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"Rent-sharing in Portuguese Banking"

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Rent-sharing in Portuguese Banking[*]

Natália Pimenta Monteiro[†]and Miguel Portela[‡]

Abstract

Using the fixed effects estimator and the dynamic panel data system-GMM estimator, on a sample of 75 banks, covering the period 1988-2005, this paper estimates how wages in the Portuguese banking sector depend on the employers ability to pay. The results indicate that wages are strongly positively correlated with profits even after controlling for firm and workforce characteristics. The Lester's range of wages due to rent-sharing is $46\% - 75\%$ of the mean wage in the Portuguese banking sector.

Keywords: rent-sharing, Portuguese banking industry, dynamic panel data.
Jel classification: J31, J45, L33.

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1 Introduction

This paper tests whether wages in Portuguese banking depend on the employers' ability to pay. Although a number of studies have examined how economy-wide wages are affected by firm or industry profitability[1], wage determination in a specific single industry has been largely overlooked.[2]

The Portuguese banking sector provides an interesting case study for analysing rent-sharing issues. In the eighties and early nineties, Portuguese banking experienced a successful deregulatory reform (OECD, 1999) – comprising not only the abolishment of price and entry barriers but also a privatisation program – which was accompanied by a simultaneous rise in the wage premium and firm profits (Monteiro, 2007). In addition, despite the coordinated bargaining mechanism prevailing in the industry – where trade unions and a group of banks meet each year to negotiate a single collective wage agreement[3] – there is evidence of bargaining over wages at firm level. Indeed, the wage drift – the differential between the wage defined by the collective agreement and the actual wage paid – has increased since early nineties (Aperta *et al.*, 1994) and was the second highest in 1999 among 16 industries in Portugal (Cardoso and Portugal, 2005).

To our knowledge, this study is the first to provide evidence on rent-sharing allowing for wage inertia, which is an important real-world phenomenon and using a system-GMM estimator. We also make use of an unexplored and rich data at firm level collected by *Associação Portuguesa de Bancos* (APB) which covers 18 years, from 1988 through 2005, and offers information about firm human capital characteristics.

2 Data, model specification and results

The dataset released every year by APB in the yearly *Boletim Informativo* consists of data from company accounts of all banks in Portugal. Beyond standard financial and operational information, the dataset reports other firm characteristics such as ownership, size and age, and portrays the workforce in terms of schooling, tenure, type of activity and occupation in each bank. Summary statistics for the data are presented Table 1. The key variables, log wages and profits per employee, are computed following the usual practice in the literature

[1] See, e.g., Arai (2003), Estevão and Tevlin (2003), Dobbelaere (2004) and Budd *et al.* (2005) and the references therein.

[2] Black and Strahan (2001) is a notable exception.

[3] The only exception to this bargaining system are two banks, BCP and CGD, which have signed (individual) firm wage agreements since 2001 and 2003, respectively.

(Hildreth and Oswald, 1997). Thus, the log average wage is constructed as the logarithm of the ratio between the reported wage bill and total employment. Profit per employee is obtained by taking sales revenues less operational costs less reported wage bill and dividing by total employment.[4] The capital-labour ratio is obtained by dividing fixed assets by total employment. All monetary measures are expressed in current 10^3 Euros.

Table 1: Summary Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Log average wage	731	3.586	.646	.822	5.514
Profits per worker	731	88.918	109.901	−313.909	883.747
Ownership (%)					
Public	731	.109	.312	0	1
Private domestic	731	.520	.500	0	1
Foreign	731	.371	.483	0	1
Firm size (10^3 employees)	731	1.410	2.258	.005	10.882
Firm age	731	27.435	41.575	0	161
Capital-labour ratio	731	73.444	71.751	0	676.675
Schooling (%)					
Primary	571	.134	.164	0	.662
High school	571	.423	.174	0	.867
University degree	571	.443	.234	.039	1
Tenure, in years (%)					
[0 − 6[	728	.493	.309	0	1
[6 − 11[	728	.196	.143	0	.800
[11 − [	728	.311	.288	0	1
Commercial activity (%)	730	.452	.249	0	1
Occupation					
1	730	.236	.103	0	.868
2	730	.280	.177	0	.892
3	730	.446	193	0	.899
4 (lowest)	730	.038	.043	0	.508

Table 1 indicates that between 1988 and 2005, the Portuguese banking sector is mainly composed by privately owned firms – either domestic (52%) or foreign (37%) – as public owned banks represent a small share (11%) of the market. This ownership structure is due to the abolishment of entry barriers in 1983/84 but also to an extensive privatisation program, which took place between 1989 and 1997 and allowed 11 out of 12 public banks to

[4] More precisely, our profits measure corresponds to the item *Resultado Bruto de Exploração* in the income sheet.

become fully private. Nevertheless, publicly owned banks still employ approximately 40% of the total banking workforce, as public banks are much larger (more then 3 times) than the sector average. Firm age and capital-labour ratio also reflect this dichotomy between publicly and privately owned banks, as the former are, on average, older and less capital intensive than their private counterparts (not shown in the table).

In terms of human capital attributes, banks employ, on average, a higher proportion of graduated (university degree) and young employees (5 or less years of tenure). Again, this is more pronounced for all privately owned firms, but in particular for foreign firms, which have more than half of the total workforce in these two categories. Finally, banking employees are working mainly in intermediate/middle occupations and in other activities than the commercial one (public employees are the only exception).

For the empirical analysis, we specify two panel data models, one static and one dynamic:

$$w_{it} = \alpha_1 PW_{it} + \alpha_2 PW_{it}F_{it} + \alpha_3 PW_{it}P_{it} + \alpha_4 Z_{it} + v_i + \varepsilon_{it}, \tag{1}$$

$$w_{it} = \beta_1 w_{it-1} + \alpha_1 PW_{it} + \alpha_2 PW_{it}F_{it} + \alpha_3 PW_{it}P_{it} + \alpha_4 Z_{it} + v_i + \varepsilon_{it}, \tag{2}$$

where subscripts i and t index bank i and time t; w is average log wage, PW is profits per worker; F and P are indicators for foreign and public banks respectively, Z is a set of other regressors that vary by bank and time, v is an unobservable bank effect and ε is an error term. In our specifications, Z includes time-varying measures of firm size (thousands of employees) and firm age, capital-labour ratio, four attributes of the workforce – educational attainments (three categories), seniority (three categories), type of activity (two categories) and occupation (four categories) – and time (year) effects.

Table 2 reports empirical results for the wage equation (1). Column 1 shows fixed estimates for the whole sample when Z includes firm size, firm age, capital-labour ratio, bank and time fixed effects. Column 2 adds eight variables regarding all workforce attributes presented in Table 1 to previous specification. Column 3 uses the specification adopted in column 1 but applied to the sample of column 2. All columns report the coefficient estimates of the regressors and their respective standard errors (clustered to control for the non–independence of repeated observations of the same firm).

Table 2: Rent-sharing results for static models

Variable	S1	S2	S3
Profits-per-worker(PW)	.001***	.001**	.0009***
	(.0004)	(.0004)	(.0004)
PW*Foreign	.0005	.0008	.0008*
	(.0005)	(.0005)	(.0005)
PW*Public	.006	.003	.003
	(.005)	(.003)	(.003)
Public	-.119	-.276*	-.261*
	(.145)	(.144)	(.147)
Firm size(thousands)	-.025	-.063*	-.064
	(.045)	(.038)	(.045)
Firm age	.091***	.054***	.067***
	(.007)	(.011)	(.007)
Capital-per-worker	.002**	.001**	.001
	(.0007)	(.0005)	(.0006)
Obs	731	571	571
Banks	77	75	75
LogLikelihood	-118.925	-81.605	-87.859

Notes: Significance levels: $*$: 10% $**$: 5% $***$: 1%. Robust standard errors in parentheses, clustered by bank. The dependent variable is log average wage. The regressions are estimated by fixed-effects, and include time effects.

Comparing the results from the three specifications, we see that the estimates of α_1 are generally unaffected by the inclusion of human regressors. However, as these regressors are jointly significant at 10% (the joint significance test has an F-statistic of 1.80, with a p-value of .091), our preferred specification is the most expanded one presented in column 2. Thus, according to this specification, the estimated effect of profits per employee on log wages is .001, with a t-statistic of 2.52 and a p-value of .014. Despite small when compared to previous studies (e.g., Arai, 2003, Dobbelaere, 2004 or Budd *et al.,* 2005), it implies a notable wage-profit elasticity of .094.[5] This figure is below the elasticities found by Abowd and Lemieux (1993), Van Reen (1996) and Estevão and Tevlin (2003), between .20 and .29, but above the range of elasticities usually found in the literature of domestic rent-sharing, between

[5] We also test if wages are sensitive to both increases and decreases in rents. Estimates using the specification presented in column 2, splitting the sample according to whether the change in profit per worker is positive or negative, suggest that this is not the case. The coefficient is nearly identical in both cases, although less precisely estimated.

.006 and .05 (Budd *et al.,* 2005). This result is thus consistent with previous evidence of firm-level bargaining. However, this elasticity is much higher than the one found by Arai (2003), who study rent-sharing under similar labour market features in Sweden.[6] Moreover, in accordance with the wage-setting system in the sector, but in contrast to earlier findings that show that public and foreign firms tend to appropriate higher proportions of rents, the degree of rent-sharing is independent of bank ownership. Only public banks present a sizable, but insignificant, positive difference in rent-sharing. Public banks also pay substantially less (24 per cent: $e^{-.276}-1 \cong .241$) than their private counterparts when workforce characteristics are controlled for.

The bank size effect is surprisingly negative in all specifications, being only marginally significant (p-value of .098) in our preferred model.[7] Firm age has a notable and significant effect on log wages of .054, implying that more "visible" banks pay higher wages. Capital per worker also has a positive effect of .001 (p-value =.037), similar in magnitude to that reported in Sweden or USA (Arai, 2003).

To allow for wage inertia and to investigate whether potential simultaneity of wages and profits, and measurement error, affect the results, we also estimate a dynamic version of wage equation (1). Table 3 repeats variable specification of Table 2 for the dynamic wage equation (2).

Given the presence of bank-specific effects, the estimation of equation (2) by OLS, fixed or random effects, is inconsistent since, by definition, w_{it-1} is correlated with v_i. One possible solution is to take first differences to eliminate bank-fixed effect and apply the Arellano and Bond (1991) first-differenced generalized method of moments (GMM). This method allows us to control for the bias introduced by omitted time-invariant variables. However, if "the lagged levels of the series are only weakly correlated with subsequent first-differences, so that the instruments available for the first-differenced equations are weak" (Bond *et al.*, 2001, p.6), this solution has poor finite sample properties on bias and precision. Another possibility, which we follow in this study, consists of estimating the system-GMM presented by Blundell and Bond (1998). This system combines a set of moment conditions for the first-differenced equations with a set of moment conditions implied for level equations. Relative to the original GMM, the estimation of the system-GMM is preferable when the dependent

[6] Arai (2003) finds that the degree of rent-sharing in Sweden is similar to the USA, despite the differences between the two countries in terms of wage dispersion and wage-setting institutions.

[7] When we interact size with two ownership variables, none of the three variables appear to be statistically significant.

and/or independent variables are persistent.

Following Bowsher (2003), the choice of our instruments is parsimonious. We use w_{it-2} as instruments for the first-differenced equation and Δw_{it-1} as instruments for the equations in level. The explanatory variables, PW_{it}, $PW_{it}F_{it}$ and $PW_{it}P_{it}$ are treated as endogenous. In the estimation, we use two to three lags of their levels as instruments for the first-differenced equations and lagged first-differences as instruments for the level equations. The remaining explanatory variables are treated as predetermined. Therefore, we use in the first-differenced equations their levels lagged one to three periods and contemporaneous first-differences as instruments for the equations in levels. We also report results for the two-step GMM estimation procedure, following the correction proposed by Windmeijer (2005).

In Table 3, the Sargan and the Difference Sargan overindentification tests do not reject the validity of instruments used in each regression. In particular, Difference Sargan tests indicate the validity of the extra instruments used in the system-GMM estimation when compared to the original Arellano and Bond (1991) proposal. The serial correlation tests based on the first-differenced residuals fail to reject the hypothesis of no second-order correlation. These results, read in conjunction with (the statistically significant) high persistence in wages (always above .66), indicate that the system-GMM procedure is appropriate to estimate our dynamic panel model.

Table 3: Rent-sharing results for dynamic models

Variable	D1	D2	D3
LagWage	.672***	.663***	.741***
	(.089)	(.108)	(.066)
Profits-per-worker(PW)	.002**	.002*	.002*
	(.001)	(.0008)	(.001)
PW*Foreign	-.002*	-.001	-.002
	(.001)	(.001)	(.001)
PW*Public	.004	.0008	.005*
	(.003)	(.003)	(.003)
Public	-.215*	.149	-.181
	(.117)	(.197)	(.177)
Foreign	.433*	.204	.336
	(.225)	(.222)	(.333)
Firm size(thousands)	-.084	-.012	-.114**
	(.059)	(.075)	(.057)

Continues on next page...

... table 3 continued

Variable	D1	D2	D3
Firm age	.004*	.0002	.005*
	(.002)	(.002)	(.003)
Capital-per-worker	.001*	.001	.002*
	(.0008)	(.0008)	(.0008)
Obs	652	527	527
Banks	77	75	75
Sargan	53.805	45.947	47.564
Sargan-DF	47	48	40
Sargan-pv	.230	.557	.192
DiffS-AB	27.547	29.068	21.691
DiffSAB-pv	.233	.409	.300
AR1	-3.144	-3.043	-3.157
AR1-pv	.002	.002	.002
AR2	-.868	.020	-.377
AR2-pv	.385	.984	.706

Notes: Significance levels: $*$: 10% $**$: 5% $***$: 1%. Robust standard errors in parentheses. The dependent variable is log average wage. The regressions are estimated by the system GMM procedure as discussed in Blundell and Bond (1998), and include time effects. The estimation details, including the instrumens used, are described in Section 2. Sargan is the test for overidentifying restrictions. DiffS-AB is the difference in the Sargan test between the system and the estimation in first-differences; *df* stands for degrees of freedom and *pv* stands for p-value of the test. AR(1) and AR(2) are tests for first- and second-order serial correlation in first-differenced residuals.

Table 3 provides further support for the existence of strong rent-sharing in the Portuguese banking sector. In all three specifications, the effect of profits per employee on log wages is equal to .002 (twice larger than before) and statistically significant at the 10% level. The implied profit-per-employee wage elasticities are thus considerably larger than the ones found previously with fixed effects. Considering the most expanded specification presented in column 2, the GMM estimate indicates that a 1% increase in the banks' profitability increases wages by .15%. Taken together, the profit-per-employee wage elasticities established in both (static and dynamic) models, imply an impact on wages due to a movement from the bottom to the top of profits distribution, between 46% and 75%. These Lester's (1952) "range of wages" are therefore well above the 16% and 24% established for the UK (Hildreth and

Oswald,1997) and the USA (Blanchflower *et al.*, 1996) or the $12\% - 24\%$ found in Sweden, where the wage setting mechanisms are similar to our case.

The remaining results in Table 3 are in line with the overall findings obtained earlier with the static model. The major difference is that the inclusion of the lagged explained variable tends to reduce the magnitude of the estimated effects of the other variables. The standard errors are also larger, which makes the estimates not statistically significant. Therefore, differences in rent-sharing among the three firms' ownership are again not significant, the bank size and firm age effects are considerably smaller and not significant. The impact of the capital-ratio has an equal magnitude and sign but is not significant. Differences in pay level among firms ownership, although sizable, are again not statistically significant.

3 Conclusions

This paper measures the degree of rent-sharing degree in the Portuguese banking industry in the period 1988-2005. Using the fixed-effects estimator and the system-GMM on a sample of 75 banks, we find an elasticity of wage with respect to profits-per-employee that varies between .094 and .154, well above the usual benchmarks found previously. Our results, in contrast to Arai (2003), may imply that wage-setting institutions do matter for the magnitude of rent-sharing.

References

[1] Abowd, John M. and Thomas Lemieux (1993), "The Effects of Product Market Competition on the Collective Bargaining Agreements: The Case of Foreign Competition in Canada", *Quarterly Journal of Economics*, 108, 983-1014.

[2] Aperta, A., Moreira and Murteira, M.(1994), Análise das Diferenciações entre Remunerações Convencionais e Efectivas, Ministério do Emprego e da Segurança Social, Colecção Estudos, série B-Rendimento.

[3] Arai, Mahmood (2003), "Wages, Profits, and Capital Intensity: Evidence from a Matched Worker-Firm Data", *Journal of Labor Economics*, 21(3), 593-618.

[4] Black, Sandra E. and Philip E. Strahan, (2001), "The Division of Spoils: Rent-Sharing and Discrimination in a Regulated Industry", *American Economic Review*, 91(4), 814-831.

[5] Blanchflower, David, Andrew J. Oswald and Peter Sanfey, (1996), "Wages, Profits, and Rent-Sharing", *Quarterly Journal of Economics*, 111(2), 227-252.

[6] Bond, Stephen R., Anke Hoeffler and Jonathan R. W. Temple (2001), "GMM Estimation of Empirical Growth Models", Centre for Economic Policy Research Discussion Paper, 3048.

[7] Bowsher, Clive G. (2003), "On Testing Overidentifying Restrictions in Dynamic Panel Data Models", *Economics Letters*, 77(2), 211-220.

[8] Budd, John W., Jozef Konings, and Matthew J. Slaughter (2005), "Wages and International Rent Sharing in Multinational Firms", *Review of Economics and Statistics*, 87(1), 73-84.

[9] Cardoso, Ana R. and Pedro Portugal (2005), "Contractual Wages and the Wage Cushion under Different Bargaining Settings", *Journal of Labor Economics*, 23(4), 875-902.

[10] Dobbelaere, Sabien (2004), "Ownership, Firm Size and Rent Sharing in Bulgaria", *Labour Economics*, 11, 165-189.

[11] Estevão, Marcello and Stacey Tevlin (2003), "Do Firms Share their Success with Workers? The Response of Wages to Product Market Conditions", *Economica*, 70, 597-617.

[12] Hildreth, Andrew K. and Andrew J. Oswald (1997), "Rent-sharing and Wages: Evidence from Company and Establishment Panels", *Journal of Labor Economics,* 15(2), 318-337.

[13] Lester, Richard A.(1952), "A Range Theory of Wage Differentials", *Industrial and Labor Relations Review*, 5(4), 483-500.

[14] Monteiro, Natália P. (2007), "Regulatory Reform and Labour Earnings in Portuguese Banking", NIPE – WP 7.

[15] Organisation for Economic Cooperation and Development 1999, *OECD Economic Surveys, Portugal*, *1999*, OECD Paris.

[16] Windmeijer, Frank (2005), "A Finite Sample Correction for the Variance of Linear Efficient two-step GMM Estimators", *Journal of Econometrics*, 126(1), 25-51.

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