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20 October 2014

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20th October 2014

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Abstract

In the lead-up to the implementation of Basel III, European banks bought back debt securities that traded at a discount. Banks engaged in these Liability Management Exercises (LMEs) to realize a fair value gain that the accounting and prudential rules exclude from regulatory capital calculations, this to safeguard the safety and soundness of the banking system. For a sample of 720 European LMEs conducted from April 2009 to December 2013, I show that banks lost about €9.3B in premiums to compensate investors for parting from their debt securities. This amount would have been recognized as Core Tier 1 regulatory capital, if regulation would accept the recognition of fair value gains on debt. The premiums paid are particularly high for the most loss absorbing capital securities. More importantly, the premiums increase with leverage and in times of stress, right when conserving cash is paramount to preserve the safety and soundness of the banking system. These results weaken the case of the exclusion from regulatory capital of unrealized gains that originate from a weakened own credit standing.

JEL codes: *E58, G21, G28, G32, G35, M41*.

Keywords: *Banking, repurchases, subordinated debt*.

BANKS are subjected to a rule that requires them to derecognise, for the calculation of regulatory capital ratios, any gains or losses on their liabilities valued at fair value that are due to changes in their own credit standing.[1] To illustrate this derecognition requirement, a bank with a low credit rating may notice one of its debt securities trades below par and therefore may wish to recognise the related fair value gain as income. The income increase will then directly improve the bank's equity level and its Core Tier 1 ratio. Unfortunately, for prudential reasons, bank solvency rules disallow the recognition of this gain.[2] However, a bank can circumvent the derecognition requirement by repurchasing the debt security at the lower market value in a Liability Management Exercise. That is, at a cost: To compensate the debt holder for parting from his security, a bank will have to pay a buyback premium. This buyback premium is the subject of this study.

A typical Liability Management Exercise would work as follows: On April 1st of 2009, Crédit Agricole announced the buyback of an Upper Tier 2 debt capital security that traded significantly below par, at 52%. Shortly after the announcement, Crédit Agricole exchanged £545M of this security at a price of 72%, thus paying the holders a 20% buyback premium (Crédit Agricole, 2011b,a). This Liability Management Exercise added £153M to equity and Core Tier 1 capital, equivalent to a 5.03 basis points increase in Crédit Agricole's 8% Core Tier 1 capital ratio. Offsetting this gain is the reduction of total regulatory capital by £545M, the decrease in Tier 2 capital. In addition, at the expense of equity, Crédit Agricole paid the debt security holders a cash premium of £114M (20% of £545M). In the absence of the derecognition requirement, this premium could have been recognised as net income, which would increase common equity and Core Tier 1 capital.

The illustration demonstrates the derecognition requirement prompts inefficient behaviour: Banks pay significant premiums to debt holders to complete a transaction that *i*) reduces the total amount of and regulatory capital, *ii*) reduces liquidity, *iii*) benefits debt holders at the expense of equity holders. This in exchange for a limited increase in Core Tier 1 capital.

[1] Article 64(4) of (EC, 2006))

[2] The rule that excludes gains and losses resulting from changes in own creditworthiness is symmetrical. Unrealized gains originating from a deteriorated own credit standing shall not be included in regulatory capital. Likewise, the loss on a debt security associated with an improved credit standing shall not affect regulatory capital either. This rule aligns the measurement of liabilities with that of liabilities accounted for at amortised cost.

There are several reasons to derecognise unrealized gains and losses on changes in own credit standing. First is that the value of liabilities may be only temporarily depressed. This renders the unrealized gain into a temporary one. It would therefore be imprudent for a bank to consider the gain as realised, as that would allow a bank to distribute the gain to shareholders. This instead of preserving it for the redemption of the liability in full.

A second reason, related to financial stability, is that a bank supervisor that allows a bank to recognise the gain made on a deteriorated credit standing may send out a distressing signal: The supervisor may give the impression that it acknowledges that the bank is unable to redeem the liability in full.

A third, and often cited reason, is that gains made on a deteriorated own credit standing are counter-intuitive (ECB, 2001; Barth et al., 2008; Alloway, 2009).

The merits of these reasons are unclear. Excluding the gains on a weakened own credit standing because they are only temporary assumes perfect foresight about the bank's ability to regain a higher credit standing. Then still, by the time the bank's credit standing improves, the assets of the bank have increased in value more than sufficiently to enable the bank to redeem the debt in full, a point made by Barth et al. (2008). In case the credit standing does not increase, a bank should be able to redeem it at the lower value.[3]

Regarding the financial stability reason, when credit standing deteriorates, the supervisor's signal would likely be only one of the many worrying signals received by instrument holders.

Lastly, the reason that the gains shall be excluded because there is something intuitively wrong about them speaks for itself.

Surprisingly little research has been done into the effects of the ban on recognising unrealized gains and losses originating from changes in own credit standing. But, policies that rely on intuition prompt closer examination. This is what this paper attempts to do.

[3]Henceforward, I will use the terms "security" and "instrument" interchangeably.

This paper analyses the buyback premiums that 100 banks from 16 European countries paid from April 2009 to December 2013. In a drive to improve the quality and quantity of regulatory capital, these banks engaged in Liability Management Exercises with the objective to crystallise fair value gains on debt instruments and add these gains to Core Tier 1 capital.

I document four factors that drive the buyback premium. The first factor is the loss-absorbing capacity of the bought back instrument: Premiums are highest for Liability Management Exercises that involve the most loss absorbing capital instruments. The second factor is book solvency measured as equity over total assets. Less solvent banks pay a higher premium in a Liability Management Exercise than well-capitalised banks, a result that in line with option theory, but contrasts with De Jong et al. (2009), who document no significant relation between premium and book solvency. The third factor is economic uncertainty, which has not been documented before as a determinant of buyback premiums. Lastly, the buyback premium decreases with the size of the bank, which may be the result of several factors, among which are more intensive following by investors and elevated levels of interest in these banks by governments.

To the best of my knowledge I am the first to document the effects of Liability Management Exercises on the structure of regulatory bank capital. Banks appear willing to sacrifice total regulatory capital (i.e. hybrid Tier 1 and Tier 2 capital) for limited gains in Core Tier 1 regulatory capital. This is also the first study that analyses Liability Management Exercises in a setting that unambiguously incentivises banks to bolster Core Tier 1 capital to meet regulatory demands and pressures from investors.

Unlike Mann and Powers (2007) and Wingler and Jud (1990), I find no significant relation between buyback premiums and performance (measured by ROA).

I documents a positive effect of the EBA recapitalisation exercise, though the effect is barely significant. This result contrasts with that of Mésonnier and Monks (2014), who document a negative impact of the EBA recapitalisation exercise on bank lending, which too is a manifestation of the pressure put on banks to increase capital levels.

These results are relevant because they show that the ban on recognising fair value gains originating from a changed own credit standing may negatively affect the safety and soundness of the banking system. In a context of economic uncertainty, poorly capitalised banks, for which cash conservation is paramount, engaged in the least efficient and least cash conserving Liability Management Exercises. This is precisely the opposite of what the recognition ban aims to achieve.

I. Background – Literature and Regulation

A. Literature

There is limited literature on early debt redemptions, albeit that none of these papers study regulatory bank capital structure. Nor do these studies focus on change in capital structure in a context that incentivises them to augment solvency ratios during challenging economic times. Neither has much research been done on the exclusion from regulatory bank capital of cumulative unrealized gains and losses on changes in own credit standing; which is surprising, because the exclusion requirement attracted controversy at the time of the introduction of IFRS in Europe.

Early studies on Liability Management Exercises rely on small samples. For example, Johnson et al. (1989), examine 42 in-substance defeasance transactions over the years 1980–1985. These transactions are akin to debt securitisations, where U.S. accounting standards allowed firms to purchase U.S. government securities to take risky debt off balance (FASB, 1983). The positive difference between the value of the securities and the value of debt could be recognised as income and be added to retained earnings. Johnson et al., document that debt holders benefit from these transactions; however, they find no evidence that shareholders finance this gain. Johnson et al. document negative stock returns around the announcement of a transaction, but this result is not significant.

Chatterjee et al. (1995) examine the wealth effects of high-yield bond workouts of 40 distressed U.S. firms during the years 1989–1992. They document mixed evidence: exchange offers lead to negative announcement returns, whereas tender offers lead to positive announcement returns. Kruse et al. (2014) also show mixed results for announcements of debt repurchases. Returns

around announcements of exchange offers are positive and just significant, whereas returns around announcements of cash offers are insignificant. The strongest positive returns that Kruse et al. document are around announcements of assets sales. But then again, that result relies on 19 observations. Moreover, untabulated results from my sample, show no difference between premiums paid in cash buyback transactions or exchanges of instruments.

Wingler and Jud (1990) also find mixed evidence, that is, for the stock returns around the announcement of a tender offer. They examine bond tenders of 26 U.S. utilities over the period 1983–1988 and show that investors favour an offer when a firm's prospects are improving. For firms with declining prospects, investors perceive tender offers as bad news. De Jong et al. (2009), on the other hand, show no negative abnormal share returns in their study of 109 bond tender offers by 96 European firms over the period 1996–2005.

Mann and Powers (2007) use a sample of 943 tender offers from U.S. corporates. Like Wingler and Jud, Mann and Powers use a sample where bonds that trade at a premium dominate. Mann and Powers show that tender offers are more likely when credit spreads are tight. My research shows that firms engage in Liability Management Exercises in adverse conditions, e.g when spreads are wide. In addition, Mann and Powers examine the effects of covenant restrictions. This again is different in my study, as most of the securities exchanged are capital securities, which, to make them more loss absorbing, have a limited number of covenants.

Regarding the accounting for debt, there is limited literature on the fair value option. This literature focuses on firms that elected the fair value option around the time of the introduction of SFAS No. 159 *The Fair Value Option for Financial Assets and Financial Liabilities* in the U.S. (FASB, 2007). In addition, this literature focuses on fair valued assets mainly, with one article focusing on the fair value of liabilities.

Song (2008) and Henry (2008) show that firms opportunistically elect the fair value option. Couch et al. (2014) find that SFAS No. 159 adopters have a significantly greater increase in earnings volatility than non-adopters. The main cause of this result is a dominant number of firms that adopt SFAS No. 159 for assets only, which apparently runs against the spirit of the fair value op-

tion, as its use should mitigate the accounting mismatch between assets and liabilities by managing them jointly.

Guthrie et al. (2011) counter the negative comments on the use of the SFAS No. 159 and find no evidence of systematic and economically meaningful opportunistic elections of the fair value option.

Liu et al. (2011) distinguish between initial adopters and regular adopters of SFAS No. 159, and show that regular adopters acted according to the intent of SFAS No. 159, though some early adopters may have acted opportunistically. Liu et al. argue that their findings for regular adopters should apply *a fortiori* to all banks subsequent to initial adoption, because SFAS No. 159 is in effect and the results of early adopters are therefore largely irrelevant.

One empirical study that investigates fair value accounting for liabilities is Barth et al. (2008) who empirically examine the prediction of Merton (1974) on the moderating effect that debt has on equity changes in the event of a change of own credit standing. Merton predicts that a one dollar reduction in debt does not translate into a one dollar increase in equity. This is because the benefits of debt reduction accrue to creditors and debt holders, not *per se* to equity holders. Debt holders benefit from the improved solvency position that a debtor achieves by paying off debt. Barth et al. empirically confirm Merton's (1974) prediction. In addition, they find that the liability gains on a deteriorated credit standing are more than offset by deteriorated asset values, a point often overlooked by politicians and standard setters.

A theoretical paper that addresses buybacks is Admati et al. (2013), who argue that *all* of the benefits of buying back debt accrue to debt holders, not to equity holders. Admati et al. demonstrate that the repurchase price should make a debt holder indifferent between selling a debt instrument and holding on to it. This will only happen if the repurchase price equals the higher post-buyback debt level. For highly levered firms (i.e. banks) a free-rider problem ensues, which makes it punitively unattractive to reduce leverage. Once indebted, the cost of deleveraging only increases, a phenomenon that Admati et al. call the "leverage ratchet effect."

Bulow and Rogoff (1988, 1989, 1990) present a similar reasoning, this however in the context of the Latin American debt crisis in the 1980s. Bulow and Rogoff show that debtor countries do not benefit from buying back their lowly priced debt. All that happens in a repurchase transaction is that the price of debt rises to the higher post-buyback level. The prospective gains of a buyback are therefore deceptive.

B. Regulation

This section describes the relevant regulation that applies to debt instruments and their repurchase. It describes the solvency and accounting rules that were in effect during the period that led up to the entry into force of the EU Capital requirements regulation (CRR), the European implementation of Basel III. It includes a brief description of the relevant European capital requirement rules as well as applicable guidelines and standards from the European Banking Authority (EBA). Regarding the accounting for debt instruments, I will briefly describe the IFRS rules on the fair value option (EC, 2002).

The description of the regulation shows that from April 2009 on, European regulators actively managed their expectations regarding the quantity and quality of regulatory bank capital. This led to an increased demand for Core Tier 1 capital. The description also shows that banks could not always rely on the accounting to augment capital ratios.

EU capital requirements and bank capital structure

Until the entry into force of the European implementation of Basel III in 2014, banks were subjected to the Capital Requirements Directive (CRD II: EC (2006)). This directive reflects the (first) Basel accord and the Basel II Framework, which require that 8% of risk-weighted assets be backed by capital to absorb losses (Basel I: BCBS (1988), Basel II: BCBS (2006a)).

CRD II allowed banks to structure regulatory capital to minimize the use of costly equity. The 8% requirement for capital adequacy, for example, pertains to the BIS ratio for total capital. This ratio is the sum of Tier 1 capital (core capital) and Tier 2 capital (or supplementary capital) both

divided by risk-weighted assets. Banks could satisfy the total capital requirement with a maximum of 50% Tier 2 capital, where Tier 2 capital instruments are subordinated debt instruments. See table Table I for an overview of regulatory capital requirements.

[About here Table I]

For Tier 1 capital requirements, banks could rely on hybrid capital, e.g. preferred shares and perpetual or permanent debt instruments that were subordinated to Tier 2 instruments. They could use hybrid capital instruments to a maximum of 50% of capital of the highest quality (book equity). Total Tier 1 capital then would allow up to one third of hybrid capital, with equity covering the remaining two thirds, see Article 66(1) of CRD II. Given these limits, banks could, in theory, satisfy the 8% regulatory capital requirements with $2\frac{2}{3}\%$ of equity over risk-weighted assets.

As a response to the global financial crisis, and to the capital standards that were in effect at the time, bank regulators vouched to improve the quality and quantity of regulatory capital. In particular, they responded to the April G20 of 2009, where global leaders agreed to improve the quality, quantity, and the international consistency of capital in the banking system (G20, 2009).[4]

The quality of capital: Soon after the April 2009 G20, EBA's predecessor (CEBS) published two sets of guidelines for Tier 1 capital that initiated the drive for more and better regulatory capital. The first set of guidelines required hybrid instruments to absorb losses through conversion or write-down at the behest of the supervisor if the issuer of these instruments failed to do so (CEBS, 2009).

The second set of guidelines tightened the requirements for equity instruments, also known as Core Tier 1, or core capital of the highest quality (CEBS, 2010). The reason for this tightening was the broad definition of this element of core capital under the CRD II, which created a proliferation of certificates and pseudo-shares that could count as core capital of the highest quality. CEBS

[4]This is just weeks after the meeting of the G20 Finance Ministers and Central Bank Governors, who showed more restraint in their commitment to reform and strengthen the global financial system, they wanted to keep capital requirements "unchanged until recovery is assured." (GHOS, 2009)

aligned the new definition of Core Tier 1 in line with the then forthcoming definition of regulatory bank capital of Basel III (BCBS, 2009, 2010).

When Basel III came out in 2010, it presented an improved regulatory capital framework. The structure of regulatory capital that it required had kept the two tiers (BCBS, 2010). But, it augmented the importance of Common Equity Tier 1. This (CET1) is equity capital after deduction of non-loss absorbing capital elements such as goodwill and deferred tax assets. Basel III requires banks to hold at minimum 4.5% of CET1 over risk-weighted assets, plus 2.5% capital in a capital conservation buffer. To mitigate procyclicality in the financial sector, Basel III requires a countercyclical buffer that would raise the capital requirements by again 2.5%. On top of these CET1 requirements is a capital surcharge for systematically important banks which requires them to have in issue an additional 1% to 3.5% of CET1 capital.

Note that *CET*1 is the Basel III definition of core capital of the highest quality, where Basel II and implementations thereof do not define an equivalent of this element of capital. Instead, reference is made to *Core Tier 1*. This is Tier 1 capital net of hybrid Tier 1 instruments.

Regarding hybrid instruments, Basel III requires banks to have at least 1.5% Additional Tier 1 capital and at least 2% Tier 2 capital. Furthermore, Basel III and the EU bank recovery and resolution directive require all capital instruments to be written off or converted into equity at the point that the viability of the bank is at risk ((BCBS, 2011), EC (2014)).

Banks were not forced to issue Basel III compliant instruments to replace existing capital instruments before the entry into force of Basel III. Old-style instruments would be gradually phased out between 1 January 2014 and 1 January 2021 (EC, 2013).

Although Basel III would only enter into force in 2014, banks responded to the regulatory initiatives by issuing instruments that anticipated the upcoming requirements. They did not, however, issue lots of common equity. For example, in 2011, Rabobank issued a Basel III compliant Additional Tier 1 hybrid instrument (Glover, 2011). Barclays, in 2012, announced the issuance of

an Additional Tier 1 instrument with a trigger that would automatically write down the instrument once the bank's CET1 ratio would drop below 7% (Glover, 2012).

The quantity of capital: The EBA actively managed expectations with respect to the amounts of capital that banks were expected to report. For example, for the 2011 stress test, the EBA set a Core Tier 1 requirement at 5% of risk-weighted assets. After this stress test, EBA rapidly raised expectations by setting that ratio to 9% for the 2012 EBA recapitalisation exercise (EBA, 2012). In setting this high ratio requirement, EBA may have responded to the embarrassing 2011 stress test, which did not prevent some banks from failing shortly after the results were published (Pignal and Jenkins, 2011).

For the 2014 EU-wide stress test, the benchmark is set at 8% Common Equity Tier 1 using the tighter definition of capital of fully implemented Basel III (ECB, 2013).

The changes in the regulation show that even before the entry into force of the CRR, regulators actively managed expectations about the quality and quantity of regulatory capital of European banks. Many European banks anticipated the forthcoming rules, if not voluntarily, they did so under pressure of their supervisors, the market – or to meet requirements of stress tests and the EBA recapitalisation exercise. In particular the EBA recapitalisation exercise stood out, because of the short time that it granted banks to meet a fairly demanding capital requirement (Mésonnier and Monks, 2014).

Instead of issuing new shares to satisfy the elevated Core Tier 1 ratio requirements banks could augment their capital of the highest quality through three alternative routes *i*) not distributing profits, *ii*) selling assets with a high risk weight by way of "derisking", and *iii*) buying back debt with a low market value.

Rules on Liability Management Exercises: The quality of capital instruments relies primarily on their loss absorbing capacity. Banks should be able to impose losses on these instruments, e.g. through a write-down or a conversion into equity. In addition, banks can impose losses on capital

instruments by way of cancelling coupon payments on Tier 1 instruments or postponing coupon payments (Upper Tier 2). See Table I for an overview of the requirements for regulatory capital.

The loss absorbing capacity increases with maturity. However, bank regulation governing the maturity of capital instruments is ambiguous and somewhat inconsistent.

In principle, regulatory capital instruments should be perpetual (or undated) and not callable. This to make sure the instruments are permanently available to absorb losses. In addition, solvency regulation disallows banks from creating any expectations that the instrument will be bought back (EC, 2006; CEBS, 2009; BCBS, 2010; EC, 2013).

Tier 1 hybrid instruments should be perpetual or undated. Further, Basel II and CRD II define *Upper Tier 2* capital instruments: subordinated debt instruments that should be perpetual or undated as well. *Lower Tier 2* capital instruments should be dated, with the condition that their maturity be at least five years, with an additional requirement that their contribution to regulatory capital gradually declines during the five years before redemption. In practice, Lower Tier 2 therefore often have a maturity of ten years.

These maturity requirements apply only in principle: the regulation also allows banks to call capital instruments after five years, which European banks generally do, albeit that rules apply. For example, banks cannot call, repurchase, or redeem capital instruments during the first five years after the date of issue (Article 64(2) of CRD II: EC (2006)). After the first five years, calls, buybacks, and redemptions can be executed. Still, conditions apply, where CRD II imposes conditions that are stricter for Tier 1 and Upper Tier 2 instruments than for Lower Tier 2 instruments. For example, Tier 1 and Upper Tier 2 instruments can only be called with permission of the supervisor and if the solvency of the credit institution in question is not unduly affected (See Article 64(3) of CRD II and §49 of CEBS (2009)). Only sufficiently solvent banks are allowed to buy back capital instruments; albeit that well-capitalised banks have no obvious incentive to engage in Liability Management Exercises to boost Core Tier 1 capital.

European banks tend to call at the first call date, with Deutsche Bank being the notable exception. During the global financial crisis it did not honour the call for a Tier 2 instrument, after which this bank found it difficult and costly to access the market for new issuances of capital instruments.

Note that the requirement to wait five years before the execution of a buyback, redemption, or calls was violated, albeit exceptionally. For example, in November 2011, the French Autorité de Contrôle Prudentiel allowed Société Générale, "to further enhance the quality and efficiency of the Groups regulatory capital," to buy back a small dozen of Tier 1 hybrids, of which at least seven were issued less than five years earlier.

Note that Basel III and implementations thereof continue to allow calling capital instruments after five years.

International Financial Reporting Standards

The default treatment for liabilities under IFRS is to recognise them at fair value initially, and subsequently at amortized cost using the effective interest method (IAS 39 §47 and IFRS 9 Section 4.2.1). This treatment applies to all instruments that cannot be measured at fair value with all gains and losses being recognised in profit or loss, i.e. financial liabilities held for trading, derivatives, and financial liabilities designated as at fair value through profit or loss on initial recognition.

Firms may designate instruments as at fair value through profit or loss on initial recognition by way of the fair value option. Under IAS 39 and IFRS 9, firms can apply the fair value option under conditions. For example, application of fair value option should result in more relevant information. In addition, firms may only elect the fair value option for instruments that mitigate the accounting mismatch that would otherwise arise from measuring assets or liabilities or recognising the gains and losses on them on different bases (IAS 39 §9). An important additional condition requires the firms to manage the instruments on a fair value basis (ibid). This implies that firms should be able to trade these instruments on a daily basis, which may not dovetail with prudential rules that require instruments to be permanently available to absorb losses.

The use of the fair value option by banks is not unproblematic. Bank regulators, in particular if they rely on the tight IFRS conditions, may resist its use for prudential concerns, albeit that no regulator offers a detailed explanation supporting these worries. For example, in 2004, ahead of the implementation of IFRS, the Basel committee issued a press release in which it expressed its worries about the inclusion of gains and losses arising from changes in an institutions own credit risk in regulatory capital (BCBS, 2004). The view of the committee was that these gains and losses should be excluded from regulatory capital. Apart from a reference to prudential concerns, the Basel committee provides no further detailed explanation or motivation supporting the ban on recognising fair value gains on debt instruments.

The European Central Bank (ECB) also used its influence to tightly control the fair value option. For example, on 6 September 2004 , Jean-Claude Trichet, head of the ECB, wrote a comment letter to Sir David Tweedie, chairman of the International Accounting Standards Board (IASB), informing him about additional conditions the ECB demanded with respect to the application of fair value option.[5]

The lack of agreement on the IFRS standard for financial instruments (IAS 39) was not solved at the entry into force of IFRS in Europe on 1 January 2005. Europe had endorsed IAS 39 with the exception of two "carve-outs." Of which one related to provisions governing the use of the fair value option.[6] Agreement on the application of the fair value option was only reached after coordination between the European Commission, the ECB, the IASB, and the Basel Committee: In June 2005, the carve-out was retroactively eliminated from IFRS so that companies would be able to apply the amended (stricter) fair value option for their 2005 financial statements (EC, 2005).

The elimination of the carve-out did, however, not apply unconditionally to banks. From 2005 onward, European bank capital rules require the derecognition of any gains or losses on own liabilities valued at fair value that are due to changes in a banks' own credit standing (CEBS, 2004; EC, 2006).

[5] See the letter: *https://www.ecb.europa.eu/pub/pdf/other/378_04_09_06_letter_iasb_signeden.pdf*.

[6] The second carve-out pertained to provisions on hedge accounting.

In 2006, the Basel committee adopted the IAS 39 (now IFRS 9) conditions for the use of the fair value option. Moreover, the committee also decided that banks shall derecognise any gains and losses from changes in own credit risk as a result of applying the fair value option to financial liabilities. The motivation to adopt this rule is the particular concern that, if a bank applies the option to its own debt, "it will recognise a gain and a resulting increase in its capital when its own creditworthiness deteriorates. Such an outcome would undermine the quality of capital measures and performance ratios" (BCBS, 2006b). The rule is now part of Basel III and the implementations thereof in Europe and the U.S. (BCBS, 2010; EC, 2013; OCC, 2013).[7]

In practice, European rules on own debt limit the application of the fair value option. Moreover, prudential bank regulation limits the ability to recognise fair value gains on debt.

II. Basis for prediction, Sample, and Research Design

A. Basis for prediction

A bank can circumvent restrictions on recognising fair value gains on debt and the conditions governing the use of fair value option by repurchasing debt. In doing so, the overall debt value increases. Therefore, an investor who is willing to sell a debt instrument back to the bank faces a free-rider problem: *other* debt holders benefit from the investor's willingness to sell his instrument back to the bank. Consequently, the investor will not sell at the current instrument price. Instead, he will only participate in a buyback transaction if he receives a premium. Bulow and Rogoff (1988) and Admati et al. (2013) predict that the investor will only participate in a buyback transaction if he receives a premium that increases the price to the value *after* the buyback.

[7]The United States followed suit, it introduced an equivalent rule in 2007 (FFIEC, 2007). The adoption of the fair value option conditions by the Basel Committee expands their scope to all large internationally active banks world-wide. However, the accounting rules in the U.S. (SFAS 159 and its successor Subtopic 825-10: Recognition and Measurement of Financial Assets and Financial Liabilities) do not mention these conditions, nor does the U.S. implementation of Basel III (OCC, 2013).

Merton (1974) enables me to show why debt holders would command a premium for selling their instrument back to a bank by demonstrating that the value of equity can be expressed as:

$$E = A \cdot N(d_1) - Ke^{-rt}N(d_2) \tag{1}$$

where E is the value of equity, A the asset value of the bank, K the book value of debt, r the risk free rate, and t the duration of debt. $N(d)$ is the probability that a standard normal random variable will be less than or equal to d:

$$\begin{aligned} d_1 &= \frac{ln(\frac{A}{K}) + (r + \sigma^2/2)^t}{\sigma\sqrt{t}} \\ d_2 &= d_1 - \sigma\sqrt{t} \end{aligned} \tag{2}$$

The last term in Equation 1 is the value of debt: $Ke^{-rt}N(d_2)$. This value increases with solvency, that is, up to a point where the value of debt starts declining, as shown by the figure below.

[About here Figure 1]

Banks generally operate at high levels of leverage, where the graph shows that debt reduction (a move along the graph to the right) leads to an increase in the value of the remaining debt. Holders of bank debt will therefore command a premium for parting from their instrument.

The buyback premium: The buyback premium compensates the holder of the instrument for early redemption in a Liability Management Exercise. The premium is of particular prudential interest, as it reflects a loss of cash, at the expense of liquidity and total regulatory capital, with limited gains in capital of the highest quality. Following the discussion on regulation in Section B, banks may predominantly focus their Liability Management Exercise efforts on debt instruments that count towards regulatory capital. The accounting rules and prudential regulation jointly work in such a way that, irrespective of the way they accounted for, gains on these instruments can be crystallised only through a buyback. In addition, regulatory capital instruments are meant to be loss absorbing and therefore offer the largest potential fair value gain in a buyback transaction.

Given Equation 1, Admati et al. (2013), and Bulow and Rogoff (1988, 1989, 1990), holders of debt instruments will command a buyback premium:

$$\begin{aligned} \pi &= P_X - P_A \geq 0 \\ P_A &= f(\tfrac{Ke^{-rt}N(d_2)}{n}) \end{aligned} \tag{3}$$

where P_X is the exchange price paid for the bought back instrument, P_A is its fair value before the buyback announcement, and n is the number of outstanding debt instruments.

Firstly, I predict Tier 1 instruments and Upper Tier 2 instruments to show a larger potential fair value gain and buyback premium than Lower Tier 2 instruments or senior unsecured debt. This is because Tier 1 and Upper Tier 2 instruments are subjected to requirements that make them more loss absorbing than other instruments, see also Table I.

Secondly, I predict that the buyback premium inversely varies with solvency. My primary measure of solvency relies on accounting values.

However, solvency may manifest itself in different ways. For example, a different measure of solvency is regulatory solvency, which is the distance of a capital ratio to its minimum required value. Unfortunately, this distance cannot be known precisely, as regulators can impose on banks additional capital requirements unknown to the public.[8] An imprecise measure of regulatory solvency can be used though: a bank may signal its true regulatory solvency position by way of its response to a stress test announcement or a call for recapitalisation.

Again another measure of solvency may be based on the probability of default, which may be higher in times of economic stress.

[8] These are the Pillar 2 capital requirements, which are kept confidential and meant to cover risks other than credit risk, market risk, and operational risk.

B. Research Design

I use the buyback premium as my main variable of interest: This is the difference between the buyback price and the value of the instrument before the buyback announcement.

$$\pi = P_X - P_A \tag{4}$$

where P_X is the exchange price of the instrument expressed as a percentage of the nominal value of the instrument; P_A is the price of the instrument before the announcement, also expressed as a percentage of the nominal value of the instrument (P_N). Instruments that are bought back in a Liability Management Exercise trade below par at the announcement date $(P_A < P_N)$. The exchange price should be higher, given Equation 3: $P_X > P_A$.

Regression models: To test the association between the buyback premium and loss absorbing capacity, I initially use the following regression model:

$$\pi = \beta_0 + \beta_1 \textit{Tier 1} + \beta_2 \textit{Upper Tier 2} + \beta_3 \textit{Lower Tier 2} + \varepsilon \tag{5}$$

where *Tier 1* is an indicator variable that is set to 1 if the bought back instrument counted towards Tier 1 capital, else the value is zero. Likewise, *Upper Tier 2* is an indicator variable for a Upper Tier 2 instrument, where Table I shows the loss absorbing capacity of these items. The regression model relies on p-values that account for the two dimensions (banks, time) of within-cluster correlation (Petersen, 2009).

The second model analyses the buyback premium further; it adds control variables:

$$\begin{aligned} \pi = {} & \beta_0 + \beta_1 \textit{Tier 1} + \beta_2 \textit{Upper Tier 2} + \beta_3 \textit{Lower Tier 2} + \beta_4 \textit{Solvency} + \\ & \beta_5 \textit{Size} + \beta_6 \textit{GIPS} + \beta_7 \textit{EBA Recap} + \beta_8 \textit{VIX} + \\ & \beta_9 \textit{Frequency} + \beta_{10} \textit{ROA} + \beta_{11} \textit{AQ} + \varepsilon \end{aligned} \tag{6}$$

where *Solvency* is accounting equity divided by total assets. *Size* is the natural log of *total assets* in millions of euros (€). *GIPS* is an indicator for Liability Management Exercises from banks in Greece, Ireland, Portugal, and Spain. *EBA Recap* is an indicator for observations of repurchases that took place in the last two months of 2011 and the first quarter of 2012. *VIX* is the closing value of the CBOE Volatility Index, standardized to values between zero and one. *Frequency* is the number of Liability Management Exercises in a calender week, *ROA* is net income over total assets, a measure of profitability, and *AQ* is the asset quality of the bank, measured as the loan loss provision over the amount of net loans. The regression model relies on p-values that account for the two dimensions (banks, time) of within-cluster correlation (Petersen, 2009).

I rely on various measures to control for solvency. The first is the ratio of equity over total assets. I expect the coefficient on this measure to be negative.

As a second measure, I include size, with small banks more at risk of failing than large banks (Banz, 1981; Fama and French, 1992) Alternatively, large banks may be too big to fail or subjected to greater market discipline, which may affect premiums (Bhagat et al., 2012; Bertay et al., 2013).

I use an indicator variable to control for Greece, Ireland, Portugal, and Spain (*GIPS*). These countries were singled out as risky debtor countries in the years after 2009, and therefore potentially less able to guarantee their national banks. This implies an expected positive coefficient on this indicator variable.

It may be that the EBA recapitalisation exercise exerted undue pressure on banks to satisfy a 9% Core Tier 1 solvency requirement in a relatively short time. For example, Mésonnier and Monks (2014) offer evidence of EU banks responding to the EBA recapitalisation exercise by lending less.

Banks that were thinly capitalised may have signalled their weak regulatory capital position by responding to this exercise through a Liability Management Exercise. Therefore, I include an indicator variable for Liability Management Exercises announced from November 2011, right after the announcement of the EBA recapitalisation exercise, to the end of March of 2012, three months

before the close of the EBA recapitalisation exercise measurement date, thus allowing for a lead time to complete a Liability Management Exercise.

Investor fear or uncertainty may alter the prospects of bank survival. Therefore, I control for the closing value of the CBOE Volatility Index. As an alternative measure I could use the Kansas City Financial Stress Index (KCFSI). However, where VIX data is available on a daily basis, the KCFSI is updated monthly, which makes it hard to relate the KCFSI to an individual Liability Management Exercise (Hakkio and Keeton, 2009). Moreover, Bellas et al. (2010) show that the VIX is an measure of financial stress.

I control for the frequency of buybacks, i.e. the number of Liability Management Exercises announced in a week, as banks may want to avoid to announce a buyback if other banks are already in the market. Lastly, I control for performance (ROA) and for asset quality (AQ), where I expect banks that engage in Liability Management Exercises to have poorer performance and lower asset quality.

C. Sample Selection and Data

Data on Liability Management Exercises: This study relies on hand-collected data from European banks over the period April 2009 to end of 2013. The period starts from the April G20 call for capital of higher quality and quantity and ends with the entry into force of the CRR, the implementation of this G20 call. I exclude Switzerland because this country is not bound by EU regulation.

The reasons to study only EU banks are *i*) EU accounting and prudential rules control the use of the fair value option and require derecognition of fair value gains on own credit standing; *ii*) the availability and quality of data. European banks more frequently engaged in Liability Management Exercises than U.S. banks: 720 observations from 100 EU banks versus 86 from 37 U.S. banks. In addition, the European observations are all corroborated by the Debt Capital Market desks of three separate investment banks, which assures the Liability Management Exercises data quality.

The data includes all Liability Management Exercises of capital instruments. To compare these Liability Management Exercises against other, comparable transactions, I also include Liability Management Exercises of unsecured debt instruments. These are close to capital instruments in ranking and subordination.

Banks announce a Liability Management Exercise generally via a press release. I use this announcement to retrieve the instrument price three days earlier, where I rely on Bloomberg for price information.

After completion of the exercise, a bank publishes the details: e.g. the exchange price, the notional offered amount, the notional accepted amount. With this information and the information from the announcement it is possible to calculate the buyback premium ($\pi = P_X - P_A$), as well as the realised fair value gain that the bank then can add to equity and Core Tier 1 capital. This (crystallised) gain is the difference between the nominal value of the underlying exchanged and the associated actual amount.

I measure the cost of the exercise by calculating the difference between the potential fair value gain that a bank could realize, based on the pre-announcement price of the nominal underlying exchanged, and the actual gain the bank realised. This cost is equal to the buyback premium multiplied by the nominal value exchanged. The larger the buyback premium, the more the holder of the instrument gains, the less a bank can add to Core Tier 1 capital.

Note that the use of the nominal amount exchanged and the pre-announcement price give a conservative measure of the cost of the exercise. Bank management decides some time before the announcement of the exercise which instruments to employ in a Liability Management Exercise, when instrument prices are low and the potential fair value gain is high. That gain may decrease as the announcement day approaches.

Bank data: I rely on bank accounting data from Datastream. For the years 2010–2012, I use data from the European Banking Authority (EBA) on stress tests and the EBA recapitalisation exercise to complement missing items. The EBA data is publicly available through its website. Hand-

collected data further complements the EBA data for the years 2009 and 2013. Restricting hand collection to only EBA covered banks should not lead to a loss of generalisable inferences, given that EBA's bank data covers 70% of the total of sample bank assets.

III. Results

A. Descriptive Statistics

Tables II and III present sample descriptives: Table II offers descriptive information of the buyback premiums as well as data on the inefficiency of Liability Management Exercises. Table III shows data of the exercises over time and per country. Table IV compares characteristics of banks that engaged in Liability Management Exercises to those that did not engage in these exercises.

Table II shows the buyback premium in percent of the par value of the exchanged instrument by regulatory classification. It shows that holders of permanent instruments, i.e. Tier 1 and Upper Tier 2 instruments, command a higher buyback premium than holders of Lower Tier 2 instruments and non-regulatory instruments. Untabulated statistics show that the premiums are significantly different from zero. In addition, the differences of the premiums between regulatory classifications are also significantly different form zero, except for the difference of the premiums paid for Tier 1 and Upper Tier 2 instruments.

[About here Table II]

The next column shows the amounts offered per instrument, which are comparable for capital instruments, but about twice as large for unsecured debt instruments.

The upper panel also shows the potential fair value gain of the liabilities subject to a Liability Management Exercise. For example, the average Tier 2 instrument would, in the absence of a Liability Management Exercise, offer a 41.8% discount. However, this is deceptive: The average realised discount is only 31.93% (41.8%-9.87%).

The rightmost column indicates the cash transfer to debt holders from equity holders. It measures which part of the potential buyback premium accrues to debt holders. Liability Management Exercises that involve the most loss absorbing instruments are the least cash conserving: about a quarter of the potential fair value gain goes to the debt holders. The transfer is lower for less loss absorbing instruments.

The lower panel shows the mean amount exchanged per instrument as well as the loss of regulatory capital per exchanged instrument (in *italicised* font). The amounts are smaller for capital instruments than for unsecured debt. Note that not all instruments offered are exchanged, the success rate is about 53%.

The column at the far right of the lower panel shows the number of instruments involved in Liability Management Exercises. These are high for Tier 1 and for Lower Tier 2 instruments, partly reflecting the use of these instruments by banks.[9]

Table III shows a breakdown of the premiums as well as the amounts involved per year and per country.

The premiums vary by year, with 2009 (2010) reporting the highest (lowest) premiums. The observations of 2009 may reflect lingering uncertainty during the post-Lehman collapse period as untabulated results show a drop in premiums, from 11.9% in H1 to 8.36% in H2. The low premiums in 2010 reflect a low number of exercises.

The potential fair value gain of the Liability Management Exercises reaches a total of €42.5B. This is significant and would contribute to improving the capital positions of EU banks.

The upper panel also shows that the actual, or crystallised, gains on Liability Management Exercises are significantly lower than the potential gain. The difference is €9.3B, which is about

[9] It is impossible under Basel II rules to assess details of capital instruments that any bank has in issue. Data kept by data vendors on regulatory capital instruments is often incomplete, banks are not required to disclose this information. Basel III, however, does require elaborate disclosure of capital instruments, including their characteristics (BCBS, 2012).

22% of the potential fair value gain. In the absence of the derecognition rule, this amount could have been added to Core Tier 1 equity.

To put these amounts in perspective, EBA's June 2013 projected CET1 shortfall of EU banks under full implementation of Basel III was €65.4B (EBA, 2014).[10] The cost of the Liability Management Exercises (€9.3B) is therefore about 14% of this projected CET1 shortfall.

[About here Table III]

The upper panel shows that 2011 and 2012, the years of the controversial EBA stress test and the EBA recapitalisation exercise, banks executed more Liability Management Exercises than in other years. In these two years, banks offered a total nominal amount of €171B. In the other years, banks offered half that amount.

The effect of the Liability Management Exercises on total EU regulatory capital is a reduction of €117bn, with the largest reductions taking place in 2011 and 2012. The number of banks engaging in Liability Management Exercises is also high for these two years: 37 (2011) and 48 (2012), where in other years this number ranged from 12 to 26.

Lastly, the penultimate row of the upper panel shows that the number Liability Management Exercises dropped in 2013. The mean premium value for this year is high because of Eurobank of Greece. Excluding this bank would lead the mean premium value to drop to 3%, which helps explain the drop off in activity for 2013: The gains to be made in a Liability Management Exercise dropped.

The next panel shows the transactions per country. France, Ireland, Italy, Spain, and the UK were particularly active regarding Liability Management Exercises. The countries with the lowest efficiency were Portugal and Spain, with Spanish banks transferring 47.5% of the potential

[10] This is the amount the EBA Basel III monitoring report of March 2014 mentions as the CET1 shortfall under the assumption of fully implemented Basel III, with a CET1 ratio requirement of 7%, i.e. the CET1 ratio includes the capital conservation buffer.

fair value gains to debt instrument holders. Cyprus and Ireland show a low discrepancy between potential and actual gain as banks in these countries imposed losses on debt holders.

Table IV shows descriptives of the buyback premium and sample characteristics split by banks that did (did not) engage in Liability Management Exercises during the sample period. The table reports 281 bank-year observations with, and 538 bank-year observations without Liability Management Exercises.

[About here Table IV]

The first row shows the distribution of the buyback premium. The average premium is relatively high when compared to other research. De Jong et al. (2009), for a wide sample of EU banks before the global financial crisis, for example, report an average (median) premium of 3.9% (1.2%). Mann and Powers (2007) report average (median) premiums of 5.55% (3.24%).

The next rows of the table show that banks that engaged in Liability Management Exercises score poorly on many dimensions. Return on Assets (*ROA*) and operating performance are significantly weaker for banks that engaged in Liability Management Exercises than for the other banks.

Measures of resilience are also weak for banks that engaged in Liability Management Exercises. Solvency, asset quality measure by way of non-performing loans over total loans, and regulatory capital ratios are weak across the board.

The market to book value of firms that bought back liabilities is also weak. This indicating higher levels of risk or lower growth expectations.

Risk, measured by the ratio of risk-weighted assets over total assets is also high for banks executing Liability Management Exercises, albeit just (p-value of 0.06).

In addition, the banks that did not engage in Liability Management Exercises are relatively small, with size measured in equity and total assets.

The last three rows show that size the magnitude of the Liability Management Exercises. Their effect is relatively limited, with the average cost of a Liability Management Exercise of 6 bp of total assets. However, multiplying this number by the average equity to total asset ratio of 22.3 would indicate a loss of equity and Core Tier 1 of 1.34%.

B. Regression Results

Table V presents the results of the regression models. The dependent variable is the buyback premium, defined as the difference between the exchange price and the instrument price three days before the buyback announcement. The buyback premium is expressed in percent of the nominal underlying value.

The sample data contains only transactions where the exchanged instrument is a regulatory capital instrument or an unsecured debt instrument. Therefore, the regressors of the first regression are only indicator variables. The coefficient values are therefore relative to those of unsecured debt instruments. Note that the sample is smaller than the sample used for Table II; this is because of the limited availability of data for some variables.

[About here Table V]

The first column pair shows that the coefficients on all bought back instruments are positive and significant, which confirms that investors command a premium for redeeming debt instruments. These coefficients are economically significant as well: the premium commanded for redeeming a Tier 1 instrument over an unsecured instrument is 8.60%. This premium is 7.56% for an Upper Tier 2 instrument, and 2.24% for a Lower Tier 2 instrument.

The second set of columns confirms a negative relation between the premiums commanded and solvency measured as the ratio of equity over total assets. This coefficient remains negative and significant throughout. This coefficient indicates that a drop of the solvency ratio by 1% point increases the buyback premium by about 90 bp.

The next block of regression models includes controls for size; whether the transactions were performed by the countries with low sovereign credit quality (GIPS); the EBA recapitalisation exercise; and the CBOE Volatility Index (VIX).

The coefficient on size is consistently negative: Larger banks pay a lower premium, a result that supports the idea that big banks are subjected to more intensive market discipline or enjoy support that prevents them from failing. The inclusion of size renders the coefficient on Lower Tier 2 insignificant. The coefficients on Tier 1 and Upper Tier 2 instruments remain, as expected, positive and significant.

The coefficient on GIPS is positive as expected, indicating that banks in these countries paid a higher premium, though the magnitude of the coefficient is about half of that of the coefficients on Tier 1 and Upper Tier 2. However, the coefficient is insignificant throughout. Likewise, the coefficient on EBA recapitalisation exercise is negative throughout, which is unexpected. But then again, this coefficient is not significant.

The premiums are sensitive to the VIX. This index has the potential to increase the premium up by 10%, which is statistically and economically significant.

The last block with coefficient values shows that the controls for issue frequency, performance, and asset quality have the predicted values. However, none of these coefficients are significant.

The results of Table II and Table V confirm my expectations. The premiums paid in Liability Management Exercises *i*) increase with the loss absorbing capacity of bought back instruments, *ii*) decrease with solvency measured by the ratio of equity over total assets, and *iii*) increase with economy-wide financial stress measured by the VIX. Also, the premiums *iv*) decrease with size.

C. Robustness Tests

Risk

The regression results reported in Table V do not include a measure of risk. As risk may augment the buyback premium, I included the ratio of risk-weighted assets to total assets as a measure of risk in the regression model below:

$$\begin{aligned} \pi \quad = \quad & \beta_0 + \beta_1 \textit{Tier 1} + \beta_2 \textit{Upper Tier 2} + \beta_3 \textit{Lower Tier 2} + \beta_4 \textit{Solvency} + \\ & \beta_5 \textit{Size} + \beta_6 \textit{GIPS} + \beta_7 \textit{EBA Recap} + \beta_8 \textit{VIX} + \\ & \beta_9 \textit{Frequency} + \beta_{10} \textit{Risk} + \beta_{11} AQ + \varepsilon \end{aligned} \tag{7}$$

For the risk-weighted assets, I rely data from the European Banking Authority, supplemented by hand collected data. The bank coverage of the EBA leads to a smaller number of observations.

Table VI reports the results that include risk as a regressor. It shows that risk affects the buyback premium, however this goes at the expense of the significance of the size variable, albeit slightly. This trade-off between risk an size has been documented by Bhagat et al. (2012).

In any case, the coefficients on Tier 1 and Upper Tier 2 capital instruments, solvency, and VIX remain statistically and economically significant.

Cumulative abnormal announcement returns

I mainly focus on the buyback premium because of its prudential relevance: the premium is a transfer of cash from the owners of the bank to its debt holders, which weakens a bank's resilience. Although Admati et al. (2013) and Bulow and Rogoff (1988) claim that the benefits of deleveraging predominantly accrue to the debt holders, the Liability Management Exercises that are the subject of this study are executed under pressure of investors, among which are equity investors. Therefore, and because of Merton (1974), equity investors should respond favourably to the announcement of a Liability Management Exercise. But, it is unclear what to expect in terms of significance: Most

of the Liability Management Exercises involve regulatory capital, which by definition is a limited fraction of the total assets of the bank.

More importantly, even if investors were to welcome a Liability Management Exercise, beware that banks engage in these exercises to circumvent the ban on derecognising fair value gains on debt instruments. The results may therefore be weaker compared to the fictional situation that allowed banks to recognise fair value gains on debt as capital without executing a Liability Management Exercise.

Table VII reports cumulative returns around Liability Management Exercises announcements of 42 banks over the sample period. The abnormal returns rely on the market model, estimated over days -250 to -50 before the announcement.

[About here Table VII]

The results confirm the direction of my expectations, investors welcome a Liability Management Exercise announcement by 2.03%, that is, for the announcement windows starting at day -3. With p-values of 5% and 6%, these results are just significant. The results show that investors appear to regard news received at the day of the Liability Management Exercise announcement as good news. These inferences should be drawn with care as the number of observations is limited to only 98.

IV. Concluding Remarks

Bank solvency rules disallow banks from recognising unrealized gains and losses that are the result of changes in the fair value of liabilities that originate from changes in their own credit standing. This to safeguard the safety and soundness of the banking system. As a consequence of this derecognition requirement, banks that may want to realize a fair value gain on liabilities can do so by repurchasing them from their holders in a Liability Management Exercise (LME).

The results of this paper show that Liability Management Exercises may not contribute to the safety and soundness of the banking system: Banks pay significant premiums to buy back

debt. These premiums go at the expense of banks' liquidity and banks' overall regulatory solvency position. For example, the majority of exercises involved Tier 2 securities, debt instruments that count as regulatory bank capital and contribute to the BIS ratio. These instruments are bought back, after which the gain, net of the buyback premium, is added to Core Tier 1 capital. The total buyback premium that the sample banks paid amounts to €9.3B, this out of a potential fair value gain of €42.5B that banks could recognise in full and add to Core Tier 1 capital if the rules allowed them to do so. The overall reduction in total regulatory of €117B is only offset by an increase of €33B in Core Tier 1 capital.

In addition, Liability Management Exercises that involve the most loss absorbing regulatory capital instruments command a significantly higher premium than instruments that are less loss absorbing: the buyback premium for Tier 1 and Upper Tier 2 instruments is about 500 bp higher than the premium paid for less loss absorbing Lower Tier 2 instruments.

The results show also that buyback premiums increase with leverage and decrease with size: Weaker and smaller banks pay higher premiums. Moreover, the premiums paid in Liability Management Exercises are high in times of economy-wide stress.

These results may have policy implications: contrary to the objectives of bank solvency rules, the ban on recognising fair value gains on debt instruments may not help the safety and soundness of the banking system. In a context of economic uncertainty, poorly capitalised banks, for which cash conservation is paramount, engaged in the least efficient and least cash conserving Liability Management Exercises. Precisely opposite to what the recognition ban aims to achieve.

My results therefore weaken the case of the exclusion of unrealized gains and losses that originate from changes in own credit standing.

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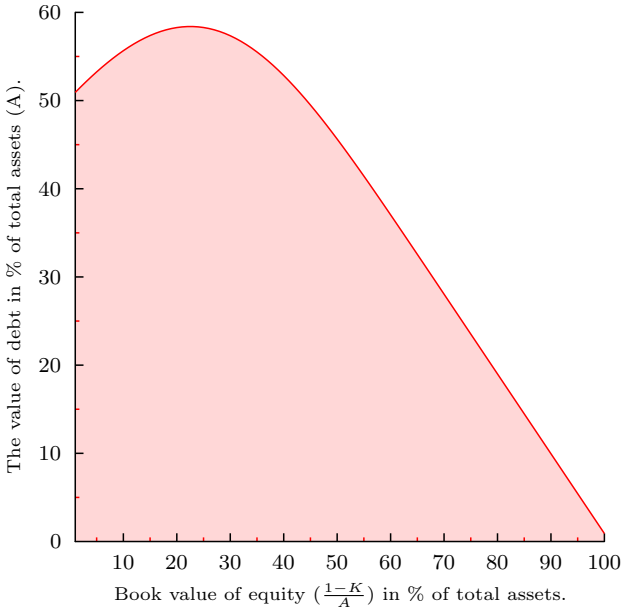

Figure 1: the value of debt: The graph follows this function $Ke^{-rt}N(d_2)$, where $d_2 = d_1 - \sigma\sqrt{t}$, $d_1 = \frac{ln(\frac{A}{K}) + (r + \sigma^2/2)^t}{\sigma\sqrt{t}}$, A is total assets, K the book value of debt, r the risk free rate, and t the duration of debt. $N(d)$ is the probability that a standard normal random variable will be less than or equal to d. The figure assumes the following parameter values: t is 2.5 year – assuming on a average maturity of a 5 year Tier 2 hybrid capital security. The risk-free rate: $r = 4.0\%$, annual standard deviation $\sigma = 20.0\%$.

Table I
Capital and loss absorbing capacity.

The table below outlines the loss absorbing capacity of capital instruments, with the most loss absorbing items at the top. The descriptions follow abridged capital definitions of Basel II (BCBS, 2006a), CRD II (EC, 2006) and Basel III (BCBS, 2010), CRR (EC, 2013). CRR, Europe's Basel III implementation entered into force on 1st of January, 2014. *Tier 1 hybrid* and *Additional Tier 1* instruments are senior in ranking to common stock and rank junior to depositors, general creditors and subordinated debt of the bank. *Upper Tier 2* instruments are undated, permanent, instruments that are subordinated in full to non-subordinated creditors. *Lower Tier 2* instruments are dated instruments of which the principal is subordinated to non-subordinated creditors. *Tier 2* (Basel III) instruments are subordinated to depositors and general creditors of the bank. *RWA* is risk-weighted assets.

Basel II and CRD II	Item	Maturity		Remarks	Requirement	
Capital of Highest Quality (book equity)	Core Tier 1	Cannot be repaid outside liquidation.	⇓ Less loss absorbing	Tier 1 + Tier 2 $\leq$8% of RWA	$> \frac{2}{3}$ of Tier 1	⇑ Subordination
Hybrid instruments[1]	Tier 1 Hybrids	Permanent, perpetual, preferential.		Subordinated to Tier 2. Coupon may be cancelled.	$\leq \frac{1}{3}$ of Tier 1	
Subordinated debt instruments[1]	Upper Tier 2	Permanent, no maturity.		Coupon payment may be postponed.	Tier 2 $\leq$ Tier 1	
Subordinated debt instruments[1]	Lower Tier 2	Maturity $\geq$ 5 years & a 5 year gradual capital derecognition period.		Buyback without permission.		
Basel III and CRR						
Capital of Highest Quality	Common Equity Tier 1 (CET1)	Cannot be repaid outside liquidation.	⇓ Less loss absorbing		$\geq$ 4.5% + buffers up to 8.5% of RWA.	⇑ Subordination
Hybrid instruments[1,2]	Additional Tier 1 (AT1)	Permanent, perpetual, preferential.		Subordinated to Tier 2. Coupon may be cancelled.	$\geq$ 1.5% of RWA	
Subordinated debt instruments[1,2]	Tier 2	Maturity $\geq$ 5 years.			$\geq$ 2% of RWA	

[1]These instruments are callable at the initiative of the issuer after a minimum of five years. Except for Lower Tier 2 instruments, calls and buybacks *i*) need supervisory approval, *ii*) are allowed if the financial and solvency conditions of the institution are not unduly affected.
[2] Under Basel III rules and under the EU bank recovery and resolution directive, all instruments shall be written off or converted into equity at the point that the viability of the bank is at risk (BCBS (2011), EC (2014)).

Table II
European Liability Management Exercises 2009–2013, exchanged instruments.

The table below shows descriptive statistics of 720 European Liability Management Exercises over the period April 2009–December 2013. π is the mean buyback premium: $P_X - P_A$, where P_X is the exchange price of the instrument expressed as a percentage of the nominal value of the instrument; P_A is the price of the instrument before the announcement, also expressed in a percentage of the nominal value of the instrument (P_N). *Offered* is the mean amount the bank announces in the Liability Management Exercise, in millions of €. *Potential Gain* is the mean potential fair value gain that a bank could realize in a Liability Management Exercise, based on the pre-announcement price of the nominal amount exchanged. *Inefficiency* is the ratio of *Cost* over *Potential Gain*. *Exchanged* is the mean nominal underlying the bank bought back in the Liability Management Exercise, in millions of €. Δ*Reg.Cap.*: the italicised font denotes the mean loss of total regulatory capital resulting from the Liability Management Exercise. *Success rate* is the mean of the ratio of exchanged over offered. *Instruments* is the number of instruments exchanged. Amounts are in millions of €.

Eligibility	Premium (π)	Offered(€)	Potential Gain (%)	Inefficiency (%) $= \frac{Premium}{Potential\ Gain}$
Tier 1	11.32	373	44.9	25.2
Upper Tier 2	9.87	301	41.8	23.6
Lower Tier 2	5.59	366	28.0	20.0
Unsecured Debt	2.48	762	17.3	14.3
Aggregate	8.22	383	35.8	23.0

Eligibility	Exchanged (€) Δ*Reg. Cap.*	Success rate (%)	Instruments
Tier 1	*187*	54.0	280
Upper Tier 2	*161*	53.5	97
Lower Tier 2	*179*	52.8	302
Unsecured Debt	392	51.0	41
Aggregate	192	53.2	720

Table III
European Liability Management Exercises 2009–2013, years, countries.

The table below shows amounts involved in European Liability Management Exercises over the period April 2009–December 2013. π is the mean buyback premium: $P_X - P_A$, where P_X is the exchange price of the instrument expressed as a percentage of the nominal value of the instrument; P_A is the price of the instrument before the announcement, also expressed in a percentage of the nominal value of the instrument (P_N). *Potential Gain* is the potential fair value gain that a bank could realize in a Liability Management Exercise, based on the pre-announcement price of the nominal amount exchanged. The *Actual Gain* is the fair value gain that a bank realized in a Liability Management Exercises, based on the exchange price of the nominal amount exchanged. *Cost* is the difference between *Actual Gain* and *Potential Gain*. This is a measure of the cost of the Liability Management Exercise. *Inefficiency* is the ratio of *Cost* over *Potential Gain*. *Offered* is the amount the bank announces in the buyback offer, in millions of €. Δ *Reg.Cap.* is the change in total regulatory capital resulting from the Liability Management Exercise. *Bank-Years* is the number of sample bank-year observations.

Gains and Losses per year (amounts in Millions €)

Year	π (%)	Potential Gain	Actual Gain	Cost	Inefficiency (%)	Offered	Δ Reg. Cap.	Bank-Years
2009	10.06	9,459	7,180	2,279	24.1	36,274	20,117	26
2010	5.23	8,901	7,806	1,095	12.3	38,696	20,925	12
2011	7.10	12,699	9,871	2,828	22.3	71,856	36,368	37
2012	9.16	10,576	7,911	2,665	25.2	99,399	35,748	48
2013	9.60	884	465	419	47.4	12,766	3,586	18
Aggregate	8.22	42,519	33,233	9,286	21.8	258,991	116,744	141

Gains and Losses per country (amounts in Millions €)

Country	π (%)	Potential Gain	Actual Gain	Cost	Inefficiency (%)	Offered	Δ Reg. Cap.	Bank-Years
Austria	6.63	845	699	147	17.4	4,913	2,599	6
Belgium	15.67	969	735	235	24.3	2,126	1,775	3
Cyprus	3.00	151	141	9	6.0	413	314	1
Denmark	4.69	51	46	5	9.8	675	149	2
France	6.13	4,189	3,279	909	21.7	33,194	12,147	15
Germany	8.25	1,894	1,514	380	20.1	10,049	4,774	4
Greece	20.07	1,342	953	389	29.0	5,271	2,201	8
Ireland	4.34	11,109	10,083	1,025	9.2	28,573	18,024	11
Italy	4.23	3,075	2,445	630	20.5	52,643	12,765	15
Luxembourg	3.41	31	24	6	19.4	698	188	1
Netherlands	7.45	2,397	1,664	733	30.6	13,882	8,258	8
Portugal	22.67	1,424	861	563	39.5	4,701	2,119	5
Slovenia	7.43	24	22	3	12.5	56	56	1
Spain	11.13	3,944	2,070	1,874	47.5	45,583	18,824	30
Sweden	12.33	185	132	53	28.6	975	535	1
UK	6.98	10,890	8,564	2,326	21.4	55,240	32,016	30
Aggregate	8.22	42,519	33,233	9,286	21.8	258,991	116,744	141

Table IV
Characteristics of sample banks.

The table reports descriptive statistics, separately for European banks that did (and did not) engage in Liability Management Exercises, over the period April 2009–December 2013. Except for the buyback premium (π), all table entries originate from bank-years. *Ever LME (Never LME)* denotes banks that (did not) engage in Liability Management Exercises. The table reports 281 bank-year observations with, and 538 bank-year observations without Liability Management Exercises. p5, p25, p50, p75, p95 indicate percentile values for percentiles 5,25,75 and 95 and the median (p50). *p*-value indicates the significance of the differences in means. π is the mean buyback premium: $P_X - P_A$, where P_X is the exchange price of the instrument expressed as a percentage of the nominal value of the instrument; P_A is the price of the instrument before the announcement, also expressed in a percentage of the nominal value of the instrument (P_N). *Net Income* is the income the bank realized over the fiscal year. *Operating* is the ratio of net interest income divided by total assets. *ROA* is the net income over total assets, a measure of profitability. *Solvency* is accounting equity divided by total assets. *AQ* is the asset quality of the bank, measured as the loan loss provision over the amount of net loans. *BIS ratio* is the sum of Tier 1 and Tier 2 capital divided by risk weighted assets. *Market to Book* is the market to book ratio. *Tier 1 Ratio* is the regulatory Tier 1 capital ratio of the bank. *Risk* is the ratio of risk-weighted assets over total assets. *Equity* is Common Shareholders' Equity. *Total Assets* is the book value of total assets at fiscal year-end. *Potential Gain* is the potential fair value gain that a bank could realize in a Liability Management Exercise, based on the pre-announcement price of the nominal amount exchanged, in bp over total assets. *Actual Gain* is the fair value gain that a bank realized in a Liability Management Exercises, based on the exchange price of the nominal amount exchanged, in bp over total assets. *Cost* is the difference between Potential Gain and Actual Gain, in bp over total assets.

	Ever LME					Never LME					Means		
	p5	p25	p50	p75	p95	p5	p25	p50	p75	p95	Ever	Never	*p*-value
Buyback premium (π in %)	0.06	2.29	5.06	10.28	29.19						8.22		
Net Income (M€)	-3,647	-429	82	638	3,581	-347	4	50	172	2,500	-24	304	0.02
ROA (%)	-4.23	-0.49	0.16	0.31	0.79	-2.03	0.13	0.41	0.64	1.41	-0.57	0.10	0.00
Operating (%)	0.30	1.00	1.30	1.90	2.60	0.50	1.10	1.50	2.40	4.30	1.40	1.90	0.00
Solvency (%)	1.10	3.60	5.20	6.60	10.00	2.30	4.70	6.80	10.30	16.80	5.40	8.30	0.00
AQ (%)	0.14	0.46	0.96	1.69	4.85	0.00	0.12	0.44	1.28	3.96	1.61	1.06	0.00
BIS Ratio (%)	9.60	11.60	13.45	15.30	17.80	10.50	13.40	15.20	17.70	21.60	13.54	15.30	0.00
Market to Book	0.10	0.37	0.62	0.86	1.42	0.04	0.34	0.69	1.20	2.08	0.72	0.85	0.04
Tier 1 Ratio (%)	6.90	9.03	10.70	12.90	16.40	4.00	10.20	13.10	16.70	21.50	11.00	13.40	0.00
Risk (%)	0.24	0.34	0.50	0.60	0.83	0.18	0.25	0.36	0.51	1.36	0.49	0.44	0.06
Equity (M€)	332	1,678	6,055	16,303	59,690	28	192	1,033	2,723	27,741	14,047	5,209	0.00
Total Assets (M€)	10,157	43,972	112,963	362,083	1,549,469	304.49	2,592	13,800	53,241	689,298	312,776	118,564	0.00
Potential Gain (bp)	0	3	7	22	70						20		
Actual Gain (bp)	0	1	4	15	59						15		
Cost (bp)	0	1	2	5	28						6		

Table V
Buyback premiums of European Liability Management Exercises 2009–2013, regression results.

The table below reports results of a regression that relies on European Liability Management Exercises over the period April 2009–December 2013. The dependent variable is the buyback premium, the difference between the exchange price and its price three days before the buyback announcement, expressed in percent of the nominal underlying value of the instrument.

$$\pi = \beta_0 + \beta_1 \textit{Tier 1} + \beta_2 \textit{Upper Tier 2} + \beta_3 \textit{Lower Tier 2} + \beta_4 \textit{Solvency} + \beta_5 \textit{Size} + \beta_6 \textit{GIPS} + \beta_7 \textit{EBA Recap} + \beta_8 \textit{VIX} + \beta_9 \textit{Frequency} + \beta_{10} \textit{ROA} + \beta_{11} \textit{AQ} + \varepsilon$$

Tier 1 is an indicator variable for exchanged instruments that are undated, permanent, capital instruments that are senior in ranking to common stock and always rank junior to depositors, general creditors and subordinated debt of the bank. *Upper Tier 2* is an indicator variable for exchanged instruments that are undated, permanent, instruments that are subordinated in full to non-subordinated creditors. *Lower Tier 2* is an indicator variable for exchanged instruments that are dated instruments of which the principal is subordinated to non-subordinated creditors. *Solvency* is accounting equity divided by total assets. *Size* is the value of *total assets* in millions of €. *GIPS* is an indicator for Liability Management Exercises from Greece, Ireland, Portugal, and Spain. *EBA Recap* is an indicator for observations of repurchases that took place in the last two months of 2011 and the first quarter of 2012. *VIX* is the closing value of the CBOE Volatility Index, standardized to values between zero and one. *Frequency* is the number of Liability Management Exercises in a calender week. *ROA* is the net income over total assets, a measure of profitability. *AQ* is the asset quality of the bank, measured as the loan loss provision over the amount of net loans. The regression model relies on *p*-values that account for the two dimensions (banks, time) of within-cluster correlation (Petersen, 2009).

	β	*p*	β	*p*	β	*p*	β	*p*	β	*p*	β	*p*	β	*p*	β	*p*	β	*p*
Tier 1	8.60	0.00	6.69	0.00	7.77	0.00	7.33	0.00	7.37	0.00	6.35	0.00	7.08	0.00	7.57	0.00	7.44	0.00
Upper Tier 2	7.56	0.01	6.10	0.03	8.35	0.00	7.93	0.00	7.69	0.00	7.01	0.00	7.68	0.00	8.05	0.00	7.92	0.00
Lower Tier 2	2.24	0.13	1.10	0.27	2.11	0.11	1.46	0.19	1.54	0.16	1.18	0.21	2.05	0.11	2.36	0.10	2.24	0.08
Solvency			-82.00	0.01	-94.12	0.00	-93.43	0.01	-102.23	0.00	-94.86	0.01	-96.77	0.00	-90.47	0.01	-92.32	0.01
Size					-2.66	0.00	-2.35	0.00	-2.30	0.00	-2.26	0.00	-2.55	0.00	-2.34	0.00	-2.34	0.00
GIPS							2.38	0.07	2.03	0.09	2.05	0.09	2.45	0.09	2.11	0.10	1.96	0.14
EBA Recap									-1.88	0.24	-2.81	0.07	-2.91	0.10	-3.05	0.10	-3.08	0.10
VIX											9.4	0.00	9.7	0.00	10.0	0.00	10.1	0.00
Frequency													0.06	0.22	0.06	0.23	0.06	0.23
ROA															-39.93	0.18	-31.85	0.17
AQ																	9.11	0.43
Intercept	2.65	0.00	8.53	0.00	41.8	0.00	37.3	0.00	37.8	0.00	35.2	0.00	36.7	0.00	33.3	0.00	33.39	0.00
Prob > F		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
$\overline{R}^2$		0.07		0.10		0.18		0.19		0.19		0.22		0.22		0.22		0.22
# of obs.		579		579		579		579		579		579		579		579		579

Table VI
Regression results and risk.

The table below reports results of a regression that relies on European Liability Management Exercises over Equitythe period April 2009–December 2013. The dependent variable is the buyback premium, the difference between the exchange price and its price three days before the buyback announcement, expressed in percent of the nominal underlying value of the instrument.

$$\begin{aligned}\pi \quad = \quad & \beta_0 + \beta_1 \textit{Tier 1} + \beta_2 \textit{Upper Tier 2} + \beta_3 \textit{Lower Tier 2} + \beta_4 \textit{Solvency} + \beta_5 \textit{Size} + \\ & \beta_6 \textit{GIPS} + \beta_7 \textit{EBA Recap} + \beta_8 \textit{VIX} + \beta_9 \textit{Frequency} + \beta_{10} \textit{Risk} + \beta_{11} \textit{AQ} + \varepsilon\end{aligned}$$

Tier 1 is an indicator variable for exchanged instruments that are undated, permanent, capital instruments that are senior in ranking to common stock and always rank junior to depositors, general creditors and subordinated debt of the bank. *Upper Tier 2* is an indicator variable for exchanged instruments that are undated, permanent, instruments that are subordinated in full to non-subordinated creditors. *Lower Tier 2* is an indicator variable for exchanged instruments that are dated instruments of which the principal is subordinated to non-subordinated creditors. *Solvency* is accounting equity divided by total assets. *Size* is the value of *total assets* in millions of €. *GIPS* is an indicator for Liability Management Exercises from Greece, Ireland, Portugal, and Spain. *EBA Recap* is an indicator for observations of repurchases that took place in the last two months of 2011 and the first quarter of 2012. *VIX* is the closing value of the CBOE Volatility Index, standardized to values between zero and one. *Frequency* is the number of Liability Management Exercises in a calender week. *Risk* is the ratio of risk-weighted assets over total accounting assets. *AQ* is the asset quality of the bank, measured as the loan loss provision over the amount of net loans. The regression model relies on *p*-values that account for the two dimensions (banks, time) of within-cluster correlation (Petersen, 2009).

	β	*p*
Tier 1	4.87	0.00
Upper Tier 2	5.84	0.00
Lower Tier 2	-0.39	0.38
Solvency	-63.03	0.00
Size	-1.33	0.04
GIPS	1.57	0.27
EBA Recap	-0.52	0.68
VIX	8.57	0.00
Frequency	-0.01	0.43
Risk	7.31	0.21
AQ	-24.63	0.29
Intercept	19.35	0.06
Prob > F		0.00
$\overline{R}^2$		0.22
# of obs.		481

Table VII
Cumulative Abnormal Announcement Returns.

The table below reports cumulative abnormal returns (CAR) around an announcement of a Liability Management Exercise. The sample contains Liability Management Exercise announcements over the period April 2009–December 2013. The abnormal returns rely on the market model, estimated over days [-250 – -50] before the announcement. All returns are from Datastream.

	Cumulative Abnormal Return (%)	Standard Deviation	# of obs.	*p*-value
CAR -1, 1	0.72	0.09	98	0.21
CAR -3, 2	2.03	0.13	98	0.06
CAR -3, 5	2.02	0.13	98	0.07