DISCUSSION PAPER SERIES

DP13722

BANKS AS PATIENT LENDERS: EVIDENCE FROM A TAX REFORM

Elena Carletti, Filippo De Marco, Vasso Ioannidou and Enrico Sette

FINANCIAL ECONOMICS

ISSN 0265-8003

BANKS AS PATIENT LENDERS: EVIDENCE FROM A TAX REFORM

Elena Carletti, Filippo De Marco, Vasso Ioannidou and Enrico Sette

Discussion Paper DP13722
Published 08 May 2019
Submitted 03 May 2019

Centre for Economic Policy Research
33 Great Sutton Street, London EC1V 0DX, UK
Tel: +44 (0)20 7183 8801
www.cepr.org

BANKS AS PATIENT LENDERS: EVIDENCE FROM A TAX REFORM

Abstract

We study how a greater reliance on deposits affects bank lending policies. For identification, we exploit a tax reform in Italy that induced households to substitute bank bonds with deposits. We show that the reform led to larger increases (decreases) in term deposits (bonds) in areas where households held more bonds before the reform. We then find that banks with larger increases in deposits did not change their overall credit supply, but increased credit-lines and the maturity of term-loans. These results are consistent with key theories on the role of deposits as a discipline device and of banks as liquidity providers.

JEL Classification: G21, G28, G01

Keywords: banks, deposits, Maturity, risk-taking, government guarantee

Elena Carletti - elena.carletti@unibocconi.it
Bocconi University and CEPR

Filippo De Marco - filippo.demarco@unibocconi.it
Bocconi University

Vasso Ioannidou - v.ioannidou@lancaster.ac.uk
Lancaster University and CEPR

Enrico Sette - enrico.sette@bancaditalia.it
Bank of Italy

Banks as Patient Lenders: Evidence from a Tax Reform

Elena Carletti Filippo De Marco Vasso Ioannidou Enrico Sette*

March 2019

Abstract

We study how a greater reliance on deposits affects bank lending policies. For identification, we exploit a tax reform in Italy that induced households to substitute bank bonds with deposits. We show that the reform led to larger increases (decreases) in term deposits (bonds) in areas where households held more bonds before the reform. We then find that banks with larger increases in deposits did not change their overall credit supply, but increased credit-lines and the maturity of term-loans. These results are consistent with key theories on the role of deposits as a discipline device and of banks as liquidity providers.

Keywords: Banks, deposits, maturity, risk-taking, government guarantee.

JEL Classification: G21, G28, G01.

* Elena Carletti: Bocconi University, Baffi Carefin, IGIER and CEPR, elena.carletti@unibocconi.it; Filippo De Marco: Bocconi University, Baffi Carefin and IGIER, filippo.demarco@unibocconi.it; Vasso Ioannidou: Lancaster University and CEPR, v.ioannidou@lancaster.ac.uk; Enrico Sette: Bank of Italy, enrico.sette@bancaditalia.it. We thank Toni Ahnert, Manuel Adelino, Tobias Berg, Claire Célérier, Federico Cingano, Paolo Colla, Matteo Crosignani, Hans Degryse, Franco Fiordelisi, Mark Flannery, Paolo Fulghieri, Nicola Gennaioli, Gabriel Jiménez, Anil Kashyap, Stephen Karolyi, Thomas Kick, Co-Pierre Georg, Victoria Ivashina, Mathias Lè, Jose Luis Peydró, Kebin Ma, Marco Pagano, Jean-Charles Rochet, Farzad Saidi, Julien Sauvagnat, Antoinette Schoar, Paolo Sestito, Anjan Thakor and participants at AFA 2019, Banca d'Italia, Banque de France, Bocconi University, Bundesbank, Bristol University, Carlo Alberto, Imperial-CEPR Spring Symposium, EFA 2018, EuroFit 2018, HEC Lausanne, IE Business School, FIRS 2018, 13th IGIER-CSEF symposium, KU Leuven, Lancaster, 7th MoFiR Workshop, NBER SI 2018 (ME), SFS Cavalcade NA 2018, WFA 2018, University of Zurich for many helpful comments and suggestions. Elena Carletti and Filippo De Marco gratefully acknowledge financial support from Baffi Carefin research center at Bocconi University. The views of this paper are those of the authors and do not represent the views of Banca d'Italia or of the Eurosystem.

1. Introduction

This paper studies how a greater reliance on retail deposits affects banks' lending policies. Seminal contributions in banking emphasize the links between the liability and the asset side of banks. They view deposits as a defining characteristic of banks (i.e., part of an optimal capital structure) that enables the provision of long-term illiquid loans to the real economy and liquidity insurance against market-wide shocks (Diamond and Dybvig, 1983; Calomiris and Kahn, 1991; Flannery, 1994; Diamond and Rajan, 2001; Kashyap, Rajan, and Stein, 2002; Gatev and Strahan, 2006; Hanson, Shleifer, Stein and Vishny, 2015). Their "specialness" draws on the distinctive contractual features and the explicit and implicit government guarantees that typically accompany deposits.

The recent financial crisis has also spurred regulatory reforms aiming to increase banks' resilience in financial crises and mitigate their transmission of financial shocks to the real economy.[1] Central in these efforts are regulations targeting banks' funding stability (e.g., net stable funding ratio under Basel III).[2] Such developments are likely to modify banks' funding mix, increasing the weight of retail deposits relative to other funding sources such as bonds and interbank funding. Going forward, it is thus important to understand not only how, but also why a greater reliance on retail deposits may influence banks' lending policies, particularly under stress conditions.

To date there is little empirical evidence on this front due to steep identification challenges. Banks' funding structure is endogenous to both their lending policies and the overall economic environment, which makes it very hard for researchers to obtain causal estimates. Moreover, investors behind banks' different funding sources are also typically different. It is thus extremely difficult to distinguish whether any observed differences are due to the *intrinsic* characteristics of the various funding sources—embedded in their contractual characteristics and broader institutional framework that governs their use— or investor differences (e.g., retail versus institutional investors).

This paper takes advantage of a tax reform enacted in Italy in September 2011 that eliminated a tax disadvantage in the treatment of income from household deposits over other privately issued securities held by households, inducing a shock in the supply of deposits and bonds from households. Households substituted their holdings of bank bonds with deposits, causing a significant change in banks' retail funding: within two years from the reform, bond funding (retail deposits) went down

[1] Banks with high reliance on interbank and wholesale funding came under severe pressure and were unable to continue lending to the real economy (see, among others, Afonso, Kovner and Schoar, 2011; Iyer, Peydró, da-Rocha-Lopes and Schoar, 2014; Cingano, Manaresi and Sette, 2016).

[2] The net stable funding ratio, one of the pillars of Basel III, requires banks to hold a certain fraction of their liabilities from "stable sources of funding", with retail deposits being a key component.

(up) from 23% to 17% (41% to 46%) of bank assets.[3] Importantly, the setting allows us to isolate the impact of the distinctive characteristics of deposits from other confounding factors. In particular, it allows us to study how banks' lending policies are affected by a shift from bonds to deposit funding, within the same class of retail investors, thus keeping investor clientele fixed.

Economic theory offers several (often conflicting) predictions as to how and why a shift from bonds to deposits may affect banks' lending policies. Fundamentally, the two funding instruments are not perfect substitutes— even when investors behind them are the same. Deposits are a demandable, first-come first-served contract that exposes banks to runs. Bonds are not: once issued, banks' funding is secured till maturity. The demandable nature of the deposit contract may serve as an incentive scheme to discipline banks (Calomiris and Kahn, 1991; Flannery 1994) and a commitment device that increases their borrowing capacity against long-term, illiquid loans (Diamond and Rajan, 2001).[4] A greater reliance on deposits, as opposed to bonds, may thus facilitate long-term lending to the real economy and limit credit to less creditworthy borrowers. An increase in long-term loans, however, may also derive from stronger government guarantees associated with deposits (Hanson, Shleifer, Stein and Vishny, 2015). Although these channels hold similar predictions on loan maturity, they have very different implications about the source of funding stability and bank risk-taking. Stronger government guarantees should increase banks' risk-taking incentives (Merton, 1977).[5] Moreover, because of synergies in the provision of liquidity on *demand* on both sides of banks' balance sheet, an increase in demandable deposits predicts an increase in credit lines and an endogenous and voluntary increase in banks' liquidity holdings (Kashyap, Rajan, and Stein, 2002). A banking system funded with more retail deposits may thus be better able to provide liquidity insurance to firms (Gatev and Strahan, 2006).

The 2011 Italian tax reform thus offers a unique opportunity to study how a shift from one funding source that is neither demandable nor government guaranteed (bonds) to one that carries both features (deposits) affects these multifaceted aspects of bank lending. We study how a greater reliance on retail deposits affects banks overall credit supply, the supply of different products such as long-term loans and credit lines, and the supply of credit to riskier firms.

[3] In nominal amounts, deposits (bonds) increase (decrease) by about €100 billion (see Figure 1, Panel A).
[4] The literature on market discipline finds that riskier banks experience larger deposit withdrawals in crisis periods (Gorton, 1988; Saunders and Wilson, 1996), as a form of depositor discipline (Park and Peristiani, 1998; Billet, Garfinkel, and O'Neal, 1998; Martinez-Peria and Schmukler, 2001). However, others argue that bank runs are also driven by panic, not just fundamentals (see, e.g., Diamond and Dybvig, 1983; Calomiris and Mason, 1997; and Iyer and Puri, 2012).
[5] For empirical evidence see, for example, Calomiris and Jaremski (2019) and Ioannidou and Penas (2010).

The analysis combines three detailed micro-level datasets: data on deposit volumes at the bank-province level, information on bank bonds held by households at the security-level from the Securities Holding Statistics and the Centralized Securities Database, and information on bank-firm credit from the Italian Credit Register. All three datasets are held at the Bank of Italy.

We first identify the impact of the reform on banks' funding mix, using a differences-in-differences specification exploiting within *bank-time* variation arising from preexisting geographical heterogeneity in bank presence and household portfolios. That is, we compare changes in deposits of the same bank over a short event-window around the reform across different provinces. Our key identifying assumption is that, all else equal, banks with branches in provinces where households held larger volumes of bank bonds prior to the reform experienced larger supply shocks to their deposit base. To avoid confounding factors, we use predetermined values of household portfolio holdings two years before the reform (in December 2009). To trace the impact of the reform on banks' lending policies we aggregate households' bond holdings at the *bank-level* as banks use internal capital markets to move funds from one region to another.[6] Identification of the effect of bank exposure to the reform on their lending policies is obtained using *within-firm* variation as in Khwaja and Mian (2008), which allows us to control for contemporaneous confounding changes in credit demand (e.g., due to changes in investment opportunities that may correlate with banks' exposure to the reform) and other unobservable firm characteristics.

We find that the reform induced households to substitute banks bonds with deposits, changing banks' debt funding mix. Banks with branches in areas where, prior to the reform, households held larger volumes of bank bonds experienced larger increases (decreases) in deposit (bond) funding from households. Our estimates indicate that on average total funding from deposits and bonds did not change (i.e., €1 of bonds was converted into €1 of deposits). Placebo tests on firms—whose tax treatment was not changed by the reform— yield no significant treatment effects. These results lend further support to the internal validity of our identification strategy as they suggest that our treatment estimates are unlikely to be biased by contemporaneous confounding factors.

Distinguishing between types of deposits, reveals that increases in household deposits are confined to term deposits. We observe no significant increases in demand deposits, suggesting that households view term deposits as a closer substitute to bank bonds. In fact, term deposits have a fixed maturity typically up to one year, although they remain demandable, and offer a higher interest rate

[6] A similar approach is used in Gilje, Loutskina and Strahan (2016) and Bustos, Garber and Ponticelli (2017).

then demand deposits.[7] Consistent with households substituting banks bonds with deposits, we also observe that banks with a higher dependence on bank bonds prior to the reform, experienced larger increases in term deposits. We also find that households with both senior and junior bank bonds reshuffled their portfolios towards term deposits to a similar degree. Interestingly, riskier banks (with lower capital and worse loan portfolios) increased their term-deposits more. This indicates that, on the margin, the shift to cheaper subsidized deposit funding benefited riskier banks more.

Overall these results, along with several additional pieces of evidence, suggest that the observed reshuffling is unlikely to be driven by an alternative 'flight to quality' explanation due to the crisis. Term deposits, for example, increased sharply only right after the reform (September 2011), while they were completely flat before, despite significant increases in bank and sovereign risk after the first Greek bailout (May 2010). In addition, a similar reshuffling is *not* observed in other European countries, such as Spain and Portugal that experienced similar pressures on their banking system during the sovereign debt crisis.

Turning to the credit analysis, we find that the change in banks' funding mix following the reform did not change their overall credit supply, consistent with total funding not expanding. However, it led to important *compositional* changes. Larger increases in deposits are associated with relatively more credit lines and less term loans. Within term loans, there is a significant compositional change towards longer maturity loans (loans with maturities longer than five years).

Further analysis reveals that the observed increase in credit lines is consistent with predictions in Kashyap, Rajan, and Stein (2002). We find that better capitalized banks, with arguably better access to capital markets and thus smaller synergies from increases in deposits, show smaller increases in credit lines as their deposit funding increases. Consistent with predictions in Kashyap, Rajan, and Stein (2002), we also find that banks endogenously increase their liquidity holdings as their reliance on deposits increases. As both deposits and credit lines compete for the same scarce resource (liquidity), this result explains why the two products did not crowd each other out. Overall, the credit line results indicate that a banking system funded with more retail deposits is better able to provide liquidity insurance to firms in crisis period, complementing and reinforcing Gatev and Strahan (2006).

Consistent with the disciplinary mechanism in Calomiris and Kahn (1991) and Flannery (1994) we find that the increase in credit lines and longer maturity loans is concentrated in low credit-

[7] Term deposits can be withdrawn prior to contractual maturity (which is typically one year) as long as holders give notice to the bank and/or pay a fee for early withdrawal. Such fee typically involves foregoing the promised interest rate, although in some cases, a base rate (lower than the contractual rate) is still guaranteed.

risk firms. Total loans to low-risk firms are also found to increase. This is not true for risky firms, neither for credit lines nor for term loans. If anything, term loans to risky firms are found to decrease. Consistent with the discipline channel of deposits, we additionally find that decreases in term loans, particularly to riskier firms, are more pronounced when the threat of a run is higher (i.e., banks with worse fundamentals and larger deposits). Importantly, we also find that the inflow of deposits into the banking sector has led to an increase in banks' share of large deposits (accounts with more than €250,000). Depositors behind large accounts are expected to be less "sleepy" as they are largely uninsured (the deposit insurance limit is €100,000) and households behind them may be better able and have stronger incentives to exercise their demandability rights when concerned about the safety of their funds. Overall, these results confirm theoretical predictions that when not neutralized by government guarantees, the deposit contract can be an effective disciplinary mechanism on banks.

Our findings complement and expand several strands of the extant literature. The paper offers a test of seminal theories in banking that try to understand the determinants of banks' capital structure and its implications for their lending policies. Our results are informative about possible asset-side implications of post-crisis regulations targeting banks' stable funding ratio and "narrow banking" proposals calling for a separation of deposit-taking and loan-granting operations (Friedman, 1960; Gorton and Pennacchi, 1992; Cochrane, 2014). Our results suggest that a forced switch to narrow banking could lead to a reduction of not only the provision of liquidity insurance to firms (as in Kashyap, Rajan, and Stein 1992), but also to long-term loans to the real economy (as predicted, among others, in Calomiris and Kahn, 1991 and Diamond and Rajan, 2001).[8]

The paper differs from prior studies analyzing the transmission of deposits shocks (e.g., Gilje, Loutskina and Strahan, 2016 and Bustos, Garber and Ponticelli, 2017) in that the shock we analyze does not involve the influx of new funds into banks as in these studies, but rather the *substitution* of one funding source with another, within the same class of investors. Importantly, this takes place during the sovereign debt crisis, which may help explain the disciplinary role of deposits in our analysis. In this context, the paper relates to studies that try to understand factors that influence deposit withdrawals during stress periods either because of panic or deterioration of bank fundamentals. Recent contributions include Iyer and Puri (2012), Iyer, Puri, and Ryan (2016) and Martin, Puri and

[8] See also a related paper by Egan, Lewellen and Sunderam (2017) on the cross-sectional determinants of bank value.

Ufier (2018). Differently from these papers, we do not study the behavior of retail depositors towards bank risk or bank run episodes, but rather the effects of a positive deposit shock on banks' lending.[9]

The paper also relates to an emerging banking literature analyzing the effects of tax shocks on bank capital structure and lending. Schepens (2016) shows that the introduction of a tax shield on equity in Belgium in 2006 that reduced the tax advantage of debt over equity (emanating from the traditional tax deductibility of interest expenses on debt), led to significant increases in bank equity and a decrease in loan portfolio risk of ex ante low capitalized banks.[10] Célérier, Kick and Ongena (2017) use similar changes in the taxation of banks' profits in several European countries to analyze the effects of an increase in capital ratios on credit supply. Our paper is different from these as the tax reform we analyze induces a change in the composition of bank liabilities, not in capital ratios. An important common takeaway from our paper and these studies, however, is that changes in taxation can prompt substantial changes in banks' funding structures and lending policies.

Finally, a recent literature also indicates that deposits and their (in)sensitivity to market risk have first order implications on the transmission of monetary policy and banks' lending policies (Drechsler, Savov and Schnabl, 2017; Drechsler, Savov and Schnabl, 2018; Hoffmann, Langfield, Pierobon and Vuillemey, 2018), especially under negative rates (Heider, Saidi and Schepens, 2018). An important insight from these studies is that a greater reliance on deposits facilitates banks' maturity transformation function by assisting their management of interest rate risk, consistent with our findings that a greater reliance on deposits leads to more long-term loans.

The remainder of the paper is organized as follows. Section 2 offers an overview of the tax reform and its aggregate effects on the Italian banking system. Section 3 describes the data. Section 4 explains our identification strategy and reports our key findings on banks' deposit and bond funding. Section 5 explains our identification strategy on banks' credit policies and reports and discusses our main findings on banks' lending policies. Section 6 concludes.

2. The tax reform

As the sovereign debt crisis intensified in the summer of 2011 and yields on Italian sovereign bonds surged, the Italian government passed an emergency budget law to increase government revenues and

[9] Choudhary and Limodio (2017) exploit a natural experiment in Pakistan (Sharia levy) to study the effects of bank deposit volatility on loan maturities and rates. Differently from our paper, they examine a change in the second moment (volatility) of a bank liability and its interaction with costly liquidity provision from the central bank.

[10] Bond, Ham, Maffini, Nobili and Ricotti (2016) and Gambacorta, Ricotti, Sundaresan and Wang (2017) examine a similar question on bank capital structure using cross-sectional variation in corporate taxes across Italian provinces.

reduce its deficit. One of the provisions of the accompanied budget law eliminated the asymmetry in the tax treatment of income from deposits over income from other securities.

This asymmetry was introduced in 1996 when the Italian government increased the tax rate on bank deposits to 27% (leaving the tax rate of all other securities at 12.5%) in an attempt to improve the government's budget deficit and meet the Maastricht criteria for joining the Euro. As a consequence, Italian banks began selling bank bonds directly to households.[11]

The 2011 reform harmonized the tax treatment of deposits and all private sector securities at 20%. Sovereign bonds, both domestic and foreign, maintained their lower 12.5% tax rate. The new tax rates came in effect in January 2012, but were first announced in August 2011 and approved in September 2011. Importantly, these changes applied only to households and not to firms.[12] Table 1 summarizes the tax rates by asset class before and after the reform.

(Insert Table 1 about here)

The reform aimed and was projected to increase the tax revenues of the government. It was politically feasible as it was perceived as a "tax on the rich" by increasing the tax rates on private sector securities, typically held by richer households.[13] Several commentators in Italy, including trade unions, had long been voicing concerns about the asymmetry in tax treatment of securities, whose income was taxed at 12.5%, and labor, whose income is taxed between 20 and 45%.[14]

Importantly, the reform shocked banks' funding sources by inducing a *positive* supply shock to bank deposits and a *negative* supply shock to bond financing. All else equal, the changes in the tax code made bank deposits (all private sector securities) more (less) attractive to households and created incentives for households to reshuffle their portfolios away from private sector securities towards bank deposits. Aggregate banking sector statistics, visualized in Figure 1A, show that between the end of 2011 and 2013, bank deposits and bank bonds moved in the opposite directions by roughly the same amount: deposits ((bank bonds) increased (decreased) by about €100 million.

(Insert Figure 1 about here)

[11] See, for example, Ricotti and Sanelli (2008).
[12] Generally speaking, the withholding tax on interest and dividend income only applies to individuals and not firms. Thus changes in the withholding tax rate due to the reform only affect households.
[13] The Bank of Italy estimated that the change in taxation would lead to a €1.5 billion per year increase in tax revenues for each of the three years following the reform (https://www.bancaditalia.it/pubblicazioni/interventi-direttorio/int-dir-2011/Visco-300811.pdf).
[14] See, for example, Marco Mobili, "Manovra di ferragosto: arriva la tassazione al 20% per le rendite finanziarie", Il Sole 24 Ore, 11th August, 2011 (http://www.ilsole24ore.com/art/norme-e-tributi/2011-08-11/rendite-finanziarie-tassate-084501.shtml?uuid=AaegYSvD).

Distinguishing between demand and term deposits, in Figure 1B reveals that the increase in household deposits was mainly driven by an increase in term deposits. Demand deposits remained roughly stable between August 2011 and December 2013 (a 0.8% increase from €458 billion to €462 billion). Term deposits instead more than tripled (from about €33 billion to €123 billion). This suggests that households viewed term deposits as a closer substitute to bank bonds than demand deposits. This is not surprising as bank bonds are primarily held by households for investment purposes and as a mean of storing excess income for future consumption. The closest substitute to bonds among deposit products are term deposits. By contrast, demand deposits are primarily held for liquidity purposes to facilitate current consumption.

The closer substitution between term deposits and bonds is also reflected in their respective interest rates. In the year prior to the reform, the average annual interest rate on demand deposits to households was about 0.36%. Household term deposits instead payed on average 2.27% per annum, which is more comparable to the 3.81% average yield on bank bonds held by households. This points to an average spread between bonds over term deposits of about 154 basis points, reflecting their higher credit risk and longer maturities. Deposits enjoy higher government guarantees than bonds and bonds have typically longer maturities. The average contractual maturity of bank bonds held by households is around 4 years. Instead, more than 90% of term deposits have a contractual maturity of 1 year or less. Because of their differential tax treatment prior the reform, the net difference was even larger at 168 basis points. After the reform, this difference dropped by 66% to 57 basis points, reducing significantly the attractiveness of bonds over term deposits. To put these figures in perspective, €100,000 before the reform would yield about €1,684 more if invested in bank instead of term deposits. After the reform, this difference shrunk to only €571, a drop of 66%.[15]

Overall, these patterns are consistent with the hypothesis that the tax reform created a positive supply shock to bank deposits and a negative supply shock to bond financing, leading to a substitution of bond financing with term deposits and possibly a short-lived substitution of demand deposits with term deposits. There could be, however, other factors that may have contributed to this reshuffling at the aggregate level. The reform coincides with the sovereign debt crisis. It is therefore possible that the observed reshuffling from bonds to deposits is not driven by the tax changes, but by a general 'flight to quality' due to the sovereign debt crisis. We think this is unlikely for several reasons.

[15] Fixing interest rates on bonds and deposits to their pre-reform levels (i.e., not accounting for the subsequent changes in rates) yields a drop in the net spread between bonds and deposits by €445 (from €1,684 to €1,239, a drop of 26%).

First, as shown earlier in Figure 1B, term deposits increased sharply only right after the reform, while they were completely flat before, despite significant increases in bank risk after the first Greek bailout. Second, a similar reshuffling is *not* observed in other European countries, such as Spain and Portugal that experienced similar pressures on their banking system during the sovereign debt crisis (see Figure 2A). In this regard, it is also worth observing that the 1996-tax reform which took place in a *non-crisis* period, increased the relative taxation of bank deposits over bank bonds and led to opposite changes in banks' funding sources (see Figure 2B). In particular, before 1996, term deposits (CDs) and banks' bonds represented 19% and 15% of bank funding, respectively. After the 1996-tax reform, term deposits progressively disappeared and were replaced by bank bonds, half of which were held by households.[16] By 2000, term deposits decreased to 4% and bonds increased to 23%. This explains the high reliance of Italian banks on retail bonds and indicates that tax changes can induce large swings in banks' funding sources as observed during our sample period.

(Insert Figure 2 about here)

Nevertheless, there could be yet other factors that may have affected banks' funding, such as liquidity interventions from the European Central Bank (ECB) over the same period.[17] In what follows, we propose an identification strategy that is geared to absorb such confounding factors by exploiting within *bank-time* variation in the intensity of the shock arising from pre-existing geographical heterogeneity in bank presence and household portfolios.

3. Data and summary statistics

The empirical analysis relies on three key datasets: i) micro data on deposit volumes at the bank-province level, ii) information on bank bonds held by households at the bank-province level from the Securities Holding Statistics (SHS) and bond pricing from the Centralized Securities Database (CSDB), and iii) granular information on bank-firm credit from the comprehensive Italian Credit Register. These three main datasets are merged and complemented with additional bank and firm information from accounting statements of banks and non-financial borrowing firms. All datasets are available at the Bank of Italy (Italy's central bank and bank supervisor).

At the end of each month, banks report to the Bank of Italy the amount of deposits they obtain from households and non-financial firms, broken down by type of deposits (demand or term), and

[16] See Ricotti and Sanelli (2008) and Coletta and Santioni (2016).
[17] The most noteworthy intervention is the ECB's three-year Long Term Refinancing Operation (LTRO) in December 2011, consisting of an unlimited offering of three-year maturity collateralized cash loans on two "allotment" dates, December 21, 2011 and February 29, 2012 (Carpinelli and Crosignani, 2018).

province of residence or headquarters. Data coverage is complete and is available for about 550 banks (banking groups) across 110 provinces.[18] Information by size of deposit account is available with less granularity i.e., at the bank-level and at an annual frequency. Data reporting distinguishes between three size categories: accounts below €50,000, accounts between €50,000 and €250,000, and accounts above €250,000. The deposit insurance limit in Italy is harmonized with the rest of the European Union at €100,000 per person, per bank following the implementation of the Directive 2009/14/EEC. Hence, accounts in the second and third categories are partially insured. In the absence of multiple accounts per depositor per bank, accounts in the first size category are fully insured.

Information on bank bonds is obtained from the SHS and the CSDB. The SHS covers the securities issued, held and traded by euro area residents broken down by holder sector and province of residence at a quarterly frequency since 2008. The SHS data are at the security level (ISIN) and are obtained directly from the banks that manage securities on behalf of clients (i.e., acting as "custodians"). We use the SHS to track at bank-province level the volume of bonds issued by Italian banks and held by households and to construct a measure of banks' exposure to the reform based on their geographical presence and households' holdings of bank bonds prior to the reform. SHS records security holdings at their market values. Hence, to obtain changes in households' bond holdings net of any market valuation effects, we divide each security at the ISIN level with its market price, obtained at quarterly frequency from CSDB.

Data on credit to Italian non-financial firms is obtained from the Italian Credit Register ("Centrale dei Rischi", CR). CR is maintained by the Bank of Italy and collects information, from all intermediaries operating nationwide, on individual borrowers with an outstanding exposure with a single intermediary over €30,000.[19] The registry allows to track the amount of credit granted to each borrower from each institution by loan type and maturity class. The data allows us to distinguish between two key credit products (credit lines and terms loans) and three maturity classes (less than 1 year, between 1 year and 5 years, and longer than 5 years). For identification purposes, our credit analysis uses firms with both committed credit lines (drawn or undrawn) and term loans from at least two banks. This yields a sample of 315,774 bank-firm relationships to about 107,670 firms. Multiple lending is a structural characteristic of bank-firm relationships in Italy (Detragiache, Garella and

[18] Italy is divided in 20 regions and each region is further subdivided into provinces, each surrounding a large city. The number of provinces has been between 107 and 110 in the period 2005-2016. In term of population, Italian provinces are about the size of US Metropolitan Statistical Areas (MSAs). For example, in 2012 Italian provinces had an average (median) population of 544,000 (377,000), similar to corresponding figures for US MAs at 660,000 (200,000) from the 2010 US Census Bureau.

[19] The €30,000 threshold applies as of December 2008.

Guiso, 2000). Hence, restricting the sample to firms borrowing from at least two banks entails a limited loss of generality. In fact, the share of credit granted to firms that borrow from at least two banks is about 85% of total credit to the corporate sector.

The information in the credit registry includes the identity of the granting institution and the identity (unique tax identifier) of the borrowing firm. This allows merging the registry with additional bank- and firm-level information from various sources. Bank-level information (such as bank size, capital, funding sources, and nonperforming loans) is obtained from bank accounting statements submitted by individual banks and banking groups to the Bank of Italy for supervision. Information on borrowing firms is obtained from accounting statements deposited at Cerved (the firm registry).[20] Data on other province characteristics such as population and GDP as of 2012 are taken from Census data by the National Statistical Office (ISTAT).

Our sample covers the period between December 2009 and December 2013 (a 2-year window around the reform). Panel A of Table 2 provides an overview of key bank characteristics (funding sources, size and loan quality) at the beginning of the sample periods. Deposits from both households and firms are banks' largest funding source (38.26% of total assets), followed by bank bonds (22.54%), equity (11.81%) and interbank funding (3.95%). There is, however, significant variation across banks in terms of funding sources. There is also significant variation with respect to both bank size and loan quality. For example, the average value of total assets is €6.8 billion, ranging from €5 million to €1.26 trillion. Similarly, the average ratio of nonperforming loans to total assets is 4.88%, ranging from 0% to 20.58%.

(Insert Table 2 about here)

Within deposits, deposits from households are 84.64% of total deposits representing 32.39% of total assets, relative to only 5.88% from non-financial firms. The share of retail deposits is considerably smaller than in other countries. For example, in the US core deposits are on average about 60% total assets (Cornett, McNutt, Strahan and Tehranian, 2011). The difference is made up by bank bonds, which in Italy represented about 22.5% of total assets, half of which are held by households (Coletta and Santioni 2016). In terms of size, deposits are equally split in each of the three size categories (below €50,000, between €50,000 and €250,000 and above €250,000), each representing roughly one third of total deposits. The vast majority of term deposits (93.74%) have a contractual maturity of up to one year. Bank bonds held by retail investors have longer maturities. As

[20] Cerved collects official balance sheet data deposited by firms to the Chambers of Commerce, as required by the Italian law. Cerved is a member of the European Committee of Central Balance-Sheet Data Office.

of December 2009, there were 26,836 bank bonds held by retail investors. These securities have an average a contractual maturity of 1,637.47 days (about 4.3 years).[21]

Panels B and C of Table 2 report summary statistics of the variables used to estimate our empirical specifications. We return to these below when we discuss our models.

4. The impact of the tax reform on bank funding

4.1. Identification strategy

To estimate the impact of the reform on banks' deposit and bond funding, we rely on disaggregated deposit and bank bond data at the bank-province level. Using bank-province information, as opposed to bank-level information, allows us to employ a differences-in-differences analysis and evaluate the impact of the reform on deposits, controlling for economy-wide and bank-level shocks. Identification of the treatment effect of interest is obtained by comparing the growth rate in household (total, demand, and term) deposits within the *same bank* before and after the reform across different provinces. We hypothesize that, all else equal, the reform led to a larger increase (decrease) in the supply of deposits (bonds) in provinces where households held larger volumes of bank bonds i.e., in provinces where there were more funds to be reshuffled.

More formally, we begin by estimating the following specification on deposits:

$$\Delta log(Dep)_{b,p,t} = \beta\, BB_{p,2009} \times Post_t + \alpha_p + \alpha_{b,t} + \varepsilon_{b,p,t}, \qquad (1)$$

where $\Delta \log(Dep)_{b,p,t}$ denotes the growth rate in (total, demand, and term) household deposits of bank b in province p before and after the reform ($t = 0, 1$, respectively).[22] $\Delta \log(Dep)_{b,p,t}$ is constructed by collapsing and time-averaging the monthly growth rate of deposits at the bank-province level for the twelve months before the announcement of the reform (September 2010 to September 2011) and the twelve months after the reform came in effect (January 2012 to December 2012), thus excluding the last quarter of 2011, when the reform was approved, but not yet in effect.[23] $BB_{p,2009}$ denotes the volume of bank bonds held by households in province p scaled by total bank bonds across all Italian provinces in 2009. We use predetermined values as of December 2009, two

[21] 90% of these securities have a contractual maturity between 2 and 7 years.

[22] We use specifications in growth rates as our baseline as they are more conservative, but offer robustness checks with corresponding specifications in levels using $log(Dep)_{b,p,t}$ as a dependent variable.

[23] Collapsing and averaging the data smooths out variation and produces conservative standard errors (Bertrand, Duflo, and Mullainathan, 2004).

years prior to the reform, to avoid a simultaneity bias. $Post_t$ is a dummy variable that equals one after the reform (i.e., for $t = 1$), and equals zero otherwise.

α_p and $\alpha_{b,t}$ denote province and bank-time fixed effects, respectively, while $\varepsilon_{b,p,t}$ denotes the idiosyncratic error-term, assumed to be i.i.d. The inclusion of bank-time fixed effects, $\alpha_{b,t}$, is important as it helps absorb economy-wide and bank-level shocks that may influence banks' average deposits growth during the event window. Province fixed effects, α_p, help to additionally control for time-invariant province characteristics that may correlate with the average growth rate of deposits in a province and household portfolio allocations (e.g., overall economic and financial development of a province, household demographic characteristics, etc.). This is important since provinces where households hold larger volumes of bank bonds tend to be larger and richer, i.e., they account for a larger fraction of GDP and have larger populations (Figure A1 in the Appendix). Given our narrow event window, such characteristics can be considered time-invariant.

All else equal, we expect that the reform led to a larger increase in the supply of deposits in provinces where households held larger volumes of bank bonds i.e., a positive and statistically significant β coefficient. To further evaluate the impact of the reform on bank bonds and banks' funding mix between deposits and bonds we employ similar specifications by replacing the dependent variable in Eqn. (1) with $\Delta \log(Bonds)_{b,p,t}$ and $\Delta\ (Dep/(Dep + Bonds))_{b,p,t}$, respectively. All else equal, we expect a larger drop in the supply of bonds and a larger increase in banks' reliance on deposit-to-bond funding in provinces where households held larger volumes of bank bonds, pointing to negative and positive estimates for β coefficients, respectively.

As it can be observed in Panel B of Table 2, there is significant bank-province variation in the sample with respect to both the dependent variables and the key explanatory variable, $BB_{p,2009}$. For example, the average growth rate of term deposits of households ranges from -19% to 33.6%, with mean of 1.8% and a standard deviation of 4.7% (2.6 times larger than its mean). Similarly, the growth rate of bank bonds held by households ranges from -28.3% to 28.7%, with a mean value of -0.4% and a standard deviation of 6.5%. Households' holdings of bank bonds prior to the reform are also very heterogeneous across provinces, with $BB_{p,2009}$ ranging between 0.01% and 9%.

4.2. Parallel trends assumption

The internal validity of Eqn. (1) rests on the assumption that in the absence of treatment (the tax reform in our case), the difference in deposit volumes in 'high' and 'low' bond provinces is constant over time, known as the *parallel trends* assumption. Visual inspection of deposit volumes in high and

low bond provinces prior to the reform, can offer some confidence whether this assumption is likely to hold. Figure 3 reports the average deposits volumes for total, demand, and term deposits in provinces with $BB_{p,2009}$ values below or above the median. The red vertical line indicates the reform's approval date (September 2011). Figure 3 confirms with confidence that, at least for term deposits, the parallel trends assumption is satisfied. Prior to the reform, term deposits in high and low bond provinces are very stable and move in parallel trends. Results are less clear-cut for demand and total deposits. Both demand and total deposits exhibit downward trends that are a little more pronounced for provinces with ex-ante high bond holdings.

(Insert Figure 3 about here)

Table 3 offers a formal statistical test (paired sample t-tests) of the differences in average growth rates of deposits prior to the reform between the two groups. Consistent with the visual inspection in Figure 3, we find that there is no statistically significant difference in the growth rate of term deposits between high and low bond provinces. The small differences in demand and total deposits, observed in Figure 3, are not statistically significant. Table 3 offers similar tests for all other dependent variables of Eqn. (1). Consistent with the parallel trends assumption, we find no statistically significant differences in the average growth rates of bonds ($\Delta \log(Bonds)_{b,p,t}$) and deposits to bond ratios ($\Delta\ (Dep/(Dep + Bonds))_{b,p,t}$) between the two groups.

(Insert Table 3 about here)

To further evaluate the internal validity of Eqn. (1), we also examine whether our identification strategy identifies a treatment effect where there should be none (*placebo test*). As mentioned earlier, the tax changes apply only to households, not firms. We thus re-estimate our model by replacing the dependent variable in Eqn. (1) with corresponding variables for the growth rate in (total, demand, and term) deposits of non-financial firms.

4.3. Results on bank funding structure: deposits vs. bonds

Table 4 reports our baseline findings for Eqn. (1). We report results for total, demand, and term deposits for both households and non-financial firms. For each dependent variable, we report two specifications: one with bank fixed-effects and one with bank-time fixed-effects. For the former, we include a dummy variable, $Post_t$, to estimate average trend in deposits after the reform.

(Insert Table 4 about here)

Consistent with the unconditional results in Figure 3, we find that the reform increased the growth rate of total household deposits more in areas where prior to the reform households held more bank bonds. This is entirely driven by an increase in term deposits. We find no significant changes in demand deposits. In terms of economic significance, our estimates indicate that a 1-standard deviation increase in $BB_{p,2009}$ (by 1.2 percentage points) leads to an additional increase in the average monthly growth rate of term deposits from households by 0.11% to 0.26% (columns 5-6). This is sizable considering that the average monthly growth rate of term deposits after the reform at the bank-province level (the coefficient of $Post_t$ in column 5) is about 1.3%.[24]

To evaluate the internal validity of our identification strategy, we estimate similar specifications for non-financial firms, whose tax rates were not changed. We find no significant treatment effects. The coefficients of the interaction terms between $BB_{p,2009}$ and $Post_t$ are close to zero and never statistically significant (columns 7-12). This makes it unlikely that our treatment estimates are driven by contemporaneous economy-wide trends.

In Table 5 we study the heterogeneity in the estimated treatment effect with respect to bond (maturity and seniority of households' bank bond holdings) and bank characteristics. This analysis helps to further understand how households responded to the reform, which banks were able to raise more deposits, and eliminate plausible alternative explanations for our findings.

(Insert Table 5 here)

We begin by distinguishing the households' holdings of bank bonds in 2009 with respect to their time to maturity by splitting our key explanatory variable, $BB_{p,2009}$, into three components depending on whether they mature before, during or after 2012 (column 1). We find that only the share of bonds maturing during 2012 ($BBmat = 2012_{p,2009}$) has significant predictive power in explaining the increase in term deposits after the reform. This result indicates that households waited for their bonds to mature to reinvest their proceeds into term deposits, rather than selling them prior to maturity. This is not surprising, given that we are considering bonds held by households and most banks in the sample are not publicly listed (only 25 banks are publicly listed). Importantly, this result lends further support to our identification strategy as it suggests that the province variation we exploit

[24] The number of observations varies across total, demand and term deposits because not all banks offer term deposits in provinces they collect demand deposits. We confirm that similar results are obtained if we keep a common sample across these three sets of dependent variables (Appendix Table A1, Panel A). Similar results are also obtained if we estimate corresponding specifications in *levels* by replacing the dependent variable with $log(Dep)_{b,p,t}$ (Appendix Table A1, Panel B). In terms of economic significance, we find we find that a 1-standard deviation increase in $BB_{p,2009}$ leads to an additional increase in total (term) deposits by about 1.6% (3.5%).

is related to a substitution of bonds with deposits rather than to province-specific confounding factors that may happen to correlate with changes in deposits.[25]

Next, we distinguish the household holdings of bank bonds in 2009 with respect to their seniority by splitting $BB_{p,2009}$ between senior and junior (subordinated) bonds (columns 2-3). We find a positive and significant treatment effect of similar size for both senior and junior bank bonds, indicating that households with both senior and junior bank bonds reshuffled their portfolios towards term deposits and the seniority of their bond holdings did not play a role.

In columns 4-6, we examine which banks experienced larger increases in deposits. We find that it is especially banks that had a higher dependence on bank bonds prior to the reform that increase their term deposits more. This is intuitive insofar as these banks had to make up for larger negative shocks in bond financing, following the new more unfavorable taxation of bonds. We find that term deposits grow twice as fast for banks with above median dependence on bond funding in areas with more bank bonds. In terms of annualized growth rates, our estimates suggest that a 1-standard deviation increase in $BB_{p,2009}$ translates into a difference of 1.8% for these banks in these areas, which is as large as the baseline effect. Interactions with bank characteristics also show that riskier banks (with more non-performing loans and lower capital) experienced larger increases in term deposits. We find, instead, no significant heterogeneity with respect to interbank funding.

Next, in Table 6 we further document the impact of the reform on bank bonds and total debt funding. We find that in the same areas where banks experienced a higher growth rate of term deposits after the reform, the growth rate of bank bonds is significantly lower (column 1). One potential concern with this specification is that the level of the bank's own bonds in 2009, which is included in the construction of $BB_{p,2009}$, may induce a negative correlation with the growth rate of the bank's own bonds (i.e., acting like a lagged dependent variable). To evaluate whether this influences our estimates, we compute the amount of bank bonds held by households in the province, excluding the bank's own bonds. Results are unchanged (column 2).

(Insert Table 6 about here)

In terms of economic significance, our column (1) estimates indicate that a 1-standard deviation increase in $BB_{p,2009}$ is associated with 0.2% lower growth rate in bank bonds, which is about half of the growth rate in bank bonds at the bank-province level. Evaluated at the mean level

[25] We test this hypothesis further with additional robustness checks, reported in Appendix Table A2, where we augment of Eqn. (1) to allow for interactions between $Post_t$ and economic and demographic province characteristics, such as GDP and population. Our key results remain the same and the new interaction terms are not found to matter.

of bonds, these estimates, combined with those from Table 4 for deposits, imply a pass-through of around 1 (i.e., 1 euro decrease in bank bonds is associated with a 1 euro increase in term deposits).[26]

Similarly, replacing the dependent variable $\Delta \log(Bond)$ with $\Delta \log(Bonds + TermDep)$ yields a statistically insignificant coefficient close to zero, indicating that the reform did not change the total funding from term deposits and bonds (columns 3 and 4).

Turning to banks' funding mix between deposits and bonds, columns (5) and (6) confirm that the reform let to an increase in fraction of deposit funding. Provinces with above median $BB_{p,2009}$ values, exhibit faster growth rates in their deposits shares.

Overall, these results indicate that changes in taxation can prompt substantial changes in banks' funding sources (in line with insights from other taxation changes in Schepens, 2016 and Célérier, Kick and Ongena, 2017). In particular, we find that the 2011 tax reform in Italy shocked banks' funding structure by inducing a substitution of retail bank bonds with deposits that led to an increase in the share of retail deposit funding, without changing banks' total funding or investor class.

It is also important to note that consistent with earlier descriptive analysis, results in section 4 are also inconsistent with an alternative 'flight to quality' explanation. Increases in deposits are confined to term deposits. We find no significant increases in demand deposits, which would be more consistent with a flight to quality explanation (Table 4). Placebo tests for firms yield no significant treatment effects (Table 4). Perhaps more importantly, the estimated treatment effect does not differ between senior or subordinated bonds (Table 5). A 'flight to quality' would be more consistent with a larger treatment effect for junior bonds that bear more risk. Similarly, the increase in term deposits is larger for riskier, not safer banks as flight to quality would predict (Table 5).

5. The effect of higher deposit funding on bank lending

5.1. Identification strategy

In the second part of the analysis, we study how a greater reliance on deposits affects banks' lending policies. Existing literature indicates that banks use internal capital markets to reallocate available liquidity from one region to another (Gilje, Loutskina and Strahan, 2016 and Bustos, Garber and

[26] We first multiply by 3 the monthly increase in term deposits to make it comparable to quarterly decrease in bonds. We then divide the resulting quarterly increase in term deposits with the quarterly decrease in bonds predicted from our estimated coefficients in columns 6 of Table 4 and column 1 of Table 6, respectively, from a 1 percentage point increase in $BB_{p,2009}$. The mean values of term deposits and bonds are €11 million and €38 million, respectively.

Ponticelli, 2017). We thus use the variation across provinces in bank bond holdings to construct a *bank-level* measure of exposure to the reform and trace its impact on banks' lending policies using a differences-in-difference specification as in Khwaja and Mian (2008).

Identification of treatment is obtained using within-firm variation by comparing changes in the credit outcomes of the *same firm* across banks that are differentially exposed to the reform. This helps control for possible confounding changes in *credit demand* (e.g., due to changes in firms' investment opportunities that may correlate with banks' exposure to the reform). Focusing on multiple lending relationship firms entails a limited loss generality in this case as multiple bank lending relationships are very common in Italy (Detragiache, Garella and Guiso, 2000). For example, about 89% of firms in the registry borrow from more than one bank.

More formally, we measure bank's exposure to the reform as:

$$Exp\_BB_{b,2009} = \sum_p w_{b,p,2009} \times BB_{p,2009} \qquad (2)$$

where $w_{b,p,2009}$ denotes the share of bank's b households deposits in province p in 2009 over the total deposits of the bank. $BB_{p,2009}$ denotes the volume of bank bonds held by households in province p scaled by total bank bonds across all Italian provinces in 2009.

In line with the results of Section 4, we hypothesize that banks with geographical presence in bond-rich areas experienced larger increases in deposits, especially if they had a larger deposit base in the province. The idea is that banks with a larger deposit base in a province were better able to capture households' funds. We find this is indeed the case. As can be observed in Figure 4, right after the reform, banks in geographically bond-rich areas (with above median values of $Exp\_BB_{b,2009}$) experienced larger increases in their term deposits than banks in less rich areas. Prior to the reform, the two groups had similar low levels of term deposits, moving in parallel.

(Insert Figure 4 about here)

In Table 7 we study whether our exposure measure correlates with differences in other bank characteristics. The table reports the average values of bank characteristics by quartile of the exposure variable, $Exp\_BB_{b,2009}$. Values in parentheses are normalized differences (equal to the difference between the quartile average and the average of the other three quartiles, normalized by the square root of the sum of the corresponding variances). As a rule of thumb, values between -0.25 and +0.25 do not raise concerns about unbalancing (Imbens and Wooldridge 2009).

(Insert Table 7 about here)

We find that banks in the lowest quartile of exposure tend to be smaller, rely less on interbank funding, and have more nonperforming loans as of December 2009. Differences in other dimensions and in other quartiles are overall limited. For example, banks across all quartiles have similar dependence on bond funding and differences in nonperforming loans and capitalization for other quartiles are quite small. In our empirical specifications, we include a full set of bank controls to address concerns about possible confounding effects from differences in bank characteristics.

In particular, to evaluate the impact of the reform on credit availability we estimate:

$$\Delta\log(Credit)_{b,f} = \gamma\, Exp\_BB_{b,2009} + \delta\, Controls_{b,2009} + \alpha_f + \varepsilon_{b,f}\,, \qquad (3)$$

where $\Delta\log(Credit)_{b,f}$ denotes the growth rate in credit of bank b to firm f before and after the reform.[27] $Controls_{b,2009}$ is a vector of bank characteristics that may influence banks' lending policies. It includes a set of dummies for each quintile of bank assets (bank-size fixed effects) as well as the ratios of bond, equity, NPLs, and interbank funding to total assets, all predetermined as of December 2009. α_f denotes firm fixed-effects and $\varepsilon_{b,f}$ denotes the idiosyncratic error-term. Eqn. (3) is estimated for the sub-sample of firms with multiple bank-lending relationships. Hence, the coefficient of interest, γ, is identified by comparing how the growth rates of credit to the *same firm* varies across banks that were differentially affected by the reform. Importantly, we also run separate regressions for different types of loans (credit lines, short-term and long-term term loans). We thus compare the growth rates of the same type of loan across banks that were differentially affected by the reform. This addresses the possibility that treatment effects may be influenced by different banks specializing in making different types of loans (Paravisini, Rappoport and Schnabl 2017).

To evaluate the impact of the reform on the provision of liquidity insurance and long-term credit we open-up the total credit variable into credit lines and term loans and further decompose term loans into short-term and long-term loans using the 5-year maturity cut-off, available in the data. To study how increases in the share of deposit funding may have influenced banks' willingness to lend to riskier firms we also estimate these specifications separately for high- and low-risk firms. We use the Altman's Z-score as our baseline measure of firm risk. Firms with a Z-score score greater than 7

[27] To construct the dependent variable, we collapse and average the amount of credit granted to a firm in the twelve months before the announcement of the reform and in the twelve months after the reform came in effect (excluding again the last quarter of 2011). We then take the difference between the natural logarithms of the two values.

are classified as high-risk firms.[28] We also employ interactions with bank and depositor characteristics to uncover possible mechanisms driving changes in lending policies.

One potential concern with Eqn. (3) is that that contemporaneous changes in bank capital or the provision of central bank funding (e.g., thorough the ECB's LTRO program in December 2011 and February 2012) correlate with our exposure measure, influencing our inference. Figure 5 shows that this not the case. Equity to total capital ratios move in parallel trends both before and after the reform. The dependence on central bank funding, which increases for all banks in 2012 after the 3-year LTRO, does not appear to be markedly different between the two groups. There is small divergence in post-reform period, mostly after the end of our event window. Hence, we also estimate augmented specifications of Eqn. (3) with bank-level changes in central bank funding among the control variables. To further evaluate the internal validity of our identification strategy towards other possible unobserved factors, we also perform a *placebo test* by re-estimating our model prior to the reform, shifting the event window from (2011, 2012) to (2009, 2010).

(Insert Figure 5 about here)

5.2. Results: Bank lending policies

5.2.1. Baseline Results

Table 8 reports our baseline results. We find that while the increased reliance on deposit funding did not change banks' overall credit supply, it did lead to important *compositional* changes. Larger increases in deposits are associated with relatively more credit lines and possibly less term loans. The coefficient for term loans is negative, but imprecisely estimated. Within term loans, there is a compositional change towards more long-term credit. Term loans with longer maturities (≥ 5 years) have a positive statistically significant coefficient, while those with shorter maturities (<5 years) have negative, but statistically insignificant coefficient.[29] Larger increases in deposits are also associated with more long-term loans as a fraction of the total credit to the firm. The coefficient of term loans ≥ 5 years to total loans (inclusive of credit lines) is positive and statistically significant.

The increase in credit lines is consistent with Kashyap, Rajan and Stein (2002) who argue that the provision of liquidity *on demand* on banks' liability side (to depositors) creates synergies for the provision of liquidity on demand on the asset side (to borrowers). The interpretation of the long-term

[28] See, for example, Rodano, Serrano-Velarde and Tarantino (2017).
[29] Term loans track a bank's outstanding loan amount to a firm. Due to lags in repayment of outstanding loans, decreases in the availability of term loans are naturally less precisely estimated than increases.

credit results is consistent with different channels. An increase in the maturity of term loans could be the equilibrium outcome of greater discipline associated with runnable debt (Calomiris and Kahn, 1991; Flannery, 1994; and Diamond and Rajan, 2001) or it could be the outcome of greater reliance on funding sources with a lower sensitivity to bank and market risk (Drechsler, Savov, and Schnabl, 2017) derived from government guarantees (Hanson, Shleifer, Stein and Vishny, 2015). From a prudential perspective, these channels are very different. While the discipline channel predicts a decrease in banks' risk-taking incentives, a lower funding sensitivity to risk may lead to an increase in banks' risk-taking incentives, particularly when it draws on government guarantees. In what follows, we study how banks' willingness to originate riskier loans has changed.

Before turning to this analysis, we first discuss the economic significance of our baseline results and the internal validity of our approach. In terms of economic significance, our estimates indicate that a 1-standard deviation increase in $Exp\_BB_{b,2009}$ (by about 1.3 percentage points) leads to a 0.8 percentage points larger increase in the growth rate of credit to credit lines and a 2.5 percentage points larger increase in the growth rate of long-term loans (i.e., term loans with maturities greater than 5 years). Relative to their respective means, these estimates point to a 26.6% (8.5%) increase in the growth rates of credit lines (long-term loans). These are sizable effects, considering that our sample period is characterized by marked decreases in credit availability in both short-term and long-term credit.[30] A 1-standard deviation increase in in $Exp\_BB_{b,2009}$ is also associated with 0.57 percentage points larger increase in the share of term loans with longer maturities to total loans.

(Insert Table 8 about here)

A threat to internal validity would arise if banks more exposed to the reform (with higher values of $Exp\_BB_{b,2009}$) had differential access to central bank funding. Earlier descriptive analysis in Figure 5 suggests this is unlikely. Nevertheless, in Panel A of Table 9 we investigate this further by estimating an augmented Eqn. (3) with bank-level changes in central bank funding among the control variables. Results remain unchanged, both qualitatively and quantitatively, consistent with our earlier findings that changes in central bank funding during the event window do not systematically correlate with geographical exposure to the reform.[31]

(Insert Table 9 about here)

[30] During the event window, total credit granted to all firms decreased on average by 13%, with credit lines decreasing by 3% and term loans by 24%. Longer maturity term loans decrease even more by around 29%.

[31] Similar insights are obtained from regression analysis at the bank-level. Regressing $Exp\_BB_{b,2009}$ on changes in central bank funding and other bank controls included in Eqn. (3) yields a statistically insignificant coefficient for changes in central bank funding that is close to zero (a point estimate of -0.008 with a p-value of -0.38).

In Panel B of Table 9 we also perform a *placebo test* by re-estimating our augmented model prior to the reform, shifting the event window to (2009, 2010). Pre-reform tests can be informative as to whether the identified treatment effects are driven by omitted variable biases that are likely to be present also in the recent pre-reform period (such as systematic differences in lending policies due to e.g., differences in expertise, lending technologies, or preferences). We find this is not the case. Re-estimating the model prior to the reform, yields no significant treatment effect.

In the remaining part of the credit analysis, we study the possible mechanisms driving our baseline findings.

5.2.2. Results: Synergies between Deposits and Credit lines

As discussed earlier, the observed increase in credit lines is consistent with predictions in Kashyap, Rajan, and Stein (2002) who argue that the provision of liquidity on demand on the liability-side creates synergies for the provision of liquidity on demand on the asset-side. Such synergies emerge because banks are saving on costly liquidity holdings (needed to honor both contracts) and exists so long as: i) deposit withdrawals and credit line takedowns are not positively correlated, and ii) banks cannot simply raise new external liquidly at a moment's notice, creating a need for costly liquidity buffers in the first place. Both conditions seem likely in this case.

Evidence in Gatev and Strahan (2006) for the US indicates that when liquidity dries up and commercial paper spreads widen, banks experience funding inflows, pointing to a negative (rather than positive) correlation between deposit outflows and credit line takedowns.[32] A positive correlation is even more unlikely in our setting. The increase in banks' deposit funding in our experiment draws from a reshuffling of previously accumulated wealth, invested for future consumption in the form of low-risk securities such as bank bonds and term deposits. Withdrawals on such funds are thus unlikely to coincide with credit line takedowns of firms.

Accessing external liquidity at a moment's notice is also unlikely for any bank in the sample, particularly during this turbulent period. Nevertheless, there may be important cross-sectional variation in this dimension that could allow us to test the underlying mechanism behind the credit lines result. All else equal, better capitalized banks should have better access to external liquidity. Synergies for such banks should be smaller and thus should exhibit a smaller increase in credit lines

[32] Evidence for the US during the recent 2007-2009 crisis underscores the importance of government guarantees. Acharya and Mora (2015) find that during the initial phases of the crisis, credit line takedowns outpaced the aggregate deposit inflows until the US government increased its backing of the banking sector (e.g., with an increases of deposit insurance limit to $250,000, among other measures) and deposit inflows soared.

in response the reform. Results in Table 10 are consistent with this prediction. Interactions between $Exp\_BB_{b,2009}$ and predetermined measures of bank capital (such as equity to total assets or tier 1 capital to risk weighted assets) yield negative and statistically significant coefficients, partially mitigating the overall positive coefficient of $Exp\_BB_{b,2009}$.

(Insert Table 10 about here)

An additional important prediction in Kashyap, Rajan, and Stein (2002), which explains why deposits and loan commitments do not crowd out each other (given that they both compete for the same scarce resource), is that banks' optimally increase their liquid-asset holdings as their reliance on deposit funding increases. This ensures that they will be able to cover the increased withdrawal risk associated with deposits or help if commitment takedowns occur instead. Figure 6 shows in fact that banks that experienced larger increases in term deposits (i.e., banks with above median values of $Exp\_BB_{b,2009}$) increase their holdings of liquid-assets more.[33] Prior to the reform, both groups have much lower levels of liquid assets that move in parallel.

(Insert Figure 6 about here)

Our findings provide empirical support to the Kashyap, Rajan, and Stein (2002) thesis that the provision of liquidity on demand to both savers and borrowers under the same roof did not emerge by chance, but is rather a defining characteristic of banks, drawing on synergies from the provision of both products. To the best of our knowledge, this analysis and results provide the most direct test and strongest micro-level confirmation of Kashyap, Rajan, and Stein's (2002) key predictions on credit lines and bank liquidity holdings. Perhaps more importantly, our results indicate that a banking system that relies more on deposit funding is better able to provide (much needed) liquidity insurance to firms in crisis periods, reinforcing and complementing key insights from Gatev and Strahan (2006).

5.2.3. Results: Demandability and Deposit Insurance

Next, we explore how a greater reliance on deposit funding may influence banks' lending policies. As discussed earlier, the provision of more long-term credit could be driven by different forces. It could be the equilibrium outcome of greater discipline, emanating from the demandable sequential service nature of the deposit contract (as in Calomiris and Kahn, 1991) or conversely it could be the outcome of greater funding stability, stemming from greater reliance on a funding source that enjoys stronger explicit and implicit government guarantees (Hanson, Shleifer, Stein and Vishny., 2015).

[33] Liquid assets include cash, securities with less than three month remaining maturity, and excess reserves.

While these channels have very similar predictions with respect to loan maturity, they have contrasting predictions with respect to the type of borrowers that banks should be directing their credit to and when. The discipline channel predicts a shift in credit availability away from riskier borrowers towards safer borrowers, particularly when the *threat* of a run is higher. Conversely, the Hanson et al. (2015) channel predicts an increase in credit to riskier firms, particularly by riskier banks more exposed to runs. In what follows, we bring these predictions to the data.

We begin by distinguishing between high- and low-risk firms by allowing for an interaction between $Exp\_BB_{b,2009}$ and $HighRiskFirm_f$, a dummy variable that equals one for firms with an Altman Z-score greater than 7, and equals zero otherwise. Results are reported in Table 11. The coefficient of $Exp\_BB_{b,2009}$ measures the treatment effect for low-risk firms (the omitted group), while the sum of the coefficients of $Exp\_BB_{b,2009}$ and its interaction with $HighRiskFirm_f$ (reported at the bottom of Table 11), measures the overall treatment effect for low-risk firms.

(Insert Table 11 about here)

Results are supportive of the discipline channel. The higher provision of credit lines and longer-maturity term loans, observed earlier, is concentrated in low-risk firms. Total credit to low-risk firms is also found to be higher. This, instead, does not hold for high-risk firms, neither for credit lines nor for longer-maturity term loans. If anything, term credit to high-risk firms is lower. This is more evident when looking at shorter-maturity term loans that arguably are faster to record any decreases in credit availability (see cumulative coefficients at the bottom of Table 11).[34]

In terms of economic significance, our estimates point to sizeable effects. A 1-standard deviation increase in $Exp\_BB_{b,2009}$ is associated with a 0.86 (2.62) percentage points higher growth in credit lines (long-term loans) to low-risk firms. These magnitudes are similar to the baseline results in Table 8 as 85% of the firms are low-risk (Z-score below 7). For high-risk firms, a 1-standard deviation increase in $Exp\_BB_{b,2009}$ is associated with 5.1 lower growth in term loans.

To gain confidence whether the lower credit availability to riskier firms is indeed driven by the disciplinary mechanism in Calomiris and Kahn (1991), in Table 12 we allow for interactions between $Exp\_BB_{b,2009}$ and bank or depositor characteristics. All else equal, the disciplinary mechanism in Calomiris and Kahn (1991) predicts a more pronounced negative effect when the threat of a run is higher (e.g., for banks with worse fundamentals and a larger fraction of larger uninsured

[34] Credit lines may also be slow to record decreases in credit availability as riskier firms may be more likely to draw on pre-committed credit lines.

deposits). Results are consistent with these predictions. We find larger negative effects on $Exp\_BB_{b,2009}$ from banks with lower capital ratios and riskier loan portfolios (e.g., with more nonperforming loans). Consistent with the disciplinary mechanism, we find that this heterogeneity with respect to bank fundamentals is stronger for loans to high-risk firms.

(Insert Table 12 about here)

Government guarantees did not neutralize this mechanism. Deposit insurance or implicit government guarantees could neutralize (or even reverse) this mechanism by removing depositors' incentives to exercise their demandability rights. However, as can be observed in Figure 7 the inflow of deposits into the banking sector has led to an overall increase in share of large deposits (accounts with more than €250,000).[35] All else equal, larger depositors are expected to be less "sleepy" as they are largely uninsured (the deposit insurance limit is €100,000) and households behind larger accounts may be better able and have stronger incentives to exercise their demandability rights when concerned about the safety of their funds.[36] Results in Panel D further show that the negative $Exp\_BB_{b,2009}$ coefficient for riskier firms is entirely driven by banks with above median increases in their shares of large deposits (above €250,000). To the degree that depositors tend to rationally place deposits above the deposit insurance limit in banks with stronger fundamentals (Iyer, Jensen, Johannesen and Sheridan, 2016), the results in Panel D will tend to underestimate this disciplinary mechanism.

(Insert Figure 7 about here)

Overall, these results confirm theoretical predictions that when not neutralized by government guarantees, the deposit contract can be an effective disciplinary mechanism on banks.

6. Conclusions

The paper studies how a greater reliance on retail deposits affects banks' lending policies. The analysis exploits a taxation reform in Italy, which led to a change in the composition of bank retail funding by inducing a substitution of retail bonds with deposits without changing banks' total funding or the class of investors. The insights from the paper are informative about the asset-side implications of post-crisis regulations and proposals targeting banks' susceptibility and resilience in crises (e.g., the net stable funding ratio under Basel III and "narrow banking proposals" calling for a separation

[35] Only 15% percent of banks experienced an increase in the share of small accounts (below €50,000).
[36] Iyer, Puri, and Ryan (2016) provide sharp micro-evidence that retail deposits are sensitive to bank fundamentals. They find that uninsured depositors as well as depositors that are more educated, engage in a business or professional occupations, are more financially literate are more likely to withdraw when concerned with the safety of their funds.

of deposit-taking and loan-granting activities). A key result of the paper is that banking systems funded with more retail deposits are better able to provide liquidity insurance to firms (e.g., credit lines and loan commitments) and long-term loans to the real economy, even during crisis periods. Importantly, we find that as long as government guarantees do not neutralize the disciplinary role of the demandable nature of the deposit contract, these benefits do not come at the cost of higher risk-taking (e.g., loans to non-creditworthy borrowers). Examples of government guarantees include both explicit and implicit government guarantees such as deposit insurance and 'too-big-to fail' policies.

A second important result of the paper is that a greater reliance on deposit funding, which leads to more liquidity on demand on both sides of a bank's balance sheet creates at the same time an endogenous and voluntary increase in banks' liquidity holdings.

The third key result of the paper is that changes in taxation can be a very effective mechanism to induce changes in banks' funding structures and lending policies. This complements insights for other studies analyzing different taxation reforms.

References

Acharya, Viral and Nada, Mora, 2015, "A Crisis of Banks as Liquidity Providers", *Journal of Finance* 70(1): 1-43.

Afonso, Gara, Kovner, Anna and Schoar, Antoinette, 2011, "Stressed, Not Frozen: The Federal Funds Market in the Financial Crisis", *The Journal of Finance* 66(4): 1109-1139.

Bertrand, Marianne, Esther Duflo and Sendhil Mullainathan, 2004, "How Much Should we Trust Differences-in-differences Estimates?", *The Quarterly Journal of Economics* 119(1): 249-275.

Billett, Matthew, Jon Garfinkel and Edward O'Neal, 1998, "The cost of market versus regulatory discipline in banking", *Journal of Financial Economics*, 48(3): 333-358.

Bond, Steve, Kyung Yeon Ham, Giorgia Maffini, Andrea Nobili and Giacomo Ricotti, 2016, "Regulation, tax and capital structure: evidence from administrative data on Italian banks", Bank of Italy WP 361.

Bustos, Paula, Gabriel Garber, and Jacopo Ponticelli, 2017, "Capital Accumulation and Structural Transformation", Working Paper.

Calomiris, Charles, and Charles Kahn, 1991, "The role of demandable debt in structuring optimal banking arrangements", *The American Economic Review* 81(3): 497–513.

Calomiris, Charles and Joseph Mason, 1997, "Contagion and Bank Failures During the Great Depression: The June 1932 Chicago Banking Panic", *The American Economic Review* 87(5): 863-883.

Calomiris, Charles and Matthew, Jaremski, 2019, "Stealing Deposits: Deposit Insurance, Risk-Taking and the Removal of Market Discipline in Early 20th Century Banks", *The Journal of Finance* 74(2): 711-754.

Carpinelli, Luisa and Matteo Crosignani, 2018, "The Design and Transmission of Central Bank Liquidity Provisions", Working Paper.

Célérier, Claire, Thomas Kick, and Steven Ongena, 2017, "Changes in the Cost of Bank Equity and the Supply of Bank Credit", Working Paper.

Cingano, Federico, Francesco Manaresi and Enrico Sette, 2016, "Does credit crunch investments down? New evidence on the real effects of the bank-lending channel", *The Review of Financial Studies*, 29(10): 2737-2773.

Choudhary, Ali and Nicola Limodio, 2017, "Deposit Volatility, Liquidity and Long-Term Investment: Evidence from a Natural Experiment in Pakistan", Working Paper.

Cochrane, John, 2014, "Toward a Run-free Financial System", Working Paper.

Coletta, Massimo, and Raffaele Santioni, 2016, "Le obbligazioni bancarie nel portafoglio delle famiglie italiane", Bank of Italy WP 359.

Cornett, Marcia Millon, Jamie MacNutt, Philip Strahan and Hasan Tehranian, 2011, "Liquidity risk management and credit supply in the financial crisis", *Journal of Financial Economics* 101(2): 297-312.

Detragiache, Enrica, Paolo Garella and Luigi Guiso, 2000, "Multiple versus single banking relationships: Theory and Evidence", *The Journal of Finance* 55(3): 1133-1161.

Diamond, Douglas and Philip Dybvig, 1983, "Bank Runs, Deposit Insurance, and Liquidity", *Journal of Political Economy*, 91(3): 401-419.

Diamond, Douglas and Raghuram Rajan, 2001, "Liquidity Risk, Liquidity Creation, and Financial Fragility: A Theory of Banking", *Journal of Political Economy*, 109(2): 287-327.

Dreschsler, Itamar, Alexi Savov and Philipp Schnabl, 2017, "The Deposits Channel of Monetary Policy", *The Quarterly Journal of Economics*,132(4): 1819-1876.

Dreschsler, Itamar, Alexi Savov and Philipp Schnabl, 2018, "Banking on Deposits: Maturity Transformation without Interest Rate Risk", NBER WP 24582.

Egan, Mark, Stefan Lewellen and Adi Sunderam, 2017, "The Cross Section of Bank Value", NBER WP 23291.

Flannery, Mark, 1994, "Debt Maturity and the Deadweight Cost of Leverage: Optimally Financing Banking Firms", *The American Economic Review* 84 (1): 320-331.

Friedman, Milton, 1960, "A Program for Monetary Stability", New York: Fordham University Press.

Gatev, Evan and Philip E. Strahan, 2006, "Banks' Advantage in Hedging Liquidity Risk: Theory and Evidence from the Commercial Paper Market", *The Journal of Finance* 61 (2): 867–892.

Gambacorta, Leonardo, Giacomo Ricotti, Suresh M Sundaresan and Zhenyu Wang, 2017, "The Effects of Tax on Bank Liability Structure", CEPR DP 11893.

Gilje, Erik, Elena Loutskina, and Philip Strahan, 2016, "Exporting Liquidity: Branch Banking and Financial Integration", *The Journal of Finance* 71(3): 1159-1184.

Gorton, Gary, 1988, "Banking Panics and Business Cycles", *Oxford Economic Papers* 40(4): 751-81.

Gorton, Gary and George Pennacchi, 1992, "Financial Innovation and the Provision of Liquidity Services", in *Reform of Federal Deposit Insurance* (HarperCollins), J. Barth and D. Brumbaugh, eds.

Hanson, Samuel G., Andrei Shleifer, Jeremy Stein, and Robert Vishny, 2015, "Banks as patient fixed-income investors", *Journal of Financial Economics* 177(3): 449-469.

Heider, Florian, Farzad Saidi, and Glenn Schepens, 2018, "Life Below Zero: Bank Lending Under Negative Policy Rates", *The Review of Financial Studies* (forthcoming).

Hoffmann, Peter, Sam Langfield, Federico Pierobon, and Guillaume Vuillemey, 2018, "Who bears interest rate risk?" *The Review of Financial Studies* (forthcoming).

Ioannidou, Vasso, and Maria, Fabiana Penas, 2010, "Deposit insurance and bank risk-taking: Evidence from internal loan ratings", *Journal of Financial Intermediation* 19 (1), 95-115.

Imbens, Guido W., and Jeffrey M. Wooldridge, 2009, "Recent developments in the econometrics of program evaluation", *Journal of economic literature* 47(1): 5-86.

Iyer, Rajkamal, and Manju Puri, 2012, "Understanding bank runs: The importance of depositor-bank relationships and networks", *The American Economic Review* 102(4): 1414–1445.

Iyer, Rajkamal, Manju Puri, and Nicholas Ryan, 2016, "A tale of two runs: Depositor responses to bank solvency risk", *The Journal of Finance* 71(6): 2687-2725.

Iyer, Rajkmal, Jose-Luis Peydró, Samuel da-Rocha-Lopes and Antoinette Schoar, 2014, "Interbank liquidity crunch and the firm credit crunch: Evidence from the 2007–2009 crisis", *The Review of Financial Studies* 27 (1): 347-372.

Iyer, Rajkamal, Thais Jensen, Niels Johannesen and Adam Sheridan, 2016, "The Run for Safety: Financial Fragility and Deposit Insurance", Working Paper.

Kashyap, Anil K., Raghuram G. Rajan, and Jeremy C. Stein, 2002, "Banks as liquidity providers: An explanation for the co-existence of lending and deposit-taking", *The Journal of Finance* 57(1): 33-74.

Khwaja, Asim Ijaz, and Atif Mian, 2008, "Tracing the Impact of Bank Liquidity Shocks: Evidence from an Emerging Market", *The American Economic Review*, 98(4): 1413-42.

Martin, Christopher, Manju Puri and Alexander Ufier, 2018, "Deposit Inflows and Outflows in Failing Banks: The Role of Deposit Insurance", NBER WP 24589.

Martinez Peria, Maria Soledad, and Sergio Schmukler, 2001, "Do depositors punish banks for bad behavior? Market discipline, deposit insurance, and banking crises", *The Journal of Finance* 56(3): 1029–1051.

Merton, Robert, 1977, "An Analytic Derivation of the Cost of Deposit Insurance and Loan Guarantees. An Application of Modern Option Pricing Theory", *Journal of Banking and Finance* 1(1): 3-11.

Paravisini, Daniel, Veronica Rappoport and Philipp, Schnabl, 2017, "Specialization in Bank Lending: Evidence from Exporting Firms", NBER WP 21800.

Park, Sangkyun and Stavros Peristiani, 1998, "Market Discipline by Thrifts Depositors", *Journal of Money, Credit and Banking,* 30(3): 347-364.

Ricotti, Giacomo and Alessandra Sanelli, 2008, "Financial accounts and taxation: a historical analysis", Bank of Italy Working Paper.

Rodano, Giacomo, Nicolas Serrano-Velarde and Emanuele Tarantino, 2017, "Lending Standards over the Cycle", *The Review of Financial Studies* (forthcoming).

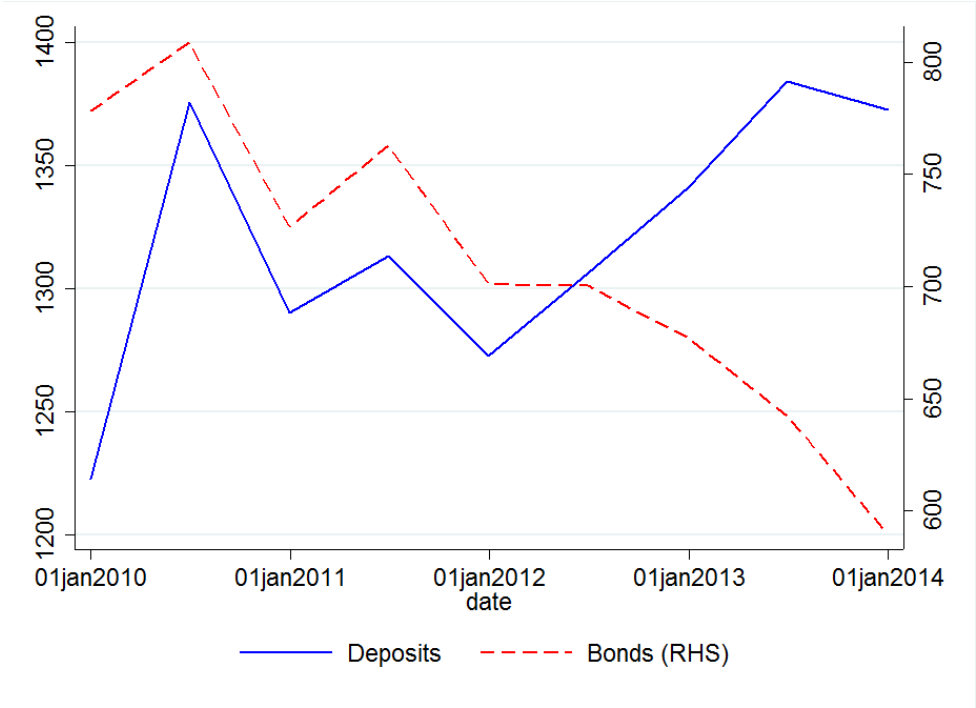
Saunders, Anthony and Berry Wilson, 1996, "Contagious Bank Runs: Evidence from the 1929-1933 period", *Journal of Financial Intermediation* 5(4): 409-423.

Schepens, Glenn, 2016, "Taxes and bank capital structure", *Journal of Financial Economics* 120, 585–600.

Figure 1: Bank deposits and bonds

This figure shows deposits and bank bonds for the entire banking system from December 2009 to December 2013. Figure 1A shows total retail deposits (blue solid line) versus bank bonds (dashed red line) from semi-annual bank balance sheets. Figure 1B shows household term (solid line) and demand (dashed) deposits aggregated from data on deposits at the monthly frequency. The vertical line indicates the approval date of the reform (September 2011).

A. Deposits and bonds



B. Term and demand deposits

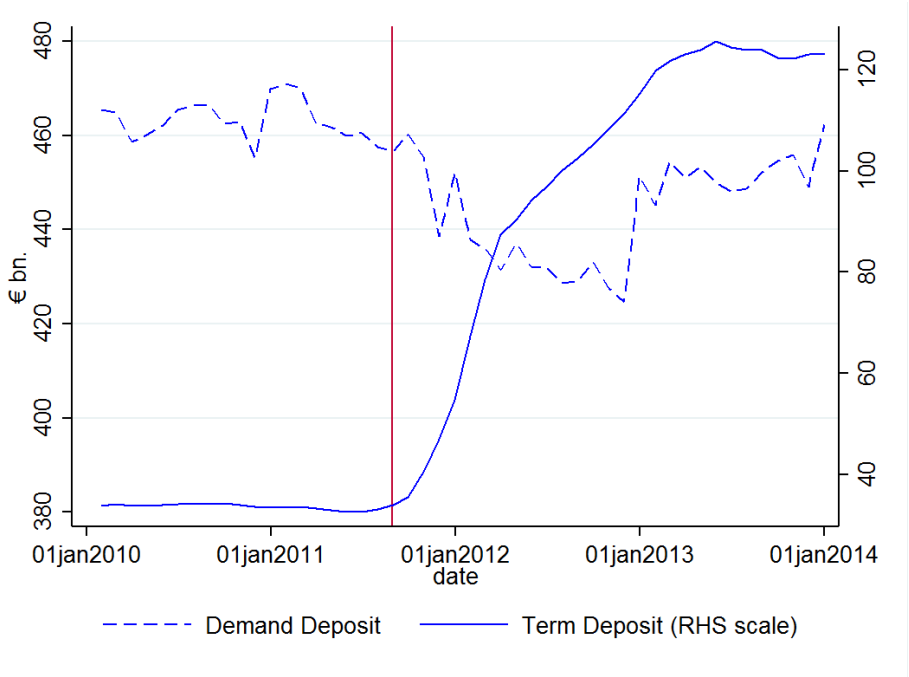
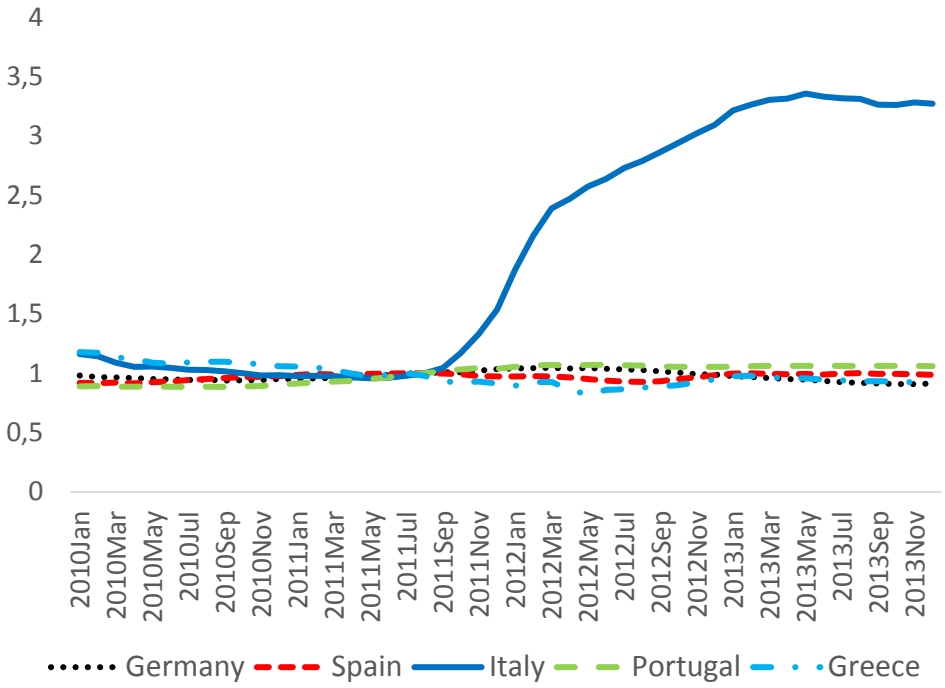


Figure 2. Term deposits in other countries and the 1996 tax reform

Figure 2A shows household term deposits using monthly data from January 2010 to December 2013 for several European countries: Germany (dotted), Spain (dashed), Italy (solid), Portugal (long dash) and Greece (dash dot). All deposit series have been normalized to 1 as of August 2011. Source: ECB Statistical DataWarehouse. Figure 2B reports the share of funding by liability type for Italian banks between 1990 and 2004. CDs or term deposits (light yellow) and bank bonds (light blue). Source: Ricotti and Sanelli (2008), p.275 Figure 4.

A. Household term deposits in Europe



B. Italian banks' funding sources, 1990-2004

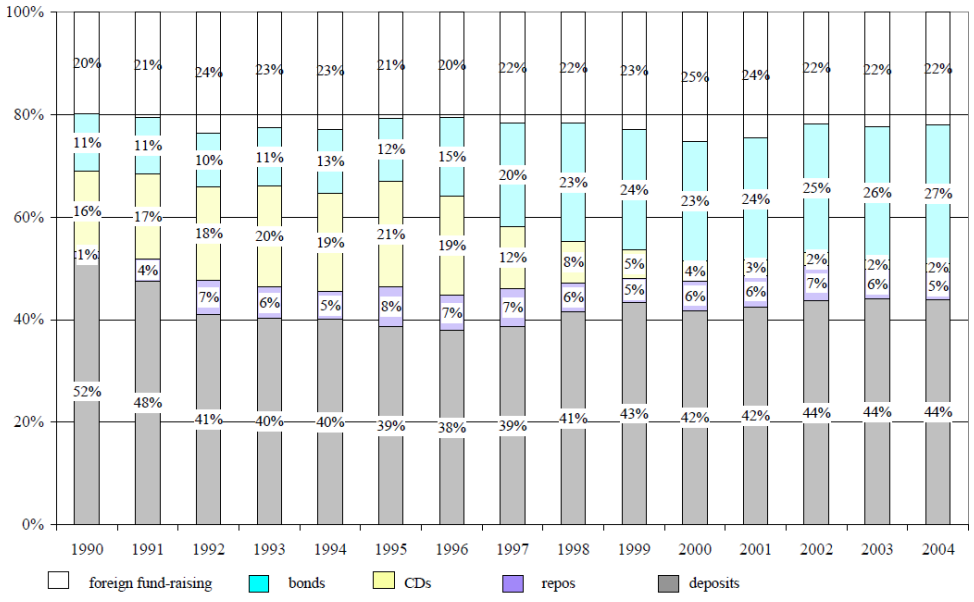
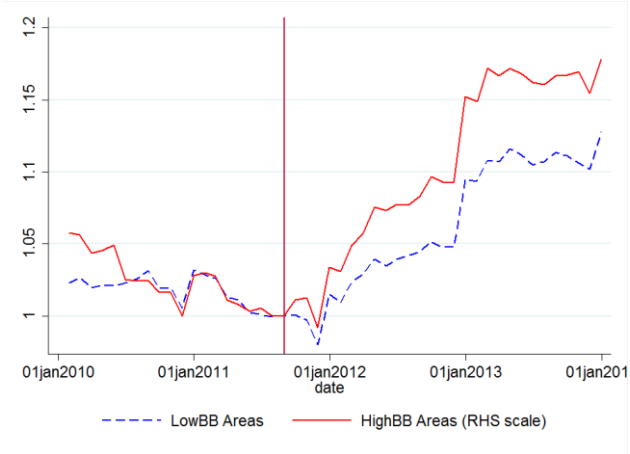


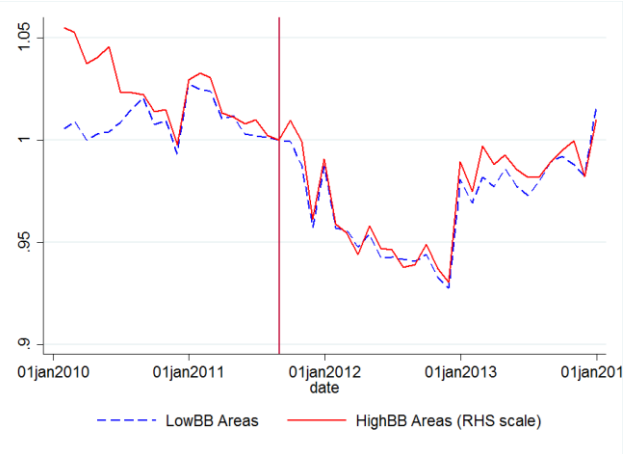
Figure 3: Household bank deposits by province

This figure shows the evolution of household (total, demand, and term) deposits between provinces with above the median holdings of bank bonds $BB_{p,2009}$ (red solid line) and below the median holdings (blue dashed line) using monthly data from 2010 to 2014. The vertical line indicates the tax reform approval date (September 2011). All deposit series are normalized to have a value of one as of the reform approval date (i.e. index value =1 in August 2011). Figure 3A, B, and C report total deposits, demand deposits, and term deposits, respectively.

A. Total deposits



B. Demand deposits



C. Term deposits

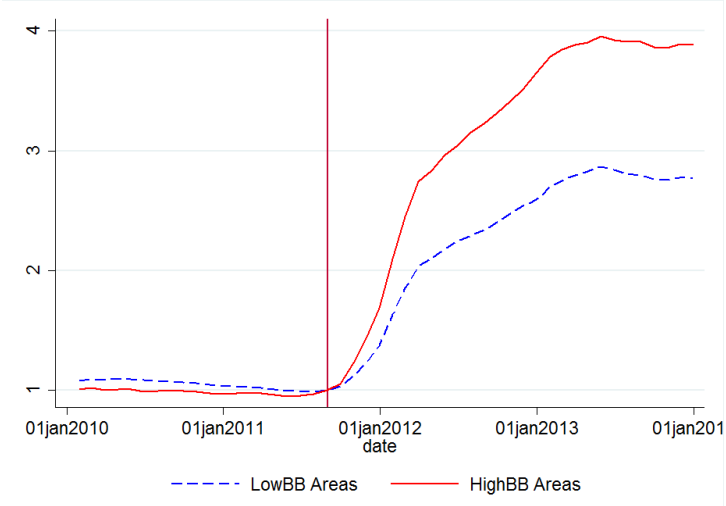


Figure 4. Term deposits by bank characteristics

This figure shows the evolution of term deposits by different groups of banks. Figure 4A shows the difference in the level of term deposits between banks with above the median exposure to the reform Exp_BB_b (red solid line) and banks below the median (blue dashed line). Figure 4B plots term deposits between banks with above the median increase in large deposits ($D250K_b = 1$, red solid line) and those below the median increase in large deposits ($D250K_b = 0$, blue dashed line). All deposit series are normalized to have a value of one as of the reform approval date (i.e. index value =1 in August 2011 for Figure 4A and December 2011 for Figure 4B, given that data on deposit size is only available at the end of each year).

A. High and low exposure (Exp_BB_b)

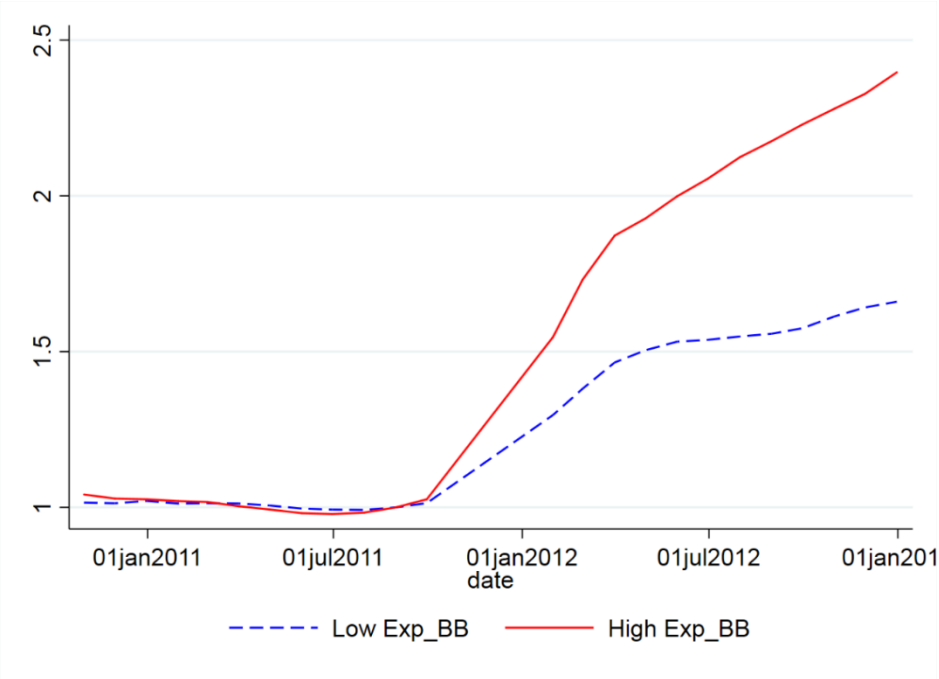
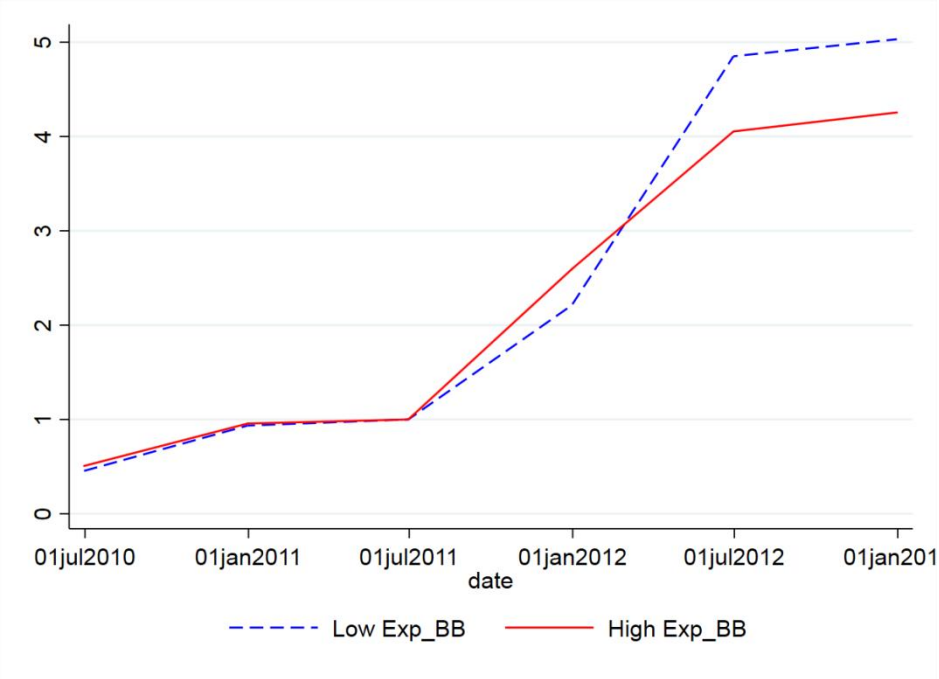


Figure 5. Bank funding by bank exposure

This figure plots bank funding between banks with above the median exposure to the reform Exp_BB_b (red solid line) and banks below the median (blue dashed line). Figure 5A plots the fraction of total central bank funding, including the 3 year LTRO, as a fraction of assets. Figure 5B plots the fraction of bank capital over total assets. All series are normalized to have a value of one as of the reform approval date (i.e. index value =1 in June 2011, given that balance sheet information is only available semi-annually)

A. Central bank funding over total assets



B. Equity over total assets

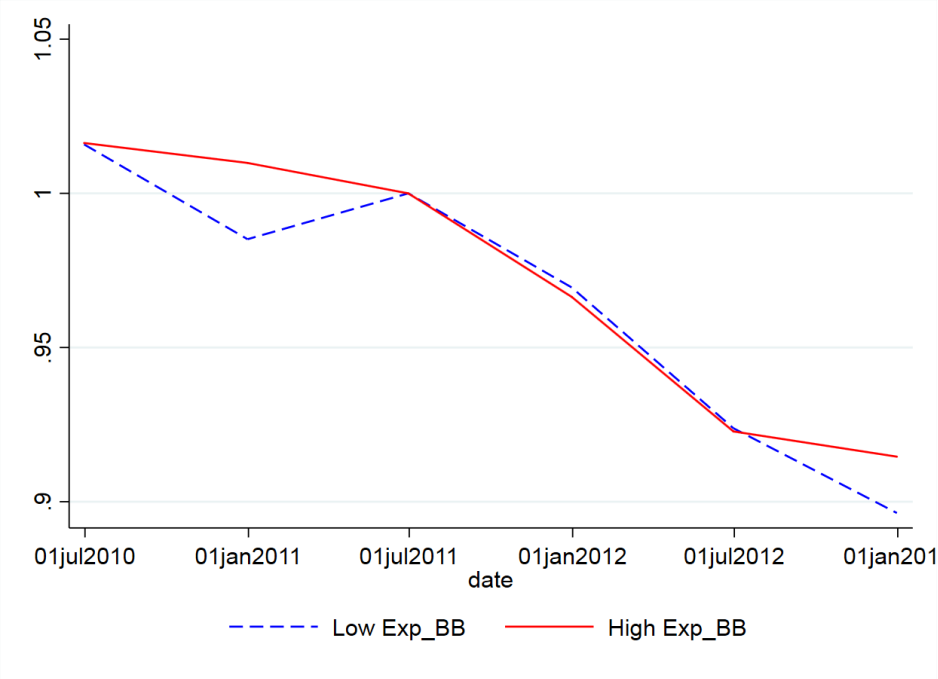


Figure 6. Liquidity ratio by bank exposure

This figure plots the liquidity ratio (cash and other short-term securities over total assets) for banks with above the median exposure to the reform Exp_BB_b (red solid line) and banks below the median (blue dashed line). The series has been normalized to have a value of one as of the reform approval date (i.e. index value =1 in June 2011, given that balance sheet information is only available semi-annually)

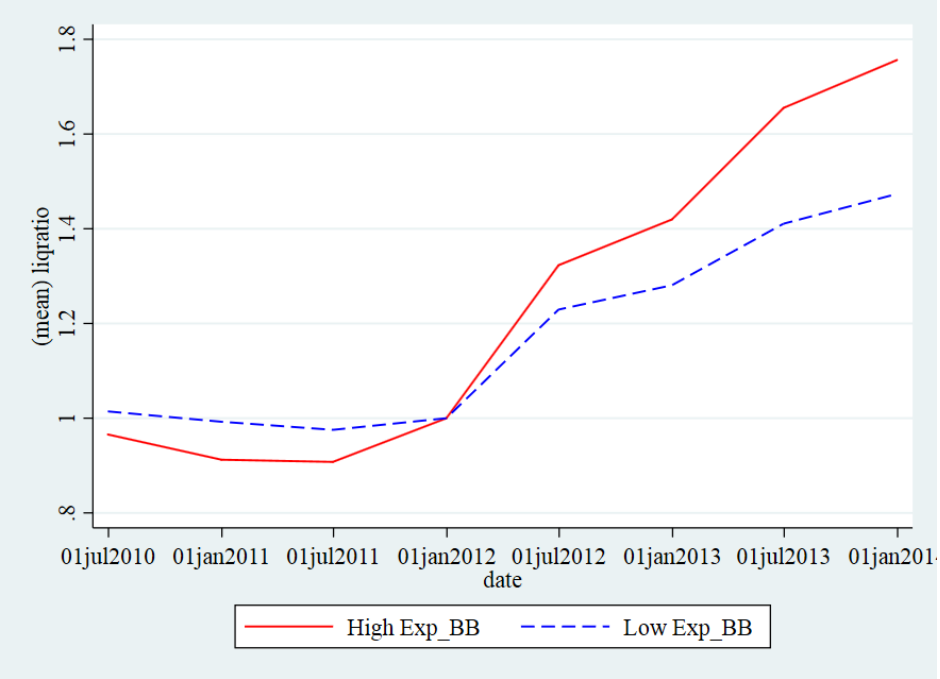


Figure 7. Insured and Uninsured Deposits in Italy

This figure shows the shares of deposits below €50,000and above € 250,000 over total of deposits in the banking system in Italy between 2009 and 2013. The deposit insurance limit during this period is €100,000 per person, per bank.

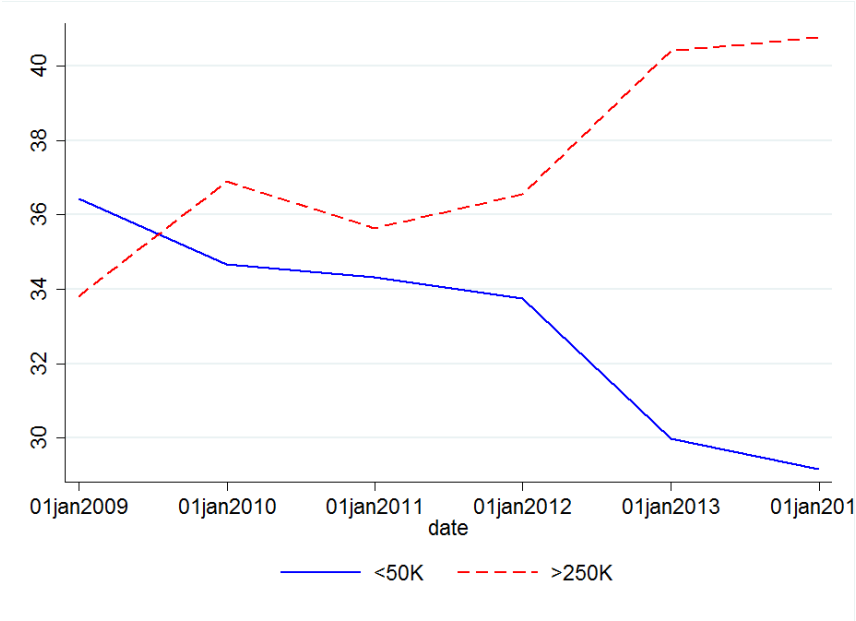


Table 1: Tax rate by asset class before and after the reform

This table summarizes the tax rates on income from bank deposits, private sector securities, and sovereign bonds that applied before and after the tax reform. The new tax rates came into effect in January 2012.

Tax rate on returns on financial assets held by households	Before	After
Bank deposits	27.0%	20.0%
Private sector securities (bonds and stocks)	12.5%	20.0%
Sovereign bonds	12.5%	12.5%

Table 2: Summary statistics

This table provides summary statistics for all variables used in the empirical analyses.

	Obs.	Mean	St.Dev.	Median	Min	Max
A. Bank Characteristics as of 2009, in % (bank level)						
Household deposits/Total Assets	523	32.39	13.68	30.19	9.70	77.39
Firm Deposits/Total Assets	523	5.878	5.47	4.62	.40	36.78
Deposits<€50,000/Total Deposits	520	34.28	15.80	36.40	0	100
Deposits>€250,000/Total Deposits	520	32.09	24.12	26.17	0	100
Bank Bonds/Total Assets	475	22.54	11.67	24.26	2.74	45.76
Equity/Total Assets	523	11.81	6.86	10.55	6.528	91.54
Interbank Funding/Total Assets	523	3.95	9.37	1.35	0	75.93
Nonperforming Loans/Total Assets	517	4.88	3.22	4.63	0	20.58
Total Assets (€ billions)	524	6.79	63.47	0.37	0.05	1261
Exp_BB_b	513	0.015	0.014	0.013	0	0.087
Term Deposits <1Y/Term Deposits	509	93.74	14.10	98.74	0.089	1
Retail bank bonds maturity (days – security	26836	1637.47	1026.84	1153	733	16619
B. Deposits and Bonds (bank-province level)						
Households						
$\Delta log(Total\ Dep)_{b,n,t}$	54880	-0.009	0.150	0.000	-1.083	1.058
$\Delta log(Demand\ Dep)_{b,n,t}$	49589	-0.018	0.174	-0.002	-1.195	1.157
$\Delta log(Term\ Dep)_{b,n,t}$	29734	0.018	0.047	0.000	-0.190	0.336
$\Delta log(Bonds)_{b,n,t}$	19284	-0.004	0.065	0.000	-0.283	0.287
$\Delta(Total\ Dep/(Total\ Dep + Bonds))_{b,n,t}$	19277	0.003	0.032	0.002	-0.141	0.152
$\Delta(Term\ Dep/(Term\ Dep + Bonds))_{b,n,t}$	14214	0.012	0.025	0.004	-0.050	0.103
Non-financial firms						
$\Delta log(Total\ Dep)_{b,n,t}$	24462	-0.028	0.196	-0.006	-1.083	1.058
$\Delta log(Demand\ Dep)_{b,n,t}$	24085	-0.033	0.211	-0.009	-1.195	1.157
$\Delta log(Term\ Dep)_{b,n,t}$	6775	0.020	0.045	0.005	-0.190	0.336
Provinces						
$BB_{p,2009}$	106	0.009	0.012	0.005	0.0001	0.09
$GDP_{p,2009}$	106	0.009	0.013	0.005	0.0002	0.09
$Population_{n,2012}$ (thousand head)	106	544.3	583.2	377.5	86.9	3995.2
$Log(Population_{n,2012})$	106	12.90	0.73	12.84	11.37	15.20
C. Bank Credit (bank-firm level)						
$\Delta log(Credit)_{b,f}$	315774	-0.136	0.387	0	-1.779	1.056
$\Delta log(Credit\ Lines)_{b,f}$	222073	-0.033	0.420	0	-1.707	1.397
$\Delta log(Term\ Loans)_{b,f}$	315774	-0.246	0.773	-0.181	-2.972	1.999
$\Delta log(Term\ Loans < 5Y)_{b,f}$	212867	-0.250	0.955	-0.153	-3.572	2.589
$\Delta log(Term\ Loans > 5Y)_{b,f}$	154327	-0.292	0.704	-0.201	-2.865	1.450
Altman Z-score	315774	4.62	4.98	5	1	9
$Risky_f$	315774	0.151	0.358	0	0	1
$Dshare250K_b$	315774	0.635	0.48	0	0	1
Exp_BB_b	315774	0.024	0.013	0.025	0	0.062

Table 3: 'High bank bonds' vs. 'Low bank bonds' provinces (paired t-tests)

This table reports average growth rates in the dependent variables of Eqn. (1) before the reform (i.e., from January 2009 to September 2011) for provinces with below median ('Low' bonds) and above median ('High' bonds) $BB_{p,2009}$ values and tests whether the averages of the two groups are statistically different from each other. Paired t-statistics are reported in the last column.

	Average growth rates		
Dependent variables (Eqn. (1))	'Low' bonds	'High' bonds	t-tests
Δ*log(Total Dep)*	-0.007	-0.003	1.26
Δ*log(Demand Dep)*	-0.009	-0.005	1.17
Δ*log(Term Dep)*	0.005	0.006	1.40
Δ*log(Bonds)*	0.007	0.004	-0.52
Δ*(Total Dep/(Total Dep + Bonds))*	-0.0016	-0.0003	0.71
Δ*(Demand Dep/(Demand Dep + Bonds))*	-0.002	-0.001	0.58
Δ*(Term Dep/(Term Dep + Bonds))*	-0.0005	0.0009	0.90

Table 4. The Effect of the Reform on Bank Deposits

This table provides the estimates for the effect of the reform on bank deposits held by households (equation (1)). The dependent variable in all specifications is the time averaged monthly log-change in deposits at bank *b* in province *p* in twelve months before the announcement of the reform (September 2010 to September 2011) and the twelve months after the reform came in effect (January 2012 to December 2012). $BB_{p,2009}$ is the share of bank bonds held by household in province *p* over total bank bonds held by Italian households in 2009 (from SHS data). $Post_t$ is a dummy equal to one for the twelve months after the reform and zero before. Columns (1) – (6) analyze household deposits while columns (7) – (12) focus on firm deposits (for a placebo test). Standard errors are clustered at the province level. t-statistics are reported in parentheses.

	Household deposits						Firm deposits (Placebo)					
	Δ log(Total Dep)		Δ log(Demand Dep)		Δ log(Term Dep)		Δ log(Total Dep)		Δ log(Demand Dep)		Δ log(Term Dep)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$BB_{p,2009} \times Post_t$	0.141***	0.117**	0.072	0.063	0.115***	0.262***	-0.014	0.044	-0.060	0.032	-0.055	0.015
	(2.78)	(2.16)	(1.21)	(0.94)	(4.14)	(6.91)	(-0.19)	(0.46)	(-0.71)	(0.29)	(-1.06)	(0.17)
$Post_t$	0.006***		-0.003		0.013***		0.007***		0.006**		0.010***	
	(4.10)		(-1.58)		(18.64)		(2.78)		(2.10)		(8.43)	
Fixed Effects												
Province	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
Bank-Time	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
Observations	29045	29026	28360	28338	19592	19558	15047	14978	14871	14799	6089	5825
No of provinces	107	107	107	107	107	107	107	107	107	107	107	107
No of banks	545	545	543	543	517	517	541	541	540	540	365	365

Table 5. Heterogeneity by bond and bank characteristics

This table provides estimates for the heterogeneity of the impact of the reform on deposit funding. The dependent variable in all estimates is the time averaged monthly growth rate of term household deposits at bank *b* in province *p* in the pre- and post-reform period (± 12 months from the reform – see Table 4 for further details). $BB_{p,2009}$ is the share of bank bonds held by household in province *p* over total bank bonds held by Italian households in 2009 (SHS). $BBmat < 2012_{p,2009}$, $BBmat = 2012_{p,2009}$ and $BBmat > 2012_{p,2009}$ are the province share of bank bonds held by households in 2009 maturing before, during and after 2012 respectively. $BBsenior_{p,2009}$ and $BBjunior_{p,2009}$ are the province share of senior and junior (subordinated) debt held by households in 2009. $Post_t$ is a dummy equal to one for the twelve months after the reform and zero before. $HighBond_{b,2009}$, $HighNPL_{b,2009}$. $HighEquity_{b,2009}$ and $HighInterbank_{b,2009}$ are dummies equal to one if bank *b* is above the median in the following characteristic: bond funding over total assets, Nonperforming loans (NPLs) over total assets, equity over total assets and interbank funding over total assets in 2009, 0 otherwise. All estimations include province and bank-time fixed-effects. Standard errors are clustered at the province level. t-statistics are reported in parentheses.

	Bond Maturity	Bond Seniority		Bank Characteristics		
	(1)	(2)	(3)	(4)	(5)	(6)
$BBmat < 2012_{p,2009} \times Post_t$	-0.010					
	(-0.06)					
$BBmat = 2012_{p,2009} \times Post_t$	0.358***					
	(3.01)					
$BBmat > 2012_{p,2009} \times Post_t$	-0.099					
	(-0.53)					
$BBsenior_{p,2009}$		0.280***				
		(6.91)				
$BBjunior_{p,2009}$			0.248***			
			(6.54)			
$BB_{p,2009} \times Post_t$				0.177***	0.162**	0.164***
				(3.10)	(2.10)	(3.00)
$BB_{p,2009} \times Post_t \times HighBond_{b,2009}$				0.153**	0.130*	0.130**
				(2.47)	(1.97)	(2.00)
$BB_{p,2009} \times Post_t \times HighNPL_{b,2009}$					0.159**	0.159**
					(2.58)	(2.57)
$BB_{p,2009} \times Post_t \times HighEquity_{b,2009}$					-0.133	-0.134*
					(-1.50)	(-1.69)
$BB_{p,2009} \times Post_t \times HighInterbank_{b,2009}$						-0.004
						(-0.06)
Fixed Effects						
Province	Y	Y	Y	Y	Y	Y
Bank-Time	Y	Y	Y	Y	Y	Y
Observations	19558	19558	19558	19381	19381	19381
No of provinces	107	107	107	107	107	107
No of banks	517	517	517	498	498	498

Table 6. The Effect of the Reform on the Substitution between Bonds and Deposits

This table provides the estimates of the effect of the reform on bank bonds and the bank's debt financing mix between deposits and bonds. The dependent variable is the time averaged quarterly growth rate of bonds issued by bank *b* held by household in province *p* in the pre- and post-reform period (± 12 months from the reform) in columns (1) and (2), the time averaged quarterly change in household deposits and bonds in columns (3) and (4) or the time averaged quarterly change in the share of deposits over deposits plus bonds issued by bank *b* held by household in province *p* in columns (5) – (6). $BB_{p,2009}$ is the share of bank bonds held by household in province *p* over total bank bonds held by Italian households in 2009 (SHS). $BB_{p-other,2009}$ is the share of bonds issued by banks other than *b* held by households in province *p*. $Post_t$ is a dummy equal to one for the twelve months after the reform and zero before. All estimations include province and bank-time fixed-effects. Standard errors are clustered at the province level. t-statistics are reported in parentheses.

	Δ log(Bonds)		Δ log(Bonds+Term)		Δ Tot/ (Tot+Bonds)	
	(1)	(2)	(3)	(4)	(5)	(6)
$BB_{p,2009} \times Post_t$	-0.205***		0.049		0.107***	
	(-4.50)		(1.08)		(3.43)	
$BB_{p-other,2009} \times Post_t$		-0.144***		0.023		0.080***
		(-4.72)		(0.72)		(3.43)
Fixed Effects						
Province	Y	Y	Y	Y	Y	Y
Bank-Time	Y	Y	Y	Y	Y	Y
Observations	16082	15634	12921	12687	16082	15634
No of Provinces	107	107	107	107	107	107
No of banks	446	466	432	432	448	448

Table 7. Balancing of bank characteristics

This table reports the average values of bank characteristics computed by quartile of bank exposure (Exp_BB_b) at the bank-firm level. Figures in parentheses are the normalized differences (the difference between the quartile average and the average of the other three quartiles, normalized by the square root of the sum of the corresponding variances, see Imbens and Wooldridge 2009). The last column shows the overall average for the sample.

	1st quartile	**2nd quartile**	**3rd quartile**	**4th quartile**	**Overall average**
Assets (€ mil)	94979	376384	379505	266418	377944
	(-0.56)	(-0.01)	(0.01)	(-0.21)	
Bonds/ass	24.29	23.61	25.98	23.19	24.34
	(0.00)	(-0.05)	(0.14)	(-0.10)	
Equity/ass	8.26	7.34	7.97	8.87	7.90
	(0.07)	(-0.32)	(-0.05)	(0.31)	
NPL/ass	6.63	4.21	4.57	3.70	4.85
	(0.77)	(-0.25)	(-0.08)	(-0.41)	
Interbank/ass	4.49	9.42	10.40	5.36	7.96
	(-0.26)	(0.21)	(0.42)	(-0.19)	

Table 8. Bank Credit: Credit Lines and Term Loans

This table provides the estimates for the effects of the exposure to the reform on credit lines and term loans, broken down by maturity (equation (3)). The dependent variable in each column is the log-change in the time averaged amount of credit granted from bank *b* to firm *f* twelve months before the announcement of the reform (September 2010 to September 2011) and the twelve months after the reform came in effect (January 2012 to December 2012) by type of credit. Exp_BB_b is the bank exposure to the reform. All bank controls are dated as of December 2009. We include bank-size fixed-effects as dummies for each quartile of bank total assets. Standard errors are two-way clustered at the bank and firm level. t-statistics are reported in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Total Credit	Credit Lines	All Term	Term<5Y	Term>5Y	Term>5Y /Total	Term>5Y /Term
Exp_BB_b	0.408	0.616**	-0.836	-1.451	1.926***	0.331***	0.581***
	(1.30)	(2.58)	(-1.22)	(-1.45)	(3.07)	(3.53)	(3.11)
Fixed Effects							
Firm	Y	Y	Y	Y	Y	Y	Y
Bank-size	Y	Y	Y	Y	Y	Y	Y
Observations	315774	222073	315774	181906	116040	315774	315774
No of firms	107670	77194	107670	62742	46246	107670	107670
No of banks	489	472	489	458	477	489	489

Table 9. Bank Credit: 3 year LTRO and Placebo test

This table provides robustness test for the estimates of equation (3). In particular, the post-reform placebo period is January 2010 - December 2010 and the pre-reform period is January 2009 – December 2009. In Panel A we replicate the analysis in Table 8 including a control for the 3-year LTRO funding uptake at bank level. Exp_BB_b is the bank exposure to the reform. In Panel B we re-estimate equation (3) in a placebo period, where the post-reform placebo period is January 2010 - December 2010 and the pre-reform period is January 2009 – December 2009. All bank controls are dated as of December 2009. We include bank-size fixed-effects as dummies for each quartile of bank total assets. Standard errors are two-way clustered at the bank and firm level. t-statistics are reported in parentheses.

Panel A. Including 3-year LTRO funding

	(1) Total Credit	(2) Credit Lines	(3) All Term	(4) Term<5Y	(5) Term>5Y	(6) Term>5Y /Total	(7) Term>5Y /Term
Exp_BB_b	0.406	0.601***	-0.859	-1.525	1.847***	0.348***	0.631***
	(1.27)	(2.65)	(-1.28)	(-1.57)	(2.90)	(3.92)	(3.73)
Observations	315774	222073	315774	181906	116040	315774	315774
No of firms	107670	77194	107670	62742	46246	107670	107670
No of banks	489	472	489	458	477	489	489

Panel B. Placebo 2010-2009

Exp_BB_b	-0.080	-0.220	-0.424	-0.300	-0.392	0.096*	0.139
	(-0.51)	(-0.87)	(-1.46)	(-0.98)	(-1.43)	(1.70)	(1.07)
Fixed Effects							
Firm	Y	Y	Y	Y	Y	Y	Y
Bank-size	Y	Y	Y	Y	Y	Y	Y
Observations	315774	222073	315774	181906	116040	315774	315774
No of firms	107670	77194	107670	62742	46246	107670	107670
No of banks	489	472	489	458	477	489	489

Table 10. Bank Credit Lines

This table provides the analysis of credit lines. $Equity/Assets_b$ and $Tier1/RWA_b$ are the de-meaned bank leverage and regulatory capital ratio as of 2009. Exp_BB_b is the bank exposure to the reform. All bank controls are dated as of December 2009. We include bank-size fixed-effects as dummies for each quartile of bank total assets. Standard errors are two-way clustered at the bank and firm level. t-statistics are reported in parentheses.

	(1)	(2)
	Credit Lines	Credit Lines
Exp_BB_b	0.856***	0.657***
	(3.30)	(3.08)
$Exp\_BB_b \times Equity/Assets_b$	-0.280***	
	(-3.13)	
$Exp\_BB_b \times Tier1/RWA_b$		-0.150***
		(-2.59)
Observations	222073	222073
No of firms	77194	77194
No of banks	472	472

Table 11. Bank Credit: Firm Risk

This table provides the estimates for the effects of the exposure to the reform on credit lines and term loans, broken down by maturity (equation (3)) by firm risk. $Risky_f$ is a dummy equal to one for firms with Z-score equal to or above 7. Exp_BB_b is the bank exposure to the reform. All bank controls are dated as of December 2009. We include bank-size fixed-effects as dummies for each quartile of bank total assets. Standard errors are two-way clustered at the bank and firm level. t-statistics are reported in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Total Credit	Credit Lines	All Term	Term<5Y	Term>5Y	Term>5Y/ Total	Term>5Y/ Term
Exp_BB_b	0.544*	0.666***	-0.555	-1.169	2.023***	0.338***	0.618***
	(1.70)	(2.84)	(-0.84)	(-1.24)	(3.05)	(4.10)	(3.73)
$Exp\_BB_b \times Risky_f$	-0.919***	-0.490**	-2.028***	-2.761***	-1.048*	0.068	0.093
	(-3.11)	(-2.26)	(-4.91)	(-4.20)	(-1.84)	(0.68)	(0.77)
$Exp\_BB_b + Exp\_BB_b \times Risky_f$	-0.375	0.175	-2.583***	-3.929***	0.975	0.406***	0.711***
	(-0.90)	(0.66)	(-3.32)	(-3.14)	(1.37)	(2.69)	(3.22)
Fixed Effects							
Firm	Y	Y	Y	Y	Y	Y	Y
Bank-size	Y	Y	Y	Y	Y	Y	Y
Observations	315774	222073	315774	181906	116040	315774	315774
No of firms	107670	77194	107670	62742	46246	107670	107670
No of banks	489	472	489	458	477	489	489

Table 12. Bank Term Loans

This table provides the analysis of term loans. $Equity/Assets_b$, $Tier1/RWA_b$ and $NPL/Assets_b$ are the de-meaned bank leverage, regulatory capital ratio and non-performing loans over total assets as of 2009. $D250K_b$ is a dummy equal to one if the bank experiences an above the median increase in deposits above $250,000 between 2012 and 2011. Exp_BB_b is the bank exposure to the reform. All bank controls are dated as of December 2009. We include bank-size fixed-effects as dummies for each quartile of bank total assets. Standard errors are two-way clustered at the bank and firm level. t-statistics are reported in parentheses.

Panel A. Bank leverage ratio

	(1)	(2)	(3)
	All firms	High Risk $Risky_f = 1$	Low Risk $Risky_f = 0$
Exp_BB_b	-1.627**	-2.945***	-1.383*
	(-2.28)	(-3.96)	(-1.91)
$Exp\_BB_b \times Equity/Assets_b$	0.881***	0.835***	0.894***
	(4.79)	(3.36)	(4.91)

Panel B. Bank regulatory ratio

Exp_BB_b	-0.985	-2.277***	-0.750
	(-1.28)	(-3.07)	(-0.95)
$Exp\_BB_b \times Tier1/RWA_b$	0.329***	0.325**	0.334***
	(2.60)	(2.08)	(2.62)

Panel C. Non-performing loans over asset ratio

Exp_BB_b	-0.668	-1.878***	-0.443
	(-1.16)	(-3.27)	(-0.74)
$Exp\_BB_b \times NPL/Assets_b$	-0.855***	-0.990***	-0.819***
	(-3.40)	(-3.37)	(-3.21)

Panel D. Uninsured depositors

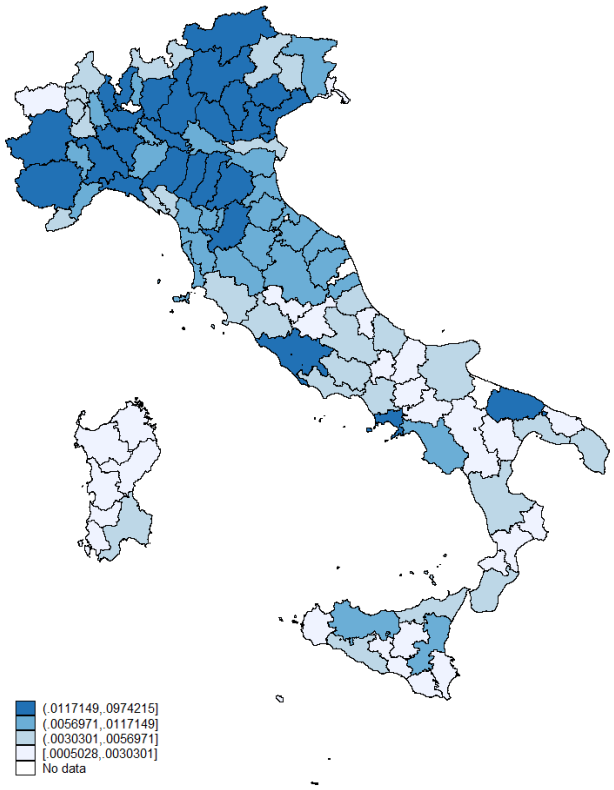
Exp_BB_b	1.149*	-0.002	1.355**
	(1.87)	(-0.00)	(2.22)
$Exp\_BB_b \times D250K_b$	-4.071***	-3.683***	-4.105***
	(-3.67)	(-2.59)	(-3.77)
Observations	315774	48958	266816
No of firms	107670	17764	89906
No of banks	489	454	487

APPENDIX

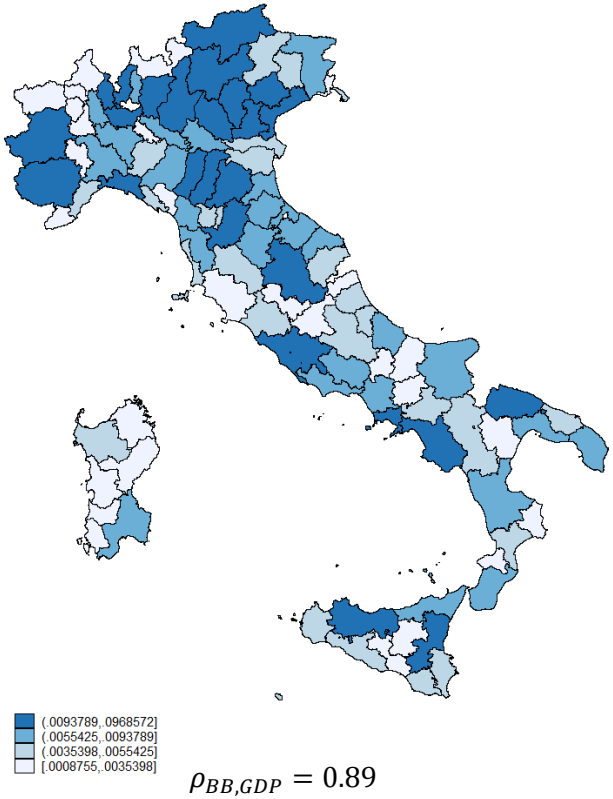
Figure A1: Bank bonds, GDP, and population by province

This figure shows three maps of Italy broken down by province. Figure A reports the share of bank bonds held by households in each province over total bank bonds held by Italian households across all provinces in December 2009. Figure B reports the share of GDP of each province over national GDP in December 2009. Figure C reports the population of each province as of 2012 (thousand head). Coefficient of correlations between the share of bank bonds and GDP or population are reported at the bottom of each figure.

A. $BB_{p,2009}$

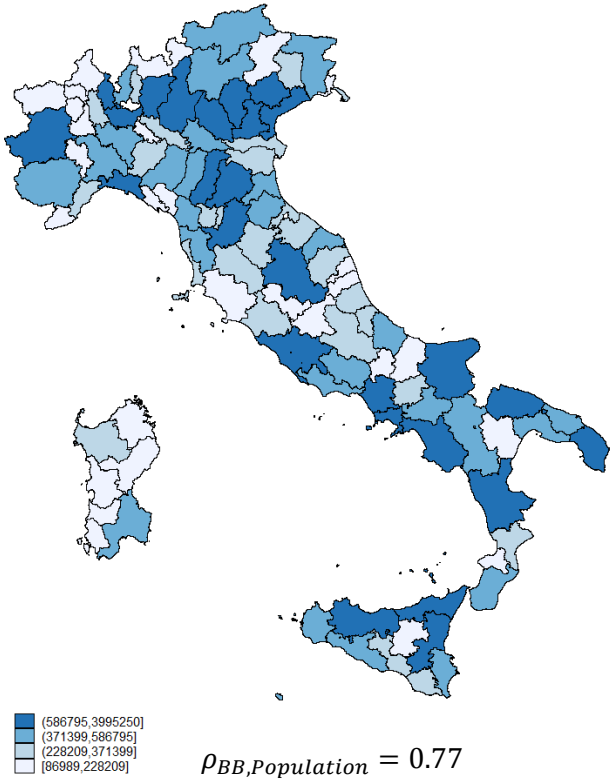


B. $GDP_{p,2009}$



$\rho_{BB,GDP} = 0.89$

C. $Population_{p,2012}$



$\rho_{BB,Population} = 0.77$

Table A1. Robustness: Constant sample and level effect

This table provides robustness checks for the baseline effect of the reform on bank deposits. The dependent variable is the average monthly growth rate of household deposits at bank *b* in province *p* in the pre- and post-reform period (± 12 months from the reform - see Table 4 for further details). Panel A reproduces the estimates in Table 4, but including only bank-province observations with positive amounts of term deposits as to have a common sample across the three sets of dependent variables. In Panel B we report corresponding specifications in levels. The dependent variable is the log of the average monthly amount of household (firm) deposits at bank *b* in province *p* in the pre- and post-reform period (± 12 months from the reform) in columns (1) - (3) (columns (4) – (6)). All estimations include Bank ×$Post_t$ and province fixed-effects. Standard errors are clustered at the province level. t-statistics are reported in parentheses.

Panel A. Common Sample

	Household Deposits					
	Δ log(Total)		Δ log(Demand)		Δ log(Term)	
	(1)	(2)	(3)	(4)	(5)	(6)
$BB_{p,2009} \times Post_t$	0.068	0.076**	-0.002	0.052	0.115***	0.262***
	(1.64)	(2.00)	(-0.04)	(0.98)	(4.15)	(6.91)
$Post_t$	0.011***		0.000		0.013***	
	(10.28)		(0.11)		(18.67)	
Fixed Effects						
Province	Y	Y	Y	Y	Y	Y
Bank-time	N	Y	N	Y	N	Y
Observations	19558	19558	19558	19558	19558	19558
No of provinces	107	107	107	107	107	107
No of banks	510	510	510	510	510	510

Panel B. Specifications in Levels

	Household Deposits			Firm Deposits (Placebo)		
	log(Total)	log(Demand)	log(Term)	log(Total)	log(Demand)	log(Term)
	(1)	(2)	(3)	(4)	(5)	(6)
$BB_{p,2009} \times Post_t$	1.636*	1.835*	3.492**	0.116	-0.493	1.800
	(1.75)	(1.71)	(2.18)	(0.12)	(-0.49)	(0.81)
Fixed Effects						
Province	Y	Y	Y	Y	Y	Y
Bank-time	Y	Y	Y	Y	Y	Y
Observations	30622	29722	20598	16315	6097	30622
Province clusters	107	107	107	107	107	107

Table A2. Robustness: Potential outliers and other province characteristics

This table provides robustness checks where we introduce additional province characteristics and exclude potential outliers. $BB_{p,2009}$ ($GDP_{p,2009}$) is the share of bank bonds held by household in province p (GDP of province p) over total bank bonds held by Italian households (total Italian GDP) in 2009. $Log(Population)_{p,2012}$ is the log of population in each Italian province as of 2012. We interact $GDP_{p,2009}$ and $Log(Population)_{p,2012}$ with the $Post_t$ in column (1); include Region × $Post_t$ fixed-effects (a region is a collection of provinces, there are 20 regions in Italy) in column (2); exclude the three largest provinces by bank bond holdings (Milan, Rome and Turin, with a combined share of 18.3% of total bank bonds in Italy) in column (3); exclude cooperative banks (around 400 banks) in column (4) and finally restricting the sample to provinces where banks have at least €500,000 (75th percentile) in deposits in column (5). Standard errors are clustered at the province level. t-statistics are reported in parentheses.

	Household Term Deposits				
	Province Charact. × Post	Region × Post	Excl. MI-RO-TO	Excl. Cooperative Banks	Dep >500K
	(1)	(2)	(3)	(4)	(5)
$BB_{p,2009} \times Post_t$	0.250***	0.250***	0.319**	0.412***	0.179***
	(3.67)	(7.17)	(2.58)	(3.82)	(3.08)
$GDP_{p,2009} \times Post_t$	-0.033				
	(-0.61)				
$Log(Population)_{p,2012} \times Post_t$	0.001				
	(1.14)				
Fixed Effects					
Province	Y	Y	Y	Y	Y
Bank-time	Y	Y	Y	Y	Y
Region-time	N	Y	Y	Y	Y
Observations	19509	19558	17757	10353	9013
No of Provinces	106	107	104	107	107
No of banks	508	508	506	130	426