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Why are some banks recapitalized and others taken over?•

Elena Beccalli

Università Cattolica del Sacro Cuore and London School of Economics

Pascal Frantz*

London School of Economics

ABSTRACT

This study investigates the likelihood of takeovers or recapitalizations for EU listed banks before and during the financial, using both static and sequential multinomial logistic models. Takeovers and recapitalizations are potential alternatives used to shore up financial institutions. We find that takeovers occur when the bank has low net interest margins. Instead, private recapitalizations occur for banks with lower equity, higher net interest margins, and positive growth at the bank level. Public recapitalizations occur for larger, less liquid banks with positive prospects that operate in bigger banking systems. Both types of recapitalizations occur in countries with lower growth. The determinants for takeovers and recapitalization differ between the pre-crisis and crisis periods. Overall, a need for corporate control exists when traditional banking suffers lower performance, whereas the search for stability explains recapitalizations.

JEL classification: G21, G34

Keywords: Banking; Recapitalizations; Takeovers; EU

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* Corresponding Author. Pascal Frantz, Houghton Street, London School of Economics and Political Science, London WC2A 2AE (UK); Tel. +44 207 9557233; E-mail: p.frantz@lse.ac.uk

Pascal Frantz, Department of Accounting, London School of Economics and Political Science, Houghton Street, London WC2A 2AE Tel. +44 (0)20 7955 7233; Fax +44 (0)20 7955 7420; E-mail: p.frantz@lse.ac.uk

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ABSTRACT

This study investigates the likelihood of takeovers or recapitalizations for EU listed banks before and during the financial, using both static and sequential multinomial logistic models. Takeovers and recapitalizations are potential alternatives used to shore up financial institutions. We find that takeovers occur when the bank has low net interest margins. Instead, private recapitalizations occur for banks with lower equity, higher net interest margins, and positive growth at the bank level. Public recapitalizations occur for larger, less liquid banks with positive prospects that operate in bigger banking systems. Both types of recapitalizations occur in countries with lower growth. The determinants for takeovers and recapitalization differ between the pre-crisis and crisis periods. Overall, a need for corporate control exists when traditional banking suffers lower performance, whereas the search for stability explains recapitalizations.

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1. Introduction

The past decade has seen major restructuring in the European banking industry partly as a result of the recent financial crisis. In order to provide financial support to the distressed financial sector, EU member states introduced a number of emergency measures ranging from state guarantee schemes, to public recapitalizations, forced takeovers and acquisitions, and nationalizations (Petrovic and Tusch, 2009). We investigate the likelihood of a listed bank either becoming involved in a takeover as a target or being (privately or publicly) recapitalized in the periods before and during the financial crisis. Because takeovers and recapitalizations are potential alternatives to shore up financial institutions, we compare the determinants of a bank being taken over with those of a bank being recapitalized. Our results show that takeovers are more likely than private recapitalizations for banks when their distress concerns traditional banking activities. Our evidence provides a tool for prudential supervision by identifying characteristics that will enable supervisory authorities to forecast the most likely outcome (takeover vs. recapitalization) and national governments/supervisory authorities to engineer recapitalizations in the case of state bailouts.

Wheelock and Wilson (2000) examine the characteristics that make banks more likely to disappear through either failures or acquisitions, whilst De Young (2003) examines the characteristics that make banks more likely to disappear via failures[1]. In contrast, we focus on the ex-ante characteristics that make banks more likely either to disappear as independent entities through takeovers or to survive through recapitalizations in the EU banking industry both before and during the crisis. Takeovers and recapitalizations are potential alternatives to shore up financial institutions although in different ways. A takeover involves a change in control, possibly new management, and the end of the bank as an independent entity. A recapitalization involves the sale

[1] Cole and White (2012) examine the same issue over the 2007-08 crisis.

of new equity in the bank to investors in the market or to a government entity without the loss of independence. Although the characteristics of banks involved in acquisitions have been thoroughly researched[2], to our knowledge no published empirical work investigates how these characteristics differ in the pre-crisis and crisis periods[3]. Furthermore, whilst the literature on the characteristics of banks involved in public recapitalizations (especially via the Troubled Asset Relief Program, TARP) is growing (Bayazitova and Shivdasani, 2012; Mariathasan and Merrouche, 2012; ap Gwilym et al. 2013; Harris et al. 2013; Elyasiani et al. 2014; Duchin and Sosyura 2014; Molyneux et al. 2014)[4], there is surprisingly little evidence on the characteristics of banks that are privately recapitalized (Dinger and Vallascas, 2015)[5]. Further, no evidence exists on how these characteristics differ between takeovers and recapitalizations[6].

Wheelock and Wilson (2000) find that the most common reasons given for bank takeovers are the aim to better manage the assets of poorly managed banks, the desire to grow, or the desire of bank managers with a large ownership stake to be acquired in the hope of receiving an attractive takeover premium. Berger et al. (2014) and Berger and Bouwman (2013) find that the most common reasons given for bank recapitalizations are the need to revive the banks, the need to reduce risk

[2] Moore, 1997; Hadlock et al., 1999; Wheelock and Wilson, 2000; Hannan and Pilloff, 2009; Goddard et al., 2009; Hernando et al. 2009; Pasiouras et al. 2011; Beccalli and Frantz 2013.

[3] For the US, there is evidence on the ex-post effects on market performance of acquirers in the resolution of failed banks during the crisis (Cowan and Salotti, 2013), and on the impact of disclosure requirements in the acquisition of undercapitalized banks promoted and subsidized by governments (Granja, 2011).

[4] Evidence is provided on the ex-post effects of government assistance on bank risk taking (for the US see Duchin and Sosyura, 2014; for Germany see Gropp et al. 2014), on the effects on bank risk taking and liquidity creation following regulatory interventions and capital support (Berger et al. 2014).

[5] The literature provides evidence on the effects on bank performance (survival and market share) associated with capital during the crisis (Berger et al. 2013), whilst not specifically on the ex-ante determinants of capital injections. The non-banking literature has instead extensively investigated the most common reasons given for private recapitalizations (see for a review Eckbo et al. 2007).

[6] Mariathasan and Merrouche (2012) estimate a multinomial logistic regression to differentiate among the forms of public resolutions (public recapitalizations, forced takeovers and nationalizations), but they ignore private interventions (private takeovers and recapitalizations, where our paper focuses).

taking[7], or to create liquidity[8], which is a core function of banks. In this industry nevertheless banks take steps to limit the use of equity as much as possible because banks perceive equity financing as expensive. Indeed, a primary challenge for capital regulation is forcing banks to hold more equity than they would like (Kashyap et al. 2008).

For poorly performing banks, which are therefore potentially subject to bank runs especially in the crisis period, takeovers have several advantages over private recapitalizations. First, equity investors in a bank are not capable of monitoring the management (Jensen and Meckling, 1976). Therefore, they constantly worry that bad decisions by management will dissipate the value of their shareholdings. This was especially important in the case of a bank badly managed in the past (Kashyap et al. 2008): the high level of discretion that an equity-rich balance sheet granted to bank management explains the cost-of-capital premium and the preference for takeovers rather than further capital injections in badly managed banks. Second, under the debt overhang framework (Myers, 1977), existing shareholders might not benefit from new capital injections because most of the benefits might go to existing creditors, especially when the equity capital is low (Admati et al. 2012; Elyasiani et al. 2014).

Furthermore, in an emergency context in which the time required to solve the bank's distress is a primary issue due to systemic risk, state recapitalizations appear preferable to private recapitalizations. They tend to be quicker, whilst private recapitalizations tend to be sluggish due to higher coordination costs and higher information asymmetries faced by small shareholders. In such a context of high information asymmetry, the state is expected to be better able to evaluate the quality of a counterpart bank than small shareholders, which should reduce the adverse selection problem faced by the small shareholders (Myers and Majluf, 1984). In addition, capital is a relatively costly

[7] See among the others the theoretical models of: Bhattacharya et al. (1998); Diamond and Rajan (2005); Allen et al. (2011); and Philippon and Schnabl (2013).

[8] See among the others theoretical models: Bryant (1980); Diamond and Dybvig (1983); Kashyap et al. (2002).

mode of funding at all times, and it becomes particularly costly during times of great uncertainty (Kashyap et al. 2008) given the higher concerns among private investors for bank failures (Okonkwo Osili and Paulson, 2009). Finally, a state recapitalization is less likely to involve information leakages to depositors and thus less likely to lead to bank runs. This explains why government intervention during crises has driven the recapitalizations aimed at restructuring in order to avoid contagion (UK House of Commons Treasury Committee 2009).

The main aim of this paper is to investigate the characteristics that determine the likelihood of banks becoming targets or being recapitalized, by using (static and sequential) multinomial logistic and Cox regressions. With reference to the EU banking industry, our results show that if we consider takeovers and recapitalizations as potential alternatives for restructuring banks, private recapitalizations are more likely for banks with less tangible equity but with higher net interest margins and positive growth, and bank takeovers are more likely when their distress concerns low net interest margins that reflect weak performance in traditional banking activities. However, the determinants differ widely between the pre-crisis and crisis periods. Whilst few differences arise in the pre-crisis period, major differences emerge during the crisis period. The major difference is that a bank's net interest margin adversely affects the likelihood of being taken over, and the magnitude of tangible equity adversely affects the likelihood of being recapitalized but the net interest margin and growth positively affects the likelihood of being recapitalized. These findings suggest that the main motivation for takeovers is to improve one specific dimension of operating performance (that is the profitability of the traditional banking activity). However, for private recapitalizations, the main motivation is to reduce risk (risk taking hypothesis through solvency risk) in presence of better operating performance. Further, a higher likelihood of going through a public recapitalization is associated with lower liquidity, larger size, and higher growth at the bank level but lower growth at the country level. In summary, there is a market for corporate control when the performance of the traditional banking activity is lower, whereas the search for stability explains recapitalizations (and

within recapitalizations, the state intervention occurs in more difficult situations, in which the private solution is not possible).

Our evidence on equity and liquidity supports the view of the Basel III Committee that macro-prudential regulation should require banks to hold higher levels of capital (not only to reduce the likelihood of a bank requiring a bailout, but also to reduce the capital transfer to and from the government and the cost of such an intervention) and should impose the liquidity coverage ratio and the net stable funding ratio (to address the issue of maturity mismatch in the short and medium term, with the aim to reduce the probability and cost of public recapitalizations). A strong normative implication however cannot be derived in the absence of a welfare analysis that weighs the costs of higher levels of capital and liquidity. Further, we find that the adverse effect of liquidity is greater for larger banks, which means that the larger the size in relation to liquidity the higher the likelihood of a state bailout. This is clearly in line with the current discussion on too big to fail.

Section 2 describes the methodology, the sample, and the data sources. Section 3 provides the empirical evidence, whereas section 4 introduces robustness tests. Section 5 provides a conclusion.

2. Methodology

2.1. A static model

To identify the determinants of recapitalizations and takeovers, we use a multi-period, multinomial logistic regression. We use a multi-period logistic regression to take into account the fact that recapitalizations and takeovers are relatively uncommon events (see Shumway, 2001; Pagano et al., 1998; Chava and Jarrow, 2004). This regression, also known as multinomial logit, explains the likelihood of an event taking place as a function of a vector of independent covariates **X** and parameters **B**, with the cumulative distribution function being the logistic distribution function.[9]

[9] In order to test the assumption of independence of irrelevant alternatives, we conduct the Hausman test: in all cases, we could not reject the null hypothesis of independence of the outcomes from other alternatives (p-values equal to 1.0): this

Equation (1) introduces the multinomial response variable, Y_t, that indicates the occurrence of an event in a distinct time interval that ranges from zero to *T* and the constant, α, that defines the risk in the case of **X=0**:

$$p(Y_t = i | t - \mathbf{X}, \quad) = \frac{e^{\alpha + \beta \cdot \mathbf{X}}}{1 + e^{\alpha + \beta \cdot \mathbf{X}}}, \qquad (1)$$

where i=1 represents the event of becoming a target, i=2 represents the event of being privately recapitalized, i=3 represents the event of being publicly recapitalized, and i=0 represents the event of being uninvolved in a recapitalization or takeover. The $p(Y_t = i | t - \mathbf{X}, \quad)$ represents the probability that Y_t = i at date t is conditional on the information set available at date t-1.

Following Palepu (1986), the selection of variables is based on prespecified hypotheses on what banks are likely to become involved in takeovers and recapitalizations. Table 1 summarizes the hypotheses, their variables, and expected signs. The hypotheses are as follows:

1. the operating performance hypothesis, tested by the profitability of operating activities (*ROA*), the profitability of the traditional banking activity (*NIM*), the free cash flow return (*FCFR*), the cost-to-income ratio (*CTI*), and the growth in total assets over the last year (*GROWTH*);
2. the risk taking hypothesis, tested by insolvency risk (proxied by the amount of tangible equity over total assets, *EQUITY*; here higher values of equity imply lower insolvency risk), credit risk (proxied by the amount of net charge off over total assets, *NCO*), and liquidity risk (proxied by the amount of liquid assets over total assets, *LIQ*);
3. control variables:

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allowed us to use the multinomial logistic regression as the baseline model. An alternative to the logistic regression is the probit regression, which uses a normal cumulative distribution function. Probit regressions however produce results that are very similar to logistic regression in binary cases. As a robustness test, we use the probit regression and obtain qualitatively similar results. These robustness tests are available from the authors on request.

- size, tested by the natural logarithm of total assets (*LNTA*);
- market reward, tested by the change in the market price (return) of the bank over the last year (*PRICE_CH*);
- regulatory/macroeconomic setting, tested by the level of economic freedom (*EC_FREE*) and regulatory quality (*REG_Q*) of the country where each bank operates, the size of the national banking system where each bank operates (*CLAIMS*), the geographical location of each bank (*EU*) and the level of GDP growth of each country (*GDPG*).

The first hypothesis is the operating performance hypothesis. This hypothesis assumes that banks might use takeovers to generate increases in profits and value (Wheelock and Wilson 2000; Hernando et al. 2009). However, recapitalizations might be more likely in the presence of better operating performance and growth (either by expanding market power or by achieving economies of scale) that could encourage investors to subscribe to the new equity issues. One of the main motives underlying takeovers is to improve the operating performance of the target, and these gains are more likely to be achievable if the target bank is underperforming. Therefore, indicators of operating performance should contain explanatory power on the likelihood of being acquired: banks with lower operating performance might be more attractive for takeovers. Overall, bad operating performance reflects either managerial inefficiency (Hannan and Rhoades 1987), or adverse economic conditions and other factors outside management control (such as inflation and GDP growth) or the bank risk taking (risk features of the bank assets). The lower profitability of operating activities (*ROA*) and the higher cost inefficiency (*CTI*) tend to suggest the failure of managers to maximize a firm's value, which drives their replacement via the takeover mechanism (Palepu 1986). Profitability from traditional banking (*NIM*) focuses on the traditional operations of the banks and is intended to reflect the exercise of market power and/or its effect on operational efficiency (Berger et al. 2004). Although *NIM* can be considered a reflection of managerial inefficiency in lending and

borrowing activities, it can also vary depending on the risk features of the bank's assets (loans) and the economic environment (banks operating in countries with higher competition, lower inflation, and lower growth also typically have lower net interest margins). As for the free-cash-flow return (*FCFR*), firms that overinvest are likely to be targets because acquiring firms can make better investment decisions (Jensen 1986): banks that tend to overinvest tend to invest in negative NPV projects and therefore are more likely to be taken over. Slower growing targets might be more attractive to acquirers looking to increase the target's growth rate (Moore, 1996; Pasiouras et al., 2011).

The second hypothesis is on risk taking and has three dimensions. The solvency risk dimension derives from the financial fragility theory (Diamond and Rajan, 2000; 2001) that argues that a highly levered capital structure in banks makes them fragile and subject to runs, therefore governments might be able to use recapitalizations to reduce this fragility. Moreover, according to the theories on the strengthening of banks' monitoring incentives (Holmstrom and Tirole, 1997; Allen, Carletti and Marquez, 2011; Mehran and Thakor, 2011), recapitalizations might reduce banks' risk taking. Also, according to the theory of debt overhang (Myers, 1977), highly levered banks should be unwilling to issue new equity because most of the benefits go to the existing creditors (Admati et al, 2012). The credit risk dimension affects the banks' operating performance in the traditional banking activity, and thus is one of the main motives underlying takeovers. The liquidity risk dimension comes from the theories on the banks' role as risk transformers. These theories argue that liquidity creation exposes banks to risk (Allen and Santomero, 1998; Allen and Gale, 2004) and that higher capital improves the banks' ability to absorb risk (Bhattacharya and Thakor, 1993; Repullo, 2004; von Thadden, 2004). Castiglionesi et al. (2014) find that banks can use recapitalizations in the presence of higher liquidity risk to reduce risk (risk absorption).

Carbo-Valverde et al. (2012) motivates our use of size and regulatory controls. These authors find that differences across countries in the size of banks and the types of rules and enforcement

allow EU banks to expand their access to safety-net subsidies through cross-border mergers. Our set of regulatory and macroeconomic controls (economic freedom, regulatory quality, size of the national banking system, geographical location of each bank[10], and the level of GDP growth of each country) corresponds to the one used in Pasiouras et al. (2011). The market reward control comes from Demirguc-Kunt et al. (2013) who find a relation between banks' capital position and their stock performance, most markedly for larger banks, during the crisis.

2.2. A sequential model

To incorporate a dynamic structure, we introduce a sequential multinomial logistic regression (Figure 1). In the first stage, banks decide whether they are restructuring in any form or not. Banks not restructuring are called non-involved. In the second stage, banks decide whether to be taken over or to be recapitalized. In the third stage, banks recapitalize either through private or public intervention (depending on the type of investor willing to provide capital to the bank).

Insert Figure 1

2.3. Data set and sample

We define a takeover as an event involving a change in control, new management, and the end of the bank as an independent entity. We define private recapitalizations as the sale of new equity shares in the bank to investors according to our calculations of the percentage increase in the number

[10] To capture the geographical location of each bank, Pasiouras et al. 2011 use a dummy variable named *5EU* (i.e. banks operating in one of the five core EU banking sectors, that is France, Germany, Italy, Spain, UK), whereas we include a dummy variable named *EU* (i.e. banks operating in the EU-28 countries). To capture the relevance of the cross-border activity of EU banks, we do not restrict the analysis to domestic takeovers and recapitalizations only. In our base analysis, our sample comprises EU banks considering their cross-border activity, that means private recapitalized banks and targets operating in any country of the world providing they are involved in a takeover with a EU bank. This results in a sample comprising about 75% EU banks and 25% non-EU banks involved in a takeover with a EU bank. In our robustness analysis, our sample comprises EU banks without considering their cross-border activity. This restricted EU sample confirms the findings of the base sample taking into account cross-border activities (Table 7, Panel A).

of outstanding shares at the 1, 5, and 10% levels. The European Central Bank defines public recapitalizations as government purchases of participation capital securities not limited to common stocks[11] (Petrovic and Tutsch, 2009).

Given the structure of the sequential model, banks that were acquired and received a capital injection in the same year are treated as targets, given that the recapitalization is assumed to be driven by the takeover.

The sample comprises banks as defined in the EU's Second Banking Directive. We investigate (private and public) recapitalizations and takeovers that occurred between January 2002 and December 2011. Further, we split this time frame into two subperiods: the pre-crisis from 2002 to 2006 and the acute crisis period from 2007 to 2011.[12] The focus is on the EU-28 banking industry considering also its cross-border activities. Specifically, private recapitalized banks and targets are banks operating in any country in the world as long as a EU bank is the acquirer[13], whereas public recapitalized banks are EU banks.

The sample comprises 635 private recapitalizations at 1%, 479 at 5%, and 400 at 10%; 33 public recapitalizations, 50 public guarantees, and 277 deals involving targets for which full financial information about the banks is available.[14] The sample also comprises banks that have

[11] Public recapitalizations also include state interventions not directly linked to equity such as guarantee schemes (e.g. guarantees for bank deposits and guarantees for bonds issued by credit institutions).

[12] For European banks, the acute crisis period comprises both the global financial crisis of 2007-08 and the European sovereign debt crisis of 2010-11. The starting date of the global financial crisis is determined according to the Bank for International Settlements (2010) as August 2007.

[13] We consider private recapitalizations for non-EU banks only when the recapitalized bank has also been a target in a deal where the acquirer is a EU bank. The rationale for including non-EU private recapitalizations is that we want to consider the two possible alternatives (takeover vs. recapitalization) for any bank in the sample. Robustness test on the sample are provided, specifically by focusing on a restricted sample comprising EU banks only without any cross-border activity (Table 7, Panel A).

[14] In our sample 16 banks that were taken over also received a private capital injection in the same year, two banks that were taken over also received a public capital injection in the same year, and 11 banks that were publicly recapitalized were also privately recapitalized in the same year.

never engaged in any recapitalization or takeover operation over the life span of this study. The sample consists of 4,866 observations over the period under investigation.

The data are obtained by combining four sources: Thomson One Banker M&A for information on takeovers, Petrovic and Tutsch (2009) for information on public recapitalization, Thomson Financial Datastream for prices of listed banks and economic indexes, and Bankscope for balance sheet and profit and loss data.

3. Empirical results

We first examine the bank-specific characteristics and regulatory and institutional variables. In Panels A and B of Table 2, we report the descriptive statistics for public and private recapitalizations and for targets respectively. The values in Table 2 (Panel A) show that recapitalized banks are larger than their non-involved counterparts and less capitalized. Recapitalized banks tend to operate in countries with more economic freedom and bigger banking systems. Further, strong differences affect public and private recapitalizations. Public recapitalizations concern banks that are larger, have a lower ROA, have less profitable traditional banking, are less cost efficient, are less capitalized, and have grown less over the last year. In terms of the regulatory and macroeconomic variables, public recapitalizations take place in countries with more economic freedom, less GDP growth, bigger banking systems, and more regulatory quality. The values in Table 2 (Panel B) show that the banks involved in takeovers are larger than their non-involved counterparts, have less profitable traditional banking, are less able to generate free-cash-flow returns, are less capitalized, and have grown more over the last year. The comparison shows that banks involved in takeovers are larger, have less profitable traditional banking, and are less capitalized. In terms of regulatory variables, banks involved in takeovers operate in countries with less economic freedom than recapitalized banks.

Table 3 displays the correlations among all of these independent variables. On average, the correlation values are low, and thus provide preliminary evidence that there are low or no multicollinearity problems. The tolerance index and variance inflation factor (VIF) confirm that no obvious multicollinearity problem affects the variables assumed to be determinants of the likelihood of being acquirers and targets except for the regulatory and macroeconomic variables.

3.1. Multinomial logistic regression

Key differences arise in the determinants of the likelihood of recapitalizations and takeovers for the whole sample period (Table 4, Panel A). Private recapitalizations are more likely for banks with less tangible equity, but with higher performance of traditional banking activity, and with positive growth at the bank level notwithstanding a negative growth at the country level: that is, banks with efficient management that have grown positively over the last year even if the general economy performed badly. The most economically significant determinant is tangible equity (negative coefficient and marginal effect of about 118%). This finding is the same as in Dinger and Vallascas (2015) who find that low capitalized banks are more likely to implement private recapitalizations and that market forces primarily motivate the decision to issue rather than capital regulation.[15] The next most significant determinant is the performance of traditional banking (positive coefficient and marginal effect of about 79%). Public recapitalizations are more likely for banks that are larger and that operate in larger banking systems, with less liquidity and with positive growth at the bank level notwithstanding a negative growth at the country level. Moreover, banks that experienced a bad performance in terms of stock returns are more likely to go through public recapitalizations (and not instead private recapitalizations or takeovers). The regulatory variables become relevant for public recapitalizations, where higher regulatory quality has an association with

[15] This finding however is not in line with the corporate finance theory (debt overhang framework) and the banking theory (risk-shifting opportunities for shareholders due to the expectation to receive government support when banks are unable to repay their debts).

a higher likelihood of state intervention. The most economically significant determinants for public recapitalizations are stock returns (negative coefficient and marginal effect of about 20%) and liquidity (negative coefficient and marginal effect of about 13%). These coefficients indicate that governments seek stabilization through recapitalization. Within recapitalizations, state interventions occur in more difficult times, where there is the need to avoid bank runs and private interventions are not possible. Takeovers are more likely when banks' distress concerns the profitability of the traditional banking activity and when banks operate outside the EU. The most economically significant determinant is the performance of traditional banking (negative coefficient and marginal effect of 77%). Takeovers take place when the acquiring bank perceives the possibility to improve the performance of the target in its traditional banking activity. Our results show that bank takeovers are more likely than private recapitalizations for banks when their distress concerns the performance of traditional banking activities.

The performance of traditional banking discriminates takeovers and private recapitalizations: there is a market for corporate control when the performance from the traditional banking activity is low, whereas private recapitalizations occur in a search for stability when the performance on the traditional banking activity is higher. This suggests that the main motivation for takeovers is to improve one specific dimension of the operating performance (that is the profitability of the traditional banking activity, that according to the banking literature reflects the exercise of market power and/or its effect on operational efficiency), whereas for private recapitalizations it is to reduce bank risk taking (risk taking hypotheses as for solvency risk) in presence of better operating performance, and for public recapitalizations it is to create liquidity (risk taking hypotheses as for liquidity risk) in presence of larger size and bad market performance.

Our results show that bank takeovers are more likely than private recapitalizations for banks when their distress concerns their performance of their traditional banking activity, that might suggest inefficient management on the lending and borrowing side (notwithstanding a variety of

other factors such as higher competition, lower risk -taking or lower levels of inflation. In such a context, takeovers have several advantages over private recapitalizations (as supported by our results and anecdotic evidence). First, banks can acquire less profitable ones in order to create value in the traditional banking activity by exporting their superior managerial skills (i.e. expectation of an improvement in the core banking activity). Assuming that the net interest margin reflects the exercise of market power and/or its effect on operational efficiency (Berger et al. 2004), poorly managed banks exhibit relatively poor performance of traditional banking activity and takeovers serve to drive out bad management. Second, equity investors in a bank must constantly worry that bad decisions by management will dissipate the value of their shareholdings, and this is especially important in the case of a bank poorly managed in the past (Kashyap et al. 2008). Third, in contrast with the debt overhang theory prediction, banks are willing to issue new equity even when capital is low; this evidence however is not dissimilar to the one in Dinger and Vallascas (2015).

When we focus on recapitalizations, the evidence shows that a higher likelihood of going through a public recapitalization is associated with banks with lower liquidity and larger size as well as low growth at the country level, whereas capitalization and operating performance are not relevant. Lower liquidity, and not lower tangible equity, drives public interventions. The evidence on liquidity and size for public recapitalizations is consistent with Mariathasan and Merrouche (2012) who find that the probability of a bank being recapitalized decreases with the bank's liquidity and increases with the bank's size. The evidence on equity for public recapitalization instead differs from Mariathasan and Merrouche (2012) who find that the probability of a bank being recapitalized decreases with the bank's Tier 1 capital. However, for the US government equity infusions, Bayazitova and Shivdasani (2013) show that strong US banks opted out of participating in the Capital Purchase Program of the TARP and that the US provided equity infusions to banks that posed systemic risk and faced high financial distress costs but had strong asset quality.

Our results show that public recapitalizations are more likely than other forms of restructurings in case of emergency (i.e. where large banks because of liquidity problems are potentially subject to bank runs). For banks potentially subject to bank runs, especially in the crisis period, the time required to solve bank distress is a primary issue and public recapitalizations are quicker, whereas private interventions tend to be sluggish (higher coordination costs and higher information asymmetry of small shareholders). Not only is capital a relatively costly mode of funding at all times, it is particularly costly for a bank to raise new capital during times of great uncertainty (Kashyap et al. 2008). Moreover public recapitalizations are less likely to involve information leakages to depositors and thus less likely to lead to bank runs. This explains why recapitalizations during the 2007-08 crisis have been driven by government intervention aimed at restructuring in order to avoid contagion (UK House of Commons Treasury Committee 2009).

Our evidence on public recapitalizations in Europe would appear to support the view to impose liquidity coverage and net stable funding ratios (to address the issue of maturity mismatch in the short and medium term, with the aim to reduce the probability and cost of public recapitalizations). Our evidence on private (but not public) recapitalizations would appear to support the view of the Basel III Committee that macro-prudential regulation must require banks to hold higher levels of capital (given that private recapitalizations are driven by the presence of lower capital). A strong normative implication however cannot be derived in the absence of a welfare analysis weighing the costs of the higher levels of capital and liquidity. Moreover, banks that experienced a bad performance in terms of stock returns are more likely to go through public recapitalizations (instead of private recapitalizations and takeovers): this is consistent with bank managers having the desire to avoid both private capital increases and takeovers when the market performance would damage the negotiation power of the bank. Finally we find that public (but not private) recapitalizations are more likely for larger banks, this means that the larger the size the

higher the likelihood of a state bailout. This is clearly in line with the current discussion on the regulation of too big to fail.

Panels B and C of Table 4 show the pre-crisis (2002-2006) and the crisis (2007-2011) periods. The evidence on the pre-crisis period shows that the same factors affect the likelihood of becoming a target or of being recapitalized: essentially lower liquidity and lower tangible equity, although the adverse effect of liquidity tends to be mitigated in the presence of higher tangible equity. The evidence on the likelihood of becoming targets is consistent with Beccalli and Frantz (2013): banks with lower liquidity might be acquired because they have liquidity problems that are difficult to resolve, and banks with lower capitalization are more likely targets because acquirers prefer lower capitalization because they can generate larger gains by improving the efficiency of the target and because they can pay less for the deal. Instead, during the crisis, a key difference in the determinants for targets and recapitalizations emerges: private recapitalizations are more likely when banks have lower tangible equity, higher performance in their traditional banking, and positive growth. Public recapitalizations are more likely when banks have lower liquidity and larger size, whereas takeovers are more likely when banks have lower performance in their traditional banking. Moreover, we find a higher likelihood of being involved in recapitalizations for banks operating in bigger banking systems and with negative growth at the country level. Conversely, we find a higher likelihood of being involved in takeovers for targets operating in countries with more economic freedom and less regulatory quality.

The key difference in the determinants for targets and recapitalizations during the crisis, as opposed to their similarity before the crisis, might be explained by the sharp increase in systemic risk that induced governments to intervene by encouraging acquirers to take over weaker banks. Moreover, the higher concerns among private investors on bank failures, and their lower confidence in the banking system, made them less prone to provide equity in the form of recapitalizations

during the crisis (Okonkwo Osili and Paulson, 2009). Therefore, these concerns led to takeovers or public interventions rather than private recapitalizations especially in cases of larger distress.

3.2. A sequential logistic regression

The first stage of the sequential logistic regression (Table 5, Panel A) highlights key differences in the determinants of being involved in any form of restructuring as opposed to not being involved. In particular, banks decide on restructuring when their equity is lower, their liquidity is lower, their growth is higher, they operate in bigger banking systems, and when they operate outside the EU in countries experiencing lower growth. The second stage of the sequential logistic regression confirms the key differences in the determinants of takeovers or recapitalizations as observed in the static model. In particular, banks recapitalize when their performance in traditional banking (net interest margin) is stronger and growth at the country level is lower. We observe that equity is not statistically significant due to the fact that targets are compared with both private and public recapitalizations, and equity does not matter in public recapitalizations. The third stage of the sequential logistic regression confirms most of the key differences in the determinants of being privately versus publicly recapitalized as observed in the static model. In particular, banks use private recapitalizations when their liquidity is higher, when they are smaller, when they operate in smaller banking systems, and when they operate in countries experiencing higher growth and lower regulatory quality. In addition to the results of the static model, we find that banks with higher cost efficiency (lower cost-to-income ratio) are more likely to go for private recapitalizations. Thus state intervention is more likely for large banks with low cost efficiency that operate in countries with low growth but high regulatory quality. Further, private recapitalizations are not necessarily more likely when banks have lower tangible equity. This finding indicates that in a dynamic model, the decision to recapitalize is not driven by a low level of equity but instead is driven by the operating performance and liquidity hypotheses. However, in the first stage of the dynamic model, the

presence of a lower level of equity is a determinant of any form of restructuring (both recapitalizations and takeovers.

When restricting our sample to the crisis period (Table 5, Panel B), the first stage of the sequential logistic regression shows that banks decide to go for a form of restructuring when their equity is lower, their liquidity is lower, their growth is higher, they operate in bigger banking systems, and when they operate outside the EU in countries experiencing lower growth and higher economic freedom. Similar to the overall period, the second stage of the logistic sequential regression confirms most of the key differences in the determinants of takeovers versus recapitalizations as observed in the static model. In particular, the likelihood of being acquired is higher when banks have lower performing traditional banking activities and operate in countries with higher economic freedom, lower regulatory quality, and higher growth. In the third stage, the likelihood of a public recapitalization is higher for larger banks with higher cost efficiency and lower liquidity that operate in bigger banking systems located in countries with lower growth but higher regulatory quality. Again, tangible equity does not appear to be a determinant of recapitalizations in the second and third stages of the dynamic model but is a determinant of restructurings in the first stage. This finding indicates that the decision to recapitalize does not occur as a consequence of equity deficiency in itself but instead occurs as a consequence of an interaction between cost inefficiency, liquidity issues, and low growth at the country level for banks with a lower level of equity in comparison to banks non-involved in any form of restructuring.

4. Robustness tests

4.1. Methodology

As a robustness test with respect to methodological issues, we add bootstrapped non-parametric tests to the multinomial logistic regression and use a different regression methodology.

The bootstrapping randomly reassigns a treatment to avoid assuming asymptotic normality. Panel A of Table 6 shows that our results confirm the findings in the baseline model. Using 95% confidence intervals, banks are more likely to become targets when their performance of traditional banking activity is lower, and they are located outside the EU. Similarly, using 95% confidence intervals, banks are more likely to be privately recapitalized when their performance in traditional banking is higher, tangible equity is lower, growth is positive, and when they are located outside the EU. Further, using 95% confidence intervals, banks are more likely to be publicly recapitalized when they are larger, operate in larger banking systems with higher regulatory quality, their liquidity is lower, and when there is positive growth at the bank level notwithstanding negative growth at the country level.

The Cox regression methodology is a subclass of the survival models used to investigate the likelihood of banks becoming targets or recapitalized and when comparing the nature of the determinants. Survival models derive the hazard of an event as a function of a vector of independent variables **X** and parameters **Θ**. The response variable, survival time, is the time till the event occurs. Survival models explicitly control for each firm's period at risk. Cox regressions are proportional hazard models. In a Cox regression with time-dependent covariates, the vector of independent variables **X** depends explicitly on time. Furthermore, the hazard rate h(t) is the likelihood of an event taking place at date t given that the event did not take place previously. The rate takes the following functional form:

$$h(t) = h_0(t)e^{\mathbf{X}\,t()} \qquad (2)$$

where $h_0(t)$ denotes the baseline hazard, that is, the hazard obtained when $\mathbf{X(t) = 0}$. Both $h_0(t)$ and **Θ** are estimated by the regression. We use Cox regressions with time-varying covariates estimated using the partial likelihood method, as in Wheelock and Wilson (2000), Hannan and Pilloff (2009), and Goddard et al. (2009). No functional form is imposed on the baseline hazard but the covariates enter the model linearly, so the estimation has semi-parametric features. In modelling the time-to-

takeover and time-to-recapitalization, banks are censored in the year in which they are acquired or recapitalized. A positive (negative) coefficient indicates that an increase in the relevant variable leads to an increase (decrease) in the event hazard, regardless of whether it is a target or a recapitalization hazard.

The results from the Cox regressions extensively support those generated by the multinomial logistic regression and appear robust to the variant tested (Table 6). First, in line with the logistic regression, the likelihood of becoming a target decreases with the net interest margin. In the Cox regression, we also find that the likelihood of becoming a target decreases with the bank's size and the country's regulatory quality, and increases with the country's economic freedom. Moreover, in line with the logistic regression, the likelihood of being privately recapitalized increases with the performance in traditional banking and with the bank's growth (notwithstanding a negative country's growth), whereas it decreases with tangible equity and with the location of the bank in the EU. Further, in line with the logistic regression, the likelihood of being publicly recapitalized increases with the bank's growth (notwithstanding a negative country's growth), the bank's size, and the banking system's size; whereas it decreases with performance in terms of stock returns.

4.2. Sample and category specification

To test the robustness of our results to the sample specification, we also estimate the likelihood of becoming a target or being recapitalized (as in Table 4) for the EU banking industry without considering any cross-border activity (i.e. restricted sample to domestic activities only with standard errors clustered at country level); more specifically, private and public recapitalized banks as well as targets are EU banks (Table 7, Panel A). The previous results including cross-border activities are confirmed here for the full period and the crisis period: private recapitalizations are more likely for banks with less tangible equity but with positive growth and higher cost efficiency, whereas public recapitalizations are more likely for larger banks with less liquidity but with positive

growth (notwithstanding a negative country's growth). Banks are more likely to become targets when their distress concerns traditional banking activities (lower net interest margin).

To test the robustness of our results to the category specification, we control for the nature of a private recapitalization. When motivated by a takeover, we now classify the private recapitalization as a private recapitalization associated with a takeover (Table 7, Panel B).[16] The results for the likelihood of being recapitalized versus acquired are confirmed: the main motivation for takeovers is to improve the performance in traditional lending and borrowing activities, whereas the motivation for private recapitalizations is to reduce risk taking in the presence of higher performance in traditional banking (higher net interest margin) and higher growth. However, the private recapitalizations associated with takeovers show different determinants: positive performance and growth do not matter, whereas positive performance and growth increase the likelihood of being privately recapitalized. Instead lower liquidity and better credit risk increase the likelihood of private recapitalizations associated with takeovers.

4.3. Predictive accuracy of logistic regressions

The multinomial logistic regression estimates the probability of a bank becoming involved in takeovers as a target as well as the probability of it being recapitalized. With respect to each potential event, each observation is assigned to one of two portfolios: observations with probabilities higher than the median probability generated by the multinomial logistic regression are assigned to the higher probability portfolio (HPP), whilst observations with probabilities lower than the median probability are assigned to the lower probability portfolio (LPP). The median probabilities are 7% for becoming a target, 19.1% for being recapitalized, and 0.12% for being publicly recapitalized. Table 8 provides the number of banks in each portfolio that actually become targets or are

[16] There are 16 cases of private recapitalizations associated with takeovers, whereas there is only one case of a public recapitalization associated with a takeover that is also associated with a private recapitalization. Therefore, we do not create a category for public recapitalizations associated with takeovers.

recapitalized, whether privately or publicly. If the multinomial logistic regression is useful in identifying the banks undergoing the above-described events, the higher probability portfolio should contain a higher number of event banks than the low probability portfolio. As shown in Table 8 (Panel A), the model works particularly well for targets and public recapitalizations, with the higher probability portfolio containing more than twice as many targets and all of the banks being publicly recapitalized. The null hypothesis that the multinomial logistic regression is not useful in predicting events is rejected at the 1% level.

As a further robustness test, the multinomial regression is estimated in a crisis subperiod consisting of the years 2007, 2009, and 2011 and validated in another crisis subperiod consisting of the years 2008 and 2010. In the estimation subperiod, all banks are allocated to three different portfolios based on the output of the logistic regression. The thirtile of observations with the highest estimated probability of an event taking place is allocated to the HPP portfolio, the second thirtile to the MPP portfolio, and the last thirtile to the LPP portfolio. Panel B of Table 8 shows that the number of banks being taken over or being recapitalized increases from the LPP portfolio to the HPP portfolio, although not monotonically. The estimated regression coefficients are then used to generate predictions in the validation subsample. Table 8 (Panel B) shows that the number of banks being taken over or recapitalized still increases in the validation subsample from the LPP portfolio to the HPP portfolio, although not monotonically. Overall the model works well in the validation subsample (i.e. the null hypothesis that the multinomial logistic regression is not useful in predicting events is rejected at the 1% level). Further, all public recapitalizations, except for one, are in the HPP portfolio, and the vast majority of the variables that are significant in the multinomial regression on the overall sample are also statistically significant and with the same signs when the multinomial regression is estimated in the estimation sample.

5. Conclusion

This study uses both static and sequential multinomial regressions in order to identify the determinants of a bank being involved in a takeover as well as being (privately or publicly) recapitalized over the period from 2002 to 2011. Moreover, we compare the determinants between both the pre-crisis (2002-2006) and the crisis period (2007-2011).

The main results are as follows: Takeovers are more likely when the distress concerns traditional banking activity (lower net interest margin), whilst private recapitalizations are more likely for banks with lower equity, higher performing traditional banking activities, positive growth at the bank level, and are located in countries with lower growth. Public recapitalizations instead are more likely for larger and less liquid banks with positive growth that operate in bigger banking systems that are located in countries with lower growth. This finding shows that banks can pursue private recapitalizations when their performance in traditional banking is stronger, whilst state intervention occurs as a consequence of an interaction among cost inefficiency, liquidity issues, and lower growth at the country level. In short, there is a need for corporate control when the performance in the traditional banking activity is lower (i.e. takeovers occur when acquirers can improve the market power and/or its effect on the operational efficiency of the target's traditional banking activities), whereas the search for stability explains recapitalizations (and within recapitalizations, a state intervention occurs in more difficult situations of emergency, where a private intervention is not possible).

The determinants differ widely between the pre-crisis and the crisis periods. Whilst in the pre-crisis period few differences between the determinants of being taken over and recapitalized arise, major differences emerge in the crisis. The major difference is that the likelihood of being taken over is adversely affected by the bank's net interest margin, whereas the likelihood of being privately recapitalized is adversely affected by the magnitude of the tangible equity and is positively affected by growth. This finding shows that the main motivation for takeovers is to improve one

specific dimension of operating performance, whereas the main motivation for private recapitalizations is to reduce solvency risk in the presence of better operating performance. Further, the likelihood of a bank being subject to public recapitalization is adversely affected by the bank's liquidity and GDP growth, and is positively affected by growth in the past year and the bank's size.

Our evidence provides a tool for prudential supervision by identifying characteristics that enable supervisory authorities to forecast the most likely outcome (takeover vs. recapitalization), and the national governments/supervisory authorities to engineer recapitalizations in the case of state bailouts. In the absence of the costs of the higher levels of capital and liquidity, it also supports the view of the Basel III Committee that prudential regulation should require banks to hold higher levels of capital and should impose the liquidity coverage ratio and the net stable funding ratio. Finally, by documenting that the larger the bank's size in relation to liquidity, the higher the likelihood of a state bailout, our evidence contributes to the current discussion on too big to fail.

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Figure 1: A sequential model

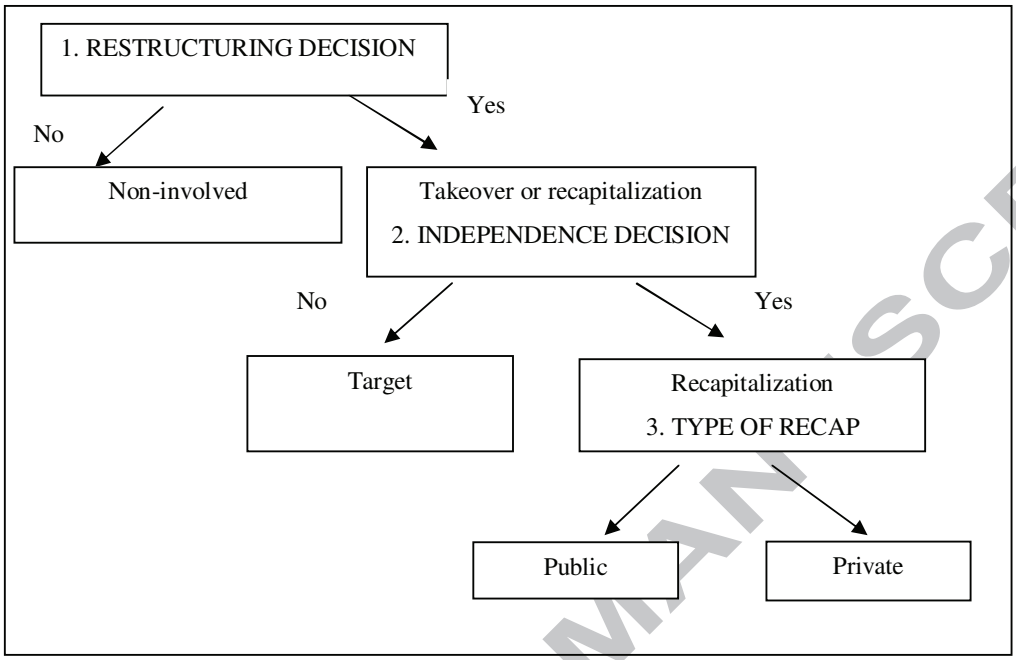

Table 1 Takeover and recapitalization likelihood hypotheses and independent variables

Hypothesis	Variable	Variable name	Variable proxy	Expected sign targets	Expected sign recap
Hp 1. Operating performance hypothesis	Operating profitability	ROA	Net income /Total assets	-	+
	Net interest margin	NIM	[Interest Income - Interest Expense]/Loans	-	+
	Free-cash-flow return	FCFR	Free-Cash-Flow Return = [Operating income - (Earning assets – Earning $assets_{LV1}$) + (Deposits - $Deposits_{LV1}$)] / Operating income	-	+
	Cost-to-income	CTI	Operating costs/Intermediation margin	-	+
	Growth	GROWTH	[Total assets – Total $assets_{LV1}$]/ Total $assets_{LV1}$	-	+
Hp 2. Risk taking hypothesis	Capital strength	Equity	Tangible equity / Total assets	+/-	-
	Credit risk	NCO	Net charge off/Total assets	+/-	+
	Liquidity risk	LIQ	Liquid assets / Total assets	-	-
Control variables	Size	LNTA	Ln (Total assets)	+/-	+/-
	Market price change	PRICE_CH	Change in the market price (return) over the last 12 months		+
	Economic freedom	EC_FREE	Includes business freedom, trade freedom, monetary freedom, freedom from government, fiscal freedom, property rights, investment freedom, financial freedom, freedom from corruption and labour freedom [Heritage Foundation]	+/-	+/-
	Regulatory quality	REG_Q	Ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development [World Bank]	+/-	+/-
	Banking industry size	CLAIMS	Bank claims on the private sector / GDP [Euromonitor international]	+/-	+
	EU bank	EU	Dummy equal one for banks located in EU-28 countries		
	GDP growth	GDPG	Growth in the GDP of the country where the bank is listed	+/-	+

Table 2 Descriptive statistics for bank-specific and regulatory and institutional variables

		ROA	NIM	FCFR	CTI	Growth	Tangible Eq	NCO	Liquid	lnTA	Price	Economic Freedom	GDP Growth	Bank Claims	Reg. Quality
Panel A															
Public recap	N	33	33	33	33	33	33	28	33	33	33	33	33	33	33
	Mean	0.01	0.03	-1.02	0.66	0.12	0.04	0.01	0.21	18.74	0.03	69.83	-2.39	138.42	1.36
	Median	0.01	0.03	0.17	0.63	0.10	0.03	0.01	0.15	19.45	0.00	70.50	-2.70	111.30	1.39
	Dv.std	0.01	0.01	4.57	0.20	0.18	0.02	0.01	0.17	1.79	0.68	7.80	2.46	54.82	0.38
	Min	-0.03	0.01	-11.57	0.46	-0.16	0.02	-0.01	0.01	14.83	-0.81	61.00	-7.00	69.80	1.00
	Max	0.03	0.07	9.13	1.32	0.89	0.09	0.01	0.62	20.17	2.28	82.00	1.80	234.50	2.00
Private recap	N	495	487	431	494	424	440	268	494	496	635	629	635	635	635
	Mean	0.01	0.05	-0.02	0.62	0.18	0.08	0.01	0.20	16.18	0.05	67.13	1.97	111.80	1.08
	Median	0.01	0.04	0.67	0.59	0.12	0.06	0.01	0.17	16.10	0.00	67.20	2.30	104.50	1.22
	Dv.std	0.01	0.06	4.07	0.21	0.25	0.06	0.1	0.15	2.28	0.42	8.54	3.85	62.68	0.66
	Min	-0.03	0.01	-14.52	0.23	-0.24	0.02	-0.02	0.01	11.02	-0.95	46.00	-17.70	0.00	-1.00
	Max	0.05	0.34	9.13	1.32	0.89	0.35	0.13	0.07	20.17	2.98	90.00	13.10	397.80	2.00
No recap	N	517	509	453	516	446	462	285	516	518	657	651	657	657	657
	Mean	0.01	0.05	-0.07	0.622	0.17	0.08	0.01	0.20	16.29	0.05	67.23	1.83	112.71	1.09
	Median	0.01	0.04	0.66	0.59	0.12	0.06	0.01	0.16	16.20	0.00	67.20	2.20	105.00	1.22
	Dv.std	0.01	0.06	4.08	0.21	0.25	0.06	0.01	0.15	2.32	0.43	8.52	3.89	62.56	0.65
	Min	-0.03	0.01	-14.52	0.23	-0.24	0.02	-0.01	0.01	11.02	-0.95	46.00	-17.70	0.00	-1.00
	Max	0.05	0.34	9.13	1.32	0.89	0.35	0.03	0.78	20.17	2.98	90.00	13.10	397.80	2.00
Public vs Private	Difference	-0.01	-0.03	-1.16	0.09	-0.09	-0.05	-0.01	0.02	2.60	-0.04	3.64	-4.38	27.18	0.32
	t-test	-2.43**	-6.65***	-1.25	1.84*	-2.92***	-8.55***	-0.80	0.46	6.51***	-0.28	2.18**	-7.37***	2.32**	3.95***
Recap vs No recap	Difference	0.00	-0.01	-0.18	-0.01	0.03	-0.01	0.01	-0.01	0.34	0.03	1.89	-0.24	8.07	0.01
	t-test	-0.01	-0.66	-0.85	-0.72	2.23	-3.59***	-0.45	-1.37	3.05***	1.46	3.99***	-1.49	3.10***	018
Panel B															
		ROA	NIM	FCFR	CTI	Growth	Tangible Eq	NCO	Liquid	lnTA	Price	Economic Freedom	GDP Growth	Bank Claims	Reg. Quality
Targets	N	201	199	188	201	175	171	108	201	201	276	258	278	276	277
	Mean	0.01	0.05	0.16	0.62	0.19	0.08	0.01	0.21	16.06	0.01	65.88	2.43	96.91	0.86
	Median	0.01	0.03	0.5	0.62	0.15	0.06	0.01	0.19	15.88	0.00	64.30	2.15	91.65	0.98
	Dv.std	0.01	0.05	3.99	0.19	0.25	0.06	0.01	0.15	2.36	0.41	8.86	3.37	63.59	0.75
	Min	0.03	0.01	14.52	0.23	-0.24	0.02	0.02	0.01	11.02	-0.90	41.00	-14.80	0.00	-1.00
	Max	0.05	0.34	9.13	1.31	0.89	0.35	0.03	0.76	20.17	4.26	90.00	14.20	400.90	2.00
Non-involved	N	2381	2339	2102	2377	1994	2015	1181	2380	2389	4208	4076	4216	4198	4208
	Mean	0.01	0.06	0.16	0.62	0.15	0.09	0.01	0.21	15.77	0.02	67.22	2.03	104.99	1.08
	Median	0.01	0.04	0.67	0.60	0.08	0.07	0.01	0.18	15.76	0.00	67.20	2.10	104.10	1.22
	Dv.std	0.02	0.06	3.78	0.21	0.25	0.07	0.01	0.15	2.17	0.28	8.14	3.38	58.82	0.65
	Min	0.03	0.01	14.52	0.23	-0.24	0.02	0.02	0.01	11.02	-0.97	37.00	-17.70	0.00	-1.00
	Max	0.05	0.34	9.13	1.32	0.89	0.35	0.03	0.78	20.17	3.78	90.00	14.20	484.50	2.00
Takeover vs Non-involved	Difference	-0.01	-0.01	-0.55	-0.01	0.02	-0.03	0.01	-0.01	1.45	-0.01	-0.07	0.01	5.40	0.01
	t-test	-1.36	-4.83***	-2.60***	-1.37	1.71*	-8.83***	-0.80	-0.13	12.30***	-0.76	-0.11	0.03	2.12**	0.06
Takeover vs Recap	Difference	0.00	-0.01	-0.41	-0.01	-0.01	-0.01	0.01	0.01	0.96	-0.02	-1.42	0.26	-1.53	0.01
	t-test	-0.21	-2.38**	-1.467	-0.5	-0.46	-2.78***	-0.03	0.61	6.26***	-1.06	-2.08**	1.33	-0.44	0.31

Differences in means (and their t-tests) are reported. Variables (as defined in Table 1) refer to the year prior to the deal. The ***, **, and * represent statistical significant of t-tests at 1%, 5% and 10% levels respectively.

Table 3 Correlation analysis

Spearman Pearson	lnTA	LIQ	ROA	NIM	FCFR	CTI	NCO	Equity	Price_ch	Growth	PublicRec	EU	Liq_Equity	EC_FREE	GDPG	Claims	REQ_Q
lnTA	1	-0.11***	-0.16***	-0.44***	-0.13***	-0.2***	0.08***	-0.62***	-0.07***	-0.15***	0.12***	0.2***	-0.45***	0.32***	-0.21***	0.34***	0.30***
LIQ	-0.13***	1	0.04**	0.35***	0.03	0.28***	-0.10***	-0.04**	0.03*	0.15***	-0.012	-0.06***	0.75***	-0.17***	0.17***	-0.17***	-0.14***
ROA	-0.10***	0.040**	1	0.37***	-0.08***	-0.39***	-0.05**	0.46***	0.05**	0.303*	-0.053	-0.078	0.31***	-0.09***	0.20***	-0.20***	-0.08***
NIM	-0.322***	0.29***	0.28***	1	0.13***	0.09***	0.13***	0.49***	0.07***	0.08***	-0.09***	-0.18***	0.56***	-0.33***	0.17***	-0.41***	-0.36***
FCFR	-0.123***	0.024	-0.014	0.064	1	0.12***	0.08***	0.09***	0.05***	-0.38***	-0.019	-0.022	0.07***	-0.10***	-0.021	-0.06***	-0.15***
CTI	-0.198***	0.23***	-0.42***	-0.003	0.07***	1	-0.031	-0.08***	0.018	-0.07***	0.014	0.037**	0.20***	-0.08***	-0.02	-0.10***	-0.05***
NCO	0.039	-0.063**	-0.13***	0.13***	0.032	-0.004	1	-0.06**	0.02	-0.06**	-0.003	-0.03	-0.13***	0.13***	0.08***	0.002	0.10***
Equity	-0.555***	0.06***	0.32***	0.47***	0.06***	0.012	-0.09***	1	0.016	0.05**	-0.13***	-0.21***	0.57***	-0.32***	0.11***	-0.34***	-0.35***
Price_ch	-0.085***	0.045**	0.002	0.06***	0.039*	0.015	0.011	0.009	1	-0.06***	-0.012	-0.015	0.033	-0.009	0.09***	-0.07***	0.03**
Growth	-0.196***	0.16***	0.26***	0.037*	-0.26***	-0.08***	-0.076*	0.041*	-0.04**	1	-0.006	-0.08***	0.15***	-0.12***	0.24***	-0.17***	-0.11***
Public.Recap	0.131***	-0.003	-0.034*	-0.05***	-0.033*	0.019	-0.013	-0.09***	0.002	-0.015	1	0.04***	-0.09***	0.028**	-0.11***	0.05***	0.03**
EU	0.208***	-0.05***	-0.029	-0.08***	-0.034*	0.024	-0.07***	-0.12***	-0.049***	-0.09***	0.043***	1	-0.17***	0.17***	-0.25***	0.38***	0.32***
Liq_Equity	-0.44***	0.61***	0.16***	0.43***	0.07***	0.17***	-0.12**	0.65***	0.031	0.11***	-0.05***	-0.09***	1	-0.30***	0.21***	-0.31***	-0.30***
EC_FREE	0.33***	-0.19***	-0.06***	-0.17***	-0.08***	-0.05***	0.08***	-0.27***	-0.016	-0.18***	0.028*	0.29***	-0.24***	1	-0.16***	0.68***	0.88***
GDPG	-0.19***	0.14***	0.15***	0.06***	-0.02	-0.05***	0.064**	0.045**	0.048***	0.28***	-0.11***	-0.24***	0.07***	-0.14***	1	-0.35***	-0.20***
Claims	0.33***	-0.13***	-0.12***	-0.15***	-0.07***	-0.11***	0.00	-0.19***	-0.09***	-0.18***	0.046***	0.31***	-0.15***	0.57***	-0.325 ***	1	0.72***
REG_Q	0.37***	-0.13***	-0.03	-0.17***	-0.14***	-0.04**	0.08***	-0.234***	-0.41***	-0.18***	0.035**	0.48***	-0.18***	0.75***	-0.266***	0.645***	1
Tolerance	0.415	0.230	0.571	0.509	0.839	0.636	0.883	0.188	0.958	0.696	0.944	0.731	0.137	0.383	0.786	0.511	0.311
VIF	2.409	4.346	1.752	1.964	1.192	1.572	1.132	5.625	1.044	1.437	1.059	1.369	6.721	2.608	1.273	1.958	3.217

Variables (as defined in Table 1) refer to the year prior to the deal. The *** and ** represent significance of the Spearman and Pearson correlations at the 1% and 5% (2-tailed) levels respectively. Variance inflation factor (VIF) and tolerance index are used to detect muticollinearity. The diagonal elements of the inverse of the correlation matrix are called VIF. A VIF>10 indicates harmful collinearity. The tolerance index is the reciprocal of the VIF.

Table 4 Determinants of takeovers, private and public recapitalizations (full period, pre-crisis and crisis); multinomial logistic

Hp	Variables (lagged values by 1 year)	Panel A. Full period all sample						Panel B. Pre-crisis all sample		Panel C. Crisis all sample		
		Target		Private recap		Public recap		Target	Private recap	Target	Private recap	Public recap
		Coeff	Marginal effect	Coeff	Marginal effect	Coeff	Marginal effect	Coeff	Coeff	Coeff	Coeff	Coef
Hp 1	ROA	5.351	0.266	4.095	0.493	4.933	0.086	-0.862	8.524	-1.335	3,937	3.075
		(0.168)		(0.230)		(0.029)		(0.001)	(0.212)	(0.008)	(0.194)	(0.012)
	NIM	-11.709*	-0.770	4.709**	0.795	2.432	0.056	3.786	1.224	-18.576**	3.145*	1.809
		(2.924)		(4.666)		(0.023)		(0.624)	(0.160)	(4.752)	(2.716)	(0.012)
	FCFR	0.001	0.001	-0.006	-0.001	0.052	0.001	-0.060	-0.021	0.004	0.006	0.053
		(0.001)		(0.073)		(1.664)		(1.188)	(0.194)	(0.010)	(0.063)	(1.769)
	CTI	-0.066	0.002	-0.312	-0.049	1.087	0.027	-0.069	-0.033	-0.150	-0.371	0.997
		(0.001)		(0.360)		(1.020)		(0.003)	(0.001)	(0.032)	(0.436)	(0.884)
	GROWTH	0.174	0.004	0.776**	0.094	2.809**	0.062	-0.174	0.464	0.695	0.834**	2.856**
		(0.073)		(3.725)		(6.101)		(0.032)	(0.410)	(1.020)	(3.386)	(6.250)
Hp 2	EQUITY	-1.688	0.007	-8.569**	-1.176	-4.037	-0.049	-20.052*	-12.998**	-0.280	-7.652*	-5.591
		(0.090)		(4.666)		(0.040)		(3.349)	(4.537)	(0.002)	(3.063)	(0.073)
	NCO	-9.535	-0.474	-7.596	-0.929	-7.131	-0.112	-	-	-1.726	-2.360	4.349
		(0.260)		(0.410)		(0.020)				(0.001)	(0.032)	(0.006)
	LIQ	-2.123	-0.102	-1.326	-0.134	-5.814*	-0126	-4.425*	-5.371***	-3.455	-0.486	-5.800*
		(1.392)		(1.440)		(3.422)		(3.098)	(6.812)	(2.250)	(0.160)	(3.168)
	LIQ*EQ	11.054	0.535	11.836	1.564	-3.095	-0.153	58.679**	50.163***	8.469	0.577	-2.713
		(0.281)		(0.774)		(0.002)		(5.476)	(8.644)	(0.123)	(0.002)	(0.002)
Controls	LnTA	-0.020	0.003	-0.054	-0.013	1.209***	0.029	-0.161	-0.050	-0.055	-0.053	1.189***
		(0.058)		(0.960)		(19.625)		(1.513)	(0.292)	(0.336)	(0.757)	(19.360)
	PRICE_CH	-0.171	-0.008	-0.079	-0.005	-0.911*	-0.201	0.605	0.707	-0.120	-0.165	-0.817
		(0.230)		(0.123)		(2.993)		(0.846)	(2.496)	(0.240)	(0.490)	(2.435)
	EC_FREE	0.055	0.006	-0.009	-0.002	-0.053	0.011	-0.090	0.011	0.096**	0.001	-0.036
		(2.190)		(0.123)		(0.360)		(2.250)	(0.053)	(5.198)	(0.001)	(0.168)
	REG_Q	-0.718	-0.051	0.178	0.020	2.823*	0.067	0.839	0.114	-1.448**	-0.079	2.512*
		(1.850)		(0.240)		(3.572)		(0.922)	(0.023)	(5.244)	(0.001)	(2.856)
	CLAIMS	0.003	0.001	0.002	0.001	0.012***	0.001	-0.008	0.001	0.004	0.003*	0.011**
		(1.323)		(1.796)		(6.760)		(1.440)	(0.109)	(2.372)	(2.822)	(5.617)
	GDPG	0.020	0.002	-0.042**	-0.004	-0.337***	-0.008	-0.158	-0.022	0.036	-0.042**	-0.314***
		(0.384)		(4.410)		(21.809)		(1.716)	(0.058)	(0.980)	(3.960)	(18.490)
	EU	-0.655**	-0.311	-0.587**	-0.071	-0.870	-0.016	-0.826	0.394	-0.567	-0.670***	-0.895
		(3.842)		(6.401)		(1.613)		(1.932)	(0.689)	(2.372)	(6.970)	(1.69)
	Intercept	-4.109		0.710		-26.839***		3.352	-1.076	-5.371*	0.304	-26.810***
		(2.250)		(0.152)		(14.823)		(0.706)	(0.109)	(2.924)	(0.023)	(14.669)
	N. targets	83						39		67		
	N. private recap	209						74		177		
	N. public recap	41						-		41		
	N. non-involved	883						389		726		
	Chi-square	203.55***						37.21*		201.93***		
	Nagelkerke R^2	0.108						0.0073		0.1224		

Variables (as defined in Table 1) refer to the year prior to the deal. The marginal effect shows the partial change in the likelihood with respect to the variation in each independent variable, evaluated at the sample mean value of each variable. The N is the number of observations. Wald tests are in parentheses. The ***, **, and * represent statistical significance of the Wald tests at 1%, 5% and 10% respectively. The chi-square is a goodness of fit test that indicates how well the logistic regression model fits the data. The Nagelkerke's R^2 is a pseudo-R^2 that indicates the power of explanation of the multinomial logistic model (Nagelkerke, 1991).

Table 5 Determinants of takeovers, private and public recapitalizations (full period, pre-crisis, and crisis) from a sequential logistic regression

Hp	Variables (lagged values by 1 year)	Panel A. Full period			Panel B. Crisis		
		First stage Recap and Targets vs. Non-involved	Second stage Private and public recap vs. Targets	Third Stage Public vs. private recap	First stage Recap ns and Targets vs. Non-involved	Second stage Private and public recap vs. Targets	Third Stage Public vs. private recap
Hp 1	ROA	1.047	3.684	42.608	-0.385	10.593	38.718
		(0.020)	(0.040)	(0.723)	(0.003)	(0.292)	(0.608)
	NIM	3.165	17.341**	-9.844	1.330	20.768***	-14.201
		(2.310)	(6.003)	(0.144)	(0.325)	(6.554)	(0.292)
	FCFR	-0.005	-0.005	-0.022	0.004	0.001	-0.029
		(0.084)	(0.014)	(0.109)	(0.029)	(0.001)	(0.185)
	CTI	-0.016	0.217	4.491**	-0.018	0.190	4.825**
		(0.002)	(0.048)	(3.881)	(0.002)	(0.029)	(4.285)
	GROWTH	0.788**	0.992	1.225	0.950**	0.664	1.102
		(5.018)	(1.464)	(0.397)	(5.954)	(0.518)	(0.303)
Hp 2	EQUITY	-8.052**	-5.910	-15.472	-7.513**	-2.283	-19.130
		(5.617)	(0.593)	(0.302)	(4.000)	(0.073)	(0.449)
	NCO	-13.879	4.447	-34.953	-11.727	2.837	12.407
		(1.742)	(0.036)	(0.160)	(1.020)	(0.012)	(0.017)
	LIQ	-2.060**	1.109	-14.442***	-1.786*	5.013	-14.790***
		(4.752)	(0.230)	(8.468)	(2.756)	(2.624)	(8.703)
	LIQ*EQ	16.535	5.914	82.889	9.115	32.792	80.016
		(2.016)	(0.044)	(1.102)	(0.462)	(0.941)	(1.020)
Controls	LnTA	0.029	0.052	1.547***	0.037	0.111	1.529***
		(0.397)	(0.281)	(16.564)	(0.518)	(1.020)	(15.920)
	PRICE_CH	-0.098	-0.022	-0.868	-0.149	-0.098	-0.834
		(0.270)	(0.004)	(2.132)	(0.548)	(0.063)	(2.016)
	EC_FREE	0.021	-0.069	-0.136	0.040*	-0.108**	-0.168
		(0.922)	(2.624)	(1.346)	(2.756)	(4.666)	(1.877)
	REG_Q	-0.204	1.045	3.893**	-0.551	1.507**	4.282**
		(0.436)	(2.592)	(3.881)	(2.465)	(4.203)	(4.452)
	CLAIMS	0.003**	0.002	0.013**	0.004***	0.002	0.013**
		(5.905)	(0.348)	(5.382)	(7.290)	(0.360)	(5.244)
	GDPG	-0.038**	-0.084**	-0.383***	-0.038**	-0.103***	-0.379***
		(4.973)	(5.382)	(13.250)	(4.244)	(6.605)	(12.320)
	EU	-0.578***	-0.019	-0.503	-0.609***	-0.194	-0.584
		(8.526)	(0.003)	(0.348)	(7.896)	(0.230)	(0.462)
	Intercept	-2.038	3.103	-28.246***	-3.114*	3.680	-25.881***
		(1.716)	(1.020)	(10.176)	(3.240)	(1.166)	(8.180)
	N. targets	83			-		
	N. (private and public) recap	250			-		
	N. private recap	-			209		
	N. public recap	-			41		
	N. non-involved	883			726		
	Chi-square	193.83***			195.81***		

Variables (as defined in Table 1) refer to the year prior to the deal. Wald tests are in parentheses. The ***, **, and * represent statistical significance of the Wald tests at 1%, 5% and 10% levels respectively. The N is the number of observations. The chi-square is a goodness of fit test that indicates how well the logistic regression model fits the data.

Table 6 Robustness tests on the methodology

Hp	Variables (lagged values by 1 year)	Panel A. Bootstrap multinomial logistic Full period all sample			Panel B. Cox regression Full period all sample		
		Target	Private recap	Public recap	Target	Private recap	Public recap
Hp 1	ROA	4.116	2.725	9.490	0.945	4.492**	13.253
		(0.109)	(0.160)	(0.096)	(0.198)	(5.040)	(1.402)
	NIM	-9.489*	4.847**	5.657	-2.205*	0.958**	-3.694
		(2.890)	(4.666)	(0.096)	(2.913)	(3.792)	(0.399)
	FCFR	-0.002	-0.007	0.054	-0.003	-0.002	0.012
		(0.003)	(0.053)	(1.210)	(0.297)	(0.204)	(1.192)
	CTI	-0.097	-0.346	1.003	-0.093	-0.006	0.307
		(0.020)	(0.260)	(1.613)	(0.400)	(0.002)	(0.833)
	GROWTH	0.170	0.791*	2.760**	0.118	0.181**	0.464*
		(0.096)	(3.460)	(4.752)	(0.974)	(3.774)	(2.877)
Hp 2	EQUITY	-4.068	-8.298*	-0.065	-1.879	-1.820**	-3.667
		(0.348)	(3.460)	(0.001)	(2.669)	(4.711)	(0.426)
	NCO	-12.771	-6.484	-70.087	2.209	2.869	8.419
		(0.314)	(0.336)	(1.742)	(0.428)	(1.304)	(0.129)
	LIQ	-2.804	-1.260	-5.135*	-0.627	-0.146	-1.170
		(0.922)	(1.232)	(2.822)	(2.298)	(0.329)	(1.496)
	LIQ*EQ	19.678	10.867	-27.620	7.339*	-0.181	15.888
		(0.449)	(0.518)	(0.203)	(2.752)	(0.003)	(0.597)
Controls	LnTA	-0.019	-0.053	1.259***	-0.024*	-0.018	0.284***
		(0.058)	(0.792)	(10.890)	(2.701)	(2.419)	(10.792)
	PRICE_CH	-0.187	-0.078	-0.902	0.050	0.020	-0.398***
		(0.336)	(0.09)	(1.145)	(0.687)	(0.132)	(9.371)
	EC_FREE	0.054	-0.009	-0.032	0.013*	-0.008	-0.022
		(2.132)	(0.123)	(0.230)	(3.445)	(0.945)	(0.788)
	REG_Q	-0.677	0.181	2.425**	-0.190*	0.060	0.638
		(1.742)	(0.260)	(5.905)	(4.238)	(0.446)	(2.385)
	CLAIMS	0.003	0.002	0.011**	0.001	0.001	0.003**
		(1.124)	(1.210)	(4.928)	(0.702)	(1.033)	(4.496)
	GDPG	0.020	-0.041*	-0.328***	0.007	-0.008**	-0.057**
		(0.423)	(2.856)	(12.603)	(1.064)	(4.449)	(4.883)
	EU	-0.657**	-0.584**	-0.813	-0.055	-0.136**	-0.024
		(4.040)	(4.410)	(1.464)	(1.072)	(5.179)	(0.020)
	Intercept	-3.958	0.720	-28.769***			
		(2.403)	(0.090)	(8.703)			
	N. targets	83			104	-	-
	N. private recap	209			-	198	-
	N. public recap	41			-	-	40
	N. non-involved	883			1609	1119	1119
	Chi-square	430.37***			23.270*	36.776***	93.229***
	Nagelkerke R^2	0.1092					

Variables (as defined in Table 1) refer to the year prior to the deal. Wald test are in parentheses. The ***, **, and * represent statistical significance of the Wald tests at 1%, 5% and 10% levels respectively. The N is the number of observations. The chi-square is a goodness of fit test that indicates how well the regression model fits the data. The Nagelkerke's R^2 is a pseudo-R^2 that indicates the power of the explanation in the multinomial logistic model (Nagelkerke, 1991).

Table 7 Robustness tests on the sample and category specification

Hp	Variables (lagged values by 1 year)	Panel A. Restricted to domestic activities EU domestic sample						Panel B. Category controlling for the nature of recapitalizations Full sample		
		Full period			Crisis			Full period		
		Target	Private recap	Public recap	Target	Private recap	Public recap	Target only	Private recap only	Private recap and target
Hp 1	ROA	9.217	9.797	19.290	2.908	-11.659	8.140	17.458	7.887	-15.817
		(0.160)	(0.722)	(0.311)	(0.017)	(0.941)	(0.036)	(1.229)	(0.790)	(0.385)
	NIM	-12.990**	2.950*	8.937	-23.434*	1.1017	8.579	-19.214**	4.586**	5.738
		(3.960)	(1.823)	(1.020)	(3.098)	(0.130)	(0.410)	(4.721)	(4.340)	(0.402)
	FCFR	-0.038	-0.005	0.043	-0.024	0.021	0.044	-0.018	-0.013	0.069
		(1.346)	(0.014)	(1.932)	(0.260)	(0.410)	(0.884)	(0.260)	(0.343)	(0.907)
	CTI	0.018	-1.239*	0.654	-0.225	-1.174*	0.483	0.225	-0.070	-0.430
		(0.001)	(3.276)	(0.462)	(0.044)	(2.592)	(0.144)	(0.078)	(0.019)	(0.073)
	GROWTH	-0.613	0.891*	2.403***	-0.070	1.039*	2.300*	-0.027	0.815**	1.250
		(0.476)	(3.276)	(19.714)	(0.005)	(3.423)	(3.276)	(0.002)	(4.268)	(0.951)
Hp 2	EQUITY	-4.078	-16.104**	2.765	-1.829	-11.862*	4.674	-5.966	-9.713**	-19.667
		(0.397)	(3.881)	(0.053)	(0.040)	(3.610)	(0.044)	(0.773)	(5.310)	(1.793)
	NCO	-2.827	-6.110	-33.729	-5.127	-5.662	-1.645	16-372	-2.213	-86.488*
		(0.008)	(0.292)	(2.496)	(0.032)	(0.102)	(0.001)	(0.615)	(0.032)	(3.162)
	LIQ	-3.251	-1.574	-7.994***	-4.031	0.018	-7.863*	-3.141	-1.583	-8.538*
		(0.773)	(0.518)	(6.970)	(1.277)	(0.001)	(3.312)	(2.258)	(1.871)	(3.518)
	LIQ*EQ	16.326	51.201*	-0.562	-2.111	25.943	-0.098	37.904	15.940	63.257
		(0.096)	(3.063)	(0.001)	(0.003)	(1.346)	(0.001)	(2.392)	(1.090)	(1.519)
Controls	LnTA	-0.100	-0.182	1.458***	-0.171	-0.170**	1.467***	-0.022	-0.029	0.172
		(0.624)	(2.403)	(12.041)	(1.392)	(4.244)	(17.893)	(0.062)	(0.284)	(0.824)
	PRICE_CH	-0.143	0.018	-0.756	-0.071	-0.127	-0.648	-0.156	-0.041	-0.649
		(0.137)	(0.006)	(1.638)	(0.020)	(0.168)	(1.124)	(0.162)	(0.037)	(0.703)
	EC_FREE	0.007	0.033	0.121	0.035	0.049	0.151	0.025	-0.003	0.094
		(0.023)	(0.348)	(1.124)	(0.270)	(1.513)	(1.742)	(0.375)	(0.014)	(1.437)
	REG_Q	-0.529	-0.660	1.250	-0.536	-0.848	1.146	-0.484	0.055	-0.850
		(0.624)	(0.656)	(0.533)	(0.281)	(1.664)	(0.410)	(0.709)	(0.024)	(0.599)
	CLAIMS	0.005	0.004*	-0.006	0.005	0.004*	-0.009	0.004	0.003*	-0.002
		(1.416)	(3.460)	(0.292)	(1.742)	(3.098)	(1.538)	(2.093)	(2.791)	(0.145)
	GDPG	-0.015	-0.049***	-0.312***	-0.028	-0.048	-0.290***	0.030	-0.043**	-0.001
		(0.068)	(8.644)	(6.864)	(0.325)	(2.560)	(11.903)	(0.650)	(4.888)	(0.001)
	EU	-	-	-	-	-	-	-0.539	-0.528**	-1.071
								(2.153)	(5.437)	(2.439)
	Intercept	-0.338	0.004	-39.630***	-0.469	-0.367	-41.269***	-2.557	0.176	-9.514
		(0.006)	(0.004)	(11.628)	(0.008)	(0.014)	(19.360)	(0.760)	(0.010)	(2.559)
	N. targets	43			38			62		
	N. private recap	133			112			211		
	N. public recap	31			31			-		
	N. private recap and targets	-			-			16		
	N. non-involved	620			536			830		
	Chi-square	71.602***			151.84***			67.09**		
	Nagelkerke R^2	0.1231			0.135			0.075		

Variables (as defined in Table 1) refer to the year prior to the deal. Wald test are in parentheses. The ***, **, and * represent statistical significance of the Wald tests at 1%, 5% and 10% levels respectively. The N is the number of observations. The chi-square is a goodness of fit test that indicates how well the regression model fits the data. The Nagelkerke's R2 is a pseudo-R2 that indicates the power of the explanation in the multinomial logistic model (Nagelkerke, 1991).

Table 8 Predictive accuracy of the multinomial logistic regression

Panel A						
Portfolios	Targets	Non-Targets	Private recap	Non-private recap	Public recap	Non-public recap
LPP	24	591	87	528	0	615
HPP	61	554	134	481	41	574
	85	1145	221	1009	41	1189
Pearson's $\chi 2$	41.6***		27.2***		103.9***	
Likelihood Ratio $\chi 2$	7.8***		5.3***		∞***	
Panel B						
	Estimation subsample			Validation subsample		
Portfolios	Targets	Private recap	Public recap	Targets	Private recap	Public recap
LPP	7	17	0	6	22	0
MPP	5	31	0	10	19	1
HPP	25	58	17	15	30	23
Overall	37	106	17	31	71	24
Pearson's $\chi 2$	15.31***			22.76***		

Number of correct predictions. HPP is the portfolio with the highest probability of an event taking place. MPP is the portfolio with a medium probability of an event taking place. LPP is the portfolio with the lowest probability of an event taking place.

Highlights for Review

- Takeovers and recapitalizations are potential alternatives used to shore up banks.
- Takeovers are more likely when banks experience low margins.
- Private recapitalizations are more likely with lower equity and higher margins.
- Public recapitalizations are more likely for larger and less liquid banks.
- These determinants differ widely pre-crisis from during the crisis.