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Abstract

This paper analyzes the existence of a wage curve in Uruguay. We run several models using data for the period 1986-2005. We use two different proxies of the wage and we estimate both micro-data and cell-mean regressions. Besides, we run the model for the whole sample and for groups of individuals disaggregated by level of education, gender, age and occupation. The results are consistent with the range of values found in similar studies for other countries. We find a negative relation between unemployment and wages. Specifically, we obtain an elasticity of -0.09. We find a higher elasticity for the youth, women and less educated workers. We also obtain difference results when disaggregating by occupation and formality. The results suggest that an increase of unemployment pushes up informality and self-employment which lead to a depression of earnings in these sectors. Thus, informality and self-employment would act as a buffer for unemployed formal wage earners.

Resumen

El presente trabajo analiza la existencia en Uruguay de la relación empírica entre salario y desempleo que en la literatura se conoce como "wage curve".Se estiman varios modelos utilizando los datos correspondientes al período 1986-2005. Se utilizan dos aproximaciones para medir el salario, y se estiman a su vez regresiones utilizando micro datos y también regresiones "cell-mean". Además, se estima el modelo para el total de los datos y para diferentes grupos de individuos de acuerdo al nivel de educación alcanzado, sexo, edad y ocupación. Los resultados son consistentes con el rango de valores encontrado en estudios similares realizados para otros países. Se encuentra una relación negativa entre desempleo y salarios; concretamente, se obtiene una elasticidad de -0.09. Se encuentra además una elasticidad mayor para los jóvenes, las mujeres y los trabajadores con menor nivel educativo. Los resultados también difieren cuando se desagrega por ocupación o por formalidad e informalidad. Estos sugieren que un aumento del desempleo produce un aumento de la informalidad y del empleo por cuenta propia, lo cual lleva a una caída de los ingresos en dichos sectores. Por lo tanto, la informalidad y el empleo por cuenta propia estarían actuando como "amortiguador" para los asalariados que quedan desempleados del sector formal.

1. Introduction

Many studies have documented empirical evidence about a negative relationship between wages and unemployment. The empirical strategy consists on estimating an equation that follows the mincerian specification but includes the unemployment rate of the region where the individual works. The estimation allows a measure of the elasticity of wages to unemployment to be obtained.

The so-called wage curve that indicates the existence of negative elasticity has been connected with a non-competitive labor market behavior. For example, the efficiency wages model argues that the firm motivates workers by offering an attractive wage in order to promote effort and/or reduce the quit rate. However, when unemployment increases, the critical wage needed to increase efficiency declines. In turn, in a trade union bargaining model, union power increases when unemployment is low and therefore, wages tend to increase.

Blanchflower & Oswald (1990; 1994) were the first in pointing out the existence of a negative relation between wages and unemployment. These studies were followed by many others referred to different countries and lately, a set of estimations was made for Eastern Europe. In spite of the different point estimations for different countries, their broad conclusion is that the elasticity between wages and unemployment is negative (Nijkamp & Poot; 2005). The estimations by Blanchflower & Oswald (1994) for the United States and United Kingdom are around –0.10. Sanromá & Ramos (2003) estimate an elasticity of -0.13 for Spain. In turn, Hoddinott (1996) find for Cote d'Ivoire an elasticity of -0.12. In Latin America, Berg & Contreras (2004) find an elasticity of -0.08 for Chile. However, criticisms to the estimation methods and issues of identification and measures have led to some skepticism about the existence of an empirical law. This debate motivated that Blanchflower & Oswald (2005) implemented different empirical alternatives to estimate a wage curve for US. Thus, attempting to correct for endogeneity and measurement error, they found evidence consistent with the existence of a wage curve.

Another set of empirical studies focuses on the differences in elasticity among groups of workers that may be explained by the different reactions of the groups to their local labor market. Indeed, in a review of the literature, Barth, Bratsberg, Naylor & Raaum (2002) conclude that there are large differences in wage curve elasticities across groups. Specifically, they focus on how the impact of local labor market conditions varies across union and nonunion workers. They find that the absolute value of the elasticity of wages to unemployment is higher in the nonunion sector than in the union sector for United States, Great Britain and Norway. Longhi, Nijkamp & Poot (2004) study the effects of spatial heterogeneity on the wage curve. They conclude that the estimated value of the elasticity depends on the definition of the "local" market. If the geographical unit of observation does not

accurately represent a local labor market (its borders are ambiguous), the likelihood of finding a wage curve will be lower.

In Uruguay there are no empirical studies about the wage curve. The purpose of this paper is to estimate the wage-unemployment elasticity for 1986-2005. As in different periods the country faced changes in the macroeconomic performance and different labor market institutions, we also estimates the elasticity for sub-periods. Additionally, we make estimations for groups of workers. The paper is structured as follows. In section 2 we briefly introduce the theoretical explanations for the wage curve focusing on the efficiency wage interpretation. In section 3 we analyze the main features of the Uruguayan labor market in the period. In section 4 we describe the data and present the empirical model. In section 5 we present the results and finally in section 6, the main conclusions are drawn.

2. Theoretical interpretations

The evidence of the existence of a wage curve shows that the estimated elasticitiy of earnings with respect to unemployment is stable across countries. Specifically, empirical studies have found a negative short-term relationship between earnings and unemployment.

As pointed out by several authors, this stylized fact does not just reflect a labor offer function. As unemployment decline means an employment increase, we may infer that a contemporaneous wage rise and unemployment decrease could be just the reflection of a movement along an upward-sloping labor supply curve. For this reason, the empirical strategies propose including the employment rate or the labor force participation rate of the region as explanatory variables. The remaining negative relationship between unemployment and earnings has led to a rejection of the labor supply function as an interpretation of the wage curve.

And a wage curve is not a Phillips curve. The wage curve has to do with the relationship of unemployment to the level of real wages at a micro level. The Phillips curve is an aggregate relation that can be derived from a model of adjustment of nominal wages to unemployment. Indeed it has to do with the relation between unemployment and the rate of change of nominal wages.

There is an agreement in the literature on the wage curve that the main explanations for this relationship are based on: i) a labor contract model; ii) a bargaining model or iii) an efficiency wage model. A summary assessment of these interpretations is given in Blanchflower & Oswald (1994) and in Card (1995).

In the labor contract model, amenity values differ among regions but unemployment benefits and reservation wage do not. Thus, differences in amenities generate differences in wages: regions with higher amenities will offer contracts with lower wages and lower employment (higher unemployment)

probability. However, based on an international review of empirical studies, Nijkamp & Poot (2005) pointed out that the evidence does not support this kind of explanation. Indeed, the labor contract model proposes a negative long-term relationship but the wage curve reflects a negative short-term relationship. Moreover, there is some evidence that unemployment and wages are positively related in the long-term.

In the union bargaining model, the "alternative" wage available for union workers in the event of dispute, declines with unemployment. Therefore, the unionized negotiated wage depends negatively on unemployment as predicted by the wage curve. Nevertheless, Nijkamp & Poot (2005) remarked once again that the evidence is not consistent with this explanation because the slope of the wage curve is usually less for union workers than for non-union workers.

The efficiency wage model seems to give the most attractive explanation. Card (1995) argues that this model is more suitable than the labor contract and bargaining models to explain the wage curve. Based on the Shapiro & Stiglitz (1984) proposal, the model assumes that the wage premium to be paid to promote worker's effort declines with unemployment. Indeed, the expected penalty of being caught shirking increases when unemployment rises. Efficiency wages also rely on turnover considerations. Recruiting and training are costly for the firms so they attempt to minimize costs paying a premium to retain workers. Once again, the premium will decrease when unemployment rises because it will be less likely to the worker to quit and find a new job.

Barth et al (2002) propose a model that combines an efficiency wage behavior and a wage bargaining behavior. As pointed by the authors, it could be expected that this model would generate a stronger wage curve than that expected by each model on its own. However, they find that the combination of the two behaviors generates a third effect (rent effect) that makes the wage curve less elastic in the presence of unions. This prediction is more consistent with the evidence than the predictions of the union bargaining model. The intuitive reasoning behind this result is as follows. The increase in unemployment leads to a decline in turnover costs per worker. The efficiency wage behavior makes the premium wage to decline and hence rents (net of turnover costs) increase. This has a positive effect on the bargaining wage, because the generated rents are shared by the union in the form of lower reductions in wages. Thus, Barth et al (2002) expect a greater negative correlation between unemployment and wages in non-union sectors than in union sectors. In fact, they do not find a statistically significant wage curves for union workers in their empirical work for Norway, the US or Great Britain. As they point out, "t*hese results suggest that efficiency wage mechanisms, rather than collective bargaining, are driving the negative relationship between wages and local labor market conditions".* On the basis of this model, they also expect less elastic wage curves in countries with stronger unions and stronger union wage bargaining.

3. The Uruguayan labor market

Compared to other Latin-American countries, Uruguay has usually had a high level of unemployment, particularly among women and young people. Indeed, average unemployment rates in the 1986-2005 period were 11% overall, 14.4% for women and 8.7% for men. The rate was 25% for people aged 18-24 but only 7% for people in the 25-59 age range.

In Table 1 we show the evolution of unemployment, wages and GDP from 1986 to 2005. After the crisis that affected the Latin-American countries at the beginning of the 1980s, the Uruguayan economy went through a period of growth that lasted until 1998, and there was only one year in which GDP decreased (1995). During this period of growth, wages rose steadily and they only declined in 1990, a year of high inflation, and in 1995.

Table 1. Macroeconomic data

Year	Unemployment rate (%)	GDP variation (%)	Real wage index (1986=100)	Inflation (%)
1986	10.1	8.9	100.0	70.7
1987	9.1	7.9	104.7	57.3
1988	8.6	0.0	106.2	69.0
1989	8.0	1.1	105.8	89.2
1990	8.5	0.3	98.1	129.0
1991	8.9	3.5	101.8	81.5
1992	9.0	7.9	104.1	58.9
1993	8.3	2.7	109.1	52.9
1994	9.2	7.3	110.0	44.1
1995	10.3	-1.4	106.9	35.4
1996	11.9	5.6	107.6	24.3
1997	11.4	5.0	107.8	15.2
1998	10.1	4.5	109.8	8.6
1999	11.3	-2.8	111.5	4.2
2000	13.6	-1.4	110.1	5.1
2001	15.3	-3.4	109.7	3.6
2002	17.0	-11.0	98.0	25.9
2003	16.9	2.2	85.8	10.2
2004	13.1	11.8	85,7	7.6
2005	12.2	6.6	89,6	4.9

Source: Banco Central del Uruguay; Instituto Nacional de Estadística

Overall, economic activity increased in 1986-1998 but we can distinguish two periods in terms of labor market performance. Until 1994, the unemployment rate was quite stable although the output/labor ratio increased and employment composition changed, mainly due to a decline in manufacturing jobs in the first half of the 1990s (De Brun & Labadie 1997, 1998). 1995 was a turning point in the level of unemployment. Indeed, the unemployment rate grew from 8-9% in 1987-1994 to 10-12% in 1995-1998, and mainly affected unskilled workers and men. This increase in unemployment was also related to a loss of jobs in manufacturing. But in those years, service and commerce did not counterbalance this process and the output/labor ratio rose in most industries (Bucheli, Diez de Medina & Mendive, 2002).

In 1999 the labor market was affected by a downturn in economic activity, and this worsened in subsequent years. In 1998-2002, GDP suffered an accumulated fall of nearly 18%, the unemployment rate rose in 2002 to an unprecedented 17% and real wages decreased. Once again, it was mostly unskilled workers who were negatively affected by unemployment.

During the whole period under consideration, informality was quite high and tended not to increase very much. In recent years, around 35-40% of the labor force has been informal (not-covered by the social security system). Informality is rather higher among unskilled workers than those who are skilled: almost half of workers with primary school are in the informal economy while more than of 90% of workers who finished college are in the formal economy.

In addition, wages tended to become more concentrated, mainly due to the rise in education rewards (Arim & Zoppolo, 2000). There have been many studies that focus on wage concentration and the widening of the gap between the skilled and the unskilled in the labor market. In any case, as is pointed by Amarante & Arim (2004) in a review of labor market performance, the analysis of the concentration of earnings in Uruguay between 1986 and 2002 is still weak.

Indeed, beyond general macroeconomic performance, in all these years there were changes in Uruguay's economic policy that affected the labor market. International insertion changed due to tariff reduction: the maximum tax was lowered from 150% in 1980 to 20% in January 1993. Besides this, in the 1990s Uruguay, Argentina, Brazil and Paraguay set up an imperfect customs union – the Mercosur – to establish free trade within the bloc and a common trade policy *vis à vis* outsiders. Casacuberta & Vaillant (2004) adduce that the trade liberalization process led to the adoption of new technologies that increased the relative demand for skilled workers and thus increased the education premium.

Other explanations of the increase in earnings dispersion are based on changes in wage policy (Arim & Zoppolo, 2000; Miles & Rossi, 2001). One factor was that real minimum wages fell. Indeed, at the end of 1985 they were 94% of the level in 1980; this figure shrank to 79% in 1989, 42% in 1994 and

32% in 2004. In addition, the mechanism of bargaining negotiations changed in the 1990s. In the latter half of the 1980s, wages were set in collective bargaining negotiations at industry level. The State ratified the agreements and made them mandatory for all workers. In 1990, the government withdrew the wage-setting procedure and as agreements expired, collective bargaining was abandoned. Only some firms with strong union workers continue to fix wages through collective negotiations.

In 2003, a period of recovery began but the unemployment rate only started to decrease in 2004, and it was in 2005 that real wages grew. It is worth noting that important institutional changes took place in 2005: the minimum wage was raised by 83% and collective bargaining was re-established. These very recent years have not been analyzed as much as the 1986-2002 period, but the most documented facts of the recovery have to do with the difficulties in trying to bring unemployment down.

4. Data and model

We use micro data provided by the Continuing Household Survey (*ECH - Encuesta Continua de Hogares*) collected by the National Institute of Statistics (*INE - Instituto Nacional de Estadística*) in 1986-2005. The *ECH* is a one-off urban monthly survey. Until 1997 it collected information on the population in cities and towns with more than 900 inhabitants, but since 1998 the sample has been limited to towns with more than 5,000 inhabitants. In order to have a similar coverage for the whole period, we drop the data on small towns for the years before 1998. As 12% of the population lives in towns with less than 5,000 inhabitants, we can assume that the results obtained with this sample are representative of the whole country. However, the survey under-covers the labor force in agricultural activities.

We use the pool of the annual cross-section information on workers between 18 and 59 years old. We drop people younger than 18 because the law establishes specific regulations for them, and we drop people over 59 years old because retirement is frequent in that age bracket. The two dropped groups amount to 10% of the active population.

We estimate the following wage equation:

$$\ln W_{irt} = \alpha + \beta \ln U_{rt} + \delta X_{irt} + \varepsilon_{irt}$$

where *i* represents an individual, *r* names the region where he lives, *t* represents the year of the interview; *W* refers to the wage (in logs), U_{rt} is the annual unemployment rate of the worker's region and *X* is a vector of personal characteristics.

We use two different proxies of the wage. The first includes regular labor income in cash and in kind received in the preceding month divided by 4.2 (the number of weeks in a month) multiplied by the hours worked the preceding week. This amount is deflated using the Consumer Price Index in order to avoid the effect of price changes through time. We refer to this proxy as the "wage".

We use the expression "adjusted wage" when we add three social benefits to the "wage". We calculate these benefits only for formal workers, that is, for the labor force which is covered by formal arrangements. As the ECH does not allow us to detect formality before 1991, we calculate the "adjusted wage" only for the 1991-2005 period. The benefits are as follows.

First, we assign an estimation of health benefits. According to the law, private workers have to contribute to the social security system and to a health fund (DISSE). DISSE supports membership of a private health system. Membership requires the payment of a monthly fee that is financed by DISSE. In order to detect the contributors, we use information about medical insurance collected in the ECH. Specifically, the survey allows us to identify DISSE beneficiaries since 1991. On the basis of this information, we assign to these workers a benefit equivalent to the price of an ordinary fee.

Although public servants do not contribute to DISSE, some sections of the public sector provide some kind of health benefit. However, the ECH does not identify the recipients of these benefits so we do not assign health benefits to public workers.

The second benefit taken into account is the so-called thirteenth wage received by public and private wage earners. The ECH has been inquiring this benefit since 2001. This recent information indicates that enforcement is weak among private wage earners and that the presence of the benefit is highly correlated with contribution to DISSE. Therefore, we add an amount equivalent to 1/12 of the monthly wage to public workers and to DISSE beneficiaries.

Thirdly, the law establishes a specific retribution (2/3 of regular monthly cash labor income) to be paid to private wage earners when they have their annual vacation. The ECH does not collect information about this benefit. Therefore, we estimate the benefit on the base of the reported labor income when the worker is a DISSE recipient.

The vector of characteristics $\underline{X}$ includes years of schooling; potential experience (calculated as *age - years of schooling - 6*) and the square of this figure; a female dummy; dummies for the relationship with the head of the household (head, wife of the head or other); dummies for the marital status (single, in couple or other); dummies for occupation (private wage earner, public servant, self-employed with some capital or self-employed without capital); dummies for industry (manufacturing and energy, agriculture, construction, commerce, services and transport) and a part time dummy for those who work less than 30 hours per week.

Besides personal and labor characteristics, vector X includes dummies for the year of the interview and for the region. It also includes the mean of the annual regional labor participation rate.

In order to build the regional dummies, we use two alternative criteria. First, we work with 19 regions that correspond to the political divisions of the country. Second, we group these divisions into five regions following *INE*'s criterion: the capital city, the North (Artigas, Salto and Rivera), the Middle North (Paysandú, Río Negro, Tacuarembó, Durazno, Treinta y Tres and Cerro Largo), the Middle South (Soriano, Florida, Flores, Lavalleja and Rocha) and the South (Colonia, San José, Canelones and Maldonado).

As local unemployment is defined at a more aggregated level than wages, the estimated standard errors may be biased downwards (Moulton, 1986). In line with previous studies, we also estimate a cell mean regression with variables defined by region and year averages:

$$\ln W_{rt} = \alpha + \beta \ln U_{rt} + \delta X_{rt} + \varepsilon_{rt}$$

where $\underline{W}_{rt}$ is the average log wage for all individuals in region $\underline{r}$ in year $\underline{t}$; $\underline{U}_{rt}$ is the annual unemployment rate of the worker's region $\underline{r}$ in year $\underline{t}$, and $\underline{X}_{rt}$ is a vector of average values over characteristics included in the previous vector X in region $\underline{r}$ at time $\underline{t}$.

In addition to the estimation for the whole sample, we run the model for groups of individuals disaggregated by level of education, gender, age and occupation. In all these estimations we use the overall regional unemployment rate.

5. Results

5.1. Estimations for different periods

In Table 2 we present the unemployment coefficients obtained by estimating the wage curve considering alternatively the two measures of wages and the two models (micro-data regression and cell-mean regression). Besides, we consider different sub-periods. In all cases, we find a negative relationship between unemployment and wages. Anyway, we observe some differences between the estimations.

Table 2. Unemployment coefficients from micro data regressions and cell-mean regressions						
		1986-2005 (A)	1991-2005 (B)	1986-1990 (C)	1991-1998 (D)	1999-2005 (E)
Microdata regression	Log wage	-0,087 (7.15)**	-0,120 (7.58)**	-0,006 (0,26)	-0,094 (4.53)**	-0,154 (3,83)**
	Log adjusted wage	n/a	-0,110 (6.89)**	n/a	-0,096 (4.55)**	-0,164 (4,04)**
Cell-mean regression	Log wage	-0.042 (1.31)	-0.129 (3.64)**	-.-	-0.080 (1.49)	-0,234 (2,79)*
	Observations	100	75	25	40	35
	Log adjusted wage	n/a	-0.138 (3.64)**	n/a	-0.102 (1.77)	-0,267 (3,73)*
	Observations		75		40	35

* Denotes signification at 5%; ** denotes signification at 1%
-.- The low number of cases does not allow to do an accurate estimation
n/a The "adjusted wage" is not available for 1986-1990.
Absolute value of t statistics in parentheses

As shown in column A, we find an elasticity of –0.087 when using the pool of the 1986-2005 cross-section micro-data. Thus, an increase of 10% in unemployment leads to a drop in pay of around 0.9%. In column B we report the results obtain when working with data from 1991-2005. We find an elasticity of –0.12 when the dependent variable is "wage" (in logs) and –0.11 when we use "adjusted wage". It can be seen that we do not find important differences when using alternatively the "wage" or the "adjusted wage" as the dependent variable. All these values are in accordance with the range of estimated elasticities for other countries, which turn around –0.1 as reported by Blanchfower & Oswald (2005) and Nijkamp & Poot (2005) in reviews of the evidence.

The estimations reported in columns A and B suggest that the elasticity may vary among periods. The difference may be interpreted in the context of the political changes presented in section 3. Indeed, the abandonment of the wage setting at industry level in the 1990's would have meant an increase in the sensitivity of wages to unemployment. Besides, it is plausible that the change in international insertion had led to an increase in uncertainty and thus greater fear of unemployment. Therefore, workers would accept wage cuts more easily. Additionally, the results from 1991-2005 period may be affected by different behaviors through the economic cycle. It is worth remembering that the period 1991-2005 included the years of crisis (1999-2002). Thus, we may deduce that the negative effect of unemployment on wages deepens in downturns of economic activity.

In columns C to E we present the estimated elasticity for sub-periods in order to have some insight into the above suggested explanations. In column C we show the results for 1986-1990: although the relationship between unemployment and wages is negative, the estimated coefficient is not significant at the usual standard levels. As proposed by Barth et al (2002), we may interpret that in this period, the wage bargaining offset the wage curve that would have been derived from an efficiency wage behavior. Thus, the non-existence of a wage curve would be due to the institutions in the labor market. In any case, we must point out that the numbers of considered years is rather lower than the numbers in the rest of the sub-periods.

In column D and E we report the estimations for 1991-1998 and 1999-2005. In the former, the period of economic growth, the estimated coefficient is –0.094 when using "wage" and –0.096 when using "adjusted wage". For the subsequent period, which was affected by the severe crisis, the elasticity is –0.154 and –0.164, when working with wage or "adjusted wage" respectively. This result supports the idea that the wage curve may change over the cycle. Additionally, in 1999-2005 the negative relation is stronger when the dependent variable is "adjusted wage" than when it is "wage". This may be due to an increase in informality during the crisis. Indeed, the "adjusted wage" includes benefits that, although mandatory, are sometimes avoided. Evasion would increase in downturn periods allowing total labor earnings to fall more than wages.

In the lower part of Table 2 we present the estimations obtained when using cell-mean regressions. Although negative, the elasticity is non-significant for 1986-2005. We also estimate sub-periods but the low number of cases does not allow us to study 1986-1990. The results for 1991-2005 show a negative relation when using both "wage" and "adjusted wage". The estimated elasticity is quite similar to that estimated using micro-data regression. However, we do not find similar results when comparing the rest of the sub-periods: indeed, the coefficient is non-significant for 1991-1998 and surprisingly higher (in absolute terms) for 1999-2005.

5.2. The spatial dimension of the local labor market

To estimate the wage curve, the geographical labor market has to be delimited. As was pointed out by Longhi, Nijkamp & Poot (2004), the geographical divisions are not "independent islands" but connected regions. Thus, local labor markets are affected by the labor force movements between regions and the more connected the regions are, the weakest the relation between wages and unemployment. Notice that the closeness between labor markets is related to geographical proximity and communications development. As Uruguay is a small country where traveling is technologically easy, a regional division may not be justified: there are around 3 million habitants in 176,000 square

kilometers. However, little is known about institutional or cultural barriers to internal migration and commuting.

As we have not been able to find a satisfactory system for defining regions, we use the political divisions of the country. Uruguay is small and is not a federated system of states, and it is divided into nineteen political units that have some measure of autonomy. Obviously, each one of these units is quite small. Alternatively, we aggregate these divisions in order to obtain five groups as proposed by *INE* when doing samples of the population. Thus, we expect them to be closely connected. Therefore, we also do an estimation considering five regions. This classification is the one proposed by INE to stratify the population. These groups are the capital city, where half of the population lives, and four zones that conform to political divisions based on geographical criteria. In table 3 we show the estimated unemployment coefficient under each geographical classification.

Table 3. Estimated unemployment coefficients using two alternative spatial dimensions of the local labor market

	1986-2005 (i)	1991-2005 (i)	1991-2005 (ii)
Five-regions division	-0,087	-0,120	-0,110
	(7.15)**	(7,58)**	(6.89)**
Nineteen-regions division	-0,029	-0,071	-0,068
	(5.66)**	(11,06)**	(10,52)**

(i) Microdata regressions, dependent variable: log wage.
(ii) Microdata regressions, dependent variable: log adjusted wage.
* Denotes signification at 5%; ** denotes signification at 1%
Absolute value of t statistics in parentheses

We find that the estimated relationship between wages and unemployment is sensitive to the geographical classification. As expected, the elasticity is lower (in absolute terms) when considering nineteen than when considering five local labor markets. When using the micro-data from 1986-2005 and five-region division, we obtain an elasticity of –0.087, and this figure is more in line with the international estimations than that obtained with the nineteen-regions division (-0.029). Similar conclusions are found when we estimate the elasticity for 1991-2005.

5.3. Groups elasticities

We also estimate the elasticity of wages to unemployment for disaggregated groups of workers using micro-data. This analysis allows us to know if unemployment affects groups of workers differently. We always use the overall regional unemployment rate, so this rate extends beyond the group local labor market. We work with the data from 1991-2005 because we can use both "wage" and

"adjusted wage" as dependent variables. As the two estimations show a similar structure of elasticities, we analyze the results focusing on the point estimations obtained when using "wage". The coefficients are reported in Table 4.

Table 4. Unemployment coefficients for groups of individuals (1991-2005).

	Log wage	Log adjusted wage
All workers	-0.120	-0.110
	(7.58)**	(6.89)**
Age		
18 - 24	-0.265	-0.242
	(7.48)**	(6.56)**
25 - 49	-0.090	-0.081
	(4.63)**	(4.13)**
50 - 59	-0.092	-0.090
	(2.31)*	(2.26)*
Sex		
Male	-0.103	-0.096
	(5.08)**	(4.71)**
Female	-0.152	-0.137
	(6.02)**	(5.33)**
Years of schooling		
0 - 8	-0.158	-0.145
	(7.40)**	(6.57)**
9 - 11	-0.144	-0.139
	(4.72)**	(4.50)**
12 or more	-0.041	-0.034
	(1.17)	(0.98)
Occupation		
Public wage earner	-0.040	-0.040
	(1.47)	(1.47)
Private wage earner	-0.132	-0.125
	(6.34)**	(5.94)**
Self-employed	-0.178	-0.173
	(4.69)**	(4.55)**
Formality		
Formal	-0.058	-0.057
	(3.08)**	(3.22)**
Informal	-0.241	-0.241
	(9.15)**	(9.15)**

Absolute value of t statistics in parentheses

* Denotes signification at 5%; ** denotes signification at 1%

Age

We distinguish three groups of ages: a youth group of 18-24 years old, prime-age workers of 24-49 years old and seniors of 50-59 years old. We find that the wage curve is deeper for the younger workers as is reported for other countries (Blanchflower & Oswald, 1994; Hoddinott, 1996). Specifically in the Uruguayan case, we find an elasticity of -0.265 for the 18-24 youth and an elasticity of around -0.09 for workers over 24 years old. Notice that the earnings of young people are more sensitive but we do not find big difference between prime-age workers and seniors.

The differences in the wage curves for different ages could be explained by their different behaviour as regards shirking and turnover. Hoddinott (1996) argues that the higher the specific human capital of the worker, the more costly it is to dismiss him and to recruit and train a new worker. In the efficiency model framework, the wage premium needed to promote non-shirking decreases with unemployment. But, as prime age workers have a higher investment in specific human capital, the premium will not decline as much as it will for younger workers. This means that firms are more tolerant of shirking by highly specific human capital workers. Hence, as unemployment exerts a greater effect on workers with less specific human capital, young people's wages are more influenced by unemployment. Barth et al (2002) also say that the wages of younger people should be more sensitive to unemployment but in the efficiency wage framework and not necessarily in the bargaining model. This argument is supported by the evidence they provide.

Gender

In the empirical literature, various different analysis of the wage curve by gender do not lead to similar conclusions. Our estimations indicate that in Uruguay the elasticity is greater for women (-0.152) than for men (-0.103). This gender pattern is similar that obtained for East Germany (Baktagi, Blien & Wolf, 2000), Turkey (Ilkkaracan & Selim, 2003) and Chile (Berg & Contreras, 2004). However, the opposite result is obtained for the USA and the UK (Blanchflower & Oswald, 1994). In the case of Spain, Sanromá & Ramos (2003) find a strong wage curve for men but a non-significant unemployment effect for women.

Groot et al (1992) do not find a wage curve for women either. They suggest that there is a wage curve for women but the negative relation is not captured by the data because of a discouraged worker effect. This phenomenon means that when unemployment rises, women react by leaving the labor market. Therefore, although a rise in unemployment pushes down wages, this effect is outstripped by an increase in wages caused by a decrease in the female labor supply caused by the discouragement effect.

Using an analogous reasoning, we could argue that in Uruguayan female behavior an added worker effect would prevail. In fact, Bucheli (2002) finds some indication of the presence of an added worker behavior among Uruguayan married women. Thus, when unemployment rises, women's wages would decrease for two reasons. First, there is a wage curve effect. Second, the decline in household earnings leads to an increase in female labor supply that pushes down female wages reinforcing the first effect. Consequently, the estimated wage curve would be deeper for women than for men.

Besides, as for age differences, the gap in elasticity could be the result of a gender difference in specific human capital accumulation or in unionized behavior.

Schooling

We classified workers on the basis of years of schooling, considering three levels. The first one contains workers who did not finish the prevailing compulsory legal minimum level of education, which means they have less than 9 years of schooling. The second group is made up of workers with 9 to 11 years of schooling. This group corresponds to people who completed the minimum level of education but have not finished high-school. Finally, the third category is for workers who finished high-school and eventually attended college.

We do not find a significant effect of unemployment on wages for workers with college studies. However, a wage curve relation exists for workers with less than 12 years of schooling. This relationship is stronger for the less educated (-0.158) than for workers with between 9 and 11 years of schooling (-0.144). These results are in harmony with estimations for other countries estimations, which also find higher elasticities for the less educated such in Turkey (Ilkkaracan & Selim, 2003), Chile (Berg & Contreras, 2004), the US and the UK (Blanchflower & Oswald, 1994),.

Occupation

We also estimate different wage curves for private wage earners, public workers and the self-employed. We find that the coefficient for public employees is negative but it is not significant at the usual standard levels. We may conclude that there is no wage curve for the public sector and that the degree of wage flexibility is higher in the private sector. Indeed, private wage earners and self-employed workers have a significant negative wage curve.

The relationship is stronger for the self-employed (-0.178) than for private wage earners (-0.132). This result may be caused by movements between salaried market and self-employment driven by unemployment. Indeed, it has been argued that in Latin American countries, self-employment takes the role of "hidden-unemployment" in the downturns. Thus, a rise in unemployment would lead to a shift from private salaried market to self-employment. The consequent increasing competition among

the self-employed would push down their earnings and hence, the wage curve of this group would be deeper than the salaried group.

This conclusion is not shared by Berg & Contreras (2004), who do not confirm this elasticity pattern with Chilean data. On the contrary, they find that unemployment elasticity is more negative for salaried workers and conclude that, possibly because it is not easy to enter self-employment is not easy, this strategy does not act as a buffer in economic recessions.

Formality

Finally, we distinguish between formal and informal workers. As presented in section 3, we define formal workers as those who contribute to the social security system.

We find that both formal and informal workers have negative unemployment elasticity. The relation is more negative for informal (-0.241) than for formal workers (-0.058). Once again, we may infer that the contribution to the social security system changes during the business cycle. First, in economic recessions when unemployment rises, non-contributors would accept more severe pay cuts than contributors, because they have less bargaining power. Second, the business that are more affected would not only reduce earnings more sharply but would also be more likely opt for evasion. Third, it has been argued that in downturns large enterprises try to avoid labor regulation costs by subcontracting workers in little units where non-contribution is more likely. Finally, the above-mentioned shifts between private salaried labor market and self-employment during recessions are also important. Indeed, when self-employment increases as a strategy reaction to unemployment, these new jobs are usually informal.

6. Conclusions

We run several models using data for the period 1986-2005 and two different proxies of wages. We estimate both micro-data and cell-mean regressions for all workers and for groups of individuals disaggregated by level of education, gender, age and occupation, using the overall unemployment rate as an explanatory variable in every case.

The results are consistent with the range of values found in similar studies in other countries. Indeed, we obtain an elasticity of -0.09, so we may conclude that there is evidence of wage curve behavior. Nevertheless, the elasticity is sensitive both to the period chosen and to the regional classification and is different for different group of workers.

Estimations for different periods suggest that the wage curve is stronger in downturns. Additionally, they indicate that the relationship depends on institutional arrangements. We do not find a wage curve (the unemployment coefficient is not significant) for the period when the rule in wage determination was the collective bargaining at the industry level. But there is a wage curve when collective bargaining policy was abandoned and this institutional arrangement only persisted in firms with strong trade unions. This kind of result may be explained by the efficiency wage / union bargaining model proposed by Barth et al (2002) who expect a stronger wage curve in non-union sectors than in union sectors. Indeed, a rent effect due to the decrease in the efficiency wage in downturns would be shared by the union through a smaller decrease in bargained wages.

When using different geographical classification of the country, we find different magnitudes of the elasticity. Specifically, we use two alternative specifications of regions: a five-region classification and a nineteen-region classification. We find a stronger wage curve for the former. As Uruguay is a little country, we think that a five-region classification is more suitable than the nineteen-region classification.

Finally, the elasticity varies among groups of workers and for some of them, there is not a significant effect of unemployment in wages. This is the case among higher-educated workers and the public workers. At the other end of the scale, wage curve behavior is strong for the lower-educated, young, informal workers, private salaried and the self-employed. Also, the relation is stronger for women than for men.

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