Insider Trading and the Predictability of Stock Returns:

Evidence for the Banking Sector.

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ABSTRACT[†]

No evidence exists so far on the causality between insider trading and stock returns for the banking industry. This paper provides the first evidence on the casual relationship between both variables both at the aggregate and at the firm level. We find that bank insiders are able to predict future returns at firm level, but no relationship is found at the aggregate level. Therefore, we conclude that the stock mispricing detected by insiders is not caused by economy-wide factors, but by firm-specific features. Unlike previous literature, we also analyse the firm-specific variables that cause bank insider trading. By using panel data estimation for the first time in the insider trading literature, we identify bank reputation, level of entrenchment, charter values, capitalisation and size as determinant factors.

Keywords: Insider trading, Granger causality, panel data, reputation, entrenchment, charter value.

JEL Classification: G14, G21, C4

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1. INTRODUCTION

The causality of insider trading and stock returns in the banking industry has never been analysed, either at the aggregate or at the firm level. In fact, outside of the US markets, little can be said about insider trading in the bank industry, since financial firms are usually dropped from the general studies on insider trading due to their particular characteristics.[1] In any case, most of the studies approach insider trading by applying the event studies methodology so as to calculate the abnormal returns associated with insider dealings, and unanimously conclude that bank insiders obtain abnormal returns in their open-market transactions thanks to their access to relevant private corporate information (Baesel and Stein, 1979; Slovin, Sushka and Polonchek, 1991; Madura and Wiant, 1995; and Jordan, 1999).

The causality of aggregate insider trading and stock market returns was first studied by Seyhun (1988), who stated that if part of the mispricing detected by corporate insiders in their own firm's shares is triggered by economy-wide factors, then a positive relationship should be expected between aggregate insider trading and future stock market returns. His results corroborated this relationship as he concluded that unusual increases in stock sales by insiders precede future declines in the stock prices, and that unusual increases in stock purchases precede future increases in the stock prices. More recently, Chowdhury, Lin and Howe (1993) and Iqbal and Shetty (2002) have provided new evidence on the causal relationship at both the aggregate level and the firm level by applying a more accurate methodology based on Granger-causality and vector autoregressive techniques.

This paper attempts to complement previous literature by providing the first test of the Granger-causality between stock returns and several indexes of insider trading in the bank sector at both aggregate and firm levels for a continental European country. Futhermore, we improve on previous studies on causality by stepping further and also analysing the factors that determine the causality between insider trading and stock returns.

1

Four major contributions are notable in this paper. First, this is the first paper that analyses the causality of bank insider trading and stock returns in any country. Second, it also represents the first study of banking insider trading in a Continental European country.[2] Third, we are unaware of any paper explaining insider trading activity by means of the more robust technique of panel data estimation either for financial or non-financial firms. Four, we provide, for the first time, evidence on the relationship of insider trading and crucial variables characterising financial firms, such as charter value, entrenchment and capitalisation.

Our results are conclusive. The causality analysis shows evidence that insiders' transactions have a strong effect on the stock returns on the Spanish stock market at only the firm level. Therefore, macroeconomic factors do not determine bank insider trading, which seems to occur only for firm-specific reasons. Our results indicate that bank insiders are able to predict future stock returns, and are therefore able to detect the mispricing of their own shares earlier than other market participants; On the other hand, their trading is not based on past returns.

This positive causal relationship, however, is only detected in the short term, since it becomes negative for the long run (around six months before the transactions). This corroborates the findings of Chowdhury, Lin and Howe (1993) and Fama and French (1988), who state that long-term returns are easier to predict. This study also confirms that sales transactions have greater informational contents in the Spanish market than purchases, supporting the findings of Del Brio, Miguel and Perote (2002) for non-financial Spanish firms, but contradicting results found in other markets.

Since insider trading activity in Spanish banks seems to be determined only by firm-specific features, the second stage of the study focuses on identifying which factors most strongly determine insider trading activity in the banking industry. The use of monthly series of abnormal trading at the bank level allows us to build a panel of insider trading transactions,

and consequently to use panel data methodology for the estimation of the determinant factors of insider trading in the banking sector. We likewise find evidence that insider trading is positively correlated with larger bank size, more prestigious banks, less capitalized banks, lower charter values for high levels of ownership, and entrenched bank directors.

The remainder of the paper is organised as follows: Section 2 presents a review of the literature on banking insider trading; Section 3 describes the samples and methodology used; results of the causality test are given in Section 4; Section 5 presents the hypotheses and the model used to identify the factors that explain insider trading in the Spanish banking industry, while Section 6 presents the estimation results. The conclusions are presented in Section 7.

2. REVIEW OF PREVIOUS STUDIES

Since Seyhun (1988) analysed the relationship between aggregate insider trading and stock market returns, several studies have attempted to find new evidence on the causal relation. Seyhun stated that if insiders recognised the effects of changes in economy-wide factors and traded on them, then a positive and contemporaneous relationship should be expected between aggregate insider trading and stock market returns. However, if insiders recognise the effects of changes in economy-wide factors *before other market participants* and trade on them, then a positive relationship between current insider trading and future excess returns should be expected. This statement was essentially based on previous literature (Jaffe, 1974; Finnerty, 1976; Seyhun, 1986) that had documented the ability of corporate insiders to detect the mispricing of their own firm's shares.

Chowdhury, Lin and Howe (1993), and more recently Iqbal and Shetty (2002), applied Granger-causal tests and vector autoregressive methodologies for the same purpose, obtaining somewhat different results. Both papers conclude that there exists a strong relationship between past returns and insider trading at the aggregate level; stock price decreases are followed by more insiders' purchases, and price increases are followed by more insiders'

sales. However, their results contradict previous literature regarding the predictability of future prices by insiders, including Seyhun (1988) and Seyhun and Bradley (1997), who both conclude that insiders cannot predict future prices or can only predict with minimal success. At the firm level, Iqbal and Shetty (2002) corroborate the results for the aggregate level and also conclude that there is no noticeable difference between the results of insiders' purchases and sales.

However, none of these studies focus on banking insider trading. In fact, most studies on banking insider trading have only been performed by calculating abnormal returns associated with insider transactions through the event studies methodology. Still, the evidence available is very scarce: Baesel and Stein (1979), Lee and Bishara (1989), Madura and Wiant (1995), Jordan (1999), Ramirez and Yung (2000) and Madison, Roth and Saporoschenko (2004), among others.

Baesel and Stein (1979), Lee and Bishara (1989) and Madura and Wiant (1995) found that banking insiders obtained abnormal returns when trading in their own firms' shares on the Canadian and US markets, concluding that purchases have greater informational content than sales. Baesel and Stein (1979) analyse bank insider trading for Canadian markets. They conclude that bank directors have unbeatable access to private information, and are in a better position than corporate insiders in other industries' firms. The reasoning being, among other things, that they control a substantial portion on the bank's ownership and are members of the boards of directors of other non-financial companies.

Madura and Wiant (1995) also analyse the characteristics of banking firms that may enable insider trading. They single out bank size as one of the main variables since small banks are less controlled by analysts and investors, so that their directors can have access to a greater volume of reserved information than large banks. Ramirez and Yung (2000) show that the bank's reputation is such an important asset for an investment bank that it can restrict the

trading behaviour of the insider. Thus, the insiders of the most prestigious banks are less likely to trade on private information**.**

Jordan (1999) concludes that trading by bank insiders helps to reduce the agency problem, since by exploiting specific private information, bank directors increase the rate of return and reduce the riskiness of their investments in their bank.

In any case, most of the existing papers detect that bank insiders obtain large profits from their private information. Similarly, abnormal returns are also detected for the banking industry when analysing insider trading around corporate announcements such as mergers and acquisitions (Madison, Roth and Saporoschenko, 2004; Filbeck and Mullineaux, 1995; Nelly, 1987; and Desai and Stover, 1985), investment banking reputation in initial public offerings (Ramirez and Yung, 2000) and sales of corporate assets (Hirschey, Slovin and Zaima, 1990).

To our knowledge, no study has yet addressed the causality between insider trading and stock returns for the bank industry wherever. However, studies on the profitability of bank insiders have been performed only for US, Canada (Madura and Wiant, 1995) and the UK (Basel and Stein, 1991). No evidence thus exists for any continental European country. For this reason, we focused the investigation on the Spanish stock market, as an example of a continental-structured market where there is already evidence regarding the abnormal profitability associated with insiders transactions (Del Brio, Miguel and Perote, 2002).

In addition, the Spanish market has some peculiarities which enhance the research, such as (i) the different pattern of Spanish firms' ownership structure (very concentrated), (ii) a minimally-developed market for corporate control, and (iii) less liquid stock markets. As for the banking sector, it is a regulated sector in Spain, where there are three main types of institutions: savings banks, commercial banks and credit cooperatives (see Crespí, García-Cestona and Salas, 2004, for further description). Since our study focuses on open market transactions by insiders, our sample is composed only of commercial banks because the other

two groups are not listed firms.

3. SAMPLE AND METHODOLOGY

This study analyses the legal open market transactions carried out by insiders in Spanish commercial banks between January 1994 and December 2003, which were reported by the insiders themselves to the Comisión Nacional del Mercado de Valores (CNMV) as required by the Spanish Securities Market Law. The transactions under analysis were carried out by presidents, vice-presidents and directors of the banks. The data on the transactions of banking insiders were obtained from the Insiders Dealings Records provided by the CNMV. The sample analysed comprises 4,623 insider transactions in 18 commercial banks quoted on the continuous market. The banks reported their transactions to the CNMV during the period of study in question. Out of these transactions, 3,089 were purchases and 1, 534 were sales. Stock prices and other data needed to construct the insider trading indexes, as well as the explanatory variables of the model estimated in Section 5, were obtained from the Datastream and the Bankscope databases.

Table 1 gives the descriptive statistics of the banks in our sample. The annual financial data from 1994 to 2003 were averaged, and the mean, median, standard deviation, and maximum and minimum values of these averaged values were obtained. Results are shown in Panel A. Panel B shows the estimations of the annual stock returns and insider transactions from 1994 to 2003. The stock returns in this period were generally positive, 1997 being the year of greatest returns for the average stock traded on the Spanish stock market and 1994 and 2003 being years of negative returns. The data corresponding to insider transactions show that the average number of purchases did not undergo significant variation except in 1997 and 1998. However, the average number of sales did decline from 1997 to 2000, after which the average level of transactions returned to levels observed in the first years of the sample period. The average number of shares bought by bank directors increased tenfold from 1994

to 2003. Likewise, the average number of shares sold increased almost 14-fold in the same period.

[INSERT TABLE 1 HERE]

[INSERT FIGURE 1 HERE]

To examine the relationship of causality between insider trading and stock market returns, we rely on four different measures of banking insider trading calculated for the time series covering 1994 to 2003. The first two indicators are traditionally employed in studies on insider trading, and examine purchases and sales separately in order to test whether there is more information content in sales or, on the contrary, purchases are more informative. Thus, the monthly Purchase Index (PI_t) is defined as

$$PI_t = \frac{P_t}{(P_t + S_t)},$$ (1)

where P_t is the volume of purchases for month t, S_t stands for the volume of sales in month t; and the monthly sales index (SI_t) is defined as

$$SI_t = \frac{S_t}{(P_t + S_t)}.$$ (2)

The other two indexes are not as commonly used, but have proven to be significant when explaining insider trading intensity (Karpoff and Lee, 1991; Yur-Austin, 1998)[3]. Thus, the third insider trading index is calculated as the absolute value of the difference between the euro volume of insiders' purchases minus sales, standardised by the earnings per share ratio in a certain month:

$$SNVI_t = \frac{|NV_t|}{EPS_t} = \frac{|P_t - S_t|}{EPS_t},$$ (3)

where $SNVI_t$ represents the EPS Standardised Net Euro Volume Index for period t, NV_t is the difference between purchases and sales for period t (also referred to as volume of net purchases), and EPS_t is the earnings per share ratio for period t. Karpoff and Lee (1991) and

7

Del Brio (2006) support the standardisation of insider trading indexes by EPS since it has been proven to be the main feature of the firm which should be controlled for when measuring the intensity of insider trading.

The forth index standardises the volume of net purchases by the total volume of purchases and sales in a given month, as used by Yur-Austin (1998), Iqbal and Shetty (2002), Ke, Huddart and Petroni (2003), among others.

$$NVI_t = \frac{NV_t}{(P_t + S_t)} = \frac{(P_t - S_t)}{(P_t + S_t)}, \tag{4}$$

where NVI_t is the net volume index for period t, and the rest of the values coincide with those of previous equations.

Regarding the methodology employed, this study applied Granger-causality tests to examine the relationship between stock returns and different measures of insider trading. We follow Iqbal and Shetty (2002) and analyse insider trading both at the aggregate and at the firm level, while Chowdhury, Lin and Howe (2003) focused only on the aggregate level. The Granger methodology allows us to determine whether bank insider transactions have a causal relationship with stock returns in any direction. Monthly stock returns (R_t) are defined as the natural logarithm conversion of stock returns in two consecutive months, adjusted by dividends and subscription rights. To proxy insider trading (X_t) we used the four insider trading indexes described in Section 3. The stock returns as well as those indexes are stationary series, thus fulfilling the *a priori* requirement for applying the Granger causality tests, imposed by the Dickey-Fuller and Phillips-Perron tests.

Granger causality tests try to establish whether any changes in X_{t-j} precede or cause in a Granger sense the changes in R_t, or vice-versa. For this, the following autoregressions are tested:

8

$$R_t = \alpha_{01} + \sum_{j=1}^{k} \alpha_{j1} R_{t-j} + \sum_{j=1}^{k} \beta_{j1} X_{t-j} + \varepsilon_{t1} \tag{5}$$

$$X_t = \alpha_{02} + \sum_{j=1}^{k} \alpha_{j2} X_{t-k} + \sum_{j=1}^{k} \beta_{j2} R_{t-j} + \varepsilon_{t2}, \tag{6}$$

where α_{ji} ($\forall i=1,2$) are the coefficients of the lagged values of the dependent variable and β_{ji} ($\forall i=1,2$) are the coefficients of the lagged values of the explanatory variable in each of the two equations

The causality of X_t towards R_t is tested in equation (5) and the causality of R_t towards X_t is tested in equation (6). To better detect causality, and following Iqbal and Shetty (2002), we use a horizon of k-months length lags, where k takes the value of one, three and six. For testing purposes, we used Wald tests.

4. RESULTS OF THE CAUSALITY TESTS

Our results show that at the aggregate level, there is no evidence of a Granger-causality relationship between insider trading and stock market returns in any direction. Therefore, the mispricing detected by Spanish banking insiders is not triggered by economy-wide factors but only by firm-specific variables. These results clearly contradict prior evidence in support of a causal relationship running from the stock returns to insiders' transactions (Seyhun, 1988; Chowdhury, Lin and Howe, 1993; Iqbal and Shetty, 2002).

Results are, however, consistent with the lack of predictive power of insiders when the mispricing of their firms' shares is due to macroeconomic factors also detected by the two latter aforementioned papers. Therefore, for the Spanish banking industry, we conclude that insiders neither base their trading on past prices nor are they able to predict future prices when the stocks' mispricing is due to macroeconomic forces. For the sake of brevity, the results for the aggregate level are not tabled, since they are significant for neither an insider trading measurement nor lags, but they are available upon request from the authors.

When analysing the causality at the firm level, results vary significantly. Thus, when the mispricing of insiders' firms are due to firm-specific variables rather than macroeconomic ones, insiders are better able to both identify the mispricing and profit from it. Tables 2 and 3 shows the empirical results of the Granger causality model for the four insider trading indexes.

[INSERT TABLE 2 HERE]

For any insider trading index and for any of the lag horizons considered, the hypothesis that insider trading does not Granger cause stock returns' is rejected, especially when *SNVI* is used to proxy insider trading. A clear causal relationship is found for all the indexes running from bank insider trading indexes to stock returns, and this relationship is not sensitive to the insider trading measure employed. This situation is thus the opposite of the one found by Iqbal and Shetty (2002), for whom the results were sensitive to the variable chosen.

However, for the three-period horizon causality seems to be less definitive. Furthermore, the first lag of $SNVI_t$ is always significant and positive, reinforcing the idea that insider trades precede increases in stock returns, but, for greater lags, insider trading indexes are not affecting stock returns or they affect them negatively (as in the case of the fifth lag). It suggests a decrease in the stock returns for longer time horizons.

As far as causality from stock returns to insider trading indexes is concerned, there does not seem to be evidence that bank directors make investment decisions based on past prices, given that the null hypothesis of the Wald test is accepted for the three lag horizons considered and for all the indexes.

[INSERT TABLE 3 HERE]

Finally, according to Table 3, it can be concluded that bank insider sales have greater informational content than purchases (p-value of 0,036), a situation that is the opposite of the

10

one found for US and UK non-financial firms (Seyhun, 1986; and Fidrmuc, Goergen and Renneboog, 2006), but which is consistent with the evidence found for Spain (Del Brio, Miguel and Perote, 2002) and Norway (Eckbo and Smith, 1998).

Given all these results, we can conclude that in spite of the existence of certain differences between insider trading in Spanish banks and banks in other markets, having private information is favourable for bank directors and it allows them to anticipate movements in their bank stock prices and thus suitably time their operations.[4] We should consider the importance that this relationship may have in relation to another line of studies, such as those by Seyhun (1988), Karpoff and Lee (1991) and Seyhun and Bradley (1997), among others, who detect that insiders use timing and are capable of trading at an advantage around specific corporate announcements.

5. FIRM-SPECIFIC FACTORS AND INSIDERS' TRANSACTIONS.

According to the causality analysis performed in Section 4, bank insiders in Spain seem to be able to identify the mispricing of shares of their own firms only when it is due to firm-specific factors, rather than macroeconomic reasons. Therefore, we next examine which firm characteristics may be triggering bank insiders' transactions by applying a generalised least squares (GLS) estimation for an incomplete panel composed of 18 banks and a 10-year time series running from 1993 to 2004.

To proxy insider trading, the literature typically uses the cumulative abnormal returns associated with insider transactions, as measured by applying the event studies methodology. Since we have ruled out this methodology in favour of a study of causality, the dependent variable in our study is the logarithm conversion of the *SNVI* index, measured as the net euro volume of purchases standardised by the earnings per share ratio. This index is chosen as the dependent variable in our model since it is found to be the most significant measure of insider trading among the four indexes tested in this paper.

To approach the analysis of the factors triggering insider trading, we apply the agency theory of insider trading (Beny, 2004), which holds that the manager-shareholder conflict is the core theoretical lens through which to analyse the positive and negative externalities of insider trading. Unlike Zhang (2001), who states that insider trading mitigates the problem of information asymmetry and allows shareholders to better control management,[5] most of the financial literature supports the opposite idea, and analyses insider trading as a manifestation of the lack of control shareholders have on managers and, thus, a source of agency costs due to the need to monitor opportunistic managers. As a result, a negative relationship is commonly expected between the convergence of property and control interests and insider trading activity.

Under this assumption, we next examine the effects on insider trading activity of several factors that are crucial to understanding managers' behaviour in the banking sector, and which are mainly related to the behaviour and monitoring of bank management. Among them, charter value, risk-taking incentives, entrenchment and capitalisation have not been analysed in the previous literature on banking insider trading so far.

Jensen and Meclkling (1976) defined directors' ownership as an efficient mechanism to more closely align managers' interests with those of shareholders. The higher the directors' ownership, the higher the alignment of interests among control and property groups. For the banking industry, Saunders, Strock and Travlos (1990) also found that banks controlled by managers—defined as those in which directors maintain a relatively smaller proportion of the bank's shares—usually pursues directors' own interests. In contrast, banks controlled by shareholders—which they define as those banks where the directors hold a relatively greater proportion of shares—usually maximise the value of the firm for its shareholders. Indeed, there is a wide consensus on the fact that high inside ownership is usually associated with a better alignment of interests. Similarly, Jordan (1999) showed that bank directors who own a

high percentage of the firm's shares tend to trade less opportunistically on private information, thus assuming that the convergence of interests is a prelude for less insider trading activity.

Nevertheless, the entrenchment literature has brought to light the fact that when insider ownership surpasses an optimal threshold, an increase in insider ownership makes managers entrenched and allows them to satisfy their non-value-maximising objectives without endangering their employment and status. However, although the relationship between entrenchment and firm value is well documented, no evidence has so yet been found regarding the level of directors' entrenchment and insider trading.[6] However, since entrenchment usually exacerbates both information asymmetry and non-value-maximising behaviours, we expect a positive relationship between insider trading activity and the level of entrenchment. In short, we expect a non-linear relationship between insider trading and insider ownership, which is based on the non-linear relationship between insider ownership and firm value already documented by Miguel, Pindado and De la Torre (2004) for the Spanish non-financial firms.

Therefore, a negative relationship is expected between bank insider ownership[7] and bank insider trading intensity for low levels of insider ownership, and a positive relationship for high stakes, due to the entrenchment effects. To properly examine this relationship, we constructed the variable insider ownership (IO) and its square (IO^2). IO is measured as the number of shares held by bank directors at the end of the former period to the total number of outstanding shares, as developed in Core, Holthausen and Larker (1999), Jordan (1999), Lee (2002) and Roulstone (2003). Thus, we test the following two hypotheses:

Hypothesis 1a: The less insider ownership, the higher intensity of bank insider trading.

Hypothesis 1b: The more entrenched the bank director, the higher the intensity of bank insider trading.

Despite the crucial influence of charter value on bank risk and bank performance, no evidence has yet been found regarding the relationship between charter value and insider trading. Charter value (understood as the value of the right to continue to operate) has traditionally been used as an indicator of risk-taking incentives for bank directors. In fact, we use charter value in this study as a proxy for risk-taking incentives[8] in order to understand how the level of risk that managers are willing to take on enhances insider trading. Since no evidence has been uncovered in the existing literature regarding this relationship within the bank industry, this remains an open empirical question.

According to Keeley (1990), Demsetz, Saidenberg and Strahan (1996) or González (2005), for the Spanish market, lower charter values are traditionally associated with greater risk-taking incentives. However, Gorton and Rosen (1995), Jordan (1999) and Cebenoyan, Cooperman and Register (1999) acknowledge that as long as insiders increase their proportion of the firm's wealth, they increase their exposure to undiversifiable risk in such a way that, when property and control interests are aligned, insiders will attempt to take on only profitable risks, thus modifying the expected relationship between charter value and risk-taking incentives. Therefore, according to these authors, to determine the effects of managers' risk aversion, we first should determine how the alignment (or lack of alignment) of interests is affecting risk-taking incentives.

For that reason, we followed Cebenoyan, Cooperman and Register (1999) and created the slope interaction variable between charter value (proxying risk-taking incentives) and inside ownership, which indicates how the impact of risk incentives on insider trading is increasing or decreasing as inside ownership rises.[9] However, as an increase in insider ownership beyond an optimal level may produce entrenchment problems, we go further and examine the relationship between risk-taking incentives and insider trading by controlling the

effects of entrenchment. In this case, lower charter values should still lead to greater risk-taking incentives and higher insider trading activity, the reason why a negative relationship is thus expected between the variables.

For this purpose, we constructed the slope interaction variable between charter value and the square of inside ownership. To proxy charter value we used Tobin's Q, previously used by González (2007), which modifies the traditional market-to-book value of equity by proxying the market value of assets by the book value of assets minus the book value of equity plus the market value of common stocks.

Hypothesis 2: The lower the charter value for high levels of insider ownership, the higher the intensity of bank insider trading.

As noted by Furfine (2001) and Lindquist (2004), in the presence of a supervisory discipline effect, banks' excess capital increases since banks attempt to avoid costs related to market discipline and supervisory intervention if they approach or fall below the regulatory minimum capital ratio. Since supervisors and market discipline help to reduce information asymmetry, the increase in excess capital may lead to less control and therefore more intensive insider trading activity. Therefore, a positive relationship could be expected between these variables. In the literature, however, firms with lower capitalisation have been shown to be related to more opportunistic behaviour from managers, probably because, under the bad management hypothesis, managers have over-invested in non-valuable investment projects, thus reducing bank capital (Williams, 2004). According to this second reasoning, a negative relationship should be expected between insider trading activity and excess capital. Since no evidence has yet been found regarding this relationship, and different theories support contradictory expectations, we consider it an empirical question.

To proxy excess bank capital (BC), we followed Furfine (2001) and used the excess capital-to-asset ratio, measured as the difference between the ratio of the book value of equity to the book value of risky assets minus the regulatory minimum capital ratio (8%).

Hypothesis 3: The lower the excess capital, the higher the intensity of bank insider trading.

Reputation, together with size, media attention or analyst interest, is usually considered a proxy of the firms' transparency or visibility (Bushman, Piotroski and Smith, 2004; Dyck and Zingales, 2002). Bad management, opportunistic behaviour and rent-expropriation by managers erode bank reputation, which, according to Hayes (1971), is one of the firm's main assets. Therefore, much effort should be devoted to preserving it from bad news, misleading rumours and financial scandals, among them insider trading. Therefore, when reputation matters, firms usually dissuade their managers from intensively trading on their own bank shares so as not to attract the attention of the media and to avoid the negative impact that profitable trading by insiders might have on future share prices.

Ramirez and Young (2001) analyse the influence of reputation on insider trading behaviour for a sample of investment banks, and conclude that the insider trading activities of the more prestigious investment banks are less likely to show systematic patterns of abnormal profits since its reputation will exert a constraint on improper insider trades of its employees. Although no evidence has been documented regarding the relationship between insider trading and commercial banks' reputation, a negative relationship would be expected.

Reputation for US investment banks is usually proxied by way of the Carter and Manaster (1990) underwriter prestige ranking; however, it is difficult to measure reputation for commercial banks outside the US. Furthermore, our study focuses on Spanish commercial banks, for which no official prestige ranking mechanism exists. However, investors usually

react positively to any Spanish bank belonging to the Forbes Global 2000—a list of the world's largest companies based on a composite ranking of sales, profits, assets and market value.

Therefore, we constructed a dummy variable that takes the value of one for Spanish banks ranking among the first 2000 firms within the Forbes Global 2000 (which we considered prestigious), and takes the value of zero for those with a rank of more than 2000 (which we classified as less prestigious). Seven out of the 18 commercial banks of Spain ranked among the first 2000 firms in at least one year within the sample period.

Hypothesis 4: The worse a bank's reputation, the higher the intensity of bank insider trading.

Finally, bank size is used as control variable since it is often correlated with other unobserved variables (such as managerial abilities and asset diversification, as shown in Crespí, García-Cestona and Salas, 2004). Thus the estimated model is expressed according to equation 7:

$$
\begin{aligned}
LSNVI_{it} = {} & \beta_0 + \beta_1 IO_{it} + \beta_2 IO^2{}_{it} + \beta_3 CV * IO^2{}_{it} + \\
& + \beta_4 BC_{it} + \beta_5 REPU_{it} + \beta_6 SIZE_{it} + u_{it}
\end{aligned}
\tag{7}
$$

where $u_{it} = \eta_i + \delta_t + \varepsilon_{it}$, η_{it} and δ_t correct for bank-specific and time-specific effects, respectively, and ε_{it} is the disturbance of the model. Controlling for time-specific effects in our study is of great importance due to the need to control for changes in the macroeconomic environment and regulation affecting Spanish banks, as well as changes in technology, as noted by Williams (2004), among others. We furthermore assume that the independent variables of the model are uncorrelated with the individual effects, and thus the efficient estimation of the model corresponds to the estimation of GLS that takes into account the structure of the matrix of variances and co-variances of the disturbance of the model u_{it}.

Table 4 shows the descriptive statistics and Pearson's correlation for the explanatory variables.

[INSERT TABLE 4 HERE]

6. RESULTS OF THE ESTIMATION

Results of the GLS estimation are shown in Table 5. Regarding the estimated coefficients, six variables turned out to be statistically significant in explaining insider trading activity in Spanish banks: *IO, IO², CV*IO², CB, REPU*, and *SIZE*.

[INSERT TABLE 5 HERE]

The variables *IO* and *IO²*, which capture the non-linear expected relationship between insider trading and insider ownership, are both significant and the expected signs apply. *IO* is negatively related to insider trading, which means that for low levels of insider ownership, managers are not aligned and usually trade on private information. At the same time, *IO²* is also significant but positively related to insider trading which means that, above a certain threshold, the higher the inside ownership, the higher the insider trading activity. This confirms that at higher levels of insider ownership, the convergence of interests is not guaranteed and insiders behave opportunistically by increasing their insider trading activity. We are unaware of any previous paper analysing the combined effects of insider trading and entrenchment, but this first insight seems to indicate that as directors get more entrenched and shareholders' control is less efficient, managers trade more intensively on private information.

The slope interaction variable *CV*IO²*, which captures the effects of risk-taking incentives on insider trading when controlling for the level of entrenchment, is significant and negatively related to insider trading activity, as expected. This variable is tested for the first time in the insider trading literature, and it corroborates the position in Klock (1994) that when managers are allowed to trade on private corporate information, they usually take on too much risk, although we should specify that this only happens when managers are entrenched.

The obtained relationship indicates that risk-taking incentives are higher for managers trading on their own firms as long as the level of insider ownership departs from control levels.

The evidence shown in this paper clearly supports that a lack of alignment of interests leads to managers behaving opportunistically and, more specifically, managers trading on private information. This fact is also corroborated by the coefficient obtained for excess capitalisation (*CB*), which is negative and significant, suggesting that for the Spanish banks, thinly capitalisation, rather than preventing insiders from trading on private information in order to not attract the attention of regulators, works as an indicator of opportunistic behaviours from the side of managers. These managers are not only more likely to over-invest in non-profitable projects, but they are also more likely to increase their insider trading activity. However, we may also conclude that this result supports the philosophy behind Basel I capital accord, which advocates close surveillance of less-capitalised banks under the presumption that these banks are the most likely to incur in bankruptcy but also in other forms of opportunistic behaviour (among which we may also consider insider trading).

Finally, reputation is also significant and negatively related with insider trading activity, which confirms the expectation that when firms care about their collective reputation, they provide incentives to their managers not to trade on the basis of private information, as a way of preserving the firm from financial scandals. Size, considered as a control variable, is significant and positive, in contradiction of previous literature, which suggests that small firms are usually less monitored and insiders are more camouflaged when trading on their own bank shares.

Therefore, the emerging picture is that of a scenario where insider trading activity is triggered by the absence of efficient control mechanisms, either external mechanisms (regulators control the level of bank capitalisation but it is not easy for them to also control other opportunistic behaviours) or internal mechanisms (shareholders fail to control managers

both when managers' stakes are very low or very high). Entrenchment seems to be clearly related to insider trading, thus indicating that managers may combine different manifestations of opportunistic behaviour. Furthermore, entrenchment modifies managers' risk-taking incentives, which in turn has a direct effect on financial costs, bank performance and firm value (see Lee, 2002). In this sense, our results provide evidence against the lower monitoring of small caps (small size banks are not associated with higher insider trading, as hypothesised by Madura and Wiant, 1995; Jordan, 1999, and Madison, Roth and Saporoschenko, 2004) and, thus, the positive relationship between insider trading activity and size could be understood as the achievement of entrenched managers who not only invest based on private information, but are also able to achieve one of their main prerequisites—firm growth.

It is worthwhile noting that the only factor that dissuades insiders from trading on private information is bank reputation, which results from the management group's effort to preserve the firm's public image from any kind of financial scandal. It brings to light the relevance and efficacy of internal ethical codes of conduct, which could be more suitable for enforcing insider trading than external or governmental rules.

In short, we may conclude that the more prestigious the bank, the more entrenched the directors, the bigger the firm and the lower the charter values for high levels of ownership, the higher the intensity of insider trading activity for Spanish commercial banks.

7. CONCLUSIONS

This paper analyses the causality between stock returns and corporate insider trading both at the aggregate and at the firm level for the Spanish banking sector. We examine the relationship between stock market returns and bank insider transactions by using monthly time-series for data from 1994 to 2003, with a sample of 18 Spanish commercial banks. To proxy insider trading activity, we constructed four measures of insider trading activity and

analysed any causal relationship in the sense of Granger between the four measures and stock market returns.

At the aggregate level, no evidence is obtained suggesting causality in any direction, which indicates that any mispricing detected by insiders in their open market transactions with shares of their own banks is not due to macroeconomic factors. On the contrary, firm-specific features seem to enhance insider trading activity, since a strong negative relationship is detected between insider trading measures and stock returns at firm-level running *only* from insider trading to stock returns. These findings indicate that insiders are able to predict future stock prices when the mispricing is due to firm-specific characteristics, and also indicate that insiders do not base their trading on past returns.

In a second stage, we used GLS panel data estimation to identify those firm-specific features. Our results conclude that the more prestigious the bank, the more entrenched the directors, the bigger the bank, the lower the excess capital and the lower the charter values for high levels of ownership, the higher the intensity of insider trading activity for Spanish commercial banks.

Other secondary results indicate that sales have greater informational content for the Spanish market than purchases, that the net purchases volume standardised by the earnings per share ratio is the most significant proxy of insider trading activity in the Spanish banking industry and, finally, we corroborate previous results suggesting that long-term returns are easier to predict than short-term returns.

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[1] Slovin, Sushka and Polonchek (1991) exclude financial firms from their sample because of their specific characteristics: potentially greater access to private information due to the strict control and monitoring of their corporate clients' solvency, the conditions of debt refinancing, and the flexibility when increasing debt losses.

[2] Although Iqbal and Shetty (2002) stated that the main sector in their sample is the financial industry, their results are influenced by the effects insider trading in other industries.

[3] Another suitable proxy for insider trading could be found in Hillier and Marshall (2002).

[4] Our results improve on those obtained by Iqbal and Shetty (2002), who found that it is the stock return that affects insider transactions significantly and negatively, and not vice-versa for a sample composed of both financial and non-financial firms.

[5] However, this only occurs in a scenario of regulated insider trading and for decentralised corporate decisions.

[6] For non-financial firms, Fidrmuc, Goergen and Renneboog (2006) analyse the effects of entrenchment of the market reaction to insider trading, rather than the relationship between entrenchment and the profitability or the intensity on insider trading activity.

[7] Palia (2001) and Miguel, Pindado and De la Torre (2004) analyse the effects of the endogeneity of insider ownership in their models due to the fact that managers' remuneration schemes are usually determined within the firm. However, we mainly focus on the level of insider ownership, which is determined by open market transactions. This leads us to treat it as an exogenous variable.

[8] See Beny (2004) and Klock (1994) for a discussion of the effects of insider trading on risk and of the need for legal regulation of insider trading. See also Jordan (1999) for an analysis of insiders' risk-exposure.

[9] Cebenoyan, Cooperman and Register (1999) do not analyse the relationship between charter value and insider ownership on insider trading but rather the influence of charter value and insider ownership on risk.

Table 1: Descriptive statistics

Panel A (Financial data)

Thousands of Euros	Mean	Median	Standard Deviation	Minimum	Maximum
Total Assets	32,572,691	6,413,236	63,881,435	851,607	224,032,798
Net Income	2,694,051	439,618	5,698,630	33,164	20,499,721
Net Result	231,341	52,192	425,886	-6,186	1,408,294
ROA (%)	0.95	0.74	0.76	-0.83	2.27

Panel B (Mean values of stock returns and indexes of insider trading for the banks in the sample)

		No. Transactions		No. of Shares		Insider Trading Indexes			
Year	Return	Purchases	Sales	Purchases	Sales	*SNVI*	*NVI*	*PI*	*SI*
1994	-0.03849	29	20	1,817,849	697,812	5,182,307	-0.355	0.678	0.322
1995	0.04192	32	18	2,860,639	1,798,237	4,380,712	-0.453	0.726	0.274
1996	0.09009	34	28	4,776,971	1,812,055	2,062,939	-0.471	0.735	0.265
1997	0.18366	14	12	1,858,119	464,307	4,357,295	-0.125	0.563	0.437
1998	0.09145	2	1	457,106	2,547,833	588,730	-0.729	0.865	0.135
1999	0.00617	29	5	9,060,779	988,973	19,140,555	-0.460	0.730	0.270
2000	0.01038	40	7	3,183,494	5,527,863	2,969,734	-0.325	0.663	0.337
2001	0.00749	32	21	4,272,089	4,730,692	476,474	-0.306	0.653	0.347
2002	-0.03591	28	26	35,303,462	50,386,384	940,440	-0.111	0.555	0.445
2003	0.12871	26	26	18,326,734	10,079,396	17,207,039	-0.398	0.699	0.301

Table 2: Granger causality tests for stock returns and *SNVI* and *NVI*. Estimated coefficients (t-ratios in parentheses) and Wald statistics for testing Granger causality (p-value in parentheses) for models of equations 1 and 2, using one, three and six lags for two insider trading indexes (*SNVI* and *NVI*) are shown. Results of the coefficients of the lagged dependent variables do not appear in the tables, but are available upon request.

No. of Lags	Dependent Variable	Independ Variable	Lag	SNVI Coefficient (t-statistic)	SNVI Wald test (p-value)	NVI Coefficient (t-sastistic)	NVI Wald Test (p-value)
1 Lag	Return	Index	1	6.45E-10 (2.22)**	4.93 (0.026)	-0.00256 (-0.59)	0.35 (0.552)
	Index	Return	1	-5.99E+06 (-0.21)	4.460E-02 (0.833)	0.02764 (0.14)	2.04E-04 (0.989)
3 Lags	Return	Index	1	6.44E-10 (2.19)**	6.61 (0.085)	-0.00389 (-0.90)	6.44 (0.092)
			2	-2.96E-10 (-0.99)		0.00925 (2.14)**	
			3	-2.35E-10 (-0.78)		0.00447 (1.01)	
	Index	Return	1	-1.06E+07 (-0.35)	4.45 (0.217)	0.68915 (0.33)	0.26 (0.967)
			2	1.32E+07 (0.42)		-0.82163 (-0.40)	
			3	-6.23E+07 (-2.10)**		0.62113 (0.31)	
6 Lags	Return	Index	1	6.34E-10 (2.11)**	18.33 (0.005)	-1.60E-03 (-0.35)	11.64 (0.070)
			2	-3.94E-10 (-1.28)		7.760E-03 (1.71)*	
			3	-3.05E-10 (-1.01)		2.32E-03 (0.51)	
			4	-3.68E-11 (-0.12)		0.01070 (2.37)**	
			5	-9.81E-10 (-3.32)***		8.94E-04 (0.189)	
			6	-8.87E-11 (-0.25)		-3.25E-03 (-0.69)	
	Index	Return	1	-9.96E+06 (-0.30)	10.58 (0.102)	0.857028 (0.40)	2.97 (0.813)
			2	8.02E+06 (0.25)		1.05495 (0.49)	
			3	-5,08E+07 (-1,57)		0.53887 (0.25)	
			4	-6.32E+07 (-1.91)*		1.01752 (0.48)	
			5	-2.82E+07 (-0.84)		1.44628 (0.70)	
			6	9.57E+06 (0.30)		-2.45456 (-1.23)	

*,**,*** denote significance at the 10%, 5% and 1% levels, respectively.

Table 3: Granger causality tests for stock returns and purchases and sales indexes (*PI* and *SI*) Estimated coefficients (t-ratios in parentheses) for models of equations 1 and 2, using one, three and six lags for two insider trading indexes (*PI* and *SI*) are shown. For the sake of brevity, only results for the significant coefficients are shown in the table, the remaining results are available upon request to the authors.

				Purchases Index		Sales Index	
	Dependent Variable	**Explanatory Variable**	**Lag**	**Coefficient (t-Statistic)**	**Wald test (p-value)**	**Coefficient (t-Statistic)**	**Wald test (p-value)**
3 Lags	Return	Index	1	(0.01155) 1.70	6.90 (0.075)		
3 Lags	Return	Index	2			(0.01824) 2.17	4.97 (0.179)
3 Lags	Index	Return	3	-2.48923 (-1.99)	4.85 (0.183)		
6 Lags	Return	Index	2			0.01909 (2.22)	4.85 (0.183)
6 Lags	Return	Index	4			0.02202 (2.54)	4.85 (0.183)

*,**,*** denote significance at the 10%, 5% and 1% levels, respectively.

Table 4: Descriptive statistics and Pearson's correlations of the variables in the models

This table gives the mean, median, standard deviation and Pearson's correlations for the following variables: $LSNVI_{it}$ is the natural logarithm of the absolute value of the *EPS* standardised net volume of insider transactions; $SIZE_{it}$ is the natural logarithm of the market value of outstanding firms; IO and IO^2_{it} are the percentage of shares in circulation in the hands of bank directors and its square, respectively; CV_{it} is the charter value, as measured by Tobin's Q; $CV*IO^2$ is the slope interaction variable between charter value and the entrenchment effect; BC_{it} is the ratio of excess equity to total assets and $REPU_{it}$ is the bank reputation.

	Mean	Median	Standard Deviation	LSNVI	REPU	IO*CV	CV	BC	SIZE
LSNVI	11.82	12.40	3.71	1.00					
REPU	0.42	0.00	0.50	0.12	1.00				
IO	51.44	49.43	33.14	-0.45	-0.59	1.00			
IO*CV	49.92	41.85	38.27	-0.46	-0.64	0.99	1.00		
BC	0.08	0.07	0.04	-0.52	-0.42	0.55	0.61	1.00	
SIZE	14.03	13.54	1.57	0.29	0.57	-0.29	-0.42	-0.47	1.00

Table 5: Factors triggering insider trading in the Spanish banking industry: Panel data estimation

GLS estimation of the parameters of a panel data model with random effects. $LSNVI_{it}$ is the natural logarithm of the absolute value of the EPS standardised net volume of insider trading; $SIZE_{it}$ is the natural logarithm of the market value of outstanding firms; IO and IO^2_{it} are the percentage of shares in circulation in the hands of bank directors and its square, respectively; CV_{it} is the charter value, as measured by Tobin's Q; $CV*IO^2$ is the slope interaction variable between charter value and the entrenchment effect; BC_{it} is the ratio of excess equity to total assets and $REPU_{it}$ is the bank reputation.

$$LSNVI_{it} = \beta_0 + \beta_1 IO_{it} + \beta_2 IO^2_{it} + \beta_3 CV * IO^2_{it} + \beta_4 BC_{it} + \beta_5 REPU_{it} + \beta_6 SIZE_{it} + \eta_{it} + \delta_t + \varepsilon_{it}$$

Explanatory Variables	(β) Coefficient	t-Ratio	P-Value
IO_{it}	-0.107719	-1.82*	0.069
IO^2_{it}	0.006026	2.48**	0.013
$CV * IO^2_{it}$	-0.005215	-2.32**	0.020
CB_{it}	-42.26267	-2.60**	0.009
$REPU_{it}$	-1. 978379	-1.96**	0.050
$SIZE_{it}$	0.979004	2.87**	0.004
$CONSTANT$	4.747174	0.90	0.366
Hausman test (p-value)	5.65 (0.4634)		
R^2	0. 69		
No. observations	107		
No. groups	15		

*,**,*** denote significance at the 10%, 5% and 1% levels, respectively.