Economics Bulletin

Volume 40, Issue 3

The Spanish cyclicality of the user cost of labour

Juan A. Sanchis-llopis
Universidad de Valencia and ERICES

Antonio Cutanda
Universidad de Valencia

Abstract

This paper contributes to the study of the Spanish unemployment puzzle: while unemployment and temporary employment rates are among the highest in the E.U., productivity is very low and wages show a rigidity similar to other European countries. We estimate the sensitivity of the user cost of labour (and wages) to aggregate unemployment (i.e., cyclicality), using a pseudo-panel built by combining two Spanish microeconomic surveys (the Labour Force Survey and the Family Expenditure and Income Survey) for the period 1987-1997. We find that the user cost of labour is more procyclical than average wages, what provides evidence of wage rigidity.

This work was supported by the Spanish Agencia Estatal de Investigación and Fondo Europeo de Desarrollo Regional (grant numbers ECO2017-86793-R and ECO2017-84632-R, AEI/FEDER, UE) and Generalitat Valenciana (grant number PROMETEU/2019/095).
Citation: Juan A. Sanchis-llopis and Antonio Cutanda, (2020) "The Spanish cyclicality of the user cost of labour", *Economics Bulletin*, Volume 40, Issue 3, pages 1893-1899
Contact: Juan A. Sanchis-llopis - sanchisl@uv.es, Antonio Cutanda - antonio.cutanda@uv.es.
Submitted: January 21, 2020. **Published:** July 14, 2020.

Economics Bulletin

Submission Number: EB-20-00051

THE SPANISH CYCLICALITY OF THE USER COST OF LABOUR

Juan A. Sanchis-llopis
Universidad de Valencia and ERICES

Antonio Cutanda
Universidad de Valencia

Abstract

In this paper we contribute to the study of the Spanish unemployment puzzle. We introduce the user cost of labour in the analysis (instead of wages) as this might be the relevant price for firms considering to hire a new worker. We construct a pseudo-panel by combining two Spanish microeconomic surveys (the labour and the family expenditure surveys), and estimate that the user cost is more procyclical than average wages.

This work was supported by the Spanish Agencia Estatal de Investigación and Fondo Europeo de Desarrollo Regional (grants ECO2017-86793-R and ECO2017-84632-R, AEI/FEDER, UE) and Generalitat Valenciana (grant PROMETEU/2019/095).
Submitted: January 21, 2020.

1. Introduction

The analysis of labour cost cyclicality, that is, the cost of labour that companies face over the business cycle, is key for understanding the functioning of the labour market. In the case of Spain, this issue is particularly interesting given the peculiarities of its labour market. Spain has experienced some of the highest unemployment rates in Europe, well above the European average rate, for a long period (for instance, in 2018, average rates were 15.3% and 8.2%, respectively).[1] Further, the percentage of fixed-term labour contracts, that were introduced in Spain in 1984 to alleviate unemployment rates that back then were above 25%, is currently among the highest in Europe, around 26.9% in 2018. The Spanish labour market has also other adverse characteristics, such as a high degree of segmentation and an especially low rate of investment in human capital.[2]

The aim of this work is to estimate the sensitivity of the user cost of labour (and wages) to aggregate unemployment over the business cycle, i.e., to study the cyclicality of the user cost of labour (and wages). For this purpose, we follow Kudlyak (2014), who argued that wages might not be a good measure for the price of labour, as salaries may be considered as an instalment payment for an implicit contract. Kudlyak (2014) proposed the concept of the *user cost of labour* as the appropriate measure for the market price of labour, assuming that labour is a quasi-fixed input with adjustment costs. The idea is as follows. In downturns unemployment rises and market salary falls. However, if the workers in payroll wages are maintained, the cost of using those workers rises. The existence of a larger cyclicality of the user cost as compared to wages, would indicate the existence of wage rigidity. In other words, the existence of a gap between the average wage and the user cost of labour might produce different estimates for cyclicality, which would provide evidence of wage rigidity. The fact that during the period of analysis, the unemployment average rate in Spain was about 16%, suggests the existence of a gap between market salary and the user cost of labour.

In the empirical approach we use a pseudo-panel data set built by combining the Spanish Labour Force Survey (*Encuesta de Población Activa,* EPA) and the Family Expenditure and Income Survey (*Encuesta Continua de Presupuestos Familiares,* ECPF), for the period 1987-1997. We consider that pseudo-panel data might be more appropriate to study cyclicality than aggregate data, given that aggregate information implicitly assumes that the labour force composition remains constant over the cycle (Bils, 1985). To anticipate our results, we obtain that cyclicality is higher for the user cost of labour as compared to average wages, in accordance with the findings of Kudlyak (2014). Further, and as expected, the user cost cyclicality is similar to that obtained using the average wage of *movers* (those workers switching from unemployment to employment), confirming that wages for these workers are theoretically closer to their real user cost (Kudlyak, 2014).

We contribute to the labour literature in that we are the first study to estimate the cyclicality of the user cost of labour in Spain following Kudlyak (2014). A number of studies have analysed wage cyclicality in Spain, such as De la Roca (2014) and Font et al. (2015), and have obtained a low estimated wage elasticity as compared to some European countries and the U.S. These results might be explained by the limitations of the (tax records) data these authors use. In contrast, by combining the information of two surveys, we are able to build a

[1] See EUROSTAT for comparative data.

[2] The labour market in Spain also shares some common trends with other developed countries. Bentolila et al. (2008) found that the Spanish Phillips curve had flattened during the last decades, in a similar way to other developed countries. Montuenga et al. (2003) showed that both the wage curve and the (nominal and real) wage rigidity in Spain are similar to those found in other western countries.

pseudo-panel that is more appropriate to estimate the cyclicality of both wages and the user cost of labour.

The structure of the rest of this work is as follows: in section 2, we present the data and methodology; section 3 analyses the results, and section 4 concludes.

2. Data and methodology

The dataset we use in this research is built by combining information from the Spanish Labour Force Survey (EPA) and the Family Expenditure and Income Survey (ECPF), for the period 1987:Q1 to 1997:Q1. To combine these two data sets, we use pseudo-panel data techniques. We construct a synthetic panel, based on the age of the head of the household (Browning et al., 1985)[3], to merge information from these two statistical sources: the consumption (ECPF) and labour (EPA) surveys. To build the pseudo-panel, we select in both surveys only those households with a non-retired male being the only member receiving labour income. We discard households whose head is unemployed or self-employed. By applying these selection criteria, we guarantee that we can merge labour income declared by these males in the ECPF with the hours declared (by the same males) in the EPA. These two surveys have quarterly periodicity: the first period is 1987:Q1, and the last one is 1997:Q1, therefore we have 41 points in data.[4] In the empirical analysis we use six cohorts of 5-year bands for the age of the head of the household, being the minimum and maximum ages 23 and 52, inclusive, in 1987 (34 and 63, respectively in 1997).[5] To obtain wages we divide cohort labour income (from the ECPF) by the hours worked (reported in the EPA) in the same cohort.

We estimate the cyclicality of the user cost of labour (and wages) as a semi elasticity with respect to the unemployment rate. The unemployment rate has been taken from the Spanish National Statistical Institute (INE). To calculate the user cost, we follow Kudlyak (2014) and assume an economy where firms and workers live infinitely, and where firms maximize profits using a production function with labour as the only input, and with constant returns to scale. In this framework, in each period the firm decides whether to hire a worker or postpone this decision. We assume that the probability of a previously employed worker being fired by the firm is δ (δ>0, exogenously determined). In Kudlyak (2014) approach firms consider labour as a fixed factor, and remunerate the average employee above the market wage, implying that the average wage would be different than the user cost of labour. Therefore, the user cost of labour is the relevant variable for the hiring decision. In this approach, firms compare all the expenses associated with hiring a worker in period t with those associated with doing it in the next period. Hence, the user cost of labour in t, UC_t^W, will be given by the following expression:

$$UC_t^W \equiv E_t\left(PDV_t - \beta\left(1-\delta\right)PDV_{t+1}\right) \equiv w_{t,t} + E_t\sum_{\tau=t+1}^{\infty}\left(\beta\left(1-\delta\right)\right)^{\tau-t}\left(w_{t,t} - w_{t+1,\tau}\right) \qquad (1)$$

where PDV_t is the present value of wages paid to a worker hired in period t, β is the discount factor, $0<\beta<1$, δ is the probability that an employee gets fired, and E_t is the expectations

[3] In our approach, we follow Arellano and Meghir (1992) who combine the Labour Family Survey and the Family Expenditure and Income Survey.

[4] As our data covers the period 1987:Q1-1997:Q1, the sample includes workers with fixed-term contracts (introduced in Spain in 1984) and workers with permanent contracts.

[5] More detailed information for the pseudo-panel data we have built may be found in Cutanda and Sanchis-Llopis (2019).

operator conditional to the information available at t. The user cost of labour is equalised to the last expression in equation (1), where $w_{t,t+j}$ is the wage paid in $t+j$ to a worker hired in period t,. Therefore, the user cost of labour in t is the hiring wage in that period plus the discounted sum of future changes in hiring wages. It is relevant to realise that the difference between the wage paid and the user cost would disappear if labour were fully flexible. However, as pointed out by Kudlyak (2014), this does not occur when labour contracts intend to protect firms and workers against fluctuations, or when new hired and ongoing workers are different in quality.

As the labour user cost is unobservable, we estimate it using the present discounted value of future wages. To obtain it, we first eliminate from wages the individual-specific effects using the following estimating equation:

$$\ln w_{t,\tau}^{c} = \beta_0 + \beta_1 X_{\tau}^{c} + \beta_2 \sum_{d_0=1}^{T} \sum_{d=d_0}^{T} X_{d_0,d} D_{d_0,d}^{c} + \beta_3 \tau + \alpha^{c} + \varepsilon_{\tau}^{c} \tag{2}$$

where $w_{t,\tau}^{c}$ is the wage for cohort c workers in quarter τ, hired in quarter t, β_0 is a constant, X_{τ}^{c} is a vector of cohort and job-specific characteristics (i.e., education, a quadratic in tenure, a quadratic in potential labour market experience, and dummies for fixed-term contracts, working part-time work, working in the public sector and working in seasonal activities);[6] $D_{d_0,d}^{c}$ is a dummy variable that takes value 1 if $d_0=t$ and 0 otherwise, τ is a vector of quarterly dummies, and α^{c} is a cohort-specific effect, τ.[7] Finally, ε_{τ}^{c} is an error term with the usual properties.

Estimation of equation (2), using fixed-effects panel-data procedures, allows predicting the expected wages for all t and τ. Introducing these wages into equation (1) we obtain a measure for the user cost of labour.[8] Finally, with this measure for the user cost, we study cyclicality using the following estimating equation:

$$\log \widehat{UC}_{\tau}^{W,c} = \alpha_0 + \alpha_1 u_{\tau} + \alpha_2 X_{\tau}^{c} + \alpha_3 trend + \alpha_4 \tau + \alpha_5 \eta_j + \alpha^{c} + \xi_{\tau}^{c} \tag{3}$$

where $\widehat{UC}_{\tau}^{W,c}$ is the estimated user cost of labour for cohort c, u_{τ} is the unemployment rate, X_{τ}^{c} is a vector of cohort and job-specific characteristics (i.e., education, a quadratic in tenure, and a quadratic in potential labour market experience), and we add a trend, quarterly dummies, τ, sector dummies, η_j, and cohort individual effects, α^{c}. Lastly, ξ_{τ}^{c} is an error term with the usual properties. Alternatively, and for the sake of comparability, we run equation (3) using wages instead of the user cost of labour.

---

[6] A description of the variables we use is reported in Table A.1 in the appendix.

[7] $D_{d_0,d}^{c}$ is a dummy variable that takes on value 1 if $d_0=t$ and $d=\tau$, for cohort c, and 0 otherwise. That is, $D_{d_0,d}^{c}$ takes on value 1 for all wage observations in year τ in the employment relationships that start in year t, where $t \in [1, T]$ and $\tau \in [t, T]$.

[8] In equation (1) β is set to 0.99 and δ to 0.0579. Kudlyak (2014) set β to 0.9569 and used a monthly separation rate of 0.029. However, the quarterly periodicity of our data advises using a different value for β. Further, the value we use for δ is the quarterly average between 1991:Q1 and 1997:Q1 using FEDEA data, https://www.fedea.net/datos-mercado-de-trabajo/. Kudlyak (2014) fixed the prediction time horizon in 7 years, while we fix it in 4 quarters. We have checked that the results remain similar with different horizons.

3. Results

Table 1 presents the estimation results for equation (3). In columns 1 and 2 we report the estimates for the specification with the user cost of labour. In columns 3 and 4 we present the estimates for the specification with average wages, in order to compare the results obtained with the user cost and assess whether the user cost is more procyclical than average wages. As a robustness test, we add to these results a specification with the average wages for the sample of *movers*, that is, those workers switching from unemployment to employment (columns 5 and 6).[9]

In all specifications, the variable of interest to analyse cyclicality is the unemployment rate. We also add in every specification, as explained above, job-related controls, a time trend, quarterly dummies and fixed cohort effects. Further, we extend the specifications in columns 2, 4 and 6, with industry dummies. We consider that those specifications with industry dummies are our preferred ones as these dummies clean for potential differences across sectors. In what follows we discuss the results for these specifications (columns 2, 4 and 6).

Table 1. Cyclicality of the user cost of labour *vs* wage.

	User cost of labour		**Wage**		**Movers wage**	
	(1)	(2)	(3)	(4)	(5)	(6)
Unemployment rate	-1.788***	-1.780***	-1.441***	-1.258***	-1.983***	-1.668*
	(0.241)	(0. 384)	(0.229)	(0.338)	(0.630)	(0.952)
Trend	0.030***	0.031***	0.025***	0.022***	0.013***	0.020***
	(0.006)	(0.006)	(0.003)	(0.003)	(0.003)	(0.005)
Fixed effects	YES	YES	YES	YES	NO	NO
Industry dummies	NO	YES	NO	YES	NO	YES
N. observations	296	296	296	296	41	41

Notes:
1. ***, ** and * mean significant at the 1%, 5% and 10% level, respectively.
2. All specifications include job controls and quarterly dummies.
3. See footnote 6 for the definition of wage movers.

The unemployment rate (for the user cost and wage specifications, columns 2 and 4, respectively) is always statistically significant at a 1% level and displays the expected negative sign. As the unemployment rate coefficient is higher in the user cost specification than in the wages one, we may conclude that the cyclicality of the user cost is larger than the estimated value for the average wage. Therefore, the user cost is more procyclical than average wages, pointing to the existence of a gap between the average wage and the user cost of labour. This evidence confirms that average wages have a higher rigidity to changes in unemployment than the user cost. Our results are in line with those obtained in Kudlyak (2014) for the U.S. Further, our estimated wage elasticity is also larger than that obtained by De la Roca (2014) and Font et al. (2015), for Spain.[10]

[9] To obtain the wage for movers, we select from the ECPF (where we can follow individuals across time) all individuals with no income in a quarter and with positive labour income in the following quarter. We combine this sample with the sample of individuals working for three or less months from the EPA, where we cannot track individuals.

[10] The low elasticities these authors obtain might be explained by the data they use (obtained from tax records). This data set might not be appropriate as income is censored in the upper tail of the distribution and it excludes the black economy.

As a robustness test (see columns 5 and 6), we restrict our sample to movers, as the wage for these individuals is theoretically closer to the user cost. The cyclicality estimate we find in this case is very similar to that obtained with the user cost, see columns 2 and 6, although the statistical significance falls to 10% given the reduction in the number of observations for the sample of movers.

4. Conclusions

In this study we have estimated the sensitivity of the user cost of labour to aggregate unemployment over the business cycle, i.e., the cyclicality of the user cost of labour, following the approach of Kudlyak (2014). Further, we have compared this result with the cyclicality estimated using the average wage. As expected, we have found that the user cost of labour is more procyclical than average wages, although the estimate for Spain is still below the estimates obtained for more flexible labour markets (like the U.S. market). These findings indicate the existence of a gap between the average wage and the user cost of labour, suggesting a higher rigidity of average wages to changes in unemployment as compared to the user cost. These results provide evidence in support of wage rigidity in Spain.

Appendix

Table A.1. Definition of variables.

Variable name	Definition
Unemployment rate	Percentage of the labour force that is currently unemployed but is available for working during the period.
Education	Years of schooling (of the head of the household).
Tenure	Number of months working in the current employment (of the head of the household).
Potential labour market experience	Age of the head of the household, minus years of schooling and minus six.
Dummy variable for fixed-term contracts	Dummy variable taking the value of 1 if the head of the household is in a fixed-term contract and 0 otherwise.
Dummy variable for working part-time work	Dummy variable taking the value of 1 if the head of the household is in a part-time job and 0 otherwise.
Dummy variable for, working in the public sector	Dummy variable taking the value of 1 if the head of the household is working in the public sector and 0 otherwise.
Dummy variable for working in seasonal activities	Dummy variable taking the value of 1 if the head of the household is working in seasonal activities and 0 otherwise.
Industry dummies	Ten industry dummies using a the National Classifications of Economic Activities for 1973 and 1993, from INE.

References

Arellano, M. and C. Meghir (1992) "Female Labour Supply and On-the-Job Search: An Empirical Model Estimated Using Complementary Data Sets" *The Review of Economic Studies* **59**, 537-559.

Bentolila, S., J.J. Dolado and J.F. Jimeno (2008) "Does immigration affect the Phillips curve? Some Evidence for Spain" *European Economic Review* **52**, 1398-1423.

Bils, M. (1985) "Real Wages over the Business Cycle: Evidence from Panel Data" *Journal of Political Economy* **93**, 666-689.

Browning, M., Deaton, A.S. and M. Irish (1985) "A Profitable Approach to Labor Supply and Commodity Demands over the Life-Cycle" *Econometrica* **53**, 503-543.

Cutanda, A., and J.A. Sanchis-Llopis (2019) "Intertemporal Substitution for Consumption and Leisure: Empirical Evidence for Spain" *WPAE-2019-1909*, Universidad de Valencia.

De la Roca, J. (2014) "Wage Cyclicality: Evidence from Spain using Social Security data" *SERIEs: Journal of the Spanish Economics Association* **5**, 173-195.

Font, P., Izquierdo, M. and S. Puente (2015) "Real Wage Responsiveness to Unemployment in Spain: Asymmetries along the Business Cycle" *Working paper* 1504, Banco de España.

Kudlyak, M. (2014) "The Cyclality of the User Cost of Labor" *Journal of Monetary Economics* **68**, 53-67.

Montuenga, V., García, I, and M. Fernández (2003): "Wage Flexibility: Evidence from five EU countries based on the Wage Curve" *Economic Letters* **78**, 169-174.