Wage adjustment in Spain during the economic crisis

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Eliminating composition bias reveals there has been some flexibility of wages in Spain in response to the economic crisis. However, the distribution of the adjustment has been uneven.

Spain´s economy has largely responded to the economic crisis through job destruction. However, data adjusted for composition bias show there has been some wage adjustment in response to the adverse demand shock of the recent recession, in part supported by measures of the February 2012 Labor reform. While the wage adjustment process in Spain has been uneven, it has not been the cause of an increase in income inequality. The burden of the wage adjustment process has fallen more heavily on workers in higher paying jobs before the crisis, as well as on workers in the public sector. Adjustment has also been larger in the construction sector and in provinces with the greatest increases in the unemployment rate.

Since 2008, Spain has lost more than 3.6 million jobs (17% of the total number of jobs in 2008). The job destruction process has been more severe in Spain than in any other developed economy and as a result of this, the unemployment rate increased in less than six years from around 8% to 26%. Spain has continued to destroy jobs in 2013 although the unemployment rate started to decrease in the first months of 2014.

Back in 1994, the Spanish unemployment rate was 24%. That year marked the peak of another economic recession that had its origins in another real estate bubble, the one of the early nineties which was spurred by the integration of Spain into European markets, and by events such as the *Universal Exposition of Seville* and the *Barcelona Olympic Games* in 1992. Then, as well as now, Spain's labor market has largely adjusted to the economic recession through massive job destruction. Other economies have navigated through the difficult years of the economic crisis slightly differently. There, wages have fallen to a larger extent and instead employment has remained relatively stable, at least compared to Spain.

Policymakers have reformed the Spanish labor market on several occasions, the last one in February 2012, in an attempt to make wages more flexible and to stop the loss of jobs. And yet, the issue as to whether wages in Spain have or have not adjusted downwards in recent years, and to what extent, remains a topic of interest.

Recently published statistics have shown a significant decrease of average labor earnings in Spain. But those statistics suffer from the so-called composition bias. They typically look at

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the average level of wages in a given industry, sector, or for a group of workers. But as millions of workers lose their jobs, individuals that remain employed in each industry or sector may be radically different from those that are laid off and this affects the calculation of average wages. For example, if high wage workers lose their jobs at a higher rate than low wage workers, then the average level of wages will show a declining trend simply because the survivors had lower wages to start with. The opposite will happen if low wage workers are the ones being laid off. Thus, statistics that suffer from this composition bias will underestimate or overestimate the degree of wage adjustment depending on whether it is the high or the low wage workers the ones that lose their jobs in larger numbers.

This article provides evidence on the wage adjustment process in Spain after removing the composition bias. This is done using work life histories of 39,188 individuals[2] observed working full-time each quarter for the same firm between 2008 and 2012.[3] The data comes from the Administrative records of the Spanish Social Security database (Muestra Contínua de Vidas Laborales in Spanish) and provides information about the gross monthly salary of each worker, each month, as well as individual and job-related characteristics. Wage trends are computed for each type of job by looking at the wages of workers who remained employed in the same firm during the entire sample period. Because individuals are the same ones during the entire sample period, the main advantage of this procedure is that the data does not suffer from the composition bias, which is present in other statistics.

The wage information comes from individuals that have worked full-time for the same firm, uninterrupted, during the first five years of the economic crisis. Therefore, the wage trends shown must be understood as wage rates for a given job (employee-firm match). These wage trends do not capture the evolution of labor income for a given worker. Workers that have lost their jobs or that were forced to change jobs may have suffered a wage loss considerably bigger than the one shown. To study the evolution of job wage rates, rather than workers' labor income, is interesting because this measure of wages offers a good idea of how the wage setting process has been affected in Spain as a result of the economic crisis.

Main findings

Data show that job wages in Spain continued to increase during most of 2008, 2009 and part of 2010. Wages of high paying jobs started to decrease in 2010, one year earlier than wages of low paying jobs. The increase of wage rates during the first two or three years of the economic crisis is quite shocking given that the economy was losing jobs at a very high speed during those years. Wages decreased in real terms (after controlling for inflation) an average of 4.1% between 2010 and 2012 and a very modest 1.4% since 2008. A big part of this decrease owes to the wage adjustment process in the public sector since private sector wages decreased only 3.4% since 2010 (compared to the 8% decrease in the public sector). This is a very modest adjustment which clearly contrasts with the rapid increase of the unemployment rate during those years.

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Of the 4.1 percentage points decrease since 2010, 1.6 correspond to the period between 2010 and 2011 and 2.5 to the period between 2011 and 2012.

[2] All individuals are males.

[3] Unfortunately, information about 2013 is still unavailable and therefore the analysis covers the years of the economic crisis from 2008 and until 2012.

This indicates that the February 2012 reform has increased wage flexibility in Spain.

A general pattern in the data is that wages have fallen more in jobs that used to pay higher salaries at the beginning of the economic crisis. For example, wages decreased more in white collar jobs, in large firms, in the public sector, and in jobs with older and more educated workers. This last evidence runs counterintuitive to recent claims that the economic crisis has increased income inequality in Spain. If it did, this increase in inequality must have come from other channels, such as different groups of workers losing their jobs at different rates.

Finally, wages have adjusted to a larger extent in the construction sector and in Spanish provinces where the unemployment rate has increased the most. This reinforces the idea that Spanish wages are somewhat flexible in the sense that they have adjusted according to the severity of the negative demand shock in each sector and region.

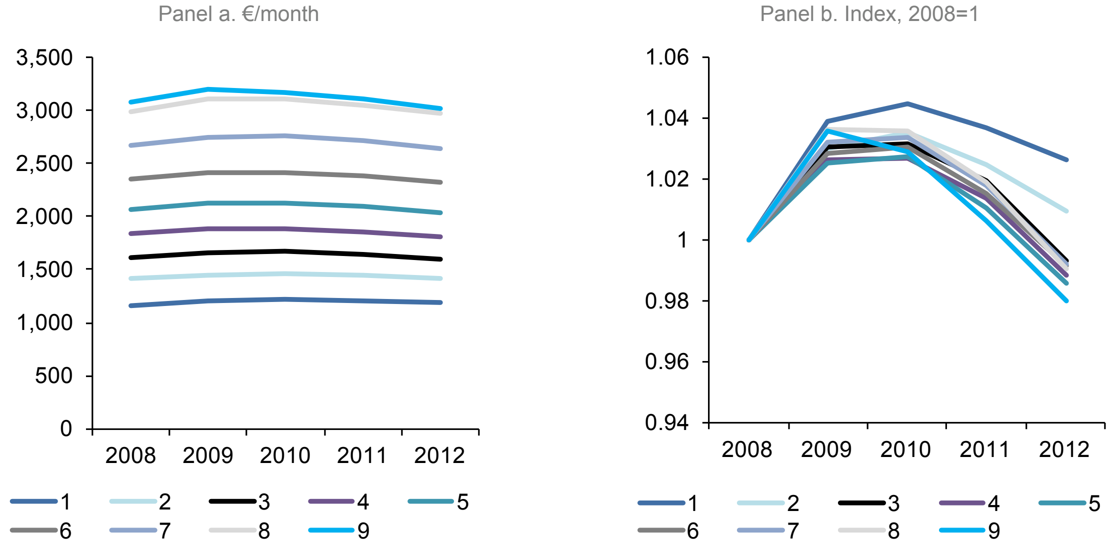
Wage adjustment across types of jobs

This section shows the wage adjustment process for different types of jobs defined by their initial wage level, the size of the firm and the type of contract that the workers in these jobs had at the beginning of the economic crisis in 2008. The exhibits in this section and in the rest of the article all have the same structure, with two panels each. Panel (a) shows the median monthly gross wage from 2008 to 2012[4] and panel (b) shows the rate of change of the same wages by normalizing their value to 1 in 2008.

Exhibit 1 shows the evolution of the gross monthly wage of jobs according to their position in the wage distribution in the first quarter of 2008. Jobs are split in 10 groups. Decile 1 corresponds to the 10% of jobs that paid the least in 2008, decile 10 corresponds to the 10% of jobs that paid the most in 2008, etc.[5] The figure shows that for the majority of jobs, wages increased until 2010. For example,

Exhibit 1

Monthly gross salary by position (decile) in the wage distribution: 2008-2012



Source: Author´s own elaboration and Social Security database *(Muestra Contínua de Vidas Laborales)*.

[4] Wages are expressed in real terms (2008€) and deflated using the *Consumer Price Index.*

[5] The figure omits workers in the 10th decile due to topcoding (i.e., the data does not capture the changes in the salaries of those workers because the information is top coded in Social Security records).

for the median income group (decile 5), salaries increased 2.7% from 2008 to 2010.

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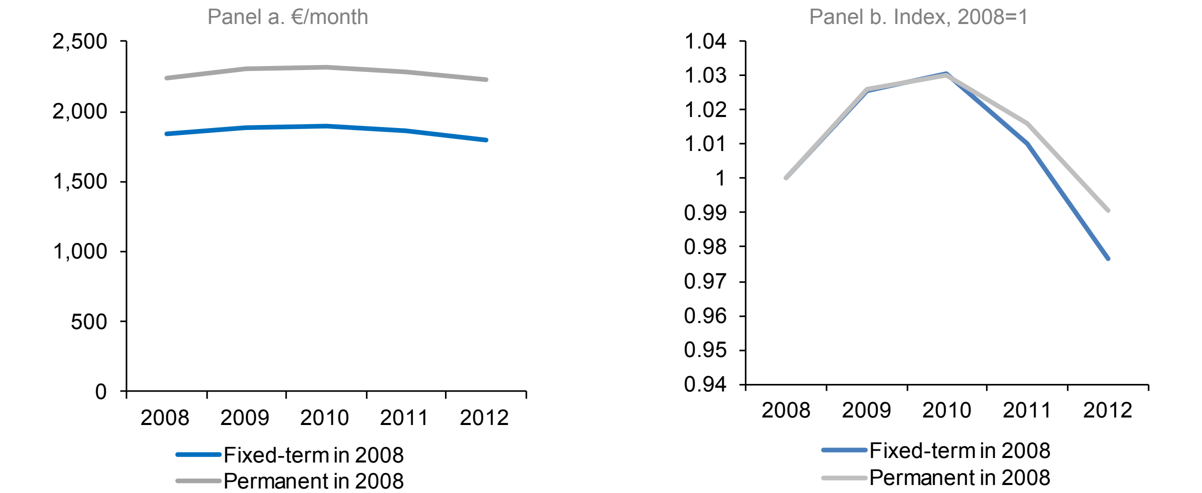
A usual claim is that the economic crisis has caused an increase of income inequality in Spain. The data in Exhibit 1 indicate this increase of income inequality is not due to the wage setting process. In fact, from the figure we can see that wages of low paying jobs (low deciles) increased more than the rest during 2008 and 2009 and continued to increase in 2010 when the wages of high paying jobs started to decline. Furthermore, and since 2010, wage rates decreased more in high paying jobs than in other jobs. For example, whereas the wages of jobs in the 1st decile of the wage distribution declined 1.8%, wages of jobs in the 4th decile decreased 3.8% and top paying jobs, in the 9th decile, lost 4.8%.[6] As a result of this, the ratio of wages of jobs in the 9th decile to jobs in the 1st decile went from 2.64 in 2008 to 2.52 in 2012. The reasons for these trends are unclear, but probably they have to do with wage floors imposed by different types of regulations and the wage setting process in Spain, which ensures that the wages of workers in the low positions of the wage distribution do not fall below a certain level.

It is important to remember that the exhibit shows the wages of jobs by looking at workers that remained employed full-time and for the same firm from 2008 to 2012. Income inequality could still increase if workers that lose their full-time jobs have to rely on lower paying part-time jobs or if displaced workers have to accept lower paying full-time jobs in other firms.

Exhibit 2 shows the change of wages of jobs according to the type of contract (permanent or

Exhibit 2

Monthly gross salary by type of contract in 2008 and year: 2008-2012

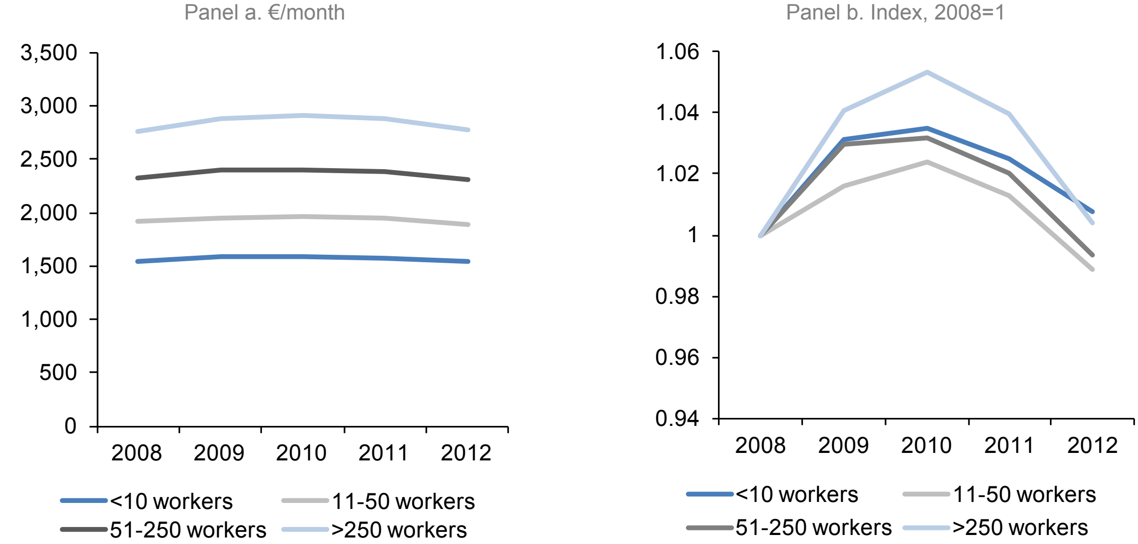


Source: Author´s own elaboration and Social Security database *(Muestra Contínua de Vidas Laborales).*

[6] This data probably underestimates the decrease of the wages of high paying jobs. The reason is that the wage measure in the dataset does not include overtime pay and bonus pay, which is likely more important for high paying jobs and which was probably cut during the economic crisis.

Exhibit 3

Monthly gross salary by firm size and year: 2008-2012



Source: Author´s own elaboration and Social Security database *(Muestra Contínua de Vidas Laborales).*

fixed-term) at the beginning of the economic crisis in 2008. Both types of jobs show the same rate of wage increase until 2010. Since then, the wages of fixed-term jobs have decreased more than the wages of permanent jobs. Wages of fixed-term jobs decreased 5.4% from 2010 to 2012 compared to 3.9% for permanent. According to this evidence, a permanent contract has protected workers in those jobs not only against the possibility of being laid off, but also against a more intense wage reduction.

Exhibit 3 shows the evolution of wages of jobs grouped according to the size of the firm. Although wages of jobs in medium-size firms have experienced the largest loss since 2008, the figure clearly shows that wages have become more flexible in larger firms, with a 5.3% decrease in the last two years. The reasons for this are probably varied. On the one hand, and as the figure shows, real wages in firms of more than 250 employees had increased significantly before 2010. On the other hand, the February 2012 reform has allowed firms to deviate from collective agreements signed at the sector or regional level. Although all firms can potentially use the leeway granted by the reform, it is large firms the ones better endowed with the skills and resources to negotiate their own wage agreement. Finally, wages are on average higher in very large firms, which gives those firms more scope for wage reductions in the midst of a recession.

Wage adjustment across jobs defined by worker characteristics

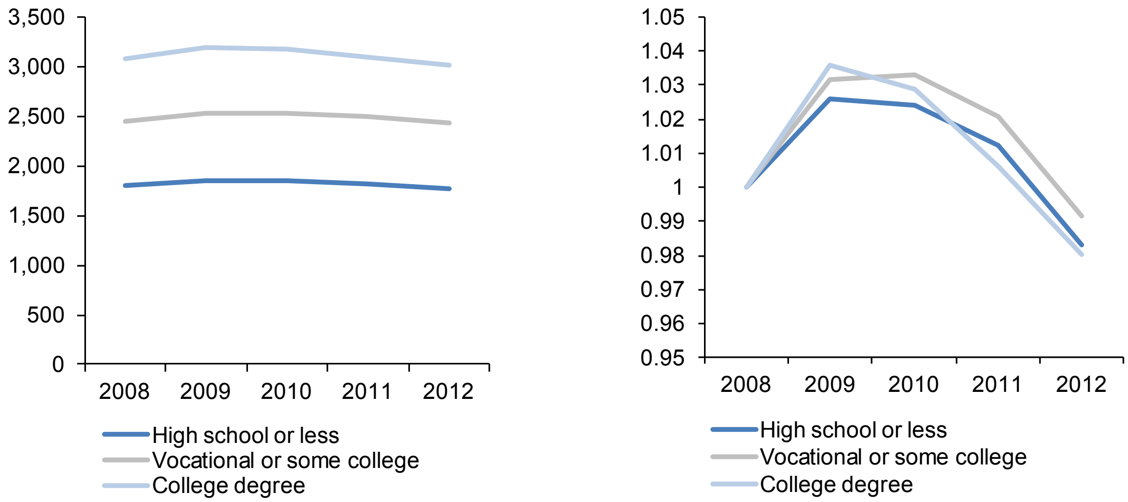
This section looks at the evolution of wages of jobs according to the characteristics of workers in those jobs: their level of education, the type of occupation they had in 2008 and their age in 2008. In general, workers with higher initial earnings have suffered a more drastic wage decline in the period between 2010 and 2012. Wages have decreased more in white collar jobs, in jobs with more educated workers and for older workers.

Exhibit 4, shows the wage evolution of jobs of workers with different levels of education. The salaries of jobs with college educated workers

Exhibit 4

Monthly gross salary of workers by their level of education: 2008-2012

Panel a. €/month　　　　Panel b. Index, 2008=1

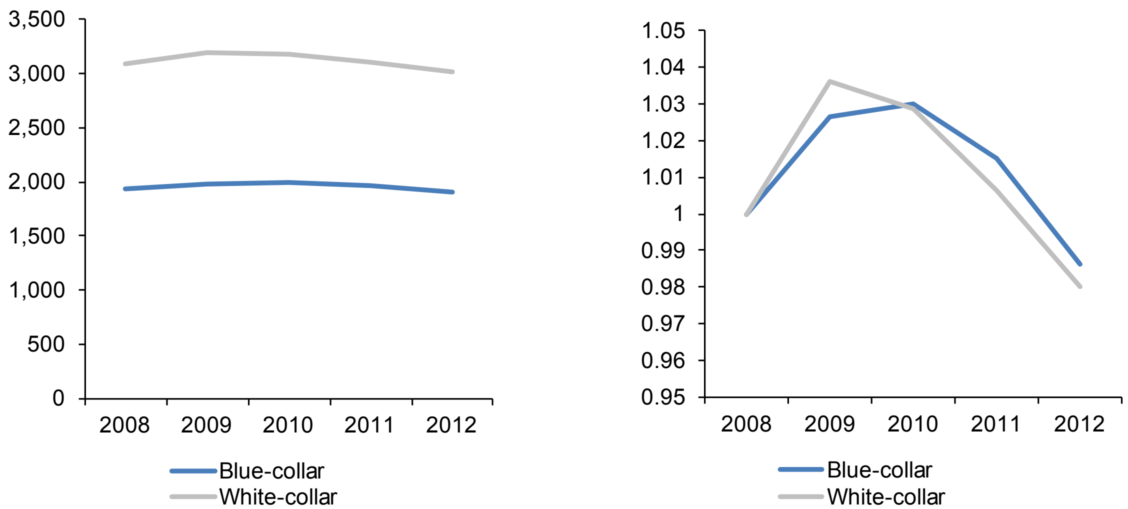


Source: Author´s own elaboration and Social Security database *(Muestra Contínua de Vidas Laborales).*

Exhibit 5

Monthly gross salary of workers by their type of occupation in 2008: 2008-2012

Panel a. €/month　　　　Panel b. Index, 2008=1

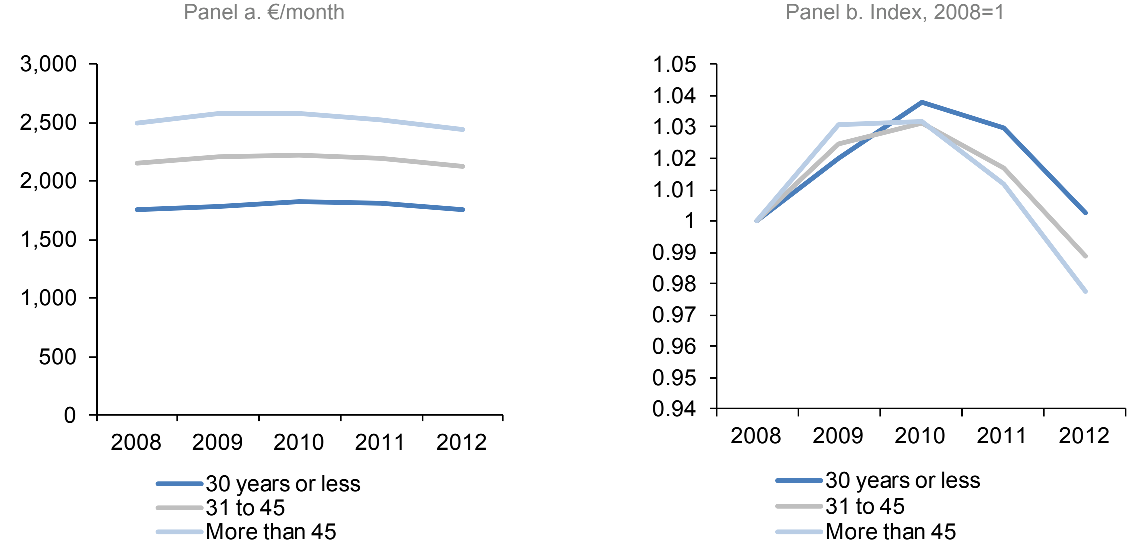


Source: Author´s own elaboration and Social Security database *(Muestra Contínua de Vidas Laborales).*

have decreased the most. Since their peak value in 2009, wages in those jobs have declined 5.6%. Instead, wages of jobs with less educated workers have lost on average 4.2% during the same years. The pattern is similar if instead of looking at the level of education, we focus on the type of occupation in 2008. This is shown in Exhibit 5. Whereas wages of blue-collar jobs decreased

Exhibit 6

Monthly gross salary of workers by their age in 2008: 2008-2012



Source: Author´s own elaboration and Social Security database *(Muestra Contínua de Vidas Laborales).*

4.3% since 2010, white collar wages declined 5.6% and started to decrease one year earlier. Finally, Exhibit 6 shows that jobs with older workers have lost 5.4% compared to jobs with workers less than 30, who lost 3.5% in real terms. This evolution implies a significant reduction of wage inequality between workers of different ages. For example, whereas in 2008 workers above 45 earned 42% more on average than workers below 30, this gap decreased to 38% five years later.

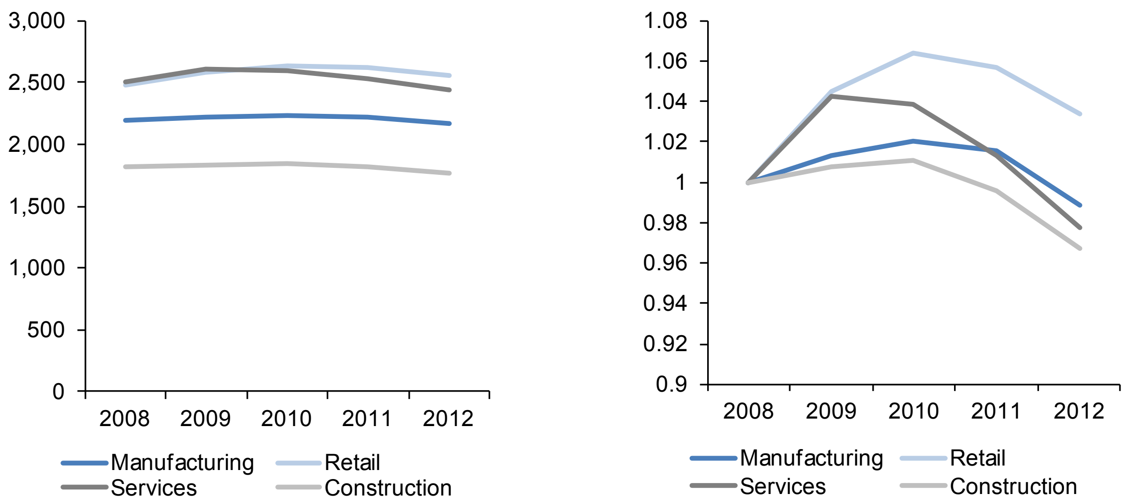
Wage adjustment by sector and region of employment

This section examines the evolution of wages of jobs in different sectors of the economy and in different regions. The recession has affected each economic sector and region with different intensity. For example, job destruction has been particularly severe in the construction sector where 65% of the jobs in 2008 are lost. Also, each Spanish province has seen its unemployment rate increase at a different speed, which probably reflects their different sector specialization as well as labor supply components. An interesting question is whether wages have adjusted downwards more in sectors or in provinces where the job destruction process has also been more intense. After all this is what one would expect in a flexible labor market where wages respond to demand and supply conditions.

Exhibit 7 shows the wages of jobs in manufacturing, retail, services or construction. Construction jobs are the ones experiencing the biggest drop in wages since 2008 (3.3% since 2008 and 4.4% since the peak value in 2010). This is consistent with the idea that wages have fallen more in the sectors more severely hit by the economic recession. The same idea arises from Exhibit 8, from comparing across the 52 Spanish provinces the change in wages from 2010 to 2012 with the increase of the rate of unemployment. The figure includes the linear trend that best fits the data. On average, wages decreased more in the provinces that had the largest increase of unemployment. The correlation coefficient between these two variables is negative and large (-0.39).

Exhibit 7

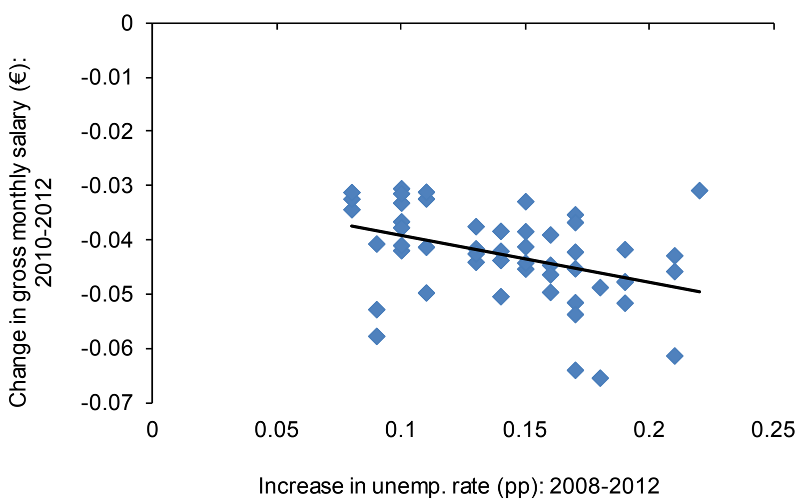
Monthly gross salary of workers by their sector of employment in 2008: 2008-2012



Source: Author´s own elaboration and Social Security database *(Muestra Contínua de Vidas Laborales).*

Exhibit 8

Change in salaries and change in the rate of unemployment across Spanish provinces: 2008-2012



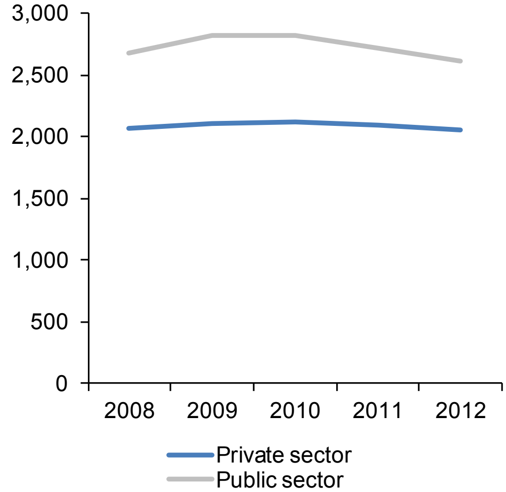
Source: Author´s own elaboration and Social Security database *(Muestra Contínua de Vidas Laborales).*

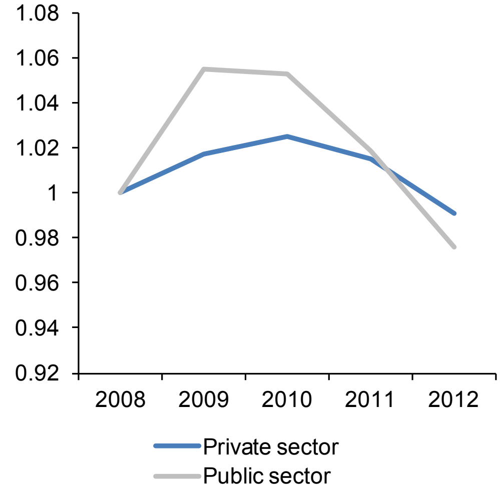
Wage trends in the public and the private sectors

Public sector wages have traditionally behaved independently of the economic cycle. Wages in the public sector are set by law, rather than by demand and supply forces and therefore could potentially be quite rigid in the face of a changing economic situation. However, the Spanish government has been under stress due

Exhibit 9

Wage trends in the public and the private sectors: 2008-2012





Source: Author´s own elaboration and Social Security database *(Muestra Contínua de Vidas Laborales).*

to its growing deficit and public debt. International financial markets and international institutions have pushed the Spanish government to take significant fiscal consolidation measures since 2010. An important question is whether the evolution of wages in the public sector reflects these fiscal consolidation efforts and whether wages in the public sector behaved differently or not from wages in the private sector.

An important question is whether the evolution of wages in the public sector reflects fiscal consolidation efforts and whether wages in the public sector behaved differently or not from wages in the private sector. All in all, the wage adjustment process has been more intense in the public sector than in the private sector since 2008.

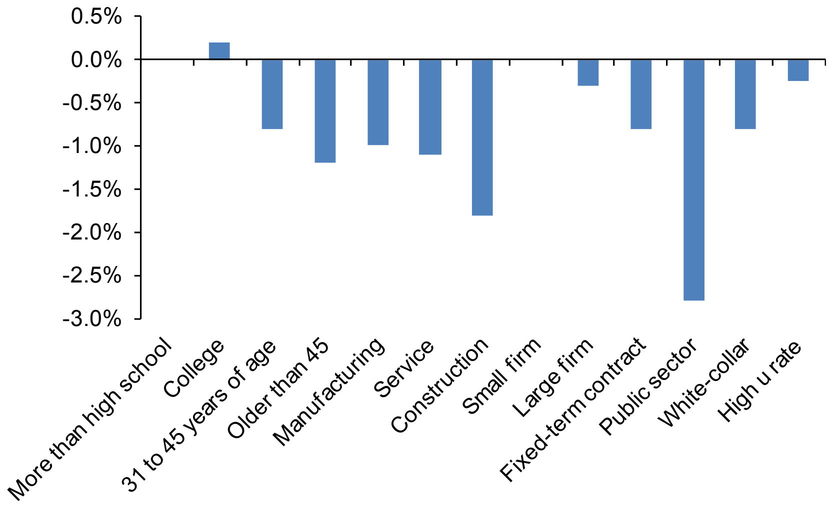
Exhibit 9 shows how differently wages in the public sector behaved compared to the wages in the private sector. In the public sector, wages increased a remarkable 5.5% during 2009, to then decrease 8% until 2012. This contrasts with wages in the private sector, which decreased a more modest 3.4% since its peak value in 2010. All in all, the wage adjustment process has been more intense in the public sector than in the private sector since 2008, with public sector jobs losing 2.4% compared to 0.8% in the private sector.

Regression analysis

Exhibits 1 to 9 have looked at the impact of job characteristics on the evolution of wages. The problem of this type of analysis is that often one or more of those characteristics are correlated with each other, which complicates the interpretation of the results. For example, wages decreased more in the public sector and in white collar jobs. But if public sector jobs are mainly white collar jobs, we do not know if the result that we find is due to the fact that these jobs are public sector jobs, or to their white collar attribute (or to both). Regression analysis offers a solution to this problem by looking at the effect of one variable after controlling for the value of others. Exhibit 10 shows the result of this type of analysis.

Exhibit 10

Impact of each job related attribute on the rate of wage decrease



Source: Author´s own elaboration and Social Security database *(Muestra Contínua de Vidas Laborales).*

Exhibit 10 shows the coefficient or the magnitude of the impact of each variable on the rate of change of wages since 2010, the years of the biggest drop in salaries. The results of this analysis in general confirm the previous findings. With the only exception being education, which now is not a significant factor, wages decreased more in jobs of older workers, in jobs in construction, in white collar jobs, in large firms, in the public sector and in provinces where unemployment increased the most.

In sum, this analysis confirms that wages in Spain have adjusted downwards in response to adverse demand shocks of various degrees across sectors and provinces. It also confirms the finding that the burden of the wage adjustment process has fallen more heavily on public sector workers and on workers in jobs that paid higher wages before the economic crisis started.