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Margarita Carvalho
João Cerejeira

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Universidade do Minho
Escola de Economia e Gestão

Financialization, Corporate Governance and Employee Pay: A Firm Level Analysis*

Margarita Carvalho† João Cerejeira‡

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Abstract

This study explores the link between financialization and employee wages. Using a panel of European banks from Bankscope we test whether banks use leverage strategically in order to refrain wage increases, focusing on the strategic use of banks' capital structure as a disciplinary mechanism. The results indicate the existence of a negative and significant effect of leverage on average employee wages. In addition, considering that the effects of leverage could depend on individual bank risk, we extend our analysis to distressed banks, using the z-score as a measure to distinguish banks that are more prone to bankruptcy. We also observe that leverage is statistically significant when relating to average wages; however the impact does not differ in magnitude in comparison to non-distressed banks.

Keywords: Panel data models; Instrumental Variables; Banks; Capital Structure; Wages.

JEL classification: C23, C26, G21, G32, J30.

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† Department of Economics and NIPE, School of Economics and Management, University of Minho, Campus de Gualtar, 4710-057, Braga, Portugal; e-mail address: margaritas@eeg.uminho.pt.

‡ Department of Economics and NIPE, School of Economics and Management, University of Minho, Campus de Gualtar, 4710-057, Braga, Portugal; e-mail address: jccsilva@eeg.uminho.pt.

1. Introduction

Financial markets have witnessed significant transformations and at the same time, they have become an important subsector of the economy. Thus, a well-functioning financial system will be determinant for economic development. In this context, the role of banks within the financial system is crucial, as their functioning affects the economy in several ways. This paper considers that financialization has changed the landscape of corporate governance in the banking sector.

Several studies have been focused on analysing the increasing role of financial markets and a considerable progress has been made in assessing the macroeconomic changes associated to financialization. However, relatively little work has been developed at the microeconomic level, therefore our main contribution is to analyse the significance of some dynamics that emerged from financialization and which are recognized by the literature, as the maximization of shareholder value and the reduction in the bargaining power of labour and to link these trends with changes in labour pay at the firm level.

The paper contributes to the literature on wages in the banking sector, establishing a relation between the banks' capital structure and average wages. The goal of this research is comparable to that of Bertay and Uras (2016) in that both studies consider the link between finance and the labour market, with a special focus on the relation between leverage and employee pay. However, our study focuses on the strategic use of the capital structure of banks, whereas Bertay and Uras (2016) put more weight on the monitoring and institutional quality of countries.

Therefore, the objective of the study is to examine how average wages are affected by leverage, focusing on the strategic use of banks' capital structure. The underlying assumption is that banks may use leverage strategically in order to renegotiate labour contracts and to impose the reduction of wages. In addition, in this paper, we consider their organizational structure considering the differentiation between stakeholder-oriented banks and shareholder-oriented banks.

The present study examines a panel of European banks for the 1987-2015 period. The banking sector has suffered several transformations in corporate governance and in the banking management models, simultaneously, the importance of this subsector in the economy is clear at the point that banking instability is rapidly reflected in the real economy.

We depart from a baseline OLS regression, however in order to consider the occurrence of potential endogeneity, first, we re-estimate our model using the first lags of the explanatory variables; second, we employ a conventional instrumental variable analysis and a novel identification strategy exploiting heteroscedasticity proposed by Lewbel (2012). In addition, to take

advantage of the panel structure of our data, we also apply a fixed effects panel data model. We find that banks may use their capital structure strategically since leverage has a negative effect on average wages.

Since the effect of leverage may depend on individual bank risk, we use z-score. This widely used measure of bank risk presents an estimate of a bank's probability of insolvency. In this sense, we examine the effect of leverage for distressed banks and find that notwithstanding, that leverage is negatively and statistically significant, when relating to average wages. The results do not present evidence that the effect of leverage on average wages differ according to the type of bank.

We also highlight the potential non-linear relationship between leverage and average wages. In this sense, we assess if the effect of leverage may differ according to different levels of leverage.

The remainder of the paper is organized as follows: Section 2 reviews the relevant literature that motivates our study. The following section focuses on the data and the description of the sample and it also presents the descriptive statistics for some of the variables used. Section 4 presents the empirical model estimation strategy. The empirical results are reported in Sections 5 and 6. Finally, Section 7 presents the main conclusions.

2. Literature review

2.1. Financialization, corporate governance and labour share

The increasing role of finance has established a common perception of the "increasing role of financial activities, financial markets, financial actors and financial institutions in the operation of the domestic and international economies" (Epstein, 2005: 3). Its impacts on the economic system can be summarized in the growing importance of financial activity over real activity, which originates a transfer from the real to the financial sector and an increase of income inequality and wage stagnation (Palley, 2007). As Giovannoni (2014) points out, the term financialization is an expression of the importance of the financial sector and it can be stated not only by the increasing role of financial markets and institutions, but also by "shareholder value orientation, increasing household debt, changes in attitudes of individuals, increasing incomes from financial activities, increasing frequency of financial crises, and increasing capital mobility" (Stockhammer, 2010: 2).

Financialization has been referred as one of the drivers for the decline in labour share, however the way it affects the wage share can be presented in several but not independent ways. As stated by Giovannoni (2014), globalization and deregulation in financial markets has allowed firms to

become less dependent of national opportunities of investment and domestic hiring. Thus, they have improved their bargaining position at the expense of employees. Another way in which financialization may affect wage share is by increasing the decline in wage share, which is already observed and explained by structural changes such as the increase in trade, globalization, technological change or the increase in the CEOs' pay, among others. Moreover, the rise of the shareholder-oriented corporate governance has put limitations in the occurrence of agency problems between managers and shareholders. Finally, other factors that influence price mark-up have contributed towards the increase in profit share in detriment of wage share. Those factors are related with the increase in mark-up in the financial sector, contributing towards the reduction of labour share and the reduction of the workers' bargaining positions.

Bearing in mind the limited empirical work on the influence of financialization on income distribution, Dünhaupt (2012) considers in her work the linkage between financialization and the distribution of income and tries to assess its relation with the decrease in labour share. Therefore, as is pointed out by the author, liberalization and deregulation have contributed to the increasing importance of shareholder value, as remuneration is more aligned to performance, additionally, managerial pay has also increased. So, we may expect that financialization contributes to the decrease in labour share. As remuneration is more aligned to the concept of shareholder value, ordinary employees need to deal with an efficiency improvement strategy of the firm, that can lead to restructuring and which can be negative for workers since they may incur in a reduction of their share of income, as real wages decline.

A shareholder value maximization strategy is also presented by Darcillon (2012) as an explanation for the erosion on the workers' bargaining power. Notwithstanding, the workers that remain at the firm, may benefit from pay increases, the same is not true for those directly affected by measures to reduce workforce or to increase labour market flexibility. This value creating strategy is also considered by Azmat et al. (2012) as maximizing shareholder value and it may mitigate some agency problems that motivate managers to obtain private benefits as job protection or "empire building".

According to Palley (2007), financialization has brought changes[1] that cannot be disentangled from the evolution that occurred in the financial sector, so among others, financialization has changed corporate behaviour and has contributed to a new business model based on shareholder

[1] Besides corporate behaviour, Palley (2007) also refers to the structure and operation of financial markets and to economic policy as important changes that have been brought by interests of the financial sector.

value (Clarke, 2014). The shareholder value orientation and the alignment of management compensation with shareholder interests, has put into question the pressure of financial markets on dividend payments or stock purchases and its relation to mark-up. The existence of a market for corporate control has put into question the disciplinary device of M&A and by doing so, financial markets have worked towards aligning managers/shareholder interests. This focus on the relationship between firms and financial markets, as the author points out, has been used to rationalize top management pay increase and to justify the rise in takeover operations. Palley (2007: 15) also refers to the adoption of "a cult of debt finance" since there are tax benefits relating to increased debt; other explanations for this trend are related with the reduction of the workers' bargaining power as managers may use debt strategically to reduce a firm's free cash flow and by doing so wage reduction may occur.

Dünhaupt (2011, 2014) focuses on the concept of shareholder value orientation and its relation to financialization for the explanation of income inequality. As pointed out by the author, an increasing movement of compensation of corporate officers may be observed, while ordinary workers have seen their wages stagnate or even decline. The maximization of shareholder value constitutes an explanation for wage dispersion and for the rise in executive compensation as an alignment of manager/shareholder interests is observed, which, in practice, reflects that compensation packages are aligned to stock price movements and to performance indicators (Dünhaupt, 2014). However, as the author points out, the financialization and the increasing focus on shareholder value orientation has contributed to wage dispersion as it is observed that, in spite the rise in the managers' income, ordinary workers suffer from a decrease or even a stagnation of their wages, making them more vulnerable. This is also pointed out by Stockhammer (2005) who refers that the increase in efficiency under the pursuing of the creation of shareholder value is positive; however, this will put into conflict employment and growth as shareholders will earn at the expense of workers.

It may also be observed, that the adoption of a shareholder value maximization strategy may put the focus on high stock prices, which can be obtained by downsizing and restructuring, which results in the dismissal of employees. Therefore, downsizing constitutes a negative consequence of shareholder value orientation (Dunhaupt, 2012; Stockhammer, 2005). Moreover, high stock prices can also be obtained through the substitution of equity by debt, which increases the return on equity thus benefiting higher income segments. As a result of the rise in financial payments,

there is a redistribution of income with a detrimental effect in the wage share (Dünhaupt, 2012, 2013; Hanka, 1998; and Hein and Shoder, 2011).

As Lazonick and O'Sullivan (2000: 18) argue, a shift from a "retain and reinvest" to a "downsize and distribute" strategic orientation was observed, and this will imply a size reduction in terms of employment, in order to increase the return on equity. This idea is also present in Fligstein and Shin (2007) who argue that the maximization of shareholder value focuses on the increase of returns on assets, since for managers what matters is to ensure higher profits for shareholders, without bearing in mind the worker's interests. The pressure of the financial community towards shareholder value maximization strategies has resulted in the reorganization of firms with strategic decisions on facilities, employment and technology.

Financialization has contributed towards the reduction in the bargaining power of labour[2], as firms may use strategically their capital structure. According to Perotti and Spier (1993), firms could use leverage strategically in order to renegotiate labour contracts and to impose the reduction of wages. By retiring equity through a junior debt issue, shareholders can threaten not to undertake new investments, thereby putting pressure on the workers. Thus, it is expected that in such circumstances, firms with high leverage are associated with a lower employee pay.

The strategic use of leverage may serve as a disciplinary mechanism, especially when firms with higher free cash flows are likely to increase employee benefits, even if these benefits are not creating value for shareholders, thus the increase of debt may prevent managers from diverting free cash flow to overinvest in employee benefits, and by doing so it may result in a negative relation between leverage and employee benefits (Bae et al., 2011; Hanka, 1998; Jensen, 1986).

This relation is not observed in the theoretical model presented by Berk et al. (2010), according to whom higher leveraged firms will pay higher wages to their employees and by doing so it is expected to compensate workers for the unemployment costs that they may face in case of bankruptcy. This contrasting theory however does not contradict what is referred by Perotti and Spier (1993). In this context, firms can reduce the probability of unionization by paying a wage premium to their employees (Berk et al., 2010, and Bronars and Deere, 1991).

As Chemmanur et al. (2013) point out and according to Perotti and Spier (1993), if workers anticipate that firms will use leverage strategically to renegotiate their wages, they will demand

[2] According to Dünhaupt (2013), M&A have contributed to the downsizing of firms and this transformation has been accompanied by a reduction in the bargaining position of workers. In line with this, there is also the idea presented by Darcillon (2012), based on Black et al. (2007), according to whom, M&A operations by its restructuring nature permit the break of long term employment commitments and by doing so we may observe a reduction in job tenure. Thus, M&A constitute a way for the equity market to influence labour market flexibility. These operations may serve as a restructuring mechanism, thus facilitating the transfer of income from labour to capital by wage cuts or dismissals (Black et al., 2007, 2008).

higher wages in order to compensate that potential risk. This hypothesis is also referred by Bae et al. (2011) according to whom, distressed firms could have incentives to increase cash flows by cutting costs relating to employee benefits, so it is expected that rational employees will demand higher wages. Thus, in line with Maksimovic and Titman (1991), reputable firms that are committed to providing better employee benefits, need to have lower debt ratios, so in this sense we may expect that reputable and safe firms may guarantee employee benefits or even higher wages.

To reduce bargaining power and the probability of unionization, firms may also pay higher wages to their workers in order to discourage the occurrence of union formation. This strategy may serve to increase shareholder wealth through the increase in labour costs, as profits are higher than in the presence of a union formation (Bronars and Deere, 1991). In fact, firms may support higher costs by paying a higher wage, but this higher wage will be not as much as the union wage. However, shareholders prefer to reduce bargaining power by using debt to limit the effect of unionization, thus diverting cash flows from workers to shareholders.

Another important issue is that the use of leverage as a bargaining tool may differ according to the firm. Therefore, safe firms (that do not face a significant probability of distress) will not be able to use leverage as a bargaining tool to reduce employee wages (Perotti and Spier, 1993; Chemmanur et al., 2013). The authors conclude that leverage has a positive and significant effect on average employee pay and that the incremental labour costs related to an increase in leverage, are large enough to offset the tax benefits that are related with that increase, thus the increase in labour costs may limit the use of debt and influence capital structure decisions. They also observe that this positive effect is more evident for safe firms, suggesting that for safe firms the disciplining effects are not as prevalent as for distressed firms, where the positive relation between leverage and employee pay is negative though not significant. As the authors suggest, even in cases where firms compensate employees for their human capital risk due to higher leverage, it may be observed that *ex post* firms may use leverage as a bargaining tool to reduce employee wages, thus offsetting the previous effect.

2.2. Banking governance and stability

Several transformations were determinant for the emergence of new business models in banking. The changing environment in which banking institutions operate, has experienced a deep change marked by the financialization of the economy (Azkunaga et al., 2013; Llewellyn, 2013). It is well known that the financialization process reflects the increase in importance of the financial sector, however, for banking this phenomenon has important consequences in the way in which corporate governance is performed and in the banking management models that are implemented.

Azkunaga et al. (2013) present four arguments that justify the special nature of financial services, thus it is important to adapt the general rules of corporate governance to the specificities that affect their governance. First, there are opposite interests in terms of risk preferences between stakeholders (it can be expected that some stakeholders like depositors or other creditors are more risk adverse than shareholders). However, if, and according to contract theory, managers are obliged to satisfy shareholders' interests, then it is expected that they would not attend to other stakeholders' interests. Secondly, managers' decisions and actions have effects on depositors and other contributors, thus it may be the case that some occurrences (good or bad) may affect the whole economy in a hasty way. Thirdly, some risks, namely those that affect liquidity or reputation, are more evident in the financial sector in comparison to other sectors. Finally, the government intervention that may take place in case of the occurrence of a problem, may distort the incentives of different participants in the banking business, as these interventions are expected to support the entities that are going through the problem.

Moreover, in line with Cibils and Allami (2013) and Lapavitsas (2009), the transformations promoted by financialization are not restricted to non-financial corporations, they are also obvious for banks as their profits shifted from production to circulation, since financial sector profits are extracted from worker salaries, this is what Lapavitsas (2009) calls financial expropriation.

As Llewellyn (2013: 335) points out the financialization process has created conditions for an over-expansion of the banking activity that is observable in several dimensions, such as: the increasing role of banks in financial intermediation; the rapid increase of the banking sector's assets relative to GDP; the magnitude and growth of the financial sector in the economy; the increase in trade volumes as well as in share profits of banks, among others.

In spite of the restructuring of corporations and the reduction of labour costs, the replacement of long-term growth strategies by short-term planning is observed, thus the shortening of the

investments' time frame has given primacy to economic and financial indicators crucial for short-term profitability (Dünhaupt, 2011; Szunke, 2014). This short-term focus, based on shareholder value, has favoured performance and profitability indicators.

The increasing role of financialization can constitute a destabilizing factor for the banking sector. A growing information asymmetry is observed, which can foster the spread of rent-seeking which can lead to a breach of trust in the relations between buyer and seller of financial products. A process of asset securitization in order to improve indicators or even as a way to manage its credit risk, can also be observed. Szunke (2014) also mentions that financialization may enhance the banking sector's instability, as an increasing role of financial institutions and their incomes is observed, as well as, an increasing scale of their financial leverage activity.

Bank corporate governance presents some differences when compared to other companies and according to Westman (2009), there are some factors that explain this. First, there is an intrinsic relation between corporate governance and banking failure, as well as, market confidence. Poor corporate governance may be reflected on the stability of the financial system and this may be more dangerous if there is a lack of confidence in banks, which may lead to liquidity crises. Furthermore, banking activity is less transparent as it is difficult for outsiders to assess the true risk of bank assets and to monitor their operations and the stakeholders involved are wider. As several stakeholders are involved, it is difficult to account for a wide range of interests, notwithstanding the obligation of accountability to their shareholders and to attend to their interests in accordance with the corporate governance principles for banks recognized by the Basel Committee on Banking Supervision (BIS, 2015). Finally, the diversification to other activities, rather than traditional banking, has contributed to the increase in risk. Therefore, an appropriate corporate governance system is crucial for the effective control of banking activities.

2.3. Development of hypothesis

In line with the ideas presented by Bae et al. (2011), Perotti and Spier (1993), Hanka (1988) and Jensen (1986) we consider that leverage may be used strategically by firms as a bargaining tool, thus it is expected that firms with more debt, pay lower wages. Firms with high debt may underinvest in employee benefits, which can be expressed in terms of wage reduction.

Moreover, following the ideas presented in Perotti and Spier (1993) we consider also that the effect of leverage will differ according to the firm, namely the negative effect of leverage will be

manifest in distressed banks. In this sense, the workers' bargaining power is reduced as they are more willing to accept lower wages, if the firm presents a potential risk of default. Thus, distressed firms are more prone to use leverage as a strategic device to renegotiate wages.

Based on this theoretical framework we test the following hypothesis:

H1: Firms with higher leverage will pay lower wages.

H2: The negative effect of leverage on employee wages increases with the probability of financial distress.

3. Data and summary statistics

In this study we examine a panel of European banks for the 1987-2015 period. We use data on all banks from 19 countries that are members of the Euro Area. Information from income statements and balance sheet information on individual banks is taken from Bankscope. The Bankscope database, provided by Bureau van Dijk, is a unique collection of micro-level banking information for different countries. It comprises information on detailed financials which are presented in multiple formats, including the universal format to compare banks globally. All data is reported in Euro and adjusted by price consumer index inflation in each country.

The original database includes 123,975 observations and 4,275 banks. After checking and clearing for inconsistencies and dropping all banks that are categorized as "Central banks", "Specialized governmental credit institutions" and "Multi-lateral governmental banks", we ended up with 121,161 observations and 4,184 banks. Table 1 reports the distribution of observations and banks across countries.

Table 2 provides a summary of the statistics of the variables used in our analysis. Panel A contains the statistics using the original dataset, while Panel B contains the variables trimmed at the 1st and 99th percentiles in order to control for the influence of outliers.

For the trimmed sample (panel B) we observe that the mean of average employee pay is 94,430 euros. The 1% and 99% cut-off is 16,660 euros and 202,330 euros, respectively. The mean of return on average assets is 0.47%.

Table 1: Sample

Country	Total number of observations	Total number of banks
Austria	10173	352
Belgium	2537	88
Cyprus	953	33
Estonia	319	11
Finland	1740	60
France	12137	420
Germany	53429	1844
Greece	464	16
Ireland	1939	67
Italy	18502	638
Latvia	580	20
Lithuania	290	10
Luxembourg	3619	125
Malta	637	22
Netherlands	2690	93
Portugal	4227	146
Slovakia	667	23
Slovenia	725	25
Spain	5533	191
Total	121161	4184
of which:		
Bank holdings & Holding companies	2689	93
Clearing & Custody Institutions	636	22
Commercial banks	22208	768
Cooperative banks	47705	1645
Finance companies	8732	302
Group finance companies	372	13
Investment & Trust corporations	1159	40
Investment banks	3761	130
Micro-financing institutions	58	2
Other non-banking credit institutions	1502	52
Private banking/Asset management companies	2890	100
Real Estate & Mortgage banks	3428	119
Savings banks	24371	841
Securities firms	1650	57

Source: Computations from the author based on Bankscope (2015)

Notes: See Appendix A3 (Table A.33) for the definition of the different types of bank specializations according to Bankscope.

Table 2: Descriptive Statistics

(In thousand euros, unless otherwise expressed)

Panel A: Original dataset										
Variable	N	Mean	St. Dev.	Min.	Max.	1st percentile	10th percentile	50th percentile	90th percentile	99th percentile
Personnel expenses	53079	70,842.15	574,280.64	5.40	16,090,000	300.00	1,300	7,285.35	59,400	1,154,400
Average personnel expenses	39860	94.43	2,022.43	0.03	214,900	16.66	38.89	54.84	91.84	202.33
Return on average assets – ROAA (%)	55005	0.57	6.09	-348.07	676.15	-3.77	0.03	0.29	1.15	8.56
Interest coverage ratio (%)	54945	0.96	8.40	-189.93	1,035.78	-4.38	0.02	0.65	1.73	11.38
Regulatory tier one capital (%)	14852	15.77	15.61	-101.30	689.10	5.43	8.30	12.97	23.65	62.90
Liabilities to total assets (%)	55222	90.12	12.84	-38.02	350.62	18.80	84.56	93.40	96.29	99.18
Total assets	55247	9,470,601	7.83e+07	18.30	2.59e+09	14,700	89,400	579,500	7,109,500	1.62e+08
Business diversification	54447	30.76	34.90	-950.00	934.23	-27.23	12.50	25.34	64.29	104.35
Employee productivity	40167	42.18	3271.53	-426550	194000	-200.00	1.36	10.98	74.24	914.29
Panel B: Trimmed dataset										
Personnel expenses	53,079	70,842.15	574,280.64	5.40	16,090,000	300	1,300	7,285.35	59,400	1,154,400
Average personnel expenses	39,860	94.43	2,022.43	0.03	214,900	16.66	38.89	54.84	91.84	202.33
Return on average assets – ROAA (%)	53,905	0.47	0.90	-3.77	8.56	-1.73	0.04	0.29	1.09	4.55
Interest coverage ratio (%)	53,846	0.81	1.19	-4.38	11.37	-2.12	0.04	0.65	1.65	5.92
Regulatory tier one capital (%)	14,557	14.86	7.38	5.43	62.90	6.20	8.44	12.97	23.00	45.74
Liabilities to total assets (%)	54,118	90.83	9.65	18.80	99.18	38.46	85.27	93.40	96.21	98.39
Total assets	54,145	3,497,880	1.20e+07	14,700	1.62e+08	27,100	95,400	579,400	6,282,100	6.27e+07
Business diversification	53,359	30.78	21.35	-27.23	104.35	-7.41	13.30	25.34	60.78	99.89
Employee productivity	39,370	30.10	77.09	-200.00	914.29	-81.81	1.74	10.98	68.97	417.57

Source: Computations from the author based on Bankscope (2015).

The interest coverage ratio, the regulatory tier one capital and the liabilities to total assets have a mean of 0.81%, 14.86%, and 90.83%, and a median of 0.65%, 12.97%, and 93.40%, respectively.

We have also observed, that the mean of net income to gross revenue which expresses our business diversification variable is 31% and that the average contribution of labour to net earnings is about 30%. Total assets have a wide range, from approximately 15 million euros to 162,000 million euros.

4. Empirical model

4.1. Estimation strategy

Focusing on financialization and changes in corporate governance, we estimate the effect of firm leverage on wages. The baseline specification is given by:

$$EP_{i,c,t} = \beta_0 + \beta_1 Leverage_{ict} + \beta_2 Shareholder\ value_{ict} + \beta_3 Size_{ict} + \\ + \beta_4\, Business\ Diversification_{ict} + \beta_5 Employee\ Productivity_{ict} + \gamma_{ct} + \varepsilon_{ict} \quad (1)$$

where $EP_{i,c,t}$ is the logarithm of average employee pay of firm *i*, in country *c*, at time (year) *t*, and it is calculated as the natural logarithm of average labour expenses.

The firms' leverage is related to financialization, as firms may use debt as a bargaining tool. Three alternative measures are used in our specification: first, regulatory tier one capital ratio which includes all capital that is defined as Tier 1 by the regulator and it comprises regulatory tier 1 capital, divided by risk weighted assets. It measures whether the pool of permanent funds available to the bank is sufficient to neutralize the risks. Second, the ratio of liabilities to total assets examines how much of a firm's assets are made of liabilities, as this ratio shows how leveraged the company is with debt, thus firms with higher liabilities to total assets ratios should have high financing and debt service costs, than firms with lower ratios.

As a third measure of leverage, we have also included the interest coverage ratio, constructed as the ratio of earnings before interests and taxes (EBIT) to interests' expense. The inclusion of the interest coverage ratio tries to consider that leverage may be seen as a means of transferring control from shareholders to bondholders (Rajan and Zingales, 1995), so a flow measure would be more appropriate to assess if the firm is able to meet its fixed payments and to measure the impact of the debt on the riskiness of the firm. A high interest coverage ratio, in terms of profitability, indicates that

the firm will be capable of paying interests owed, even in difficult times. A low ratio indicates that a small decrease in income will put the firm at risk, as it will not be able to pay the interests which are owed (Bierman, 2003: 83).

We consider profitability as a measure of value creation and performance. A widely used performance indicator is the return on average assets (ROAA) that permits the identification of the returns generated from the bank's assets. This ratio expresses how profitable a company is, relative to its total assets and how efficient management is at using its assets to generate earnings. In view of a profit maximizing behaviour, a negative effect of these variables on employee pay is expected, as labour costs are inversely related to profit.

As larger firms tend to pay higher wages to their employees, we have considered the employer-size wage effect (Brown and Medoff, 1989) and we have included the bank-size measure as the natural logarithm of total assets, in order to consider the positive correlation between firm size and wages. In line with Schoar (2002), diversification may be seen as a value destroying strategy accompanied by rent dissipation, through higher wages to workers, thus we include business diversification, computed as non-interest income, divided by gross revenue. In order to control for the contribution of labour to the net earnings, we have also included employee productivity calculated as the logarithm of net income, divided by the number of employees. As has been referred by Koch and Scott (2015: 173), this indicator expresses the productivity and profitability of a bank´s workforce. In a value enhancing strategy, if workers participate on the firm's profitability, this will be positively reflected on their wages. Finally, the model includes country-time interaction dummies, γ_{ct}, to control for macroeconomic shocks specific to the country.

Some concerns may arise from the estimations above as, for instance, consider that wages are negotiated in the beginning of the year, thus to assess the effects of the explanatory variables on wages we need to take into account their lagged values. In order to consider this issue and to lower the potential endogeneity, we re-estimate our model using our explanatory variables lagged by one year.

The use of a panel dataset imposes some restrictions in our linear model, namely the assumption of independence among observations. Moreover, we can use the panel data structure and deal with panel data endogeneity. As banks are repeatedly observed along subsequent years, we control for time-invariant unobserved firm heterogeneity by including bank-specific effects, α_i, that will reveal, for instance, differences that may be reflected on wages or management policies, and we have also included, country-time interaction dummies, γ_{ct}, to control for macroeconomic shocks specific to the country.

$$EP_{i,c,t} = \beta_0 + \beta_1 Leverage_{ict-1} + \beta_2 Shareholder\ value_{ict-1} + \beta_3 Size_{ict-1} +$$
$$+ \beta_4\ Business\ div_{ict-1} + \beta_5 Employee\ Productivity_{ict-1} + \alpha_i + \gamma_{ct} + \varepsilon_{ict} \quad (2)$$

4.2. Distressed versus non-distressed banks

The effects of leverage could be different for safe banks comparing to distressed banks, thus as Chemmanur et al. (2013) propose it would be interesting to disentangle the leverage effects on employee pay, according to the type of bank. For the prediction of bankruptcy, we use the Z-score as a measure of individual bank risk. Specifically, it indicates the number of standard deviations below the expected value of a bank's return on assets at which equity is depleted and the bank is insolvent (Boyd et al., 1993).

The Z-score has been frequently used to measure bank risk as it is related to the probability of a bank's insolvency (Bhagat et al., 2015; Demirgüç-Kunt and Huizinga, 2012; Hesse and Čihák, 2007; Köhler, 2015; Laeven and Levine, 2009). The simplicity of its application and the fact that it can be constructed by only using accounting data, are referred as the main advantages of this measure. Also, it is possible to compare the risk of default in different groups of institutions, however it does not represent a truly aggregate measure of financial stability as it does not take into consideration the potential effects of a bank's default into other banks. Nevertheless, the purpose is to evaluate each institution separately, in order to distinguish between those that could incur in a situation of financial distress, therefore, for this goal, the Z-score seems adequate.

The traditional concept of Z-score is defined as the ratio of the mean of return to assets (μ_{ROA}) plus the capital ratio (CAR), divided by the standard deviation of the return on assets (σ_{ROA}).

$$Z - score = \frac{\mu_{ROA} + CAR}{\sigma_{ROA}}, \quad (3)$$

If we define bank insolvency as a condition where $(CAR + ROA) \leq 0$, then we can obtain the individual bank's probability of insolvency as $p(ROA \leq -CAR)$. Thus, if ROA is a random variable with mean μ_{ROA} and finite variance σ^2_{ROA} an upper bound of the probability of insolvency can be estimated as

$$p(ROA \leq -CAR) \leq Z^{-2} \quad (4)$$

$$\text{where } Z \equiv \frac{\mu_{ROA}+CAR}{\sigma_{ROA}} > 0 \quad (5)$$

The Z-score obtained in expression (3) presents an appropriate estimate of a bank's probability of insolvency, as if μ is not normally distributed, and in accordance to Hannan and Hanweck (1988), Boyd et al. (1993) and Boyd and Runkle (1993), based on the Bienaymé-Tchebycheff inequality, Z is the inverse measure of the upper bound of the probability of insolvency.

In spite of its wide use on banking literature, its application as a time varying-measure in panel studies has contributed to the discussion about the best way for the construction of this measure. Lepetit and Strobel (2013) present a comparison of different approaches for the construction of Z-score measures. One of the presented approaches is the one adopted by Hesse and Čihák (2007), which was also implemented by Köhler (2015). According to Lepetit and Strobel (2013: 9) this approach allows the construction of time-varying Z-scores that are available over the full sample and it represents a clear and simple method, making Z-scores measures practical to implement in the banking and financial literature.

Following this approach our Z-score measure is defined as the ratio of the return to assets (ROA) plus the capital asset ratio (CAR) divided by the standard deviation of the return on assets $(SDROA)$ over the entire sample period,

$$Z_{it} = \frac{ROA_{it}+CAR_{it}}{SDROA_i}, \quad (6)$$

where ROA is the return on assets and CAR the ratio of total equity over total assets of bank in year t. $SDROA$ is a bank´s standard deviation from ROA. The standard deviation of returns is calculated for the entire sample period, to obtain a sufficiently long-term view of the risks faced by a given bank. A higher Z-score means that banks are more stable and present a lower probability of bankruptcy.

Table 3 presents descriptive statistics for the Z-score and its components for the full sample. A preliminary look at the z-scores suggests a high variability in the sample, with a z-score varying from -2.78 to 23573.36 with an average of 55.12.

Table 3: Descriptive statistics for the z-score and its components

	Mean	St. Dev.	Min.	Max.
ROA (%)	0.47	0.90	-348.07	8.56
CAR (%)	9.17	9.65	0.82	81.20
SDROA (%)	0.49	0.65	0.00	7.35
Z-score	55.12	200.65	-2.78	23,573.36

Source: Computations from the author based on Bankscope (2015).
Notes: The variables were trimmed at the 1st and 99th percentile.

In order to observe the subsample of distressed banks, we have defined distressed banks as those with z-scores that fall in the lowest 10 percent of the distribution[6]. For our sample, banks with a z-score below 8.96 are considered distressed. We have estimated our regression, including a dummy variable taking the value of one if the bank is distressed and zero if the bank is safe, and we have included an interaction term between the variables $Distress$ and $Leverage$. The interaction between these two variables will allow us to assess if there is any distinctive feature for distressed banks in the relation between leverage and employee pay.

$$EP_{i,c,t} = \beta_0 + \beta_2 Leverage_{ict}\beta_1 + Shareholder\ value_{ict} + \beta_3 Size_{ict} + \\ + \beta_4\, Business\ div_{ict} + \beta_5 Employee\ Productivity_{ict} + \beta_6 Distress_{ict} + \\ + \beta_7 Distress \times Leverage_{ict} + \gamma_{ct} + \varepsilon_{ict} \quad (7)$$

As reported in Subsection 4.1, we include the lagged values of the explanatory variables. Furthermore, we control for time-invariant unobserved heterogeneity, including bank-specific effects in our regression.

4.3. Instrumental Variable Analysis

Considering that leverage may be endogenous, in the sense that high wages can also imply low leverage, we address this potential reverse causality concern by employing an instrumental variable (IV) approach. Notwithstanding that this problem may already be partially out, by the use of lagged values in equation (2), we consider as suggested by Reed (2015) that replacing contemporaneous lagged variables with its lagged values, may not adequately address the problem associated with simultaneity, however the use of lagged values as instruments may be an effective estimation strategy. In this sense, the instrumental variables fixed effects estimation with two-stages least squares (IV2SLS) approach is applied.

[6] In accordance with the International Monetary Fund (2013).

Bearing in mind that there is a natural source of instruments in terms of predetermined variables (Wooldridge, 2009), the availability of information about previous realizations of the variables of interest provides potential instruments, and by doing so it is possible to isolate the effect of exogenous changes in leverage on wages, as the instruments are correlated with the explanatory variable, but they will not be correlated with the error term at time *t*, since they were generated at an earlier point in time. In this context, the second and third lags of leverage are used as instruments for our endogenous variable, which in our case is the first lag of liabilities to total assets.

In order to assess the robustness of our IV estimates, we employ an alternative identification strategy proposed by Lewbel (2012)[7] for the construction of instruments as functions of the model's data.

To understand the basic framework of the method proposed by Lewbel (2012), consider Y_1 and Y_2 as observed endogenous variables, $\mathbf{X}$ as a vector of observed exogenous regressors, and $\varepsilon = (\varepsilon_1, \varepsilon_2)$ as unobserved error processes, where the structural model can be defined as

$$\begin{aligned} Y_1 &= \boldsymbol{X}'\beta_1 + Y_2\gamma_1 + \varepsilon_1 \\ Y_2 &= \boldsymbol{X}'\beta_2 + Y_1\gamma_2 + \varepsilon_2, \end{aligned} \tag{8}$$

Lewbel (2012) suggests that, in the presence of some heteroscedasticity, one can take a vector $\boldsymbol{Z}$ of observed exogenous variables and use $[Z - E(Z)]\varepsilon_2$ as an instrument if $cov(\boldsymbol{X}, \varepsilon_i^2) \neq 0, i = 1,2$ and $cov(\boldsymbol{Z}, \varepsilon_1\varepsilon_2) = 0$ and $\boldsymbol{Z}$ could be a subset of $\mathbf{X}$ or equal to $\mathbf{X}$. In this sense, no information outside the model is required. The generated instruments are constructed from the first-stage equation residuals, multiplied by each of the included exogenous variables in mean-centered form

$$Z_j = \left(X_j - \overline{X}_j\right)\hat{\varepsilon}, \tag{9}$$

where $\hat{\varepsilon}$ is the vector of residuals from the first-stage regression of each endogenous regressor on all regressors, including a constant vector.

Once the above set of instruments is obtained, it is possible to use two-stage least squares to estimate the IV regression, as a standard IV estimation. Moreover, Lewbel (2012) suggests that in cases where there is an external instrument it is possible to estimate by TSLS using the second and third lags of leverage (our instruments) and the generated instruments. In this case, there will be three sets of estimates: the traditional IV estimates, estimates using only generated instruments, and estimates using both generated and excluded instruments.

[7] This method is implemented by stata using the Stata module ivreg2h (Baum and Schaffer, 2012).

5. Empirical Results

5.1. Relation between leverage and employee pay

We depart from a baseline specification to estimate the effect of firm leverage on wages, in which we include variables that characterize firm size, business diversification and employee productivity, as well as variables that control for bank profitability and a set of dummies that control for macroeconomic shocks specific to the country. As previously mentioned, we use three alternative measures of leverage – regulatory tier one capital ratio, liabilities to total assets and interest coverage ratio.

In our baseline model, we start with OLS regressions of average employee pay for all the sample. Considering the endogeneity issue, and in an attempt to deal with it, we estimate our model using our explanatory variables lagged by one year. In addition, to control for heteroscedasticity and serial correlation between banks, the standard errors are robust and clustered at the bank level. The results from estimating equation (1) with lagged effects are reported in Table 4.

We find that profitability is inversely related to employee pay. This inverse relationship is expected, as the increase in labour costs will reduce profit, thus invalidating any profit-maximization strategy. Considering that our employee pay variable is by construction related to personnel costs, this relation is manifest.

The positive coefficient for business diversification reflects that employee pay is positively related to firm's diversification, thus workers benefit from this strategy. It is also observed that productivity affects average wages positively. The effect suggested by the literature that larger firms tend to pay more to their employees is not clear in all the specifications, a significant but negative effect is observed in column (1) for the specification that uses the interest coverage ratio.

The coefficients for the two alternative measures of leverage – regulatory tier one capital and liabilities to total assets – suggest a negative relation between leverage and employee pay. It is observed that banks with lower leverage, pay higher wages. For the interest coverage ratio, the results suggest that there is a positive effect of leverage on average wages for a significance level of 10%.

Table 4: Ordinary Least Square regressions of average employee pay (with lagged effects)

Dependent variable: Logarithm of average employee pay			
Variable	(1)	(2)	(3)
Interest coverage ratio (t-1)	-1.167*		
	(0.598)		
Regulatory tier one capital (t-1)		0.301***	
		(0.075)	
Liabilities to total assets (t-1)			-0.411***
			(0.082)
Return on average assets (t-1)	-4.246***	-10.430***	-6.969***
	(1.177)	(2.089)	(1.153)
Total assets (t-1)	-0.006**	0.004	-0.003
	(0.003)	(0.004)	(0.003)
Business diversification (t-1)	0.497***	0.424***	0.485***
	(0.037)	(0.056)	(0.038)
Employee productivity (t-1)	0.134***	0.128***	0.133***
	(0.007)	(0.011)	(0.007)
Constant	3.645***	3.462***	3.974***
	(0.076)	(0.098)	(0.102)
Observations	29,971	9,397	29,898
R-squared	0.576	0.624	0.579
RMSE	0.242	0.218	0.239
F-stat	22155	13463	5652
Prob>F	0.000	0.000	0.000

Source: Computations from the author.

Notes: (1) The regression includes country-time interaction dummies to control for macroeconomic shocks specific to the country. (2) All explanatory variables were trimmed at the 1st and 99th percentiles. (3) Robust standard errors in brackets, clustered at the firm level. (4) *significant at 10%; **significant at 5%; ***significant at 1%.

Controlling for both bank and year effects and with the explanatory variables lagged by one year, we observe from Table 5 that, as expected, when we control for unobserved heterogeneity, the wage variation explained by the regressors is reduced. Specifically, it is observed that employee pay is positively related to the firm's employee productivity and that profitability is inversely related with employee average wage. Moreover, there is no evidence of a size-wage premium effect, as the coefficient of total assets suggests a negative effect of size on wages. With respect to business diversification its coefficient is insignificant throughout the specifications.

We observe that leverage is statistically significant, thus suggesting a negative relation between leverage and average wages, but only when considering the specification that uses liabilities to total assets as a measure of leverage, as observed in column (3).

Table 5: Fixed effects regressions of average employee pay (with lagged effects)

Dependent variable: Logarithm of average employee pay			
Variable	(1)	(2)	(3)
Interest coverage ratio (t-1)	0.325		
	(0.260)		
Regulatory tier one capital (t-1)		0.045	
		(0.111)	
Liabilities to total assets (t-1)			-0.230***
			(0.066)
Return on average assets (t-1)	-2.259***	-1.876	-2.526***
	(0.670)	(1.520)	(0.758)
Total assets (t-1)	-0.038***	-0.011	-0.024***
	(0.008)	(0.021)	(0.008)
Business diversification (t-1)	0.038	-0.011	0.041
	(0.028)	(0.042)	(0.028)
Employee productivity (t-1)	0.030***	0.025***	0.031***
	(0.005)	(0.007)	(0.005)
Constant	4.593***	4.286***	4.608***
	(0.112)	(0.279)	(0.111)
Observations	29,971	9,397	29,898
R-squared	0.361	0.409	0.362
F-stat	340.2	2.399e+06	160.5
Prob>F	0.000	0.000	0.000
Banks	3,471	2,499	3,460

Source: Computations from the author.

Notes: (1) The regression includes country-time interaction dummies to control for macroeconomic shocks specific to the country. (2) All explanatory variables were trimmed at the 1st and 99th percentiles. (3) Robust standard errors in brackets, clustered at the firm level. (4) *significant at 10%; **significant at 5%; ***significant at 1%.

5.2. Distressed versus non-distressed banks

Table 6 reports the results from estimating equation (4.7). Taking into consideration that our variable of interest is the interaction between $Distress$ and $Leverage$, the estimations with the explanatory variables lagged by one year, suggest that for banks financially distressed, the magnitude of the effect of leverage is not different in comparison to non-distressed banks, except for the case of the specification that uses the regulatory tier one capital as a measure of leverage, whose coefficient for the interaction term is positive but only at a 10% level of significance, thus suggesting that the negative effect of leverage on wages can be more pronounced for distressed firms.

The estimations of our fixed effects model with the explanatory variables lagged by one year are presented in Table 7. From the results, we can conclude that there are no differences on the effects of leverage on average wages for distressed banks and safe banks.

Table 6: Ordinary Least Square regressions of average employee pay for distressed banks (with lagged effects)

Dependent variable: Logarithm of average employee pay			
Variable	(1)	(2)	(3)
Interest coverage ratio (t-1)	-1.260**		
	(0.603)		
Regulatory tier one capital (t-1)		0.299***	
		(0.070)	
Liabilities to total assets (t-1)			-0.448***
			(0.083)
Distress	0.074***	-0.008	0.201
	(0.022)	(0.046)	(0.331)
Distress* Interest coverage ratio (t-1)	0.864		
	(1.818)		
Distress*Regulatory tier one capital (t-1)		0.685*	
		(0.353)	
Distress*Liabilities to total assets (t-1)			-0.109
			(0.355)
Return on average assets (t-1)	-5.960***	-11.944***	-8.627***
	(1.209)	(2.170)	(1.185)
Total assets (t-1)	-0.008***	0.003	-0.004
	(0.003)	(0.004)	(0.003)
Business diversification (t-1)	0.474***	0.388***	0.459***
	(0.037)	(0.056)	(0.037)
Employee productivity (t-1)	0.136***	0.131***	0.135***
	(0.007)	(0.011)	(0.007)
Constant	3.670***	3.473***	4.019***
	(0.077)	(0.098)	(0.101)
Observations	29,743	9,360	29,757
R-squared	0.584	0.628	0.586
RMSE	0.234	0.212	0.234
F-stat	6272	465765	4730
Prob>F	0.000	0.000	0.000

Source: Computations from the author.

Notes: (1) The regression includes country-time interaction dummies to control for macroeconomic shocks specific to the country. (2) *Distress* is a dummy variable taking the value of one if the bank is distressed and zero if the bank is safe. (3) All explanatory variables were trimmed at the 1st and 99th percentiles. (4) Robust standard errors in brackets, clustered at the firm level. (4) *significant at 10%; **significant at 5%; ***significant at 1%.

Table 7: Fixed effects regressions of average employee pay for distressed banks (with lagged effects)

Dependent variable: Logarithm of average employee pay			
Variable	(1)	(2)	(3)
Interest coverage ratio (t-1)	0.370		
	(0.248)		
Regulatory tier one capital (t-1)		0.072	
		(0.083)	
Liabilities to total assets (t-1)			-0.207***
			(0.068)
Distress	-0.032**	0.012	-0.184
	(0.014)	(0.039)	(0.153)
Distress* Interest coverage ratio (t-1)	-0.270		
	(0.581)		
Distress*Regulatory tier one capital (t-1)		-0.206	
		(0.210)	
Distress*Liabilities to total assets (t-1)			0.163
			(0.164)
Return on average assets (t-1)	-2.821***	-1.025	-3.148***
	(0.710)	(0.994)	(0.815)
Total assets (t-1)	-0.033***	0.007	-0.025***
	(0.008)	(0.023)	(0.008)
Business diversification (t-1)	0.023	-0.029	0.034
	(0.028)	(0.039)	(0.029)
Employee productivity (t-1)	0.030***	0.022***	0.032***
	(0.005)	(0.006)	(0.005)
Constant	4.538***	4.047***	4.616***
	(0.107)	(0.317)	(0.114)
Observations	29,743	9,360	29,757
R-squared	0.368	0.373	0.366
F-stat	865.7	3.680e+06	4365
Prob>F	0.000	0.000	0.000
Banks	3,427	2,495	3,430

Source: Computations from the author.

Notes: (1) The regression includes country-time interaction dummies to control for macroeconomic shocks specific to the country. (2) All explanatory variables were trimmed at the 1st and 99th percentiles. (3) Robust standard errors in brackets, clustered at the firm level. (4) *significant at 10%; **significant at 5%; ***significant at 1%.

6. Robustness tests and additional results

In this section, we perform alternative specifications in order to further validate our findings. First, we test the inverse relation between leverage and employee pay for alternative sub-samples. Furthermore, an additional control test was performed with the inclusion of the financial crisis. Second, we reestimate our model, taking into account the non-linear effect of leverage on wages. Third, bearing in mind that the use of lagged values, as suggested by Reed (2015), may not adequately address some potential endogeneity problem, we employ an IV approach.

6.1. Subsamples

Considering that our sample presents several types of banks, we have restricted our sample and estimate equation (2) for the sub-samples of banks operating in two distinct business models: shareholder-oriented banks and stakeholder-oriented banks. In line with Ferri et al. (2015), organizational form has important implications on financial firms. Besides commercial banks, whose explicit goal is the maximization of profits, which means shareholder value, other banks such as cooperative and savings banks aim to maximize the value for stakeholders.

Concerning commercial banks, we consider, as Ferri et al. (2015), a broad category of commercial banks, which includes commercial and investment banks as well as private banking and asset management companies. In this broader category of commercial banks, we have also included bank holdings and holding (BHH) companies. However, since BHH companies are defined by Bankscope as holding companies of bank groups, which usually have very limited business activities, we have also estimated equation (2) for the sub-samples of shareholder-oriented banks, excluding this type of banks.

The results presented in Table 8 validate our previous findings; we observe that the results remain almost qualitatively the same, confirming the negative effect of leverage on average employee pay for shareholder-oriented banks. In the case of stakeholder-oriented banks the coefficient of leverage is not statistically significant; suggesting that for these banks leverage has no effect on wages.

We have also considered the occurrence of the financial crisis during our sample period and we have tried to further assess, if the effect of leverage on wages is the same during that period. We have reestimated equation (2) including a dummy variable (*Crisis*) for the financial crisis, that is one for 2008 and 2009, and zero for the previous and subsequent years of the sample.

It is observed, from Table 9, that the coefficient of liabilities to total assets remains negative and significant, and that this effect is positive in the years during the crisis, 2008 and 2009, as suggested by the coefficient on the interaction term; however, the differential is not statistically significant.

Table 8: Fixed effects regressions of average employee pay (sub-samples)

Dependent variable: Logarithm of average employee pay					
	Shareholder-oriented				Stakeholder--oriented
	Bank holdings & holdings companies, commercial and investment banks, and private banking/asset management companies	Bank holdings & holdings companies and commercial banks	Commercial and investment banks, and private banking/asset management companies	Commercial banks	Savings and cooperative banks
Liabilities to total assets (t-1)	-0.274***	-0.242***	-0.240***	-0.243***	-0.287
	(0.088)	(0.090)	(0.085)	(0.089)	(0.221)
Return on average assets (t-1)	-3.772***	-3.806**	-2.673**	-1.988**	-5.087***
	(1.365)	(1.507)	(1.147)	(0.970)	(1.277)
Total assets (t-1)	-0.018	-0.030*	-0.014	-0.020	-0.030***
	(0.016)	(0.018)	(0.015)	(0.018)	(0.009)
Business diversification (t-1)	0.103**	0.117*	0.097**	0.118**	0.011
	(0.051)	(0.064)	(0.038)	(0.047)	(0.027)
Employee productivity (t-1)	0.044***	0.048***	0.028***	0.027***	0.036***
	(0.013)	(0.016)	(0.008)	(0.009)	(0.007)
Constant	4.711***	4.794***	4.681***	4.712***	4.672***
	(0.197)	(0.229)	(0.193)	(0.228)	(0.239)
Observations	5,367	4,338	5,133	4,104	22,648
R-squared	0.351	0.391	0.389	0.414	0.433
F-stat	55.73	17107	224.5	924.3	103.8
Prob>F	0.000	0.000	0.000	0.000	0.000
Banks	796	636	742	582	2,309

Source: Computations from the author.

Notes: (1) The regression includes country-time interaction dummies to control for macroeconomic shocks specific to the country. (2) All explanatory variables were trimmed at the 1st and 99th percentiles. (3) Robust standard errors in brackets, clustered at the firm level. (4) *significant at 10%; **significant at 5%; ***significant at 1%.

Table 9: Fixed effects regressions of average employee pay (sub-samples)

Variable	Financial Crisis
Liabilities to total assets (t-1)	-0.249***
	(0.067)
Crisis	-0.214***
	(0.063)
Crisis*Liabilities to total assets (t-1)	0.127**
	(0.063)
Return on average assets (t-1)	-2.488***
	(0.755)
Total assets (t-1)	-0.023***
	(0.008)
Business diversification (t-1)	0.039
	(0.028)
Employee productivity (t-1)	0.031***
	(0.005)
Constant	4.624***
	(0.111)
Observations	29,898
R-squared	0.362
F-stat	136.1
Prob>F	0.000
Banks	3,460

Source: Computations from the author.

Notes: (1) The regression includes country-time interaction dummies to control for macroeconomic shocks specific to the country. (2) Crisis is a dummy variable equal to one for 2008 and 2009, and zero for the previous and subsequent years of the sample. (3) All explanatory variables were trimmed at the 1st and 99th percentiles. (4) Robust standard errors in brackets, clustered at the bank level. (5) *significant at 10%; **significant at 5%; ***significant at 1%.

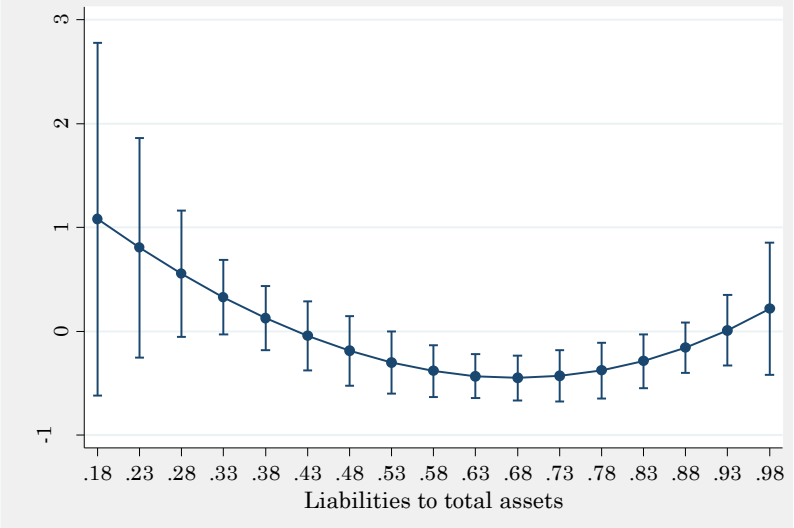
6.2. Non-linear relationship between leverage and employee pay

In order to try to account for some potential nonlinear relationship between leverage and employee pay, we apply a polynomial regression model as an extension of our model identified in equation (2), thus enabling a more effective and flexible curve fitting procedure.

Considering that a polynomial may provide a good approximation, we estimate a quartic polynomial regression assuming non-linear leverage effects and try to plot the relationship between leverage and employee pay for different levels of leverage.

In seeking to understand how the response varies as leverage changes, we may use our fixed-effects model, regressing average wages on leverage and its non-linear terms, controlling for profitability, size, business diversification, and employee productivity and try to assess for different levels of leverage, how the effect of leverage on wages changes as leverage changes.

Figure 1: Average marginal effects of leverage



Source: Computations from the author.
Notes: Average marginal effects calculated with a 95% confidence interval.

The presence of non-linearities in the effect of leverage on wages is observed. Notwithstanding, for lower and higher levels of leverage, the effects on wages are not apparent; the average marginal effects are significant for values of leverage between 53% and 83%. This reflects that a unit change in liabilities to total assets has a different impact according to where this change happens. Therefore, for instance, we may observe that for a ratio of liabilities to total assets of 53%, it is estimated a marginal effect of 0.30%, thus indicating that at this value, a 1 p.p. increase in leverage will decrease wages by 0.30%, but for a ratio of liabilities to total assets of 68% the expected decrease in wages, when leverage increases 1 p.p., will be of 0.45%, as stated in Figure 1 for the lower value of the curve.

The relation between leverage and employee pay reveals a threshold effect. This suggests that for certain levels of debt there will be a constraint in wages to competitive levels, thus further increases have no additional effects on wages.

6.3. Instrumental variable results

As previously mentioned, we also address the potential endogeneity problem by using the IV2SLS approach. We instrument the first lag of liabilities to total assets, by using the second and third lags of the referred variable. The results from the IV first-stage regression are presented in Table 10.

Table 10: First-stage regression

Dependent variable: Liabilities to total assets (t-1)	
Excluded Instruments	FE
Liabilities to total assets (t-2)	0.575***
	(0.059)
Liabilities to total assets (t-3)	0.054
	(0.040)
Observations	26,872
Number of banks	2,972
First stage *F*-statistic	100.46***

Source: Computations from the author.

Notes: (1) Robust standard errors in brackets, clustered at the bank level. (2) The table reports only the coefficient estimates for the instruments. (3) *significant at 10%; **significant at 5%; ***significant at 1%.

As expected, these results show that the previous lagged values, namely the second and third lags of liabilities to total assets, are positively related with the instrumented variable, notwithstanding that the third lag is not significant.

As we can see the F-statistic of exogenous instruments is clearly high and goes above the rule of thumb value of 10 for non-weak instruments, thus validating the instruments proposed. Moreover, according to Stock, Wright and Yogo (2002), who developed weak-instrument threshold critical values of *F* for testing that instruments are weak, in the case of two instruments, the suggested critical value is of 11.59, therefore the instruments will be considered weak if the first-stage F-statistic falls below that critical value. Therefore, the results confirm the validity of the instruments proposed.

Table 11 presents the results from the second stage of the instrumental variables fixed effects estimation. We are also presenting the results obtained from OLS and fixed effects estimation, which were reported before on Table 4 and Table 5.

Table 11: Instrumental variable regression

Dependent variable: Logarithm of average employee pay			
Variable	OLS	FE	IV-FE
Liabilities to total assets (t-1)	-0.411***	-0.230***	-0.444***
	(0.082)	(0.066)	(0.139)
Return on average assets (t-1)	-6.969***	-2.526***	-3.874***
	(1.153)	(0.758)	(0.912)
Total assets (t-1)	-0.003	-0.024***	0.008
	(0.003)	(0.008)	(0.011)
Business diversification (t-1)	0.485***	0.041	0.059*
	(0.038)	(0.028)	(0.035)
Employee productivity (t-1)	0.133***	0.031***	0.031***
	(0.007)	(0.005)	(0.005)
Constant	3.974***	4.608***	
	(0.102)	(0.111)	
Observations	29,898	29,898	26,872
Number of banks		3,460	2,972
Hansen J			0.159
p-value			0.690

Source: Computations from the author.

Notes: (1) Robust standard errors in brackets, clustered at the bank level. (2) All explanatory variables were trimmed at the 1st and 99th percentiles. (3) OLS and FE regressions include country-time interaction dummies to control for macroeconomic shocks specific to the country. (4) *significant at 10%; **significant at 5%; ***significant at 1%.

In the second stage analysis, banks' leverage is negatively related with average employee pay, consistent with the results from our previous estimations. In this sense, even after accounting for the potential endogeneity of leverage, this variable is significant in the determination of average wages. Moreover, the estimates for the remaining variables are also consistent with our previous findings.

In order to increase the robustness of our results, we have employed an alternative approach to our standard IV method proposed by Lewbel (2012). As previously mentioned, this approach allows us to construct additional instruments as simple functions of the regressors.

One condition for the implementation of this procedure relies on the existence of heteroscedasticity in the data. In order to assess if there is variance in the error term over time, the modified Wald test for groupwise heteroscedasticity was used, rejecting the null of constant variance.

Table 12 reports IV estimates using the Lewbel's method. The diagnostic tests suggest that instruments are valid. We observe that the F-test of exogenous instruments and the Hansen overidentifying restriction test confirms the validity of our instruments. Finally, the p-value of the Kleibergen-Paap rk LM statistic rejects the null of model underidentification.

Table 12: Lewbel's instrumental variable regression

First stage regression			
Dependent variable: Liabilities to total assets (t-1)			
	Standard IV	Lewbel IV (generated instruments)	Standard and Lewbel IV (standard plus generated instruments)
Variable			
Liabilities to total assets (t-2)	0.575***		0.547***
	(0.059)		(0.055)
Liabilities to total assets (t-3)	0.054		0.016
	(0.040)		(0.041)
Return on average assets (t-1)	-1.100***	-1.706***	-1.036***
	(0.146)	(0.205)	(0.136)
Total assets (t-1)	0.022***	0.036***	0.021***
	(0.002)	(0.003)	(0.002)
Business diversification (t-1)	0.010**	0.101	0.007
	(0.005)	(0.008)	(0.005)
Employee productivity (t-1)	0.001	0.002**	0.0003
	(0.001)	(0.001)	(0.0004)
Second stage regression			
Dependent variable: Logarithm of average employee pay			
Variable			
Liabilities to total assets (t-1)	-0.444***	-0.165	-0.410***
	(0.139)	(0.251)	(0.130)
Return on average assets (t-1)	-3.874***	-3.353***	-3.810***
	(0.912)	(1.146)	(0.934)
Total assets (t-1)	0.008	0.002	0.007
	(0.011)	(0.015)	(0.011)
Business diversification (t-1)	0.059*	0.054	0.058*
	(0.035)	(0.035)	(0.035)
Employee productivity (t-1)	0.031***	0.031***	0.031***
	(0.005)	(0.005)	(0.005)
Observations	27,138	27,138	27,138
Number of banks	3,238	3,238	3,238
First stage *F*-statistic	100.47***	16.29***	55.61***
Underidentification test			
Kleibergen-Paap (χ^2	51.79	71.19	111.63
p-value	0.000	0.000	0.000
Overidentification test			
Hansen J (χ^2	0.159	28.774	41.083
p-value	0.690	0.321	0.053

Source: Computations from the author.

Notes: (1) Robust standard errors in brackets, clustered at the bank level. (2) All explanatory variables were trimmed at the 1st and 99th percentiles. (3) The regression includes country-time interaction dummies to control for macroeconomic shocks specific to the country. (4) *significant at 10%; **significant at 5%; ***significant at 1%.

The results show that the Lewbel's IV results are lower in comparison to the standard IV estimates. We have also observed that there are minor differences between the estimates produced by the standard IV and those from the estimation that uses both generated and excluded instruments, thus the combination of instruments presents results that are closer to the estimates from the standard IV.

In addition, one limitation of the Lewbel's IV approach is that the estimation will present larger standard errors than those presented in the standard IV, thus in the presence of valid and strong instruments the standard IV is preferable. However, Lewbel's approach allows us to check the robustness of our standard IV, providing further evidence.

7. Conclusion

In this paper, we have analysed the relationship between wages, shareholder value and leverage for a panel of European banks for the 1987-2015 period. We have used data on all banks from 19 countries of the Euro Area, whose information is available on Bankscope.

We have observed that for all the specifications the effect of leverage on average wages differs according to the leverage measure that is used. When we consider as an alternative measure of leverage, the interest coverage ratio and liabilities to total assets, the results suggest a negative effect, thus indicating that banks with more leverage pay lower wages, however with a higher level of significance in the case of the liabilities to total assets. On the contrary, the same effect does not hold for the regulatory tier one capital. For this specification, the results suggest a significant and positive effect of leverage on average wages.

Controlling for both firm and year effects, the results suggest a negative relation between leverage and average wages, which is only statistically significant for the variable liabilities to total assets.

The contradictory effect that is observed when using the interest coverage ratio, may be motivated by the fact that this variable is a flow measure, so it is different in its nature when compared to regulatory tier one capital or to liabilities to total assets. On the other hand, we consider that the specification that uses regulatory tier one capital as leverage measure must be perceived with caution, as the observations that are considered are almost one third of the observations used in other specifications. Furthermore, we consider the liabilities to total assets an adequate measure of leverage.

Our instrumental variable specification validates our baseline results, suggesting that the relationship between leverage and average wages remains significant even after instrumenting a

bank´s leverage, thus we can conclude that the negative relation is not driven by endogeneity bias. In addition, the alternative Lewbel's IV estimation provides additional support to our findings. In this sense, we may say that, as proposed by Perotti and Spier (1993), banks may use their capital structure strategically, thus leveraged banks may renegotiate labour contracts and reduce wages. The substitution of equity by debt will function as a pressure mechanism for workers, as new investment may not occur, thus leading them to accept lower wages.

It may be the case that banks may also pay higher wages to their workers in order to persuade them from forming unions (Berk et al., 2010 and Bronars and Deere, 1991), however our results do not allow us to reach this conclusion, since we do not have information about unionization.

Finally, our paper indicates that for distressed banks, leverage is also statistically significant, when related to average wages, thus confirming the inverse relationship between leverage and average wages. Furthermore, we have not found evidence that the effect of leverage on average wages differs according to the type of bank.

In this sense, we share the same point of view as Chemmanur et al. (2013), based on Perotti and Spier (1993), according to whom, notwithstanding that the disciplining effect of debt on labour may be more evident in distressed firms, the disciplining mechanism can also be present in other firms, namely safe firms.

Moreover, the results validate our previous findings when we consider additional alternative specifications. First, considering that the ownership structure may influence the relation between leverage and average employee pay, our findings suggest that, as expected, the negative effect is prevalent for shareholder-oriented banks and that there is no effect for stakeholder-oriented banks. This may suggest, in accordance to Hanka (1998), that debt may increase shareholder wealth by reducing labour costs. Secondly, when we include the financial crisis, it is observed that the negative effect of leverage remains negative; additionally, the results suggest that the effect of leverage differs during the crisis, however this difference is not statistically significant.

Finally, the non-linear feature of the relationship between leverage and average employee pay seems evident, as we observe that the effects on average wages differ as leverage changes. In this sense, we identify that the negative relation between leverage and employee pay is significant only for values of leverage between 53% and 83%. Following the same line of reasoning presented in Hanka (1998), if this relation is explained by a disciplinary mechanism, the negative relation between leverage and employee pay reveals a threshold effect. Therefore, it suggests that for certain levels of debt there

will be a constraint in wages to competitive levels, thus, further increases have no additional effect on wages.

Our panel data study shows that a bank's capital has a positive effect of on average wages and it establishes a link between finance and the labour market, thus bringing to the forefront questions that need to be taken into account for policy makers. Our results also highlight new questions for further research, such as the determination of leverage thresholds that may harm wages, and it has also contributed by suggesting a novel approach for researchers wishing to deal with endogeneity.

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Appendix

A.1. The Bankscope Dataset

The Bankscope database, provided by the Bureau van Dijk (BvD), is a unique collection of micro-level banking information for different countries. This database contains financial information on banks worldwide. Content includes balance sheet data, income and expenses, ratios and other annual financial data years. Information on global and country-specific rankings (by total assets) is also available and ownership information as well.

The descriptive information includes addresses, contact numbers and web addresses, directors and managers, banks' specialisation, world and country rankings, auditor and auditor's qualification of the statement, various identification numbers as well as the history of the bank. The financial data is collected for a rolling period thus when a new year of data is added, the oldest data is dropped, which means that only the most recent data for each company is available. In our analysis we use information for the period 1987 to 2015.

Regarding its content, it offers a global coverage providing standardized variables for comparing banks across countries and regions. Thus, it comprises information on detailed financials which are presented in multiple formats, including the universal format to compare banks globally. This standardisation is the result of the development of the Fitch Universal Format with the adoption of the IFRS (International Financial Reporting Standards) by the majority of European banks as well as many Asian and Central American banks.

A.2. Definition of variables

Table A.2: Variables definition

Variables	Definition
Average employee pay	Logarithm of average employee pay, computed as the natural logarithm of total labour expenses. Labour expenses include: wages, salaries, social security costs, pension costs and other staff costs, including expensing of staff stock options.
Regulatory tier one capital	This measure of capital adequacy measures Tier 1 capital. It comprises regulatory tier 1 capital divided by risk weighted assets. It seeks to measure whether the pool of permanent funds available to the bank is sufficient to neutralize the risks. This figure should be at least 4%.
Interest coverage ratio (ICR)	Ratio of earnings before interest and taxes (EBIT) to interest expense. It represents the capacity of the firm to pay interest on debt. In terms of profitability, a high ICR indicates that the firm will be capable of paying interest on debt even in difficult times.
Liabilities to total assets	It corresponds to liabilities divided to total assets. This ratio examines how much of a firm's assets are made of liabilities. Banks with higher liabilities to total assets ratios should have higher financing and debt service costs, than banks with lower ratios.
Profitability	Return on average assets (ROAA), computed as net income divided by average total assets. This ratio compares the efficiency and operational performance of banks as it looks at the returns generated from the bank's assets.
Size	Natural logarithm of total assets.
Business diversification	Non-interest income divided by gross revenue. This ratio indicates de amount of fees, trading and asset sale income to total revenues, which also includes net interest income.
Employee productivity	Net income divided by the number of employees. This ratio shows the participation of a company's employees in its financial figures such as profits.
Distressed	Dummy variable taking value one if the bank is distressed and zero if the bank is safe. We define distressed banks as those with z-scores that fall in the lowest 10 percent of the distribution.
Crisis	Dummy variable taking value one if year=2008 and year=2009, and zero for the previous and subsequent years of the sample.

A.3. Bank specialization

Table A.3: Bank specialization

Bankscope Classification	
Commercial banks	Mainly active in a combination of retail banking (Individuals, SMEs), Wholesale Banking (large corporates) and Private banking (not belonging to groups of savings banks, cooperative banks).
Savings banks	Mainly active in Retail Banking (Individuals, SMEs) and usually belonging to a group of savings banks.
Cooperative banks	Cooperative banks have a cooperative ownership structure and are mainly active in Retail Banking (Individuals, SMEs).
Real Estate & Mortgage banks	Mainly active in Mortgage Financing and Project Development.
Investment banks	Mainly active in Corporate Finance, Debt/Equity Issues, Mergers & Acquisitions, Securities Trading and usually in Private Banking.
Other non-banking credit institutions	Institutions providing guarantees, money transfer companies, companies providing banking and non-banking financial services to groups of financial institutions.
Specialized governmental credit institutions	Institutions providing National Development Finance, Sectoral Finance or Export/Import Finance. This specialisation category includes Public Institutions acting on privileged or protected segments or benefiting from Governmental guarantee or sponsoring.
Bank holdings & Holding companies	Holding companies of bank groups, which usually have very limited business activities.
Central banks	Supervising national banking systems.
Multi-lateral governmental banks	Active in multi-lateral development finance.
Micro-financing institutions	Providing micro finance to individuals and very small companies.
Securities firms	Mainly active in Securities Trading/Arbitrage activities/ Securities Brokerage/Derivatives.
Private banking/Asset management companies	Banks mainly active in private banking and asset management.
Investment & Trust corporations	Investment Corporations/Investment Trust Companies and Private Equity Companies/Property Developers and Covered Bond Issuers investing in various assets.
Finance companies	Consumer Finance Companies, Credit Card Companies, Factoring Companies, Leasing Companies, Trade Finance Companies
Clearing & Custody institutions	Institutions providing clearing and custody services.
Group finance companies	Companies mainly active in attracting funding for and lending on behalf of the group.

Source: Bankscope (2015).

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