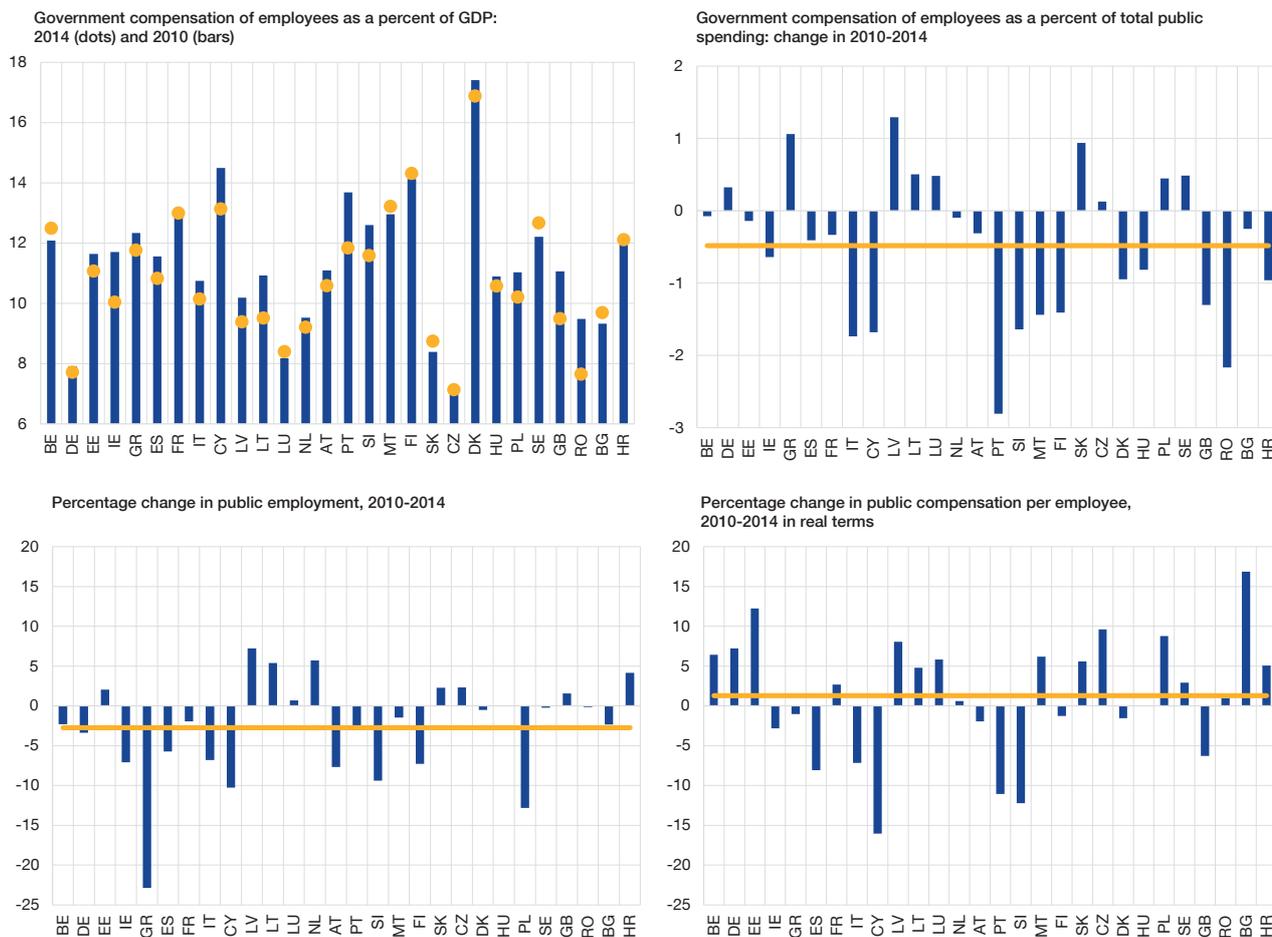
The evolution of the public sector wage bill exhibited substantial cross country heterogeneity during the crisis (Chart 4). While a majority of countries reduced their public wage bill as a fraction of GDP between 2010 and 2014 (21 out of 28 EU countries), with an average adjustment of 0.8 percentage points (p.p.) of GDP, the dispersion across countries was significant, ranging from a fall of 1.8% of GDP (Portugal) to -0.01% (France). For the group of countries in which this ratio increased, the average was, in any case, moderate (+0.32 p.p.). Notwithstanding the restraining policy, general government compensation of employees grew faster than nominal GDP over the whole 2007-2014 crisis period (i.e. there was an increase in the ratio to nominal GDP, despite the 2010-2014 adjustment).

⁸ For the entire 2007-2014 period, only 5 out of 28 EU countries registered a lower increase or a higher decrease in their ratio to GDP of government compensation to employees compared to the public investment to GDP ratio

CROSS-COUNTRY HETEROGENEITY IN THE EVOLUTION OF THE PUBLIC WAGE BILL DURING THE RECENT FISCAL CONSOLIDATION EPISODE

CHART 4

(y-axis: government compensation of employees as a percent of GDP: 2014 (dots) and 2010; government compensation of employees as a percent of total public spending: change over 2010-2014; percentage change in public employment, 2010-2014; percentage change in public compensation per employee, 2010-2014, in real terms)



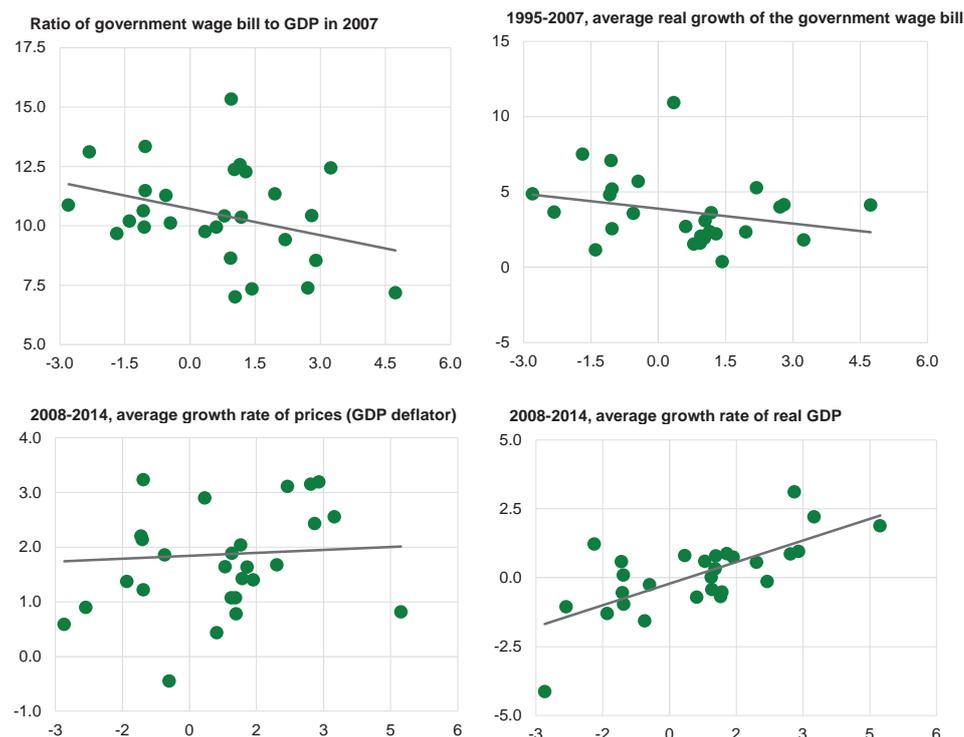
SOURCES: Authors' calculations based on data from the National Accounts and national central banks (ESCB) databases.

NOTE: The private consumption deflator has been used to compute government compensation per employee in real terms. In the case of Bulgaria, the change of compensation per employee is partially driven by the increase in 2013 of social security contributions by 20 p.p. In the case of Slovenia, the increase in the number of public employees is distorted by the reclassification of units in the general government sector after 2010. No data on public employment for the most recent years is available for Hungary; thus the zero figures shown in the two lower panels for this country are explained by the lack of available data. Horizontal lines are averages over all EU countries.

At the same time, though, the public sector wage bill fell as a proportion of total government expenditure during the crisis (2007-2014) in most EU countries (22 out of 28). This is broadly due to spending on social transfers (as a consequence of the acute impact of the crisis on employment) and interest expenditure (as a consequence of the sovereign debt crisis) exhibiting less restraint than the public wage bill. Within the wage bill, the variability of public employment and wages across countries was also substantial (Chart 4).

Despite the heterogeneity observed, some approximate common features of the fiscal adjustment effort can be highlighted (Chart 5). First, there is to some extent an association between the amount of adjustment implemented during the 2008-2014 period and the pre-crisis level of the public wage bill, measured either by its size in 2007 or by its medium-term pre-crisis dynamics (the top two panels in Chart 5). Second, countries that registered lower inflation rates were the

(x-axis: 2008-2014, average real growth of the government wage bill)

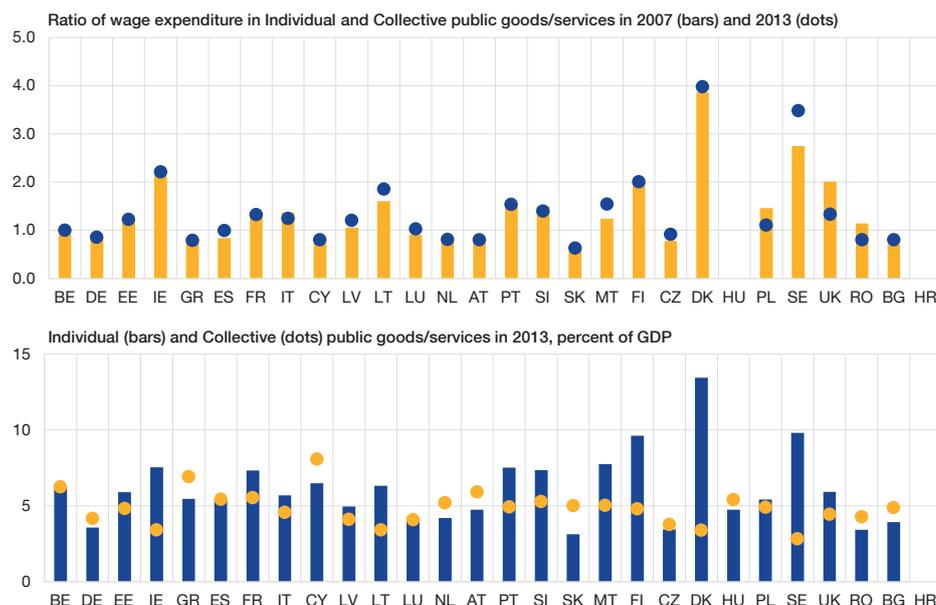


SOURCES: Authors' calculations on the basis of national accounts and national central banks' databases.

ones that reduced their public wage bills more in real terms. Third, lower real GDP growth rates were associated with higher real reductions in public wage spending.

As regards the type of public goods/services, the wage bill adjustment was evenly implemented between individual and collective ones, as between 2007 and 2013, the ratio between government wage expenditure in individual and collective goods/services remained broadly constant for most countries (Chart 6). Individual goods/services produced by general government are goods that can also be provided privately (according to international experiences), such as health, education and other services, while collective goods/services are typically provided in a quasi monopoly-fashion, and include defence, public order, the judiciary and regulation. The latter class complements private sector production. The former, however, can substitute private sector activity. Thus, the ratio of public wage expenditure in individual goods/services to public wage expenditure in collective good/services is an indicator of the degree of substitution of private activity by public activity⁹. According to the evidence shown in Chart 6, then, the crisis did not significantly impinged on the existing cross country heterogeneity regarding the production of different types of public goods/services.

⁹ For one approximation to measure the elasticity of substitution between public and private employment, see Fernández de Córdoba, Pérez and Torres (2012a).



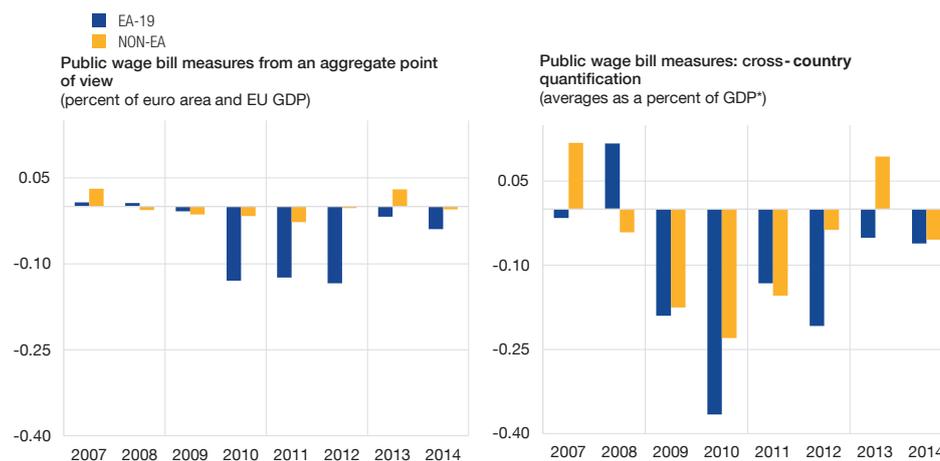
SOURCE: Authors' calculations based on COFOG General Government National Accounts data (Eurostat).
NOTE: 2012 for Germany, Ireland, Greece, France, Cyprus, Latvia, Lithuania, the Netherlands, Austria, Slovenia, Slovakia, Denmark, the UK, Romania, Bulgaria, and Malta.

2.3 The heterogeneity of policy responses

Measures aimed at containing governments' running costs (operational expenditure) were frequently used among EU countries in the 2007-2014 period, mainly from 2010 onwards. Government wage bill cost containment measures have been more frequent on the wage side, given the special status that (some) public sector employees enjoy as regards job security and redundancy (see Appendix III). The most common government wage measures were wage freezes and wage cuts, in some instances. A number of EU governments have implemented policies aimed at reducing staff numbers, particularly those with more strained public finances. The most common measures include new vacancy freezes and limitations on the replacement rate of retired workers.

Overall, public wage bill measures at the euro area aggregate level were limited, amounting to some 0.15% of euro area GDP per year during the 2010-2012 period, while they were negligible from an euro area aggregate perspective (Chart 7). Nevertheless, when accounting for individual country heterogeneity, the picture changes. The average amount of restraining measures implemented by the governments of the countries that actually adopted consolidation policies is much larger than the EU average number. These countries mainly included those under a financial assistance programme (Ireland, Greece, Portugal and Cyprus), Spain, Italy, and Latvia.

Policy measures also targeted the number of hours worked per government employee in some countries, which created room for additional staff adjustments. The impact of these measures can be analysed by using micro data. According to EU SILC data (see Appendix I for



SOURCE: Authors' calculations based on a questionnaire prepared in consultation with fiscal experts of the European System of Central Banks. See Appendix III.
 * Only countries in which measures were implemented.

a description of this data source), hours worked in a typical week by employees in government-related activities increased during the recent fiscal consolidation period for the euro area as a whole and in particular in countries subject to greater fiscal stress (Table 1 and Chart 8). In particular, for the euro area pool the mean weekly number of hours worked by government employees (NACE proxy OPQ) increased from 34.9 in 2007 to 35.6 in 2012 (the median being 36 to 38), while it rose from 35.2 to 35.9 in countries subject to fiscal stress during the crisis, namely Greece Cyprus, Spain, Ireland, Portugal, Greece and Italy (the median being 36 to 37). In the latter group of countries, the mean number of hours worked per week in the private sector, on the contrary, decreased. Increases in hours per extant employee may have created some room for staff reductions, mainly of public employees with temporary contracts. In addition, increases in hours worked were implemented without an accompanying wage compensation. Thus, government wages per hour are not as inflexible as commonly believed when compared with the private sector¹⁰.

¹⁰ In this regard see Kopelman and Rosen (2016).

DISTRIBUTION OF HOURS WORKED PER WEEK IN THE PUBLIC AND PRIVATE SECTORS

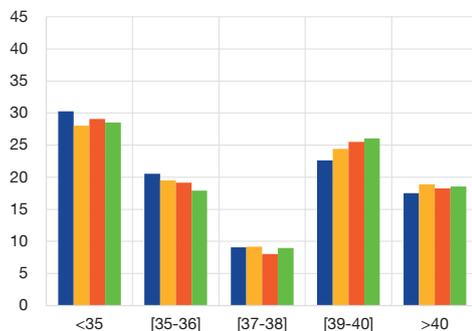
CHART 8

(percentages of workers in each interval of hours)

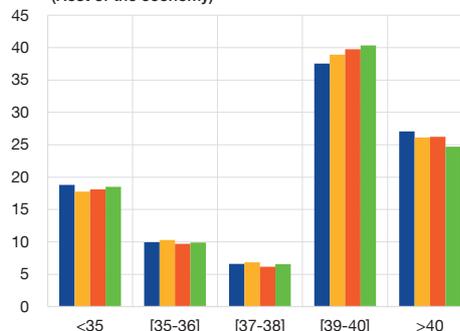
■ 2007 ■ 2011
■ 2009 ■ 2012

Panel A. Pool of euro area countries

Hours worked per week in the "public sector"
(NACE proxy to the government sector)

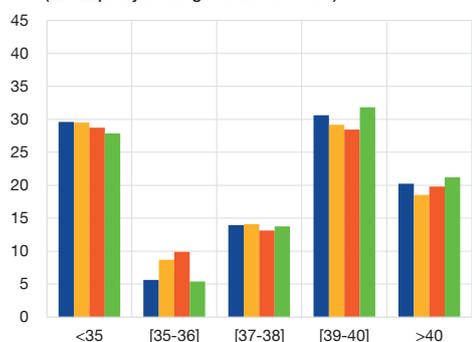


Hours worked per week in the "private sector"
(Rest of the economy)

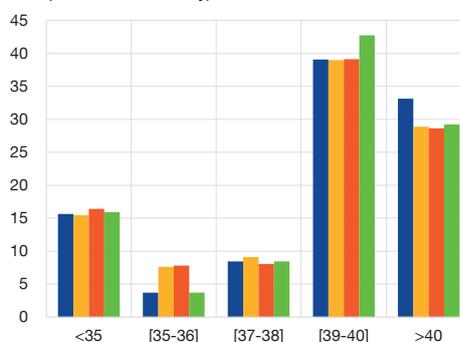


Panel B. Pool of the non-euro area EU countries

Hours worked per week in the "public sector"
(NACE proxy to the government sector)

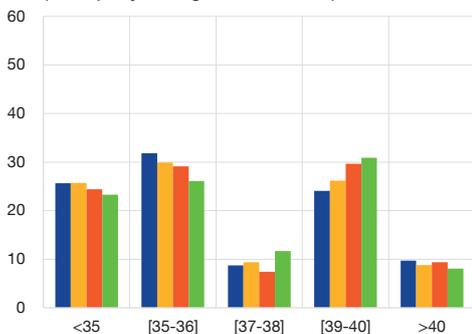


Hours worked per week in the "private sector"
(Rest of the economy)

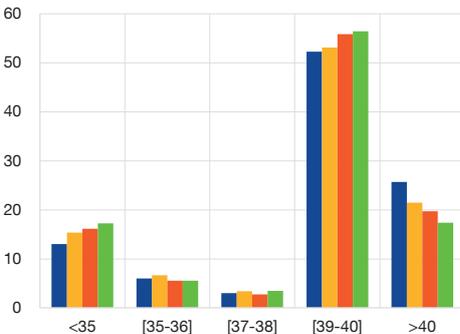


Panel C. Euro area countries under fiscal stress (pool of Cyprus, Spain, Ireland, Portugal, Greece and Italy)

Hours worked per week in the "public sector"
(NACE proxy to the government sector)



Hours worked per week in the "private sector"
(Rest of the economy)



SOURCE: Authors' calculations on the basis of EU-SILC (Eurostat)

NOTE: Hours correspond to the number of hours usually worked per week in main job.

	Mean			Median		Variance	
	2007	2012	Diff	2007	2012	2007	2012
Hours worked per week (EU-SILC survey)							
Euro Area							
NACE OPQ proxy to the government sector	34.9	35.6	***	36.0	38.0	106.5	93.3
Rest of the economy ("private sector")	38.0	38.1		40.0	40.0	118.7	97.3
Public Administration (NACE O)	37.4	38.0	***	38.0	39.0	75.8	60.4
Rest of European Union							
NACE OPQ proxy to the government sector	35.8	36.7	***	39.0	40.0	117.0	112.3
Rest of the economy ("private sector")	39.6	39.5		40.0	40.0	111.8	107.8
Public Administration (NACE O)	38.7	39.3	*	40.0	40.0	71.8	68.9
Euro area countries under fiscal stress							
NACE OPQ proxy to the government sector	35.2	35.9	***	36.0	37.0	71.4	55.1
Rest of the economy ("private sector")	39.9	38.4	***	40.0	40.0	78.9	75.1
Public Administration (NACE O)	37.2	37.9	***	37.0	38.0	47.3	34.8

SOURCE: Source: Authors' calculations based on EU-SILC (Eurostat).

NOTE: Hours correspond to the number of hours usually worked per week in main job. In the column "Diff" we show the probability of rejecting the null hypothesis of a Wald test of equality of means in 2007 and 2012: *** denotes a p-value lower than 1%, ** a p-value lower than 5%, and * a p-value lower than 10%, while a blank means that the null hypothesis cannot be rejected.

2.4 The wage bill adjustment: temporary or permanent?

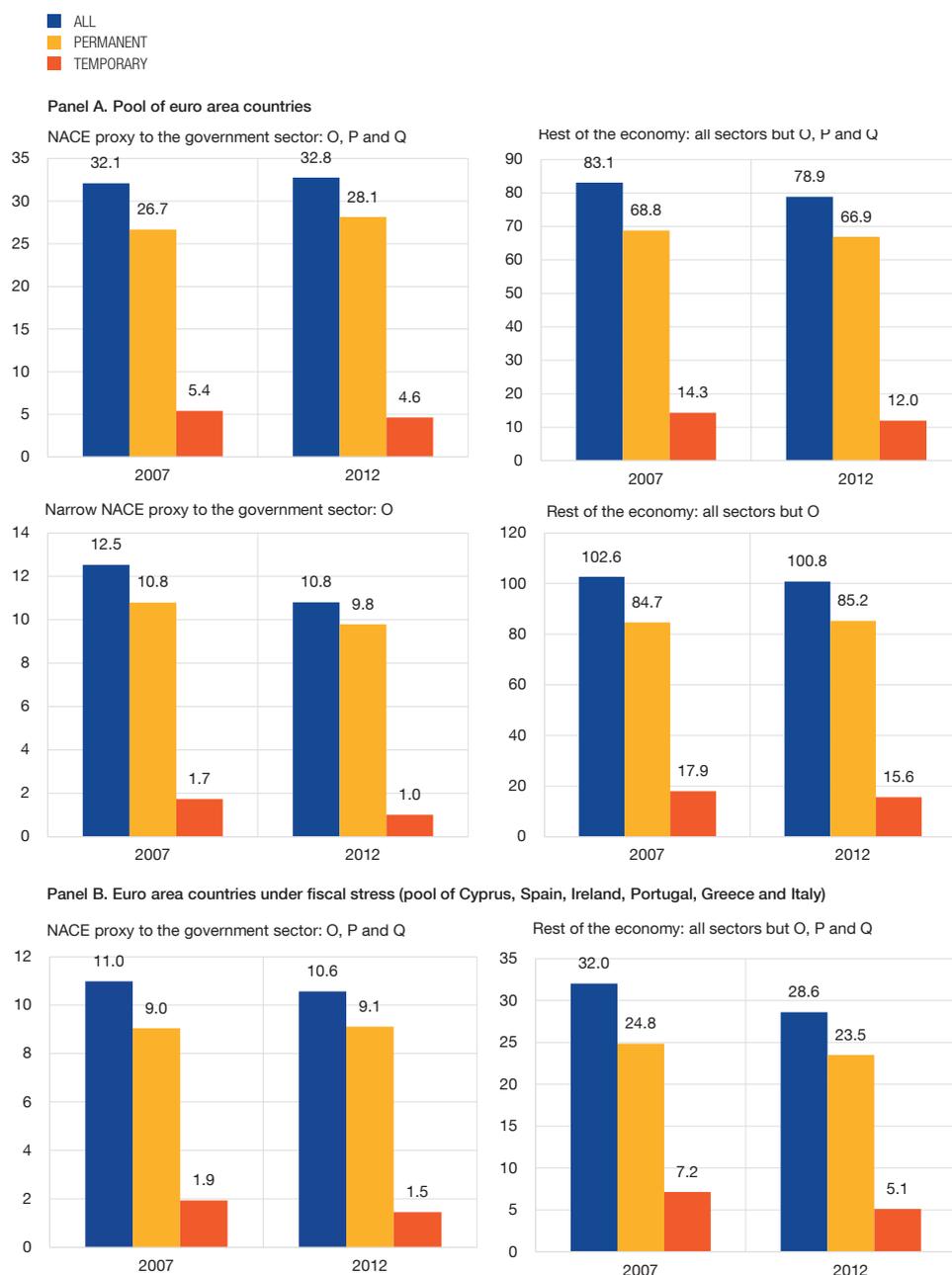
Recent public employment and wage policies have been part of a response to the perceived fiscal sustainability risks that increased with the crisis. In adverse cyclical conditions the government budget constraint tightens, and as a consequence different fiscal instruments have to be adjusted. When cyclical conditions become normalised, the need for fiscal adjustment loosens and even a reversal to pre crisis conditions might be expected. Indeed, the historical experience with policies aimed at containing public wage growth shows that they might not end up being of a structural, permanent nature. On the contrary, catching up processes in good economic times tend to counteract the initial government wage bill reduction, either partly or completely.

The most recent experience shows that a significant portion of the public employment adjustment hinged on government workers with temporary contracts. Some insights can be drawn in this regard from EU SILC data, available for the period up to 2012. According to the broader NACE proxy to government employment (OPQ) (Chart 9), the adjustment of employment in government related activities between 2007 and 2012 depended to a significant extent in net terms on workers with temporary contracts, while the number of employees with permanent contracts in NACE OPQ sectors increased over that period of time. In the NACE O sector ("Public Administration") there was a reduction in both the number of permanent and temporary workers between 2007 and 2012, but the latter fell more in relative terms. Country-specific studies with alternative data sources confirm this finding¹¹.

¹¹ See for instance Montesinos et al. (2015).

**NUMBER OF EMPLOYEES IN THE PUBLIC AND PRIVATE SECTOR
BY TYPE OF CONTRACT**
(millions of persons)

CHART 9



NOTE: Hours correspond to the number of hours usually worked per week in a main job.

Consolidation measures, as discussed above, have increased average hours worked by public employees and as a consequence may have reduced the need to revert to pre crisis staff levels (temporary hires). Nevertheless, it could be the case that the adjustment of employment witnessed recently ends up being of a transitory nature, as in previous episodes of economic hardship.

MEDIUM-TERM TRENDS IN THE RATIO OF GENERAL GOVERNMENT EMPLOYEES (Ng) TO TOTAL EMPLOYMENT IN THE ECONOMY (N)

TABLE 2

(percent)

	Ratio of government employees to total employment: Ng/N				Change in th ratio: (Ng/N)t – (Ng/N)t-i	
	1980	1999	2007	2014	1980-2007	2007-2014
Belgium	19%	18%	18%	18%	-0.5%	0.0%
Germany	13%	12%	11%	11%	-2.0%	-0.7%
Ireland	20%	14%	15%	15%	-5.0%	0.4%
Greece	13%	18%	19%	16%	5.3%	-2.2%
Spain	8%	14%	12%	14%	3.4%	1.9%
France	18%	22%	21%	21%	3.0%	-0.2%
Italy	13%	16%	14%	14%	1.0%	-0.7%
Luxembourg (1985)	16%	16%	18%	19%	1.8%	1.0%
The Netherlands	20%	15%	14%	14%	-5.9%	-0.1%
Austria	16%	16%	16%	16%	0.5%	-0.7%
Portugal	9%	14%	14%	14%	5.6%	0.1%
Finland	16%	25%	25%	25%	8.8%	0.8%
Denmark	27%	29%	29%	30%	1.9%	1.5%
UK	27%	19%	19%	17%	-8.0%	-2.5%
Sweden	32%	31%	30%	28%	-1.9%	-1.8%
United States	16%	15%	15%	15%	-1.3%	-0.3%
Japan	9%	8%	8%	8%	-0.4%	-0.5%

SOURCES: ESCB, EUROSTAT (ESA2010) and OECD Economic Outlook Database. Data sources are heterogeneous and as such the numbers in the table have to be taken as being only indicative of underlying individual country trends.

Another remark is that it is difficult to assess what is or should be the optimal level of public employment of a given country. In fact, the share of public employment vis a vis private employment varies significantly both across countries and within countries over time (Table 2). Since the early 1980s a downward trend in the ratio of government to private employment is visible in a number of countries, particularly in those countries with a larger public labour force. Nevertheless, other countries followed the opposite trend, particularly those with lower starting levels. Against this background, though, the size of the contraction during the recent fiscal consolidation episode seems to be more significant in countries in which public employment followed an upward trend vis-à-vis the private sector in the pre-crisis period. In those countries, private sector employment losses during the crisis were also more significant, which contributed to the tightening of government resources.

2.5 The supporting role of fiscal structural policies

Beyond policy actions with a short-term (budgetary) impact (see Appendix III-A), a number of measures of a more structural nature have been implemented in recent years (see Appendix III-B). In particular, policy initiatives to streamline public administration are encouraging. In addition, some renewed discussion is taking place on policy actions that focus on the substitutability/ complementarity between the public and the private sector as regards public production of goods/services vs. public financing of private provision.

The literature claims that sustained reductions in the public wage bill are more likely to be achieved by countries that simultaneously adopt a wide range of structural public sector reforms and/or discretionary wage bill reduction measures. In addition, social dialogue between governments and labour market partners is also highlighted as a contributing factor (IMF, 2015; Forni and Novta, 2014). In previous episodes of public employment reform, measures of this kind were associated with a more contained evolution of the government wage bill following a crisis episode, as the budgetary savings were kept over time. One may also claim that savings were related to the increased efficiency of the government sector induced by the structural measures. As regards public wages, policies of a more structural nature include human management/pay reforms, such as tightening the link between pay and performance, or changes in wage bargaining mechanisms within the government sector. A few measures along these lines have been put in place recently, in some cases in the framework of ongoing “public spending reviews”. A group of measures are aimed at streamlining the size, structure and scope of government, such as the elimination of redundancies among levels of government, the simplification of procedures or reorganisation of services, and the consideration of alternatives to the public production of goods/services, including the introduction of schemes to publically finance private provision.

Based on the micro data evidence supporting this paper, a positive conditional public private wage gap emerges as a structural characteristic of many EU countries (see Appendix II). In this respect, some policy proposals have been recently put forward to reduce the wage gap. Several theoretical papers (see for example Economides, Philoipopoulos and Varthalitis, 2015a; Gomes, 2014) show that establishing parity between working conditions in the public and the private sectors can be welfare improving under certain conditions. In particular, specific policies may be aimed at introducing more job flexibility in the public sector, or explicitly linking public wage setting to the productivity of the market economy. Other authors (see, for instance, Ujhelyi, 2014) inspect the benefits of civil service rules, exploring the conditions under which the existence of tenured “bureaucrats” raises or decreases overall economy welfare. Nonetheless, all these proposals tend to be put forward in abstract terms, i.e. they do not take into consideration the country specific heterogeneity observable in the data that is at the root of differences across countries.

3 The macroeconomic effects of public wage bill reform

This section is aimed at providing some evidence on the possible positive medium to longer-term benefits to the economy of using public wages and employment as fiscal consolidation instruments, when compared with other fiscal instruments. We look at these issues taking as given that a certain amount of fiscal consolidation had to be delivered to counteract a situation of fiscal stress. Contrary to other fiscal instruments, public employment and wages' policies induce spillovers on private sector employment and wages through labour market dynamics. While the focus of this section is on the euro area as a whole, country-specific facts are also provided, where possible, based on comprehensive macro and micro datasets.

3.1 *An overview*

The macroeconomic effect of public wage bill restraint is the outcome of a trade off between direct (negative) demand effects and indirect (positive) effects that occur through the labour market. A seminal work Alesina et al. (2002) found that reducing public wage expenditure generates reductions in private wages per employee, which improves competitiveness, increasing profits, investment, and economic growth. Along similar lines, Bermperoglou et al. (2013) found that cuts in government vacancies generate large output losses (direct effects dominate), while wage cuts have, if anything, insignificant expansionary effects (indirect effects dominate). See also Lamo, Moral Benito and Pérez (2016) along the same lines.

These channels are illustrated in Table 3, where some quantitative insights are shown on the basis of the ESCB macro econometric models of Lithuania (Celov, 2015) and Spain (Hurtado et al., 2014). In the two models, public employment is exogenous, but public wages influence private sector wages. In both models, in response to a cut in public wages (by 1% of GDP) private consumption and wages fall, while investment and net exports increase. The direct adverse GDP effect is thus mitigated by the increased competitiveness of the economy. Under a public employment shock, the impact on wages is much lower, as it only relates to the increase in economic slack, measured by the unemployment rate-thus the GDP costs are larger.

The possible mechanisms operating to offset the negative short-term macroeconomic impact are explored. A key argument is that public wage restraint may set in motion a labour market adjustment through the inter-linkages with private wages. This is particularly important when public wage policy influences private sector-wage setting decisions (e.g. "leadership" or "signalling" role of government wages).

The literature has found robust evidence of significant interrelations between public and private sector wages per employee. A wealth of recent empirical papers provides evidence of a direct causal relationship between these variables (Holm-Hadulla et al., 2010; Pérez and Sánchez, 2011; Lamo, Pérez and Schuknecht, 2012). While private wages tend to lead public wages in the long run, for some countries b-directional causality (i.e. running from public to private wages and vice versa) is found. The main theoretical reference is the well-known

Country: Shock (-1% of GDP): Year	Spain						Lithuania					
	Public wage shock			Public employment shock			Public wage shock			Public employment shock		
	1	2	3	1	2	3	1	2	3	1	2	3
<i>Percentage deviations from steady-state</i>												
GDP	-0.09	-0.18	-0.23	1.11	-1.17	-1.24	-0.06	-0.07	-0.06	-0.10	-0.04	-0.07
Private consumption	-0.28	-0.62	-0.85	0.19	-0.35	-0.51	-0.17	-0.17	-0.16	-0.17	-0.31	
Investment	0.28	0.38	0.39	0.04	0.13	0.10	-0.01	-0.01	0.01	0.10	0.07	0.08
HICP	-0.09	-0.20	-0.27	0.22	-0.34	-0.38	0.00	-0.02	-0.03	0.00	-0.01	-0.02
Wages	-2.80	-3.15	-3.35	0.81	-0.48	-0.57	-0.26	-0.27	-0.29	-0.02	-0.06	-0.09
Employment	-0.08	-0.22	-0.34	1.77	-1.88	-1.97	0.01	0.02	0.02	-0.25	-0.24	-0.22
Exports	0.09	0.19	0.24	0.04	0.13	0.18	0.00	0.014	0.02	0.15	0.17	0.18
Imports	-0.19	-0.38	-0.46	0.19	-0.25	-0.34	-0.06	-0.05	-0.05	0.06	0.02	0.02
Net exports (% of GDP)	0.09	0.21	0.27	0.08	0.12	0.15	0.04	0.03	0.04	0.07	0.10	0.12
Fiscal balance (% of GDP)	0.45	0.33	0.25	0.50	0.46	0.43	0.07	0.08	0.09	0.10	0.11	0.13

SOURCES: Author's calculations based on Celov (2015) and Hurtado et al. (2014).

Scandinavian model of inflation. With this, especially in the case of fixed exchange rates, there is an obvious case for the traded goods sector being the “wage leader”, i.e. wage leadership is exerted by the sector more open to competition (Lindquist and Vilhelmsson, 2006). Cross country differences exist in public wage spillovers due to differences in domestic labour and product market institutions. The probability of public wages leading private sector wages is stronger in countries where wage bargaining centralisation and coordination is high and in which there are high levels of union membership, while it is weaker the greater the openness to trade and the presence of wage indexation (Lamo, Pérez, and Sánchez Fuentes, 2013)¹².

Section 3.2 describes how the recent consolidation period has contributed to some competitiveness gains in the euro area, in view of the evidence provided on the partial correction of the public private wage premium. On the other hand, section 3.3 discusses some evidence on the efficiency gains in the labour market dynamics, based on the complementarity of public private goods and their relative wage compression. It must be noted that the implementation of fiscal structural reforms explained in section 2.5 is also aimed at increasing efficiency in the public sector.

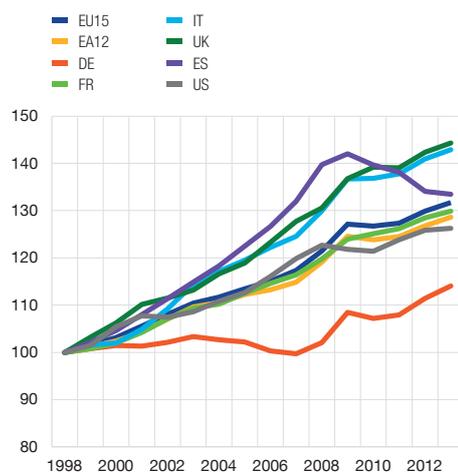
3.2 The competitiveness channel

The facts are that EU countries that were subject to substantial fiscal stress during the crisis were among the ones that cumulated larger competitiveness losses in the pre crisis period (Chart 10). At the same time, though, these countries have corrected part of their imbalances since the beginning of the crisis. The evolution of public wages may have played a role in this correction.

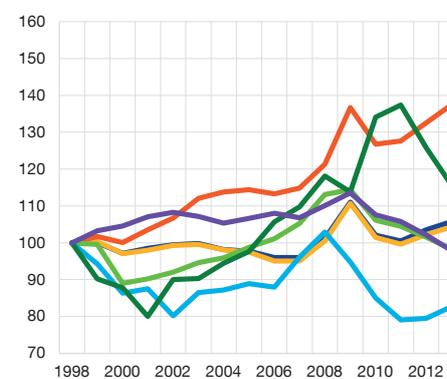
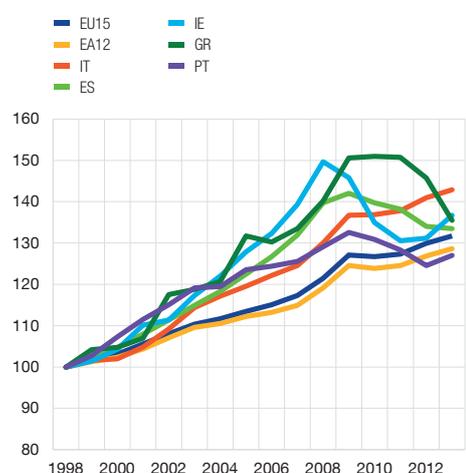
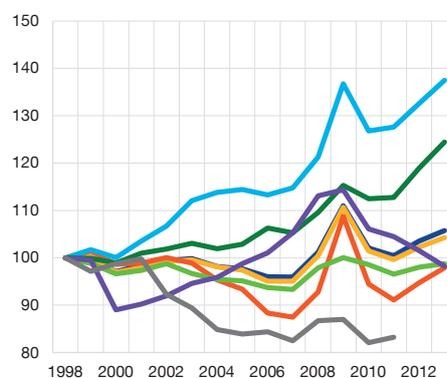
¹² In turn, wage setting institutions and practices in the public sector vary considerably across EU countries in several respects, including in particular the role of collective bargaining versus government legislative decision, the degree of centralisation of collective bargaining, or union density. See EC (2014) for an in depth comparative analysis of labour market institutions and practices of EU governments. See also Giordano et al. (2015).

(1998 = 100)

Whole economy



Manufacturing sector



SOURCES: Authors' calculations based on AMECO: ratio of compensation per employee to real GDP per person employed.

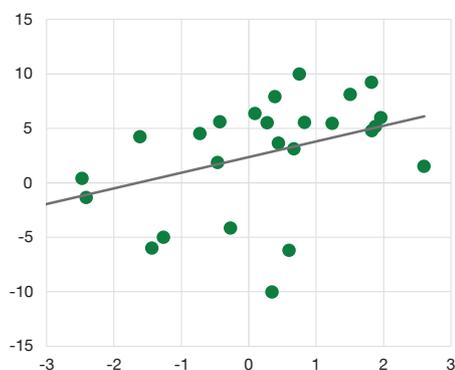
First, more relaxed wage conditions in the general government sector have a direct impact on overall economy competitiveness given its significant share in the total. Overall, the restraint in public wages directly reduced unit labour cost (ULC) growth in the euro area during the 2010-2014 period (Chart 11). The contribution to ULC growth from compensation per public sector employee was limited to -0.1 percentage point per annum over 2010-2014, which contrasts with the positive contribution from compensation per private sector employee (1.8 p.p. on average per annum for the same period). The contribution from productivity has been erratic over the reference period, but this factor has helped to improve overall cost competitiveness (around 0.3 p.p. on average per annum).

Beyond this direct impact, there could be other mechanisms at work. Given the aforementioned potential leadership role of public wages in some countries¹³, there could also

¹³ The probability of public wages leading private sector wages is higher in countries where wage bargaining centralisation and coordination is high and where there are high levels of union membership, while it is weaker when there is greater openness to trade or wage indexation (Lamo, Pérez, and Sánchez-Fuentes, 2013).

EU countries

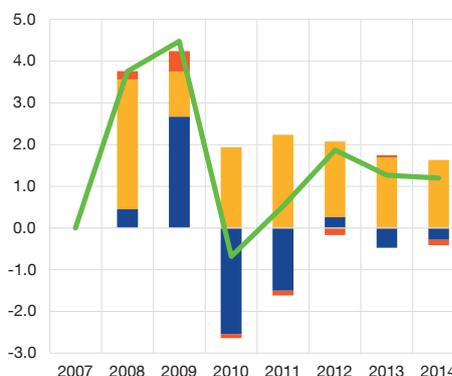
x-axis: % change in real wages general government sector (2009-2013)
y-axis: % change in unit labour costs all sectors (2009-2013)



Euro area aggregate

x-axis: Percentage change

■ CONTRIBUTION FROM PRODUCTIVITY (-)
■ CONTRIBUTION FROM COMPENSATION PER PRIVATE SECTOR EMPLOYEES
■ CONTRIBUTION FROM COMPENSATION PER PUBLIC SECTOR EMPLOYEES
— ULC GROWTH



SOURCES: Authors' calculations from AMECO and ESCB databases. Countries included in the left panel are the EU-28 excluding Bulgaria.

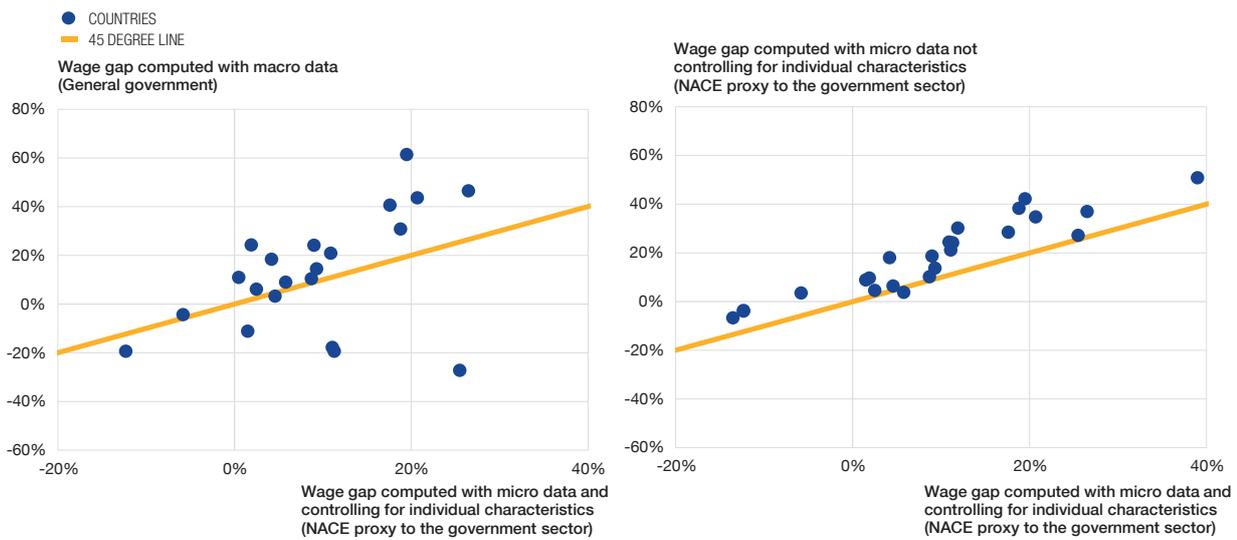
be an indirect effect from public wages on ULC by setting in motion beneficial labour market dynamics. It is difficult to assess, however, to what extent private wage developments in recent years may have been influenced by those in the general government sector.

The existence of distortions in public private wage gaps (see Appendix II for a detailed explanation and quantification) can be particularly harmful for competitiveness given that public sector activities are concentrated in non tradable sectors, which are less exposed to international competition. The wage gap is estimated to rise after controlling for workers' characteristics and stems mainly from differences between workers' wages at the low end of the wage distribution. As an example, for the euro area and the group of non-euro area countries shown, the wage premium is estimated to be positive for workers in the lower 10% quantile of the wage distribution, and turns negative in the top 10% (90% quantile) (Chart 12).

There is evidence that the recent public wage restraint has driven the partial correction of the existing positive public-private wage premium in the euro area. Macro (aggregate) data illustrated in Chart 2 (last panel) show a relative decline of 2 p.p. of the ratio of public-to-private wages per employee for the euro area (from 25% in 2009 to 23% in 2013). This reversed the upward trend in the wage gap since the second half of the 1990s¹⁴. Micro data analysis also supports this favourable trend, as the estimated (unexplained) wage gap has been recently

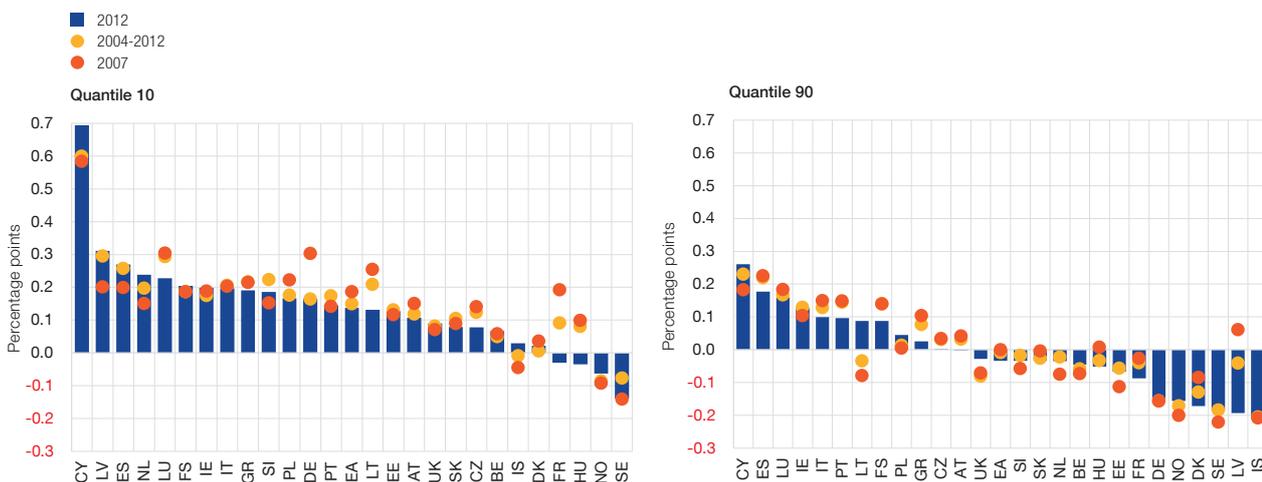
¹⁴ Since the start of EMU, certain peripheral countries experienced high and volatile public wage growth, coupled with positive public-private wage gaps, and rapid increases in unit labour costs, facts that have been linked by some authors to the overall economy loss of competitiveness witnessed in the pre-crisis period (see e.g. Holm-Hadulla et al., 2010; Fernández de Córdoba, Pérez and Torres, 2012a; García-Rodríguez, 2015; or Kollintzas, Papageorgiou, and Vassilatos, 2015; Campos et al, 2015).

Panel A. Different definitions of the public-private wage gap (average of 2004-2012)



Panel B. The public-private wage gap at different parts of the wage distribution with micro data

(NACE definition of the government sector O, P, Q controlling for individual characteristics percentages points)



SOURCES: Authors' calculations based on National Accounts data (macro data) and EU-SILC database (micro data). Countries included in the first panel are the EA aggregate and all EU-28 with the exception of Malta, Finland, Bulgaria, Poland, Romania, and Croatia. Countries included in the remaining panels are the same plus Norway and Iceland. For the computation of micro-based gaps we referred to Campos et al. (2015).

reduced. For the euro area as a whole, the estimated conditional wage gap for the 2008-2012 period for the broader NACE proxy of government related activities is 40% lower than the one estimated for the 2004-2007 period. In turn, for 2012 the gap was 55% lower than the one estimated for 2007 (see Chart 12 above, and Campos et al., 2015).

The reduction of the (unexplained) wage gap has been, however, uneven over the wage distribution and across different types of workers. For the euro area pool and the group of non euro area EU countries the wage premium dropped more significantly at the upper end of the wage distribution between 2007 and 2012 (Chart 12, Panel B, differences between bars and

dots in both panels)¹⁵. In fact, most of the countries have smaller or negative public private wage differentials in quantile 90 of the income distribution, than at the lower end of the wage distribution (quantile 10).

The dynamics of the gap during the crisis reflect the different behaviour of wages and hours worked in the public and the private sectors. Wages per hour worked grew much faster in the private than in the government sector over 2007-2012 for the pools of euro area and non-euro area EU countries. On the individual country level, wage per hour growth was higher in the private sector in 15 out of the 23 individual EU countries studied, reflecting the generalised implementation of cost containment policies in the public sector over that period, most notably since 2010. In particular, there was an increase in hours worked in a typical week for employees in government related activities (particularly in countries under fiscal stress). Data for the private sector indicate an opposite trend.

The sectorial structure of the country, between tradable goods and services and non-tradable sectors, may also be instrumental to understanding the public pay gap (Chart 13). Indeed, compared to the baseline estimated wage premium, the “Scandinavian model” seems to operate partially, as public private wage gaps are reduced when public wages are compared to wages in the tradable sectors, instead of those in the overall private sector delimitation used before (all sectors except OPQ). In particular, the premiums of Belgium, Germany, and the UK turn negative, while that of France becomes more negative. In general premiums with respect to the tradable sector are lower, even though there are exceptions.

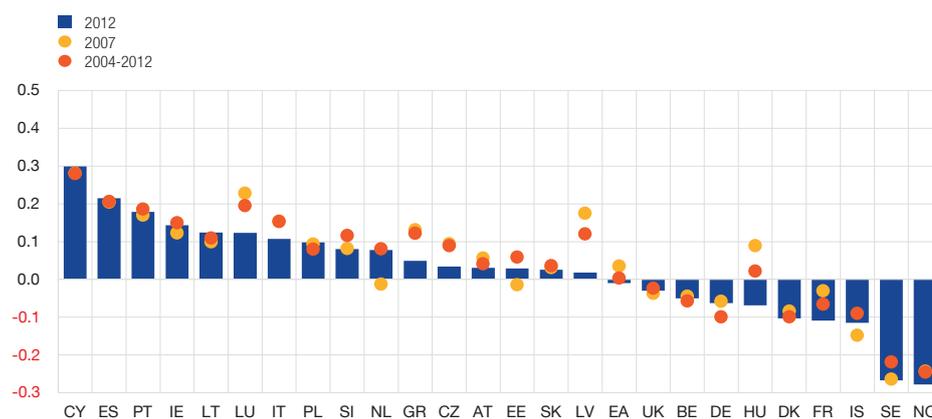
3.3 The efficiency channel

The assessment of the efficiency of labour market flows provided here is based on two concepts: the complementarity between public and private employment, and the wage dispersion in the public vis à vis the private sector.

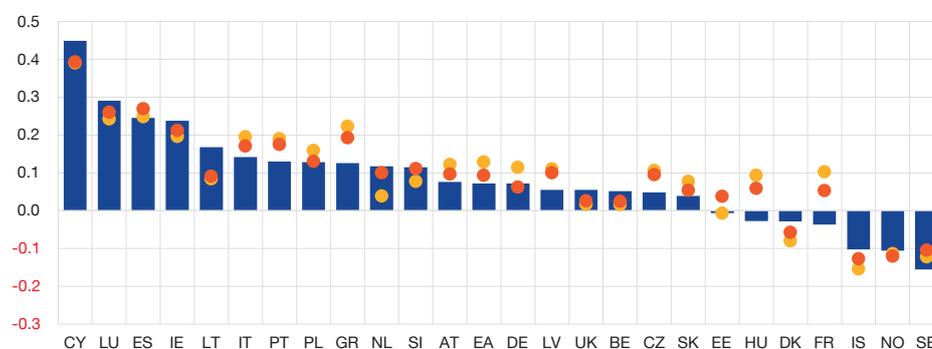
The size and strength of the impact of reductions in public employment mainly depends on the degree of complementarity between the public and private sectors. Government activity complements private sector activity through the provision of collective goods/services (like the judicial system), while at the same time partially competes with (substitutes) the private sector in a number of sectors (like education or health). A decrease in public jobs in sectors that produce highly substitutable products can directly spur private jobs. However, in sectors in which public and private production complement each other, there exists the possibility that a reduction in public employment negatively affects private sector employment, if public production positively affects the marginal product of labour in the private sector (see Maley and Moutos, 1996; Algan et al., 2002).

15 In the former case, the lower 10% premium moved from 0.19 in 2007 to 0.14 in 2012, while in the upper 10% the wage premium decreased from 0.00 to -0.03. For a number of countries, though, the change by quantiles went in opposite directions, reflecting in some cases policy measures aimed at reducing wage differentials within the government sector or targeting certain groups of public workers. However, at the upper end of the wage distribution, the literature shows that the premium may reflect more the impact of characteristics whereas at the lower end it reflects unobserved characteristics.

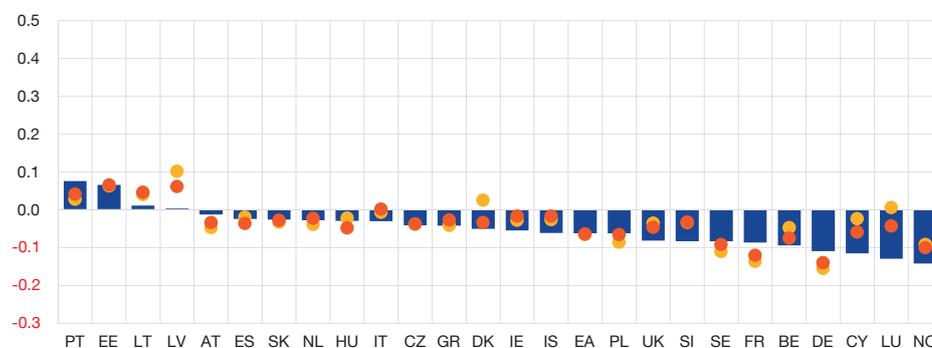
Panel A. The gap between the “public sector” and the “tradable sectors”



Panel B. The gap between the “public sector” and the “private non-tradable sectors”



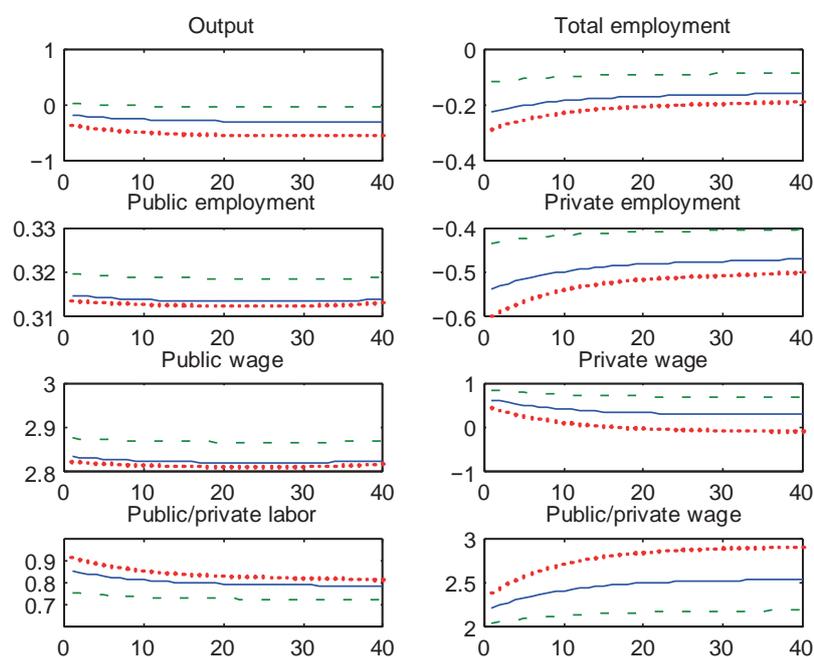
Panel C. The gap between the “private non-tradable sectors” and the “tradable sectors”



SOURCES: Authors' calculations based on National Accounts data (macro data) and EU-SILC database (micro data). Countries included are the euro area pool (EA), all EU-28 countries with the exception of MT, FI, BG, PL, RO, and HR, plus Norway and Iceland (in this case 2011 instead of 2012 estimates). For the computation of micro-based gaps we referred to Campos et al. (2015).

RESPONSE TO A PUBLIC WAGE BILL (POSITIVE) SHOCK IN A SMALL-SCALE DSGE MODEL CALIBRATED FOR THE EURO AREA CHART 14
(percentage deviations from steady state values)

Lines differ in the degree of the elasticity of substitution between public and private employment. Dashed line: 1.1 (baseline calibration); Solid line: 1.7; Dotted line: 5.



SOURCES: Authors' calculations based on Fernández-de-Córdoba et al. (2012).

The empirical literature tends to find that public employment crowd-out private sector employment. An increase in vacancies in the public sector causes labour flows from the private to the public sector if a positive public-private wage gap exists. This leads to an increase in private sector wages and a potential reduction of private sector employment (Stepanyan and Leigh, 2015). The dependence on the degree of public private substitutability is exemplified by means of simulations of a small-scale DSGE model for the euro area (Chart 14). The model encompasses a positive public-private wage gap and an aggregate production function in which output is produced by combining public and private employment. The elasticity of substitution between public and private employment modulates the degree of complementarity in production of the two inputs. The shock consists of an increase in the public sector wage bill implemented through an increase in public wages and in public employment by about the same proportion. This increase in the public wage bill is self-financed by an increase in the income tax rate¹⁶.

A second factor in determining the economic incentives inducing people to enter or leave a sector, is the relative wage dispersion, i.e. the shape of the wage structure. It has been argued that the public sector finds it more difficult to attract and retain highly skilled workers as a result of a relatively higher wage compression (see e.g. the seminal work of Borjas, 1993).

¹⁶ The relative strength of the channels outlined above depends on the degree of economic slack (see, e.g. Michailat, 2014, for a theoretical model, and Lamo et al., 2016, for empirical results).

In the case of the euro area pool, according to EU-SILC data, the distribution of public wages became more compressed between 2007 and 2012 (the coefficient of variation of log hourly wages decreased by 6% for the broad definition of government related sector). Nevertheless, in relative terms, the ratio of the coefficient of variation of log hourly wages in the public and the private sectors increased from 0.85 in 2007 to 0.88 in 2012 for the euro area pool, and from 0.76 to 0.81 for the pool of non-euro area EU countries. At the same time, though, relative wage compression increased in the 2010-2012 period for the euro area pool (and in 15 out of the 17 countries analysed), broadly due to increased wage compression in the public sector. The opposite happened in the group of non-euro area EU countries. Discretionary policies implemented during the recent fiscal consolidation process may be at the root of this increase in public wage compression.

4 Policy discussion

Well designed government wages and employment policies and reforms may generate overall economy competitiveness gains and increase the efficiency of the labour market. In times of fiscal stress, public employment adjustments can affect GDP and total economy employment positively if there are large inefficiencies in the government sector and/or there is high substitutability between private and public sector output. Public wage policies can have beneficial effects on competitiveness if they are targeted to influence overall economy wage moderation (via “wage leadership”). In addition, if a public pay gap exists, the latter positive effect of public wage restraint becomes amplified as labour market inefficiencies are also reduced, provided policies are correctly designed.

While public sector demand across the euro area is needed in the current circumstances to support economic growth, in some countries fiscal consolidation needs are still high, and recent government wage bill savings are to be preserved. When cyclical conditions become normalised, the need for fiscal prudence loosens, not least given that public employment and wages tend to follow lagged pro cyclical patterns, as pointed out by the available literature (see e.g. Lamo, Pérez, and Schuknecht, 2013a).

As regards public wage containment, historical experience shows that catching-up processes in good economic times tend to partially or completely cancel out crisis-related budgetary savings. As regards public employment, analysis based on micro data shows that, in many countries, a significant portion of the reduction depended on workers with temporary contracts. Thus, the employment adjustment was more of a cyclical-like reaction than a permanent reduction. Additional margins of short-term adjustment include the moderation of high public-to-private wages ratios (the “wage gap”).

Moreover, many countries have recently embarked on fisca-structural reforms, geared towards increasing efficiency in the public sector, which in turn are likely to support the public wage moderation achieved and help to counteract the risks of policy reversal.

Overall, further adjustment of the government wage bill has to be designed carefully and with regard to country specific circumstances. Margins for possible further public wage and employment retrenchment have to take into account the particular country-related conditions. This includes the consolidation effort and structural reforms already accomplished, and the efficient provision of public goods and services, including the preservation of a high level of human capital.

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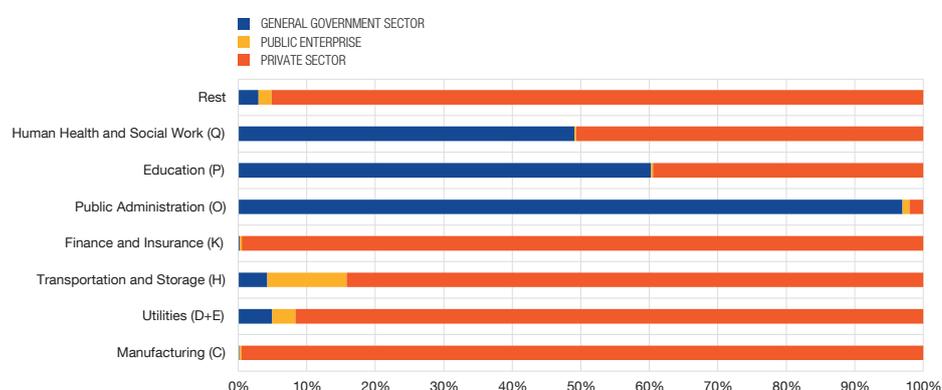
Appendix I

Definitions and data used

In advanced OECD economies, the government is widely involved in the provision of welfare services (mainly health and education) and utilities. This means that its presence in the economy goes well beyond the provision of pure public goods and services. The specific form of the provision of welfare services varies significantly across countries, i.e. whether it consists of direct service delivery, partial delivery and/or partial/full subsidisation of consumption. These alternatives imply a different role for non governmental organisations, and thus translate into significant heterogeneity across countries in the number of public sector employees in those sectors.

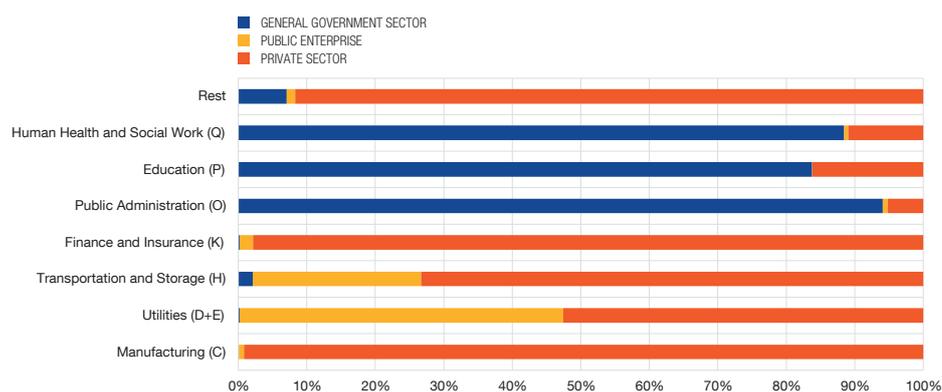
DISTRIBUTION OF EMPLOYMENT BY SECTOR: SPAIN AND DENMARK

SPAIN



SOURCES: Labour force Survey (INE).

DENMARK



SOURCES: Danmarks Statistik.

For a cross country study, it is important to acknowledge upfront that it is very difficult to delineate the precise nature of the public sector. For example, according to Eurofound (2015) services in the health systems in Germany, France and the Benelux countries, while largely state-funded, are provided mainly by private sector companies or mixed-ownership organisations.

The heterogeneity in the direct involvement of the public sector in the different sectors of the economy might be illustrated by considering the distribution of employees in the general government, public enterprises and the private sector (for the cases of Denmark and Spain and, to some extent, France). In Denmark the number of general government employees in the health and education sectors is close to 90% and more than 80%, respectively. In contrast, in Spain the percentages are about 50% and 60%, respectively. In addition, the involvement of the public sector (directly or via public enterprises) in the transportation and storage and utilities sectors is quite different between the two countries. It is worth mentioning that the selection of just a few countries is not only for the sake of brevity, but mainly due to difficulties in finding publicly available, cross-country homogeneous datasets on which to base a broader analysis.

In this regard, in order to analyse the activity of the government as an employer, it is necessary to make use of different partial data sources, as no single source guarantees comprehensive coverage of the total number of public employees in terms of institutional sector coverage, characteristics (including wages), and homogeneity of definitions.

As regards macro (aggregate) data, the focus is on the general government sector (S.13) as defined in National Accounts (ESA2010) for all current EU Member States (EU 28, where possible). The primary source of government wage bill data and all macroeconomic variables used through the study (GDP, prices, total economy wages and employment, population) is Eurostat for European Union (EU) countries and the OECD (Economic Outlook Database) for non-EU countries. General government employment data, in turn, have been provided by the Eurosystem National Central Banks, even though in a majority of cases the primary data source is Eurostat. For non EU countries, OECD data is used. The pre-1995 series of euro area aggregates is taken from the ECB's Area Wide Model Database (see Fagan, Henry and Mestre, 2005); the fiscal block of this database is taken from Paredes, Pedregal and Pérez (2014). While the choice of macro data sources and definitions ensures the best available degree of harmonisation and comparability, there are however measurement problems both within and across countries. Differences/changes in working hours, privatisation, differences/changes in the size of the public sector over time, or changes in the skill composition of the labour force over time might distort the view on certain issues.

The measure of aggregate wages chosen for the analysis is compensation per employee in nominal terms (instead of wages), owing to data limitations in terms of sample size and coverage of countries in the sample. Compensation per employee is computed using compensation of employees and employment data. Compensation of private sector employees is defined as total economy compensation of employees minus compensation of government employees. Compensation per private employee is defined as private compensation of employees divided by private sector employment minus government employment minus self-employment.

OECD and Eurostat data on the Classification of the Functions of Government (COFOG) is also used. This makes it possible to analyse the general government sector wage bill expenditure broken down into individual and collective goods and services. Individual services ("merit goods",

see e.g. Fiorito and Kollintzas, 2004), are characterised by the fact that they can also be provided privately, such as health, education and other services, while collective goods (traditional “public goods”) are non-rival substitutes for private consumption. In particular, we proxy individual services by aggregating the functions of health, education and social protection, and collective services by aggregating the remaining seven COFOG categories, namely general services, defence, public order and safety, economic affairs, environment, housing, and recreation.

As regards sources of micro data, the selected database is the European Union Statistics on Income and Living Conditions (EU SILC) survey, given its cross country comparability, data availability for the pre- and post-crisis periods, and the fact that it covers most European Union countries (all with the exception of Finland, Malta, Bulgaria and Croatia), as well as Norway and Iceland. The distinction between public and private sector employment is based on NACE (Statistical Classification of Economic Activities), Rev.2. The most recent data refers to the 2013 EU SILC wave, which includes employment and earnings information pertaining to 2012. In this framework, as it is standard in the literature, the “government sector” will be an approximation based on either the aggregation of the O (Public Administration and Defence, Compulsory Social Security), P (Education) and Q (Health and social work) sectors of the NACE classification (broad definition), or only the O sector (restricted definition). With the EU-SILC database it is not possible to separate public employees from private sector employees in any of the sectors. This means that to construct the proxy, all the employees in these sectors are assigned to the “public sector”. This might be particularly relevant for activities P and Q, where private sector providers are more prevalent. In the case of EU-SILC data the definition of “wages per employee” is computed based on the individual gross monthly earnings (including only monetary earnings and excluding financial income from investments, assets, savings, stocks and shares) before netting out taxes and social contributions, and the number of hours worked per week in the main job. It must be stressed that in this study data limitations prevent us to control for a number of factors: fringe benefits, pension rights, job security. Finally, the data selected do not allow to control for the same selection bias due to the possibility that the sorting of employees among sectors is not random, but occurs on the basis of unobserved characteristics.

Appendix II

Deepening the understanding of public private pay differentials

In advanced OECD economies the government is widely involved in the provision of welfare services (mainly health and education) and utilities, i.e. its presence in the economy goes well beyond the provision of traditional public goods and services. The specific form of the provision of the former varies significantly across countries, in particular as regards the type of provision, i.e. whether it consist of direct service delivery, partial delivery and/or partial/full subsidisation of consumption. These alternatives involve a different role for non governmental organisations, and thus translate into significant heterogeneity across countries in the number of public sector employees in those sectors.

A number of reasons for the existence of public private wage differentials have been advanced in the literature on the subject. For example, starting from the observation that wage premiums tend to be higher in countries with a lower share of government employment as a proportion of total employment in the economy, some authors develop models in which a smaller group of public employees derive monopoly power from a tighter control of the production of public goods/services (see e.g. Fernández-de-Córdoba, Pérez and Torres, 2012a; EC, 2014; Kollintzas, Papageorgiou, and Vassilatos, 2015). On related grounds, it is argued that a wage premium arises because of differences in the bargaining power of private and public sector workers (Holmlund, 1997). Other explanations are linked to countries' degree of fiscal decentralisation. In this regard it has been argued that public expenditure decentralisation tends to be related to the presence of higher overall public wage premiums, because of common pool problems (in the case of highly decentralised countries) and when government wages are set in a homogeneous way in the country (in the case of more centralised countries). In addition, some recent evidence signals that the public-private wage premium may be related to employment protection legislation, possibly because higher compensations are needed to make public employment attractive when private employment is more strongly protected (see EC, 2014). More fundamentally, the heterogeneity of the premium may also be linked to the degree of substitutability between publicly provided goods and services and private activity. Simple correlation analysis shows that the higher the degree of substitutability, the lower the wage premium.

Despite the rich set of theories rationalising the existence of a public pay premium, there is a limited amount of research providing cross country comparisons of public-private pay differentials, see e.g. Giordano et al. (2015) or de Castro et al. (2013). An exception is Campos et al. (2015), who provide a structured and comprehensive analysis of the factors outlined above, and analyse the changes in the gap during the financial crisis and in the long-run.

This paper estimates for a set of 25 (mostly) EU countries for 2004-2012 the part of the wage gap that remains unexplained once (observable) individual characteristics are controlled for. Unfortunately, the data available are not enough to provide a full understanding of the

mechanism of sorting between the public and private sector on the basis of factors such as fringe benefits, job security or pension schemes. Moreover, it is also not possible to control for self selection effects determined by the unobservable characteristics of the individuals (such as preferences). Despite these drawbacks, the analysis of EU SILC data allows the identification of several relevant differences between public and private sector workers. They follow the common approach of running Mincer type wage regressions taking the logarithm of gross income per hour as the dependent variable, (y). The set of covariates (X) includes binary variables denoting married status, low and high education, managerial position, part time job and female, year and region related effects, as well as experience and a second degree polynomial in experience (or age and age squared whenever information on experience is not available). The specification also includes a binary variable ($public$) denoting that individual i works in one of the industries taken as a proxy for the public sector (Public Administration, health and education). Equation (1) clarifies the specification.

$$y_i = \alpha + X_i' \beta + Public_i \delta + \varepsilon_i \quad (1.1)$$

Thus, as per the usual approach, the coefficient associated with the category of public worker (δ) represents the earnings differential (evaluated at the mean of the distribution) that remains once the other relevant determinants are controlled for and, if estimated to be positive, it is labelled public private wage differential/premium/gap (or wage penalty if negative).

Campos et al. (2015) document large cross country differences in the estimated public-private wage premium (from -13.5% in Norway to 39% in Cyprus). They also find that that more than half of the cross sectional variation in wage gaps can be accounted for by variables linked to non-competitive wage settlements in the public sector, whereas different labour market institutions in the public vs. the private sector have less explanatory power. By looking at long-term trends (1970-2014) using national accounts data, they also find that openness to international competition and improvements in the institutional quality of governments have been associated with decreases in the public-private wage gap.

With regard to the financial crisis, a significant narrowing of wage gaps has been documented across European countries, this process being mainly associated with the widespread fiscal consolidation needs, rather than structural factors such as those explaining the pay gap differences in the cross section.

Appendix IIIa

Policy measures implemented during the crisis with a direct impact on the general government sector wage bill

Year	Wage measure	Staff measure	Reasons	Other comments	
Euro area countries					
AT	1996–1997	wage freeze	fiscal consolidation		
	1998–2000	wage increase (above past inflation)		partial compensation for losses incurred in 1996/97	
	2002	wage increase (below past inflation)	fiscal consolidation		
	2013	wage freeze	fiscal consolidation		
BE	1982–1986	freeze in wage indexation; wage freeze	fiscal consolidation		
	1984–1986		employment freeze (partial)	fiscal consolidation	
	1992	wage increase			
	1994	wage indexation (new regulations)		fiscal consolidation	health index
	1994		abrogation of compulsory military service		
	2012–2013	freeze in wage indexation; wage freeze			federal budget control march 2012, federal budget 2013
CY	2009		employment increase		
	2010		employment cut		
	2011–2012	wage cut; wage freeze			
	2013–2014	wage cut; wage freeze; other savings			
DE	During 1990s		employment cut (local gov. and east german states)	unification of germany	
	1990–2010	wage increase (stepwise adjustment of wages in east german states to west german levels)		unification of germany	
	1990–2009	increase in working hours (without wage adjustment)		fiscal consolidation	reverse in recent years
	2009–2010		employment increase (special case)	part of fiscal package in economic and financial crisis	additional temporary staff for employment agency
EE	2008–2010	wage cut; wage freeze	employment cut; employment freeze	fiscal consolidation	budgets, supplementary budgets
	2011–2012	wage freeze	employment freeze	fiscal consolidation	budgets, supplementary budgets
ES	1993–1994	wage freeze	hiring freeze (with few exceptions)	fiscal consolidation	
	1995–1996		replacement rate	fiscal consolidation/ public sector downsizing	
	1997	wage freeze		fiscal consolidation	
	1997–2001		limits to the replacement rate (with some exceptions)	fiscal consolidation / public sector downsizing	
	2007–2009	wage increase (certain groups)			budget laws
	2009–2014		limits to replacement rate	fiscal consolidation	budget laws
	2010	wage cut		fiscal consolidation	royal decree-law 8/2010
	2011–2014	wage freeze		fiscal consolidation	budget laws
	2012	changes to compensation during temporary incapacity and union licenses; one-off elimination of one extra payment (december)	increase in working hours	fiscal consolidation	royal decree-laws 20/2012, 20/2011
	2012–2014	wage cut (regional level)	hiring freeze	fiscal consolidation	budget laws
2015	one-off partial cash devolution of 2012 extra payment			budget laws	

FI	1992–1994	possibility to replace monetary holiday bonuses for additional vacation	employment cut (local government)	fiscal consolidation and cuts in central government transfers to local government	
	1992–1993	wage freeze			in accordance to collective agreements
	1994		increase in working hours	fiscal consolidation	
FR	1996	freeze in wage indexation			
	2003	freeze in wage indexation			
	2007–2012		replacement rate	government modernisation, reduction of spending	
	2011–2014	freeze in wage indexation		fiscal consolidation	
GR	1978–1980		employment freeze	fiscal consolidation	since may 1978
	1982	wage increase (certain groups); wage indexation		Income redistribution	Introduction of ATA (ex post automatic wage indexation)
	1983	partial deference of wage indexation; wage freeze		effort to check the increase in ULC	law 1320/1983; ATA
	1984–1985	wage indexation			ATA
	1986–1987	wage freeze; (revision of) wage indexation (rules)		balance of payments crisis	revision of ATA (from ex post to ex ante wage indexation); Laws 1584,1589, 1986
	1988–1989	wage increase; (revision of) wage indexation (rules)			revision of ATA, law 1836/1989
	1990	deduction in wage increase; (revision of) wage indexation (rules)		fiscal consolidation	laws 1874/1990, 1884/1990
	1991	wage increase; (revision of) wage indexation (rules)			ATA abolishment
	Year	wage measure	staff measure	reasons	other comments
	GR	1992	wage freeze (with some exceptions)		
1993–1994		wage increase; wage indexation			laws 2129/1993, 2198/1994
1995–1999		wage increase; wage indexation	restrictions on hiring	convergence program 1994–1999	laws 2297/1995, 2399/1996, 2470/1997, 2606/1998, 2448/1996, 2521/1997, 2530/1997, 2469/1997, 2702/1999; restrictions on hiring 1998
2000–2007		wage increase			laws 2768/1999, 2873/2000, 3016/2002, 3156/2003, 3205/2003, 3356/2005, 3356/2005
2008–2009		wage increase (certain groups), wage freeze			
2010–2014		wage cut; other measures; wage increase (certain groups)	employment cut; restrictions on hiring		Laws 3812/2009; 3833/2010, 3845/2010((MoU/2.2011), 4002/2011, MTFS, budgets , others
IR	1988–2000	wage increase			1988–1990 program for national recovery 1991–1993 program for economic and social progress 1994–1996 program for economic and social progress 1997–2000 partnership 2000
	2001–2006	wage increase			2001–2003 program for prosperity and fairness 2004–2006 sustaining progress
	2009–2011	wage cut			supplementary budget 2009; budget 2010, budget 2011
	2012–2014	wage cut			budget 2012, MTFS/Ec fiscal Outlook; Croke Park II Haddington Rd, MTFS

IT	2001–2003	pension (two) reforms		tax harmonization	
	2002	wage increase			
	2004–2006	wage increase			process started in 2004
	2006–2007	wage increase			process for 2006/2007
	2008–2009	wage increase			process for 2008/2009
	2010–2012	wage freeze (wage cut certain groups); stop renewal of contracts	stop turn over	fiscal consolidation	process for 2010–2012 law 78/2010
	2013–2014	wage freeze (wage cut certain groups); stop renewal of contracts		fiscal consolidation	extension of provisions of 2010 to 2014
LU	1986–1987	wage increase			
	1990	wage increase			
	1995–2006	wage increase			
	2007	wage increase			
	2009	wage increase			
	2010	wage increase (certain groups)			
	2011		employment freeze		
LT	1994–2014	increase in minimum wages			
	2010	wage reduction		economic and financial crisis	
	2013–2014	wage increase			partially due to constitutional court decision
LV	2007–2009	increase in minimum wages			
	2009–2010	wage cut			
PT	2002		replacement rate	fiscal consolidation	
	2003	wage freeze (automatic career progressions and reclassifications)		fiscal consolidation	
	2003–2004	wage freeze		fiscal consolidation	
	2006	wage freeze (automatic career progressions and reclassifications)	replacement rate	fiscal consolidation	Staff measures: under the scope of prace: central government restructuring programme
	2007	wage freeze			
	2011–2014	wage cut			
	2013	hours worked adjustment			
SI	1995–2000	wage increase (below past inflation)		macroeconomic stability	
	2000–2001	wage increase (certain groups)			
	2001–2002	wage increase (below private sector wage increase)			
	2004–2005	wage indexation (in accordance to inflation; new regulations)			Programme for effective Integration into the EU (July 2003); planned implementation of the new payment system
	2006–2008	wage increase (below past inflation)			2006–2007 planned implementation of the new payment system; 2008–2009 introduction of the new payment system
	2009–2011	wage increase (below past inflation); wage freeze		fiscal consolidation	
	2012	wage increase (below past inflation); wage cut	replacement rate	new payment system, fiscal consolidation	New payment system for wage adjustment
	2013–2014	wage cut		fiscal consolidation	
SK	2001 – 2006		employment cut	improving local accessibility and efficiency of public administration	
	2011	wage cut	employment cut	fiscal consolidation	
	2012	wage freeze		fiscal consolidation	
	Year	wage measure	staff measure	reasons	Other comments

Non-euro area countries				
BG	2010	wage freeze (indexation)	Employment cut	
	2011–2012	wage freeze (indexation); increase in minimum wages		
	2013–2014	increase in minimum wages		
CZ	2008	wage growth reduction		2008 stabilization reform of public finance
	2009	wage increase		2009 stimulus package
	2011	wage increase (certain groups)		2011 consolidation package
	2010–2012	wage freeze		2010 austerity package
	2011–2012	wage cut		2011 consolidation package
DK	1982	wage increase (automatic indexation)		inflation
				First suspended and later abolished permanently in 1986.
HR	1994	wage freeze		
	1998–1999	wage increase		
	2000–2001	wage decrease		fiscal consolidation
	2003		employment cut	fiscal consolidation
	2007–2012	wage increase		Agreement of 2006
HR	2009–2010	wage cut		fiscal consolidation
HU	2007–2008	control of wage growth	employment cut	
PL	2002–2003	wage freeze		fiscal consolidation
	2006	wage increase (certain groups)		wage pressure
	2007	wage freeze		reduction of social security contribution rate paid by employees
	2007–2009	wage increase (certain groups)		programme for years 2007-2009 (modernisation of uniformed services)
	2008–2012	wage increase (certain groups)		
	2010	wage freeze		fiscal consolidation
	2011	wage cut (certain groups)		fiscal consolidation
	2011–2014	wage freeze (certain groups)		fiscal consolidation
	2013–2014	wage increase (certain groups)		
RO	2009	wage cut		
	2012	wage freeze		
	2013	wage increase		
	2014	near-freeze in public wages		

SOURCES: European System of Central Banks.

Appendix IIIb

Significant structural policy actions with a direct impact on the general government sector wage bill implemented by EU countries

Country	Measure	Description
Historical episodes: 1980-2008		
Belgium	copernicus plan (1999-2004)	new organizational structure, new management culture, new HRM policy
Germany	federalism reform i (2006)	devolution of legislation and remuneration for civil servants to individual state governments --> more efficient allocation of competences across gov. levels
Greece	1988; 1997; 2003-2004	1988: public sector employees governed by private-law contracts; establishment of an "unified pay scale" of the civil service 1997: new pay scale 2003-2004: extension of part-time employment opportunities (non-permanent) to the public sector
Ireland	1988-1990	introduction of social partnership
Italy	privatisation of the public sector (1993)	staff regulations in the public sector determined by a collective bargaining system (as in the private sector): augment labour mobility, including the right to lay off public employees. introduction of performance-related pay
Portugal	restructuring of state central administration programme (prace) (2005-2009)	aim: reorganise central government in order to cut costs and raise efficiency (restructuring of ministries and regionalised services) including : mobility regime, introduction of performance assessment mechanisms, the social protection reform, the new legal employment, career system and pay scales law (labour legislation closer the private sector)
Portugal	2006	increase in the minimal retirement age and years of service for public employees, as part of the convergence towards the general social security regime.
Slovenia	2001-2002; 2003	2001-2002: separate agreement for public and private sector (adjustment of wages in private and public sector could differ). 2003: the adjustment of the basic wage was replaced with a pension insurance premium; new payment system
United Kingdom	new public management (1994, comprehensive spending review 2007)	outsourcing non-core functions, establishment of executive agencies performance pay (which links part of a public servant's salary to his annual performance)
Current episodes: 2008-2017		
Cyprus	public administration reform 2013	reforms of public administration to improve its functioning and cost-effectiveness improving the efficiency of state-owned and semi-public enterprises, scaled wage cuts, streamlining of allowances, further horizontal wage cuts, income contribution to health care, reform of pension schemes.
Estonia	new public service act (2012) 2013	new public remuneration system (drop of the central salary scales, reduction of wage components) 2013: reclassification of a large transport service company in to the general government sector
France	general review of public policies (RGPP) (2009-2012) / spending reviews	replacement of only 1/2 of retiring employees (2007-2012) / spending review on the general government sector and publicly-owned companies (ongoing since end-2014)
Greece	public administration reform 2009-2013	reorganising local and central government tighter rules for temporary staff, cancellation of vacant job post and reallocation of qualified staff to priority areas extension of working hours in the public sector rationalising the public remuneration system: the single payment authority (SPA)'s, which will allow for a more effective coverage, assessment and payment of employees/new wage grid
Ireland	public administration reform 2009-2013	reorganising local and central government rationalising the public remuneration system introduction cross public sector measures, including greater use of shared services and information technology solutions, reform of public procurement processes, regular comprehensive expenditure reviews and using new business models for service delivery
Italy	2009-2013	more flexibility in labour organization introduction of an evaluation system and performance's reward
Portugal	program "reduction and improvement of central administration plan" premac (2010-2013)	increase in public sector working time (from 35 to 40 hours in september 2013) reorganising local and central government --> the plan established a reduction of 40% of central administration high level structures, 27% of the hierarchical levels and optimisation of staff numbers. 2009 new single pay scheme (linked to individual performance/except in time of wage freezing)
Romania	public administration reform 2010-2013	new public pay system (ratio between the national minimum wage and the maximum salary in the public sector, rules to govern pay rises, new pay grid...)
Spain	public administration reform 2012-2017	restructuring and rationalisation of public sector companies and foundations. limitations to staff of municipalities: linked to population and set with reference to central government reference salaries (2014) increase flexibility in public employment (internal mobility and firing conditions) (2014-2017)

SOURCES: European System of Central Banks.

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