Banks as Patient Lenders: Evidence from a Tax Reform

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Abstract

We test whether the composition of bank funding, and the share of deposit funding in particular, affects bank lending policies. For identification, we exploit a tax reform in Italy that created incentives for households to substitute bank bonds with deposits. Using geographically disaggregated data on deposits and securities from securities holdings statistics, we first show that the reform led to larger increases (decreases) in term deposits (bank bonds) in areas where households held more bank bonds prior to the reform. Relying on the comprehensive Italian Credit Register, we find that banks exposed to the reform did not change overall credit supply, but increase the maturity of loans to non-financial firms. Consistent with theories about depositor discipline and the role of the government safety net, we find that banks that experienced larger increases in large uninsured deposits extended less credit to riskier firms and did not increase loan maturity.

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

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1. Introduction

The financial crisis highlighted the importance of the composition of bank funding for financial stability and the transmission of financial shocks to the real economy. Banks with high reliance on uninsured funding, in particular interbank and wholesale funding, came under severe pressure and were unable to continue lending to the real economy (Iyer, Peydró, da-Rocha-Lopes and Schoar, 2014; Cingano, Manaresi and Sette, 2016).[1] As a consequence, recent post-crisis regulatory initiatives focus on the composition of banks' funding and a special role is attributed to retail deposits, as they are regarded a stable source of funding, particularly during crises periods, also owing to the safety net provided by deposit insurance.[2] These developments are going to modify banks' funding mix, increasing the weight of retail deposits relative to other funding sources. Understanding how a greater reliance on retail deposits may influence banks' lending policies, particularly in crises periods, is therefore essential.

Banks' funding structure is endogenous to their lending policies and the overall economic environment. This makes it very hard to obtain causal estimates on how a change in banks' funding sources may influence lending and bank risk-taking. Moreover, investors behind different funding sources are also typically different. It is thus 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 in Italy in September 2011 to study how changes in banks' funding mix within the same class of investors affected bank lending policies. The reform eliminated a tax disadvantage in the treatment of household deposits over other privately issued securities held by households, inducing a shock in the supply of deposits and bonds from households. The reform altered the bank retail funding mix significantly: within two years aggregate bond funding went down from 21% to 18% of bank assets, while retail deposits increased from 41% to 46% of bank assets. In terms of nominal amounts, the reshuffling from bonds to deposits following the reform amounts to about €100 billion (Figure 1A). This shock allows us to study how the reform affected banks' funding mix and trace its impact on banks' credit supply and willingness to grant longer maturity loans or lend to riskier firms.

[1] Many view the 2007-09 financial crisis as a run on wholesale funding (Afonso, Kovner and Schoar, 2011; Gorton and Metrick, 2012; Covitz, Liang and Suarez, 2013). Shocks to interbank liquidity may have negative real effects also in non-financial crisis times (Khawja and Mian 2008; Schnabl, 2012).

[2] One of the pillars of the Basel III is the net stable funding ratio, which requires banks to hold a certain fraction of their liabilities from "stable sources of funding", whose key component are retail deposits.

Economic theory and the existing empirical literature offer conflicting predictions as to how a shift from bond to deposit funding may affect banks' lending policies. Deposits and bonds are not perfect substitutes, even when investors behind them are the same (e.g., households). Deposits are a demandable, first-come first-serve, contract. Bonds are not: once issued, banks' funding is secured till maturity. The demandable nature of deposits exposes banks to liquidity risk and bank runs (Diamond and Dybvig, 1983) and serves as an incentive scheme to monitor and discipline banks (Calomiris and Kahn, 1991; Diamond and Rajan, 2001).[3] Greater reliance on deposits, as opposed to bonds, may thus limit bank risk-taking or incentivize banks to originate more short-term loans. Deposits, however, enjoy stronger (explicit and implicit) government guarantees than bonds. They may thus offer banks a cheaper, more stable, and less risk-sensitive funding source than bonds, which may increase banks' risk-taking incentives (Merton, 1977). If deposits are effectively stable and "sleepy", banks may instead act as "patient" investors holding illiquid, long-term loans (Hanson, Shleifer, Stein and Vishny, 2015). It is thus ex ante unclear how a shift from bond to deposit funding may impact banks' lending policies.

The Italian tax reform thus offers a unique opportunity to study how a greater reliance on deposits may influence banks' lending in periods of intense economic uncertainty. 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 Centralised 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-*

[3] The literature finds that riskier banks experience larger deposit withdrawals in crises periods (Gorton, 1988; Saunders and Wilson, 1996). The sensitivity of deposits to bank fundamentals acts as a form of depositor discipline that limits banks' *ex ante* risk taking (Flannery and Sorescu, 1996; Park and Peristiani, 1998; Billet, Garfinkel, and O'Neal, 1998; Martinez-Peria and Schmukler, 2001). However, there is considerable evidence that deposit withdrawals are also driven by panic, not just fundamentals (Calomiris and Mason, 1997 and Iyer and Puri, 2012).

level as banks use internal capital markets to move funds from one region to another.[4] 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 investment opportunities that may correlate with banks' exposure to the reform).

We find that the reform induced households to substitute banks bonds with deposits, changing banks' funding mix from bonds to deposits. 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. On average, our estimates indicate a pass-through of around 1 (i.e., €1 of bonds was converted into €1 of deposits). We find no significant changes in banks' total funding from deposits and bonds or other funding sources. Placebo tests on firms—whose tax treatment was not influenced by the reform— yield no significant treatment effects. This lends internal validity to our identification strategy as it suggests that our treatment estimates are unlikely to be biased by contemporaneous confounding factors.

Distinguishing among different types of deposits, reveals that increases in household deposits are confined to term deposits. We observe no significant increases on demand deposits, suggesting that households view term deposits as a closer substitute to bank bonds. 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. Interestingly, riskier banks (with lower capital and worse credit portfolios) were able to increase their term-deposits more. This indicates that, on the margin, the shift to cheaper subsidized deposit funding benefited riskier banks more.

Turning to the credit analysis, we find that the change in banks' funding mix following the reform did not change their overall credit supply, but it decreased their willingness to lend to riskier firms. Consistent with Calomiris and Kahn (1991)'s argument that the threat of deposit withdrawals disciplines banks, we find that the decrease in credit to riskier firms was driven by banks with large increases in large deposits that are at a higher "flight risk" as they are partially uninsured and households behind them are presumably better able or have stronger incentives to withdraw their funds when concerned about their safety. It is important to note that term deposits are demandable contracts: depositors can withdraw their funds prior to contractual maturity as

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

long as they give notice to the bank and/or pay a fee for early withdrawal.[5] In terms of magnitudes, our estimates indicate that, for a 1-standard deviation increase in bank exposure to the reform, the growth rate of credit to riskier firms is 5% lower.

On loan maturity, we find that a greater reliance on deposit funding increases banks willingness to provide long-term loans (loans with maturities longer than 5 years). This increase is driven exclusively by banks that did not experience large increases in large uninsured deposits. These banks increased both the supply and the maturity of their loans, suggesting that, consistent with the predictions in Hanson, Shleifer, Stein and Vishny (2015), that greater reliance on cheaper and stable deposit funding enables banks to act as "patient" lenders providing more illiquid, long-term loans to firms. In terms of magnitudes, our estimates indicate that, a 1-standard deviation increase in bank exposure leads to 0.7 percentage points increase in the share of long-term loans (i.e., 4% increase from the average share) and a 1.5 percentage point increase in the growth rate of credit (i.e., 15% increase compared to the average growth rate of credit).

A variety of empirical tests make us confident that the observed changes in banks' funding are due to the reform, and are not driven by alternative explanations, and, in particular, by a 'flight to quality' argument whereby households wary of the increased risk due to the sovereign debt crisis move their funds away from risky and potentially illiquid bank bonds into safer and liquid deposits.[6] As explained later, several pieces of evidence are inconsistent with this explanation.

Our findings complement and expand several strands of the extant literature. An extensive literature in banking tries to understand factors that influence deposit withdrawals during stress periods either because of panic or deterioration of bank fundamentals. Recent contributions with sharp micro-evidence for retail deposits include, for example, Iyer and Puri (2012), Iyer, Puri, and Ryan (2016) and Martin, Puri and Ufier (2018). Differently from these papers, we do not study the behavior of retail depositors towards bank risk or during bank run episodes, but rather the effects of a shock to the composition of bank liabilities on the composition of risk and maturity on the asset side. Our results indicate that the demandable nature of deposits can act as a disciplinary device on banks limiting credit to riskier firms, as long as the threat of deposit withdrawals is credible.

[5] Typically early withdrawal fees involve losing the promised interest rate. In some cases, a base rate (lower than the contractual rate) is still guaranteed.
[6] See, for example, Gatev and Strahan (2006) and Acharya and Mora (2015).

The paper also relates to recent studies in banking analyzing the transmission of positive deposit shocks from one local market to another through the bank's branching network (Gilje, Loutskina and Strahan, 2016; Bustos, Garber and Ponticelli, 2017). Differently from these papers, the shock we analyze does not involve the influx of new funds into banks, but rather the substitution of one funding source with another within the same class of investors. The paper also relates to work documenting the effects of negative liquidity shocks on bank lending and the associated real effects (e.g., Khawja and Mian 2008; Cornett, McNutt, Strahan and Tehranian, 2011; Schnabl, 2012; Iyer, Peydró, da-Rocha-Lopes and Schoar, 2014; Cingano, Manaresi and Sette 2016). The shocks analyzed in these papers typically involve institutional investors withdrawing wholesale deposits from affected banks. Our results indicate that small retail deposits represent a more stable funding source that facilitates the extension of long-term loans. On a broader level, our findings relate to papers studying the complementarity between lending and deposit taking (Diamond and Rajan, 2001; Kashyap, Rajan and Stein, 2002, Egan, Lewellen and Sunderam, 2018).[7]

Recent literature also indicates that deposits and their effective duration have first order implications on the transmission of monetary policy and bank 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, 2017). An important insight from these studies is that the effective duration of deposits is higher than their contractual maturity, indicating that banks' maturity mismatch may be smaller than previously thought. By a revealed preference argument, our results also contribute to this debate in so far as we find that banks with larger increases in stable deposits extend longer maturity loans.

Finally, our paper relates to an emerging 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.[8] Célérier, Kick and Ongena (2017) use similar changes in bank taxation 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

[7] Choudary 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.

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

reform we analyze induces a change in the composition of liabilities from bonds to deposits, not in capital ratios. An important common takeaway from our paper and these studies is that changes in taxation can prompt substantial changes in banks' funding structures and lending policies.

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. Section 6 offers concluding remarks.

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 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 consequence, Italian banks began selling bank bonds directly to households.[9]

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.[10] 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 government's tax revenues. It was politically feasible as it was perceived as a "tax on the rich" by increasing the tax rates on private

[9] See Ricotti and Sanelli (2008).
[10] 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 apply only to households and not firms.

sector securities that are typically held by richer households.[11] Several commentators in Italy, including trade union representatives, had long been voicing their concerns about the asymmetry in the tax treatment of securities, whose income was taxed at 12.5%, vis-à-vis labor, whose income is taxed between 20 and 45%.[12] 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 from the Bank of Italy, visualized in Figure 1A, indicate that between the end of 2011 and 2013, bonds and bank deposits to total assets changed by about the same amount.

(Insert Figure 1 about here)

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).

This is also reflected in their respective interest rates. In the year prior to the reform, the average annual gross 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 deposits of about 154 basis points, reflecting their higher credit and duration risk.[13] Because of their differential tax treatment prior the reform, the net difference was even larger at 168 basis

[11] 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).

[12] 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).

[13] Deposits enjoy higher explicit and implicit government guarantees than bonds and bonds have typically longer durations. The average contractual maturity of bank bonds held by households is around 4 years. Instead, 90% of term deposits have contractual maturity of 1 year or less.

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, before the reform, €100,000 would yield about €1,684 more if invested in bank bonds as opposed to term deposits. After the reform, this difference shrunk significantly to only €571.[14]

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 driven by a general 'flight to quality' due to the sovereign debt crisis. Several pieces of evidence are not consistent with this interpretation. First, 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). Second, it is interesting to observe that the 1996 reform, which increased the relative taxation of bank deposits over bank bonds, led to *opposite* changes in bank funding sources. Figure 2B shows that in 1996, term deposits (CDs) represented 19% of bank funding, while bank bonds were about 15%. After the 1996 reform, term deposits progressively disappeared and were replaced by bank bonds, half of which were held by Italian households.[15] By 2000, term deposits decreased to 4% of total assets and bonds increased to 23%. This explains the high reliance of Italian banks on retail bond funding and indicates that changes in taxation can induce large swings in banks' funding sources.

(Insert Figure 2 about here)

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.[16] 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 preexisting geographical heterogeneity in bank presence and household portfolios.

[14] Fixing interest rates on bonds and deposits in 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%).
[15] See also Ricotti and Sanelli (2008) and Coletta and Santioni (2016).
[16] The most noteworthy intervention is the announcement of 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. This type of intervention is shown to stimulate lending from Italian banks (Carpinelli and Crosignani, 2017).

3. Data and summary statistics

The empirical analysis relies on three 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 deposits), and province of residence. Data coverage is complete and is available for about 550 banks (banking groups) across 110 provinces.[17] 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. In the absence of multiple accounts per depositor per bank, accounts in the first size category are fully insured, while accounts in the second and third categories are only partially insured. If depositors hold multiple accounts within the same bank, accounts below the insurance limit may be partially or completely uninsured.

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 data are at the security level (ISIN) and are obtained directly from the banks that manage securities on behalf of clients (acting as "custodians"). We use the SHS to track the volume of bonds issued by Italian banks and held by households at the bank-province level and to construct a measure of banks' exposure based on their geographical presence and households' holdings of bank bonds prior to the reform. SHS

[17] 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.

records security holdings at their market values. To obtain changes households' bond holdings net of any market valuation effects, we divide each security at the ISIN level with its market price, obtained at the quarterly frequency from the 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 of over €30,000 with a single intermediary.[18] The registry allows to track the amount of credit granted or disbursed (drawn) to each borrower from each institution by loan type (credit lines and term loans) and maturity class (less than 1 year, between 1 year and 5 years, and longer than 5 years). For identification purposes, our sample includes firms that have loans granted (drawn or not) from at least two banks. This yields a sample of around 340,000 bank-firm relationships to about 102,000 firms. Multiple lending is a structural characteristic of bank-firm relationships in Italy (Detragiache, Garella and 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. Accounting bank-level information (bank size, capital levels, funding source, and nonperforming loans) is obtained from accounting statements submitted by individual banks and banking groups to the Bank of Italy for supervision. Information on borrowing firms in the CR is obtained from accounting statements deposited at Cerved (the firm registry).[19] Data on other province characteristics such as population and GDP as of 2012 are obtained from Census data by the National Statistical Office (ISTAT).

Our sample covers the period between December 2009 and December 2013 (i.e., 2 years before to 2 years after the reform). Panel A of Table 2 provides an overview of key bank characteristics at the beginning of the sample period. Household deposits are banks' single largest funding source, followed by bank bonds, equity and interbank funding. Household deposits are on average about 32.4% of total assets (by way of comparison, deposits of non-financial firms are only about 5.9% of total assets). The share of retail deposits is considerably smaller than in the US, where on average banks fund more than 60% of their assets with core deposits (Cornett,

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

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.[20]

There are about 23,000 bank bonds held by retail investors as of December 2009. These securities have an average contractual maturity of about 4.3 years and 90% of all outstanding securities have a contractual maturity between 2 and 7 years. By contrast, 90% of term deposits have a contractual maturity up to one year. 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. Equity is on average 11.8% of total assets and interbank deposits are about 4% of total assets. There is, however, significant variation across banks in terms of funding sources. There is also significant variation with respect to bank size. The average value of total assets is €6.8 billion, ranging between €5 million to €1.26 trillion.

(Insert Table 2 about here)

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. Identification strategy and results: bank deposits and bonds

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 follow a similar approach for bonds. 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 estimate the following differences-in-differences specification:

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

[20] See Coletta and Santioni (2016).

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).[21] $\Delta \log(Dep)_{b,p,t}$ 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 quarter the last quarter of 2011, when the reform was approved, but not yet in effect.[22] $BB_{p,2009}$ 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 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. To analyze how the impact of the reform may have varied over time, we also estimate corresponding specifications with higher frequency data where $Post_t$ is replaced with quarterly dummy variables. α_p and $\alpha_{b,t}$ denote province and bank-time fixed effects, respectively. $\varepsilon_{b,p,t}$ denotes the idiosyncratic error-term, assumed to be i.i.d.

The inclusion of bank-time fixed effects absorbs economy-wide and bank-level shocks that may influence banks' average deposits growth during the event window. The coefficient of interest is β. All else equal, we expect that the reform led to a larger positive shock on the supply of deposits in provinces where prior to the reform households held larger volumes of bank bonds. We thus expect that $\beta > 0$.

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 (see Figure A1 in the Appendix). The inclusion of province fixed-effects, α_p, is thus important as it absorbs 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). Given our narrow event window, such characteristics can be considered time-invariant.

We use similar specifications to Eqn. (1) to evaluate the impact of the reform on bank bonds and the bank's debt financing mix between deposits and bonds 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

[21] 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.

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

else equal, we expect that the reform led to a larger negative shock to the supply of bonds and thus a large increase in banks' reliance on deposit-to-bond funding in provinces where households held larger volumes of bank bonds before the reform.

As it can be observed in Panel B of Table 2, there is significant variation in the sample in the growth rates of both deposits and bonds across banks and provinces. For example, the average growth rate of term deposits of households ranges from -19.5% 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 between -28.3% and 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 0.02% 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 as to whether this assumption is likely to hold. Figure 3 reports the average deposit volumes in provinces with above and below median $BB_{p,2009}$ values, respectively. We report separate graphs for total, demand, and term deposits. The red vertical line indicates the reform's approval date (September 2011). Figure 3B confirms with confidence that, at least for term deposits, the parallel trends assumption is satisfied in this case. Before 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 of Figure 3, we find that prior to the reform there is no statistically significant difference in the growth rate of term deposits between the two. Differences in the average growth rates of total and demand deposits prior to the reform between high and low bond provinces 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 positive 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 deposits

Table 4 reports our baseline findings from the estimation of 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 increases 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 0.25% (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 1.2%.[23]

To evaluate the internal validity of our identification strategy, we estimate similar specifications for non-financial firms, whose tax rates were not affected by the reform. We find no significant treatment effects. The coefficients of the interaction terms between $BB_{p,2009}$ and

[23] The number of observations varies across total, demand and term deposits because not all banks offer term deposits in provinces they collect demand deposits. 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 1.8% (3%).

$Post_t$ 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 better 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.[24] 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). This result lends further support to our identifications strategy as it suggests that the province variation we exploit is related to a substitution of bonds to deposits rather than to province-specific confounding factors that may happen to correlate with changes in household 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

[24] In additional tests we estimate corresponding specifications of Eqn. (1) using the full bank-province panel at a monthly frequency (i.e., without collapsing and averaging the data for the period before and after the reform). The $Post_t$ dummy is replaced with quarterly dummy variables whose coefficients allow us to estimate the impact of the reform in each quarter, relative to a baseline period (the first quarter of the event window, from January 2010 to March 2010). Appendix Figure A3 reports the estimated coefficients and associated 95% confidence intervals and reveals that it took a little longer than one year for the impact of the reform to die-off.

[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.

increase term deposits more. This is intuitive insofar as these banks had to make up for larger negative shocks in bond financing, following the more unfavorable taxation of bonds going forward. In particular, 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 rate of term deposits, 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. We find no significant heterogeneity in the size of the treatment effect with respect to interbank funding. With respect to risk we find that riskier banks (banks with higher non-performing loans to total assets and lower equity to total assets ratios) experienced larger increases in term deposits. This suggests that riskier banks benefited more from the reform.

It is worth noting, that overall results so far are inconsistent with a 'flight to quality' phenomenon. Several pieces of evidence are at odds with this alternative explanation. First, as shown in Figure 2A, the observed reshuffling of banks' funding mix is not observed in other European countries whose banking systems were also under severe pressure over the same period. Second, as visible in Figure 1B, term deposits increase sharply only right after the reform, while they are completely flat before, despite significant increases in bank risk after the first Greek bailout. Third, the increase in deposits is confined to term deposits. We find no significant increases in demand deposits that will be more consistent with a flight to quality explanation. Perhaps more importantly, the estimated treatment effect on term deposits does not differ between senior or junior (subordinated) bonds. 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.[26]

4.5. Results on bank bonds and bank funding mix between deposits and bonds

In Table 6 we evaluate the impact of the reform on bank bonds and banks' financing mix between deposits and bonds. 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). In terms of economic significance 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 of bonds, these estimates, combined with those

[26] At the aggregate level, the share of deposit accounts above the insurance limit increases after 2012, which is again inconsistent with a flight to quality explanation (see Appendix Figure A2). A flight to quality would be more consistent with a larger increase in accounts below the insurance limit as the crisis intensifies to take advantage of the explicit limited guarantee on deposits (see also Iyer, Jensen, Johannsen, and Sheridan, 2017).

from Table 4 for deposits, imply a pass-through of around 1 (i.e., a one euro decrease in bank bonds is associated with a 1 euro increase in term deposits).[27] In fact, if we add together total funding from term deposits and bonds, we find that in areas with more bank bonds total funding is not changing (column 3).

(Insert Table 6 about here)

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). Turning to the bank's financing mix between deposits and bonds, we find that, consistent with the increase in deposits and the decrease in bonds, the share of total and term deposits over bonds is also increasing more in the high bond areas (columns 5-8).[28]

5. Identification strategy and results: bank lending

5.1. Identification strategy

In the second part of the analysis, we trace the impact of the reform on banks' credit availability, loan maturity, and willingness to lend to riskier borrowers. 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 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*

[27] 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.

[28] Corresponding specifications with higher frequency data reveal that the impact of the reform on the bank's financing mix dies-off at around one year after the reform (see Appendix Figure A3).

demand (e.g., due to changes firms' investment opportunities that may correlate with banks' exposure to the reform). 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.

We hypothesize that banks with geographical presence in rich bond areas experience 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 that this is indeed the case. As can be observed in Figure 4A, right after the reform, banks with above median values of $Exp\_BB_{b,2009}$ experienced larger increases in their term deposits than banks with below median values, whereas they both have parallel trends before the reform.

(Insert Figure 4 about here)

It is also important to rule out the possibility that more exposed banks, which increase deposits more in the post-reform period, have different evolution in other sources of funding, such as central bank or equity funding. Figure 5 shows that dependence on central bank funding, which markedly increases for all banks in 2012 after the 3-year LTRO, is not different between banks with high and low $Exp\_BB_{b,2009}$ values. The same holds for bank equity: while capital ratios are declining in the crisis period, they do so at the same rate between high and low exposed banks.

(Insert Figure 5 about here)

Table 7 reports the balancing of bank characteristics.[29] Banks in the lowest quartile of exposure are smaller, resort less to interbank funding, and have more NPLs as of December 2009. Differences across banks are overall limited (for example, they have similar dependence on bond funding and the difference in NPLs and capitalization is small), and are related to bank size (bigger banks have more interbank funding and less NPLs). In our empirical specifications, we include a full set of bank controls to address concerns about the confounding effect of bank characteristics.

[29] The difference across quartiles of bank exposure are measured using the normalized difference, as proposed by Imbens and Wooldridge (2009). As a rule of thumb, values between -0.25 and +0.25 should not raise concerns about unbalancing.

(Insert Table 7 about here)

We use $Exp\_BB_{b,2009}$ to study how the reshuffling in banks' funding mix induced by the reform affected banks' credit availability with the following diff-in-diff specification:

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

where $\Delta\log(Credit)_{b,f}$ denotes the growth rate in total credit of bank b to firm f before and after the reform.[30] $Controls_{b,2009}$ is a vector of bank characteristics that may influence banks' lending policies. It includes bond, equity as well as interbank financing to total assets and a set of dummies for each quintile of bank assets (bank-size fixed effects), 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 whose funding was differentially affected by the reform.

To evaluate the impact of the reform on loan maturity we replace the dependent variable in Eqn. (3) with $\Delta(Maturity > 5Y)_{b,f}$— a variable that measures the change in the banks' share of longer maturity loans (greater than 5 years) to the firm as fraction of the bank's total credit to the firm.[31] To evaluate how increases in the share of deposit funding influenced banks' willingness to lend to riskier firms we also estimate these specifications separately for high- and low-risk firms. We use Altman's z-score as our baseline measure of firm risk. Firms with a z-score score greater than 7 are classified as high-risk firms.[32]

To explore the role of deposit stability and deposit insurance, we introduce interactions between $Exp\_BB_{b,2009}$ and $\Delta Share250K_b$— a dummy variable that equals one if a bank experienced an above median increase in the share of deposits above €250,000. The idea is that deposits above €250,000 are less "sleepy" as they are largely uninsured and households behind them may be better able or have stronger incentives to monitor their banks and withdraw when

[30] 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.

[31] In additional robustness checks, we also consider the share of 5 year loans as a fraction of total term loans to the firm, excluding credit lines whose maturity is hard to define. Contractual maturity for credit lines is zero, but effective duration may be higher depending on when the borrower draws on the credit line.

[32] See, for example, Rodano, Serrano-Velarde and Tarantino (2017). We also estimate similar specifications using alternative indicators of firm risk such as leverage, profitability, and coverage ratio.

concerned about the safety of their funds.[33] The median increase in the share of deposits above €250,000 in the post-reform period is 4 percentage points, which is about 12.5 percent of the 32% average share deposits above €250,000 prior to the reform. Most banks experience increases in their share of deposits above €250,000. Large banks with larger presence in metropolitan areas where households held more bank bonds, experienced larger increases in their shares of large deposits above €250,000 (see Figure 4B).

Panel C of Table 2 reports summary statistics of the variables used in the credit analysis.

5.2. Results: credit availability, loan maturity, and risk-taking

Table 8 reports our findings with respect to credit availability and loan maturity. We first report results for all firms and then for low- and high-risk firms separately.

(Insert Table 8 about here)

We find that the change in banks' funding mix following the reform did not change their overall supply of credit (column 1 Panel A)[34], but it increases banks' willingness to provide long-term loans, i.e., with maturities longer than 5 years (column 1, Panel B). When distinguishing between low- and high-risk firms, we observe that while the amount granted to low-risk firms did not change, the amount granted to high-risk firms decreased significantly (columns 2 and 3, Panel A). (The decrease in the amount granted to riskier firms is not evident when looking at all firms because riskier firms are only 15% percent of all bank-firm relationships.) The share of long-term loans, instead, increased similarly for both low- and high-risk firms.

In terms of economic significance, our estimates indicate that a 1-standard deviation increase in $Exp\_BB_{b,2009}$ (i.e., by 1.3 percentage points) leads to a 0.87 percentage points decrease in the growth rate of credit to high-risk firms and a 0.22 percentage points increase in the share of long-term loans to all firms. Relative to their respective means, these estimates point to a 5% additional decrease in credit to high-risk firms and a 1.2% increase in the share of long-term loans

[33] 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, engaged in a business or professional occupations, are more financially literate, or hold more assets are more likely to withdraw their deposits when concerned with their safety. Ideally, we would like to observe data on deposits below €100,000 to better capture deposits that are fully insured. Unfortunately, this information is not available in our data.

[34] This is contrast to results in Gilje, Loutskina and Strahan (2016), for example, reflecting the different nature of the shock. Their shock involves an increase in retail deposits shares due to an influx of additional funding, while ours involves the substitution of retail bonds with deposits without changes in total funding.

to all firms. These are sizable effects, considering that our sample period is characterized by marked decreases in credit availability both long-term and short-term.[35]

A threat to the internal validity of our approach arises if banks more exposed to the reform have different lending attitudes towards riskier firms and long-term loans. If that were the case we should observe similar patterns even before the reform. To investigate this possibility, we re-estimate Eqn. (3) prior to the reform by comparing 2010 with 2009 lending outcomes. We find no significant treatment effects. The coefficient estimates are not only statistically insignificant, but also much smaller than in Table 8 and near zero for maturity. Overall, these results indicate that our exposure measure is unlikely to be capturing systematic differences in banks' lending policies unrelated to the reform. We report the results of these placebo tests in Table 9.

(Insert Table 9 about here)

In Table 10 we further test how banks' lending policies changed depending on whether the reform let to a significant increase in their shares of large uninsured deposits. We do so by including interactions between $Exp\_BB_{b,2009}$ and $\Delta Share250K_b$— a dummy variable that equals one if a bank experienced an above median increase in their shares of deposits above €250,000. All else equal, we expect that deposits above €250,000 can exert stronger discipline on banks as any amount above €100,000 is uninsured and households behind larger deposits are presumably more responsive to concerns about the safety of their funds.

(Insert Table 10 about here)

We find that banks without large increases in accounts above €250,000 increase both their loan supply and the maturity of their loans, suggesting that greater reliance on more stable and cheaper deposit funding enabled these banks to increase both the availability and the maturity of their loans. Evaluated at the mean, our estimates point to a 15% increase in the amount granted and a 4% increase in the share of long-term loans for a 1-standard deviation increase in the exposure. By contrast, banks with large increases in large uninsured deposits above €250,000 did not change the availability or the maturity of their loans at all (column 1, Panel A and B). Distinguishing between low- and high-risk firms, reveals that the decrease in credit to high-risk firms observed earlier was entirely driven by banks that experienced large increases in large uninsured deposits that are at a higher flight risk. While these banks did not change their credit to

[35] During the event window, credit granted to all firms (riskier firms) decreased on average by 11% (18%). Prior to the reform, the share of long-term loans to low-risk (high-risk) firms is about 17% (22%) of their total loans.

low-risk firms (i.e., the sum of the coefficients on $Exp\_BB_b + Exp\_BB_b \times \Delta Share250K_b$ reported under column 2, Panel A is not significant), they decreased significantly their credit to high-risk firms by about 0.9 percentage points (column 3, Panel B).

Our findings are consistent with key predictions in Calomiris and Kahn (1991) and Hanson, Shleifer, Stein and Vishny (2015). In line with the former, we find that banks more exposed to the threat of runs, as represented by larger increases in large uninsured deposits, became more prudent in their lending policies, providing less credit to riskier firms. By contrast, and in line with the latter, banks experiencing increases in more insured stable deposit funding were able to grant more credit and invest more in illiquid long-term loans. Overall, our results indicate that the demandability of the deposit contract acts as a disciplinary device on banks, limiting credit to riskier firms as long as the threat of deposit withdrawals is credible. Instead, the ability of banks to act as "patient" investors providing illiquid, long-term loans to the real economy is due to the stability of deposits and draws on government safety net.

6. Conclusions

The post-crisis regulatory environment has been characterized by sweeping regulatory reforms of the banking system. Since the financial crisis of 2007–2009 revealed a new notion of "bank runs", banks have been required to improve the stability of their funding. Retail deposits, because the implicit and explicit government guarantees, are generally considered to be a stable source of funding for banks, particularly during crises. We test this notion formally by exploiting a tax reform that led to 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.

Even though deposits enjoy higher government guarantees than bonds, allowing banks to be "patient" and lend more in long-term, illiquid assets, they are also a demandable contract. The threat of runs may expose banks to higher liquidity risk, which in turn may act as disciplining device on banks, reducing incentives to extent loans to riskier firms.

We find evidence consistent with both channels. The higher threat of runs coming from large uninsured deposits is a key factors that allows to distinguish between these two channels. We find that as long as the threat of deposit withdrawals is credible, the demandability of the deposit contract acts as a disciplinary device on banks, limiting credit to riskier firms.

The ability of banks to act as "patient" lenders instead is contingent on the stability of deposits and draws on government safety net. Thus overall our results support the idea that

deposits can be a stable funding source, but also highlight that this stability depends crucially on the size of deposits and the credibility of the deposit insurance.

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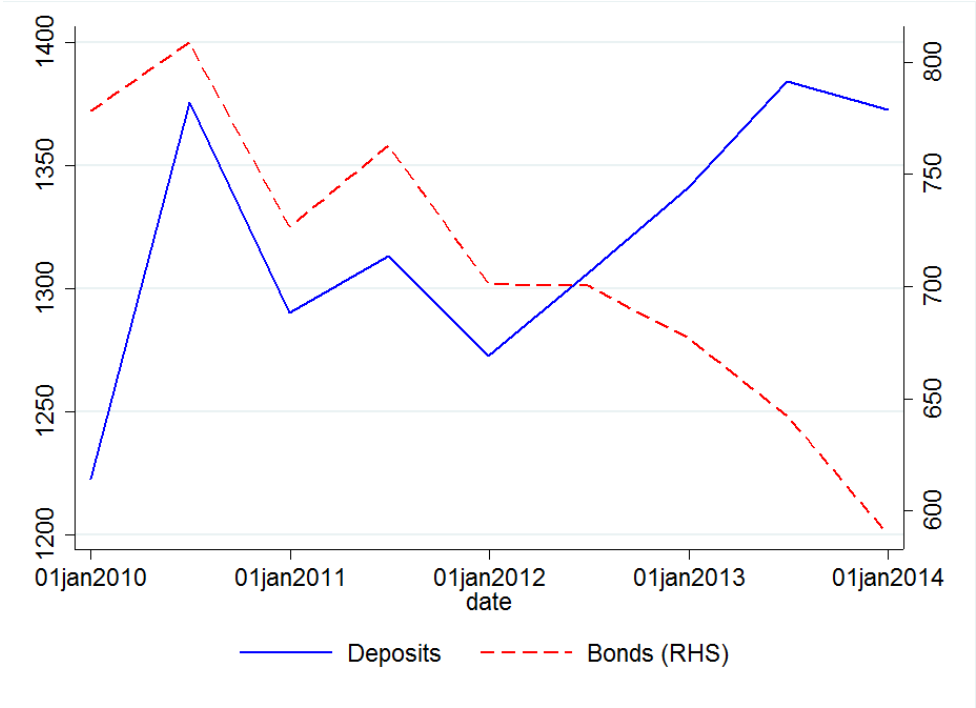
Schnabl, Philipp, 2012, "The International Transmission of Bank Liquidity Shocks: Evidence from an Emerging Market", *Journal of Finance*, 67(3): 897-932.

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

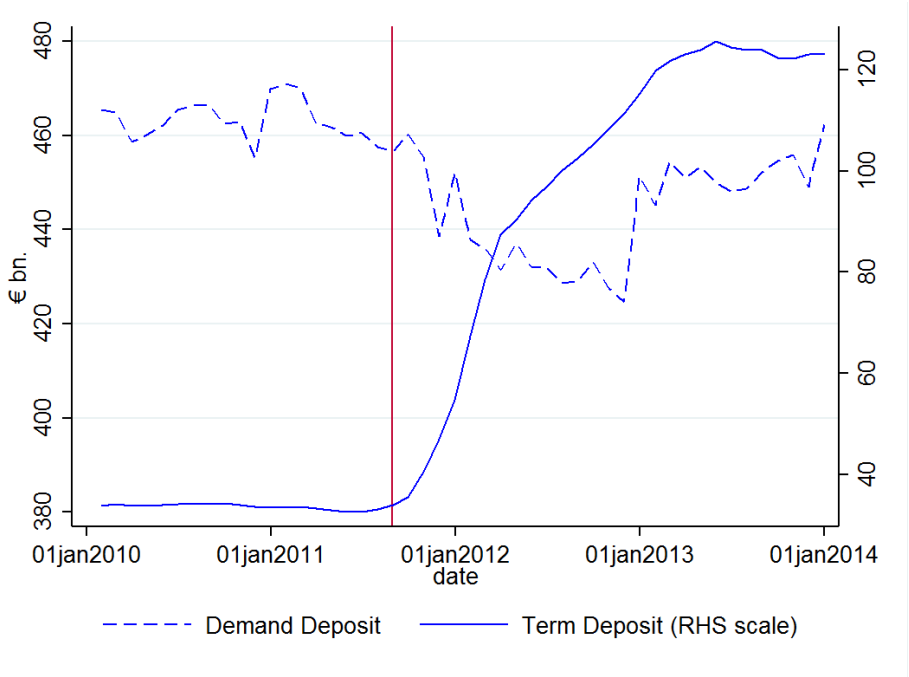
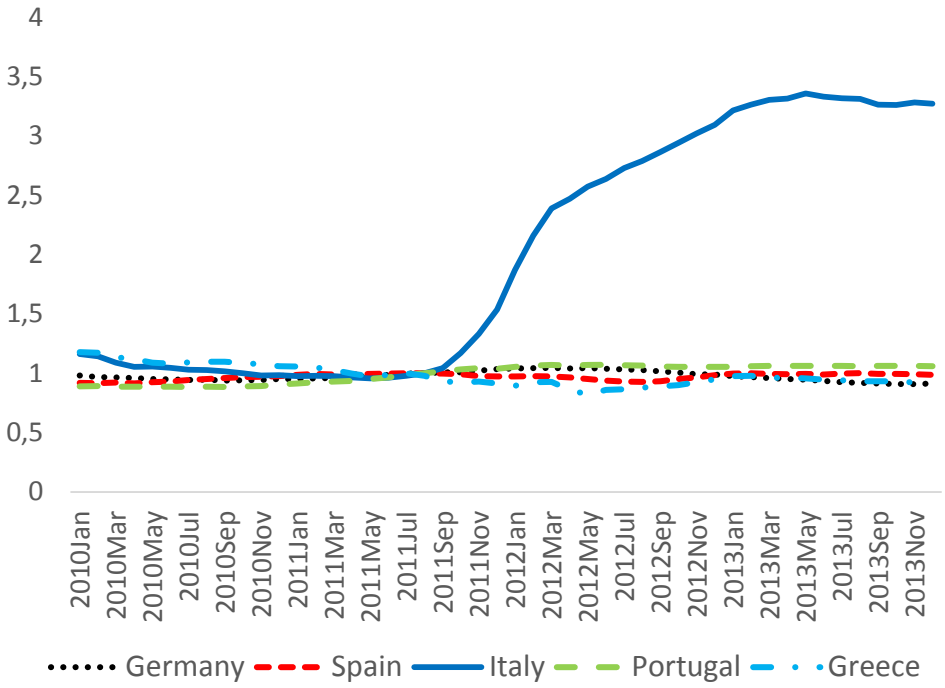


Figure 2. Term deposits in other countries and the 1996 tax reform

Figure 2A shows household term deposits using monthly data from January 2010 to December 2013 for several European countries: Germany (dotted), Spain (dashed), France (dash dot), Italy (solid), Portugal (long dash). 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

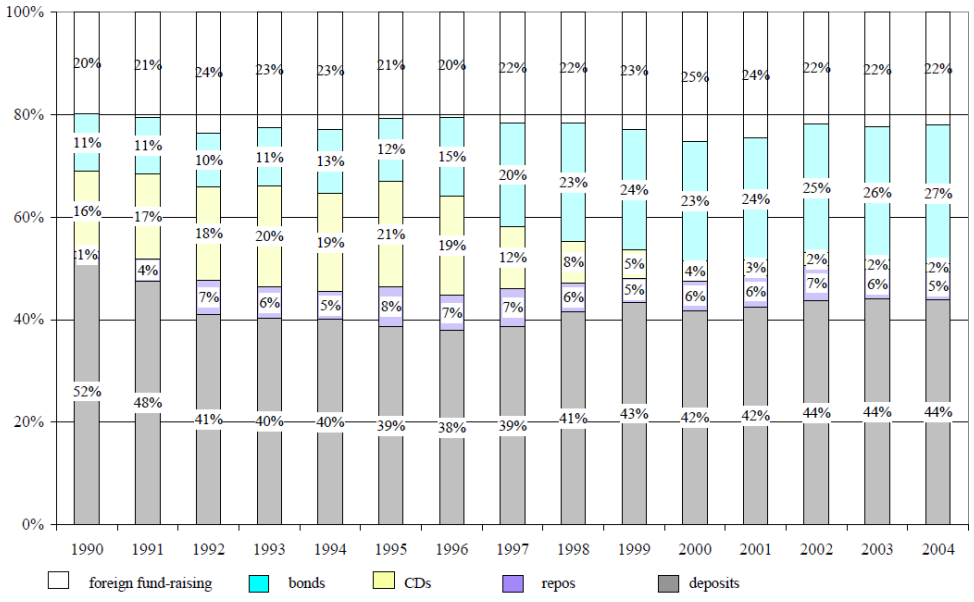
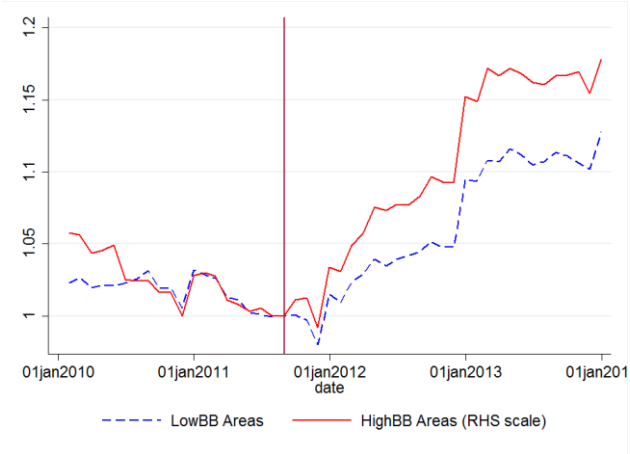


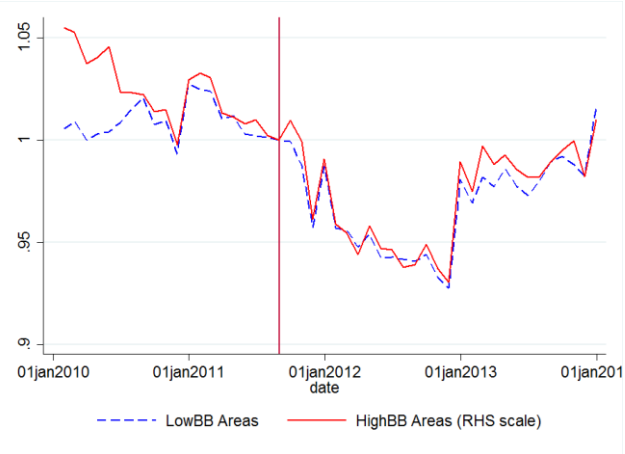
Figure 3: Household bank deposits by province

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 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

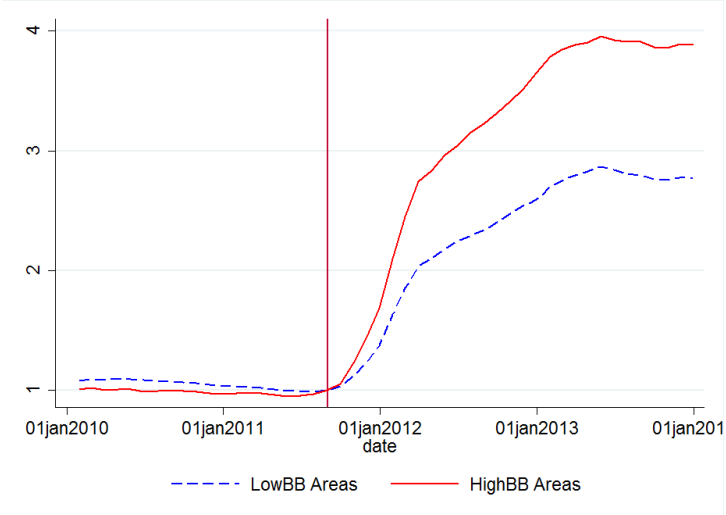
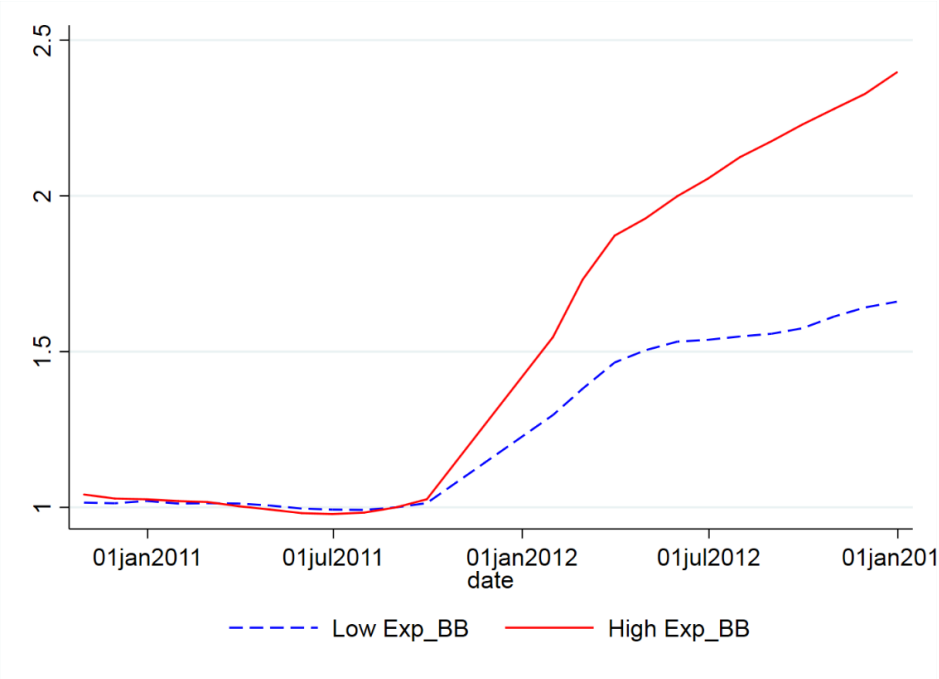


Figure 4. Term deposits by bank characteristics

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 ($\Delta Share250K_b = 1$, red solid line) and those below the median increase in large deposits ($\Delta Share250K_b = 0$, 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)



B. Large and small increase in large deposits ($\Delta Share250K_b$)

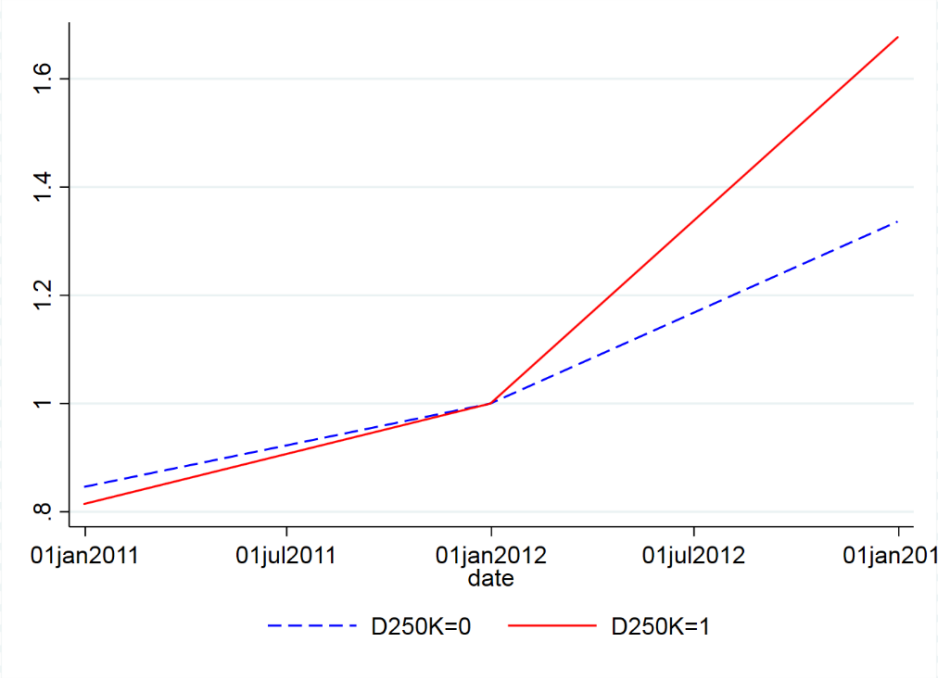
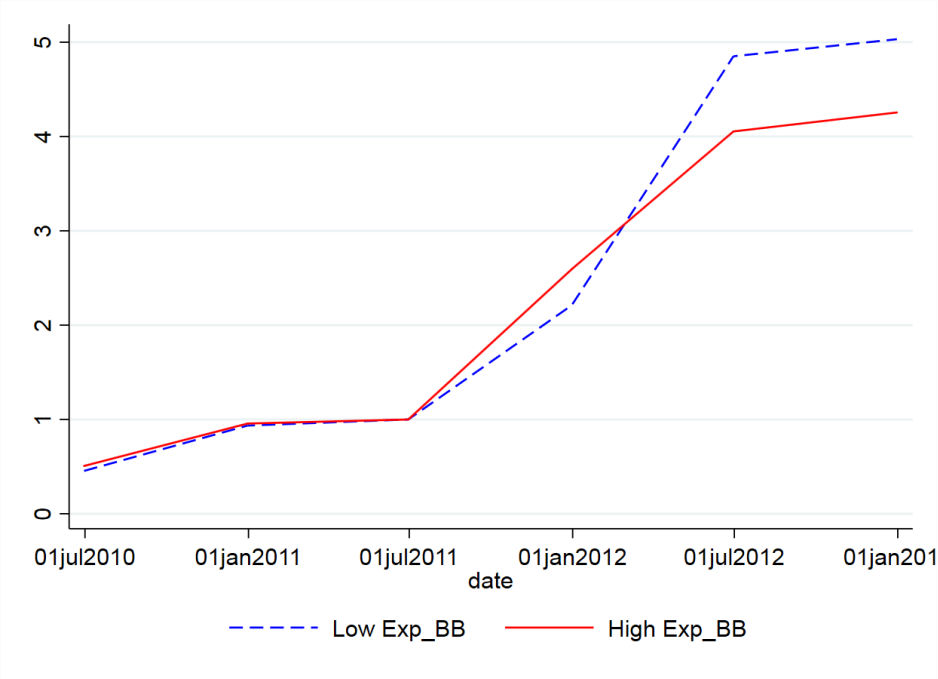


Figure 5. Bank funding by bank exposure

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

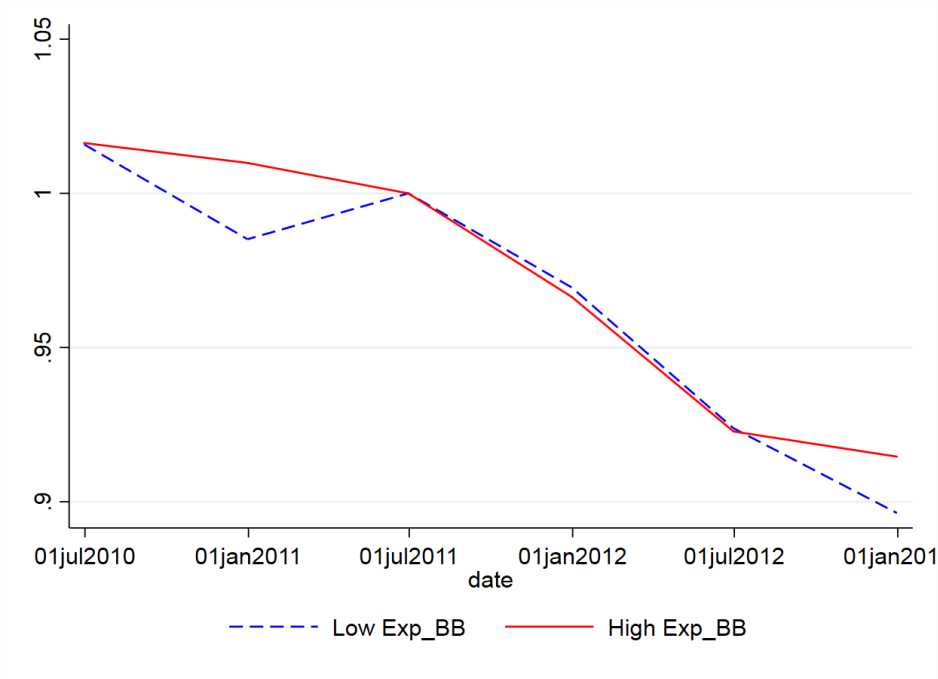


Table 1: Tax rate by asset class before and after the reform

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 in 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 level)	26836	1637.47	1026.84	1153	733	16619
B. Deposits and Bonds (bank-province level)						
Households						
$\Delta log(Total\ Dep)_{b,p,t}$	54880	-0.009	0.150	0.000	-1.083	1.058
$\Delta log(Demand\ Dep)_{b,p,t}$	49589	-0.018	0.174	-0.002	-1.195	1.157
$\Delta log(Term\ Dep)_{b,p,t}$	29734	0.018	0.047	0.000	-0.190	0.336
$\Delta log(Bonds)_{b,p,t}$	19284	-0.004	0.065	0.000	-0.283	0.287
$\Delta(Total\ Dep/(Total\ Dep + Bonds))_{b,p,t}$	19277	0.003	0.032	0.002	-0.141	0.152
$\Delta(Term\ Dep/(Term\ Dep + Bonds))_{b,p,t}$	14214	0.012	0.025	0.004	-0.050	0.103
Non-financial firms						
$\Delta log(Total\ Dep)_{b,p,t}$	24462	-0.028	0.196	-0.006	-1.083	1.058
$\Delta log(Demand\ Dep)_{b,p,t}$	24085	-0.033	0.211	-0.009	-1.195	1.157
$\Delta log(Term\ Dep)_{b,p,t}$	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
$Population_{p,2012}$ (thousand head)	106	544.3	583.2	377.5	86.9	3995.2
$Log(Population_{p,2012})$	106	12.90	0.73	12.84	11.37	15.20
C. Bank Credit (bank-firm level)						
$\Delta log(Credit)_{b,f}$	343145	-0.113	0.401	0	-1.79	1.05
$(Loans > 5Y/TotLoans)_{b,f}$	343145	0.188	0.334	0	0	1
$\Delta(Loans > 5Y/TotLoans)_{b,f}$	343145	-0.004	0.132	0	-0.613	0.605
Altman Z-score	343145	4.62	4.98	5	1	9
$RiskyFirm_f$	343145	0.151	0.358	0	0	1
$Dshare250K_b$	343145	0.635	0.48	0	0	1
Exp_BB_b	343518	0.024	0.013	0.012	0.002	0.062
$\Delta log(Term\ Dep)_b$	329863	0.762	0.800	0.582	-1.456	1.889

Table 3: ‘High bond’ vs. ‘Low bond’ 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’ bond) and above median (‘High’ bond) $BB_{p,2009}$ 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’ bond	‘High’ bond	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). The dependent variable is the growth rate of total deposits in columns (1) – (2) and (1) – (2) of demand deposits in column (3) – (4) and finally of term deposits in columns (5) – (7). 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)
$BB_{p,2009} \times Post_t$	0.132**	0.138**	0.066	0.076	0.110***	0.253***	-0.020	-0.054	-0.090	-0.098	-0.085	0.004
	(2.14)	(2.40)	(1.00)	(1.16)	(4.33)	(6.15)	(-0.17)	(-0.43)	(-0.70)	(-0.69)	(-1.59)	(0.05)
$Post_t$	0.005***		-0.004***		0.012***		0.008**		0.008**		0.009***	
	(3.59)		(-2.78)		(17.92)		(2.60)		(2.28)		(7.60)	
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	30499	30469	29593	29558	20380	20344	23876	23836	23511	23467	6579	6330
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)
$BBmat < 2012_{p,2009}$	-0.002					
$\times Post_t$	(-0.01)					
$BBmat = 2012_{p,2009}$	0.351***					
$\times Post_t$	(3.01)					
$BBmat > 2012_{p,2009}$	-0.108					
$\times Post_t$	(-0.60)					
$BBsenior_{p,2009}$		0.273***				
		(6.92)				
$BBjunior_{p,2009}$			0.241***			
			(6.55)			
$BB_{p,2009} \times Post_t$				0.178***	0.165**	0.161***
				(3.04)	(2.06)	(2.87)
$BB_{p,2009} \times Post_t$				0.149**	0.126*	0.126*
$\times HighBond_{b,2009}$				(2.35)	(1.84)	(1.88)
$BB_{p,2009} \times Post_t$					0.160***	0.160***
$\times HighNPL_{b,2009}$					(2.70)	(2.69)
$BB_{p,2009} \times Post_t$					-0.138	-0.137*
$\times HighEquity_{b,2009}$					(-1.50)	(-1.66)
$BB_{p,2009} \times Post_t$						0.005
$\times HighInterbank_{b,2009}$						(0.08)
Fixed Effects						
Province	Y	Y	Y	Y	Y	Y
Bank-Time	Y	Y	Y	Y	Y	Y
Observations	20344	20344	20344	19250	19250	19250
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) – (8). $BB_{p,2009}$ 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)		Δ Term/ (Term+Bonds)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$BB_{p,2009} \times Post_t$	-0.204***		0.038		0.088***		0.103***	
	(-4.39)		(1.14)		(4.47)		(6.96)	
$BB_{p-other,2009} \times Post_t$		-0.140***		0.025		0.062***		0.068***
		(-4.50)		(0.78)		(4.28)		(7.30)
Fixed Effects								
Province	Y	Y	Y	Y	Y	Y	Y	Y
Bank-Time	Y	Y	Y	Y	Y	Y	Y	Y
Observations	16004	15561	12193	12680	28460	23398	18968	16820
No of Provinces	107	107	107	107	107	107	107	107
No of banks	446	466	432	432	448	448	440	440

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 and Loan Maturity

This table provides the estimates for the effects of the exposure to the reform on credit and loan maturity (equation (3)). The dependent variable in Panel A 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). In Panel B the dependent variable is similarly constructed as the change in the share of long-term loans (i.e. above 5 years maturity), over total loans. Column (1) includes the full sample of bank-firm relationships, column (2) restricts the sample to firms with z-score below 7 ("Low Risk Firms"), column (3) restricts the sample to firms with z-score equal to or above 7 ("High Risk Firms"). 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. Δ log(Credit)

	All Firms (1)	Low Risk Firms (2)	High Risk Firms (3)	Difference High vs. Low Risk (4)
Exp_BB_b	0.0686	0.209	-0.675*	-0.885***
	(0.25)	(0.74)	(-1.83)	(-3.02)
Observations	343145	289467	53678	
No of firms	104215	87399	16816	
No of banks	487	486	457	

Panel B. Δ Maturity

Exp_BB_b	0.165**	0.158**	0.205*	0.046
	(2.28)	(2.26)	(1.95)	(0.68)
Fixed Effects				
Firm	Y	Y	Y	Y
Bank-size	Y	Y	Y	Y
Observations	343145	289467	53678	
No of firms	104215	87399	16816	
No of banks	487	486	457	

Table 9. Bank Credit and Loan Maturity: Placebo test

This table provides the estimates for a placebo test one year before the reform. 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 the dependent variable is the change in log credit over the placebo period while in Panel B the dependent variable is the change in the share of long-term loans (i.e. above 5 years maturity), over total loans. Column (1) includes the full sample of bank-firm relationships, column (2) restricts the sample to firms with z-score below 7 ("Low Risk Firms"), column (3) restricts the sample to firms with z-score equal to or above 7 ("High Risk Firms"). 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. Δ log(Credit)

	All Firms	Low Risk Firms	High Risk Firms	Difference High vs. Low Risk
	(1)	(2)	(3)	(4)
Exp_BB_b	-0.126	-0.115	-0.166	-0.051
	(-0.84)	(-0.77)	(-0.67)	(-0.23)
Observations	359238	289467	69393	
No of firms	109268	87399	21380	
No of banks	487	487	456	

Panel B. Δ Maturity

Exp_BB_b	0.032	0.032	0.035	-0.017
	(0.76)	(0.70)	(0.58)	(-0.03)
Fixed Effects				
Firm	Y	Y	Y	Y
Bank-size	Y	Y	Y	Y
Observations	343145	289467	53678	
No of firms	104215	87399	16816	
No of banks	487	486	457	

Table 10. Bank Credit and Loan Maturity: "Sleepy" deposits

This table provides the estimates for the effect of the exposure to the reform on credit and loan maturity. The dependent variable in Panel A 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). In Panel B the dependent variable is similarly constructed as the change in the share of long-term loans (i.e. above 5 years maturity), over total loans. Column (1) includes the full sample of bank-firm relationships, column (2) restricts the sample to firms with z-score below 7 ("Low Risk Firms"), column (3) restricts the sample to firms with z-score equal to or above 7 ("High Risk Firms"). Exp_BB_b is the bank exposure to the reform. $\Delta Share250K_b$ is a dummy equal to one if a bank experiences an above the median increase in deposits above €250,000 between 2012 and 2011. 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. Δ log(Credit)

	All Firms	Low Risk Firms	High Risk Firms	Difference High vs Low Risk
	(1)	(2)	(3)	(4)
Exp_BB_b	1.287*	1.522**	0.049	-1.472***
	(1.94)	(2.12)	(0.08)	(-5.43)
$Exp\_BB_b \times \Delta Share250K_b$	-1.476**	-1.512**	-0.936**	
	(-2.14)	(-2.09)	(-2.09)	
Tests:				
$Exp\_BB_b + Exp\_BB_b \times \Delta Share250K_b$	-0.189	0.011	-0.887*	-0.897**
	(-0.63)	(0.03)	(-1.94)	(-2.11)
Observations	343145	289467	53678	
No of firms	104215	87399	16816	
No of banks	487	486	457	

Panel B. Δ Maturity

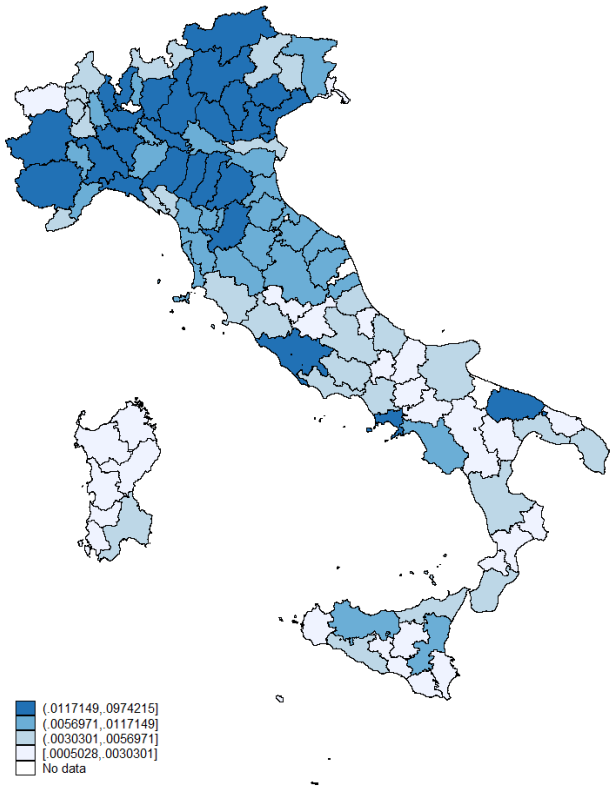
Exp_BB_b	0.548***	0.551***	0.727***	0.175
	(4.08)	(4.23)	(3.39)	(1.43)
$Exp\_BB_b \times \Delta Share250K_b$	-0.509***	-0.521***	-0.706*	
	(-3.76)	(4.00)	(-1.70)	
Tests:				
$Exp\_BB_b + Exp\_BB_b \times \Delta Share250K_b$	0.039	0.035	0.021	-0.01
	(0.63)	(0.53)	(0.21)	(1.43)
Fixed Effects				
Firm	Y	Y	Y	Y
Bank-size	Y	Y	Y	Y
Observations	343145	289467	53678	
No of firms	104215	87399	16816	
No of banks	487	486	457	

APPENDIX

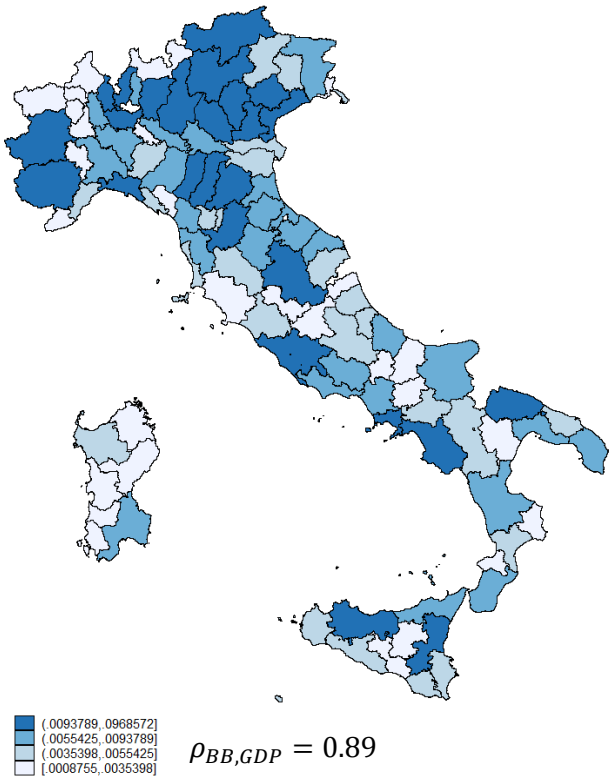
Figure A1: Bank bonds, GDP, and population by province

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. $BB_{p,2009}$

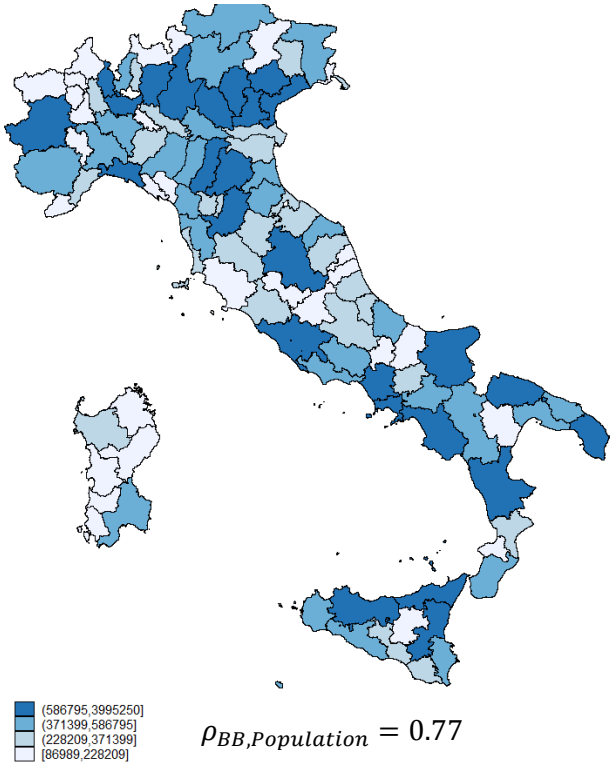


B. $GDP_{p,2009}$



$\rho_{BB,GDP} = 0.89$

C. $Population_{p,2012}$



$\rho_{BB,Population} = 0.77$

Figure A2. Deposits Below and Above the Deposit Insurance Limit (€100,000)

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.

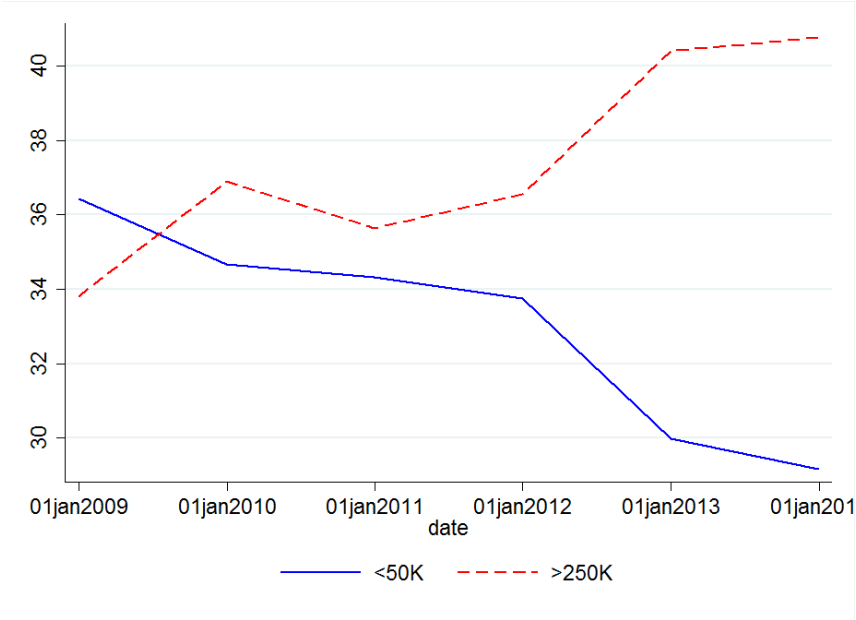


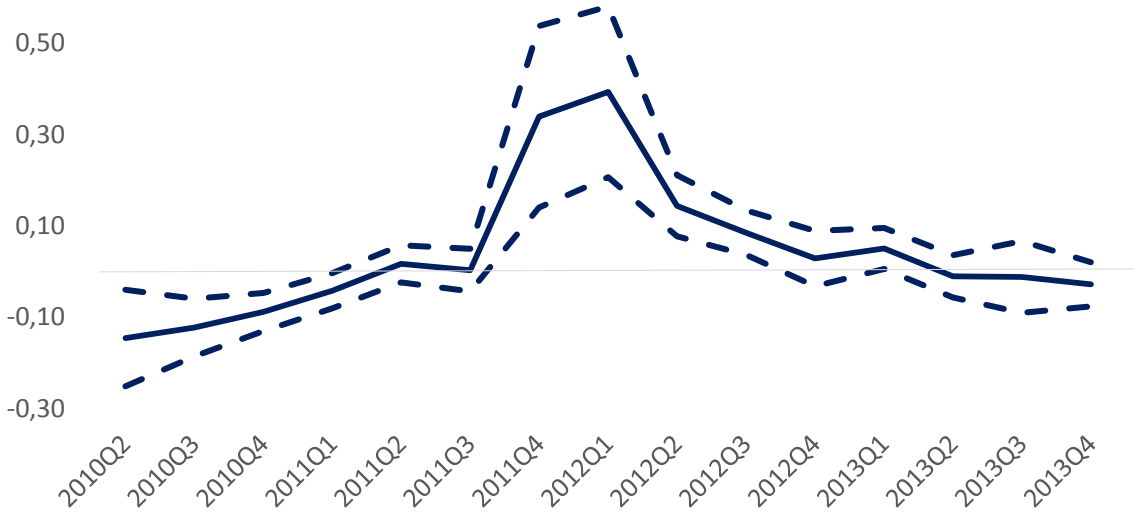
Figure A3. Dynamic Impact of the Reform

This figure plots the β coefficients and associated 95% confidence interval from the following regression:

$$\Delta Y_{b,p,t} = \beta_t BB_{p,2009} + \alpha_p + \alpha_{b,t} + \varepsilon_{b,p,t},$$

Where $\Delta Y_{b,p,t}$ is $\Delta \log(\text{TermDep})_{b,p,t}$, the quarterly growth rate of term deposits in Figure A, and $\Delta(Dep/(Dep + Bonds))_{b,p,t}$, the change in the financing mix between term deposits and bonds in Figure B. $BB_{p,2009}$ are bank bonds held by households in province p as of 2009 and β_t measures the impact of $BB_{p,2009}$ in each quarter from 2010Q1 to 2013Q4 (omitting 2010Q1). Standard errors are clustered at the province level.

A. Term Deposits



B. Term Deposits / (Term Deposits + Bonds)

Table A1. Robustness: Consistent 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 $\times Post_t$ 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)
$BB_{p,2009} \times Post_t$	0.071*	0.054*	-0.010	0.023	0.103***	0.246***
	(1.76)	(1.87)	(-0.26)	(0.50)	(4.00)	(5.87)
$Post_t$	0.010***		-0.001		0.013***	
	(9.17)		(-1.13)		(18.28)	
Fixed Effects						
Province	Y	Y	Y	Y	Y	Y
Bank-time	N	Y	N	Y	N	Y
Observations	19427	19427	19427	19427	19427	19427
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)
$BB_{p,2009} \times Post_t$	1.850**	1.563	3.837**	0.088	1416	1.850**
	(2.62)	(1.47)	(2.34)	(0.11)	(0.64)	(2.62)
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: Outliers and other province characteristics

This table provides robustness checks 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. In Panel B. 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)
$BB_{p,2009} \times Post_t$	0.261***	0.239***	0.304**	0.385***	0.172***
	(3.40)	(6.39)	(2.46)	(3.37)	(2.66
$GDP_{p,2009} \times Post_t$	-0.045				
	(-0.82)				
$Log(Population)_{p,2012} \times Post_t$	0.001				
	(1.12)				
Fixed Effects	-0.045				
Province	Y	Y	Y	Y	Y
Bank-time	Y	Y	Y	Y	Y
Region-time	N	Y	Y	Y	Y
Observations	20291	20344	18494	11198	9625
No of Provinces	107	107	104	107	107
No of banks	508	508	506	130	426