The announcement effect of convertible bond issues in the banking industry

(Research Proposal)

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I Introduction

Companies and financial institutions that attract new capital have several options. The most common sources are external equity and straight debt. However, there is also a third category that is used by a large number of companies, convertible debt. A convertible bond is a bond that, at the option of the holder, can be exchanged in shares of the issuing company. Duca, Dutordoir, Veld, and Verwijmeren (2010) find that convertible debt issuance comprised approximately ten percent of total securities issuance by U.S. corporations over the last 30 years. According to the *Financial Times* of March 10, 2011 convertible bonds are particularly popular in the current (post financial crisis) financial climate. The popularity of convertible bonds has induced a large amount of empirical research on these financial instruments. In particular, there is an extant literature that studies abnormal returns associated with convertible debt announcements. This research suggests that such announcements generally are associated with negative abnormal stock returns.[2] For example, in the U.S. market document, the announcements of convertible bond have significant negative effects of the stock market in the range between -1 and -3 percent. Other studies on Anglo-Saxon countries, such as Magennis et al., 1998 and Abhyankar and Dunning, 1999, find similar results for Australia and the UK respectively.

In contrast to the extensive amount of research on the announcement effects of convertible bond issuance for non-financial companies, the relevant research on the banking industry is deficient. In fact, most of the existing studies leave out issues by financial institutions. This lack of research is remarkable, because the financial industry is responsible for a large number of convertible bond issues. For example, Metlife, which is among the largest global life insurance companies, has sold $9.4bn of convertible bonds in March 2011. This is one of the largest single issues since the financial crisis started. This study is to fill in the research gap by seeking empirical evidence of the impact of the announcement of convertible bonds issues on stock return for banking industries.

We posit that the announcement effects associated with convertible bond issuance are likely to be different for the banking industry for two reasons. The first is

[2] See Dann and Mikkelson, 1984; Mikkelson and Partch, 1986; Lewis, Rogalski, and Seward, 1999, Abhyankar and Dunning, 1999, Burlacu, 2000, Dutordoir and Van de Gucht, 2005, Ammann, Fehr and Seiz, 2006. Duca,Dutordoir,Veld, and Verwijmeren,2010.

the special function of the financial intermediary. Because of the special economic role of money and the uncertainty associated with financial intermediaries, (Dow, 1996), they are normally heavily regulated. The issuance of convertible bonds for financial companies may hence be considered in the context of regulation in addition to seeking finance. The second reason is the different role of bank capital in contribution to the total bank value. Theory suggests that higher capital induces more incentive for banks to monitor, in which both banks and borrowers will benefit (Allen, Fulghieri, and Mehran, 2011b). Consequently, high bank capital increases the total surplus generated in the bank-borrower relationship, which will lead to higher bank profitability (Mehran and Thakor, 2011). In addition, the high-capital banks will be more likely to survive during financial crises and increase market share during both normal and financial crises time (Berger and Bouwman, 2010). Therefore, we expect less negative stock price impact in financial institutions than in non-financial institutions. We posit that the announcement effects associated with convertible bond issuance are likely to be different for the banking industry for two reasons. First, recent theory and empirical evidence suggest that bank capital contributes positively to bank total value. Allen, Fulghieri, and Mehran, (2011) suggest that higher capital induces more incentive for banks to monitor, in which both banks and borrowers will benefit. Consequently, high bank capital increases the total surplus generated in the bank-borrower relationship, which will lead to higher bank profitability (Mehran and Thakor, 2011). In addition, the high-capital banks will be more likely to survive during financial crises and increase market share during both normal and financial crises time (Berger and Bouwman, 2010).[3] In this context, bank issuance of convertible bond may potentially increase the bank's capital level, which may in turn increase total bank value. Hence, the announcement of convertible bond issues may be seen as a positive signal to the market. The second is the special function of the financial intermediary. Because of the special economic role of money and the uncertainty associated with financial intermediaries, (Dow, 1996), they are normally heavily regulated. The issuance of convertible bonds for financial companies may hence be considered in the context of regulation in addition to seeking finance. A bank issuing convertible bond may indicate that it is optimistic for the future stock

[3] Campello et al (2009) provides detailed explanation why banks with high capital may improve their profitability during crises relative to banks with low capital.

price so as to be able to converse the bond into equity. The lower the bank equity level, the better the signal since if the bank stock price do no perform well in the future, the bank will end up with even higher leverage and more difficult to meet the capital regulation.

This study contributes to the literature by providing the first empirical evidence of the announcement impact of convertible bonds issues on the stock performance in the financial industry. It is also the first study in this literature with evidence in the same industry with significantly less heterogeneity problem than in cross-industry studies as found in previous literature.

The objective of this study is then to examine how the announcement of convertible bonds issuance will affect the abnormal stock return for the banking industry by using an event study methodology. Furthermore, we explore the determinant factors of the size of the wealth effects in relation to the issuance of the convertible bond. These factors may include the design of the convertible bond issues, the specific characteristics of banks, and the regulation, institutional and macroeconomic environment of the banking industry.

II Literature review

2.1 Theories of convertible bonds: why firms issue convertible bonds?

Companies can attract financing from different sources, such as issuing equity or debt. Convertible bond gains popularity as an alternative source of financing other than equity and debt in recent years. Convertible bond is a hybrid security with debt- and equity-like features. It is a type of bond that can be exchanged by the bondholders at an agreed-upon price for shares of common stock in the issuing company or cash of equal value within a predetermined time period. It traditionally appeals to long-only investors looking for diversification benefits and indirect participation in equities (Lummer and Riepe, 1993).

Theoretical studies on convertible debt predict that convertible bond, as an indirect mechanism for implementing equity financing, is able to mitigate the adverse selection costs associated with attracting common equity financing (Green, 1984; Brennan and Schwartz, 1988; Stein, 1992). There are three major theories on why

firms issue convertible bonds, the 'back-door' theory (Stein, 1992), the 'risk-shifting' theory (Green, 1984), and 'sequential-financing' theory (Mayers, 1998).

According to the back-door theory, Stein (1992) argues that firms find convertible bonds an attractive middle ground between the negative informational consequences associated with an equity issue and the potential for costly financial distress associated with a debt issue. The primary motivation for issuing convertible bonds is to obtain common equity financing at a better price than the issue date stock market price. Stein (1992) provides a formal model and gives a suggestion of the motivation for firm issuing convertible bonds. Firms facing significant information asymmetries are most likely to use convertible bond as an indirect method for implementing equity financing. Firms may use it to get equity into their capital structures 'through the backdoor' in situations where informational asymmetries make conventional equity issues unattractive. This is because if the market is information asymmetric, there will be a lemons problem (Akerlof, 1970). Managers run firm in their own interests rather than maximizing stockholders' wealth. Investors do not know the firm is willing to invest in a good project or not, consequently they ask for discounts on the stock price to compensate the information asymmetry. Therefore firms with good investment opportunity (safer but lower return) may feel it's not worth to issue the equity given the heavy discounts. Convertible bond provides a financing alternative to the firm that mitigates the adverse selection costs of an immediate sale of common equity. Convertible bonds are typically callable after the expiration of a call protection period. The backdoor theory focuses on this call provisions of the convertible bonds. The firms issue convertible bonds could force investors to exercise their conversion option early, thereby inducing them to swap their bonds for shares of stock. In this case, convertible bond serve as an indirect mechanism for implementing equity financing with less adverse price impact than an offering of common stock. Straight debt seems to be a financing solution for firms facing information asymmetric problem, but Stein (1992) argues that the excessive debt can lead to costs of financial distress. With costly distress, a company that is already substantially leveraged will choose convertible financing only if it is relatively optimistic about the prospects for its stock price. Because if the stock price falls, the firm will be unable to force conversion, and left with an even larger debt.

Stein's model suggests that convertible bonds would be especially valuable for firms with significant information asymmetric problem and high financial distress costs. For these firms, common equity is an unattractive financing source because its value is very sensitive to the subsequent disclosure of the firm's private information. Convertible bonds allow them to obtain financing immediately through a delayed equity offer.

According to the risk-shifting theory, Green (1984) models and characterizes investment incentive problems associated with debt financing. The wealth transfers from creditors to shareholders by the substitution of 'risky' for 'less risky' operating and investment policies. Straight debt may be an incentive of firms to overinvest in risky but high return project in order to maximize the wealth transfers from creditors. If the wealth transfer is large enough, shareholders may even support the adoption of negative net present value projects to increase the shareholder's wealth at the detriment of bondholders. Bondholders get the limited coupon but bearing unlimited risk, consequently the investors are reluctant to invest in the straight bonds. Therefore, Green (1984) address the financing and incentive problems simultaneously, and propose a 'risk-shifting' theory that convertible bonds, unlike straight debt, can reduce the agency costs that are caused by bondholder and stockholder conflicts of interest. Bondholders have the right to convert the debt into common share, which makes the shareholders sharing any wealth expropriated from bondholders. The conversion features impose a payoff structure on the shareholders' residual claim that reduces the incentive to overinvest in risky projects. Since by issuing convertible debt the firm has committed itself to choosing the less risky asset, the convertible bonds may be a solution to control distortionary incentives. Therefore, firms facing significant risk in their investment project and having incentive problem are most likely to issue convertible bonds.

Mayers (1998) proposes a reason of firms issuing convertible bonds from a different aspect. He proposes that firms can use convertible bonds solve sequential-financing problems. He assumes a sequential financing problem involves an investment option with a future maturity date and it is costly to issue securities. He

examines 289 calls of convertible bonds from 1971 through 1990 in the U.S market. Consider a firm at the beginning of the first period in a two-period world. The firm requires financing not only for a profitable investment project to undertake immediately but also for an investment option that will mature at the beginning of the second period. Two key factors in making financing decisions are issue costs and overinvestment costs. The convertible bond economizes on issue costs because conversion leaves funds in the firm and reduces leverage when the investment option is valuable. Managers prefer profitable projects and get perquisites from firm size. If there is cash available they always invest, even when the investment option turns out to be unprofitable. Thus, managers have control over funds unless the funds are required by contract to be paid out. This causes the overinvestment problem. Issuing a convertible bond that matures at the end of the first period could be a good solution for this problem, because it both economizes on the second-period issue costs and controls the overinvestment problem. The firm could get the fund immediately when the bond is constructed if the net present value of the investment option is revealed to be positive. If the second-period project turns out to be profitable enough, the bondholders prefer to convert at the bond maturity date, leaving the funds in the firm. These funds can be used to finance the second-period project, thus economizing on the second-period issue costs. The bondholders can choose not to exercise the conversion option and redeem the convertible bond and get the fund back if the project turns out to be not sufficiently profitable. This helps to control the overinvestment problem. When the maturity date of the investment option is uncertain, the call provision allows the firm to force the conversion. Therefore the firm could proceed with its financing plan when the investment option is valuable.

2.2 Empirical evidence of why firms issue convertible bonds

Chang et al. (2004) provide an empirical evidence of the sequential-financing hypothesis advanced by Mayers (1998). They examine the wealth effect of the announcement of convertible bonds from Taiwanese-listed firms within 1990-1999. The hypothesis suggests that firms may design their convertibles so that there are sufficient internal funds for future investment expenditures so as to avoid the costs of accessing capital markets. They find that the issuing firms' net new financing is not significantly different from zero over the life of the convertible bond. Thus, their

results provide further support for the sequential-financing hypothesis that convertible bond financing is motivated by a desire to minimize security issue costs and agency costs of overinvestment for firms with promising growth opportunities to finance a sequence of potential investment options.

2.3 The impact of the announcements of convertible bonds on firms' stock prices

There is extensive literature on stock market reactions to the announcement of convertible bond issues. Myers and Majluf (1984) develop an adverse selection model on security issuance that is based on asymmetric information between shareholders and managers. Since managers have more information than shareholders, security offerings are viewed as a special example of the lemons problem presented by Akerlof (1970) As Ross's (1977) signaling model predicts, a company issuing securities for investment opportunities sends a negative signal to the market. Therefore when a company issues risky securities (including convertible bond), investors will demand a discount on the security price, because they assume that managers may overvalue the firm and try to maximize the wealth of their existing shareholders by trying to sell overpriced equity. According to these models, the announcement of convertible issues is associated with a negative future abnormal return.

Empirical studies generally find negative abnormal stock returns associated with the announcement of convertible bond issues. For example, this evidence has been found in the U.S. (Dann and Mikkelson, 1984; Mikkelson and Partch, 1986; Lewis, Rogalski, and Seward, 1999; Duca et al., 2011), Australian and the UK (Abhyankar and Dunning, 1999), France (Burlacu, 2000), Western European markets (Dutordoir and Van de Gucht, 2007), Germany and Switzerland (Ammann, Fehr and Seiz, 2006).

Dann and Mikkelson (1984) provide evidence on the valuation effect of the issuance of convertible debt. They argue that the negative common stock valuation effect does not appear to be systematically related to the estimated leverage change induced by the added convertible debt, the extent to which the proceeds are used for new investment or to refinance existing debt, or possible underpricing of the new offerings. They analyze the average daily common stock prediction errors centered around the announcement date 132 convertible debts from 124 different U.S. firms

over the time period from 1970 through 1979. The stock price response to the initial announcement of a new issue is measured over a two-day trading period, because available evidence on capital market efficiency and other studies of the stock price responses to the announcement of capital structure changes suggest that most of the price response to the initial announcement of a convertible debt offering is confined to this trading period. This two-day trading period encompasses the publication date of the earliest report of the offering in The Wall Street Journal (day 0) and the preceding trading day (day -1). The result shows that the announcements of convertible bond are associated with an immediate and significant decrease in the price of common stock.

Mikkelson and Partch (1986) examine the stock price effects of security offerings of 360 U.S firms from 1972 to 1982, and find that the type of security is the only significant determinant of the price. The sample consists of announcements of 595 financing events, including 280 announcements of public security offerings for cash. Of these, 70 are common stock offerings, 168 are straight debt offerings, 29 are convertible debts offerings and 13 are preferred stock offerings. Their result shows that the announcement of common stock and convertible bonds offering gives a statistically significant negative valuation effect on stock price. The average price reaction to the announcement of preferred stock, straight debt, and private placements of debt and term loans is small and not significant at the 0.10 level. The average price response to the announcement of credit agreements is positive. The result is consistent with the prediction by Myers and Majuf (1984) that offerings of common stock and convertible debt are met with a less favorable price response than are offerings of straight debt. In Myers and Majuf (1984) model, the type of security conveys information about the values of the firm's investment opportunities and assets in place. Mikkelson and Partch (1986) also suggest that market participants tend to infer that the market price is too high whenever an offering of common stock or convertible debt is announced.

Lewis, Rogalski and Seward (1999) examine the excess returns for 203 convertible bonds issues from a European countries over the period from 1977 through 1984 by using the security choice model, and show that the announcement of convertible bonds have negative wealth effect on common stock excess return.

Empirical evidence also suggests that the impact of the issuance of convertible bonds on common stock abnormal return is related with the type of the financial

system (market- or network-based system). The literature discussed so far in this section mainly examines the market-based systems, which have well-developed financial markets and open corporations with widely dispersed ownership. Since the market-based system is more information asymmetric, and the managers are likely to act in the interest of existing shareholders, the market reaction to convertible bond may be less favorable. (Veld et al, 2010)

The network-based system, which has strong banks with large share ownership and a greater role in monitoring, is expected that managers are more likely to be entrenched given their institutional settings, the Myers and Majluf (1984) adverse selection model may not hold.

Previous studies of network-based countries show that there is less negative abnormal stock return in the network-based countries than the market-based system countries, such as Japan, the Netherlands, and Taiwan.

Christensen et al (1996) find that convertible bond offerings the Japanese capital market received neutral stock price responses. Their sample consists a total of 139 events of security issuance from 1984-1991, and there are 36 convertible bond announcements among them. By using mean-adjusted returns model in the event study, they detect no significant results of the stock price in offering convertible bonds. For the Dutch financial market, De Roon and Veld (1998) use a standard event study methodology to analyze 47 convertible bonds announcement from January 1976 to December 1996. They measure the abnormal return using the Ordinary Least Squares market model regression, and find that the average abnormal stock returns are positive but insignificant around the announcement day. Chang et al. (2004) find abnormal stock return and the announcement of convertible bonds are positive related by examining 109 announcements from 86 Taiwanese-listed firms within 1990-1999.

2.4 Bank capital and value

While the research of convertible bonds issues on non-financial industries is extensive, surprisingly, to our best knowledge, there is no research has done on the financial industry.

Because of the special economic role of money and the uncertainty associated with financial intermediaries (Dow, 1996), they are normally heavily regulated. The recent global financial crisis calls for stringent bank regulation to encounter the

problems when the market conditions worsened abruptly. Basel III requires banks to hold 4.5% of common equity (increase from 2% in Basel II) and 6% of Tier I capital (increase from 4% in Basel II) of risk-weighted assets. Basel III also introduces some additional capital buffers. Banks must hold 2.5% mandatory capital conservation and a discretionary countercyclical buffer, which allows national regulators to require up to another 2.5% of capital during periods of high credit growth. The ability of banks' recapitalization becomes crucial for banks not only to be able to survive in the market meltdown but also to be able to meet the stringent bank regulation imposed by Basel Committee and local government.

Convertible bonds have two special functions that can be of particular interests for banks. First, the call features of convertible bonds give the ability of the issuer to force investors to exercise their conversion option early, sometimes subject to certain share price performance, thereby inducing the investors to swap their bonds for shares of stock. Second, contingent convertible bonds (so called CoCos) can be automatically converted into ordinary shares once the equity ratio falls below a predetermined threshold. It is considered as a transparent, efficient and less costly resolution mechanism for distressed banks to increase capital level when needed (Koziol and Lawrenz, 2011).

Hence, by issuing convertible bonds, banks may enhance their recapitalization abilities to encounter problems when facing worsened market conditions or threatened to not be able to meet the capital regulation. The issuance of convertible bonds may also mean a positive signal to the stock market that the bank has more flexible capital conditions to meet various requirements from both the market and government.

Literature on the impact of bank capital on performance, stability and total value is extensive but rather conflicting. Modigliani and Miller (1958) propose the capital structure irrelevance principle. They demonstrate that in a world of fully informed investors, no taxes, and risk-free debt, firm value is determined without regard to the firm's capital structure.

Myers and Majluf (1984) present a model of the issue-invest decision when the firm's managers have superior information, and explain how the lemon problem, which caused by this informational asymmetric, leads to a real capital investment misallocated and a decrease of the firm value. If the managers know more about the value of its assets and opportunities than potential investors, there will be cases in

which that information is so favorable that management, if it acts in the interest of the existing stockholders, will refuse to issue shares even if it means passing up a good investment opportunity. Because the cost to the existing shareholders of issuing shares at a bargain price may outweigh the project's NPV. The investors may think no shares issuance signals 'good news'. The news conveyed by an issue is bad or at least less good. This affects the price investors are willing to pay for the issue, which in turn affects the issue-invest decision. Their model suggests that when the firm has asymmetric information problem, and issue stock to finance investment, stock price will fall and the value of firm will decrease.

Besanko and Kanatas (1996) show that in imperfect information environment the equity value of an impaired bank may decrease when it is required to meet the capital standard, and its stock price will fall in response to a forced recapitalization. Requiring a higher capital to assets ratio would reduce bank's deposit funding, for a given asset base, and thereby provide a disincentive for such risk-taking. However, they argue that enforcing a higher capital requirement may result in greater risk exposure for the regulator. Their model predicts that banks that are required to issue stock to satisfy a capital requirement will experience a decline in their stock price. The results suggest that when there is an economic significant agency problem between managers and investors, regulatory capital standards may not have their expected effect in promoting bank safety. Enforcing the capital standard might actually lower the bank's market value under certain conditions. Therefore, the increase in the regulator's exposure would accompany a reduction in the bank's market value of equity.

Hellmann, Murdoch, and Stiglitz (2001) find that capital requirements force banks to have more of their own capital at risk so that they internalize the inefficiency of gambling. The capital requirement induce banks to take more prudent portfolio risk but may also reduce charter values and encourage more gambling behavior.

Other studies give the similar implication by presuming that bank capital imposes a value-relevant cost (Thakor, 1996; Kashyap, Rajan, and Stein, 2002; Dell'Ariccia and Marquez, 2006; Repullo and Suare, 2007; Allen Carletti, and Marquez, 2009). For example, Thakor (1996) shows that the bank earns lower rents when capital requirements go up, because the increase in bank capital requirements raises the bank's cost of lending without increasing its bargaining power. Thus, the

supply of bank loans decreases, and the bank has been forced to switch from loans to lower-yielding securities, with potential value implications.

Previous studies also argue that bank capital contributes positively to value. Holmstrom and Tirole (1997) study an incentive model of financial intermediation in which firms as well as intermediaries are capital constrained. They use the example of a credit crunch from late 1980s to early 1990s in several OECD countries to show that all forms of capital tightening, such as credit crunch, collateral squeeze, or savings squeeze hit poorly capitalized firms the hardest. They suggest that the capital of bank induces the bank to monitor borrowers and improves borrowers' access to credit both from the bank and the capital market.

A similar argument is suggested by Allen et al (2011) that bank capital not only increases the incentive of its monitor, the success probability of the borrowers, but also the extracted surpluses captured by borrowers in a competitive credit market. They develop a simple one-period model of a competitive credit market where equity capital is costly but banks may nevertheless choose a level that is above the regulated level. Banks grant loans to firms and monitor them, which helps improve firms' expected payoff. Bank monitoring can increase the probability that the firm's loan is repaid, and the probability of firm's investment is successful will increase as a result of the monitoring. More successful investment the firms make, more borrowers desire the loan. A higher loan rate gives banks higher payoff on average, therefore gives banks greater incentive to monitor the firms. The amount of bank's equity capital has affects its incentive to monitor as well. The more capital there is, the greater the loss the bank will face if the loan is not repaid, and so the greater the bank's incentive to monitor. They also argue that the market equilibrium entails a combination of capital and loan rate that would maximize borrower surplus. This could be an asset-side incentive to hold capital. The loan rate is set at the lowest level consistent with bank participation, and the remaining incentives for monitoring loans are provided by banks holding positive amounts of capital. The competition in the loan market induces banks to voluntarily hold positive levels of capital as a way to commit to greater monitoring. Banks may even keep a higher capital level than the regulatory minimums. In a competitive credit market, banks keep more capitals to generate more surpluses of the borrowers, therefore to make their loan more desirable. Allen and

Gale (2004) theoretically justify the result as well. They argue that greater competition among banks reduces the interest rates that borrowers pay, increases the profitability of their ventures and hence reduces the incentive to take risk. Therefore, increased competition among banks leads to increased financial stability. Allen Carletti and Marquez (2011) focus on the agency problem between firm's shareholders and managers. They show that the bank monitoring could increase the probability that the firm will repay its loan, which in itself is an incentive for the monitor, and could benefit the firm's owners. The amount of equity capital could affects bank's incentive to monitor, because the higher the level of capital, the greater the loss the bank's owners will face if the loan is not repaid and, in turn, the greater is the bank's incentive to monitor.

Capital provides loanable funds and buffers earnings decline for the bank, which imply that better capitalized banks could be safer. An earlier study by Keeley and Furlong (1990) demonstrated that capital controls do indeed enhance bank safety. They find there are two reasons why declining capital ratios could lead to an increased rate of bank failures. First, lower capital, holding asset risk constant, leads to less protection against failure. Second, lower capital ratios increase the incentive for banks to increase asset risk. Thus, even if overall risk in the economy did not increase, banks would have a greater incentive to increase asset portfolio risk due to the decline in capital ratios.

Recent studies conforms the findings that bank capital adds total value. Mehran and Thakor (2011) show theoretically that higher capital provides a higher survival probability for the bank in dynamic setting, and also present evidence that capital positively affects bank value in the cross-section. In their theoretical model, the benefits of bank associated with capital come from both direct and indirect way. The direct benefit is that higher capital reduces the probability of the bank being closed at an interim time. The indirect benefit is that the bank invests more in monitoring its relationship with borrowers and earns higher rents[4]. Moreover, an acquirer will pay more for a bank with more capital, since this bank monitored more in the past and thus has more valuable loan portfolio with a higher expected future payoff. Berger and Bouwman (2011) also show that during the banking crisis, more capital increases the survival probability and associate with higher abnormal stock returns. There is a

[4] See also Allen, Carletti and Marquez (2008) and Holmstrom and Tirole (1997).

set of theories that suggests capital as a buffer to absorb negative shocks to earnings (Repullo, 2004, Von Thadden, 2004). If the bank's portfolio, screening, and monitoring choices are held fixed, then this buffer role immediately implies that higher capital increase the probability of the bank's survival. There are also some other theories focused on the incentive effects of capital. Holmstrom and Tirole (1997), Allen et al (2011), and Mehran and Thakor (2011) propose the monitoring theory. They argue that higher bank capital induces higher levels of borrower monitoring by the bank, thereby reducing the probability of default. Coval and Thakor (2005) use the screening-based theory showing that a minimum amount of capital may be essential to the very viability of the bank. Merton (1997) shows another theory that based on the asset-substitution-moral-hazard. He argues that shareholders to prefer low capital and excessive risk to increase the value of the deposit insurance put option because they have the government guarantees. Berger and Bouwan (2011) provide empirical evidence that capital helps banks of all sizes during banking crises. For small banks, capital is the main defense of negative shocks since they have limited access to the financial market in unanticipated event. Therefore, higher capital increases the survival probability for them all the time. Medium and large banks can rely on financial market access, and correspondent and other interbank relationships as risk-mitigation sources in addition to their on-balance-sheet capital to survive negative shocks. However, banking crises create stresses for all banks, and financial market access and interbank relationships may offer inadequate protection against negative shocks for all but the very largest banks. So, capital may be very important for survival for medium and large banks during banking crises.

Hypothesis 1: The announcement of convertible bond offerings by banks has a less negative market valuation effect than offerings by non-financial companies.

2.5 Determinants of the size of wealth effects

Theory provides conflicting predictions about the impact of diversification of activities on the performance of banks. Diamond (1991), Rajan (1992), Saunders and Walter (1994), and Stein (2002), suggest that banks acquire information on clients during the process of making loans that may improve the efficiency of other financial

services functions. Similarly these financial services can also produce information that improves the loan making. Therefore diversified banks enjoy economies of scope that boost performance and market value. Other literature provides similar suggestions, for example, Diamond (1984) suggests that diversification within banks can increase market valuations by facilitating monitoring, and Williamson (1970) and Gertner et al. (1994) argue that the diversification of bank's financial activities can ease informational asymmetries and use internal capital markets to allocate resources more efficiently. On the other hand, Laeven and Levine (2007) argue that diversification of activities within a single financial conglomerate could intensify agency problems between corporate insiders and small shareholders with adverse implications on the valuation of the conglomerate. The diversification may increase the level of information asymmetries because of the expanded range of financial activities. The more complex financial activities could give managers more chances to make decision for their own benefits without known by the shareholders. Therefore we test the following hypothesis.

Hypothesis 2: The level of diversification of bank's financial service is expected to have negative effect on the abnormal return.

Theoretical work by Clarke (1983) and Gal-Or (1985) predicts that in more concentrated industries firms have interdependent investment strategies with rivals, and firms in such industries prefer less information disclosure policies to avoid providing competitors with strategically useful information. If a firm discloses its production information, it will be seen as a signal of higher future demand for the products made in its industry, which could cause its competitors to increase production to protect their market share. Ali et al. (2009) provide empirical evidence that firms in more concentrated industries have opaque information environments. They use a sample of manufacturing firms in US over the sample period 1995-2004, and find that negative relations between industry concentration with the frequency of management earnings forecasts and frequency make long-term forecasts, and with disclosure ratings from analysts. They also find that firms' in more concentrated industries have current stock returns that are less reflective of future earnings changes, because firms that publicly disclose less information about themselves should have worse information environments. Bolton et al (2007) suggest that competition among

financial intermediaries can reduce the information asymmetry because competition both reduces the gains from lying and induces financial institutions to disclose information in order to differentiate their products. Since banks often care about maintaining their relationships with their clients, they need to provide more information about the financial product.

Hypothesis 3: Competition among financial intermediaries positively affect the bank's abnormal return associated with the convertible bond announcement.

Mehran and Thakor (2011) show theoretically that higher capital provides a higher survival probability for the bank. Higher capital reduces the probability of the bank being closed at an interim time in direct way, and increases the incentive of the monitor on the relationship with its borrowers and earns higher rents in the indirect way. Therefore the bank capital positively affects bank value. Berger and Bouwman (2011) also show that during the banking crisis, more capital increases the survival probability and associate with higher abnormal stock returns. Therefore a bank with high equity level issues convertible bonds has positive abnormal return. There is also conflicted opinion of the impact of bank's capital on bank's market value from other literature. Hellmann, Murdoch, and Stiglitz (2001) find that capital requirements force banks to have more of their own capital at risk so that they internalize the inefficiency of gambling. The capital requirement induce banks to take more prudent portfolio risk but may also reduce charter values and encourage more gambling behavior. Thakor (1996) shows that the bank earns lower rents when capital requirements go up, because the increase in bank capital requirements raises the bank’s cost of lending without increasing its bargaining power. Thus, the supply of bank loans decreases, and the bank has been forced to switch from loans to lower-yielding securities, with potential value implications. Therefore the announcement of convertible bonds issued by a high equity bank should have a negative effect on the abnormal return because more equity capital leads less market value. Stein (1992) also suggests that with costly distress, a company with substantial financial leverage will choose to issue convertible debt only if it is relatively optimistic about its future stock price. This is because if the stock price falls, the firm will not be able to force the conversion, and will be left with an even larger debt burden to service. In the financial industry, a bank with low equity level issues a convertible bond may indicate that it is optimistic

for the future stock price in order to converse the bonds into equity to be able to meet the government capital regulation and reduces bankruptcy risk. Therefore the bank equity level should be negatively related to abnormal return.

Hypothesis 4: Leverage of the bank negatively affects the bank's abnormal return associated with the convertible bond announcement.

III. Data and Methodology

3.1 Data description

The sample of convertible bond issues used in this study is constructed as follows. First, data on announcement dates and other features of the convertible bond issues are collected from the SDC (Securities Data Company) database on all US banks which issued convertible bonds between 1992 (when the Basel I was enforced by law) to 2011. Multiple issues of convertible bonds by the same bank on the same date was then consolidated.[5] We only include "plain vanilla" convertible bonds (no exchangeable bonds, mandatory convertible bonds, or convertible preferred stock). We then have 417 issues from 219 banks over the sample period.

The issuing bank's stock price data and bank's accounting data are collected from DataStream.

3.2 The event study methodology

Announcement effects of convertible bonds are generally measured by standard event study methodology as described in Brown and Warner (1985). They measure abnormal returns using the Ordinary Least Squares (OLS) market model regression

$$A_{i,t} = R_{i,t} - \hat{\beta}_{0,i} - \hat{\beta}_{1,i} R_t^M$$

where $A_{i,t}$ is the abnormal return for firm i on day t, $R_{i,t}$ denotes the return on security i on day t, defined as $\ln(P_{i,t})$-$\ln(P_{i,t-1})$, and R_t^M is the return on the market index that is measured in a similar way as $R_{i,t}$. The parameters $\hat{\beta}_0$ and $\hat{\beta}_1$ can be

[5] The proceeds are added up to arrive at the total proceeds for that day.

estimated over the estimation period by running an OLS regression of the stock returns on a constant and the return on the market index. The market return is the rate of return on S&P 500, a market weighted index of the top 500 stocks trading on either of the New York Stock Exchange and the NASDAQ.

Following Kang and Stulz (1996) and De Roon and Veld (1998), we use the 3-day event (day -1 to day +1). The announcement day reported by SDC is denoted as day 0, one day before this date is denoted as day -1, and one day after is day +1. A 200-day period for each company is used for the estimation for the abnormal returns, which are based on the market model, and the estimation period ranges from day -200 to day -10. The test statistic is calculated using the methodology outlined by Brown and Warner (1985, p.7) and defined as

$$\bar{A}_t / \hat{s}(\bar{A}_t)$$

where $\bar{A}_t$ is the average abnormal return over the N different firms on day t and $\hat{s}(\bar{A}_t)$ is the standard deviation of the average abnormal return obtained from the estimation period. The null hypothesis is that the abnormal return is zero. If the null hypothesis holds and if the abnormal returns are independently identically distributed with finite variance, the test statistic is asymptotically normally distributed. The cumulative average abnormal returns over the 3 days event window are also calculated.

The Fama-French three factor model is used to adjust the abnormal return reaction at the announcement of the convertible bond. Size and book-to-market equity (BE/ME) are used as proxies for stock risk. This model uses three explanatory variables for explaining abnormal return. The first variable is the excess market return factor which is the market index return minus the risk-free return. This is calculated from the S&P 500 index (using the formula R=ln[y(t)]-ln[y(t-1)]) which is a weighted average of popular stock reflecting market movements at the national level. The second is SMB (small minus big), which is the risk factor in returns related to size. This is the difference between the daily return on small and big stocks. The third factor is HML (high minus low), which is related to value. This is the difference between the daily return on high book to market equity stocks and low book to market equity stocks.

The Fama and French three factor time-series regression estimated is

$$R_{jt} = a_j + b_j R_{mt} + s_j SMB_t + h_j HML_t + \varepsilon_t \qquad \text{j=1,...,N; t=1,...,T}$$

where R_{jt} and R_{mt} are the daily return on stock j and the market portfolio. a_j, b_j, s_j, and h_j are stock specific parameters and ε_t is the random error. BE/ME is book value of common equity for the fiscal year ending in calendar year t-1, divided by market equity at the end of December of t-1. The three factor are computed exactly as in Fama and French (1993). The Fama and French factors are from Kenneth French data library.

3.3 Proxies and control variables

The variables that are used in the analysis are related to the hypotheses described in Section 2.5

Diversification is measured as the proportion of non-interest income (all other operating revenues of the bank besides interest income) over bank's total operating income (the difference between sales and the total operating expenses, including both net interest income and non-interest income) (Laeven and Levine, 2007). The non-interest income represents all other operating revenues of the bank besides interest income. This is used to test hypothesis 2 whether the level of diversification of bank's financial service is negatively affect the abnormal return associated with the convertible bond announcement. ***CR3*** is the concentration ratio measured as the percentage of total assets held by the three largest banks in the banking market. The degree of banking competition is associated with market concentration. The higher the level of concentration, the lower the degree of competition. The concentration ratio is to test hypothesis 3 whether the competition among financial intermediaries positively affect the bank's abnormal return. **KA** is the level of bank equity capital, calculated as the total equity capital divided by total assets. This is used to test hypothesis 4 whether higher capital ratio of the bank negatively affect the abnormal return associated with the convertible bond announcement.

We also control for various issue, bank and market specific characteristics in order to have a robust examination of the impact of bank diversification, competition

and capital level on the abnormal return associated with convertible bond announcement.

Coupon is the coupon rate paid on convertible bonds. The coupon rate is a key factor for firms to call the convertible bonds early or late. Sarkar (2003) points out if the coupon rate is higher than the dividend yield on the underlying stock, the firm will force the conversion to save money by paying lower dividends instead of paying higher coupon interest. However if the coupon rate is lower than the dividend yield that is forgone by not converting the bonds into stock, the firm will not call the convertibles in order to save the difference. A late call of the convertibles could be seen as a good sign for the investors because they may feel the issuer is optimistic of the future growth. Hence lower coupon rate leads less negative abnormal return. Veld and Zabolotnyuk (2009) also suggest that investors prefer the issuer to call convertible late. The investor may put downward pressure on the price for the new issued convertibles from the firms which call their convertible bonds early in the past. However, Duca et. al.,(2011) suggests that zero-coupon convertible bond will be more interested by the arbitrageurs since the zero coupon rate makes it easier for them to separate the option component of the convertible from its fixed-income component. Arbitrageurs but convertible bonds and short sell stocks will bring down the stock prices, and reduce the stock abnormal return. Therefore we have no clear expectation of the relationship between coupon rate of the bank's convertible issues and the stock abnormal return.

Tobin's Q (Q) is used to measure bank's investment growth opportunities. Theoretically this ratio is defined as the ratio of a firm's market value to the replacement costs of its assets. Because of data availability, we estimate Q = market value of the firm's assets/ book value of the firm's assets, to obtain the market-to-book ratios as the proxy for the growth opportunities. The market-to-book ratio is the value of the fiscal year ending in calendar year one year before the announcement. This measure captures the rate of change of investment during the period immediately surrounding the announcement of convertible bond. A bank with good growth opportunities should face less agency costs. De Jong and Veld (2001) argue that expectations in the market regarding the profitability of the firm's projects reduce the adverse selection problems. This adverse selection problem occurs when investors believe that managers issue new security when its common stock is overvalued, and

therefore they want discount on the price. If investors could see the bank has good growth opportunities, this problem could be solved. Therefore we expect that better growth opportunities of the bank positively affect the abnormal return associated with the convertible bond announcement.

VOLAT is the annualized bank stock returns volatility, measured as annualized standard deviation of underlying stock returns. The volatility of the bank's stock expressed relative to the volatility on the S&P 500 index measures the level of the bank's riskiness. Lewis et al (1999, 2003) argue that firms with a higher volatility face higher costs of attracting new debt financing. Duca et al., (2011), Dutordoir and Van de Gucht (2007) also provide the empirical evidence in split-sample abnormal return regressions that the volatility of stock return is significant negatively related to the abnormal return in both hot and non-hot convertible debt market, where hot convertible bond means periods with a high convertible debt issuance volume. Therefore we expect that firm's volatility is negative related to abnormal return associated with convertible bond announcements.

STOCK RUNUP as a proxy for the level of equity-related financing costs faced by the convertible bond issuers is calculated by issuer's raw stock return over 75 days preceding the announcement date. It is measured as the continuously-compounded non-market-adjusted daily stock return over trading days -75 to -1. (Dutordior and Van de Gucht, 2007)A firm with high stock run-up is more likely to be seen as overvalued by stockholders. Lucas and McDonald (1990) and Jung et al. (1996) suggest that firms are more likely to issue equity when pre-issue stock return is high. Lewis et al. (2003) also find that firms with high pre-issue stock run-up and high-risk firms are more likely to issue equity-like convertibles to reduce equity-related financing costs. Therefore we expect the relationship between pre-issue stock run-up and convertible bonds announcement abnormal return is negative.

Bank liquidity (or slack for non-financial firms) is measured as the ratio of liquid assets (cash and short term investment) over total assets. De Jong and Veld (2001) argue that, because of the information asymmetries, there will be an adverse selection problem if a firm with liquid assets issues equity-like convertible bond. Since the slack provide an alternative source for financing of new projects, the investors are more likely to believe that the firm is overvalued and want discount on

the price. But the wealth effect of liquidity is uncertain because it does not only have a negative effect of increased agency cost of equity, but also a positive effect. Loncarski et al. (2006) argue that liquid assets can be seen as a buildup of internally generated and needed funds for increased capital expenditures, when the external sources of financing are very costly. Loncarski et al. (2006) and Lewis et al (2009) also provide empirical evidence that the firm liquidity and abnormal return are positively related. However, Dutordoir and Van de Gucht (2007), Lee et al (2009), and Duca et al (2011) fail to find significant impact of firm liquidity on stock performance in reaction to the convertible bond issues. Hence, we include bank liquidity in our cross-sectional analysis without hypothesizing its overall wealth effect.

Table 1 Description of Variables

Variable name	Description
Diversification (DIV)	The ratio of non-interest income over total operating income.
Concentration (CR3)	The share of three largest bank's total assets over the total assets of the whole banking system
Bank capital (KA)	The total equity capital divided by total asset.
Coupon (COUPON)	Coupon rate paid on convertible bonds
Tobin Q (Q)	The sum of market value of equity
Volatility (VOLAT)	Annualized standard deviation of underlying stock returns.
Stock runup (RUNUP)	The level of equity-related financing costs faced by the convertible bond issuers
Bank liquidity (LIQ)	The ratio of liquid assets over total assets.

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