WAGE RESPONSE TO CHANGES IN THE CYCLICAL SITUATION: AN ESTIMATE BASED ON MCVL SOCIAL SECURITY ADMINISTRATIVE LABOUR RECORDS

The authors of this article are Mario Izquierdo and Sergio Puente, of the Directorate General Economics, Statistics and Research.

Introduction

Numerous studies have been published on how wages respond to changes in the economic situation. This research, summarised, for example, in Pissarides (2009), tends to find procyclical behaviour of wages in the United States and various European countries, i.e. wages tend to grow in economic upturns and fall in downswings. These same studies find that wages are more closely related to labour market conditions in the case of new job entrants.

In Spain, the available evidence on this question is scant. Recently, De la Roca (2014) found weakly procyclical behaviour of wages in Spain based on information in the *Muestra Continua de Vidas Laborales* (social security administrative labour records – hereafter "MCVL" by the Spanish abbreviation). This article summarises the main findings of a recent study[1] which estimates the degree of procyclicality of wages in Spain between 1987 and 2013 using the same database and analysing possible differences in the degree of wage response in the various phases of the business cycle. In principle, nominal or real downward wage rigidities induce a lower wage response in recessions,[2] but the empirical evidence of differences throughout the business cycle is scant and inconclusive.[3]

The rest of the article is organised as follows. Section 2 briefly describes the data and the methodology used, Section 3 sets out the main results, discussing the possible differences between different types of workers according to years of service and type of contract, and Section 4 analyses the differences in wage response in the last two recessions.

Data and methodology used

A robust analysis of the cyclical behaviour of wages requires individual information on the wages received and on the characteristics of the workers considered, since aggregate data are strongly affected by changes in the composition of employment and by the potential differences between different types of workers. Hence their use may bias estimates notably. This study uses the MCVL, a database which provides individual information on the complete working life of a random sample of 4% of workers registered with the social security system at some time between 2005 and 2013. For these workers, the MCVL contains information on all transitions in the labour market since 1980.

The analysis focuses on private-sector workers and the wage variable is defined as the real daily wage[4] of all those who were employed full-time for at least seven days of work in a particular month. The wages received are proxied by the social security contribution base, which coincides with the wage actually received by most workers, except for those whose wage is higher than the maximum contribution base. These latter workers are excluded from the analysis.[5]

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1 See P. Font, M. Izquierdo and S. Puente (2015), *Real wage responsiveness to unemployment in Spain: Asymmetries along the business cycle,* Documentos de Trabajo, n.º1504, Banco de España.

2 Dickens *et al.* (2007) show the presence of rigidities of this type in an extensive group of countries.

3 For example, Cervini Pla *et al.* (2013) estimate for the United Kingdom a greater cyclicality in recessions and Martins (2007) reports similar results for Portugal. By contrast, Shin and Shin (2008) report the opposite result for the United States, i.e. wage cyclicality is greater in expansionary periods.

4 Using the CPI as deflator.

5 Although the results do not change if they are included and, moreover, De la Roca (2014) used the MCVL tax data for the period 2004-2013 to find a degree of cyclicality which was very similar to that estimated in this study.

The empirical model used is an equation in which workers' monthly wage is related to a set of characteristics, including age, work experience, contract type, educational level,[6] and economic sector. The variable used to capture the impact of the business cycle on wages is the unemployment rate, lagged by four quarters because wages usually take time to react to changes in the economic situation. Finally, this wage equation also includes an individual fixed effect to capture unobservable worker characteristics which may affect aggregate wage behaviour.

To analyse the wage response in the various phases of the business cycle, we examined the expansionary periods (defined as those in which the year-on-year change in employment is positive) separately from the contractionary periods (negative year-on-year change in employment). Furthermore, the level of unemployment may also affect the degree of wage responsiveness, so the periods in which the unemployment rate is above the average for the period in question are distinguished from those in which it is below it. This distinction allows us to estimate, for example, whether the downward pressure on wages in a recession is more intense when the recession is longer and unemployment is high or whether, on the contrary, the discouragement effect on job searchers may mitigate this response.

To consider all these situations, the business cycle is divided into four phases. The first is characterised by a recession situation (employment is falling) and a high level of unemployment (above the historical average). In the second phase, employment begins to recover, but the economy is still beset by high levels of unemployment. The third phase is described as a situation of job growth and low levels of unemployment. Finally, in the fourth phase the economy enters recession, but still has a low unemployment rate.

Wage response to the economic situation

The top part of Table 1 shows the estimates for the period from 1987 to 2013. It is found that real wages, after taking into account changes in the composition of employment, are procyclical, i.e. the coefficient which relates the changes in real wages to the unemployment rate is negative. Thus real wages tend to decrease when the unemployment rate rises, and to increase in periods in which the unemployment rate is falling. This relationship does not, in any event, seem to be constant over the various phases of the business cycle. In particular, the reaction of wages in recessions is smaller than that observed in expansions. In recessions, irrespective of the level of the unemployment rate, it is found that an increase in the unemployment rate of one percentage point (pp) reduces real wages by 0.24%, while in expansionary periods a larger cyclical response of wages is observed. This response is estimated at between 0.38% and 0.48% depending on the level of unemployment, so that in the initial stages of expansions, when unemployment is still high, wages tend to respond less to the improvement in the economy than when unemployment has dropped below its historical average.

These estimates have lower values than those determined for other countries using similar methodologies. For example, Pissarides (2009) summarises the cyclical nature of real wages in the United States and some European countries, and observes that the wage response to an increase of 1 pp in the unemployment rate is usually above 1% in the case of the United States, although with large differences between different types of workers depending on their experience in the labour market. The results for different European countries also tend to put the values of this elasticity at above 1%, particularly in the United Kingdom,[7] but also in Germany, Italy and Portugal.

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6 Proxied by the social security contribution group.
7 With a semi-elasticity of nearly 2, according to Deveraux and Hart (2006) and Peng and Siebert (2007)

TABLE 1

	Recession high unemployment (1)	Test 1 = 2	Expansion high unemployment (2)	Test 2 = 3	Expansion low unemployment (3)	Test 3 = 4	Recession low unemployment (4)	Test 4 = 1
Total sample	-0.243***	***	-0.383***	***	-0.481***	***	-0.245***	NO
	(0.038)		(0.041)		(0.067)		(0.065)	
By worker length of service								
Less than 1 year: new hires	-0.416***	***	-0.548***	**	-0.649***	***	-0.408***	NO
	(0.045)		(0.048)		(0.079)		(0.077)	
Less than 1 year: job change	-0.333***	***	-0.484***	NO	-0.533***	***	-0.315***	NO
	(0.044)		(0.047)		(0.076)		(0.075)	
Between 1 and 2 years	-0.350***	***	-0.486***	**	-0.584***	***	-0.282***	NO
	(0.047)		(0.051)		(0.083)		(0.081)	
Between 2 and 4 years	-0.274***	***	-0.456***	***	-0.599***	***	-0.267**	NO
	(0.047)		(0.051)		(0.083)		(0.082)	
Between 4 and 6 years	-0.237***	***	-0.381***	***	-0.533***	***	-0.298***	NO
	(0.040)		(0.043)		(0.070)		(0.068)	
Over 6 years	-0.130***	***	-0.253***	***	-0.333***	***	-0.134*	NO
	(0.033)		(0.036)		(0.058)		(0.057)	
By type of contract								
Permanent	-0.207***	***	-0.345***	***	-0.466***	***	-0.209**	NO
	(0.041)		(0.044)		(0.071)		(0.070)	
Temporary	-0.431***	***	-0.520***	*	-0.587***	***	-0.414***	NO
	(0.043)		(0.046)		(0.074)		(0.072)	

SOURCE: Banco de España.
NOTE: ***, ** and * denote significance of 1%, 5% and 10%, respectively.

a The results show wage semi-elasticity to the unemployment rate. Standard errors in brackets.

To attempt to interpret this lower elasticity of wages to unemployment, we analyse below the differences by years of worker service, a variable which in other countries is closely related to the degree of cyclical sensitivity of wages. For this purpose, the middle part of Table 1 sets out the results of an estimation exercise which identifies six categories of workers based on their years of service with the company, and distinguishes, in the case of those with less than one year's service, between new hires drawn from the unemployed and those coming from another job.

The differences in wage responses between the four cyclical phases defined above are similar for the six years-of-service categories, although in all cases the cyclical sensitivity of new labour market entrants is higher. In particular, it is estimated that the wage response to a change of 1 pp in the unemployment rate ranges from –0.41 in recessions to –0.65 in expansionary periods with low unemployment, these values all being lower than those reported in other countries.[8] Also, as the length of service in the company increases, the cyclical response of wages decreases. In fact, for workers with more than six years'

8 Pissarides (2009) reports elasticities above 2 for the United States and the United Kingdom, and Carneiro *et al.* (2012) around 2.5 for the Portuguese labour market.

TABLE 2

	Early 1990's recession (1)	First phase of the last recession (2)	Second phase of the last recession (3)	Expansion high unemployment (4)	Expansion low unemployment (5)
Total sample	-0.239***	-0.135**	-0.260***	-0.367***	-0.435***
	(0.061)	(0.042)	(0.043)	(0.050)	(0.069)
Test 1=2	NO				
Test 1=3	NO				
Test 2=3	***				

SOURCE: Banco de España.
NOTE: ***, ** and * denote significance of 1%, 5% and 10%, respectively.

a   The results show wage semi-elasticity to the unemployment rate. Standard errors in brackets.

service, the relationship of wages to the business cycle is very loose, with a coefficient of –0.13 in recessions and of –0.33 in upturns.

Given the characteristics of the Spanish labour market, with its high incidence of temporary employment, we examine below whether there are differences in the degree of cyclical sensitivity of wages according to the type of employment contract. The bottom part of Table 1 shows that the wages of workers with temporary contracts are more sensitive to changes in unemployment rate than those of workers with permanent contracts. Indeed, in the first case wages are nearly twice as sensitive to rises in unemployment when the economy is in recession and unemployment is high than in the case of permanent employees (0.43 compared with 0.21). These differences hold more or less constant across the various phases of the business cycle, although when the economy enters an expansionary phase and unemployment is already low, the largest increase in sensitivity is among permanent workers and the difference from temporary workers becomes insignificant.

Differences between different recessions

This section analyses to what extent it is possible to identify differing wage behaviour in the past crisis and in the early 1990s crisis. Some factors, such as the greater length or depth of the crisis initiated in 2008 compared with that in the early 1990s, or the introduction of labour market reforms in 2010 and 2012, may have prompted differences in the strength of wage responses, particularly insofar as the regulatory reform made companies more able to adjust employment conditions to changes in the cyclical situation, by, for example, setting more flexible conditions for opting out of collective bargaining agreements and for changing conditions of employment.

To carry out this analysis, five sub-periods were defined: the early 1990s recession (from 1991 Q1 to 1993 Q3), the first phase of the last recession (from 2008 Q3 to 2012 Q2), the second phase of the last recession (from 2012 Q3 to 2013 Q4) and the two expansionary periods with a high and a low level of unemployment, respectively, defined in the previous section. Therefore excluded from this analysis is the recovery phase which has been under way for the past two years.

The results show some differences in wage response in the three recessions (see Chart 2). Specifically, in the early 1990s crisis, wage elasticity to the unemployment rate was

9   This finding agrees with the results of Puente and Galán (2014), who reported an increase in real wages in the first phase of the 2008 crisis, even controlling for the main changes in the composition of employment.

estimated at –0.24, very close to the figure estimated for the second phase of the last crisis (–0.26). However, in the first phase of the last crisis the wage response to the sharp deterioration of the economic situation was very modest (–0.14).[9] The greater sensitivity of wages from 2012 seems to be in line with firms' greater use of the possibility offered to them by the new regulatory framework to adjust employment conditions to the economic situation. However, there are other factors, such as the greater length and depth of the crisis, which may explain this higher response. Further, the elasticity estimated for the period from 2012 is no higher than that estimated for the 1990s recession and below the available estimates for other countries.

In short, the analysis in this article indicates that wages tend to react procyclically to changes in the labour market situation, i.e. they tend to rise when unemployment decreases, and vice versa. In any event, the link between wages and the labour market situation is weaker than that estimated for other countries using similar methodologies. Further, the sensitivity of wages to unemployment is not constant along the business cycle. Specifically, real wages tend to be more sensitive to decreases in unemployment in upturns and less sensitive in recessions, due to the existence of downward rigidities. This general pattern holds when the differences between different types of workers are analysed, particularly those in length of service or type of contract, although the procyclicality of wages is lower for individuals with long service and permanent contracts, who, moreover, exhibit high asymmetry between expansions and recessions.

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