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Signalling by banks using loan loss provisions: the case of the European Union

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Abstract

Purpose – The purpose of this paper is to investigate whether bank managers of countries within the European Union (EU) engage in signalling, especially after implementation of international financial reporting standards (IFRS) commencing 2005.

Design/methodology/approach – "Signaling" is the use of loan loss provisions (LLPs) to convey signals of fiscal prudence and future profitability to investors. The authors use data from 18 countries across the EU covering the pre and post IFRS regimes and apply univariate and multivariate tests in order to test signaling behavior under both accounting regimes.

Findings – The findings indicate insufficient evidence that financially healthy banks engage in signaling behavior. However, banks facing financial distress appear to engage in aggressive signaling relative to healthy banks. Finally, the propensity to engage in signaling behavior is more pronounced for financially distressed banks in the post IFRS regime. While IFRS, under IAS 39 sort to mitigate the discretionary component of LLPs, our finding may be attributable to lax enforcement of IFRS.

Practical implications – The findings have implications for both investors and regulators. Investors should be aware that troubled banks engage in signaling to convey positive information about their future prospects. Regulators should be aware that financially stressed banks have a greater propensity to engage in signaling and need to ensure that the provisions of IFRS (which attempts to limit discretion in estimating LLPs) are enforced more stringently.

Originality/value – The paper contributes to the growing literature on bank signaling in a number of ways. First, the authors use a sample from 18 countries within the EU which has not been done before. Second, unlike prior studies which only examined healthy banks, the authors also include financially distressed banks in the sample. Third, the authors examine signaling behavior in the pre and post IFRS regimes to understand the influence of IFRS on the propensity to engage in signaling by bank managers.

Keywords European Union, Commercial banks, Financial reporting, International standards, Loan loss provisions, Signalling

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1. Introduction

The origins of signaling theory can be attributed to Akerlof (1970) who discussed the problems and consequences of adverse selection. Adverse selection refers to a market

process in which "bad" results occur when buyers and sellers have asymmetric information (i.e. buyers undervaluing the firm or its products because they do not have the inside information of firm managers). Signaling has been examined within macroeconomic and monetary frameworks (Peel and Pope, 1985; de Mendonça and Filho, 2007) and also within firm specific decisions (dividends) and stock market reactions (Lonie *et al.*, 1996). The theory propounded by Akerlof was that managers would be motivated to engage in signaling to eliminate adverse selection problems. From the context of this paper, bank managers will seek to alleviate the problems of adverse selection by communicating inside information (anticipated favorable future performance) to investors. Signaling theory, as related to banks, can be traced to a seminal paper by Beaver *et al.* (1989) in which the authors provided evidence that banks' market values are cross-sectionally correlated with characteristics of their loan loss reserves. The implication was that changes in loan loss reserves could influence market values. Beaver *et al.* (1989) concluded that investors interpret an unexpected increase in loan loss provision (LLP) as a signal of a bank's financial strength.

Subsequent studies dichotomized LLPs into two components; discretionary and nondiscretionary. Several studies hypothesized that bank managers used discretionary components of provisions to signal their private information about future prospects of banks. Scholes *et al.* (1990), for example, demonstrated that bank managers can lower their cost of capital by exercising discretion over LLPs to convey their private information to investors. Other studies (Grammatikos and Saunders, 1990; Musumeci and Sinkey, 1990; Elliott *et al.*, 1991; Griffin and Wallach, 1991) examined how an increase in LLPs affected investors' perceptions for large banks dealing with customers represented by lesser developed countries (LDCs). Elliott *et al.* (1991) concluded that changes in loan loss levels were related to changes in market values. Elliott *et al.* (1991) found support for the view that increases in LLPs in the presence of debt suspension behavior by LDCs are perceived positively by investors. They documented that the strongest stock price increases were for those banks in their sample that reported the highest increases in their LLPs.

The signaling hypothesis for banks in this scenario was further corroborated by Griffin and Wallach (1991). They found that the stock market reacted adversely to banks' reclassification of loans to bad debt. But they also reacted positively to increase in LLP in the presence of news that Latin American countries to which they lent money were in trouble and declaring a moratorium on their interest payments. Griffin and Wallach (1991) viewed this as consistent with the signaling hypothesis, that adjustments (increases) to loan loss reserves are credible signals about the intentions and abilities to resolve the Latin American debt situation. The studies of Grammatikos and Saunders (1990), Musumeci and Sinkey (1990), Elliott *et al.* (1991), and Griffin and Wallach (1991) all considered large commercial banks dealing with loans to LDCs. The conclusion is that signaling theory is applicable in this context, i.e. increases in LLPs convey a signal of prudent management and are viewed positively by investors.

But, how about commercial banks dealing with regular customers other than countries? Does signaling theory still hold? Wahlen (1994) documented that bank managers, in the presence of anticipated increase in future cash flow prospects, engaged in signaling (in the form of increasing the discretionary component of LLPs) to convey positive information to investors. Subsequent researchers focused on the discretionary component of LLPs. Beaver and Engel (1996) provided additional evidence of positive

effects of discretionary LLP on stock price, which is consistent with Wahlen's (1994) findings. Liu *et al.* (1997) also documented a positive market reaction to the unexpected increase in LLP. However, they found that this was only applicable for banks with low regulatory capital levels and only in the fourth fiscal quarter.

In one of the more recent published studies, Kanagaretnam *et al.* (2004) had dual objectives. First, to examine whether and how bank managers use LLPs to smooth income and, second, to study how LLPs are used as a signaling device to convey their private information about their respective bank's future prospects. They conjectured that relatively undervalued banks have greater incentives to signal their future prospects relative to banks that are perceived as fairly valued. The authors found evidence that bank managers use LLPs to smooth earnings. This is consistent with the theory. However, interestingly, they did not find evidence to support the signaling theory. They also included a variable that measured the intensity of signaling, but their results were not conclusive as it varied across their sample. Kanagaretnam *et al.* (2005) concluded that banks managers do use LLPs for signaling. However, they concluded that signaling varies negatively with bank size (the smaller the bank the greater the propensity to engage in signaling) and varies positively with earnings variability and future investment opportunities (the higher the volatility or variability in earnings and the higher the future investment opportunities the greater the propensity to engage in signaling). Finally, Kanagaretnam *et al.* (2009) examined what factors contribute to enhancing the information content of the signal conveyed by the discretionary component of LLPs. They find that when banks are audited by auditors with greater expertise in the banking industry, the information content conveyed by LLPs is more meaningful to investors.

However, the overall results on this issue appear to be mixed. Some authors conclude that commercial bank managers do engage in signaling via LLPs and that signaling does convey a positive message to investors (Wahlen, 1994; Beaver and Engel, 1996; Liu *et al.*, 1997; Kanagaretnam *et al.*, 2004, 2005). On the contrary, Ahmed *et al.* (1998) conclude that evidence to support the signaling hypothesis is insufficient. All the aforementioned studies used a sample of commercial banks from the USA. Two recent studies using sample data of commercial banks from Spain, Anandarajan *et al.* (2003) and Pérez *et al.* (2008) also concluded insufficient evidence to support the signaling hypothesis. Subsequently, Anandarajan *et al.* (2007) also concluded insufficient evidence to support the signaling theory for commercial banks in Australia. Thus, while the literature does provide support for the signaling hypothesis for large banks dealing with LDCs, the evidence to support the validity of the signaling hypothesis in the case of commercial banks dealing with customers other than LDCs is insufficient. Nevertheless, none of the above studies has examined the signaling issue within a multi-country context and under different accounting regimes (international financial reporting standards (IFRS) versus local GAAP) and different institutional characteristics (bank insolvency risk).

Therefore, this study contributes to the growing literature on bank signaling in a number of ways. First, we use a sample from 18 countries within the EU which has not been done before (most studies subject to Anandarajan *et al.*, and Perez *et al.*, used US commercial banks). Second, unlike prior studies which only examined healthy banks, we also include financially distressed banks in our sample. Third, we examine signaling behavior in the pre and post IFRS regimes to understand the influence of IFRS on the propensity to engage in signaling by bank managers.

In summary, we add three new dimensions to the banking literature in general and studies on signaling by banks in particular. One dimension is that we study signaling in a multicultural context (by examining 18 countries in the EU) second, we study this in the context of different accounting regimes (pre and post IFRS) and third, we examine the moderating influence of different institutional characteristics (focus on healthy versus unhealthy institutions). These are all issues not researched before in the context of banks in general and signaling in particular.

2. Hypotheses development

Beaver *et al.* (1989) suggest that an increase in LLP can indicate that management perceives the earnings power of the bank to be sufficiently strong that it can withstand a hit to earnings in the form of additional LLPs. Implicit in their reasoning is that the increase in LLPs conveys a good news signal about the strength of a bank's future earnings. However, an increase in LLPs can also be viewed as bad news especially if it is not accompanied by other, more timely indicators of loan default because LLPs will then serve as the primary source of information on loan default. Banks generally disclose information on the change in nonperforming loans, which is an important indicator of loan default. By controlling for timely indicators of loan default such as change in nonperforming loans, loan loss allowance and loan write offs, any excess LLPs will contain only the good news component (Liu and Ryan, 1995; Wahlen, 1994). If signaling is an important motive for deciding the level of LLPs then a positive relation between LLPs and changes in future pre-loan loss earnings might be the case when there is ambiguity over reported performance. Hence, our first hypothesis is stated as follows:

H1. LLPs are positively related to one-year ahead changes in earnings.

A goal of the International Accounting Standards Board (IASB) is to develop an internationally acceptable set of high quality financial reporting standards. To achieve this goal, the IASB adopted principles-based standards, removed alternative accounting treatments and encouraged a more rigorous enforcement. Considering the fact that the IFRS impacts both on disclosure and measurement of accounting values, banks might be in need to signal confidence in the market. Under this framework, bank managers may wish to use the discretion provided by the new accounting standards so as to disclose more LLPs on their annual accounts in order to cover future prospective losses and communicate to potential investors an increased profit making ability (IASC, 1998). Thus, we expect the relation between one-year ahead earnings change and LLPs to be more positive in the post IFRS period compared to the pre IFRS period. Hence, our second hypothesis is stated as follows:

H2. The relation between LLPs and one-year ahead changes in earnings will be positive in the post IFRS period.

Signaling might also be determined by the level of risk exposure of banking institutions. Banks convey the quality of their assets (loans in particular) through credible signals according to the level of loan's default risk exposure (He, 2009). Additionally, banks with superior abilities to hedge risks, design credit derivative contracts and signal their loan quality in the market so as to overcome the adverse selection problem generated by information asymmetries (Nicoló and Pelizzon, 2008). Consequently, banking firms may use several means to signal to investors and regulators their ability to handle risk

in order to avoid regulatory scrutiny and negative market consequences (stock price drop, loss of confidence, stock liquidation, etc.). LLPs could be used by the managers of already troubled banks as a signaling device that the current situation could be reversed and therefore deal with regulatory and financial problems. It is also possible however that bank managers might aggressively use LLPs so as to avoid breaching the lines of default and signal this situation afterwards. So increased LLPs might be perceived as good news particularly for banks that appear to have loan default risk problems. Prior literature tends to support this view (Elliott *et al.*, 1991; Griffin and Wallach, 1991; Liu and Ryan, 1995). Liu *et al.* (1997) argue that LLPs are perceived as good news only for risky banks. Therefore, we believe that financially troubled banks might use the LLPs as a signaling device to communicate confidence and safety. Hence, we expect that risky banks will present a more positive association between one-year ahead earnings change and LLPs. Thus, our third hypothesis is stated as follows:

H3. The relation between LLPs and one-year ahead changes in earnings will more positive for riskier banks.

3. Data and methodology

3.1 Data and sample selection

The dataset used in our study is limited to EU listed commercial banks for a ten-year period (1999-2008). During the specific time frame the commercial banks were subject to two major regulatory changes:

(1) the mandatory adoption of IFRS on January 2005; and

(2) the implementation of the Basel II Accord on December 2006.

Data were extracted from Thomson 1 Banker database and carefully reviewed for any data inconsistencies and availability. Commercial banks with incomplete data, central banks, government development banks, cooperative banks and export-import banks were excluded from the sample. This procedure produced a balanced sample of annual end-of-year information for 91 listed commercial banks originating from 18 European countries with a total number of 910 firm-year observations. Table I presents the data selection procedure. We did not proceed in any curtailing of the data in the upper and lower bounds of the distributions because data are quite dispersed within countries and we also did not want to lose any further observations which could deteriorate the validity of our inferences[1].

3.2 Testing for signaling

We test the signaling hypothesis by examining the association of LLPs to one-year ahead change in earnings before taxes and LLPs similar to Ahmed *et al.* (1998) and Anandarajan *et al.* (2007), as follows:

Table I.
Sample characteristics

Sample selection procedure	
EU banks included in the Thomson database	212
Less: non-commercial banks	(20)
Remaining non-financial firms	192
Less: banks with incomplete accounting data	(101)
Bank included in the final sample	91

$$
\begin{aligned}
LLPR_{it} = & a_0 + a_1 MCAP_{it} + a_2 EBT_{it} + a_3 \Delta EBT_{it+1} + a_4 IFRS_{it} \\
& + a_5 IFRS_{it}{*}MCAP_{it} + a_6 IFRS_{it}{*}EBT_{it} + a_7 IFRS_{it}{*}\Delta EBT_{it+1} \\
& + a_8 Dz_{it} + a_9 Dz_{it}{*}MCAP_{it} + a_{10} Dz_{it}{*}EBT_{it} + a_{11} Dz_{it}{*}\Delta EBT_{it+1} \\
& + a_{12} IFRS_{it}{*}Dz_{it}{*}MCAP_{it} + a_{13} IFRS_{it}{*}Dz_{it}{*}EBT_{it} \\
& + a_{14} IFRS_{it}{*}Dz_{it}{*}\Delta EBT_{it+1} + a_{15} LnTA_{it} + a_{16} CFEER_{it} \\
& + a_{17} \Delta GDP_{it} + b Country\ \ dummies + c Year\ \ dummies + u_{it}
\end{aligned} \tag{1}
$$

where:

MCAP	= ratio of actual regulatory capital (Tier 1 capital) before loan loss.
EBT	= ratio of earnings before taxes and LLPs to total assets.
ΔEBT	= one-year ahead change in earnings before taxes and LLPs to total assets.
IFRS	= dummy variable; (1) if banks report under IFRSs, (0) otherwise.
IFRS*MCAP	= interaction of MCAP with type of accounting regime (IFRS).
IFRS*EBT	= interaction of EBT with type of accounting regime (IFRS).
IFRS*ΔEBT	= interaction of the type of accounting regime with ΔEBT.
Dz	= dummy variable; (1) for observations lying below the sample median of the Z-score (developed by Boyd *et al.* (1993)), (0) otherwise.
Dz*MCAP	= interaction of Dz with MCAP.
Dz*EBT	= interaction of Dz with EBT.
Dz*ΔEBT	= interaction of the level of risk with ΔEBT.
IFRS*Dz*EBT	= interaction among IFRS, the level of risk Dz, and EBT.
IFRS*Dz*ΔEBT	= interaction among the type of accounting regime, level of risk, and ΔEBT.
LnTA	= natural logarithm of total assets.
CFEER	= ratio of commission and fee income to total assets.
ΔGDP	= change in gross domestic product.
e	= error term.

In the above model we include earnings before tax and provision (EBT) and primary capital ratio (MCAP) to control for the potential effects on discretionary LLP of motivations related to earnings management and capital management[2]. If LLPs are used by banks to smooth earnings then the coefficient of EBT will be expected to be positive. The capital management hypothesis (Moyer, 1990; Beatty *et al.*, 1995; Ahmed *et al.*, 1998) posits that managers of banks with low primary regulatory capital

have incentives to increase LLP because the coefficient of MCAP will be negative. However, the 1990 change in bank capital adequacy regulation substantially reduced the incentive to manage capital via LLP. Therefore, if capital management has declined, we would not expect the coefficient of MCAP to significantly differ from zero. Our model also includes a dummy variable representing pre and post IFRS regimes since we also seek to examine change the change of regime influenced signaling behavior. We also include bank size as a control variable. Kanagaretnam *et al.* (2005) note that larger banks are more closely monitored by regulatory agencies and followed by more analysts. Such banks are more likely to have strong linkages with analysts and investors. As a result, managers of larger banks will have less private information to signal through LLPs and consequently, may be less likely to use signaling devices including LLPs to communicate their private information.

In order to measure risk (Dz) we use the Z-score which is a metric for bank insolvency risk developed by Boyd *et al.* (1993). The Z-score is a statistic indicating the solvency for each bank and is calculated annually as follows (Yasuda *et al.*, 2004):

$$Z = \frac{\sum_{j=1}^{12}(\pi_j/A_j) + \sum_{j=1}^{12}(E_j/A_j)}{S_r}$$

where π_j is the estimated market value of total profit (the subscript j denotes the month), E_j is the market value of total equity (e.g. share prices multiplied by number of shares outstanding), A_j is the market value of total assets, S_r is the estimated standard deviation (SD) of π_j/A_j. The market value of total assets and total equity are averaged monthly. The estimated value of total profit is calculated as follows:

$$\pi_j = c_j p_j - c_{j-1} p_{j-1}$$

where c_j is the number of outstanding shares adjusted for stock splits, and p_j is the share price of the last business day of month j. The market value of total assets is estimated:

$$A_j = E_j + L$$

where L is the book value of total debt at the end of each fiscal year. The Z-score is negatively associated with insolvency risk, where Z is the number of SDs below the mean by which profits must fall in order to eliminate equity. Boyd *et al.* (1993) defines the downside risk as being negative values of the Z-score (Yasuda *et al.*, 2004). In other words, the higher the value of the Z-score the lower the insolvency risk.

We have included in the model country dummies to encapsulate any unobservable country specific effects. We have also included year dummies to capture time specific effects and also to deal with the problem of heteroscedasticity in the error term. We control for the IFRS and solvency risk impacts separately and concurrently by introducing relevant factors gradually in the empirical model in order to examine the effect of each factor on manager's decision to mask earnings and capital via LLPs.

The main variable of interest is the one-year ahead change in earnings before taxes and LLPs (ΔEBT_{it+1}) which indicates the existence of signaling via LLPs. Elliott *et al.* (1991) argue that an increase in LLPs is considered as good news because they imply that a bank is dealing effectively with loan default problems. Hence, bank managers have the flexibility of using additional LLPs to communicate

a signal of prudence and confidence that downturns in earnings can be weathered. If signaling is an important motive for LLPs there should be a positive relation between LLPs and changes in future pre-loan loss earnings (ΔEBT). If IFRS increase transparency, signaling devices might be more prominent, so we should expect the relation between one-year ahead earnings change and LLPs to be stronger (positive) in the post IFRS period compared to the pre IFRS period. Thus, the term IFRS*ΔEBT will have a positive sign. That might be particularly the case for more troubled banks. Thus, we expect a positive coefficient of the interaction Dz*ΔEBT. Finally, the variable IFRS*Dz*ΔEBT indicates the interaction of high risk banks with one-year ahead earnings change in the post IFRS regime. If the incentive to use LLPs to signal future profitability is higher for high risk banks, we expect a positive coefficient.

4. Empirical results

4.1 Descriptive statistics and correlations

Descriptive statistics for the full sample, pre and post IFRS samples are presented in Table II. The mean (median) value of LLP in the pre IFRS period is 0.0057 (0.0044) while for the post IFRS period indicates an increase to 0.0063 (0.0052). Also the mean (median) value of Tier 1 capital over the minimum required capital (MCAP) shows a significant decrease from 1.789 (0.706) in the pre IFRS period relative to 1.087 (0.739) in the post IFRS period. Our findings indicate a material increase of both provisions and liabilities in the post IFRS era.

Table III provides the Pearson correlation coefficients of the sample variables. LLPs are negatively and significantly correlated to EBT (−0.252) and LnTA (−0.66), but insignificantly correlated with MCAP and ΔGDP. LLP are positively and significantly correlated with CFEER (0.094). The magnitude, economic and statistical significance is consistent with similar studies in the literature.

4.2 Findings on signaling

We estimated four models which we identify as models A, B, C and D. The regression results are shown in Table IV. A schematic representation justifying the selection of variables is shown in Table V. In model A we include the capital variable (MCAP), earnings variable (EBT), and change in earnings (ΔEBT), IFRS dummy variable representing pre and post IFRS regime, and interaction of IFRS dummy variable with capital, earnings and change in earnings ratios, respectively. In model B we do not include the dummy representing IFRS or any interactions associated with that dummy variable. We include the solvency risk variable and interactions of solvency risk with capital, earnings and change in earnings, respectively. In model C we include the IFRS dummy and all interactions of the dummy variable with capital, earnings and change in earnings. We also include the risk variable and interactions of the risk variable with capital, earnings and change in earnings. Model D is a full model including all the variables in models A, B and C. The model includes, in addition, three way interactions interacting IFRS regime and solvency risk with capital, earnings, and change in earnings, respectively. In all models we control for size (represented by log of total assets), non depository activities (CFEER), and the country's economic activity (Δ GDP).

We include the one-year ahead change in earnings before taxes (ΔEBT) and LLPs and also the interaction terms IFRS*ΔEBT, Dz*ΔEBT and IFRS*Dz*ΔEBT for the purpose

Table II.
Descriptive statistics of sample variables

Variables	Full sample Mean	Median	SD	Min.	Max.	Pre IFRS Mean	Median	SD	Min.	Max.	Post IFRS Mean	Median	SD	Min.	Max.
LLPR	0.0061	0.0049	0.0067	0.0002	0.087	0.0057	0.0044	0.0065	0.0001	0.063	0.0063	0.0052	0.007	0.003	0.088
MCAP	1.510	0.716	4.896	0.004	109.5	1.789	0.706	5.962	0.004	109.6	1.087	0.739	2.482	0.015	25.51
EBT	0.012	0.011	0.011	−0.062	0.108	0.011	0.009	0.012	−0.062	0.108	0.014	0.013	0.011	−0.041	0.048
ΔEBT	0.0008	0.0013	0.0103	−0.126	0.071	0.002	0.001	0.009	−0.065	0.071	0.005	0.001	0.008	−0.126	0.058
LnTA	100.96	97.40	19.32	46.88	147.6	98.69	95.55	18.90	46.88	139.3	104.3	100.7	19.47	54.78	147.6
CFEER	0.014	0.012	0.009	0.0009	0.144	0.013	0.012	0.009	0.001	0.113	0.014	0.012	0.008	0.001	0.063
ΔGDP	0.028	0.023	0.049	−0.144	0.335	0.027	0.029	0.048	−0.110	0.334	0.028	0.021	0.051	−0.143	0.223

Notes: The sample includes 91 listed banking firms from 18 European countries over the period 1999-2008; LLPR is the ratio of LLPs to total loans, MCAP is the ratio of actual regulatory capital (Tier 1 capital) before loan loss reserves to the minimum required regulatory capital, EBT is the ration of earnings before taxes and LLPs to total assets, ΔEBT is the annual change of earnings before taxes and LLPs, LnTA is the natural logarithm of total assets capturing the effect of bank size, CFEER is the ratio of commission and fee income to total assets, ΔGDP is the change in gross domestic product, a proxy for the change in economic growth

Variables	LLPR		MCAP		EBT		LnTA		CFEER	
MCAP	−0.037	(0.266)								
EBT	−0.252*	(0.000)	0.028	(0.398)						
LnTA	−0.066*	(0.048)	−0.025	(0.459)	−0.147*	(0.000)				
CFEER	0.094*	(0.004)	0.133*	(0.000)	0.404*	(0.000)	−0.183*	(0.000)		
ΔGDP	−0.013	(0.715)	−0.014	(0.681)	0.122*	(0.000)	−0.140*	(0.000)	0.141*	(0.000)

Notes: Significant at: *1 per cent level; *p*-values in the parentheses; the sample includes 91 listed banking firms from 18 European countries over the period 1999-2008; LLPR is the ratio of LLPs to total loans, MCAP is the ratio of actual regulatory capital (Tier 1 capital) before loan loss reserves to the minimum required regulatory capital, EBT is the ration of earnings before taxes and LLPs to total assets, LnTA is the natural logarithm of total assets capturing the effect of bank size, CFEER is the ratio of commission and fee income to total assets, ΔGDP is the change in gross domestic product, a proxy for the change in economic growth

Table III.
Pearson correlation coefficients of sample variables

of capturing the impact of IFRS adoption and different levels of solvency risk. The coefficient of ΔEBT is negative and statistically significant in all model specifications suggesting that an increase in LLPs is associated with lower reported earnings, similar to Anandarajan *et al.* (2007). This finding is not consistent with our *H1*. When the effects of solvency risk and IFRS are considered, we found positive and statistically significant coefficients on the interaction terms IFRS*ΔEBT (0.071 in model C). Hence, we conclude that the relation between one-year ahead earnings change and LLPs are more positive in the post IFRS period thus supporting our *H2*. The coefficient of Dz*EBT is positive and significant in all models indicating that troubled banks use LLP signaling more actively. This finding supports our *H3*. The three-way interaction term IFRS*Dz*ΔEBT is also positive and statistically significant (at 1 per cent) indicating that riskier banks communicate earnings more intensively after the IFRS adoption period. Finally, all control variables are statistically significant in all model specifications and have the expected predictive signs. This corroborates our interpretations.

5. Summary and conclusions

This study extends prior literature on the use of LLPs for signaling. Prior research documents that, for large corporations dealing with loans to LDCs, increase in the loan loss reserves are viewed positively by investors. However, the results for commercial banks with respect to dealing with regular customers are mixed. There are two opposing theories on the influence of the discretionary use of LLPs through signaling. One view is that signaling will be viewed favorably, while the other view holds the converse. In this study we further seek to understand if the signaling theory holds and also the consequences of signaling. We use a sample of banking institutions originating from 18 countries of the EU covering the period before and after implementation of IFRS.

Our findings indicate that there is insufficient evidence to support the signaling theory for EU banks. Presumably, for the managers of healthy banks the perceived costs of signaling (costs comprising lower compensation to managers due to lower reported profits in the presence of higher LLPs) may be greater than the anticipated benefits (increase in future market values). However, we also find that when a bank is financially distressed it engages in more pronounced signaling relative to healthy banks. In this case, presumably the costs (banks with low earnings reporting even lower earnings could result in increased

Table IV.
Empirical findings on signaling

Variables	Model A		Model B		Model C		Model D	
Intercept	0.0088*	(5.92)	0.010*	(6.82)	0.010*	(7.00)	0.0091*	(6.22)
MCAP	−0.000057**	(−1.66)	−0.00038	(−0.95)	−0.00031	(−0.52)	−0.00054***	(−1.59)
EBT	−0.119*	(−5.18)	−0.196*	(−10.20)	−0.119*	(−5.10)	−0.114*	(−5.00)
ΔEBT	−0.068*	(−2.81)	−0.081*	(−4.49)	−0.121*	(−4.60)	−0.067*	(−2.77)
IFRS	0.0014*	(2.75)			0.0014*	(2.69)	0.0012**	(2.41)
IFRS*MCAP	0.0000	(0.72)			0.00003	(0.36)	0.00006	(0.99)
IFRS*EBT	−0.102*	(−3.25)			−0.126*	(−4.06)	−0.144*	(−4.22)
IFRS*ΔEBT	0.024	(0.72)			0.071**	(2.10)	0.012**	(2.35)
Dz	−0.010*	(−2.87)	−0.0029*	(−5.21)	−0.0041*	(−4.84)	−0.0016*	(−3.89)
Dz*MCAP			0.0002	(0.37)	−0.00044	(−0.07)	−0.0035	(−0.65)
Dz*EBT			0.118*	(3.24)	0.039**	(2.43)	0.048*	(2.88)
Dz*ΔEBT			0.122*	(2.81)	0.169*	(3.91)	0.170*	(4.02)
IFRS*Dz*MCAP							−0.00009	(−0.69)
IFRS*Dz*EBT							0.083**	(2.13)
IFRS*Dz* ΔEBT							0.053*	(2.65)
LnTA	−0.00042*	(−3.68)	−0.00043*	(−4.10)	−0.00052*	(−4.61)	−0.00044*	(−3.88)
CFEER	0.096*	(4.66)	0.062*	(2.98)	0.071*	(3.42)	0.091*	(4.38)
ΔGDP	−0.008**	(−2.17)	−0.0095*	(−2.63)	−0.0092**	(−2.52)	−0.0074**	(−2.00)
R^2-adjusted	31.6%		34.0%		34.6%		32.2%	
F-statistic	15.57*		17.89*		15.92*		14.43*	
Observations	910		910		910		910	

Notes: Significant at: *1, **5, ***10 per cent levels (two-tailed test); *t*-statistics are in the parentheses; all model specifications include year dummies and country dummies for capturing unobserved effects; LLPR is the ratio of LLPs to total loans, MCAP is the ratio of actual regulatory capital (Tier 1 capital) before loan loss reserves to the minimum required regulatory capital, EBT is the ration of earnings before taxes and LLPs to total assets, ΔEBT is the one-year ahead change in annual earnings before taxes and LLPs, IFRS is a binary variable taking the value of (1) for the years 2005-2008 and (0) otherwise, Dz is a dummy variable which takes the value of (1) for observations lying below the median of sample's Z-score developed by Boyd *et al.* (1993) indicating the probability of bankruptcy, LnTA is the natural logarithm of total assets capturing the effect of bank size, CFEER is the ratio of commission and fee income to total assets, ΔGDP is the change in gross domestic product, a proxy for the change in economic growth

Variable	Measurement	Relationship with signaling
Model A		
Capital ratio (MCAP)	Ratio of actual regulatory capital (primary or Tier 1 capital before loan loss returns) to the minimum required regulatory capital	The lower the ratio, the more latitude for banks to engage in signaling via use of LLPs. We test if managers of banks with low primary to regulatory capital have incentives to increase LLPs
Earnings (EBT)	Earnings before taxes and LLP divided by average total assets	
Change in earnings	Earnings as shown above, next year's ratio minus this year's ratio	If signaling via LLPs is being conducted, we should observe (and hence test) if a positive relationship exists between one year ahead change in earnings and LLPs
IFRS/pre post regime	Dummy variable; 1 if post regime, 0 otherwise	If IFRS increases transparency then we should expect (and test) if the relation between one year ahead earnings change and LLPs is stronger (more positive) in the post IFRS regime relative to the pre IFRS regime
Interaction variables IFRS*change in earnings IFRS*capital IFRRS*EBT	Definitions as before	The purpose is to examine how the regime (IFRS or otherwise) interacts with levels of earnings and capital to moderate the use of LLPs for signaling
Model B		
Solvency risk	Measured as Z-score metric for bank insolvency risk (Dz)	Main purpose is to test whether riskier banks engage in greater signaling relative to less risky banks
Interaction variables Solvency risk*MCAP Solvency risk*earnings Solvency risk*change earnings		To test whether riskier banks engage in greater signaling relative to less risky banks and how levels of capital and earnings moderate this association
Model C		
Same as model B but includes interaction variables IFRS*change in earnings IFRS*MCAP IFRRS*EBT		In addition, to model B, here we test how changes in the relationship between LLPs and capital in the post IFRS relative to the pre IFRS regime influence signaling
Model D		
Includes all the above and three way interactions IFRS*Dz*MCAP IFRS*Dz*EBT IFRS*Dz*change in EBR		Purpose is to test if riskier banks communicate future earnings information more intensely after IFRS adoption, and how this association is affected by capital ratios and earnings

Table V.
Schematic representation of independent variables and their influence on signaling

insurance premiums by the regulatory body) are lower than the benefits (positive impressions of prudent behavior and overall future performance enhancing market values). We also find that the signaling behavior by financially distressed banks is more pronounced after implementation of IFRS relative to the prior period when they adhered to their respective countries' GAAPs. Since IFRS attempts to mitigate the discretionary component of LLPs, in theory, we would expect a lower propensity to signal. However, the implementation of IFRS may be lax thus, resulting in greater signaling. This is an avenue for future research. It would be interesting to test signaling inferences by applying more powerful multivariate statistical methodologies. We therefore call some future research to apply co-integration in panel data method, as suggested by Kao (1999).

Notes

1. We also performed our empirical tests after curtailing the 1 and 2 per cent of the higher and lower ends of our observations so as to mitigate the effects of outliers in our inferences. The results remain qualitatively unchanged compared with those on the tables.
2. Many studies in the past argue that banks are prone to earnings and capital manipulation (Ahmed *et al.*, 1998; Beatty *et al.*, 1995). Especially in the USA, LLPs are used by banks as a mechanism for earnings management mainly for stock market purposes (avoid stock variability, beat analyst's forecasts, etc.). Also according to Collins *et al.* (1995), the incentive for manipulating the capital adequacy ratios arises because any violation of this ratio will incur regulatory costs. So banks with higher costs of violating capital requirements have stronger incentives to manipulate capital.

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