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Leverage ratio, central bank operations and repo market

by Annalisa Bucalossi and Antonio Scalia

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LEVERAGE RATIO, CENTRAL BANK OPERATIONS AND REPO MARKET

by Annalisa Bucalossi* and Antonio Scalia*

Abstract

Using estimates of the Basel III leverage ratio, we show the rapid convergence of banks in the euro area towards levels well above the preliminary 3 per cent threshold. Contrary to predictions that the new requirement might interfere with the conduct of monetary policy and its transmission via the money market, throughout 2014 we find that leverage-constrained banks have decreased neither Eurosystem refinancing nor trading volume on repo markets. We measure the extent to which banks in the euro area have until now benefited from improvements in their regulatory capital, the low reporting frequency of the leverage ratio, and the favourable treatment of repo and derivatives trades with central counterparties in calculating the ratio, achieving an average of 5 per cent at end-June 2015. This level is likely to fall to around 4.5 per cent by March 2017, as a consequence of the Eurosystem Asset Purchase Programme, which causes an expansion of banks' balance sheets and, therefore, an increase in the denominator of the leverage ratio.

JEL Classification: E58, G21, G28, G1.

Keywords: Basel III, leverage ratio, central bank operations, European banks, repo market.

Contents

1. Introduction.....	5
2. Key financial and regulatory issues.....	6
3. Compliance in 2013-2014.....	13
4. Participation in Eurosystem operations and money market activity	17
5. Over-compliance in 2015	21
6. Conclusion	25
Appendix - The Basel III leverage ratio	27
References	35

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1. Introduction¹

Since October 2015 the Basel III leverage framework applies to all European banks, and the new standard will become mandatory on 1 January 2018. This paper shows first how the main banks in the euro area are adjusting to the new regulation. Second, we aim to assess whether compliance with the leverage ratio might affect the functioning of monetary policy in the euro area.

The leverage ratio (LR) is intended as a simple, transparent measure complementing and reinforcing the risk-based capital requirements for the purpose of financial stability and market discipline. It is defined as the minimum amount of Tier1 capital which banks must hold as a percentage of exposures, set at a preliminary level of 3%. The LR discourages banks from underestimating and under-reporting risks on their balance sheet as well as those associated with off-balance-sheet exposures, taking on more risks during cyclical upswings, and amplifying cyclical downturns by disorderly deleveraging. By improving the stability of the financial system the LR fosters the flow of credit to the economy.

Notwithstanding these benefits, the debate surrounding the introduction of the Basel III LR has highlighted the potential repercussions on the operational framework of central banks which rely primarily on repos for the conduct of monetary policy: banks borrowing from the Eurosystem increase their debt, thus worsening their leverage ratio. The LR might also reduce banks' intermediation and arbitrage activity in financial markets, thereby weakening the link between central bank policy rates and market rates.

To examine these predictions we build estimates of the LR for 70 major banks in the euro area. We document a rapid adjustment to the new framework in the years 2013-14, with an average LR of 4.4% and only three banks below the preliminary 3% threshold at the end of 2014. We analyse this early compliance by tracking changes in the size and composition of banks' balance sheets relative to changes in regulatory capital.

We find that the convergence to higher LR has affected banks' participation in Eurosystem monetary policy operations only mildly. Contrary to expectations, repo market activity does not seem to have suffered: rather, trading volume increased in 2014 compared with 2013 for the banks which were improving their individual LR. We propose possible explanations for these preliminary results, highlighting the importance of the precise specification of the LR framework in the euro area. Two issues stand out. First, we show how the low frequency of reporting dates encourages window dressing, allowing banks to improve the LR at the end of each quarter without having to reduce trading within the quarter. Second, specific provisions, such as those favouring trades through central counterparties, reduce the severity of the LR requirement for banks with large repo and derivatives portfolios. These factors facilitate over-compliance with the LR, as many banks target levels well in excess of 3% to increase their credit standing or as dry powder in preparation for changes in the regulatory or policy environment. This phenomenon is clearly shown by the LR figures for June 2015.

It would be premature to rule out any undesirable interaction of the LR with monetary policy implementation in the euro area. The expansion of banks' excess liquidity as a result of quantitative easing will cause a deterioration in the average LR, probably concentrated among large and complex banks in core countries that are already more constrained by it. Other things being equal, the ECB's Asset Purchase Programme can be estimated to cause a decrease of 0.4 percentage points in the average LR by March 2017, to 4.5%. This could weigh on repo market activity and market making, possibly affecting access to wholesale funding by smaller or periphery banks.

Our analysis aims to shed some light on the interaction of the LR with monetary policy by focusing on the first link of the transmission mechanism, namely monetary policy implementation. Unlike most empirical studies that use a simplified leverage measure (equity as a share of accounting assets), our analysis includes off-balance-sheet items in the exposure measure, offering a closer estimate of the regulatory definition of the

¹ Helpful comments by Tiziana Rosolin, Sergio Longoni and seminar participants at the Banca d'Italia and at the ECB are gratefully acknowledged.

LR. By matching such estimates with data on monetary policy operations in the Eurosystem and trading in the euro secured money market, we are able to compare the behaviour of LR-constrained banks to that of non LR-constrained banks as in a natural experiment.

The paper is organized as follows. Section 2 reviews the key financial and regulatory issues relating to the introduction of the LR since the first draft regulation published by the BCBS in 2010. Section 3 presents estimates of the LR for the sample banks in the euro area, from June 2013 to December 2014. Using these estimates, Section 4 investigates whether LR-constrained banks have reduced participation in the ECB's monetary policy operations and/or their activity in the euro repo market. Section 5 explores some possible explanations for banks' over-compliance with the LR and the effects of quantitative easing. Section 6 concludes. The Appendix describes the definition of the LR in the Basel III framework and the way we have built our estimates.

2. Key financial and regulatory issues

2.1 Lessons from the crises: the introduction of leverage limits

The case for a simple LR including off-balance sheet exposure dates back at least to the 1998 financial crisis following the Russian debt moratorium. Regulators then noted the important role played by leverage of unregulated hedge funds in the ensuing liquidity squeeze (e.g. BCBS, 1999; President's Working Group, 1999). Initial attempts were then made to define an inclusive leverage measure (Counterparty Risk Management Policy Group, 1999). These attempts were corroborated by the empirical evidence, showing that the LR is as good as more complex risk-based capital ratios at predicting bank failures at short horizons (Estrella et al., 2000) and that checks on off-balance sheet leverage of derivatives positions would have been useful in supervisory action as a complement to risk-based ratios owing to their simplicity and predictive power (Breuer, 2002).

The reasons for introducing leverage-based capital rules became more impelling after the financial crisis of 2007-08. One of the main lessons was the inadequacy of the risk-based capital requirements of the Basel II framework to prevent or even predict the crisis. The apparently healthy capital ratios had not avoided the build-up of excessive on- and off-balance-sheet leverage, which was at the root of the distress. Furthermore, the procyclicality of subsequent deleveraging pressures helped to exacerbate the crisis owing to the feedback loop between losses, capital declines and credit contraction.

Several theoretical considerations support the LR notion. Banks' risk levels are heterogeneous and opaque, to the extent that it is difficult for outsiders to assess them accurately. As the amount of capital that banks must hold is based on their internal risk assessment, they have an incentive to understate their own risk. It is difficult for regulators to detect banks which under-report and hold too little capital. In this framework, adding an LR requirement to the traditional capital ratio would decrease the benefits to the banks of understating risks and enhance the ability of regulators to detect and sanction weak banks (Blum, 2008).²

The Basel Committee on Banking Supervision (BCBS) came to the conclusion that there was a need for a credible and non-risk-based constraint on leverage in the banking sector to prevent future damage to the financial system and the economy. Two practical objectives were assigned to the LR, namely (i) to cap the banks' degree of leverage and (ii) to complement the risk-based capital ratios with a simple, transparent and non-risk-based backstop measure (BCBS, 2010). Empirical research supported the BCBS resolution.³

² Kiema and Jokivuolle (2010) develop a theoretical model in which the leverage ratio requirement interacts with the risk-based capital requirement, showing that the latter might result in less lending to low-risk customers and increased lending to high-risk customers.

³ Damar et al. (2013) identify a significant and positive link between assets growth and leverage growth hinging on wholesale funding. Banks that rely more on wholesale funding exhibit higher degrees of leverage procyclicality. Papanikolaou and Wolff (2013) perform a study on US systemically important financial institutions before and after the 2007-08 crisis and note that, mainly owing to the expansion of off-balance-sheet exposure, leverage was one of the main factors responsible for the fragility of the

In the original Basel III rules text (BCBS, 2010), the definition of the LR was less detailed and relatively mild compared with the subsequent BCBS proposals. The original definition was more permissive with the netting of securities financing transactions (SFTs) and derivatives, which rested on the Basel II rules. Following increased attention by international regulators, in June 2013 the BCBS proposed in a public consultation a revision of the LR definition to make it more stringent by adopting a wider definition of the exposure measure at the denominator of the ratio (BCBS, 2013). The proposal introduced three main changes. First, it used a gross measure of SFTs, not recognizing accounting netting. Second, it comprised a measure of counterparty credit risk on borrowing transactions, to be included in the measurement of the bank's exposure. Third, it required the full effective notional value of written derivatives to be included in the exposure measure, albeit allowing limited recognition of offsetting.

The new LR definition prompted a general reaction by the banking sector, which produced several impact studies and commentaries, putting forward the argument that the changes would transform the nature of the LR from backstop⁴ measure to binding ratio, thereby negatively affecting banks' activities and market transactions.

After the BCBS public consultation, in January 2014 the Group of Central Bank Governors and Heads of Supervision (GHoS), the BCBS governing body, endorsed the revised version of the LR framework, admitting instances where collateral, credit risk parameters and netting could be used to reduce the exposure measure (as clarified in the Appendix⁵), resulting in a less stringent leverage ratio requirement than that envisaged in the June 2013 proposal.

In April 2016 the BCBS published a consultation document on LR calibration which brings forward by one year, to December 2016, the final definition of the LR requirement (BCBS, 2016b). The main proposals concern the treatment of derivatives, measured using a methodology that has been updated in the risk-based capital framework but not yet in the leverage framework, and the introduction of a higher LR for global systemically important banks. Consultation also concerns differences in accounting standards that allow banks to book transactions on the 'trade date', enabling them to net purchases and sales, as opposed to the 'settlement date', which gives no netting benefit. The BCBS will carry out a quantitative impact study to assist the final design of the LR requirement. Developments in the LR definition are summarized in Table 1.

banking system. The benefits of leverage regulation are also described by Demirguc-Kunt et al. (2013), who find a positive relationship between capital position and stock market performance during the financial crisis. This relationship is stronger when capital is measured by a leverage ratio rather than by a risk-adjusted ratio. Jarrow (2013) shows on analytical grounds that the LR based capital rule controls for the same risk of insolvency as risk-based rules, such as VaR, but is easier to compute and to compare across banks.

⁴ According to GFMA (2013) the new LR would be binding for 54% of the participating financial institutions and for 44% of the participating G-SIBs. LR constraints would entail undesired effects and first of all create an incentive for banks to increase their detention of riskier assets in order to remunerate the extra capital they would need to raise.

⁵ An impact analysis of the revised LR framework shows that the new exposure definition would reduce the percentage of banks failing to meet the intended 3 %LR from 31.8% to 25.5% compared to the June 2013 proposal (EBA 2014).

Table 1: Timeline of the Basel III leverage ratio and implementation in the EU

Date	Basel III	European Union
December 2010	BCBS officially introduces the leverage ratio as part of its Basel III package; minimum set at 3%	
April 2012	BCBS starts publishing semi-annual data on the leverage ratio of a sample of banks from 27 countries (starting from June 2011)	
June 2013	BCBS publishes consultation document with specific formulation for calculating the leverage ratio and a set of public disclosure requirements. Final adjustments to the definition to be made by 2017.	
July 2013		Capital Regulation (CRR) and Directive (CRD IV) implement the Basel III framework in the EU. New rules apply from 1 January 2014, with full implementation on 1 January 2019
January 2014	BCBS issues the full text of the leverage ratio framework and disclosure requirements and changes the definition of the exposure measure	
March 2014		European Commission starts public consultation for Basel III implementation in the EU
October 2014		European Commission delegated act implements Basel III leverage ratio in EU law
January 2015	Mandatory public disclosure of leverage ratio by international banks	
April 2016	BCBS publishes consultation document with proposed revisions to the design and calibration of the Basel III leverage ratio framework (consultation ends 6 July 2016)	
September 2016		All EU banks to start reporting to regulators and publishing their leverage ratio based on the instructions provided by the EBA and adopted by the European Commission in March 2016.
December 2016	End of monitoring period before final calibration (shortened from 3 years to 2 years in April 2016)	Report from the Commission to the Council and Parliament including, where appropriate, a legislative proposal to introduce the leverage ratio as a binding measure as of 2018.
2017		EU decision on calibration of the leverage ratio measure (based on risk profile, business model and size of institution)
1 January 2018	Leverage ratio to become a mandatory part of Basel III Pillar 1 requirements	Pillar 1 requirement if so decided by the EU authorities during the 2017 review

2.2 Interaction with monetary policy

Like the risk-based capital requirements, the LR can interact with monetary policy transmission by affecting the way banks adjust loan supply in response to changes in monetary policy. The increasing influence of minimum capital requirements on bank behaviour has shifted the emphasis of research from the ‘bank lending channel’ (Bernanke and Blinder, 1988), whereby monetary policy influences the supply of bank loans by changing the composition and cost of bank funding, to the ‘bank capital channel’ (Van den Heuvel, 2002), whereby the main determinant of bank lending is the cost of equity funding. Capital requirements tend to make monetary policy less effective because banks cannot expand lending without additional capital. Empirical evidence of the operation of the capital channel is mixed.⁶ Results also depend on the economy’s reliance on bank lending compared with market based sources of financing. Over time a consensus has been reached that in the long-run equilibrium, after adjustments to the new regulatory regime, higher LR ratios and, more generally, better capitalized banks will improve credit availability to the real economy (Panetta, 2015). The introduction of the LR can also make the traditional bank lending channel more effective by lowering the cost of funding for banks. Gambacorta and Shin (2016) show that banks with higher capital and lower leverage increase lending at a faster pace because they have more favourable external ratings which provide investors with a signal about their creditworthiness, making it easier to substitute central bank funds with uninsured market financing.

A second, related area of research is the interplay of bank regulation and monetary policy in counteracting credit and asset price cycles. Borio and Zhu (2012) address the question of how monetary policy should react to the build-up of financial imbalances. They introduce an additional transmission mechanism, the ‘risk taking channel’, based on the interaction of risk pricing with liquidity and financing constraints, which are becoming more prominent determinants of bank lending and business cycle fluctuations as a consequence of the increasing role of finance in the global economy. Jiménez et al. (2014) advocate the use of accommodative policy rates to support credit during a financial crisis, when bank balance sheets are weak and monetary policy is more effective. The European Systemic Risk Board (ESRB, 2015) underlines the importance of considering the interactions between monetary and macroprudential policies and coordinating them, especially when an LR requirement might prevent higher risk taking and monetary policy needs to be accommodative.

A further direction of investigation stems from the concern that monetary policy operations might adversely affect banks’ leverage ratios by increasing the size of their balance sheets and that this might, in turn, weaken the transmission of monetary policy impulses through financial markets. First, leverage-constrained banks might be discouraged from participating in central bank refinancing operations because this could increase their overall debt. Second, the gross treatment of SFTs in the exposure measure penalizes intermediation activity on the repo market, making the link between policy rates and market interest rates less effective. To overcome this type of unintended effect, the Swiss National Market Supervisory Authority introduced in its LR framework a deduction for assets that are required for the proper functioning of the repo market from a monetary policy perspective. Reverse repos which have CHF-denominated claims and collateral fulfilling specific conditions, such as central bank eligibility and a sufficient liquidity, are carved out from the LR (Swiss FINMA, 2008). Third, quantitative easing policies deteriorate banks’ leverage ratios via the injection of bank reserves and the multiplier mechanism which increases the volume of deposits in the banking system.

Market participants too have focused on the possible threats to the effectiveness of monetary policy transmission posed by the LR, arguing that banks would be forced to reduce their activity on repo and tri-party markets, which have a lower return per unit of exposure than higher risk-weighted assets (e.g. GFMA 2013; J.P. Morgan, 2013). Trading and liquidity in the government securities markets would also be reduced,

⁶ While most studies suggest that capital-constrained banks react more strongly to changes in interest rates than unconstrained banks (Kishan and Opiela, 2000; Bolton and Freixas, 2006), some reach the opposite conclusion (Kashyap and Stein, 1994; Tanaka, 2002; Peek and Rosengren, 1995). Martynova (2015) offers a review of studies exploring how higher capital requirements can reduce credit supply as well as credit demand by raising lending rates.

as banks would shift from low margin matched-book transactions against government collateral in large volumes to higher margin, riskier collateral in smaller volumes. According to the ICMA survey of the European repo market (ICMA European Repo Council, 2015) the LR is the primary constraint on market activity and makes repos an unprofitable product. The ratio would ignore the risk reduction of collateral, resulting in some cases in substantially higher capital requirements than before.

CGFS (2015) assesses the individual as well as the combined impact of key new regulations on monetary policy, focusing on the effects on money markets, monetary operations and monetary transmission.⁷ The report reiterates the concern that the LR, by potentially increasing the cost of expanding bank balance sheets, might reduce the demand for cash borrowing and hence money market activity as well as participation in central bank operations. At an early stage of implementation it is difficult to predict the combined effects of the various measures on the functioning of financial markets and monetary policy effectiveness.⁸ In equilibrium, however, a healthier banking sector should be better placed to respond to easier monetary policy and to withstand adverse macroeconomic shocks. Monetary policy is therefore likely to face less challenging tasks once the new regulations have been fully phased in.

2.3 Implementing the LR

In October 2014 the European Commission issued the delegated regulation⁹ amending the EU Capital Requirements Regulation of 2013 (CRD IV-CRR framework). The changes, which also reflect the outcome of consultations conducted by the Commission with banks and industry associations in the European Union, align the leverage ratio regulation in the EU to the updated Basel III framework published in January 2014.

The CRD IV – CRR/Basel III leverage ratio is preliminarily set at a 3% minimum requirement. The numerator of the leverage ratio as defined in EU legislation is the CRD IV-CRR Tier 1 capital, which applies as of 1 January 2014.¹⁰ The exposure measure in the denominator includes:¹¹

- on-balance-sheet assets, excluding SFTs and derivatives;
- SFT exposures with limited recognition of netting of cash receivables and cash payables with the same counterparty under strict criteria;
- derivatives exposures at replacement cost (net of cash variation margin meeting a set of strict eligibility criteria) plus an add-on for potential future exposure;¹²
- off-balance-sheet exposures, obtained by multiplying notional amounts by a range of ‘credit conversion factors’ ranging from 10% to 100% according to their level of credit risk.

⁷ An overview of the potential effects of the supplementary LR in the US financial market and of the interactions with the Basel III liquidity standards, i.e. the LCR and the NSFR, is provided by Citi (2013), which predicts disintermediation of the large banks in the fixed income trading business, to the advantage of smaller banks as well as of non-banks. A similar case for disintermediation from banks to money market funds is made by Pozsar and Sweeney (2015).

⁸ For example, while the LR discourages bank recourse to central bank refinancing, the LCR and NSFR liquidity requirements might on the contrary increase the dependence of the banking system on central bank money as they treat transactions with the central bank more favourably than those with private counterparties.

⁹ Commission Delegated Regulation (EU) 2015/62 amending Regulation (EU) No 575/2013 of the European Parliament and of the Council with regard to the leverage ratio.

¹⁰ Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012. Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC.

¹¹ BCBS (2016a), EBA (2016).

¹² Derivatives exposure includes written credit derivative exposures at their effective notional amount (net of negative changes in fair value that have been incorporated into the calculation of Tier 1 capital) reduced by the effective notional amount of purchased credit derivatives that meet offsetting criteria relating to reference name, level of seniority and maturity.

The clarifications and adjustments made to the calculation of the exposure measure result in less stringent LR requirements (see the Appendix for details). Banks in the EU are also set to benefit from the fact that the delegated act aligns the non-risk-based leverage framework to the CRR risk-based capital requirements.

It is worth recalling the state of play across jurisdictions. According to a review published in October 2015 on the adoption of the Basel regulatory framework (BCBS, 2015), the final rule on the LR is in force (final and published by banks) in 22 out of the 27 reporting countries. The national implementation presents differences (Table 2).

Table 2: Implementation of the Basel III leverage ratios across jurisdictions

Country	Minimum leverage ratio	Targeted banks	Introduced	Mandatory	Exposure measure
United States	Supplementary leverage ratio (SLR) of 5% for BHCs and 6% for IDIs (*)	Global systemically important banks (G-SIBs)	April 2014	January 2018	BCBS definition of January 2014
European Union	3%	All EU banks	October 2014	January 2018	Definition from the CRR modified by the delegated act
Switzerland	5%	The 2 Swiss G-SIBs	October 2015	January 2019	BCBS definition of January 2014
Japan	3%	Global systemically important banks (G-SIBs)	March 2013	March 2018	BCBS definition of January 2014
Canada	3% + authorized leverage ratios communicated on a bilateral basis	All Canadian banks	October 2014	2015 Q1	BCBS definition of January 2014
United Kingdom	3% + add-ons (**)	Major UK banks and building societies	July 2015	January 2016	Definition from the CRR modified by the delegated act

(*) Bank holding companies (BHCs) and their insured depository subsidiaries (IDIs).

(**) Countercyclical leverage ratio buffer of 35% of the institution specific capital buffer; for G-SIBs and domestically systemically important banks, supplementary leverage buffer ratio of 35% of corresponding risk-weighted capital buffer rates.

Source: ESRB (2015), BCBS (2015), central banks and supervisory authorities' websites.

The differences between regulations implemented across jurisdictions in the calibration, frequency of calculation and disclosure requirements of the LR raise level playing field concerns for internationally active banks. One such discrepancy arises from differences in the frequency with which LRs have to be calculated for supervisory reporting. The difference is noticeable between US and UK banks (daily averaging) and EU banks (quarter-end).¹³ According to market participants, a lower reporting frequency (such as monthly averaging) ‘affords the possibility of trading repo on net balance sheet between reporting dates, while significantly reducing activity (to the point of closing their books) over reporting dates’ (ICMA European Repo Council, 2015). Recent reports on the European repo market highlight increased rate volatility at month and quarter ends, reflecting a decrease in market liquidity.

This seems a non-trivial issue. Munyan (2015), within the framework of a joint model of supply and demand for the US repo market, argues that the observed pattern of very pronounced and statistically relevant reductions in volume at quarter-end is a consequence of window dressing by highly leveraged non-US bank holding companies.¹⁴ The drop in repo activity is driven by European and Japanese dealers, who reduce their cash borrowing at quarter-end by very significant amounts (USD 170 billion) in order to improve their leverage ratios. Such window dressing may lead to an underestimation of systemic risk by regulators and raises the concern that it might interfere with the effectiveness of the Federal Reserve’s Reverse Repurchase Program. These findings indicate that the calculation method for reporting a regulatory ratio may matter as much as the required level of the ratio itself.

2.4 Calibration of the LR in the EU

In accordance with the implementation timeline set out by the leverage framework at international and EU level, the process of calibration is now underway, with a view to revising and adjusting the regulatory standards over a full credit cycle and for different types of business models before the LR becomes a mandatory minimum requirement. Regulators are conducting analytical work in two main directions: i) emphasizing the nature of the LR as a complementary measure to the risk-based capital indicators; and ii) developing an integrated macro-prudential framework, especially for systemically relevant financial institutions.

Both the BIS and the ECB have indicated that it is possible to identify a level of the LR which provides the optimal combination with the existing risk-weighted prudential measures based on the amount of risk-weighted assets (RWA). Fender and Lewrick (2015) propose measuring the dynamics of the leverage ratio through the business cycle and calibrating the regulatory requirement around the level that would make it binding for on average 50% of the banks in the sample during the observation period. In an upturn the leverage of banks would increase faster than their overall risk levels, making the LR more binding than risk-based capital measures in that stage of the business cycle; in a downturn, fewer banks would be bound by the LR and more by Tier 1 capital ratios, thus strengthening the LR’s function as a backstop. Accordingly, the leverage ratio should be about 4.5%.

ECB (2015) studies the impact of adding the leverage ratio to the risk-weighted capital requirements both in a theoretical model and based on financial data for 500 banks in the European Union from 2005 to 2014. Raising the LR tends to encourage banks to increase their RWAs slightly, but this is more than offset by the additional capital banks have to raise to meet the ratio. The net benefit of increasing the LR starts to diminish as a bank’s LR reaches around 5%.

¹³ The EU delegated act states that LR exposure should refer to the end of the reporting period, i.e. each quarter. This departs from the 2014 BCBS criteria (the three-month average) and from those decided by the US authorities (daily averages for on-balance-sheet items and the average of three month-end calculations for off-balance-sheet items).

¹⁴ Over the sample period (July 2008-July 2014) US banks calculate the reported end-of-quarter LR based on averages of daily exposure over the quarter (for items on the balance sheet); non-US banks conducting transactions on the US repo market report end-of-quarter LR based on quarter-end balance sheet data.

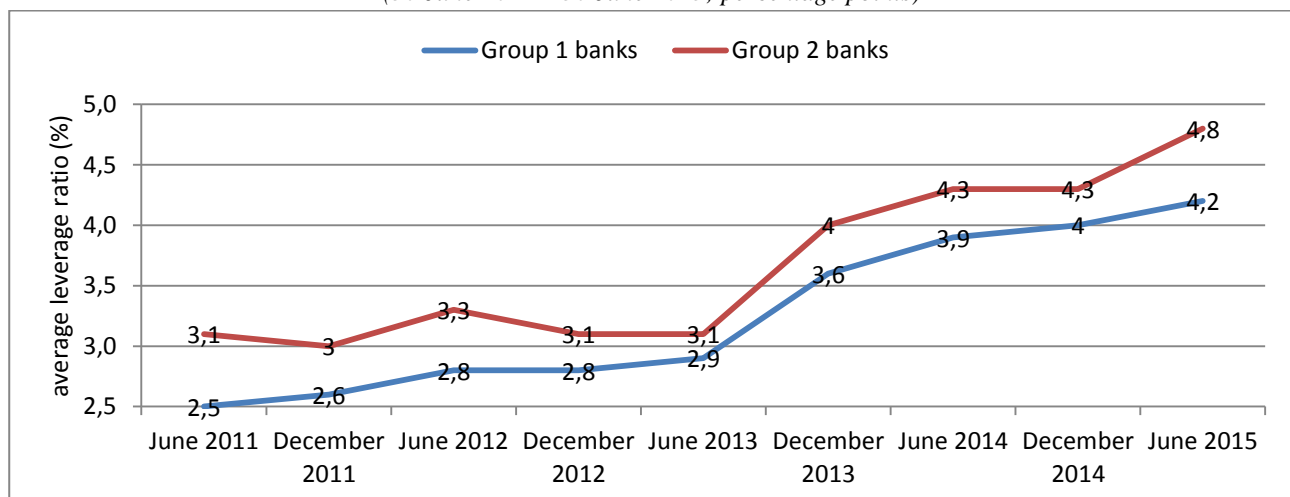
A number of countries are considering conservation, countercyclical (time-varying) and systemic (supplementary) buffers as an add-on to the Basel III LR¹⁵ in the same way that these buffers have been incorporated into the risk-weighted framework.¹⁶ They would increase the amount of capital needed to meet the LR requirement and change its composition when certain financial or macro-economic conditions (triggers) occur, raising the LR to around 6%.¹⁷

3. Compliance in 2013-2014

3.1 Results of the EBA’s quantitative impact studies

The European Banking Authority (EBA) monitors the adequacy of the leverage ratio as part of its semi-annual assessment of the implementation of the Basel III rules.¹⁸ The definitions of the LR used in the EBA reports reflect the evolution of the Basel III LR framework and its implementation in EU legislation, as outlined in Section 2 and described in greater detail in the Appendix. Figure 1 depicts the evolution of the LR since June 2011, assuming that those frameworks had been fully implemented at the reference dates; the visible improvement in the first half of 2013 reflects the changes made by the BCBS in January 2014, applied for the first time to the reporting date of 31 December 2013. In aggregate, European banks largely fulfil the future regulatory leverage requirements.¹⁹

Figure 1: Leverage ratio for EU banks reported by the EBA
(30 June 2011 – 30 June 2015; percentage points)



Source: EBA (2016).

¹⁵ A possible extension of the macro-prudential toolkit is also being examined (ESRB, 2015).

¹⁶ Bank of England (2014). According to some estimates, this would add 100 -150 basis points to the current 3% minimum leverage ratio requirement.

¹⁷ The SLR of 6% in United States for global systemically important banks envisages a 3% minimum component and a buffer component. Also the Financial Stability Board is calibrating the required level of Total Loss Absorbing Capital to the leverage ratio denominator as well as G-SIB’s risk-weighted assets: in its November 2015 final term sheet for the standards on Total Loss Absorbing Capital (TLAC) the FSB foresees a two-stage compliance process for GSIBs, which will be required to hold TLAC equivalent to 16% of risk-weighted assets or 6% of the leverage ratio denominator in 2019.

¹⁸ The report includes an analysis of data submitted by 49 Group 1 banks from 14 countries (internationally active banks with Tier 1 capital above EUR 3 billion) and 248 Group 2 banks from 20 countries in the EU participating on a voluntary basis since June 2011. Coverage of the banking sector in terms of risk-weighted assets (as defined in the CRD IV – CRR framework), is 94.5% for Group 1 banks and 36.6% for Group 2 banks. For 30 June 2015, the latest available date, the sample of banks submitting data on the leverage ratio consists of 101 Group 1 banks and 108 Group 2 banks from 10 EU countries (FSB, 2015).

¹⁹ At international level, the fully phased-in Basel III Tier 1 leverage ratio average as of 30 June 2015 is 5.2% for Group 1 banks and 5.4% for Group 2 banks.

The report by the EBA points out that capital shortfalls for both groups of banks have decreased significantly; they are now mostly to be found in the balance sheets of small and medium-sized Group 2 banks, for which meeting a leverage ratio of 3% would require additional Tier 1 capital of EUR 4.5 billion. Comparing capital shortfalls attributable to the entire range of capital measures, the EBA concludes that Group 1 banks' needs arise from risk-based capital requirements, whereas the LR is the main constraint for Group 2 banks (EBA, 2016).

3.2 Individual LR estimates

The LR of individual banks in the EU will only become public in the second half of 2016.²⁰ In this section we describe how the main banks in the euro area have achieved and indeed over-fulfilled the preliminary 3% level, using estimates of the LR which attempt to replicate the regulation applicable over the sample period. To estimate the exposure measure (the denominator of the ratio) we add to banks' total accounting assets several components, such as guarantees, acceptances and other off-balance-sheet positions (such as credit risks associated with derivatives and SFTs), based on the Basel III LR of June 2103 and January 2014 respectively.²¹

Using information on firms' financial accounts from publicly available sources (mostly Bankscope and SNL), we calculate semi-annual leverage ratios for 70 large banking groups in the euro area, from June 2013 to December 2014 (Table 3; see Table A2 in the Appendix for their names).

At the beginning of the sample period the average LR was 3.2%. Nearly one third of banks (24, or 34% of the sample) had LRs below 3% and would have needed to increase their (fully loaded) Tier 1 capital by EUR 59.2 billion to reach that minimum. Under the assumption that banks would have increased Tier 1 capital to the level needed to fulfil the CRR risk-based capital requirements, the number of LR-constrained banks would have fallen to 14 and the shortfall to EUR 41.4 billion; the share of the total shortfall attributable to the LR requirement was 70% (Table 4).

The largest banks had an average LR below 3% as of 30 June 2013. In general, LR-constrained banks tended to be located in core countries. The share of repos and derivatives was highest for the largest banks (24%), for banks below the target level (23%) and for banks in core countries (20%), against a sample average of 16% (Figure 2).

As shown in Table 4, in the 18 months between 30 June 2013 and December 2014 compliance with the LR requirement improved markedly, with the average estimated, fully loaded LR for the sample rising from 3.2% to 4.4%.²² By 31 December 2014 only 3 banks (4% of the sample) were below the 3% threshold. The corresponding Tier 1 capital shortfall fell by 94%, to EUR 2 billion.

²⁰ Disclosure is mandatory of EU banks starting in 2015; however, the changes in the reporting templates which had to be made to include the new definitions of the EC delegated act have only recently come into effect (March 2016); banks will start reporting and publishing quarterly leverage ratio starting in September 2016.

²¹ Brei and Gambacorta (2014) use a similar approach to build estimates of the leverage ratios for 109 international banks from 14 countries for the years 1995–2012.

²² Banks in non-core countries have improved their LR by 1.7 percentage points (from 3.8% to 5.5%), more than those in core countries (+1 percentage point, from 2.9% to 3.9%).

Table 3: Sample banks

Country	No. banks	Total assets December 2014	
		€ billion	% of country total bank assets
Austria	6	441.3	50.1
Belgium	3	714.8	64.9
Finland	2	456.6	78.8
France	6	6,722.3	82.2
Germany	17	4,253.7	54.5
Ireland	3	285.8	26.5
Italy	11	2,165.4	53.8
Netherlands	8	2,029.0	82.8
Portugal	3	219.1	46.7
Spain	5	2,456.7	82.6
Others	6	115.5	9.3
Total	70	19,860.1	64.5

Others: Cyprus, Estonia, Luxembourg, Malta, Slovenia, Slovakia

Table 4: LR, number of banks below 3% and shortfall

	Total	Banks with LR <3%			Banks with LR <3% if Tier 1 ≥ 8.5% *		
		LR %	No. banks	LR (%)	Shortfall (€ billion)	No. banks	LR (%)
30 June 2013	3.2	24	2.3	59.2	14	2.6	41.4
31 December 2013	3.8	15	2.5	26.6	7	2.6	21.4
30 June 2014	4.1	7	2.6	5.2	7	2.6	5.1
31 December 2014	4.4	3	2.6	2.3	3	2.6	2.3

(*) Residual capital shortfall, entirely attributable to the LR, that would result after fulfilment by each banking group of the 6% Tier 1 requirement +2.5% capital conservation buffer + loss absorbency requirement of 1% -2% for banks classified as G-SIBs.

Further evidence on LR compliance is provided in Figure 3, where banks are arranged according to their estimated Tier 1 capital ratios and LRs. The blue and red dots represent banks as of June 2013 and December 2014 respectively. The vertical dashed line divides the banks that fail to meet the LR 3% threshold, while the horizontal line identifies the banks with an insufficient (fully loaded) Tier 1 ratio. All banks have shifted upwards and to the right as a consequence of improvements in both ratios.

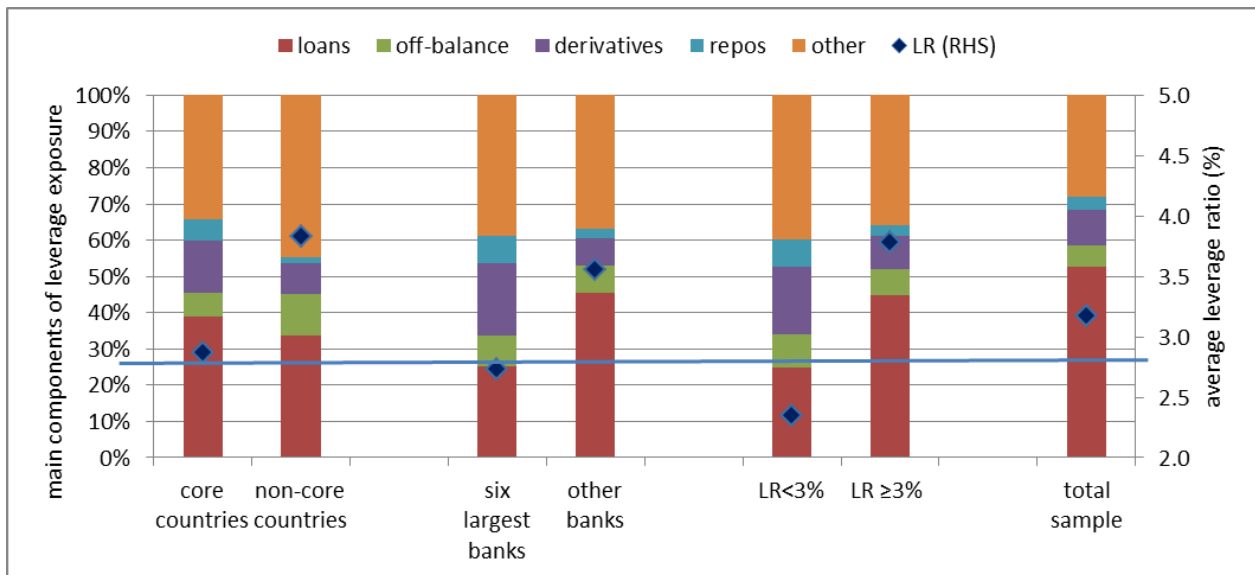
The red diagonal line represents the points where an 8.5% Tier1 capital ratio results in the same amount of required Tier1 capital as a leverage ratio of 3%.²³ Banks plotted above this break-even line hold more capital than they would need to fulfil the Tier 1 ratio; for such banks the LR is the constraining requirement. For banks plotted below the line, the risk-based ratio is the constraining requirement. The majority (60%) fell into the latter category on both dates.²⁴

²³ By construction, it also represents a proportion of $8.5\%/3\% \approx 2.83$ between the amount of (unweighted) leverage exposure measure and of risk-weighted assets that the bank can hold for a given amount of Tier 1 capital.

²⁴ Three outliers with estimated fully loaded Tier 1 ratios above 40% are not plotted.

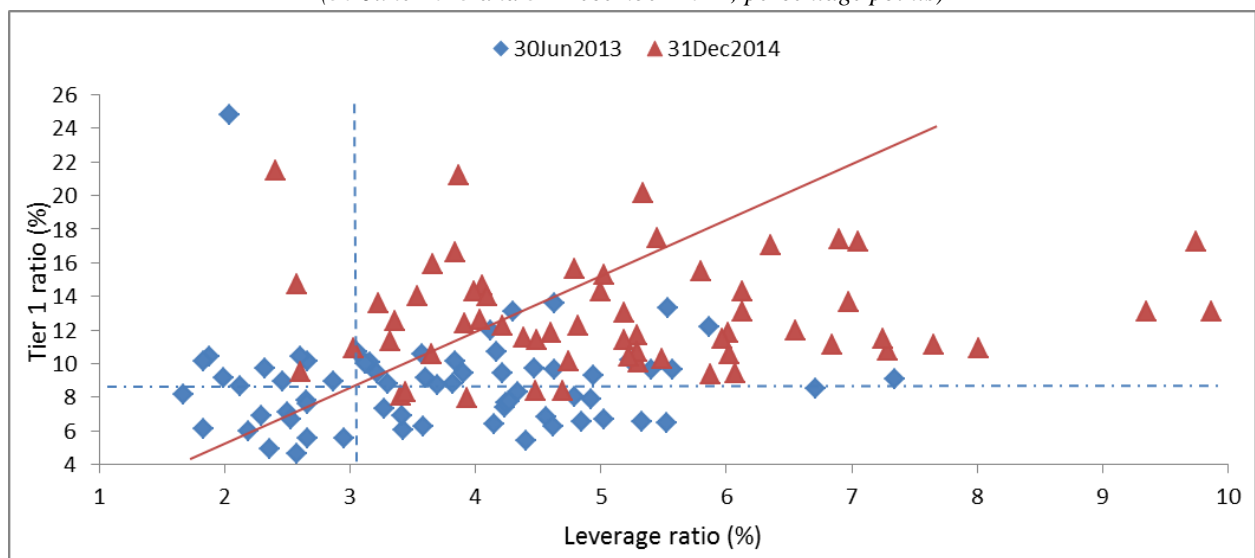
This evidence confirms that the LR acts mostly as a backstop to the Basel III risk-based capital ratios, as intended. We find that during the sample period Tier 1 ratios improved by more than LR and that, in the latter case, the improvement was mostly driven by the increase in Tier 1 capital (+ EUR 200 billion, or 30%), whereas exposures fell by EUR 1,370 billion (-6%).

Figure 2: Composition of LR exposure
(30 June 2013; percentage points)



Core countries: Austria, Finland, France, Germany, Luxembourg, Netherlands. Non-core countries: Belgium, Cyprus, Estonia, Ireland, Italy, Malta, Portugal, Slovenia, Slovakia. Largest banks: Banco Santander, BNP Paribas, BPCE, Credit Agricole, Deutsche Bank, Societe Generale. Source: Bankscope and SNL.

Figure 3: Tier1 risk-based capital ratio and leverage ratio
(30 June 2013 and 31 December 2014; percentage points)



The average LR for the sample rose by 1.2%, from 3.2 % to 4.4%. Using shift-share analysis to decompose this increase, we find that capital strengthening is by far the most important factor, accounting for 0.8%. At bank level too the LR improvement is predominantly driven by capital increases. Figure 4 compares the contributions to changes in the LR ascribed to Tier 1 capital and to exposures. Banks are arranged on the horizontal axis according to their June 2013 estimated LR. The capital effect (blue) is larger than the exposure effect (red), irrespective of the LR at the beginning of the sample period. The share of capital is larger than that estimated by Bologna et al. (2014) for the period December 2011 to June 2013.

We focus on the banks that reduced their exposures (i.e. the 53 banks with a positive exposure effect in Figure 4) to examine whether compliance implies cuts to securities financial transactions, derivatives and off-balance-sheet items. As seen in Section 2, these business lines contribute less to profitability than riskier assets; they are also easier to unwind on both the asset and the liability side and are therefore likely candidates for banks that wish to raise the LR.

Figure 5 shows that the 19 LR-bound banks (with LR below 3% as of June 2013) have increased capital and cut exposures by a larger extent than the remaining 34 banks (with $LR \geq 3\%$). Changes in the less profitable business lines behave as expected, being much larger for banks with an LR below 3%.

4. Participation in Eurosystem operations and money market activity

The potential effect of the LR on monetary policy in the euro area is mainly linked to the treatment of repo operations in the exposure measure. During the observation period repo operations with the Eurosystem, where counterparties bring securities to the central bank in exchange for cash, have been the main monetary policy instrument. Since repo borrowing increases the leverage exposure by an amount at least equal to the cash borrowed, as the collateral remains on-balance-sheet for the length of the financing operation, LR-constrained banks might be discouraged from participating in repo operations with the central bank and from trading in the secured (repo) money market (see the Appendix).

4.1 Eurosystem refinancing operations

The total amount of Eurosystem lending to euro-area counterparties decreased from EUR 823 billion on 30 June 2013 to EUR 513 billion on 31 December 2015 (-38%), mainly owing to the reimbursement of the LTRO operations which had been allotted on tap in large amounts. Out of the 70 banking groups in our sample, participation in monetary policy operations varied from a minimum of 31 banks (June 2013) to a maximum of 42 banks (December 2014), accounting on average for almost 50% of total outstanding Eurosystem open market operations.

In our estimates the share of central bank refinancing in total leverage exposure is small (around 2.5%), mitigating possible negative effects of central bank liquidity provision on the banks' leverage ratios. Mainly because of this small dimension, Bucalossi et al. (2016) find that participation in Eurosystem monetary policy operations by LR-constrained banks does not differ from that of non-constrained banks in the period June 2013-June 2014.

We repeat this analysis using two periods: June 2013-December 2014 and the year 2015. Figure 6 shows the change in Eurosystem borrowing as a fraction of individual exposure with respect to the initial LR for the first sub-period. The relationship between the adjustment of refinancing and the LR is not significant. If anything, banks with a large LR tend to reimburse more, not less.

Figure 4: Contribution of capital effect and exposure effect to the change in the LR
(From June 2013 to December 2014; percentage points)

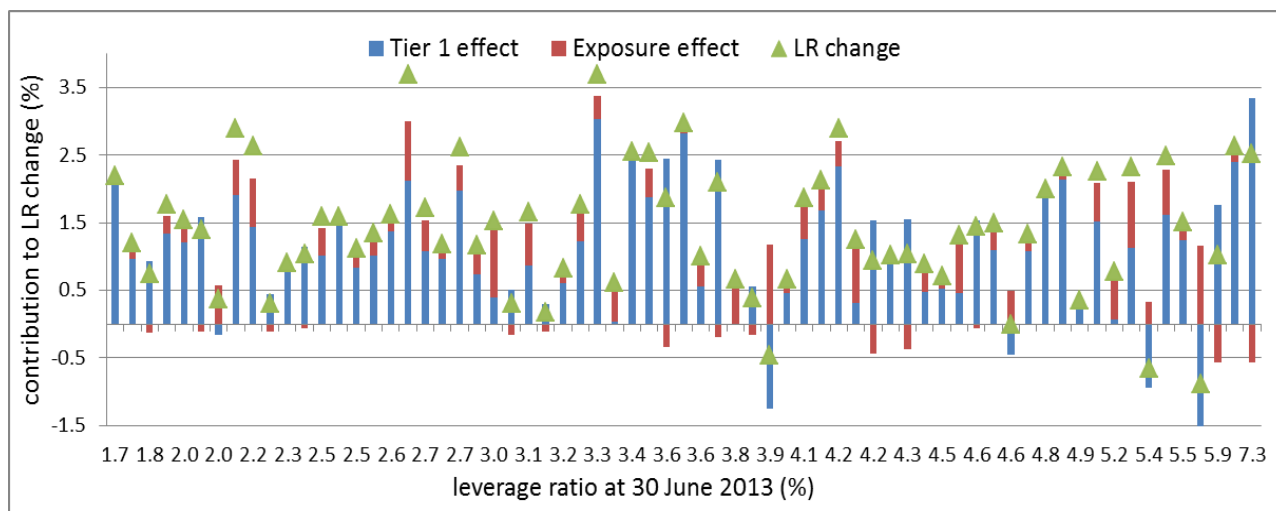
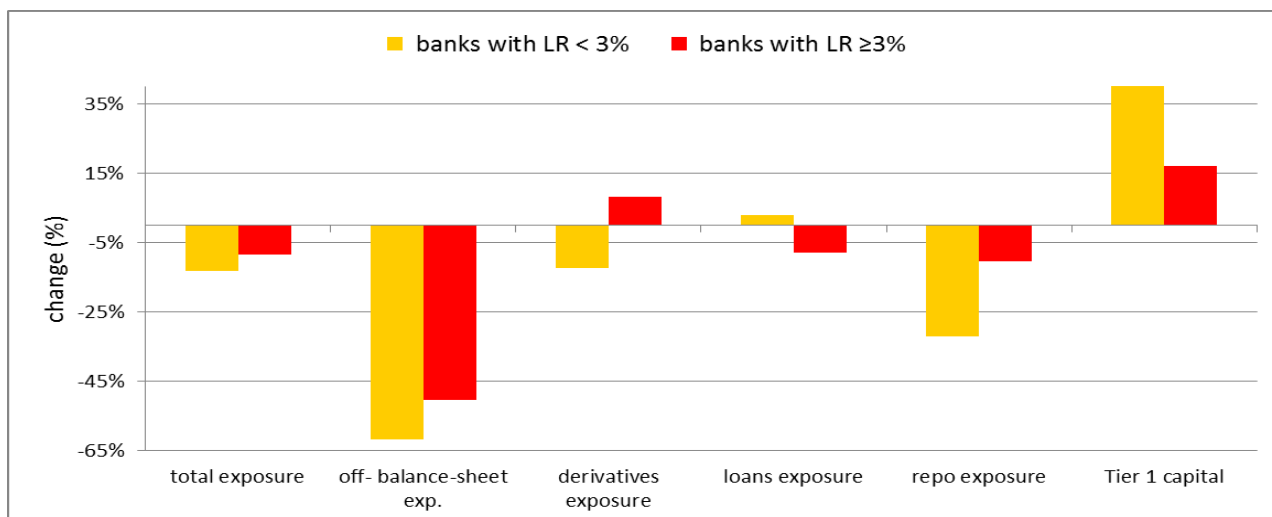


Figure 5: Change in exposure and Tier 1 for banks that reduced exposure
(From June 2013 to December 2014; percentage points)



At the end of 2014 the ECB launched the first two targeted longer term refinancing operations (TLTROs) designed to revive credit to the real economy. TLTROs were in full swing in the first half of 2015. In March 2015 the ECB added the new quantitative easing measures, via the Public Sector Purchase Programme.

We argue that banks that borrow from the Eurosystem via TLTROs envisage not only increasing/replacing their debt by a long-term borrowing commitment (of up to 4 years) but also expanding their overall balance sheet as they are supposed to use the extra funds to create new loans. We therefore expect banks with low LR levels to be less willing to increase their recourse to Eurosystem TLTROs. The scatter plot for 2015 is less dispersed (Figure 7), showing a slightly positive relationship between changes in Eurosystem refinancing and the initial LR level. Banks with a ‘moderate’ LR, i.e. below 4%, show practically no increase in refinancing. Although still not statistically significant, this relationship seems consistent with our hypothesis concerning the more LR-constraining nature of TLTROs compared with previous operations. The higher sensitivity to the LR is also probably related to the growing influence of other factors that affect leverage exposure, such as the start of the PSPP in March 2015 (see Section 5).

Figure 6: Change in banks' Eurosystem borrowing as a share of leverage exposure
(from June 2013 to December 2014; percentage points)

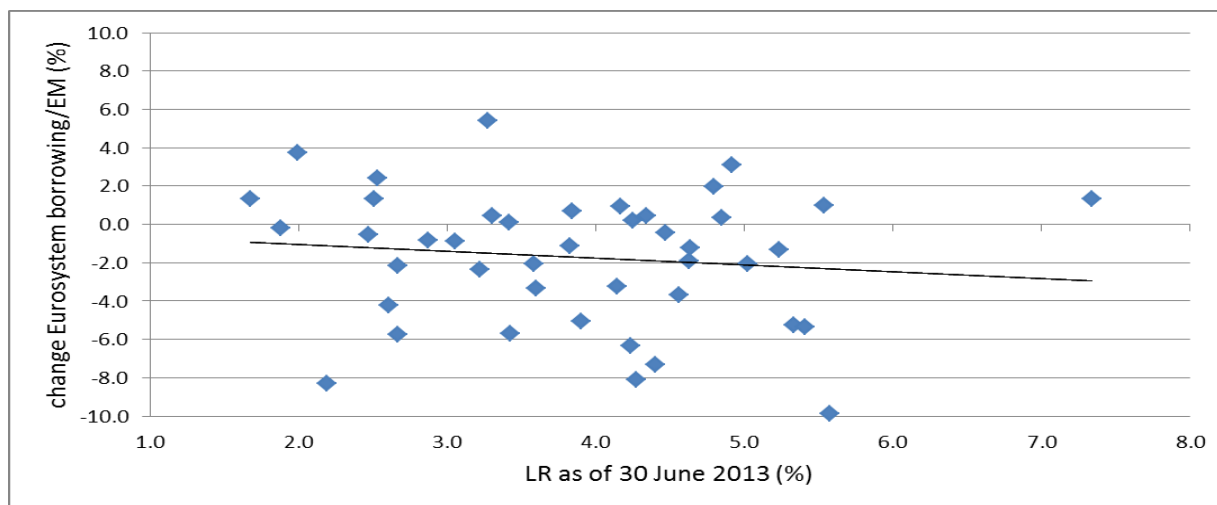
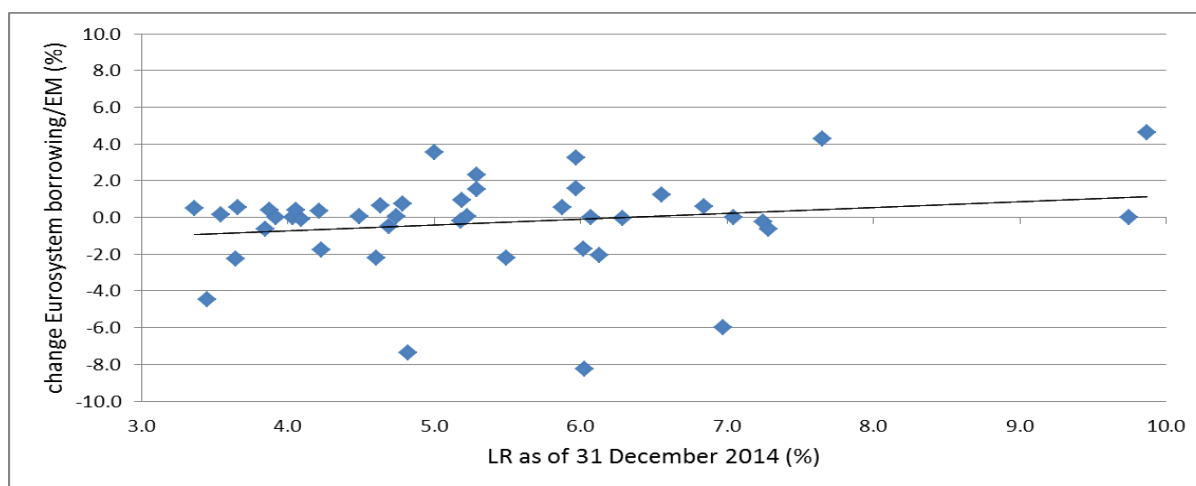


Figure 7: Change in banks' Eurosystem borrowing as a share of leverage exposure
(from December 2014 to December 2015; percentage points)



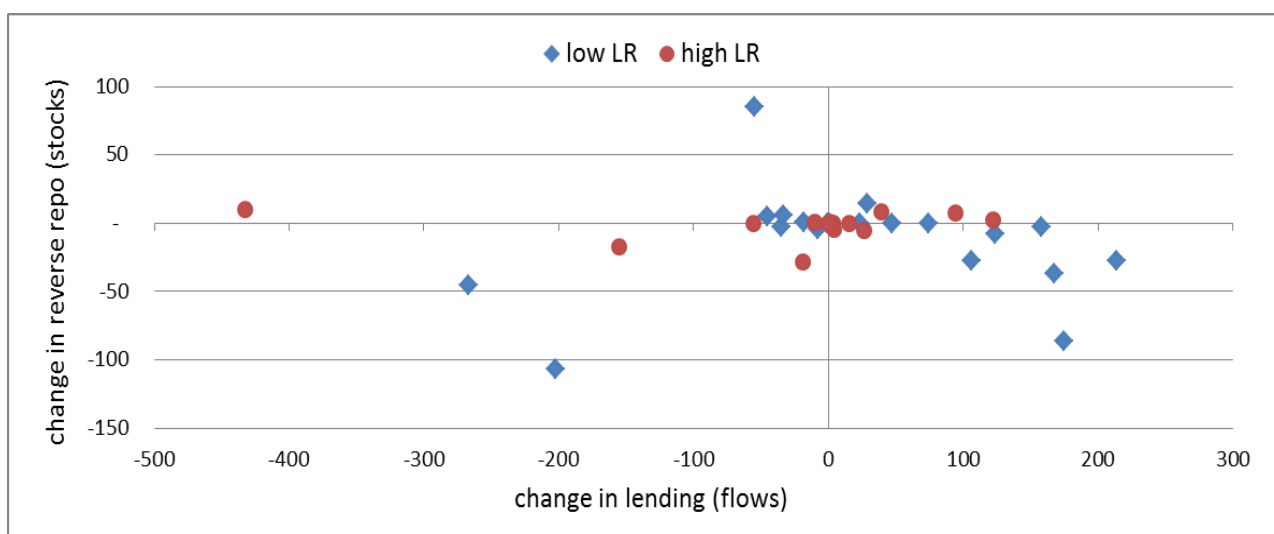
4.2 Repo activity

To investigate whether LR-constrained banks reduce repo market activity we use two datasets: i) banks' balance sheet data on repos and reverse repos; ii) the ECB Money Market Survey (EMM) data on secured transactions in 2013 and 2014, providing information on borrowing and lending flows of major euro-area banks for the second quarter of each year. The balance sheet dates are end-June 2013 and end-June 2014, coinciding with the end of the reporting period in the EMM survey.

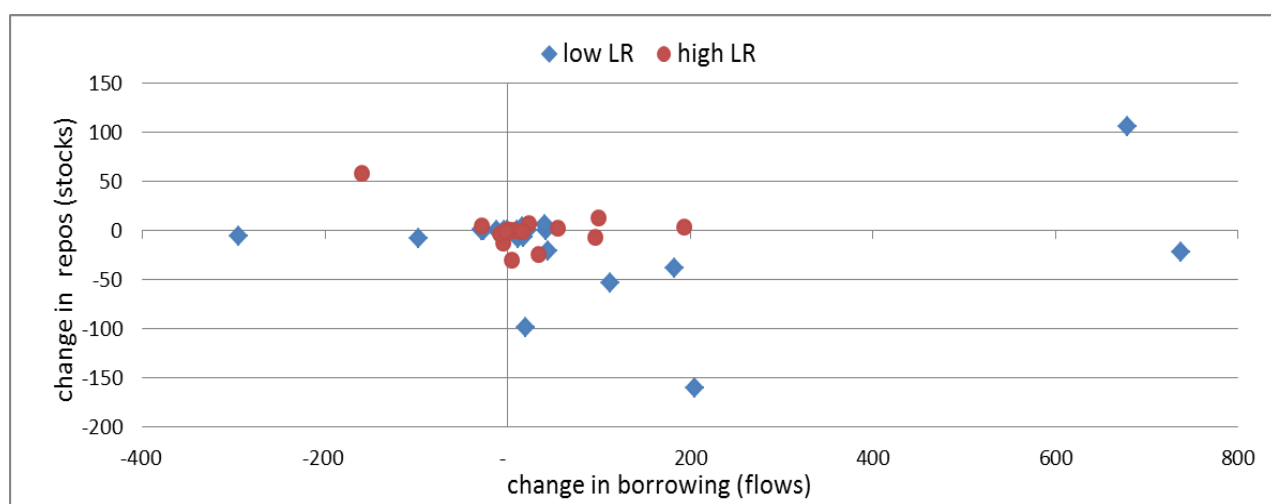
We find that changes in the stock of repos (cash borrowing) and reverse repos (cash lending), as reported by banks in their financial accounts, in many instances do not match the changes in trading flows reported by the same banks in the EMM survey. The two measures of market activity tend to move in opposite directions. Many banks that reduce stocks, which matter for the calculation of the exposure measure, display a concurrent increase in trading activity: while stocks have been curbed, sample banks have increased lending (slightly) and borrowing (substantially) between Q2 2013 and Q2 2014. This is clearly visible in Figures 8a and 8b, respectively plotting the lending side and the borrowing side. Besides, this behaviour is more pronounced for banks exhibiting an initial LR below the median, as shown in the bottom right quadrant of each figure.

Figure 8: Change in secured money market trades and balance sheet stocks
(between Q2 2013 and Q2 2014; billions of euros)

(a) Lending



(b) Borrowing



Banks with a high LR are those with $LR \geq$ median of 3.4% at 30 June 2013.

Source: SNL and Bankscope for repos and reverse repos; EMMS data on individual banks for repo borrowing and lending.

This result is important because it shows that European banks engage in window dressing in the euro money market as well, as already documented by Munyan (2015) for the repo market in the United States. Munyan argues that the low frequency of LR reporting by European banks encourages large-magnitude, short-lived drops in trading activity at the end of the reporting period as banks attempt to achieve higher regulatory leverage ratios by trimming their exposures. The incentive for window dressing is much smaller for US banks which, according to domestic regulations, are required to report the daily average of the on-balance-sheet components of the exposure measure (LR denominator) over the reporting period. The Basel III regulation applicable to EU banks instead defines the LR as the average of the three end-of-month LR over the quarter. Since the adoption of the LR delegated act the difference in reporting frequency has further increased because banks must only report their end-of-quarter LR, in line with supervisory reporting.

The data for 2015 do not show the same discrepancy between stocks and flows. This is probably because participants in the 2015 EMM survey display a general year-on-year decline in turnover in the secured market, equal on average to 13%.²⁵ However, market participants also report significant increases in repo rates at quarter-end, reflecting a decrease in market liquidity.²⁶

5. Over-compliance in 2015

In order to examine the dynamics of the LR after December 2014, we consider the actual individual figures published by the EBA and covering a sample of 90 banks as of 31 December 2014 and 30 June 2015 (EBA, 2015c; see Table A3 in the Appendix for their names).

These figures are not immediately comparable with our estimates. The EBA sample includes a larger number of banks, with a bigger share of small banks. While our analysis is based on fully loaded LR, the EBA uses the transitional definition of the LR, which is usually slightly higher because it includes elements of capital that are being gradually phased out in order to align the numerator to the CRR-CRD IV composition of Tier 1 capital.

The LRs have continued to improve in the first semester of 2015. According to the current definition, 92% of the sample banks comply with the 3% threshold; most are well above that level, resulting in an average LR of almost 5% (Table 5).²⁷ The pattern which we described in Section 3 is confirmed in H1 2015. The average LR improves because the capital effect more than compensates for the (negative) exposure effect. Again, even though the exposure change is relatively small, we note that banks with a lower LR are more careful than those with a high LR in managing their exposures, either trimming their exposure measure or increasing it by a smaller amount.

5.1 Preparing for QE

Why are European banks pursuing such large LR over-compliance? Some evidence of this conduct has been already documented for the US, where over-compliance with the SLR for the largest US banks is around 0.5%-1%. Analysts ascribe this phenomenon mostly to the expectation of monetary tightening, which would expose banks to mark-to-market declines on their fixed-bond portfolio, though the need to make space for larger HQLA portfolios may also play a role.²⁸ Based on the experience of QE in the United States, analysts predict that the increase in exposure as a result of central bank bond buying will mostly affect the largest euro-area banks.²⁹

²⁵ The reasons cited by respondents for the contraction in trades include high excess liquidity as a result of accommodative monetary policy, the effects of liquidity and capital regulation, low volatility in money market rates, and increased recourse to longer-maturity trades to the detriment especially of overnight trades.

²⁶ The ICMA European Repo Council (2015) for example documents such rate increases for the Italian MTS repo market. Large rate increases were also observed for repos on Bunds at the end of 2015.

²⁷ The 2015 EU-wide transparency exercise provides detailed bank-by-bank data on capital positions, risk exposure amounts and asset quality on 105 banks from 21 countries of the European Economic Area (EEA) covering around 70% of total EU banking assets at the reference dates of 31 December 2014 and 30 June 2015. The report relies on supervisory reporting information (COREP and FINREP) collected by the EBA and submitted for verification by banks and supervisors. For the leverage ratio, for which supervisory reporting data at the required level of detail are not available, data were collected from banks. EU banks have continued to strengthen their capital positions and the impact of the transitional adjustments has also become less significant: the aggregate reported CET1 ratio of 12.8% is approaching the fully loaded CRD IV/CRR CET1 ratio of 12.0%, facilitating comparability across banks.

²⁸ To meet the liquidity requirements banks could issue additional debt and use the proceeds to increase the share of Level 1 assets relative to Level 2 assets. In this case, banks would be holding high leverage ratios as 'dry powder' for the expected increase in Level 1 assets needed to comply with LCR and NSFR requirements (Pozsar and Sweeney, 2015).

²⁹ Autonomous (2015).

These banks would act as brokers and custodians for their clients who are the final counterparties of the APP purchases; when clients deposit the proceeds from the bond sales with the banks there is an equivalent expansion in the banks' exposure measure. If LR-constrained banks cannot discourage deposit inflow, their LR will further deteriorate (though liquidity measures might improve).

Table 5: LR reported by euro-area banking groups and published by the EBA

Sample		Leverage ratio (%)		Change		
Country	No. banks	31/12/2014	30/06/2015	LR (b points)	Tier 1 (%)	Exposures (%)
Austria	5	5.62	5.83	0.20	3.3	- 0.3
Belgium	5	4.90	5.11	0.21	3.4	- 0.9
Finland	1	6.41	7.08	0.66	15.8	5.0
France	10	4.52	4.63	0.11	2.8	0.4
Germany	20	4.64	4.71	0.07	2.6	1.1
Ireland	3	6.15	7.30	1.15	17.6	- 0.9
Italy	14	5.56	5.60	0.04	3.3	2.6
Netherlands	6	3.96	3.96	- 0.01	4.8	4.9
Portugal	3	6.24	6.58	0.35	5.9	0.3
Spain	14	5.51	5.68	0.17	9.0	5.7
Others	9	7.22	7.23	0.01	4.1	4.0
Total	90	4.85	4.97	0.11	4.5	2.1

Others: Cyprus, Latvia, Luxembourg, Malta, Slovenia.

The LR data published by the EBA cover only the initial four months of the Public Sector Purchase Programme, namely March–June 2015.³⁰ To attempt some analysis of over-compliance we compare first the changes in aggregate exposure to the amount of liquidity injected by the Eurosystem through government bond purchases and refinancing operations, to changes in banks' liquidity reserves and changes in banks' holdings of euro-area government bonds. In the first half of 2015 for the 90 banking groups in the EBA sample, representing roughly 70% of the total euro-area banking system, the increase in leverage exposures exceeds the total liquidity created by the APP purchases (Figure 9). Unless bonds are sold from banks' own portfolios, which would be leverage-neutral, APP purchases have the effect of increasing their reserves and hence their total leverage exposure. Besides, a deposit multiplier effect is in place which may further raise exposure. We note that in aggregate euro-area banks have not reduced, but rather slightly increased, their holdings of government bonds.

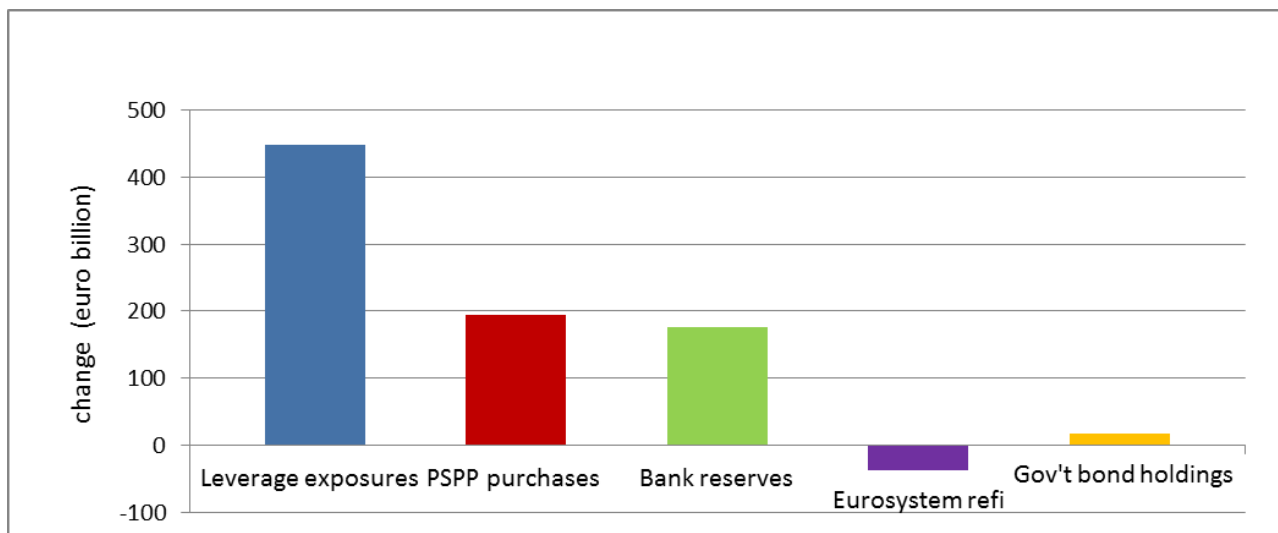
This preliminary evidence of unchanged bond portfolios of banks and over-proportional increase in leverage exposure reinforces the expectation that QE in the euro area will contribute to a deterioration in banks' LR, given also that euro-area banks are reducing the pace of Tier 1 below the very high rate of recent years.

To obtain an estimate of the possible LR reduction that will be brought about by the full QE package upon its completion in March 2017 we perform a simple comparative statics exercise. Assuming that QE will increase the Eurosystem balance sheet by EUR 1.7 trillion from March 2015 to March 2017 and that the EBA sample will absorb 70% of the extra bank reserves, we hypothesise that the exposure change will be equal to the change in bank reserves times a factor of 1.5. We further hypothesise that the banks will raise

³⁰ The Covered Bond Purchase Programme 3 (CBPP3) and the ABS Purchase Programme (ABSPP), which make up the Asset Purchase Programme (APP) together with the PSPP, had been running since October 2014 by smaller amounts than the latter.

Tier 1 to make up for their shortfall as of December 2014, estimated at EUR 17 billion.³¹ The final LR will thus be equal to 4.5%, i.e. 40 basis points below the December 2014 level.

Figure 9: Change in key banks' variables vis-à-vis PSPP purchases
(from December 2014 to June 2015; billions of euros)



Source: Exposure measure for 90 euro-area banking groups published by the EBA (2015); ECB for total euro-area data.

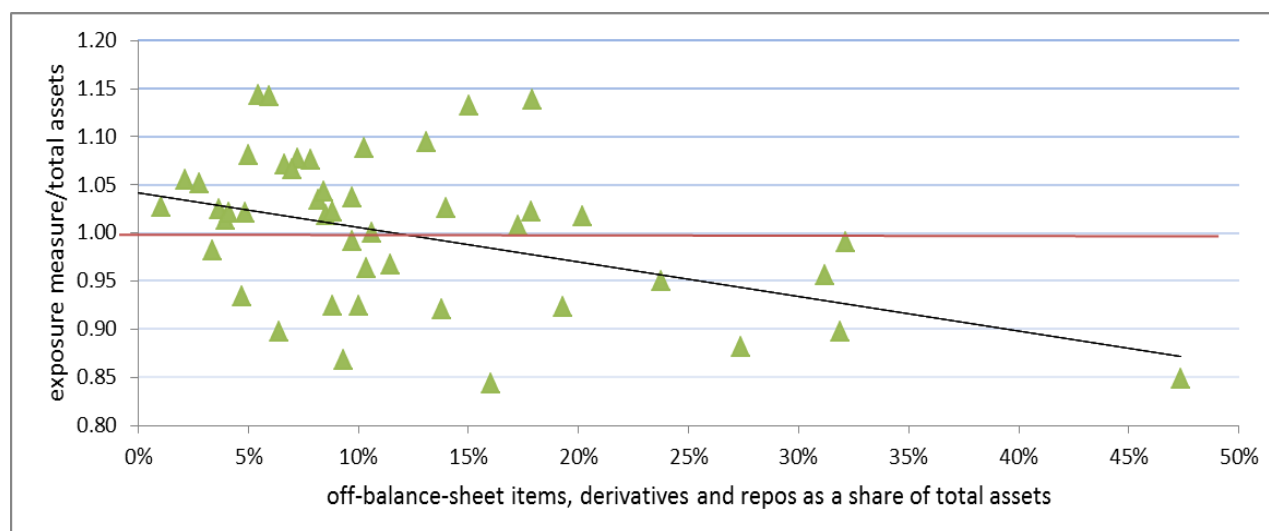
5.2 Compensating for the cost of a higher LR

Besides the wish to prepare for re-calibration of the LR and the likely effects of expansionary monetary policy, the third possible explanation of over-compliance is the increased ability of banks to adjust their business models so as to reduce the economic burden imposed by the introduction of the LR requirement.

One extreme instance of such ability can be found in the window dressing behaviour documented by Munyan for the US repo market (Section 2), evidence of which can be inferred also in the euro area (Section 4). More generally, according to a recent market survey ‘the European repo market is changing dramatically, and with it, so are banks’ repo businesses. The key consistent trends can be summarized as: (i) de-risking and deleveraging; (ii) the transformation from profit-centre to cost-centre; and (iii) the combining of collateral and liquidity management functions. [...] virtually every bank interviewed felt that they had been pro-active in remodeling their businesses, pre-empting regulatory and structural change, and keeping one-step ahead of their peer group’ (ICMA European Repo Council, 2015). The report supplies further evidence of banks’ tendency to over-comply with the LR, reflecting the desire to stand out positively amongst the peer group as well as being the result of operating across several jurisdictions.

³¹ To estimate the exposure measure as of March 2017 we add the increase in reserves to the December 2014 EBA exposure of EUR 22,050 billion.

Figure 10: Ratio of exposure to accounting assets relative to asset composition
(31 December 2014)



Source: EBA (2015) for exposure measures; SNL and Bankscope for balance sheet items.

Most market participants believe that the current repo market prices are far below the level that would be needed for the activity to be sustainable on its own,³² suggesting that the reduction of repo market volume might have been larger than that observed since the crisis had banks not adopted ‘aggressive prices: some are cited as opportunistically “cornering” much of the repo market, or “picking up the slack” where other banks have retrenched’. Banks have also developed collateral management and other balance sheet optimization strategies, such as collateral swaps.

The policy choices of the European authorities also help banks achieve higher LRs. As seen in Section 2.4, the details of the final LR design implemented in the delegated act of 2014 ease the rules concerning the treatment of collateral and netting, which are seen as the main factors which might discourage banks’ intermediation in financial markets.

We measure the overall effect of the regulatory definition on the LR comparing exposures for the individual banks from the EBA sample (computed by banks in accordance with the 2014 EC delegated act) with accounting total assets of banking groups from the Bankscope database (accounting assets at the consolidated level under IFRS). Figure 10 plots the ratio of leverage exposure to total assets relative to the share of assets represented by off-balance-sheet, repos and derivatives components.³³ Several banks have a ratio of exposure measure (EM) to assets above 1, as expected, since the regulatory EM is designed to include sources of leverage ‘below the line’ (guarantees, collateral, derivatives positions, etc.). In a large number of cases (42%) the ratio of EM to assets is below 1, indicating that the computation of the EM allows banks to make more deductions than additions to the items on the balance sheet. As shown in Figure 10, banks for which the EM is smaller than accounting assets are those with larger off-balance-sheet items and derivatives and repo portfolios. The negative relationship is stronger for banks with a large share of repo exposure.³⁴

³² For example, at 3% capital charges and assuming a 10% return on equity, lending of secured cash necessitates a return of at least 30 bps to become economically viable; break-even rates for repos are even higher at 40-45 bps and including other Basel measures at 70-75 bps.

³³ There are 48 observations in the chart, corresponding to the subset of the 90 banks in the EBA sample for which balance sheet information is also available in Bankscope (see Table A3).

³⁴ Repo exposure is calculated by adding a measure of counterparty credit risk to the amount of repo operations and subtracting 30% of this from the reverse repos reflecting the assumption of netting with the same counterparty .

Three factors may explain why many banks have an exposure measure below the value of total assets. First, large derivatives books allow banks to benefit from bilateral netting contracts and compensation of cash variation margins. Second, banking groups with a larger share of non-banking activities, such as insurance businesses, may have a much lower EM than a group with comparable consolidated accounting assets but with larger participations in banking activities. This is because the scope of consolidation has been made compatible with that of the risk-based capital framework (see the Appendix). Third, the leverage framework generally favours the use of central counterparties (CCPs), which allow multilateral netting and better regulatory treatment of counterparty credit risk.³⁵ This might have encouraged the use of CCPs for repo transactions. According to the ICMA (2016), the share of CCP-cleared transactions rose to its highest level of 31% in December 2015, from 23% in June 2013.

6. Conclusion

Will LR-constrained banks refrain from entering repo transactions which would increase their leverage exposure? Will this matter for monetary policy implementation? Can we learn something from the present transition phase of the leverage regulation in the EU? In attempting to answer these questions we are aware that it is difficult to establish a clear link between banks' behaviour and the LR requirement, considering both the peculiarities of the present accommodative monetary policy stance and the wide-ranging, ongoing process of regulatory innovation impacting banks and financial markets. All the same, our analysis of euro-area banks can contribute to a better understanding of the interactions of leverage regulation with monetary policy implementation in several ways.

Our observation period begins when 24 euro-area banks (one third of the sample) were below the 3% target, which allowed us to identify key traits of LR-constrained banks. They tended to be large, located in core countries and with a high share of derivatives, off-balance-sheet and repo exposures.

Banks have adjusted quickly to the new leverage framework defined by the BCBS in June 2013, well in advance of the 2018 deadline. At the end of 2014 all but three banks were LR-compliant, with a combined shortfall of EUR 2 billion (-94% of the LR shortfall of EUR 41 billion in June 2013). The share of banks more constrained by the risk-based Tier 1 ratio than by the LR was 60%; this confirms that the LR mostly acts as a backstop rather than as a binding requirement.

We measure the relative importance of the capital and exposure effects. The average LR for the sample increased by 1.2% (from 3.2% to 4.4%); capital strengthening was by far the main factor, accounting for 0.8% of the total LR change. Besides increasing capital, LR-constrained banks also cut exposure: both of these changes were larger than those exhibited by non-constrained banks. Repo changes for LR-constrained banks were large.

Even though LR-constrained banks reduced exposure, when we compare LR levels with central bank borrowing and with trading in the interbank repo market we find little support for the claim that the LR impaired the functioning of monetary policy through smaller recourse to such transactions.

This is partly due to banks reducing excess liquidity by reimbursing the 3-year LTROs and to repo markets recovering after the sovereign debt crisis, with central bank refinancing representing a limited share (2.5%) of leverage exposure. It is also due to the fact that banks with a low LR engage in window dressing, trimming their repo exposures at the end of the reporting period. As banks are targeting LR levels of 4%-5%, all banks are seeking to improve their LR at quarter-end, not just those with an LR still below 3%. The low frequency (end-of-quarter) of LR reporting as mandated by EU rules facilitates window dressing, allowing banks more flexibility in managing liquidity, exposures and trades but creating seasonal peaks in repo market rates.

³⁵ Additional benefit in terms of lower leverage exposures is provided by the exemption of the CCP leg of client-cleared trade exposures.

Besides reporting frequency, other elements of the LR design adopted by the European banking authorities, such as the netting of repo trades with central counterparties, the regulatory scope of consolidation, and the deduction of cash margins on derivatives transactions, all facilitate the achievement of larger LRs by euro-area banks.

In spite of these mitigating factors, we believe that the impact of the LR on the effectiveness of monetary policy remains an important issue. Our results as to the relative harmlessness of the LR for monetary policy implementation thus far will need to be updated to include the expansion of exposures of banks in the euro area deriving from the QE programme and from recourse to the new 4-year central bank refinancing operations, the TLTRO II. Moreover, it is possible that European banking authorities will fix a Pillar 1 LR above the preliminary 3%. In its April 2016 consultation document on LR calibration the BCBS envisages this possibility for banks classified as G-SIBs, though it does not give any indication of the size of the increase. These factors are likely to affect especially large banks in core countries. It remains to be seen whether this requirement will affect those banks' ability to redistribute liquidity in the euro area. The analysis of these possible developments is therefore an important topic for future research.

We observe that market participants and central banks have a range of choices at their disposal to accommodate the unwarranted effects of the LR and make them compatible with the need to provide liquidity to markets. While it is too early to reach any definite conclusion as to the future impact of the leverage ratio, our analysis suggests that calibration of the LR and adaptations of the operational framework of monetary policy can play an important role in shaping the long-term results.

Appendix - The Basel III leverage ratio

A.1 Components of the exposure measure

The leverage ratio is one of the three core elements of the Basel III package of measures designed by international regulators within the BCBS in 2010 as a response to the global financial crisis;³⁶ the other two are the capital requirements and the liquidity requirements. The leverage ratio is meant to act as a complement to the risk-based capital requirements,³⁷ providing a simple and transparent indicator of the amount of exposure that a bank can support with a given amount of capital:³⁸

$$\text{leverage ratio (LR)} = \frac{\text{Tier 1 capital}}{\text{Exposure measure} = \text{off balance} + \text{on balance sheet assets}} \geq 3\%$$

The Basel III leverage regulation will be finalized in the course of 2016 and implemented on 1 January 2018. Since the publication of the Basel framework in December 2010, the BCBS has revised the exposure measurement of the leverage ratio,³⁹ which determines the severity of the LR for each bank, given its capital and the composition of its balance sheet.

The specific Basel III definition of the exposure measure reflects the following objectives:

- to develop a common, comprehensive and precise definition of banks' exposures, overcoming differences in accounting standards,
- to recognize the potential exposures of items not included on banks' balance sheets, and
- to provide special treatment for some types of financial instruments, such as securities received as collateral or derivatives transactions, which, though useful for mitigating financial risks, can increase the ability of banks to create additional leverage.

The treatment of the EM components in the Basel III leverage framework mostly follows accounting rules, which differ substantially across jurisdictions, however, requiring the BCBS to issue clarifications concerning the accounting treatment of derivatives, written credit derivatives, collateral and securities financing transactions (SFTs).⁴⁰ To ensure the capital and exposure measures are consistent with the risk-based capital framework, the valuation of assets follows the criteria used for Tier 1 capital, and deductions from Tier 1 capital are also made from the EM. This principle also applies to the criteria for the

³⁶ The Basel Committee on Banking Supervision consists of senior representatives of bank supervisory authorities and central banks from Argentina, Australia, Belgium, Brazil, Canada, China, France, Germany, Hong Kong SAR, India, Indonesia, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

³⁷ Basel III capital ratios introduced in 2010 required banks to hold 4.5% of common equity (up from 2% in Basel II) and 6% of Tier I capital (up from 4% in Basel II) of 'risk-weighted assets' (RWA). Basel III has since introduced 'additional capital buffers' which include a 'mandatory capital conservation buffer' of 2.5%, as well as a 'discretionary counter-cyclical buffer'. This addition to the measure has been set up to allow regulators to stipulate a further buffer of another 2.5% of capital by banks during periods of high growth in the credit market.

³⁸ BCBS (2010), Basel III: a global regulatory framework for more resilient banks and banking systems, rev. June 2011. This document envisages an observation and parallel run period lasting until the end of 2017, during which changes can be made before implementation on 1 January 2018.

³⁹ The consultation document of June 2013 provides a more detailed definition of the leverage exposure as well as a uniform format for LR disclosure which became a requirement from January 2015 onwards (BCBS, 2013). A revised version was published in January 2014 (BCBS, 2014a). In April 2016 the BCBS issued a consultation document, for comment by 6 July, to be finalized by the end of the year, including further adjustments to the definition of components of the exposure measure (BCBS, 2016b).

⁴⁰ For a comparison of the main differences in the treatment of the Basel III exposure components under IFRS and US GAAP see EY (2013).

consolidation of assets on the balance sheet of entities within the banking group (scope of consolidation): when investments in financial or non-financial entities can be deducted from Tier 1 capital, then the assets of those entities are excluded from the banking group's EM.

The exposure measure is determined as follows:

1. All on-balance-sheet exposures net of specific provisions and valuation adjustments are included, to which off-balance-sheet items are added according to specified conversion factors
2. In principle, physical or financial collateral, guarantees or any form of credit risk mitigation may not be used to reduce on-balance-sheet exposures.
3. The exposure measure resulting from derivatives contracts is the sum of two elements: (i) present value reflecting the fair value of the contract, where banks are permitted to recognize bilateral netting when a qualifying master netting agreement is in place (although cross-product netting is not permitted); and (ii) the potential future exposure associated with derivatives contracts, calculated by applying add-on factors defined under the Current Exposure Method, which provides only limited netting benefits.⁴¹
4. The treatment of securities financing exposures is similar to that of derivatives, including an add-on for the potential exposure of SFTs resulting from the difference in value of the securities/cash lent out and the securities/cash received (a measure of counterparty credit risk, CCR).
5. Written credit derivatives, measured at their nominal amount. This may be reduced if there is a purchased credit derivative on the same underlying exposure, subject to a range of restrictions relating to seniority and maturity.

As of January 2015 internationally active banks are required to publish their leverage ratios according to a common disclosure template with the same frequency as, and concurrent with, their financial statements.⁴²

A.2 Leverage ratio as defined in EU legislation

The Basel III framework has been implemented in the EU through the Capital Requirements Regulation of 2013 (CRD IV-CRR framework), which was amended by the delegated act of the European Commission (EC).⁴³ The delegated act makes a number of clarifications and adjustments to the main EM components, including:

- SFTs: netting of cash receivables and payables is allowed if counterparty, maturity and currency criteria are satisfied;
- Off-balance-sheet items (OBSIs): instead of using a uniform 100% credit conversion factor (CCF) to convert OBSIs to an on-balance-sheet equivalent, banks can apply lower factors, subject to a floor of 10%;⁴⁴
- derivatives: cash variation margins received can be deducted from the exposure measure;

41 Calculated according to the Current Exposure Method; this may change following the consultation initiated by the BCBS in April 2016.

42 The public disclosure components of the common template include 1) a summary comparison table of total accounting assets and leverage ratio exposures, 2) a common disclosure template that shows the breakdown of the main leverage ratio regulatory elements, 3) a reconciliation requirement that discloses and details the source of material differences between on-balance-sheet exposures in the common disclosure template and total on-balance-sheet assets in the financial statements, and 4) other requirements (e.g. key drivers of material change in the leverage ratio over consecutive reporting periods). Work is under way to review these templates within the Pillar 3 framework.

43 Commission Delegated Regulation (EU) 2015/62 amending Regulation (EU) No 575/2013 of the European Parliament and of the Council with regard to the leverage ratio.

44 The original Basel III leverage framework brings OBSIs on the balance sheet using a CCF of 100% except for the commitments that are unconditionally cancellable at any time by the bank without prior notice, for which the CCF is 10%. The current CCFs are the same as in the Basel framework's Standardised Approach for credit risk under the risk-based requirements (0%, 20%, 50% or 100% depending on the risk category).

- written credit derivatives are valued using the gross notional amount, but fair value losses can be deducted (if recognized through P&L) and offsetting of protection sold with protection bought is allowed, subject to strict criteria;
- transactions with a Qualifying Central Counterparty (QCCP): banks acting as direct participants on behalf of clients may deduct client exposures.⁴⁵

For some EU banking groups these rules may result in a total EM calculation which is significantly higher or lower than the accounting definition of total assets. For example, accounting standards for EU banks (IFRS) provide for derivatives to be reported at their gross amounts, while for EM purposes derivative transactions covered by eligible bilateral netting contracts can be netted, resulting in a more favourable treatment for entities with large derivatives portfolios. On the contrary, banks with sizeable off-balance-sheet positions will report a higher EM compared with accounting assets. The criteria of consolidation of items on the balance sheets of the various entities of a banking group also leads to significant differences between the accounting and regulatory definition of consolidated assets, especially for groups with many non-banking activities, such as insurance. The EC delegated act clarifies that the EM definition is obtained using the same consolidation used for the CRR risk-based capital requirements; moreover, it allows the exclusion of intragroup exposures, under certain conditions and subject to approval from the competent authority.

The LR is calculated and reported at the end of the each quarter, in line with the frequency for the other CRR risk-based capital requirements.

A.3 Empirical estimates

The empirical estimates of the leverage ratio used in Section 2 reflect the regulatory framework known to banks over the 4 sample dates (the stricter definition for June 2013 and the relatively milder one of January 2014 for the other 3 half-year dates from December 2013 to December 2014). Table A1 offers a description of the data and assumptions as well as a comparison of the Basel III LR definitions of June 2013 and January 2014.

Although we need to make some approximations, lacking the necessary detailed information on the precise make-up of bank's balance sheets for regulatory purposes, the following steps allow us to closely replicate the main components of the LR:

- 1) The numerator is the fully phased-in Basel 3 Tier 1 capital. This ensures comparability over time. Since this figure is disclosed only by a few large banks, we estimate it by applying a discount factor to the level of Tier 1 as reported by banks over the sample period.⁴⁶
- 2) The denominator of the leverage ratio (total exposures) is calculated as follows:
 - As a starting point we use total assets as reported by banks.
 - These are netted by subtracting balance sheet assets deducted from Tier 1 capital (i.e. intangible assets and deferred tax assets).
 - Exposure associated with derivatives is calculated as the sum of the accounting value and an add-on factor for future exposure, which is derived by applying the add-on to the accounting value. Add-on factors for derivatives are differentiated by instrument type (financial, credit) and by residual maturity. As no specific information is available on the composition of the derivatives for banks, a common factor is chosen (0.5%, that is the factor that should be applied to financial derivatives with a maturity between 1 and 5 years). The estimates of the exposure associated with derivatives employ two approximations: the use of the accounting value for derivatives instead of the replacement cost and the use of a common add-on factor.⁴⁷

⁴⁵ This client leg can be deducted where the institution has no obligation to reimburse the client if the QCCP would default.

⁴⁶ The discount factor is derived from the ratio of country-level fully phased-in T1 to T1 according to the EBA monitoring exercises for the reference dates. This is an approximation that does not distort data at country level although it does not consider differences between banks within the same country.

⁴⁷ Accounting values instead of the gross value are also used for repos.

- Reverse repo transactions are reported as a component of banks' total assets. Since netting is partially allowed according to the January 2014 definition, for the 3 reference dates of December 2013, June 2014 and December 2014 we reduce the repo exposure by 30%.⁴⁸
- A common measure of counterparty credit risk (CCR) is included for derivatives and repos but not for reverse repos, where we assume that the value of received collateral is higher than that of provided cash. Counterparty credit risk is approximated using margin parameters applied to transactions on debt securities: using data on margins from LCH.Cleernet we assume a CCR of 1.2% for core countries (AT, DE, FI, FR, LU and NL) and 5.5% for non-core countries.
- Off-balance-sheet items should be converted to an on-balance-sheet equivalent applying the same CCFs that are used in the Basel framework Standardised Approach for credit risk (from 0% to 100%); as there is no disclosure about the latter information, we apply a common conversion factor of 30%, which is derived from the composition of the leverage ratio exposure published in the EBA monitoring exercises.

Table A1 - Definition of leverage ratio components and data/assumptions

		Basel III - June 2013	Basel III- January 2014	Data/Assumptions
Exposure measure	Derivatives	Replacement cost (fair value) + future exposure (according to Basel II Current Exposure Method)	Fair value + future exposure (according to Basel II Current Exposure Method). Recognition of cash collateral in the replacement cost component.	- On- balance-sheet exposure - Add-on for potential future exposure (0.5% of balance sheet exposure) <i>Source: Bankscope.</i>
	Repos	Gross SFT assets recognized for accounting purposes (no recognition of accounting netting), plus add-on for counterparty credit risk (CCR)	Accounting SFT exposure with limited netting with the same counterparty to reduce the exposure measure, plus add-on for counterparty credit risk (CCR)	- On-balance-sheet exposure -Netting of 30% (*) - CCR of 1.2% or 5.5% of balance sheet exposure <i>Source: Bankscope.</i>
	Off-balance- sheet items	Uniform 100% credit conversion factor (CCF) t; unconditionally cancellable commitments and guarantees at 10% CCF.	The same CCFs that are used in the Basel framework Standardised Approach for credit risk.	- reported value - CCF of 30% (*) <i>Source: SNL and Bankscope, EBA reports (BIII monitoring exercise)</i>
	Capital measure	Tier 1 (fully phased-in)	Tier 1 (fully phased-in)	Tier 1 (transitional), corrected with the ratio of country-level fully phased-in T1 over T1 <i>Source: SNL, Bankscope and internal EBA/QIS monitoring exercise.</i>

(*) For 30 June 2013: limited netting for repos (15% for banks with assets over EUR 500 billion and 55% CCF for off-balance-sheet items).

The following tables give the names of the banking groups included in our sample for the years 2013-2014 (Sections 3 and 4) and in the EBA sample for the first half of 2015 (Section 5) respectively.

48 According to ICMA (2016) the share of CCP-cleared repo transactions was on average 30% during the sample period. This is used as a proxy for same-counterparty netting.

Table A2: Sample banks in Table 3 (Sections 3-4)

No.	Bankscope index	Bank name	Country	Also in EBA sample of section 5
1	13222	Aareal Bank AG	Germany	yes
2	43032	ABH Financial Limited	Cyprus	
3	12060	ABN AMRO Group N.V.	Netherlands	yes
4	44089	Achmea Bank NV	Netherlands	
5	20103	Allied Irish Banks plc	Ireland	yes
6	21498	Banca Carige SpA	Italy	yes
7	21413	Banca Monte dei Paschi di Siena SpA-Gruppo Monte dei Paschi di Siena	Italy	yes
8	41128	Banca Piccolo Credito Valtellinese-Credito Valtellinese Soc Coop	Italy	
9	42468	Banca Popolare dell'Emilia Romagna	Italy	yes
10	21480	Banca Popolare di Milano SCaRL	Italy	yes
11	45798	Banca Popolare di Sondrio Societa Cooperativa per Azioni	Italy	yes
12	22628	Banco Bilbao Vizcaya Argentaria SA	Spain	yes
13	45638	Banco BPI SA	Portugal	yes
14	22541	Banco Comercial Português, SA-Millennium bcp	Portugal	yes
15	23370	Banco de Sabadell SA	Spain	yes
16	21937	Banco Popolare - Società Cooperativa-Banco Popolare	Italy	yes
17	22724	Banco Popular Espanol SA	Spain	yes
18	47560	Banco Santander SA	Spain	yes
19	20112	Bank of Ireland-Governor and Company of the Bank of Ireland	Ireland	yes
20	27933	Bank of Valletta Plc	Malta	yes
21	22651	Bankia, SA	Spain	
22	22057	Banque et Caisse d'Epargne de l'Etat Luxembourg	Luxembourg	yes
23	13109	Bayerische Landesbank	Germany	yes
24	48939	Belfius Banque SA/NV-Belfius Bank SA/NV	Belgium	yes
25	49013	BNP Paribas Fortis SA/ NV	Belgium	
26	10931	BNP Paribas SA	France	yes
27	10708	BPCE Group	France	yes
28	13172	Bremer Landesbank Kreditanstalt Oldenburg - Girozentrale	Germany	
29	22529	Caixa Geral de Depositos	Portugal	yes
30	13190	Commerzbank AG	Germany	yes
31	22317	Cooperatieve Centrale Raiffeisen-Boerenleenbank B.A-Rabobank Nederland	Netherlands	yes
32	10696	Crédit Agricole-Crédit Agricole Group	France	yes
33	44090	Credit Europe Bank N.V.	Netherlands	
34	45740	Credito Emiliano SpA-CREDEM	Italy	yes
35	13229	DekaBank Deutsche Girozentrale AG	Germany	yes
36	19814	Depfa Bank Plc	Ireland	
37	13216	Deutsche Bank AG	Germany	yes
38	15469	Deutsche Kreditbank AG (DKB)	Germany	
39	14133	Deutsche Postbank AG	Germany	
40	17881	DZ Bank AG-Deutsche Zentral-Genossenschaftsbank	Germany	yes
41	46146	Erste Group Bank AG	Austria	yes
42	19978	HSH Nordbank AG	Germany	yes
43	22417	ING Bank NV	Netherlands	
44	46616	Intesa Sanpaolo	Italy	yes
45	48888	KBC Groep NV/ KBC Groupe SA-KBC Group	Belgium	yes
46	29070	La Banque Postale	France	yes
47	47734	Landesbank Baden-Wuerttemberg	Germany	yes
48	13306	Landesbank Hessen-Thuringen Girozentrale - HELABA	Germany	yes
49	11050	Le Crédit Lyonnais (LCL) SA	France	
50	22265	NIBC Bank NV	Netherlands	

51	31238	NLB dd-Nova Ljubljanska Banka d.d.	Slovenia	yes
52	13584	Norddeutsche Landesbank Girozentrale NORD/LB	Germany	yes
53	46827	Nordea Bank Finland Plc	Finland	
54	44316	Oberbank AG	Austria	
55	31978	OP-Pohjola Group-OP Osuuskunta	Finland	yes
56	14021	Portigon AG	Germany	
57	44096	Raiffeisen Zentralbank Oesterreich AG - RZB	Austria	yes
58	43946	Raiffeisenlandesbank Niederösterreich-Wien AG	Austria	yes
59	34513	Raiffeisenlandesbank Oberösterreich AG	Austria	yes
60	43947	Raiffeisen-Landesbank Steiermark AG	Austria	
61	13043	SEB AG	Germany	
62	36731	SEB Pank	Estonia	
63	35909	Slovenska sporitel'na as-Slovak Savings Bank	Slovakia	
64	22324	SNS Bank N.V.	Netherlands	yes
65	11150	Société Générale SA	France	yes
66	47295	UniCredit SpA	Italy	yes
67	16185	Unione di Banche Italiane Scpa-UBI Banca	Italy	yes
68	22273	Van Lanschot NV	Netherlands	
69	14088	Volkswagen Bank GmbH	Germany	
70	14019	WGZ-Bank AG Westdeutsche Genossenschafts-Zentralbank	Germany	yes

Table A3: EBA sample in Table 5 (Section 5)

No.	Legal Entity Identifier	Bank name	Country	Also in sample of sections 3 -4
1	ROMUWSFPU8MPRO8K5P83	BNP Paribas SA	France	yes
2	EZKODONU5TYHW4PP1R34	Aareal Bank AG	Germany	yes
3	95980020140005986047	Abanca Holding Hispania	Spain	
4	549300IHIJ7SCANBWN17	ABLV Bank	Latvia	
5	724500DWE10NNL1AXZ52	ABN AMRO Groep N.V.	Netherlands	yes
6	3U8WV1YX2VMUHH7Z1Q21	Allied Irish Banks, Plc	Ireland	yes
7	LSGM84136ACA92XCN876	AXA Bank Europe SA	Belgium	
8	F1T87K3OQ2OV1UORLH26	Banca Carige SpA - Cassa di Risparmio di Genova e Imperia	Italy	yes
9	J4CP7MHCXR8DAQMKIL78	Banca Monte dei Paschi di Siena SpA	Italy	yes
10	N747O17JINV7RUUH6190	Banca popolare dell'Emilia Romagna SC	Italy	yes
11	8156009BC82130E7FC43	Banca Popolare di Milano Scarl	Italy	yes
12	J48C8PCSJVUBR8KCW529	Banca Popolare di Sondrio	Italy	yes
13	V3AFM0G2D3A6E0QWDG59	Banca Popolare di Vicenza SCpA	Italy	
14	K8MS7FD7N5Z2WQ51AZ71	Banco Bilbao Vizcaya Argentaria, SA	Spain	yes
15	3DM5DPGI3W6OU6GJ4N92	Banco BPI SA	Portugal	yes
16	JU1U6S0DG9YLT7N8ZV32	Banco Comercial Português SA	Portugal	yes
17	95980020140005881190	Banco de Crédito Social Cooperativo SA'	Spain	
18	SI5RG2M0WQQLZCXKRM20	Banco de Sabadell, SA	Spain	yes
19	549300PY124PITBSWN73	Banco Mare Nostrum	Spain	
20	5493006P8PDBI8LCO096	Banco Popolare Società Cooperativa	Italy	yes
21	80H66LPTVDLM0P28XF25	Banco Popular Español SA	Spain	yes
22	5493006QMFDDMYWIAM13	Banco Santander SA	Spain	yes
23	PQORAP85KK9Z75ONZW93	Bank of Cyprus Public Company Limited	Cyprus	
24	Q2GQA2KF6XJ24W42G291	Bank of Ireland	Ireland	yes
25	529900RWC8ZYB066JF16	Bank of Valletta Plc	Malta	yes
26	VWMYAEQSTOPNV0SUGU82	Bankinter SA	Spain	
27	R7CQUF1DQM73HUTV1078	Banque et Caisse d'Epargne de l'Etat, Luxembourg	Luxembourg	yes
28	VDYMYTQGZZ6DU0912C88	Bayerische Landesbank	Germany	yes
29	A5GWLFB3KM7YV2SFQL84	Belfius Banque SA	Belgium	yes
30	549300TJUHHEE8YXKI59	BFA Tenedora De Acciones, S.A.	Spain	
31	969500FYSB4IT3QWYB65	Bpifrance (Banque Publique d'Investissement)	France	
32	TO82200VT80V06K0FH57	Caixa Geral de Depósitos SA	Portugal	yes
33	5493007F6CE5P22TJ731	Co-operative Central Bank Ltd	Cyprus	
34	851WYGNLUQLFZBSYGB56	Commerzbank AG	Germany	yes
35	DG3RU1DBUFHT4ZF9WN62	Coöperatieve Centrale Raiffeisen-Boerenleenbank B.A.	Netherlands	yes
36	969500TJ5KRTCJQWXH05	Crédit Agricole Group	France	yes
37	9695000CG7B84NLR5984	Crédit Mutuel Group	France	
38	815600AD83B2B6317788	Credito Emiliano Holding SpA	Italy	yes
39	969500TVVZM86W7W5194	CRH (Caisse de Refinancement de l'Habitat)	France	
40	959800DQQUAMV0K08004	Criteria Caixa Holding, S.A.	Spain	
41	0W2PZJM8XOY22M4GG883	DekaBank Deutsche Girozentrale	Germany	yes
42	5299007S3UH5RKUYDA52	Deutsche Apotheker-und Ärztebank eG	Germany	
43	7LTWFZYICNSX8D621K86	Deutsche Bank AG	Germany	yes
44	529900HNOAA1KXQJUQ27	Deutsche Zentral-Genossenschaftsbank AG	Germany	yes
45	D3K6HXMBBB6SK9OXH394	Dexia NV	Belgium	
46	PQOH26KWD7FCG10L6792	Erste Group Bank AG	Austria	yes
47	391200EEGLNXBBCVKC73	Erwerbsgesellschaft der S-Finanzgruppe mbH & Co. KG	Germany	
48	9695005MSX1OYEMGDF46	Groupe BPCE	France	yes
49	529900JZTYE3W7WQH904	HASPA Finanzholding	Germany	
50	CXUHEGU3MADZ2CEV7C11	Hellenic Bank Public Company Ltd	Cyprus	

51	TUKDD90GPC79G1KOE162	HSH Nordbank AG	Germany	yes
52	52990082YOVZIC8QX60	Hypo Real Estate Holding AG	Germany	
53	5493000LBL49CW8CT155	Ibercaja Banco	Spain	
54	815600D79C96B9661149	ICCREA Holding	Italy	
55	549300NYKK9MWM7GGW15	ING Groep N.V.	Netherlands	
56	2W8N8UU78PMDQKZENC08	Intesa Sanpaolo SpA	Italy	yes
57	5493008QOCP58OLEN998	Investar	Belgium	
58	213800X3Q9LSAKRUWY91	KBC Group NV	Belgium	yes
59	549300U4LIZVOREEQ46	Kutxabank	Spain	
60	96950066U5XAAIRCPA78	La Banque Postale	France	yes
61	B81CK4ESI35472RHJ606	Landesbank Baden-Württemberg	Germany	yes
62	DIZES5CFOSK315R58746	Landesbank Hessen-Thüringen Girozentrale	Germany	yes
63	OSK1ILSPWNVBNQWU0W18	Landeskreditbank Baden-Württemberg-Förderbank	Germany	
64	529900Z3JON6S0F7CT25	Landwirtschaftliche Rentenbank	Germany	
65	635400XT3V7WHL5FY25	Liberbank	Spain	
66	PSNL19R2RXX5U3QWHI44	Mediobanca - Banca di Credito Finanziario SpA	Italy	
67	529900GM944JT8YIRL63	Münchener Hypothekenbank eG	Germany	
68	529900GGYMNGRQTDOO93	N.V. Bank Nederlandse Gemeenten	Netherlands	
69	JLP5FSPH9WPSHY3NIM24	Nederlandse Waterschapsbank N.V.	Netherlands	
70	DSNHHQ2B9X5N6OUJ1236	Nord/LB Norddeutsche Landesbank Girozentrale	Germany	yes
71	549300J0GSZ83GTKBZ89	Nova Kreditna Banka Maribor D.D.	Slovenia	
72	5493001BABFV7P27OW30	Nova Ljubljanska Banka D.D., Ljubljana	Slovenia	yes
73	52990002O5KK6XOGJ020	NRW.BANK, Düsseldorf	Germany	
74	7437003B5WFBOIEFY714	OP-Pohjola Group	Finland	yes
75	635400DTNHVYGZODKQ93	Permanent TSB Group Holdings Plc	Ireland	
76	549300AUUQG072ATL746	Precision Capital S.A.	Luxembourg	
77	5299004SNO5GECIBWJ18	Promontoria Sacher Holding N.V.	Austria	
78	529900XSTAE561178282	Raiffeisenbankengruppe OÖ Verbund eGen	Austria	yes
79	529900SXEWPJ1MRRX537	Raiffeisen-Holding Niederösterreich-Wien registrierte Genossenschaft mit beschränkter Haftung	Austria	yes
80	529900JP9C734S1LE008	Raiffeisen-Landesbanken-Holding GmbH	Austria	yes
81	96950001WI712W7PQG45	RCI banque (Renault Crédit International Banque)	France	
82	549300HFEHJOXGE4ZE63	SFIL (Société de Financement Local)	France	
83	72450032NPOX5UJQTI97	SNS Reaal N.V.	Netherlands	yes
84	O2RNE8IBXP4R0TD8PU41	Société Générale SA	France	yes
85	5493007SJLLCTM6J6M37	Unicaja Banco S.A.	Spain	
86	549300TRUWO2CD2G5692	UniCredit SpA	Italy	yes
87	81560097964CBDAED282	Unione di Banche Italiane SCpA	Italy	yes
88	549300W9STRUCJ2DLU64	Veneto Banca SCpA	Italy	
89	529900USFSZYPS075O24	VW Financial Services AG	Germany	
90	EFHQAFG69S4HKHLIZA14	WGZ BANK AG Westdeutsche Genossenschafts-Zentralbank	Germany	yes

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