Valuation Methods and Banks' Takeover Premium: an Empirical Investigation across the Financial Crisis of 2007

Daniele Previtali

Luiss Guido Carli University, dprevitali@luiss.it

Abstract

No empirical investigation about valuation methods of banks has been provided by literature. Using and outside analyst perspective, the aim of this paper is to provide a first empirical investigation on how valuation methods are able to explain banks' deal values in mergers and acquisitions. The paper places in the acquisition premiums determinants literature adopting a value relevance research design and providing a comparison of methods' statistical significance prior and after the financial crisis of 2007. Findings show that prior the financial crisis analytical methods are strongly related to premiums while, after the financial crisis, banks' takeover pricing seems to be more related to market benchmarks rather than business' fundamentals. In addition, risk variables are tested. Results support the literature of leverage pro-cyclicality (Tobias and Song Shin., 2010).

Jel Codes: M41, G21, G34

1. Introduction

Bank valuation is a relevant topic joining the interest of several stakeholders such as: academics, Authorities, analysts, market operators, investors and of all the others internal and external stakeholders. The motivations behind such an interest are easily deducible: banks creating value represent an element of stability in the economic system. In facts, after the financial crisis of 2007, we have been learning that financial stability is a key factor for confidence among banks and markets and an essential prerequisite for a grounded economic growth as well. Therefore, the ability of banks in creating value in relation to their capability in managing and controlling risks has become an inescapable activity and a very important task under an academic, professional and regulatory perspective.

Notwithstanding the relevance of the topic, not so many contributions have been proposed by scholars. Two main areas of bank valuation have been investigated. The broader range of literature concerned the value relevance of banks' balance sheet items and intangibles as well (the most recent contributions: Begley et al. 2006, Kohlbeck and Warfield 2007). The other stream of literature has tried to work out a new bank-specific valuation method (Calomiris and Nissim 2007, Dermine 2010). All these contributions investigated the relation of some specific variables with market prices without considering that, price, is "*what you pay*", and, intrinsic value, is "*what you get*". In facts, no academic contribution analyzed the relation of banks' value drivers within a better benchmark of intrinsic value such as premiums in mergers and acquisitions. In addition, no academics following Penman and Souggianis (1998), studied whether DCF or RIM models are more effective in bank valuation.

This paper, joining the these two literature gaps, places in the literature of bank valuation providing empirical evidences of the value relevance of currently applied valuation methods (DCF and RIM) and of specific risk variables in relation to acquisitions premiums. Since no empirical literature exists on the topic of banks valuation methods, the research design employed is the one of the banks takeover premiums literature (Hagendorff et al. 2012). In these terms, no attempts have been made in linking premiums paid in mergers and acquisition neither to valuation methods nor to risk factors.

The sample is composed by 225 U.S. bank mergers and acquisitions from 2003 to 2011 including listed and non-listed banks. Findings show that premiums were positively related to fundamental valuation methods in

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the pre-crisis period while to market models in the post-crisis period. The empirical results support studies which found that practitioners' market orientation has driven valuations toward an overweighed role of the relative (or multiples) approach, while, generally, cash-flow expectations and earnings growth became thorough to be valued during the aftermath of the financial crisis. In addition further evidences highlight the absolute importance of leverage as a risk indicator and even on how its pro-cyclicality (Tobias and Song Shin, 2010) is priced by managers.

The paper is organized as follows. After a literature review of banks' valuation methods and bank takeover pricing in section 2, the methodology and sample description are presented in section 3. Results are discussed in section 4. Finally, in section 5, the conclusions draw additional considerations and further implications of the presented results, discussing limitations and future research.

2. Literature Review

2.1 Bank valuation: a brief literature review

Bank valuation literature can be split in two main areas of investigation: the former is the one which has studied the *value relevance* of banks' specific balance sheet and intangibles variables; the latter tries to work out a new bank-specific valuation model in relation to their business' value drivers.

Regard to the first stream of literature, the main contributions are the one of Beaver et al. (1989), Barth et al. (1994), Venkatachalan (1996), Nelson (1996), Beaver and Engel (1996), Eccher et al. (1996), Park et al. (1999) e Nissim (2003). They tried to explain how some value drivers of banks' balance sheets, especiallyin terms of intangible assets, can explain stock market prices. In particular, Begley et al. (2006) and Kohlbeck and Warfield (2007) using a model grounded on RIM (Ohlson 1995, Feltham e Ohlson 1995, 1996) found that abnormal returns were explained by some specific intangibles such as: mortgage servicing rights, credit card, core deposit and trust operations.

In the second stream of literature, Calomiris e Nissim (2007) proposed a bank valuation model for *Banking Holding Companies* (BHCs) which has an important explanatory power over market-to-book ratio. The BHC model, based on 32 variables, evidenced that the two main value drivers are core deposits and lending activity. The other contribution is the one of Dermine (2010) who introduced the *Fundamental Valuation Formula* as a bank-specific valuation model. The intuition laying under the model is that a single dividend cash-flow can be broken down in all the assets and liabilities' cash-flows. Dermine bears that the value of equity is composed by the sum of *liquidation value* and franchise value netted by the net present value of the operative costs and tax expenses. The model consider as a discount rate a bond benchmark instead of and equity one. Notwithstanding the Dermine's model presents a degree of innovation, no empirical evidence was provided.

2.2 Valuations methods of banks and M&A research design

The lack of an empirical literature in valuation methods of banks in relation to acquisition premiums is the main gap that this research project tries to cover. In particular, the research project tests the importance of valuation metrics on mergers and acquisitions premiums in order to assess whether they are significantly related. The choice of M&A prices instead of stock market prices is due to the higher degree of theoretical reliability of the former than the one of the latter. As a matter of fact, stock market prices are often driven by investors' behavior which is characterized by problems of timing (Bernard and Thomas 1990) and overreaction (De Bondt and Thaler 1985) which make market prices temporary deviating from their fundamental value.

For those reason, the financial determinants on premiums paid in mergers and acquisitions among banks is the main stream of literature this work refers to. In the next sections, the literature review of bank takeover premium is presented.

2.3 Relevant literature of bank takeover determinants

The topic of mergers and acquisitions among banks has been deeply investigated by scholars. Wide overviews spanning over 30 years of literature have been presented by De Young et al. (2009), Amel et al. (2004) and Berger et al. (1999). Those contributions provide a broad description of many topics regarding banks takeovers.

Narrowing the field of investigation, my contribution places into the literature of financial determinants of bank takeover premium. Over the years, many empirical evidences have been found by scholars, although their findings have been sometimes equivocal due to their research design, sample composition, and, especially, period of observation.

Table 1 summarizes the relevant studies on banks takeovers premiums which represent the main contributions which the project refers to.

Looking at *table 1*, it can be claimed that the only three studies which are focused on Europe are those of Hagendorff et al. (2012), Molyneux et al. (2010) and Diaz and Azofra (2009). On the opposite, scholars have paid a lot of attention to the U.S. market. However, by the studies I am aware of, none of them takes into consideration neither the theoretical framework of valuation methods nor the effect of the financial crisis on premiums. In the next paragraphs I discuss the relevant existing literature of banks takeovers pricing.

Almost all of those studies investigate banks mergers pricing focusing on the targets features. In facts, there is no doubt that the first level of analysis should concern the targets' performance since bidders managers are strongly focused on the combined performance of the "in-house" business and the acquired one. Firstly, all these studies have been focused on a profitability measure which usually proxy target's expected cash flow (Hagendorff et al., 2012). However, the explanatory variables used have been the return on asset and return on equity which do not explain the future growth in earnings and cash flows but a backward looking performance. In addition recent studies demonstrated inefficiency of such performance indicators since they do not consider banks' risk profile and revenues sustainability over time (BCE, 2010). However literature found managers particularly focused on return on equity ratio.

Another relevant variable in mergers is relative size. As a matter of fact, size has frequently been used as a proxy of operating synergies (Jackson and Gart 1999, Akhavein et al. 1997, Hannan and Rhoades 1987) among merging entities. In particular, relative size explains the potential synergies pursued by acquirers in order to reduce the operating costs of the combined businesses (DeLong 2001; Benston et al. 1995). With regards to size, scholars showed contradictory results. A large and significant evidence that acquirers pay less for greater targets has been found by Hakes et al. (1997), Benston et al. (1995), Palia (1993), Cheng et al.(1989). On the opposite, Brewer and Jagtiani (2007), Brewer et al. (2000) and Rogoski and Simonson (1987) found positive coefficients, whilst recent European studies such as Diaz and Azofra (2009) and Hagendorff et al. (2012) have reported insignificant betas.

Specifically to small banks, Fraser and Kolari (1987) analyzed 132 mergers and acquisitions prior and after the 1985 finding that smaller sized banks showed higher premiums due to their better economic and financial structure than the one of large sized banks. Also De Young et al. (2004) investigated the small banks' performance in mergers and acquisitions. They underlined that the higher was the amount of deposits, which, according to them, was strictly related to their relationship lending approach, the greater was the availability of acquirers to pay for.

The literature investigated also on the relation of market growth with premiums. Market growth has been proxied with different variables and it has been considered as a proxy of the potential and continuing expansion of target banks. However controversial results have been found by scholars. Generally, the main results found that market growth is statistically insignificant such as Hagendorff et al. (2012), Diaz and Azofra(2009), Brewer and Jagtiani (2007) and Palia (1993).

Capital adequacy is another variable generally tested by scholars. In facts, the higher is the level of targets' capital, the greater is the potential growth of revenues that bidders buy without raising new capital and keeping on paying dividends. However high buffer of extra-capital might lead to high diluted premiums per shares (Hagendorff et al., 2012). The main findings in the literature show contradictory results.

Most of the authors found a negative relation between premiums and capital adequacy such as Diaz and Azofra (2009), Hagendorff et al. (2007), Brewer et al. (2007), Hakes et al. (1997), Beatty et al. (1987), Shawky et al. (1996) and Rogowski and Simonson (1989). On the opposite, insignificant and positive relations were respectively found by Palia (1993) and by Adkisson and Fraser (1990) and Cyree (2010).

Table 1 Bank takeover premium literature - Main contributions

Author(s) and Year	Period	N° Observations	Country	Dep. Variable	Main findings
Rhoades et al. (1987)	1973-1983	1.835	US	Book Value	Bidders are willing to pay more for growth rather than targets' returns. Also low level of capital to asset ratio is an incentive for paying higher premium.
Beatty et al. (1987)	1984-1985	264	US	Book Value	Pay larger premiums for targets with high RoE and more capitalized banks. Also market concentration has a positive impact on premiums.
Rogowski and Simonson (1989)	1984-1988	168	US	Book Value	Interstate deals offer potential benefits while market concentration is not signigicant. RoE in not significant on premiums in terms of book value. Bidders pay less for more capitalized and sized banks.
Cheng et al. (1989)	1981-1986	135	US	Book Value	Pay larger premiums for smaller profitable banks with high deposit and asset growth.
Adkisson and Fraser (1990)	1985-1986	174	US	Book Value	Bidding banks pay more for profitable and capitalized targets. Interstate deals affect premiums positively.
Palia (1993)	1984-1987	137	US	Book Value	Pay larger premiums for banks with higher RoA in concentrated markets. Large degree of capital is negative related to premiums while growing banks are not valued. Interstate deals are priced while size is not.
Benston et al. (1995)	1981-1986	302	US	Market Value	Bidders pay more for banks with targets' low variance and covariance of earnings.
Shawky et al. (1996)	1982-1990	320	US	Book Value	Higher premiums were paid for higher degree of profitability and less capitalized banks. Interstate benefits are positive related to premiums.
Hakes et al. (1997)	1982-1994	868	US	Book Value	High level of profitability and growing banks have a positive relation to premiums. Capital, size and NPLs affect negatively premiums.
Brewer et al. (2000)	1990-1998	189	US	Book Value	Risk in earnings are negative related to premiums so as the covariance with acquirers'. Bidders pay more for profitable and sized banks while interstate deals affect negatively premiums.
Brewer et al. (2007)	1990-2004	392	US	Market Value	RoA variance and covariance have negative impact on premiums. High level of capital and sized banks are less priced. The presence of independent directors in targets' boards are positive related to premiums.
Brewer and Jagtiani (2007)	1991-2004	412	US	Market Value	Asset and deposit growth are negative related to premiums. Size has a positive impact on takeovers premium. Mergers enclose a premium to become over the Too-Big-To-Fail threshold.
Dìaz and Azofra (2009)	1994-2000	147	EU	Book Value	Bidders pay more more more profitbale less capitalized while asset growth, market concentration, interstate, asset size and business line diversification are insignificant.
Cyree (2010)	2003-2005	288	US	Book Value	Larger and capitalized bidder tend to pay higher premiums for non-public bank. Large deposits, larger average size and growing targets are paid more. Acquirers do not pay for targets accounting performance.
Molyneux et al. (2010)	1997-2008	172	EU	Market Value	Premiums are driven by the targets' size that can be interpreted as the incentive to become systemic banks.
Hangerdorff et al. (2012)	1997-2007	236	EU	Book Value	Bidders pay more for high-growth and profitable banks, while high degree of capital and high volatility of earnings are paid less. Higher regulatory constraint reflect on lower premiums.

Regard to risk variables, it has been considered only in terms of diversification hypothesis (Benston et al. 1995) where acquirers either pay more for high covariance with targets' return or for low variance of targets' returns . Many of the U.S. studies support the diversification hypothesis such as Brewer et al. (2007), Brewer et al. (2000) and Benston et al. (1995). Diversification has been considered even in terms of business line diversity of acquirers and targets. Findings show an insignificant coefficients in Hagendorff et al. (2012) and Diaz and Azofra (2009) while Beitel et al. (2004) and De Long (2001) found that the more focused the merger, the greater the return.

Regarding the deposit insurance hypothesis, acquirers are willing to pay more for targets where there are lower domestic deposit costs (Buch and De Long 2004). In particular, Brewer and Jagtiani (2007) support the "too-big-to-fail" hypothesis where acquirers are willing to pay more for the targets which make them likely to be considered a "too-big-to-fail" entity.

Besides, even the shareholder protection might have an impact on premiums so that high degree of minorities protection increases market of corporate control (Bris and Cabolis 2008). However in the U.S., the standards for minority protections are partly determined by Authorities (Hagendorff et al. 2012) so that they might be insignificantly related to premiums.

Besides, when a mergers and applications occurs many others considerations need to be made. The role of potential synergies that the resulting firm will be implementing after merging is, actually, the primary aspect assessed by acquirers. On the topic, strategy scholars have underlined that the "strategic fit" among the merging firms is an essential factor to ensure a profitable development of the integration (Levine and Aaronovitch 1981, Lubatkin 1983). Therefore, the strategic similarities (Altunbas and Marques 2008) would have to be a crucial element of future performance, however no empirical evidences have been provided in relation to premiums.

2.4 Research Questions

Looking at prior studies of valuation methods and takeover pricing of banks, some evidences stem from the literature review. First of all there is no empirical contribution on valuation methods' validity in relation to acquisition premiums. Only Penman and Sougiannis (1998) and all the others supportive contributions (among the others: Corteau et al. 1999, Francis et al. 2000, Dechow 2002, Karathanassis and Spiloti 2003, Grund and Gyllenhammar 2007) investigated on the superiority of RIM models over DCF. However they use stock market as a benchmark and they did not considered the financial industry.

In regards to banks takeovers pricing literature any attempt has been made in linking valuation methods to premiums. Scholars have been usually concerned in searching explanatory variables related to targets and acquirers' performance, to the deal characteristics and to the market and regulatory environment. As a matter of facts a gap in literature can be identified in linking valuation methods and takeover premiums of banks. This research try to address this literature gap proposing the following research questions:

1. *What is the marginal effects of banks' valuation metrics and risk variables over acquisition premiums? Are they significant?*

In order to study whether the financial crisis have had a significant impact on valuation methods and risk variables, the second research question is the following:

2. *Did the financial crisis of 2007 change the relation between valuation methods, risk variables and acquisition premiums?*

My contribution, focusing on the valuation methods (DCF, RIM and PBV) and considering the effect of some risk parameters tries to point out which of those variables are statistically significant to premiums paid in mergers and acquisitions.

3. Methodology and Sample

3.1 Model specification

The empirical investigation is based on an heteroskedasticity robust standard errors OLS regression on 225 U.S. bank mergers occurred from 2003 to 2011. Besides, variables interactions with a dummy variable related to the financial crisis of 2007 are tested. Financial crisis dummy variable (**CR**) takes 0 if the merger occurred before the crisis of 2007, 1, otherwise. According to Fleming and Klagge (2010), Taylor and Williams (2009) and Mc Andrews et al. (2008), the watershed of the financial crisis can be marked at August 9 of 2007 when the LIBOR-OIS spread began sharply to increase. Thus, all those mergers which had been closed before that date have been considered "*out of the crisis*". Conversely, all the mergers completed after August 9, 2007 are clustered as "*in the crisis*". The *CR* variable is expected to have a negative relation with premiums since the financial crisis should have generally squeezed the acquirers' future growth expectations and, consequently, prices. I also expect that the bidders should have paid much more attention to the targets' characteristics and they have been highly focused not only on their future growth and potential synergies, but even on their risk profile.

The OLS model explains acquisition premiums (**PBV**) as a function of three vectors: the deal characteristic (**Deal**), the valuation methods (**VM**) and the target's risk characteristics (**TR**):

$$PBV = \alpha + \beta_1 Deal + \beta_2 VM + \beta_3 TR + \varepsilon$$

I defined premiums as the purchase price paid for by the acquiring institution scaled by the pre-merger book value (fiscal year before the date of merging) of the targets (Hagendorff et al., 2012), so that:

$$PBV = \left[\frac{Deal\,Value}{s \times BV\,Equity} - 1 \right] \times 100$$

where *s* is the percentage of the target's equity acquired.

The deal characteristics vector is composed by the following variables:

- *Market Concentration* (**HHI**): HHI represents the Hirschman-Herfindahl index measured by the Federal Deposit Insurance Corporation (FDIC) for every U.S. state in which the target's headquarter was placed the fiscal year before the acquisition[1]. The *HHI* is measured by the FDIC as the market-share of deposits. In highly concentrated markets, it is rather difficult to acquire new clients so that acquirers may pay higher premiums to buy banks, especially the domestic ones. The sign of relation is expected to be positive.

- *Market Growth* (**GDP**): market growth is proxied by the gross domestic product growth in the U.S. in the year of acquisition. The relation between GDP growth and market growth is represented by the strong pro-cyclicality of the banking sector. The greater the growth expectations in terms of GDP, the higher the level of banks' future profits. Therefore *GDP* is expected to be positive related to premiums.

- *Relative Size* (**RSIZE**): relative size is measured by the ratio between target and acquirer's size. The relative size is here considered as an indicator of those synergies pursued by acquirers in order to reduce the cost of production by the combined organizations (De Long, 2001; Benston et al., 1995). In these terms the higher the relative size, the greater the potential cost of integration. The sign of the relation is expected to be negative since higher cost of integration should make bidders more cautious in paying premiums.

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[1] The FDIC reports the Hirschman-Herfindahl index every June. The index considered is the last before the deal had been completed.

- *Asset Diversification* (**DIV**): asset diversification is proxied like in Laeven and Levine (2007). Acquirers can be interested in paying higher premiums for those banks which have greater portion of other earning assets instead of loans. The diversification of assets is expected to be positive related to premiums since, *ceteris paribus*, diversified sources of incomes, especially when margins are scarce, should make managers willing to pay higher prices for targets. The asset diversification is measured by the following equation:

$$DIV = 1 - [\frac{Net\,loans - Other\,earning\,assets}{Total\,earning\,asset}]$$

Regarding the valuation methods vector, it explains the targets' financial and economic performance from a valuation methods perspective. All the prior literature treated targets' characteristics only by considering some performance indicators such as RoE or RoA. Notwithstanding the existing literature found a significant relation with premiums, in the valuation methods there are some variables which can better explain the potential profits (and their risk) with a forward looking perspective. Such measures should be more consistent with the takeover pricing since bidders pay for future cash flows and not for targets' liquidation value. By this assumption and considering the three main clusters of valuation methods (analytical, excess returns and market methods) proposed as most reliable valuation metrics in banking by Damodaran (2009), I modeled some "core-variables" which here are assumed to be the main value driver of such methods. Therefore, the valuation metrics vector is composed by the following variables:

- *Discounted Cash Flow Model* (**EXPD**): the most used model to value banks is a dividend discount model or, with specific assumptions, a cash flow to equity model. Both methods rely on the theoretical concept of shareholders' cash flows, narrowly, dividends. Notwithstanding such models limitations, it can be claimed that one of the most important variables of the model is dividends' future growth which stem from future growth in earnings. In this way, growth is endogenous and it identifies how much banks reinvest for their future growth. Therefore the expected dividends variable (*EXPD*) is described by the retention ratio (b) times RoE both considered as the three years average pre-merger value. *EXPD* is expected to have a positive relation with premium since both higher level of retained earnings and good degree of profitability might increase future cash flows.

- *Excess Returns Model* (**ER**): to represent the effect of creating or destroying value on premiums, the ER variable is measured by the difference between the targets' last year RoE and the average U.S. banking sector's cost of equity[2] modeled by the CAPM model. The expected relation with premiums is positive.[3]

- *Market Model* (**MLT**): the impact of market methods on bank takeover pricing is also investigated. I proxied the effect of market models on premiums by considering a variable which indicates the price to book value (MLT) of the targets. For those banks which were not publicly traded, an average banking sector price to book value is considered as a proxy of the market ratio. Market models are expected to have a positive relation with premiums.

With regards to the targets' risk vector, the base assumption is that the financial crisis brought a new consciousness in terms of risk management among regulators, managers and investors. Investors and analysts thoroughly began to observe banks' fundamental value and risk exposures (Hoffmann et al., 2013). As a matter of facts, the financial crisis of 2007 highlighted that risk variables should play a greater role in the

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[2] The average cost of equity has been computed as following: risk-free rate is the U.S. T-bond 10 years maturity, beta factor is the U.S. banking sector average beta and market risk premium is measured as the implied equity risk premium (Damodaran, 2010).

[3] Due to the high degree of correlation between EXPD and ER, a new variable which indicate the analytical methods (FUND) was generated through the factor analysis testing for the Cronbach's alpha (Cronbach, 1951). The theoretical background is explained in the next sections. For the factor analysis procedure see Appendix B.

valuation process of banks. In fact, the sustainability of risk exposures must be a key driver for a profitable and financially sound bank. Even the regulatory institutions moved toward a higher prudential approach paying much more attention on the control of risk exposures (Basel III Regulation, 2010) and monitoring the development of risky business models (The Dodd-Frank Act, 2010).

For those reasons, four measures of risk are tested which are strictly related to the "monitoring variables" that the new regulation of Basel III has recently highlighted:

- *Capital adequacy*[4] (**T1C**) proxied with the Tier 1 capital ratio[5]. The higher the Tier 1 ratio, the lower the banks' profitability. However, the literature shows contradictory results finding that greater capitalized banks can either be a source of future earnings growth or an obstacle in terms of earnings dilution. The financial crisis might have played a role on determining the relation between capital adequacy and premiums.

- *Leverage* (**LEV**) proxied as the conventional measure of total asset to equity ratio. Leveraged banks are generally more profitable than low leveraged banks since the weighted cost of funding of the former is lower than the one of the latter. However leveraged banks are even riskier and subject to the deleveraging phenomena during the period of economy's contraction. As a result, the environmental conditions might have led to a reverse relation with premiums before and after financial crisis.

- *Liquidity* (**LIQ**). Liquidity is modeled in terms of short-term liquidity so that such ratio puts in relation liquid assets to short-term funding. *LIQ* is expected to be negative related to premium since, *ceteris paribus*, more liquid banks are less profitable, but safer. This condition might make the expected relation changing before and after the financial crisis.

- *Credit risk* (**CRED**) modeled as loan loss provisions on interest margin[6]. Credit risk is a relevant portion of banks' core business and it has to be taken thoroughly in consideration in terms of future cash flows. The expected relation with premium is negative both before and after the financial crisis breakout since the higher the impact of provisions the less bidders are willing to pay for bad managed targets.

3.2 Sample and sampling strategy

The list of mergers and acquisitions occurred from 2003 to 2011 is obtained by *Zephyr Bureau van Dijk* database. I considered only the specific deals labeled as "mergers" and "acquisitions" among "banks" as they are computed in *Zephyr*.

The sample spans nine full years from 2003 to 2011 considering mergers and acquisitions announced and completed which have been undertaken in the US market. Prior to the merger and acquisition, the target and the bidder banks were independent and the targets are required to have a 3 years data of their balance sheets. Besides, target banks had not to being involved in any other merger in the three years prior the merger and acquisition accounted in the sample occurred.

Bidders and targets' headquarter has to be in the U.S. in order to avoid cross-border effects on premiums. The cutoff level for considering mergers and acquisitions is 200 million $ in total assets so that very small

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[4] A positive relation between capital and premiums ,is expected. Especially during period of financial turmoil the higher level of capital can be considered a source of value since the access to the capital markets might be highly prohibitive in terms of cost.

[5] Also the Total Capital Ratio has been tested. However it was less significant than the Tier 1 Capital Ratio.

[6] Since in some cases the indicator is negative due to a negative denominator. To avoid problems of significance the non-negativity constraint has been imposed.

transactions have not an excessive weight. I also imposed that the acquisition would have a final stake of at least 50,01% of the target's equity. In addition, the target and the bidder must have their accounting data available on *Bankscope Bureau van Dijk* database. I cross-checked data from *Zephyr* and *Bankscope* in order to extrapolate the accounting data exactly related to those entities involved in the merger by the BvD number. I finally checked for the deals characteristics by analyzing news and reports available on the web. From the initial sample I cleaned for:

- 855 deals were accounting data needed were unavailable;
- 212 deals were non-banking institutions or different from bank holding companies and commercial banks;
- 61 transactions in which the identity of one of the bidder and target was uncertain due to inconsistencies between the databases used;
- 32 operations were corporate restructurings or bailouts;
- 13 were business branch acquisitions.

The final sample consists of 225 mergers and acquisitions split in 140 operations from 2003 to August 2007 and 85 deals in the post-crisis period. In the following subsections a description of the sample is presented.

3.3 Descriptive statistics

The following *table 2* exhibits overall sample's deals descriptive statistics while table 4 shows the values related to post-crisis variations[7].

Table 2 Mergers and acquisitions - Deals characteristics 2003 / 2011 – n° obs. 225

2003 - 2011	Mean	Median	Std. Dev.
Premium	117,33	117,22	94,11
BV Equity (th $)	503.832,79	74.794,00	1.952.825,77
Deal Value (th $)	947.143,42	157.000,00	3.725.102,52
Total Asset (th $)	4.881.928,89	869.386,00	18.472.037,84

Table 3 Deal overview – Pre-crisis vs post-crisis - Variation (%) - n° obs. 225

Δ Period (%)		Mean		Median		Std. Dev.
Premium	-	66,17	-	75,22		0,04
BV Equity	-	42,25	-	11,26	-	33,21
Deal Value	-	74,54	-	43,51	-	84,68
Total Asset	-	38,19		2,23	-	17,38

The overview of the sample shows a clear effect of the crisis over takeovers' prices. Basically, in terms of medians, premiums paid after the financial crisis dropped of 75% in the post-crisis from 145,7% to 36,1% (*figure 1*). Targets were bigger (+2,2%) but less capitalized (-11,3%) in the aftermath of the financial crisis than those in the pre-crisis period.

The 2007 financial crisis breakout represented an important threshold in terms of future growth expectations. Generally, the reduction of premiums can be explained by the combination of two main value drivers such as: sector's profitability and risk. As a matter of facts, profits' lower growth (in some cases, negative) expectations and the increasing level of risk which characterized the afterwards of the financial crisis have played a double effect on premiums: on one hand, toward the targets' current and expected performance and, on the other hand, on the cost of risky investments which has considerably rose after August 2007. Such conditions are clearly observable in *figure 2* and *figure 3*. They occurred simultaneously.

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[7] See Appendix A in order to observe the descriptive statistics of the sub-samples.

On the whole, the drop of premiums substantially followed the trend of the banking sector fundamentals where risk and return had been playing a crucial role in determining takeover pricing after the financial crisis of 2007.

Conversely, the *tables 4*, *5*, *6* show the descriptive statistics of the model determinants.

In regard to the vector of deal characteristics, it can be claimed that the financial crisis represented a strong watershed in bank takeover pricing. As a matter of facts, the variable of the crisis exhibits a significant negative correlation with banks pricing (-0,53) so that, on average, the financial crisis is associated with lower premiums.

In terms of market concentration, mean and median values slightly grow after the financial crisis but it seems not be highly correlated with premiums. However the marginal effect need to be read also according to the magnitude of HHI of deposits.

In regard to market growth, despite it dropped of 46% after the financial crisis consistently in line with the downturn of the economy, an overall positive correlation with premiums of 0,26 is found. In other words growing economy tend to be associated with higher premiums.

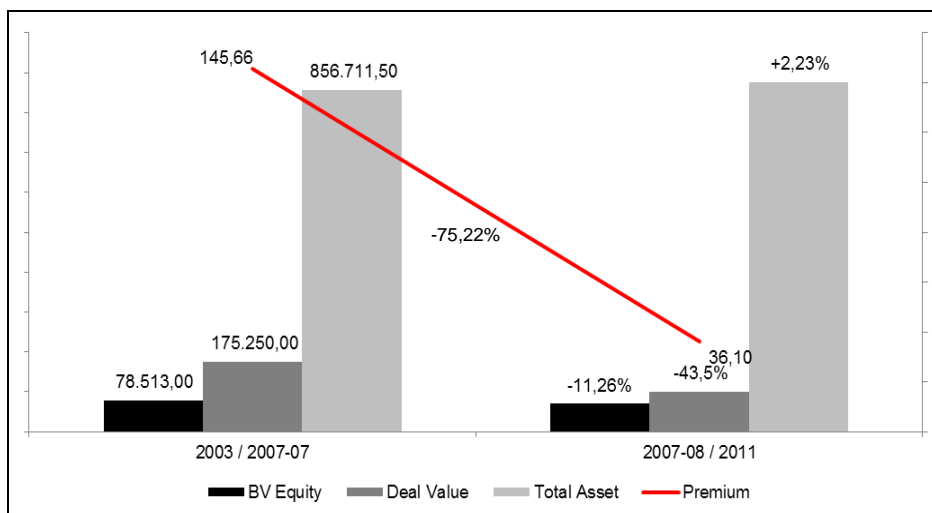**Figure 1 - Deals outline 2003-2011 (median)**

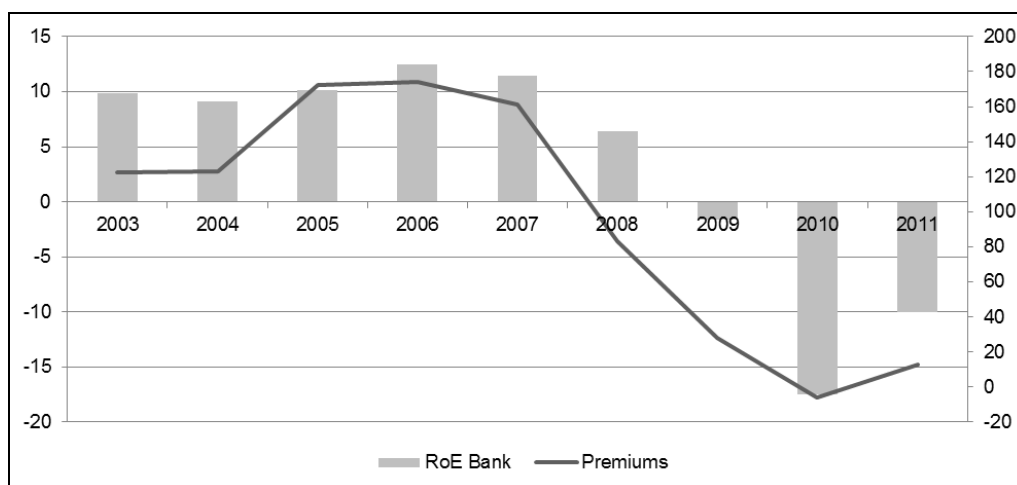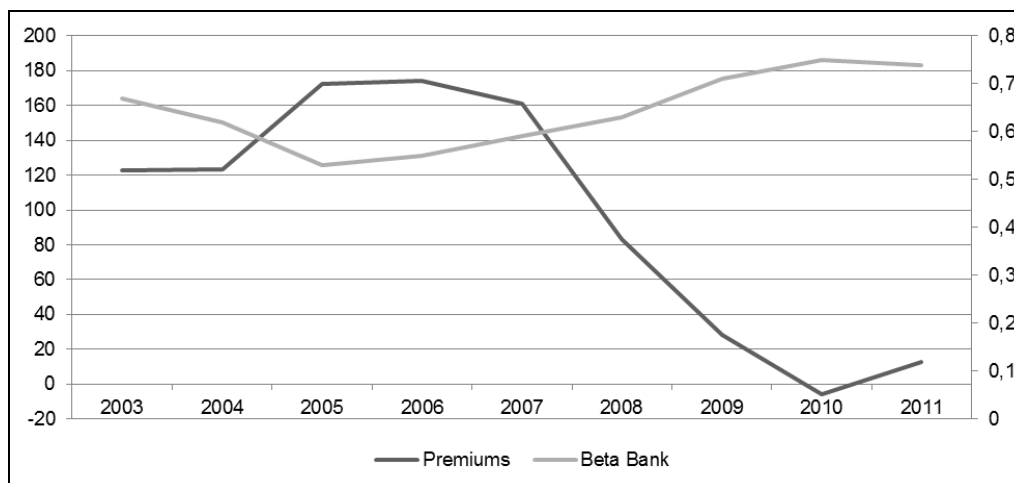**Figure 2 - Premiums and RoE relation 2003 – 2011 (mean)**

Figure 3 - Premiums and banks' beta relation 2003 – 2011 (Mean)

In terms of relative size, median doubled from 0,12 to 0,24 highlighting that, in the post-crisis sample, there are more dimensionally similar banks merging than in the pre-crisis. As expected, the relative size is negative related to premiums (-0.23) so that on average higher costs of integration are negatively valued by bidders.

From a diversification perspective, in the post-crisis period, the targets were less diversified considering the reduction of their medians and standard deviations values. In other words, banks seem to be highly focused on credit intermediation rather than on other sources of income after the financial crisis. However diversification doesn't show any significant correlation with premiums.

In regard to the analytical valuation methods, their median values of targets' expected dividends consistently declined from 7,75 to 2,50 so as the one of value creation decreasing from 5,27 to -2,97 signaling that targets had low future growth expectations and they were destroying value at the time of acquisitions in the post crisis period. However, in terms of medians, the overall sample show positive values for growth expectations (6,41) and value creation (2,68). The expected dividends and excess returns variables show significant positive correlations with premiums respectively equal to 0,60 and 0,58 highlighting a strong positive association between fundamentals and premiums.

In regard to market models, the median market value of targets dropped of 49% decreasing from 2,17 to 1,11. Basically, markets might have reflected the targets' low future growth expectations, the higher degree of banking sector's risk and the increasing non-diversifiable risk as well. As a result the price to book value is less dispersed after the crisis. Correlations show a positive significant link with premiums (0,42) in the overall sample.

Table 4 Pre-crisis descriptive statistics – n° obs. 140

	Symbol	Mean	Median	Std Dev	Correl
Market concentration	HHI	863,51	752,64	557,99	0,0919
Market growth	GDP	3,21	3,20	0,88	-0,2255
Relative size	RSIZE	0,23	0,12	0,26	-0,1917
Asset diversification	DIV	0,51	0,50	0,28	0,0123
Expected dividends	EXPD	7,43	7,75	4,99	0,4996
Excess returns	ER	4,14	5,27	1,17	0,4874
Market model	MLT	2,60	2,17	1,17	0,0327
Capital adequacy	T1C	11,97	11,14	3,04	-0,0942
Leverage	LEV	11,34	11,36	2,78	0,4805
Liquidity	LIQ	6,46	4,48	5,40	0,1935
Credit risk	CRED	7,03	3,50	15,46	-0,2903

Table 5 Post-crisis descriptive statistics – n° obs. 85

	Symbol	Mean	Median	Std Dev	Correl
Market concentration	HHI	885,48	775,45	447,19	-0,1353
Market growth	GDP	1,35	1,70	1,13	-0,0814
Relative size	RSIZE	0,44	0,24	0,68	-0,1492
Asset diversification	DIV	0,44	0,43	0,20	0,0438
Expected dividends	EXPD	2,05	2,50	7,78	0,5271
Excess returns	ER	-8,46	-2,97	0,55	0,5175
Market model	MLT	1,24	1,11	0,55	0,7127
Capital adequacy	T1C	11,73	11,00	3,07	0,1370
Leverage	LEV	12,13	11,44	4,70	-0,1375
Liquidity	LIQ	7,04	4,44	7,59	-0,0798
Credit risk	CRED	24,02	9,98	41,21	-0,4016

Table 6 Sample Descriptive statistics - n° obs. 225

	Symbol	Mean	Median	Std Dev	Correl
Crisis	CR	0,37			-0,5345
Market concentration	HHI	871,81	758,55	517,99	0,0039
Market growth	GDP	2,51	2,80	1,33	0,2631
Relative size	RSIZE	0,31	0,15	0,47	-0,2381
Asset diversification	DIV	0,49	0,47	0,25	0,0915
Expected dividends	EXPD	5,40	6,41	6,71	0,5978
Excess returns	ER	-0,62	2,68	14,80	0,5789
Market model	MLT	2,08	1,93	1,18	0,4194
Capital adequacy	T1C	11,88	11,10	3,05	0,0146
Leverage	LEV	11,64	11,38	3,64	0,0800
Liquidity	LIQ	6,68	4,47	6,31	0,0325
Credit risk	CRED	13,45	4,49	29,21	-0,4118

Looking at risk driver variables, targets seem to be riskier in the post-crisis period. As a matter of fact, in median terms, it can be observed slightly higher leverage, lower capital adequacy and short-term liquidity and a strongly higher value of credit risk. Regard to correlations only credit risk shows a significantly negative correlation with premiums (-0,41). Consistently, the weight of loan loss provisions on interest margin signal targets' banking book quality and, consequently, the impact on profitability of clients and general economy deterioration. All the other risk drivers present a low degree of correlation and they seem not be associated with significant premiums variations.

Among all the other explanatory variables, as expected, high correlation was found for EXPD and ER: 0,7024[8]. As highlighted in several contributions such as Plenborg (2002), Penman and Sougiannis (1998) and Penman (1997), dividend discount models and residual income approaches[9] are theoretically equivalent specifically when growth assumptions of cash flows are consistent and if debt is fairly priced. Due to such equivalence, a factor analysis with Cronbach's alpha test (Cronbach, 1951) has been conducted in order to

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[8] In the Appendix B, the correlation matrix is reported.

[9] The Residual Income model was introduced by Edwards and Bell (1961) and developed by Peasnell (1992) and Ohlson (1995). Residual Income model is considered a variation of EVA model (Stewart, 1991) and it can be included in the excess return methods.

assess whether EXPD and ER can be represented by a new variable (FUND) which it indicates the aggregated explanatory power of discounted cash flows and excess returns metrics.

The factor analysis results allow to construct a new variable which represents the explanatory power of analytical methods over premiums. The descriptive statistic and univariate analysis is presented in *table 7.*

Table 7 Sample Descriptive statistics - n° obs. 225

	Symbol	Mean	Median	Std Dev	Correl
Analytical models	FUND	2,38	4,23	10,04	0,6262

In the next sections, three different models are tested:
- Model 1: with EXPD as an explanatory variable for analytical methods;
- Model 2: with ER as an explanatory variable for analytical methods;
- Model 3: with FUND as an explanatory variable for analytical methods.

4. Results

The heteroskedasticity robust standard errors OLS model considers the effect of the crisis on premiums by interactions of the crisis dummy variable (CR) and all the other vectors'. *Table 8* shows the results of *Model 1* regression using the expected dividends (EXPD) as explanatory variable for analytical methods.

Regard to the deal characteristics' none of the variables are found statistically significant in relation to premiums neither before nor after the financial crisis.

Regard to valuation methods vector, basically, results display a change both in terms of marginal effect and coefficients of the underpinning drivers of banks' value. As a matter of facts, EXPD, controlling for all the other variables, shows a statistically significant relation with premiums both in both pre-crisis and post-crisis sample. As expected, its marginal effect gets more moderate: +6,00% before the crisis at 99% level of confidence, and 2,21% at 95% level of confidence in the aftermath of the financial crisis. However, expected growth earnings is seen as one of the main value drivers considered by bidders when valuing premiums. In other words, the potential and quality of growth play a relevant role in determining targets' attractiveness.

In terms of market models, the effect across the crisis can be considered an interesting point to analyze. Since MLT[10] is measured as a multiple on equities, the relation was expected statistical significant in both the two sub-samples. However regressor's marginal effect is found relevant just in the aftermath of the financial crisis +97,87% at 99% level of confidence. Bidders seem to thoroughly consider market valuation as a benchmark of their targets' value in the post-crisis period rather than in the pre-crisis one. Besides, the coefficient effect is almost close to 100% since an increase of 1 unit in price to book value is equal to double the equity value of targets.

Regard to the targets' risk vector, only leverage and credit risk variables seem to affect premiums. As a matter of facts, leverage is strongly significant either before and after the crisis at 99% level of confidence. However there is an interesting drop of the coefficient: +11,50% in the pre-crisis, +2,50% in the post crisis. The marginal effect of leverage is strongly relevant in the pre-crisis while, despite banks' deleveraging, it maintains a positive effect on premiums in the post-crisis. Such smooth effect in premiums and leverage relation might be explained by the theory of leverage pro-cyclicality (Tobias and Song Shin, 2010).

In terms of credit risk, CRED show statistical significance in both the two samples. The relation between premiums and credit risk is negative: -0,86 in the pre-crisis, -0,008 in the post-crisis period. The net effect on premiums is negligible and might be driven by model imperfections. However, as expected, high level of credit risk might affect earnings distribution and can be interpreted as a signal of counterparts deterioration or lower quality of credit allocation. The effect is found to be smoother in the aftermath of the financial crisis.

Model 1 variables have an explanatory power of 64,86% over premiums.

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[10] It has to be reminded that the price to book value considered in the model is not the one of the pre-deal, but it is referred to the quarter before the deal was announced.

Table 8 OLS Model 1

Model 1: OLS, using observations 1-225
Dependent variable: PBV
Heteroskedasticity-robust standard errors, variant HC1

	Coefficient	Std. Error	t-ratio	p-value	
Const	-28.8108	55.9431	-0.5150	0.60711	
CR	-96.8072	68.888	-1.4053	0.16147	
HHI	0.0108728	0.0108114	1.0057	0.31577	
GDP	-1.75591	7.19501	-0.2440	0.80744	
RSIZE	-24.5747	18.1838	-1.3515	0.17805	
DIV	-20.4429	18.129	-1.1276	0.26081	
EXPD	6.00138	1.0829	5.5419	<0.00001	***
MLT	0.517537	4.16006	0.1244	0.90112	
TC1R	1.95661	1.87241	1.0450	0.29728	
LEV	11.4993	2.48874	4.6205	<0.00001	***
LIQ	0.616361	0.779499	0.7907	0.43003	
CRED	-0.865837	0.349332	-2.4786	0.01401	**
HHI*CR	-0.0299426	0.0187103	-1.6003	0.11108	
GDP*CR	-4.91177	8.39971	-0.5848	0.55936	
RSIZE*CR	31.561	26.8709	1.1745	0.24155	
DIV*CR	33.1178	34.711	0.9541	0.34117	
EXPD*CR	-3.79282	1.62399	-2.3355	0.02049	**
MLT*CR	97.3486	16.9848	5.7315	<0.00001	***
TC1R*CR	0.666348	2.9252	0.2278	0.82003	
LEV*CR	-8.99769	2.99231	-3.0069	0.00297	***
LIQ*CR	0.553607	1.14011	0.4856	0.62779	
CRED*CR	0.874019	0.379015	2.3060	0.02212	**

Mean dependent var	117.3318	**S.D. dependent var**	94.11027
Sum squared resid	696954.8	**S.E. of regression**	58.59415
R-squared	0.648696	**Adjusted R-squared**	0.612355
F(21, 203)	22.03902	**P-value(F)**	2.35e-41

Table 9 shows Model 2 results where the variable representative of the analytical model usage is ER, excess returns metrics.

Regard to the deal characteristics' variables, in this case, CR variable is found statistically negatively related with premiums at 95% level of confidence. Being in the post-crisis, on average, has an effect of -130,48% over premiums. This result seems to me more consistent with the evidences of descriptive statistics.

Market concentration is found statistically negatively related with premiums in the post crisis period. The interpretation of negative relation of high concentrated markets (in terms of deposits) might be due to their less attractiveness of lower concentrated markets. Managers might have been considered the cost of new clients acquisition as a key driver of value after the drop of reputation of many banks in the U.S. after Lehman's bankruptcy. On the whole market concentration's marginal effect is -0,02% for 1 point increase of concentration with statistical significance of 90% level of confidence in the post-crisis period. Despite it might seems a low impact, however an increase of one standard deviation of market concentration leads to an effect of -9,38% on premiums.

Regard to other deal vector's variables only RSIZE is found negatively related to premiums in the pre-crisis period. The effect of being equally sized is paid less 17,58% in the pre-crisis period, while the effect becomes opposite +12,46% in the post-crisis. This inversion of the sign might be due to the smaller premium paid in relation to the size of targets. In facts, the trend of the economy and of the specific future expectations over banking sector might have been pushed to concentrations.

Table 9 OLS Model 2

Model 2: OLS, using observations 1-225
Dependent variable: PBV
Heteroskedasticity-robust standard errors, variant HC1

	Coefficient	Std. Error	t-ratio	p-value
Const	-0.337475	47.2164	-0.0071	0.99430
CR	-130.482	63.6675	-2.0494	0.04171 **
HHI	0.0108756	0.0103184	1.0540	0.29314
GDP	-6.99888	6.82227	-1.0259	0.30617
RSIZE	-35.1528	21.2513	-1.6542	0.09964 *
DIV	-10.8742	16.159	-0.6730	0.50174
ER	3.73293	0.592903	6.2960	<0.00001 ***
MLT	1.43729	4.04825	0.3550	0.72293
TC1R	1.99102	1.73591	1.1470	0.25275
LEV	11.4736	2.30092	4.9865	<0.00001 ***
LIQ	1.73886	0.811051	2.1440	0.03323 **
CRED	-0.114632	0.383114	-0.2992	0.76509
HHI*C	-0.0350792	0.0167812	-2.0904	0.03783 **
GDP*C	-0.98793	8.15139	-0.1212	0.90365
RSIZE*C	47.6113	26.5101	1.7960	0.07399 *
DIV*C	35.3481	34.0103	1.0393	0.29989
ER*C	-2.21023	0.877191	-2.5197	0.01252 **
MLT*C	95.771	13.0073	7.3629	<0.00001 ***
TC1R*C	0.219025	2.86236	0.0765	0.93908
LEV*C	-7.50726	2.91539	-2.5750	0.01073 **
LIQ*C	0.180724	1.34278	0.1346	0.89307
CRED*C	0.286415	0.404479	0.7081	0.47969

Mean dependent var	117.3318	S.D. dependent var	94.11027
Sum squared resid	691499.9	S.E. of regression	58.36440
R-squared	0.651446	Adjusted R-squared	0.615389
F(21, 203)	21.22650	P-value(F)	2.94e-40

Regard to valuation methods vector, results display a similar change as in Model 1. This time, ER, the analytical method variable displays a strong statistical relation with premiums both in both pre-crisis and post-crisis sample. As it was for EXPD, its marginal effect is more moderate: +3,73% before the crisis and 1,52% in the aftermath of the financial crisis. Expected growth earnings is seen having an higher marginal effect than value creation. However the latter is more consistent with the value creation hypothesis which tend to be more appropriated even in case of negative cash-flows. In addition value creation approach has been demonstrated as a superior approach to equity valuation as reported in Penmann and Souggianis (1998).

In terms of market models, as in Model 1, MLT is found statistically significant just in the post-crisis period, +97,21%. Even in this model version, bidders seem to thoroughly consider market valuation as a benchmark of their targets' value in the post-crisis period rather than in the pre-crisis one.

Regard to the targets' risk vector, it seems to differently affect premiums. As a matter of fact only leverage and liquidity significantly affect premiums. Leverage has a marginal effect of +11,47% over premiums at 99% level of confidence in the pre-crisis period and 3,97% at 95% in the post-crisis. Differently short-term liquidity is found significant just in the pre-crisis period with a positive marginal effect of +1,74%.

Model 2 variables have an explanatory power of 65,14% over premiums. The model 2 explains better than model 1 premiums variability.

Basically Model 1 and Model 2 exhibit a certain degree of variation in terms of variables significance that might be depending on the choice of valuation method variable tested. In terms of targets' risks, leverage is found always being significant while liquidity and credit risk regressors seem to be affected by the type of the variable selected to test analytical methods effect. On the whole, it seems that, in the financial crisis period, bidders are less focused on targets' fundamentals and more reliant on market benchmarks.

In order to further investigate these relations and due to the dividend discount model and residual income equivalence widely investigated by Plenborg (2002), Penman and Sougiannis (1998) and Penman (1997), I decided to undertake a factor analysis and Cronbach's alpha test in order to, on one hand, creating a single variable which signal the total effect of analytical methods over premiums and, on the other hand, trying to avoid valuation methods' selection bias. Results of factor analysis and Cronbach's alpha allow to construct the new variable, FUND.

Model 3 regresses FUND as the variable for analytical methods usage. Findings are displayed in *table 10*.

Table 10 OLS Model 3

Model 3: OLS, using observations 1-225
Dependent variable: PBV
Heteroskedasticity-robust standard errors, variant HC1

	Coefficient	Std. Error	t-ratio	p-value
Const	-18.2426	50.1169	-0.3640	0.71624
CR	-118.089	65.8002	-1.7947	0.07420 *
HHI	0.00982922	0.0103238	0.9521	0.34218
GDP	-4.95523	6.83504	-0.7250	0.46930
RSIZE	-28.3408	19.3771	-1.4626	0.14512
DIV	-15.6413	16.3332	-0.9576	0.33939
FUND	5.46631	0.771109	7.0889	<0.00001 ***
MLT	1.24966	3.88545	0.3216	0.74807
TC1R	2.29908	1.78836	1.2856	0.20005
LEV	11.2743	2.29991	4.9021	<0.00001 ***
LIQ	1.31639	0.795305	1.6552	0.09943 *
CRED	-0.294166	0.347483	-0.8466	0.39823
HHI*C	-0.0290576	0.0174937	-1.6610	0.09825 *
GDP*C	-2.44716	8.0848	-0.3027	0.76244
RSIZE*C	38.7527	25.8828	1.4972	0.13588
DIV*C	38.0829	33.7751	1.1275	0.26084
FUND*C	-2.95265	1.22615	-2.4081	0.01693 **
MLT*C	91.352	14.2179	6.4252	<0.00001 ***
TC1R*C	0.114529	2.82969	0.0405	0.96776
LEV*C	-7.1858	2.96726	-2.4217	0.01633 **
LIQ*C	0.459656	1.3179	0.3488	0.72762
CRED*C	0.472203	0.370521	1.2744	0.20397

Mean dependent var	117.3318	S.D. dependent var	94.11027
Sum squared resid	666359.3	S.E. of regression	57.29361
R-squared	0.664118	Adjusted R-squared	0.629372
F(21, 203)	21.83114	P-value(F)	4.46e-41

Regard to the deal characteristics' variables, CR is consistently found significant with a negative effect over premiums of -118,09% at 90% level of confidence. Model 3 confirms Model 2 finding where being in the crisis, on average, has a significantly relevant effect over premiums.

Market concentration is again found statistically negatively related with premiums in the post crisis period. Consistently with Model 2, the marginal effect is -0,02% at 90% level of confidence. It can be claimed that high concentrated markets have been less attractive than lower concentrated markets since the cost of acquisition of new clients might have been an higher effect after the financial crisis broke out due to the funding competition which have characterized the banking sector in post-crisis period.

On the opposite, GDP, RSIZE and DIV are found not having a significant effect over premiums. Literature findings are often conflicting. Model 3 evidences support the recent EU findings where Hagendorff et al. (2012) and Diaz and Azofra (2009) found insignificant betas of deal characteristics variables.

Valuation methods vector is conversely found significantly positive related to premiums. Model 3 findings show a marginal effect of FUND of +5,47 % in the pre-crisis period and +2,51% in the post-crisis at 95% level of confidence.

The effect is reduced between the two periods of observation showing that fundamentals have had a lower weight in determining premiums. On the opposite market models (MLT) show an insignificant relation in the pre-crisis, while becoming statistically significant in the post-crisis period. Its marginal effect is positive (+92,60%) at 99% level of confidence. Therefore Model 3 confirms that premiums seem to be related much more to the market models instead of the fundamentals' in the post-crisis. This evidence is confirmed by the all three models.

In terms of targets' risk vector, Model 3 sterilizes the effect of liquidity and credit risk in Model 1 and 2 so that those regressors are not found significant. On the contrary, Model 3 shows that leverage (LEV) is the only risk regressor which have an explanatory power over premiums. Model 3 confirms Model 1 and Model 2 evidences finding a drop in the marginal effect across the financial crisis. A 1% increase in leverage increases premiums of 11,27% at 99% level of confidence in the pre-crisis period, while a smooth effect of +4,08% at 99% level of confidence is found in the post-crisis period. According to Tobias et al. (2010), banks amplify their leverage (and their profits) during positive trend of the economy while they tend to reduce it in during period of GDP contraction. In these terms, managers can have assessed as a danger the potential negative effect of deleveraging of the banking sector especially from both a loss in assets' value and future earnings perspective.

On the whole the Model 3 have an higher explanatory power than other models. R-squared is equal to the 66,41%. Tests by eliminating outliers, influential and high leverage observations demonstrates that results were consistent.

Figure 4 Actual vs Predicted PBV
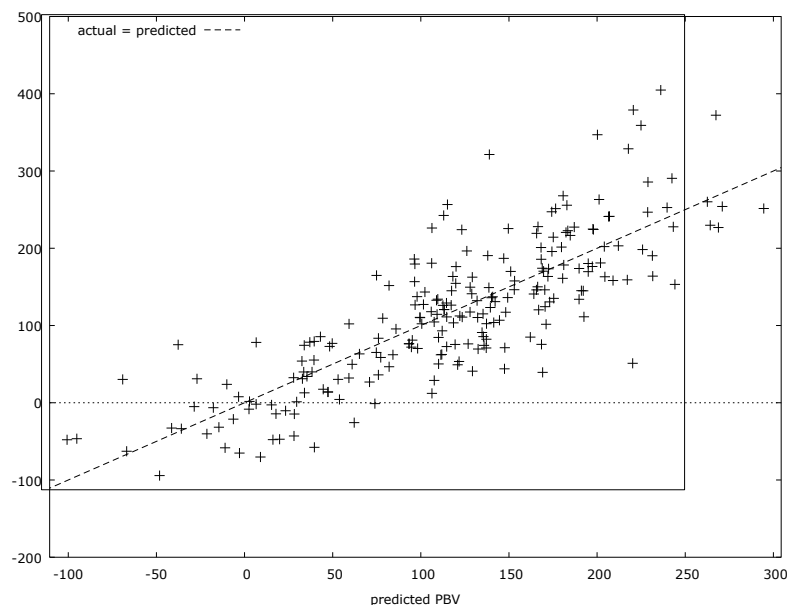
5. Conclusions

The previous literature has widely discussed determinants of premiums in banks takeovers. Although many different variables tested, no contribution has related premiums to valuation methods in order to analyze whether models currently used have an explanatory power over premiums. Notwithstanding a generalization constraint in the choice of the valuation methods variables tested and a restrictive number of observations in relation to premiums variability, results show a different weight of the metrics before and after the financial crisis.

Generally, it can be claimed that despite their significance, fundamentals (expected growth in earnings and value creation) have lost part of their marginal effect over premiums across the financial crisis. Those evidences show that financial crisis has represented a relevant watershed in the way the banks were valued with a smaller correlation with their economics. As a matter of fact, pre-crisis mergers are strongly related to the discounted cash-flows and excess returns models while, in the post-crisis period, market models seem to guide banks' pricing.

Many interpretations can be provided to the findings. On one hand, the evidences cannot be interpreted in the light of targets' lower past performance since valuations are forward looking and, anyhow, the higher the level of uncertainty of targets' future performance, the greater should be the link to their fundamentals instead of market values. However, Rountree et al. (2008) found that investors are particularly able to value cash-flows than earnings so that, after the financial crisis of 2007, where high degrees of uncertainty of future earnings spread out of the markets, market methods would have been more reliable than fundamental metrics in estimating banks' economic value. In addition, it has to be claimed that the theory of corporate finance pointed out that market models should be employed as control method and not as the main driver of value. Therefore, analytical models should represent the main metrics to be applied in valuation. This must be even more true during periods of financial turbulence where markets tend to deviate from fundamentals. Unfortunately, U.S. mergers and acquisitions pricing after the financial crisis of 2007 showed that this was not the case.

Finally, regard to risk drivers, leverage is found the unique and very important value driver for premiums. Findings support the recent literature concerning leverage pro-cyclicality. Leverage seems to have a strong relationship with premiums signaling that it represents one of the key drivers for the future profitability of a bank. According to the economic cycle, the management of the leverage ratio is thus expressive of a greater ability of management to create value for shareholders. On the other hand, higher leverage means higher risks in periods of economic expansion, while deleveraging often entails lower profitability and lending contraction contributing to amplifying economic downturns. This pro-cyclicality then shows the importance of a regulatory regime that sets limits on leverage and thus able to maintain a more balanced relationship between risk and return and social benefits. The new regulation of Basel III seems to be going in the right direction.

Finally, notwithstanding the number of mergers and acquisitions analyzed, the specific period of observation is characterized by volatility since the financial crisis might have brought high variance over premiums. Such limitation can be overcome by widening the sample over the years before and after the financial crisis. Another limitation can be represented by the proxy of valuation methods which are here considered as the "fundamental variable" of the method. Further investigations may follow a whole methods applications which can be compared to mergers and acquisitions' deal values. Further improvement might be brought from the separation of the effect of listed and not listed banks. As a matter of facts, the relation among methods and listed banks might be different from not publicly traded banks.

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Appendix A

Table 11 Mergers and acquisitions - Deals characteristics 2003 / 2007-07 – n° obs. 140

2003 / 2007-07	Max		Min	Mean	Median	Std. Dev.
Premium	404,78	-	47,91	156,44	145,66	79,71
BV Equity (th $)	21.574.000,00		22.182,00	599.513,04	78.513,00	2.195.765,10
Deal Value (th $)	47.000.000,00		36.400,00	1.318.389,72	175.250,00	4.656.905,96
Total Asset (th $)	200.356.000,00		228.815,00	5.704.922,76	856.711,50	19.698.226,94

Table 12 Mergers and acquisitions - Deals characteristics 2007-08 / 2011 – n° obs. 85

2007-08 / 2011	Max		Min	Mean	Median	Std. Dev.
Premium	290,55	-	94,27	52,92	36,10	79,74
BV Equity (th $)	13.407.800,00		12.231,00	346.241,78	69.672,00	1.466.552,99
Deal Value (th $)	5.584.000,00		701,00	335.678,92	99.000,00	713.590,42
Total Asset (th $)	150.374.000,00		223.630,00	3.526.409,58	875.839,00	16.273.926,80

Appendix B

Full Sample	PBV	HHI	GDP	RSIZE	DIV	EXPD	ER	MLT	TC1R	LEV	LIQ	CRED
PBV	1.0000	0.0039	0.2631	-0.2381	0.0915	0.5978	0.5789	0.4194	0.0146	0.0800	0.0325	-0.4118
HHI		1.0000	-0.0496	0.1236	-0.0643	-0.0963	0.0578	-0.0653	-0.0047	0.0361	0.0659	0.0489
GDP			1.0000	-0.1325	0.1998	0.1647	0.1909	0.4415	0.0294	-0.0825	0.0224	-0.0183
RSIZE				1.0000	0.0258	-0.1959	-0.3123	-0.2091	-0.1522	0.1565	-0.0329	0.2283
DIV					1.0000	0.0573	-0.0077	0.1641	0.3107	0.1037	0.1118	-0.0838
EXPD						1.0000	0.7024	0.3193	0.0371	-0.1777	-0.0235	-0.4272
ER							1.0000	0.3421	0.1356	-0.3483	-0.2080	-0.4245
MLT								1.0000	0.0162	-0.0638	-0.0330	-0.2730
TC1R									1.0000	-0.4692	0.1611	-0.2532
LEV										1.0000	0.0318	0.1979
LIQ											1.0000	0.1352
CRED												1.0000