The Distortive Effects of Deposit Insurance on Bank Funding and Credit Allocation [†]

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Preliminary Draft
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Abstract

This paper investigates the distortive impact of deposit insurance on deposit and credit allocation. Utilizing administrative datasets covering all household deposit and corporate credit accounts in Danish banks, we exploit salient changes to the deposit insurance limit after the Global Financial Crisis (GFC). A reduction in the deposit insurance limit prompts retail depositors to withdraw uninsured deposits and reallocate them to other banks to maintain insurance coverage. This disproportionately benefits banks most affected by the GFC, as they differentially raise interest rates to attract funding inflows. The reallocation of deposits has real consequences as exposed banks lend disproportionally to less profitable and less productive firms, which exhibit higher default rates ex-post. We quantify the resulting decrease in aggregate productivity and output. The continued accumulation of elevated credit risk on exposed banks' portfolios may contribute to future financial fragility.

Keywords: Deposit Insurance, Deposit allocation, Deposit Rates, Credit Allocation, Financial Crisis

JEL Classification: G01, G21, G28

[†]The views expressed in this manuscript are those of the authors and do not necessarily represent the views of the Danmarks Nationalbank, the Bank of Italy, or the Eurosystem.

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1 Introduction

The unexpected collapse of Silicon Valley Bank in March 2023 was triggered by a run of uninsured depositors, heralding a new banking crisis. As policymakers and regulators deliberated over the crisis's implications, a key focus area was the design of deposit insurance schemes (Heider et al. 2023, White 2023). As a pivotal component of the financial safety net, deposit insurance provides a governmental guarantee to avoid runs on bank deposits (Diamond and Dybvig 1983, Goldstein and Pauzner 2005, Dávila and Goldstein 2023). However, the existing literature has focused on how deposit guarantees erode market discipline and incentivize risk-taking by banks.[1] Our focus is on the distortive effect of deposit insurance schemes on deposit allocation across banks, and the resulting impact on credit allocation across firms.

To investigate the distortions caused by deposit guarantees, we exploit changes to the deposit insurance threshold in Denmark for empirical identification. Prior to the Global Financial Crisis (GFC), the Danish government guaranteed all deposits up to a ceiling of DKK 375,000 (ca. USD 50,000). In the aftermath of the collapse of Lehman Brothers, the Danish government chose to lift the deposit insurance limit and fully guarantee all bank liabilities in 2008. However, in alignment with a European Union directive aimed at standardizing deposit insurance across member states, insurance was limited to DKK 750,000 (ca. USD 100,000) in 2010. This adjustment left approximately 20% of all retail deposits without a government guarantee during a period marked by several bank failures.

This sequence of regulatory shifts provides a useful laboratory for measuring the distortive effects of deposit guarantees in the market for retail deposits. Intuitively, we can compare the allocation of deposits during the period of unlimited insurance (2008-2009), when depositor choices were unaffected by guarantee limits, with the period after the new deposit insurance ceiling (2010 onwards), where deposit guarantees may

[1] A non-exhaustive list includes: Calomiris and Kahn (1991), Diamond and Rajan (2000, 2001), Demirgüç-Kunt et al. (2014).

have affected the allocation of deposits above the insurance limit.

Despite the pivotal role of deposit insurance in shaping depositor behavior, empirical analysis in this area is sparse for several reasons. Detailed information about individuals' deposit relationships is required to track their response to changes in government guarantees, and exogenous changes to deposit insurance schemes are rare but essential for identifying causal effects on depositors' and banks' behavior. Additionally, isolating the specific influence of deposit insurance limit alterations from other economic or regulatory changes is complex.

To overcome these challenges, we leverage administrative data from Denmark and a specific reform of the deposit insurance scheme post-GFC. This enables us to assess the ripple effects that deposit insurance has on the distribution of bank funds and its downstream impact on lending decisions. Our data covers the universe of retail deposit and corporate loan accounts in Danish financial institutions for the period 2005-2016, augmented by bank-level supervisory information and detailed information about account holders. The period is deliberately chosen to straddle the pre- and post-regulatory shifts in deposit insurance coverage. We can thus track how deposits are redistributed across different banks, in response to changes in the insurance limits. Moreover, we can analyze how these shifts affect banks and depositors differently, depending on their unique characteristics.

Our analysis compares banks which were more or less affected by the GFC. Following Jensen and Johannesen (2017), we note that Danish banks generally had limited direct exposure to US mortgage-backed securities, but those heavily dependent on wholesale funding faced a severe liquidity shock in 2008. Hence, we use the 2007 loan-to-deposit ratio as a proxy for a bank's reliance on wholesale market funding and its exposure to the GFC (Jensen and Johannesen 2017). Specifically, we define banks as 'exposed' to the GFC if their loan-to-deposit ratio is in the top 25% of the distribution in 2007. Subsequently, our analysis centers on deposit and credit flows around the 2010 deposit insurance reform at exposed relative to non-exposed banks.

In the initial empirical analysis, we demonstrate that the introduction of the deposit insurance limit led to significant depositor responses: individuals with deposits above the limit redistributed their deposits across multiple banks to remain fully insured. As shown by Iyer et al. (2019), this redistribution was a reallocation across banks, as withdrawals from the banking system were limited. Importantly, we highlight that this reallocation involved a systematic shift: depositors disproportionately channeled uninsured deposits into insured deposits at more exposed banks.

We explore these results in various ways. Examining the distribution of deposit account balances in 2010, we document noticeable clustering at the DKK 750,000 insurance threshold, particularly at exposed banks. This clustering suggests that depositors actively managed their balances to remain under the insurance limit. Employing a regression framework on consolidated deposits within the same value range and at the same bank, our data reveals a significant divergence in 2010 between deposit balances above and below the DKK 750,000 threshold: balances surpassing the threshold declined, while those below increased. Deposit flows among banks displayed significant heterogeneity, marked by a substantial shift from uninsured to insured deposits, notably favoring the most exposed banks.

In the next step, we investigate the mechanism behind the differential reallocation of deposits towards exposed banks post-deposit insurance reform. Our findings show that, post-reform, exposed banks raised deposit interest rates relative to less exposed banks. We interpret this differential change in interest rates as a deliberate strategy by the exposed banks to compensate for their funding shortfall caused by the wholesale funding market freeze. By leveraging the deposit insurance safety net, exposed banks could afford to raise deposit rates to attract new funds without passing the entirety of their heightened default risk onto depositors. Importantly, our findings on deposit quantities and prices are not driven by depositors' flight-to-safety in the form of reallocating to too-big-to fail banks.

In the later part of our analysis, we examine the consequences of deposit redis-

tribution for the real economy, focusing on differences in lending between exposed and non-exposed banks. We utilize data on the universe of non-mortgage credit by non-financial firms in Denmark, augmented with detailed balance sheet and accounting information. Our analysis reveals that exposed banks disproportionately allocated their lending towards less profitable and less productive firms, suggesting a potential misallocation of credit as in Schivardi et al. (2022). We document these results through detailed loan-level regression analysis with granular fixed effects. Exposed banks' disproportionate lending to unprofitable firms does not merely mask risk-taking by these banks, as we do not find differences in lending to ex-ante riskier borrowers between exposed and non-exposed banks. We argue that the funding inflow due to the deposit insurance reform allowed exposed banks to continue these unproductive lending practices. Absent deposit guarantees, exposed banks' funding shortfall due to the wholesale funding market freeze, and the resulting increased default risk, would have shrunk their funding base and consequently their lending portfolio.

Finally, we document notably higher exit rates among less profitable firms that received relatively more funding from exposed banks. This suggests that the deposit insurance reform, which sustained the funding base of exposed banks in a period of frequent bank failures, inadvertently led to a distortive redirection of credit away from more productive firms. We quantify the resulting decline in allocative efficiency by studying changes in the distribution of the marginal productivity of capital, as suggested by Sraer and Thesmar (2023). Our estimates imply that the deposit insurance reform led to a decline in aggregate TFP of roughly -1.7% and a drop in aggregate output of roughly -2.4%. These effects are due to a misallocation of resources both within and between sectors in the economy. In addition to real economic effects, there are implications for financial stability: as less profitable firms default at higher rates ex-post, exposed banks continue accumulating credit risk, which may lead to future financial fragility.

Our study intersects with three significant strands of literature, offering novel in-

sights into the dynamics of government guarantees, depositor behavior and bank runs, and the mechanisms that may seed subsequent crises. Building on Goldberg and Hudgins (2002) and Acharya et al. (2022), which examine the broader effects of government guarantees, we provide a granular analysis of the distortions in deposit funding allocation across banks. We underscore the nuanced reactions of banks and depositors to changes in insurance coverage, expanding on the insights provided by studies like Caglio et al. (2023) on deposit reallocations (flight-to-safety) during crises. Our contribution to this strand is to understand how deposit insurance affects depositor behavior and bank funding patterns, particularly in how it might incentivize depositors to seek higher returns rather than safety, and how this influences the broader credit market and economic efficiency. It addresses a gap in the literature by showing that deposit insurance can have unintended consequences on credit reallocation.

We advance the understanding of depositor behavior in the context of deposit insurance limits, an area less directly addressed by bank-run literature such as that of Iyer and Puri (2012), Iyer et al. (2016) and Iyer et al. (2019). We go beyond these studies by leveraging detailed data to observe how changes in deposit insurance influence the behavior of depositors allocating insured deposits across banks and how banks respond to these depositor preferences by adjusting their deposit rates, a nuance not captured in previous studies like Blickle et al. (2022). The paper closest to our study is by Iyer et al. (2019), who analyze the effects of implicit too-big-to-fail guarantees on households' deposit allocation decisions. We show that our deposit reallocation results are not driven by these guarantees, and additionally study the implications of the reallocation for the real economy through bank lending. Artavanis et al. (2022) find that withdrawal of deposits from a large Greek bank is primarily motivated by a lack of confidence due to deteriorating fundamentals and strategic complementarities, rather than the pursuit of higher returns. Our paper contributes to the literature by highlighting a different aspect of depositor behavior, where the decision to reallocate funds is driven by the search for yield within the safety net provided by deposit

insurance, rather than by a reaction to fundamental risks or strategic considerations.

Our unique dataset enables us to trace the dual matching process of depositors with banks and banks with firms, revealing how assortative matching can exacerbate financial frictions. While studies by Acharya and Mora (2015) and Jensen and Johannesen (2017) touch upon liquidity provision and systemic risk implications, our paper adds depth by demonstrating how exposed banks' lending to less profitable and less productive firms could potentially prolong financial crises.In summary, our paper fills an empirical literature gap by providing a dual analysis of deposit insurance impacts on bank funding strategies and credit allocation to firms, using comprehensive data to track the evolution of deposit and lending relationships.

2 Institutional background

The financial crisis in Denmark. Leading up to the global financial crisis of 2007-2008, the Danish economy experienced robust growth, and domestic banks in Denmark significantly expanded their lending activities. This surge resulted from strong domestic credit demand and a thriving housing market. This expansion in credit significantly outstripped the growth in deposits, promting Danish banks to depend more on wholesale market funding. This led to a sharp rise in leverage ratios and a decline in liquidity ratios. Despite these developments, the banks remained profitable, and none failed during the pre-crisis boom (Rangvid et al. 2013).

While the Danish banking sector had minimal direct exposure to the U.S. mortgage-backed securities central to the global financial crisis, it still felt the impact of the 2007-2008 credit crunch (Shin 2009, Jensen and Johannesen 2017). Simultaneously, a housing market downturn led to the collapse of several banks with significant exposure to real estate developers. The situation worsened with Lehman Brothers' collapse in September 2008, causing a freeze in international credit markets and triggering a funding crisis for many Danish banks. From 2008 to 2010, about 30 small to medium-sized

Danish banks failed to meet regulatory capital requirements or went out of business.

Policy responses. In response to the crisis, the central government introduced a series of measures in October 2008 known as the "Bank Rescue Package I". First and foremost, it temporarily guaranteed all deposits in banks in Denmark, thereby lifting the previous deposit insurance limit of DKK 350,000 (50,000 euros). The effective lift of the deposit insurance limit was initially set to expire in September 2010. In addition, the Danish central bank launched temporary credit facilities to improve liquidity in the banking sector. While these facilities enhanced confidence in the banking sector, banks made virtually no use of them (Dam and Risbjerg 2009).[2]

In the aftermath of the GFC the European Commission proposed to harmonize the deposit insurance schemes across EU members because of growing concerns about cross-country flight of deposits. Effective from 1 October 2010, Denmark aligned with the new EU rules by setting the deposit insurance limit at DKK 750,000 (100,000 euros). This threshold, determined and standardized by the European Union, was external to the Danish banking system and left a considerable portion of bank deposits in Denmark uninsured (Iyer et al. 2019). Media coverage at the time highlighted strategies for depositors to safeguard their savings, such as distributing deposits across several banks, shifting funds to larger banks considered too big to fail, or converting bank deposits into other secure assets (Rangvid et al. 2013).[3]

3 Data

Our analysis is based on several administrative datasets collected by Statistics Denmark. To document the effects of deposit insurance on deposit reallocation, we uti-

[2]For further details on the Danish policy response to the GFC, including the creation of the Financial Stability Company ("Finansiel Stabilitet") to oversee the activities of struggling banks, see Abildgren and Thomsen (2011) and Rangvid et al. (2013).

[3]In Denmark, as in the U.S., deposit insurance coverage is determined separately for accounts held by the same individual at different banks, meaning the deposit insurance limit is applicable on a per-depositor, per-bank basis. This structure enables depositors to effectively increase their coverage by distributing their accounts across several banks.

lize data on the universe of retail deposit accounts in Danish banks. We supplement this data with supervisory information on bank balance sheets to distinguish between banks that were more exposed to the GFC. Our analysis of bank lending relies on records of the universe of non-mortgage lending agreements between Danish lenders and borrowing firms, which we enhance with information about the firms. Throughout our analyses, we focus on the period from 2005 to 2016. This section provides a brief overview of the data and the sample restrictions we impose. We also present descriptive statistics of our sample.

3.1 Data sources and sample restrictions

Deposit data. We derive information about bank account balances from the records maintained by the Danish tax authorities. Financial institutions in Denmark are mandated to report the year-end balances of all deposit accounts held by Danish residents to these authorities annually. These reports are compulsory and serve as a reliable means for tax enforcement. We compile the account-level data into bank-individual level summaries, which align with the criteria for deposit insurance, by aggregating accounts owned by the same individual at the same bank. Consequently, for each individual, we observe the consolidated end-of-year account balance at each bank in Denmark. The data encompasses not only the outstanding deposit volumes and interest payments but also, for some records, the contractual interest rate. However, since the interest rates are not pivotal for tax purposes, they are not consistently reported by the majority of banks.

Loan data. Our dataset on corporate loans is a counterpart to the retail deposit data as outlined above. This dataset encompasses all non-mortgage lending agreements, which include regular loans, credit card debt, commercial paper, and flexible credit facilities such as revolving loans or overdraft accounts. [4] Similar to the deposit data, for each lending agreement, we have access to the identity of the borrower, the account

[4] In Denmark, mortgage lending is handled by specialized mortgage institutions, which operate under distinct regulations. Consequently, we have excluded these institutions from our analysis.

number, the outstanding credit balance, and the total interest payments made over the year. We compile our account-level data at the lender-firm-year level by summing the credit balances and interest payments across any multiple accounts a firm may have.

Lender and borrower characteristics. We enhance our corporate loan data with detailed information on both borrowers and lenders from databases compiled by Statistics Denmark and the financial supervisory authority. For details on corporate borrowers, we access the Danish firm register ("FIRM"), which includes data on firms' legal status, founding year, location, number of employees, and financial statements such as balance sheets and income statements.

Bank-specific information, encompassing balance sheets, income statements, and key regulatory metrics like capital adequacy ratios, is sourced from the financial supervisory authority. Although this data is updated quarterly, we align our analysis with the annual frequency of our other datasets and, therefore, concentrate on the year-end figures provided in the regulatory data.

Sample construction. To arrive at our baseline sample we restrict the data in a number of ways. In the case of corporate credit, we begin with the universe of unsecured credit to Danish non-financial companies. We drop state-guaranteed student loans and loans granted by municipalities. We also drop all loans that are in some form of arrears or debt forgiveness. Lastly, we drop loans by mortgage banks, extraterritorial as well as governmental institutions and the Danish central bank.

At the firm level, we consider all active firms from 2003 to 2016, excluding those with equity below 1,000 USD to ensure financial substance. Additionally, we exclude cooperatives, NGOs, and other non-profit entities, primarily to omit housing cooperatives from our analysis.

3.2 Descriptive statistics

Banks. Table 1 presents summary statistics of the average bank in our sample, which includes 100 unique banks, ranging from small to large and systemically important institutions. Column 1 indicates that the average bank has a total asset size of 4.5 billion DKK (calculated as the exponential of 8.44). The standard deviation of 1.74, column 2, indicates variability among the banks' asset sizes. The Tier 1 capital adequacy ratio, which serves as a key indicator of a bank's financial health, has an average value of 13.46% across the sample. This suggests that Danish banks, in general, maintain a moderate level of capital buffer.

Next, we compare banks which were more or less exposed to the adverse consequences of the financial crisis. We measure crisis exposure based on banks' loan-to-deposit ratio at the end of 2007 as in Jensen and Johannesen (2017). We label banks with a high loan-to-deposit ratio (top 25% of the distribution) "Exposed banks", as they backed a large share of their loan portfolios with fragile wholesale funding rather than stable retail deposits. The remaining 75% of banks are labeled "Non-exposed banks."

Columns (3)-(4) of Table 1 illustrate that *exposed banks* are notable larger in asset size, averaging DKK 14.8 billion. Conversely, columns (5)-(6) describe *non-exposed banks*, which tend to be smaller. Besides being larger, exposed banks are also less capitalized (Tier 1 capital ratio), and have higher loan-to-deposit ratios (by construction). These differences indicative greater susceptibility to liquidity pressures and financial instability caused by the financial crisis among the exposed banks. Finally, column (7) sheds light on the significant differences between the two groups of banks.

Firms. In Table 2 we provide an overview of the firms in our sample, measured by their balance sheet characteristics at the end of 2007. Columns (1)-(2) illustrate that the average firm's total assets amount to approximately DKK 6 million (ca EUR 800,000). The average firm's return on assets (RoA), measured as the ratio of operating profits

Table 1: Descriptive statistics of banks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All banks		Exposed banks		Non-exposed banks		Diff.
	Mean	SD	Mean	SD	Mean	SD	Mean
Total assets (log)	8.44	1.74	9.60	1.55	8.06	1.64	-1.54***
# of Employees	631.10	2,620.72	1411.87	4,883.14	367.01	1,056.48	-1044.85
T1 capital ratio	13.46	8.87	11.70	10.38	14.03	8.32	2.33
Debt/TA	0.83	0.06	0.84	0.09	0.83	0.05	-0.01
Avg credit growth '04-'07	0.24	0.10	0.29	0.10	0.23	0.09	-0.07**
Loan-to-deposit ratio	1.15	0.35	1.60	0.08	1.01	0.27	-0.59***

Notes: This table provides descriptive statistics of the banks used in our analysis. Columns (1)-(2) present statistics for all banks, while columns (3)-(4) and (5)-(6) refer to exposed and non-exposed banks, respectively. Exposed banks are defined as those in the top 25th percentile of the loan-to-deposit ratio distribution at the end of 2007, indicating higher exposure to the financial crisis. Column (8) presents t-tests for the difference in means between the two groups of banks.

to total assets, is 9%. Columns (3)-(6) highlight how characteristics vary between more and less profitable firms. We label firms as "High RoA" if their RoA is above the median in 2007. Conversely firms whose RoA is below the median are labeled "Low RoA." Lastly, column (7) shows statistically significant differences between low and high RoA firms in several metrics. In particular, less profitable firms have a RoA of -3% and tend to be smaller and less capital-intensive than more profitable firms, whose RoA is on average 24%.

These descriptive statistics lay the foundation for our investigation into the distortive effects of deposit insurance on bank behavior and credit allocation. The delineation of banks into exposed and non-exposed categories based on their liquidity profiles pre-crisis is instrumental for our subsequent analysis. It enables a focused examination of the banks' funding strategies and depositors' responses to the deposit insurance threshold adjustments. Likewise, the distinction between firms with low and high RoA facilitates an exploration into the potential shifts in credit allocation patterns that these banks may have undertaken.

Table 2: Descriptive statistics of firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All firms		Low RoA firms		High RoA firms		Diff.
	Mean	SD	Mean	SD	Mean	SD	Diff.
Total assets (log)	15.59	1.42	15.78	1.54	15.39	1.26	-0.39***
Capital stock/TA	0.33	0.25	0.38	0.27	0.28	0.21	-0.10***
Wage bill/TA	0.55	0.53	0.51	0.53	0.59	0.52	0.08***
Sales/TA	2.07	1.89	1.85	1.76	2.28	1.99	0.42***
Net investment/TA	0.04	0.16	0.04	0.19	0.04	0.13	0.00*
Return on assets	0.09	0.24	-0.03	0.24	0.22	0.14	0.25***

Notes: This table provides descriptive statistics of the firms used in our analysis. Columns (1)-(2) present statistics for all firms, while columns (3)-(4) and (5)-(6) refer to firms with below and above median return on assets (RoA), respectively. Column (7) presents t-tests for the difference in means between the two groups of firms.

4 Reallocation of deposits

4.1 Bank exposure to the financial crisis

In line with Jensen and Johannesen (2017), we identify banks more vulnerable to the global financial crisis by their loan-to-deposit ratio at the end of 2007. The main premise is that banks with fewer deposits on the liability side of their balance sheet and more loans on the asset side were more exposed to the financial turmoil that ensued during the GFC. This ratio acts as an indicator of banks' reliance on less stable wholesale market funding, which was a significant stress point during the GFC. For our analysis, we define banks in the top 25 percentile of this ratio as "exposed". Additionally, for robustness, we also refine the definition of the exposed banks and we consider banks with the highest credit growth in the preceding years (2004-2007) and the lowest Tier 1 capital ratios as exposed, to capture different dimensions of vulnerability during the financial turmoil.

Table 3 delineates conditional correlations between different bank characteristics

and measures of exposure: the loan-to-deposit ratio is shown (column (1)), the Tier 1 capital ratio (column (2)), and average credit growth from 2004 to 2007 (column (3)). These correlations are obtained from cross-sectional regressions with bank characteristics measured at the end of 2007. This table complements our descriptive analysis in section 3.2 by providing a more detailed perspective on how different characteristics are linked to our exposure indicators.

The findings in Table 3 provide evidence that banks with higher loan-to-deposit ratios generally had a more extensive asset portfolio, lower net margins and Tier 1 capital ratios. Moreover, these banks endured more significant loan losses during the GFC, corroborating their heightened exposure level. Validation of this trend is echoed in columns (2) and (3), where the Tier 1 capital ratio and average credit growth for the years leading up to the crisis mirror these trends, signalling a broader spectrum of financial vulnerability. These insights reinforce the narrative that banks characterized by high loan-to-deposit ratios, substantial credit growth before the crisis, and thinner capital cushions were more susceptible to the adverse effects of the GFC.

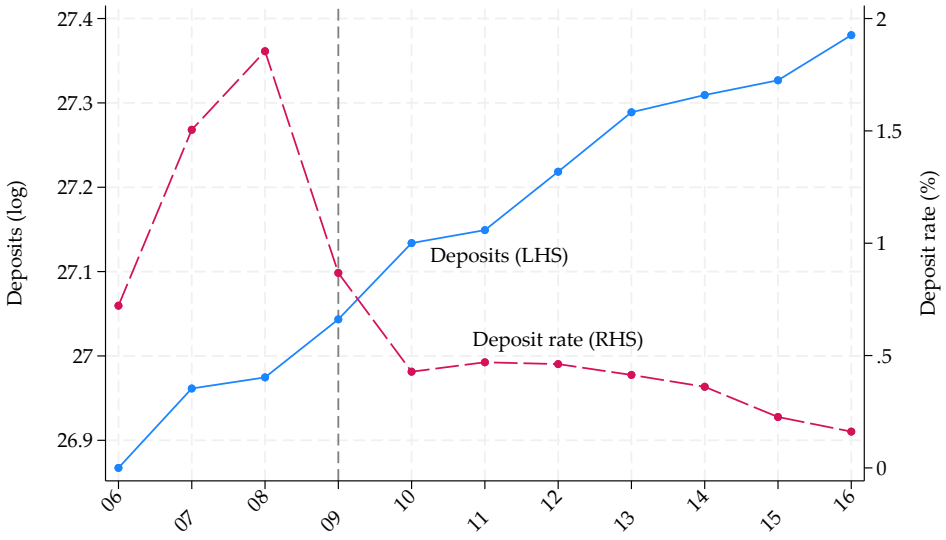
Figure 1 illustrates the macro-level trends in retail deposit activity during our sample period. Total retail deposits in the banking system grew steadily throughout our sample period (blue, solid line). Concurrently, the average interest rates offered on deposits (red, dashed line) peaked at nearly 2% in the run-up to the financial crisis, before beginning a steady decline towards zero in the aftermath of the crisis. The declining trajectory was largely due to the easing of monetary policy in response to the crisis. The vertical dashed line marks the introduction of the deposit insurance limit of DKK 750,000, demarcating the pre- and post-policy change landscapes. These observations lay the groundwork for the next section, which studies changes in deposit volumes and rates at exposed and non-exposed banks in response to the change in the deposit insurance limit.

Table 3: Bank exposure and bank characteristics

	(1)	(2)	(3)
	Loan-deposit ratio	Tier1 captal ratio	Avg credit growth 04-07
Total assets (log)	0.07**	0.74	-0.02
	(0.03)	(1.00)	(0.02)
Net interest margin	-24.83***	-858.14**	-3.43
	(7.60)	(378.07)	(3.41)
Net income/TA	13.39***	452.35*	-0.13
	(1.80)	(231.09)	(1.10)
Debt/TA	-1.09	-54.64**	-0.31
	(0.76)	(22.91)	(0.36)
Loan losses 2008-2010/TA	1.77***	-41.29	1.12***
	(0.60)	(24.66)	(0.32)
Low TFP loans/Total loans	0.27	-14.99	0.08
	(0.75)	(12.17)	(0.24)
Tier-1 capital ratio	-0.02***		0.00
	(0.00)		(0.00)
Avg. credit growth 04-07	0.26	15.18	
	(0.34)	(15.75)	
Loan-to-deposit ratio		-16.90*	0.06
		(9.21)	(0.08)
Constant	1.69**	77.04***	0.60**
	(0.81)	(21.89)	(0.28)
Observations	60	60	60
R2	0.63	0.56	0.36

Notes: This table presents the results of a cross-sectional regression of various measures of bank exposure to the Global Financial Crisis (indicated in column titles) on bank characteristics. All variables are measured at the end of 2007. Robust standard errors in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 1: Aggregate trends in the market for retail deposits



Notes: The figure illustrates the aggregate developments in the market for retail deposits. The blue line illustrates the (log of) total deposits and the red dashed line depicts the average interest rate on deposits in per cent. The vertical dashed line marks the introduction of the deposit insurance limit of DKK 750,000.

4.2 Reallocation of deposits

This section delves into the dynamics of deposit reallocation triggered by the 2010 deposit insurance limit adjustments. Instead of a systemic withdrawal from the banking sector, we observe a strategic redistribution of insured deposits where depositors actively redirected their funds from less exposed to more exposed banks. The exposed banks, leveraging the security of deposit insurance, were able to attract these deposits by offering higher interest rates compared to their less exposed counterparts. This highlights the nuanced impact of deposit insurance policy on depositor decisions and banking stability.

4.2.1 Deposit volumes

Figure 2 provides a representation of how depositor behaviors adapted around the DKK 750,000 insurance threshold in response to the policy adjustment, an exercise first

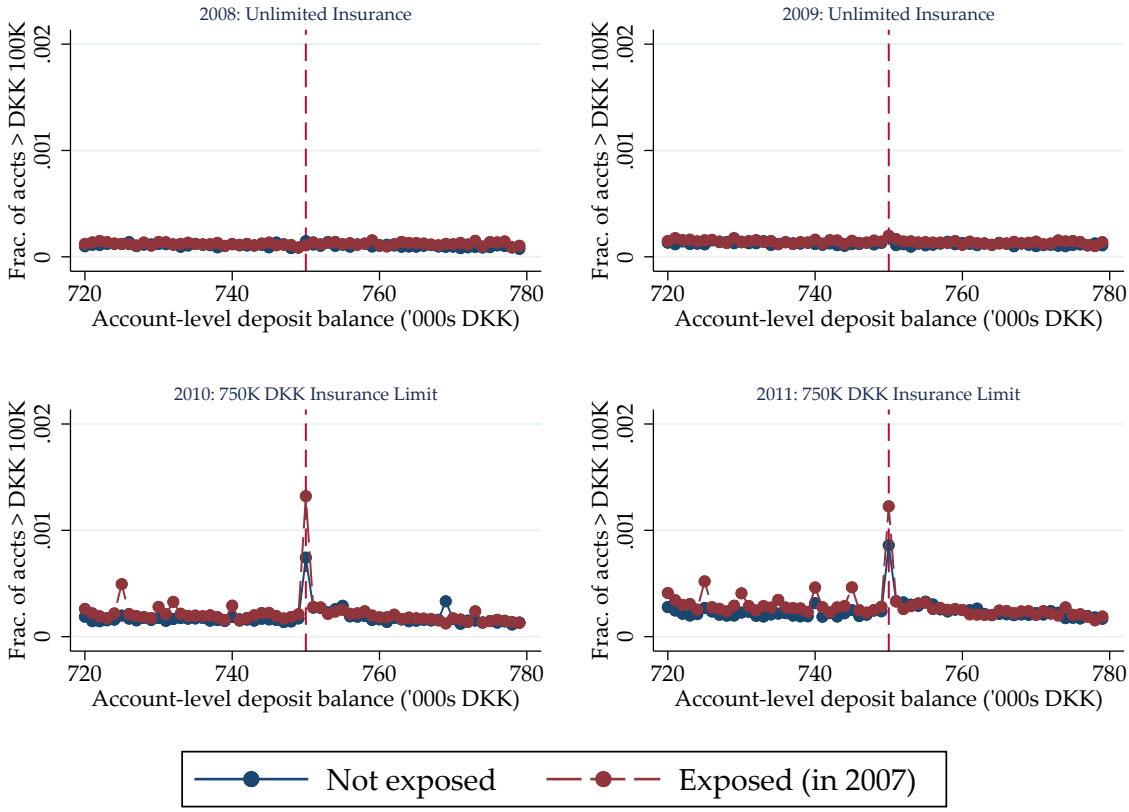
shown in Iyer et al. (2019). For each year, the histograms show the share of accounts in 1000-DKK bins over a range of account values close to the insurance limit. The graphical depiction highlights the comparative distribution of deposits in proximity to the threshold for exposed and non-exposed banks during the deposit insurance limit imposition transition in October 2010. To enhance the comparison, the number of accounts within each 1000-DKK bin is standardized by the total count of accounts holding over DKK 100,000.

Post-implementation of the deposit insurance limit, a pronounced clustering of deposits at the DKK 750,000 mark becomes evident in 2010 and persisted into 2011, indicating a strategic response from depositors to align their account balances with the newly insured ceiling. The absence of such clustering in 2008 and 2009 underscores a reactive adjustment to the policy change rather than preemptive action. This account behavior, as detailed by Iyer et al. (2019), aligns with a reallocation strategy across bank-depositor relationships instead of a systemic withdrawal from the banking sector.[5]

An important insight derived from the figure is the concentration of deposit balances below the insurance limit, particularly at exposed banks. This phenomenon can be attributed to two interrelated factors, both driven by the new deposit insurance limit, which encouraged depositors with balances above the revised DKK 750,000 limit to spread them across multiple banks. Firstly, depositors with amounts surpassing the insurance limit withdrew funds from their bank to stay within the insurance threshold, resulting in an outflow of funds from their respective banks. Secondly, the reallocation of funds exceeding the insurance limit by depositors led to an influx of insured deposits at other banks.

[5]We replicate Figure 2 at the individual level instead of the account level. The individual-level distribution of deposit balances remains smooth throughout the entire range, both in periods before and after the deposit insurance limit was set. The absence of discontinuities suggests that the observed bunching at the bank level is not a result of a systemic withdrawal but is consistent with depositors redistributing their deposits across multiple accounts to stay within the insured limit, validating the evidence in Iyer et al. (2019).

Figure 2: Distribution of deposits at the bank-individual level around DKK 750,000



Notes: The figure shows the empirical distribution of account balances in a narrow window around DKK 750,000 for each of the years 2008-2009 (where all deposits were guaranteed by the government) and for 2010-2011 (where the insurance limit was DKK 750,000) for exposed and not exposed banks. Densities are measured relative to the total number of accounts with a balance above DKK 100,000 to facilitate comparisons between the two groups. Exposed banks are those whose loan-to-deposit ratio at the end of 2007 was in the top 25%, while the remaining banks are labelled as "Not exposed". The sample of deposit accounts is divided into DKK 1,000 (approximately USD 150) bins and counts of account balances are recorded for each bin. Thus, each point indicates the number of deposit accounts with balances within DKK 500 of the stated amount.

Since these two dynamics have opposite implications for banks' funding, it remains unclear whether exposed and non-exposed banks, on average, encountered positive or negative funding shocks due to the deposit insurance reform. Moreover, redistributing deposits across banks does not automatically translate into clustering at the insurance threshold. For example, a depositor evenly distributing a DKK 1,000,000 balance across two banks would not hold any balances at the DKK 750,000 threshold. To comprehensively evaluate the extent of deposit reallocation, we employ a regression-based analysis to quantify shifts in deposit volumes and elicit the motivating factors behind these movements. Our first objective is to understand if the introduction of the deposit insurance limit in 2010 led to an increase in deposits at exposed banks compared to non-exposed banks. Since deposit accounts with balances above the DKK 750,000 insurance limit contain both insured and uninsured deposits, we follow Iyer et al. (2019) and slice up each account in a number of deposit ranges, DKK 0-50,000, DKK 50,000-100,000, DKK 100,000-150,000 and so on. This will allow us later on to analyze if deposit volumes above and below the insurance threshold changed differentially around the insurance reform.

Before delving into the specific developments of insured and uninsured deposits, we initially examine the overall deposit volume trends at exposed and non-exposed banks surrounding the deposit insurance reform. Utilizing a difference-in-difference methodology, we investigate whether deposit amounts grew faster after the deposit insurance reform, particularly at banks most impacted by the financial crisis. To mitigate the influence of bank heterogeneity on our results, we saturate our specification with bank and bank-account range fixed effects. Essentially, we compare the growth rates of deposits in narrowly defined account ranges between exposed and non-exposed banks. We estimate the following econometric model over the period 2005-2016:

$$\begin{aligned}\log(\text{deposits})_{btk} = \alpha &+ \beta_1 \text{After}_t \times \text{Exposed bank}_b \\ &+ \beta_2 \text{After}_t + \beta_3 \text{Exposed bank}_b + \epsilon_{btk}\end{aligned} \tag{1}$$

The dependent variable, $\log(\text{deposits})_{btk}$, is the logarithm of deposit amounts in bank b, in year t, across deposit range k. The explanatory variables include Exposed bank_b, a binary indicator that marks whether bank b's loan-to-deposit ratio at the end of 2007 was in the top quartile, signifying higher exposure to the financial crisis. The term After_t is also a binary indicator, denoting years 2010 and onwards—the period after the deposit insurance reform. We report standard errors clustered at the bank-account range level. The key variable of interest is the coefficient β_1 of the interaction ($\text{Exposed bank}_b \times \text{After}_t$) capturing the deposit growth at exposed banks between the pre-reform and the post-reform period relative to the deposit growth at non-exposed banks over the same period.

Table 4 displays the initial regression results, isolating the effects of the 2010 deposit insurance reform on bank-account-level deposits. In Column (1), the coefficient for *After reform* indicates a roughly 37% (i.e., $e^{0.312} - 1$) increase in deposits at non-exposed banks between the pre-reform and post-reform period. Combining this estimate with the interaction term *After reform x Exposed bank* suggests that deposits at exposed banks grew by a factor of 1.4 ($e^{0.312+0.567} - 1$) over the same period. The significantly different growth rates underscore the pronounced impact of the deposit insurance reform on the allocation of retail deposits across exposed and non-exposed banks.

To probe the robustness of these results, in columns (2)-(3), we sequentially include bank fixed effects and bank-range fixed effects, which control for unobserved heterogeneity across banks and deposit ranges within banks that could influence the deposit volumes. The coefficient estimates for the interaction term remain positive and statistically significant across these specifications, confirming that the observed effects are not driven by other unaccounted factors.

Table 4: How Do Bank Exposure Levels Impact Deposit Volumes Post-Reform?

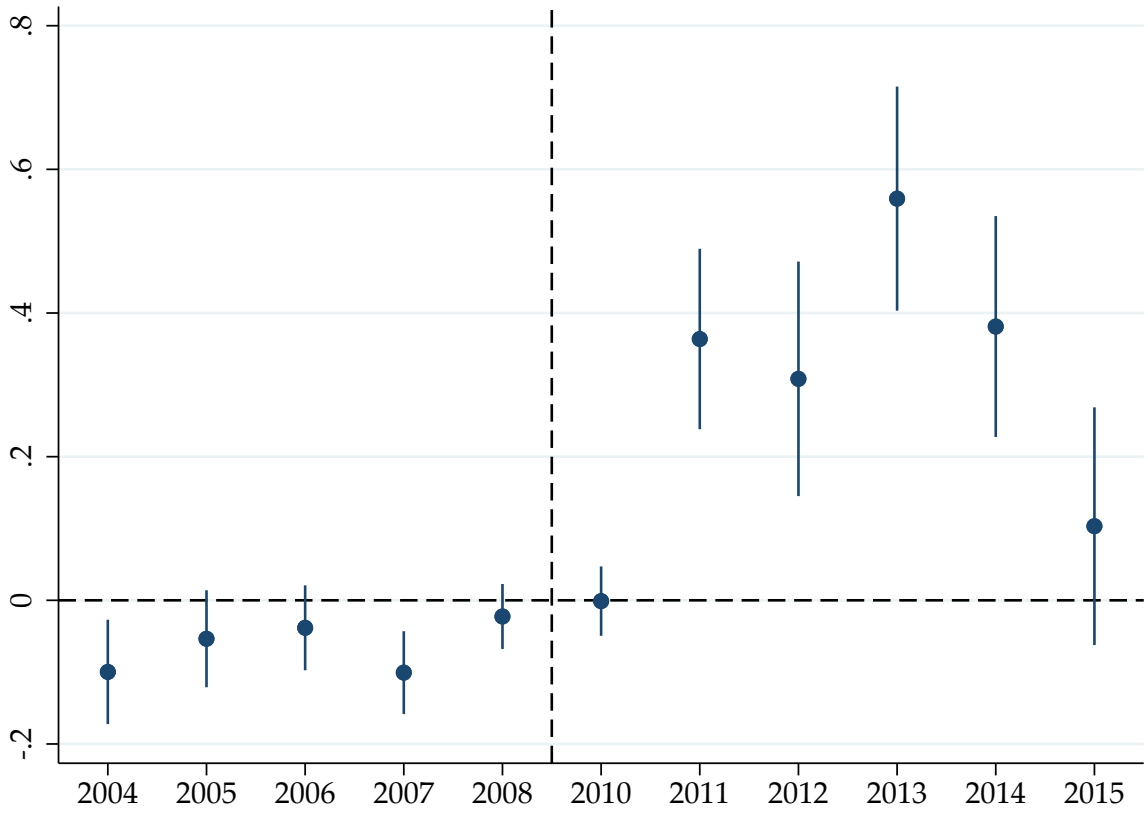
	(1) ln_deposits	(2) ln_deposits	(3) ln_deposits
After reform	0.312***	0.157***	0.157***
	(0.0223)	(0.0122)	(0.0121)
Exposed bank	0.393***	(dropped)	(dropped)
	(0.0891)		
After reform x Exposed bank	0.567***	0.317***	0.316***
	(0.0705)	(0.0579)	(0.0578)
Observations	17,616	17,616	17,597
R2	0.04	0.85	0.94
Bank FEs		Yes	Yes
Bank-range FEs			Yes

Notes: This table presents the results from estimating the differential growth of deposits between exposed and non-exposed banks around the deposit insurance reform (equation 1). In this model, *log(deposits)* represents the logarithm of the deposit amounts, *Exposed bank* is an indicator for banks in the top 25 percentile based on their loan-to-deposit ratio in 2007, and *After reform* indicates the period post-2010 deposit insurance reform. Standard errors are reported in parentheses and clustered at the bank-account range level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

We also estimate a dynamic model to capture the diverging trend between deposit growth rates at exposed and non-exposed banks on a year-by-year basis. Starting from our baseline specification in equation 1 with bank and bank-account range fixed effects, we replace the $After_t$ dummy with a full set of year dummies. The results, visually presented in Figure 3, show a clear pattern: starting from 2010, exposed banks have consistently raised more deposits compared to their non-exposed counterparts, suggesting that the deposit insurance limit had a lasting and growing impact on depositor behavior and bank deposit acquisition strategies over the years.

The evidence reported above suggests that exposed banks experienced an increase in deposits in the post-reform period, relative to non-exposed banks. To further understand the extent to which deposits grew differentially above and below the deposit insurance threshold, we follow Iyer et al. (2019) and augment our baseline specification in equation 1 with a triple interaction term namely Exposed bank$_b$ $\times$ After$_t$ $\times$ Below$_k$,

Figure 3: Deposit growth rates at exposed relative to non-exposed banks over time



Notes: This figure depicts the double interaction coefficients and standard errors over time. We estimate our baseline specification in equation 1 when replacing the $After_t$ dummy with a full set of year dummies and with bank, bank-range, and bank-time fixed effects.

where Below_k is an indicator variable equal to one for deposit range bins below the DKK 750,000 threshold. Specifically, we estimate the following regression model:

$$\begin{aligned}\log(\text{deposits})_{btk} = \alpha + \beta_1 \text{Below}_k \times \text{After}_t \times \text{Exposed bank}_b + \beta_2 \text{Below}_k \times \text{After}_t \\ + \beta_3 \text{Below}_k \times \text{Exposed bank}_b + \beta_4 \text{After}_t \times \text{Exposed bank}_b \\ + \beta_5 \text{Below}_k + \beta_6 \text{After}_t + \beta_7 \text{Exposed bank}_b + \epsilon_{btk}\end{aligned} \tag{2}$$

Our key coefficient of interest is β_1, which indicates whether the increase in deposits at exposed banks post-reform is primarily driven by a redistribution of deposits above

the insurance limit, which became uninsured, relative to those below the limit, which remained insured.

Table 5 presents the results from estimating equation 2. Column (1) of the table shows the specification without fixed effects, where the triple interaction coefficient is significant and positive. This result suggests that exposed banks indeed saw a relative increase in account ranges below the insurance limit post-reform. The results for the double interaction are consistent with the broader trends observed in Table 4. Columns (2)-(4) illustrate that the estimated coefficient is remarkably stable as we successively add more stringent fixed effects. The most granular specification in column (4) includes bank, bank-range and bank-time fixed effects, which absorb all cross-sectional variation and bank-level shocks. This specification exhaustively controls for bank characteristics (including the characteristics of the average customer), both in levels and changes, and effectively identifies from within-bank differences in the growth rate of deposits above and below the limit. Notably, the estimated coefficient of the triple interaction in this stringent specification is almost identical to that in Column (3), while the R-squared increases, suggesting that our coefficient is not driven by unobservables (Altonji et al. 2005, Oster 2019).

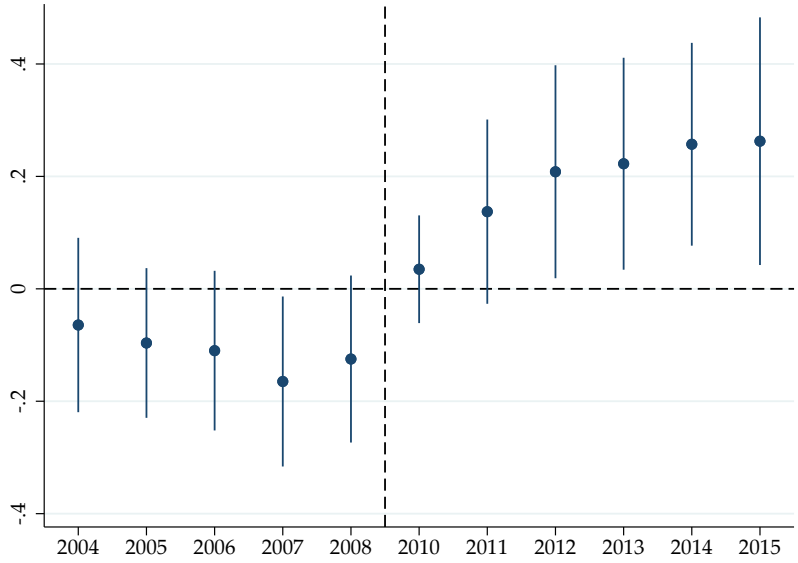
To illustrate the differential growth of insured deposits over time, we re-estimate our baseline triple interaction model in equation 2 and replace the $After_t$ dummy with a full set of year dummies (omitting 2009 as the reference category). Figure 4 illustrates the resulting triple interaction term over time and shows that the differences in growth rates of insured deposits at exposed relative to non-exposed banks only started with the 2010 deposit insurance reform. While growth rates of deposits above and below the DKK 750,000 threshold were comparable at exposed and non-exposed banks, the growth of deposits below the limit at exposed banks strongly increased with the 2010 reform.

Table 5: How Does Deposit Insurance Reform Affect Insured Deposit Growth Across Banks?

	(1) ln_deposits	(2) ln_deposits	(3) ln_deposits	(4) ln_deposits
Below limit	0.356***	0.356***	(dropped)	(dropped)
	(0.0995)	(0.0287)		
After reform	0.155***	-0.000	0.010	(dropped)
	(0.0466)	(0.0280)	(0.0267)	
After reform x Below limit	0.209***	0.209***	0.195***	0.200***
	(0.0528)	(0.0317)	(0.0297)	(0.0193)
Exposed bank	0.538***	(dropped)	(dropped)	(dropped)
	(0.1796)			
Below limit x Exposed bank	-0.194	-0.190**	(dropped)	(dropped)
	(0.2067)	(0.0757)		
After reform x Exposed bank	0.329**	0.081	0.122	(dropped)
	(0.1480)	(0.1128)	(0.1190)	
After x Below x Exposed bank	0.318*	0.314**	0.259*	0.255***
	(0.1669)	(0.1265)	(0.1351)	(0.0665)
Observations	17,616	17,616	17,597	17,597
R2	0.05	0.87	0.94	0.99
Bank FEs		Yes	Yes	Yes
Bank-range FEs			Yes	Yes
Bank-time FE				Yes

Notes: This table presents the results from estimating the differential growth of insured deposits between exposed and non-exposed banks around the deposit insurance reform (equation 2). The dependent variable, *log(deposits)*, represents the logarithm of deposit amounts. *Below limit* indicates deposit amounts below the DKK 750,000 insurance threshold. *Exposed bank* denotes banks with loan-to-deposit ratios in the top quartile at the end of 2007. *After reform* refers to the period post-2010 deposit insurance reform. Standard errors are reported in parentheses and clustered at the bank-account range level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 4: Fully dynamic triple interaction model of deposit growth rates



Notes: The figure shows the interaction coefficients based on estimating our baseline specification in equation 2 when replacing the $After_t$ dummy with a full set of year dummies.

4.2.2 Interest rates on deposits

Exposed banks, which were most affected by the dry up of wholesale funding markets, were substantially more succesful in attracting inflows of (insured) deposits following the deposit insurance reform compared to non-exposed banks. As exposed banks also incurred higher loan losses during the GFC compared to non-exposed banks (see Table 3), it is natural to wonder what drove deposits to exposed banks. To investigate the underlying mechanism, we now study the interest rate on deposits offered by banks. We document that after the deposit insurance reform, exposed banks started to offer higher deposit rates compared to non-exposed banks in order to attract deposit inflows. Depositors recognized that deposits below the insurance threshold were government-guaranteed and were thus willing to accept the higher returns offered. The additional risk associated with maintaining deposits in exposed banks was effectively born by the deposit insurance scheme.

We provide empirical evidence for this phenomenon by applying our difference-in-

difference approach outlined in equation (1) to interest rates on deposits. In particular, we replace the dependent variable $log(deposits)_{btk}$ with the interest rate on deposits. Given that data does not directly report deposit rates, we infer them from details on interest payments and account balances, following the methodology of Jensen and Johannesen (2017). We compute the effective interest rate paid by bank b to depositor i in year t using the formula:

$$i_{b,i,t} = \frac{\text{Interest payments}_{b,i,t}}{0.5 \times (\text{Deposit balance}_{b,i,t} + \text{Deposit balance}_{b,i,t-1})}. \tag{3}$$

This effective interest rate is calculated by dividing the total interest payments in year t by the average deposit balance across the end of the current and previous year. This average serves as a proxy for the mean deposit balance throughout the year, assuming a linear progression of deposit balances over the year. Since this assumption is more likely to hold when the account balance is roughly stable within the year, we impute interest rates only for account-years with a change in the balance of less than 20%.

In the first step, we estimate the differential change in interest rates around the introduction of the deposit insurance limit in non-exposed banks relative to exposed banks. To distinguish the general trend in interest rates from the interest rates on deposits that became uninsured, we provide specific estimates for different ranges of account values by computing the median imputed interest rate among all the accounts in bank b in year t in range k.

Table 6 presents the results from the difference-in-difference estimates of the interaction between the $After_t$ and $Exposed_b$ indicators. The baseline results in column (1) show a general decrease in rates after the reform, consistent with the broader interest rate environment of the time. The interaction term "After reform x Exposed bank" is of particular interest, as it suggests that the decrease in deposit rates following the reform was less pronounced for exposed banks. Specifically, while deposit rates generally decreased by 1.2 percentage points after the reform, exposed banks decreased their

Table 6: How Did Deposit Insurance Reform Influence Bank Deposit Rates?

	(1) rates	(2) rates	(3) rates
After reform	-0.012***	-0.012***	-0.012***
	(0.0001)	(0.0001)	(0.0001)
Exposed bank	-0.000	(dropped)	(dropped)
	(0.0003)		
After reform x Exposed bank	0.002***	0.001**	0.001**
	(0.0003)	(0.0003)	(0.0003)
Observations	16,649	16,649	16,636
R2	0.35	0.45	0.57
Bank FEs		Yes	Yes
Bank-range FEs			Yes

Notes: This table presents difference-in-difference estimates analyzing the impact of deposit insurance reform on bank deposit rates. The dependent variable, *Deposit rates*, represents the interest rates on deposits. Independent variables include *After reform*, an indicator for the post-reform period, and *Exposed bank*, denoting banks in the top quartile of loan-to-deposit ratios at the end of 2007. Standard errors are reported in parentheses and clustered at the bank-account range level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

rates by only 1.0 percentage points. This smaller reduction in interest rates implies that exposed banks were actively using higher rates to attract or retain deposits under the new insurance regime. Despite the inclusion of granular different fixed effects in columns (2) and (3), the interaction term remains robustly positive and significant. We interpret this as evidence that exposed banks exploited the governments' deposit guarantees to attract funding inflows by lower deposit rates by less than non-exposed banks.

It should be noted that our *exposed* banks share similarities with the systemic banks studied in Iyer et al. (2019), notably their larger size relative to non-exposed banks. A valid concern is therefore whether our results on deposit quantities and prices are

merely capturing depositors' flight to too-big-to-fail banks as in Iyer et al. (2019). First, the six systemic banks are roughly evenly split across exposed and non-exposed banks in our analysis. Moreover, we emphasize that our label of *exposed* pertains specifically to their vulnerability and funding pressure during the financial crisis rather than their systemic importance. We demonstrate that our results on deposit volumes and rates are robust to the exclusion of the systemic banks in Tables A.3-A.4 in the Appendix.

In an additional robustness test we explore a different measure of banks' exposure to the GFC. Rather than analyzing banks with a high loan-to-deposit ratio, signaling dependence on wholesale funding markets, we study banks' with excessive credit growth in the years prior to the onset of the crisis. In particular, Tables A.1-A.2 in the Appendix replicate our baseline results on deposit volumes and prices when we categorize banks as "Exposed banks" if their average annual credit growth between 2004 and 2007 was in the top quartile. Our baseline result on deposit quantities remains: banks more heavily affected by the GFC raised significantly more (insured) deposits after the deposit insurance reform relative to less affected banks. We do not find statistically significant differences between interest rates on deposits offered by banks with high relative to low credit growth prior to the GFC.

Our key takeaway from this section is that exposed banks, which were funding-constrained during the GFC, successfully attracted deposit inflows by offering higher interest rates to depositors compared to non-exposed banks. Depositors, recognizing the implications of the deposit insurance limit introduced in 2010, redistributed their funds across multiple banks to stay within the insured limit. This deposit reallocation, driven by the new insurance cap, particularly benefited exposed banks, which experienced a rapid influx of insured deposits relative to their non-exposed counterparts. We now proceed to demonstrate that this reallocation of deposits had significant repercussions for the real economy, reflected in the lending behaviors of exposed versus non-exposed banks.

5 Credit misallocation

This part of our analysis focuses on the impact of deposit redistribution on lending practices, particularly by banks more successful in attracting insured deposits after the deposit insurance reform. We utilize an extensive dataset encompassing annual credit account balances of Danish banks and integrate detailed financial data on firms. This comprehensive approach allows us to explore how the capital allocation within the economy might have shifted due to changes in the banks' funding structure.

Our investigation focuses on whether these exposed banks, which had higher loan-to-deposit ratios at the onset of the financial crisis, altered their lending practices towards firms with varying profitability levels. To ascertain this, we adopt an empirical model that controls for demand, supply, and unobserved bank-firm matching factors fixed effects (Khwaja and Mian 2008, Amiti and Weinstein 2011). The model is specified as:

$$\begin{aligned} \log(\text{credit})_{bit} = \alpha + \beta_1 \text{Low RoA}_{it-1} \times \text{Exposed bank}_b \\ \beta_2 \text{Low RoA}_{it-1} + \beta_3 \text{Exposed bank}_b + \epsilon_{bit} \end{aligned} \tag{4}$$

In equation 4, $\log(\text{credit})$ denotes the logarithm of the outstanding credit between firm i and bank b in year t. The key explanatory variables include Low RoA_{it-1}, an indicator that is set to 1 if the firm i's return on assets (RoA) in the previous year was below the median, and Exposed bank_b, a binary variable that indicates whether bank b's loan-to-deposit ratio at the end of 2007 was in the top quartile, signifying a higher level of exposure during the financial crisis. We report standard errors clustered at the bank-firm level. The main coefficient of interest is the interaction term Low $\text{RoA}_{it-1} \times$ Exposed bank_b, as it captures the assortative matching between exposed banks and firms with pre-determined low profitability ratio.

Table 7 presents the results from estimating equation 4. The key variable of inter-

est is the interaction term Low RoA$_{it}$ $\times$ Exposed bank$_b$, which sheds light on whether exposed banks disproportionately allocated credit to less profitable firms. A significant and positive coefficient on this term would suggest a potential misallocation of credit similar as in Schivardi et al. (2022), entailing exposed banks matching with less profitable firms during our sample period.

Column 1 provides the baseline results without any fixed effects. The negative coefficient on *Exposed bank* suggests that exposed banks, on average, provided less credit compared to non-exposed banks, possibly due to higher losses as detailed in Table 3. However, the positive and significant interaction term *Exposed bank x Low RoA* implies that exposed banks tended to attenuate the drop in credit for less profitable firms. Columns 2, 3, 4 and 5 successively introduce more intricate combinations of time-varying fixed effects. These added layers of control are designed to alleviate concerns related to omitted factors driven by supply-side (bank-time fixed effects) and demand-side (firm-time or ILST fixed effects) influences.[6] Column 5, being the most stringent specification, is reassuring as the coefficient of the interaction term remains positive and significant, reinforcing the finding that exposed banks tended to lend more to less profitable firms, ceteris paribus.

Building upon our earlier findings, we further augment our analysis by incorporating a triple interaction into Equation 4. This addition assesses the interplay between bank exposure, firm profitability, and the timing of the deposit insurance reform. Employing a difference-in-difference approach, we compare lending patterns to low-profitable firms before and after the deposit insurance reform, particularly focusing on banks that were more exposed during the financial crisis. Our objective is to ascertain whether the tendency of exposed banks to lend more to less profitable firms, as evidenced in Table 7, intensified or was mitigated following the deposit insurance reform. This critical examination seeks to unravel whether the reform in 2010, which

[6]The ILST fixed effects control for a wide range of factors across different dimensions, providing a more robust and nuanced understanding of the relationships being analyzed. In the context of bank lending, these fixed effects would help isolate the effect of bank exposure or bank-firm relationships from other industry, location, size, and temporal influences (Degryse et al. 2019).

Table 7: How Do Exposed Banks' Lending Patterns Vary with Firm Profitability?

	(1)	(2)	(3)	(4)	(5)
Outcome: Total credit (log)					
Exposed bank	-0.94***	-0.84***	(dropped)	(dropped)	(dropped)
	(0.02)	(0.03)			
Low RoA	0.27***	0.10***	0.31***	(dropped)	(dropped)
	(0.02)	(0.01)	(0.02)		
Exposed bank x Low RoA	0.15***	0.03	0.08***	0.19**	0.19**
	(0.03)	(0.02)	(0.03)	(0.08)	(0.08)
Observations	328,837	314,534	323,144	81,753	81,681
R2	0.09	0.53	0.23	0.58	0.59
Firm FE		Y			
Bank FE			Y	Y	
ILST FE			Y		
Firm-Year FE				Y	Y
Bank-Year FE					Y

Notes: This table presents regression results analyzing lending patterns of exposed banks to firms with varying levels of profitability. The dependent variable, *Total credit (log)*, represents the logarithmic value of total credit extended. The independent variables are *Exposed Bank*, indicating banks whose loan-to-deposit ratio was in the top-25% in 2007; *Low RoA*, an indicator for firms with below-median return on assets in the previous year. Standard errors are reported in parentheses and clustered at the bank-firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

resulted in exposed banks attracting a greater volume of insured deposits by offering higher rates than non-exposed banks (as discussed in Section 4.2), had a consequential impact on the lending patterns of these banks towards firms with lower profitability.

The results depicted in Table 8 offer valuable insights into the lending patterns post-deposit insurance reform through the triple interaction term Exposed bank$_b$ $\times$ Low RoA$_{it-1}$ $\times$ After reform$_t$. This indicates that the tendency of exposed banks to lend to less profitable firms did not undergo a significant change after the reform, compared to the period before the reform. Such a finding implies that the credit misallocation by exposed banks, observed in our previous analysis, was ongoing and persisted even after the introduction of the deposit insurance limit. This suggests that the deposit insurance reform, which kept exposed banks alive in a period of frequent bank failures, inadvertently led to a distortive redirection of credit away from more productive economic sectors, potentially exacerbating inefficiencies within the economy.

The core findings remain consistent as we progressively incorporate more stringent fixed effects in columns (2) to (5). The significant and positive coefficient on the double interaction term Exposed bank$_b$ $\times$ Low RoA$_{it-1}$ across these specifications underscores the ongoing misallocation of credit. Exposed banks continued to allocate more credit to less profitable firms, underscoring the distortive effects of the deposit insurance reform on credit allocation within the banking sector.

We present additional results on the lending practices of exposed banks to unprofitable firms around the deposit insurance reform in Tables A.5-A.7 in the Appendix. We first study extensive margin measures of lending, the creation and termination of lending relationships, and finally the interest rate on loans. Tables A.5 and A.6 illustrate significant extensive margin effects in lending markets: exposed banks were significantly more likely to begin new lending relationships with unprofitable firms after the deposit insurance reform. In addition, exposed banks are generally less likely to terminate lending relationships with less profitable firms, although we do not find significant changes in this practice around the reform date. Similarly, exposed banks

charge lower interest rates to less profitable firms relative to non-exposed banks, but this pattern does not change around the deposit insurance reform, see Table A.7.

5.1 Risk-taking versus misallocation in bank lending

Our analysis thus far has established a pattern of credit misallocation by exposed banks towards less profitable firms, particularly in the context of the deposit insurance reform. We now provide additional evidence that these results are leading to an inefficient allocation of capital, and not merely mask exposed banks' risk-taking.

First, exposed banks may be lending to less profitable but productive firms. These could be, for example, firms in their early growth stages or engaged in long-term projects where profitability is not immediately apparent, yet they contribute positively to the economy. To address this, we re-estimate our baseline lending results after replacing the indicator for low profitability with one for low productivity. Our measure of productivity is the ratio of *value-added to physical capital*. This allows us to discern whether exposed banks were also channelling credit to potentially productive but currently less profitable firms.

Table A.8-A.9 in the Appendix show that when we incorporate this productivity measure in our specification, we find that exposed banks extended more credit to less productive firms than non-exposed banks. This holds both before and after the deposit insurance reform. This is additional evidence that exposed banks' inflow of funding due to the deposit insurance reform supported an inefficient allocation of capital: exposed banks used these funds to extend credit to unprofitable and unproductive firms. This would be an inefficient allocation of resources if these funds could have instead been channeled towards productive firms. We will revisit this question, and the implications for the real economy, in the following section.

A natural question arising from these results is whether exposed banks truly tend to lend to unprofitable firms, or if they in fact channel their credit supply to riskier

Table 8: How Did the Deposit Insurance Reform Impact Lending Practices of Exposed Banks?

	(1)	(2)	(3)	(4)	(5)
Outcome: Total credit (log)					
Exposed bank	-0.96***	-0.87***	(dropped)	(dropped)	(dropped)
	(0.03)	(0.04)			
Low RoA	0.20***	0.05**	0.23***	(dropped)	(dropped)
	(0.02)	(0.02)	(0.02)		
Exposed bank x Low RoA	0.19***	0.09***	0.13***	0.19**	0.20**
	(0.04)	(0.03)	(0.03)	(0.09)	(0.09)
After reform	-0.32***	-0.23***	(dropped)	(dropped)	(dropped)
	(0.02)	(0.02)			
Exposed bank x After reform	-0.05	-0.02	-0.14***	-0.17	(dropped)
	(0.04)	(0.04)	(0.04)	(0.12)	
Low RoA x After reform	0.15***	0.11***	0.16***	(dropped)	(dropped)
	(0.03)	(0.03)	(0.03)		
Exposed bank x Low RoA x After reform	-0.07	-0.11**	-0.09*	0.00	-0.01
	(0.05)	(0.04)	(0.05)	(0.15)	(0.15)
Observations	328,837	314,534	323,144	81,753	81,681
R2	0.09	0.53	0.23	0.58	0.59
Firm FE		Y			
Bank FE			Y	Y	
Bank-Year FE					Y
Firm-Year FE				Y	Y
ILST FE			Y		

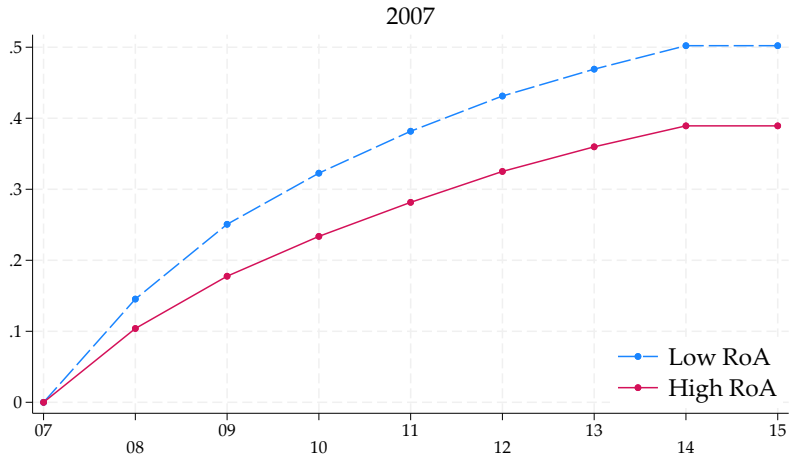
Notes: This table presents the results of lending regression analysis, using a difference-in-difference approach, to evaluate the impact of the deposit insurance reform on exposed banks' lending practices. The dependent variable, *Total credit (log)*, represents the logarithmic value of total bank credit. The independent variables are *Exposed Bank*, indicating banks whose loan-to-deposit ratio was in the top-25% in 2007; *Low RoA*, an indicator for firms with below-median return on assets in the previous year; and *After reform*, an indicator for the post-reform period. Standard errors are reported in parentheses and clustered at the bank-firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

firms, which happen to be less profitable on average. This is important because the distinction between lending to risky or unprofitable borrowers has vastly different implications for the real economic consequences of our results: While exposed banks providing credit to riskier firms may pose financial stability issues, it must not be undesirable from an economic efficiency perspective. On the other hand, channeling funding to less productive firms at the expense of more productive firms leads to an inefficient allocation of capital. In this situation, efficiency could be restored by reallocating funding from less to more profitable firms.

To explore this question, we re-estimate our difference-in-difference model of credit provision in equation 4 but replace the indicator for less profitable firms with an indicator for ex-ante riskier firms. We utilize two proxies of firm risk: the within-firm volatility of and firms' leverage ratio, defined as the ratio of total debt to total assets. Tables A.10-A.13 in the Appendix report our results and showcase that or previous results are not necessarily driven by exposed banks lending to riskier firms. We find no statistically significant differences in the lending of exposed and non-exposed banks to borrowers with higher sales volatility. When analyzing lending to more levered firms, we find the opposite of risk-taking: exposed banks lend relatively more to less levered firms. Overall, these results reinforce the idea that exposed banks tended to lend to unprofitable, and unproductive, but not necessarily ex-ante riskier firms.

Finally, to explore the real impact of credit misallocation we turn to Figure 5, which offers compelling graphical evidence of its effects on economic activity. In this figure, we categorize firms borrowing from exposed and non-exposed banks in 2007 based on their RoA status in 2007 and track their cumulative exit rates over subsequent years. The figure strikingly illustrates higher exit rates among low RoA firms, underscoring the real economic consequences of credit being channelled away from potentially more viable and productive businesses due to the misallocation practices of exposed banks. This trend of higher exits in less profitable firms lends weight to the argument that credit misallocation has tangible, adverse effects on the broader economy.

Figure 5: Lending patterns and financial exposure



Notes: The figure shows the cumulative exit rates over the years for firms borrowing from exposed and non-exposed banks as of 2007, categorized based on their RoA status also in 2007.

6 Aggregate Effects of the Insurance Reform

We documented that the deposit insurance reform in 2010 triggered a redistribution of (insured) deposits to exposed banks, which lend disproportionally to less profitable and less productive firms. Next, we quantify the aggregate effect of this mechanism on output and efficiency in the real economy. Allocative efficiency is measured by the dispersion of the marginal productivity of capital as in Hsieh and Klenow (2009). To estimate the aggregate impact of the deposit insurance reform we implement the approach developed by Sraer and Thesmar (2023), who show that it only depends on three moments of the sector-level distribution of log marginal product of capital (log-MRPK): the variance, the mean, and the covariance with value added. This approach takes general equilibrium effects into account and does not require an estimation of a structural model.

We estimate the moments of the log-MRPK distribution running regressions on a window centered around the reform, 2005-2016:

1. $\Delta\hat{\Delta}\sigma^2(s)$ is the diff-in-diff estimate of the effect of the policy change on the vari-

ance of log-MRPK in industry s;

2. $\Delta\hat{\Delta}\mu(s)$ is the diff-in-diff estimate of the effect of the policy change on the mean log-MRPK in industry s;

3. $\Delta\Delta\hat{\sigma_{MRPK,py}}(s)$ is the diff-in-diff estimate of the effect of the policy change on the covariance between log-MRPK and log value added in industry s.

The idea of the method is that each industry has been affected by the introduction of the insurance limit differently, i.e. each industry has been differentially exposed to the reform. In our setting, exposure λ_s to the policy in each industry s is measured by the share of lending from exposed relative to non-exposed banks averaged in the pre-reform years. Our data covers 414 distinct industries identified by their 4-digit NACE codes, making up a total of 108,791 firms. We define the MRPK as the ratio of value added over capital, and we require at least five firms in a sector-year in order to compute the moments of the log-MRPK distribution.

As the baseline exercise in Sraer and Thesmar (2023), for each of the three moments of the log-MPRK distribution M_{st} we evaluate the effect of the reform by adopting a diff-in-diff strategy by quartile of exposure:

$$M_{st} = \delta_t + \eta_s + \sum_{j=2}^{4} c_{jM} \mathbb{1}_{\lambda_s \in Q_j} \times POST_t + \mu_s \times t + \eta_{st}$$

where δ_t is a year FE, η_s is an industry FE, λ_s is industry-level exposure to the policy, and $POST$ is dummy variable post 2010. As an example, $\Delta\hat{\Delta}\sigma^2(s) = \sum_{j=2}^{4} \hat{c_{jM}} \mathbb{1}_{\lambda_s \in Q_j}$ is the estimated coefficient when the dependent variable is the variance of log-MRPK.

Finally, we plug in the estimates $\Delta\hat{\Delta}\sigma^2(s)$, $\Delta\hat{\Delta}\mu(s)$, and $\Delta\Delta\hat{\sigma_{MRPK,py}}(s)$ in the aggregation formulas derived in Sraer and Thesmar (2023) and use their same calibrated parameters – common in the literature, see e.g. David and Venkateswaran (2019) – to obtain the counterfactual change in aggregate TFP and output. In particular, we set demand elasticities and capital shares constant across industries. The capital share in

production α is set to 0.33, the price elasticity of demand is set so that $\theta \approx 0.85$, and the Frisch elasticity ϵ is set to 0.5. Additionally, we compute the pre-reform share of industry s in total sales ϕ_s and capital κ_s directly in our firm-level data.

The counterfactual change in aggregate TFP is then measured as:

$$\Delta \log(TFP) \approx \underbrace{-\frac{\alpha}{2}\left(1+\frac{\alpha\theta}{1-\theta}\right)\sum_{s=1}^{S}\kappa_s \Delta\Delta\hat{\sigma^2}(s)}_{-0.7\%} + \underbrace{-\frac{\alpha}{2}\left(1+\frac{\alpha\theta}{1-\theta}\right)\sum_{s=1}^{S}(\phi_s-\kappa_s)\left(\Delta\Delta\hat{\mu}(s)+\Delta\Delta\hat{\sigma_{MRPK,py}}(s)+\frac{1}{2}\frac{\alpha\theta}{1-\theta}\Delta\Delta\hat{\sigma^2}(s)\right)}_{-1.1\%} = -1.7\% \tag{5}$$

The total loss in TFP of roughly -1.7% can be decomposed into two terms. The first term, representing within-sector reallocation of resources, contribute to -0.7% of decreased TFP following the reform. The second term, representing cross-industry production reallocation, contribute slightly more to the loss in TFP, and precisely -1.1%. We can similarly measure the counterfactual change in aggregate output as following:

$$\Delta \log Y \approx -\frac{\alpha(1+\epsilon)}{1-\alpha}\sum_{s=1}^{S}\phi_s\left(\Delta\Delta\hat{\mu}(s)+\Delta\Delta\hat{\sigma_{MRPK,py}}(s)+\frac{1}{2}\frac{\alpha\theta}{1-\theta}\Delta\Delta\hat{\sigma^2}(s)\right) = -2.4\% \tag{6}$$

Therefore, we conclude that the change in insurance limit introduced in 2010 generated a misallocation of resources both within and between sectors in the economy, leading to a loss in efficiency and aggregate output.

7 Conclusion

This paper investigates the distortive impact of deposit insurance on deposit and credit allocation, utilizing comprehensive administrative datasets covering Danish household deposits and corporate credit accounts. We study a reform of the Danish deposit

insurance scheme in 2010 and show that banks more exposed to the adverse consequences of the Global Financial Crisis benefited differentially from the deposit insurance scheme.

Examining the reallocation of deposits across banks in response to changes in deposit limits, we demonstrate a systematic shift where exposed banks attract disproportionately more insured deposits after the deposit insurance reform. Exposed banks attracted deposit inflows by increasing their interest rates on deposits relative to other banks after the reform. The inflow of funds allowed exposed banks to buffer the funding pressure due to the wholesale funding market freeze. Depositors strategically kept their funds in exposed banks below the new insurance limit such that exposed banks' default risk was effectively borne by the deposit insurance scheme.

Moving beyond the deposit reallocation dynamics, the analysis explores the consequences for the real economy, revealing that exposed banks disproportionately allocate lending to less profitable and less productive firms. The deposit insurance reform inadvertently leads to a misallocation of credit away from more productive firms. We quantify the resulting effect for the real economy and find a negative impact on aggregate productivity and output.

We provide novel insights into deposit guarantees' distortions in the allocation of deposits across banks, nuances in depositor behavior in response to changes in insurance coverage, and the subsequent implications for credit allocation and economic efficiency. The findings underscore the unintended consequences of deposit insurance on credit reallocation and highlight the potential for future financial fragility as exposed banks continue accumulating credit risk.

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Table A.1: Deposit Growth Rates - Bank Exposure Measured via Credit Growth

	(1) ln_deposits	(2) ln_deposits	(3) ln_deposits	(4) ln_deposits
Below limit	0.336***	0.337***	(dropped)	(dropped)
	(0.1101)	(0.0310)		
After reform	0.170***	0.007	0.018	(dropped)
	(0.0472)	(0.0317)	(0.0316)	
After reform x Below limit	0.234***	0.234***	0.220***	0.224***
	(0.0539)	(0.0364)	(0.0362)	(0.0186)
Exposed bank	-0.014	(dropped)	(dropped)	(dropped)
	(0.1398)			
Below limit x Exposed bank	-0.088	-0.090	(dropped)	(dropped)
	(0.1608)	(0.0669)		
After reform x Exposed bank	0.057	0.087	0.125	(dropped)
	(0.1485)	(0.1079)	(0.1039)	
After x Below x Exposed bank	0.209	0.211*	0.159	0.154*
	(0.1669)	(0.1190)	(0.1143)	(0.0806)
Observations	17,276	17,276	17,257	17,257
R2	0.03	0.86	0.94	0.99
Bank FEs		Yes	Yes	Yes
Bank-range FEs			Yes	Yes
Bank-time FE				Yes

Notes: This table re-estimates our baseline results on the differential growth of insured deposits (equation 2) with a different measure of bank exposure to the GFC. The dependent variable, *log(deposits)*, represents the logarithm of deposit amounts. *Below limit* indicates deposit amounts below the DKK 750,000 insurance threshold. *Exposed bank* denotes banks with an average credit growth between 2004-2007 in the top quartile. *After reform* refers to the period post-2010 deposit insurance reform. Standard errors are reported in parentheses and clustered at the bank-account range level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix A Additional Tables

Table A.2: Changes In Deposit Rates - Bank Exposure Measured via Credit Growth

	(1) outcome_var	(2) outcome_var	(3) outcome_var
After reform	-0.0117***	-0.0117***	-0.0117***
	(-97.50)	(-90.58)	(-91.52)
Exposed bank	0.000574	0	0
	(1.88)	(.)	(.)
After reformExposed bank	0.000790**	-0.000421	-0.000336
	(2.84)	(-1.55)	(-1.23)
"Observations" "R2" "Bank FEs" "Bank-range FEs"	16,436	16,436	16,429
r2	0.36	0.44	0.57
BankFEs		Yes	Yes
BankRangeFE			Yes

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: This table re-estimates our difference-in-difference model for bank deposit rates after dropping the systemic banks studied in Iyer et al. (2019). The dependent variable, *Deposit rates*, represents the interest rates on deposits. Independent variables include *After reform*, an indicator for the post-reform period, and *Exposed bank* denotes banks with an average credit growth between 2004-2007 in the top quartile. Standard errors are reported in parentheses and clustered at the bank-account range level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.3: (Insured) Deposit Growth Rates Without Systemic Banks

	(1) ln_deposits	(2) ln_deposits	(3) ln_deposits	(4) ln_deposits
Below limit	0.367***	0.367***	(dropped)	(dropped)
	(0.0854)	(0.0299)		
After reform	0.027	-0.032	-0.016	(dropped)
	(0.0452)	(0.0287)	(0.0273)	
After reform x Below limit	0.232***	0.233***	0.212***	0.217***
	(0.0518)	(0.0327)	(0.0306)	(0.0196)
Exposed bank	0.536***	(dropped)	(dropped)	(dropped)
	(0.1501)			
Below limit x Exposed bank	-0.188	-0.186**	(dropped)	(dropped)
	(0.1730)	(0.0805)		
After reform x Exposed bank	0.309**	0.080	0.196	(dropped)
	(0.1399)	(0.1284)	(0.1382)	
After x Below x Exposed bank	0.324**	0.322**	0.168	0.163***
	(0.1601)	(0.1417)	(0.1565)	(0.0619)
Observations	16,176	16,176	16,157	16,157
R2	0.07	0.80	0.91	0.99
Bank FEs		Yes	Yes	Yes
Bank-range FEs			Yes	Yes
Bank-time FE				Yes

Notes: This table re-estimates our baseline results on the differential growth of insured deposits (equation 2) after dropping the systemic banks studied in Iyer et al. (2019). The dependent variable, *log(deposits)*, represents the logarithm of deposit amounts. *Below limit* indicates deposit amounts below the DKK 750,000 insurance threshold. *Exposed bank* denotes banks with loan-to-deposit ratios in the top quartile at the end of 2007. *After reform* refers to the period post-2010 deposit insurance reform. Standard errors are reported in parentheses and clustered at the bank-account range level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.4: Changes In Deposit Rates Without Systemic Banks

	(1) rates	(2) rates	(3) rates
After reform	-0.012***	-0.012***	-0.012***
	(0.0001)	(0.0001)	(0.0001)
Exposed bank	-0.000	(dropped)	(dropped)
	(0.0003)		
After reform x Exposed bank	0.002***	0.001**	0.001**
	(0.0003)	(0.0003)	(0.0003)
Observations	15,292	15,292	15,279
R2	0.35	0.45	0.58
Bank FEs		Yes	Yes
Bank-range FEs			Yes
Bank-time FE			

Notes: This table re-estimates our difference-in-difference model for bank deposit rates after dropping the systemic banks studied in Iyer et al. (2019). The dependent variable, *Deposit rates*, represents the interest rates on deposits. Independent variables include *After reform*, an indicator for the post-reform period, and *Exposed bank*, denoting banks in the top quartile of loan-to-deposit ratios at the end of 2007. Standard errors are reported in parentheses and clustered at the bank-account range level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.5: Exposed Banks, (Un)profitable firms, and New Lending Relationships

	(1)	(2)	(3)	(4)	(5)
Outcome: New lending relationship					
Exposed bank	-0.034***	-0.059***	(dropped)	(dropped)	(dropped)
	(0.001)	(0.002)			
Low RoA	-0.002	-0.006***	-0.004***	(dropped)	(dropped)
	(0.001)	(0.002)	(0.001)		
Exposed bank x Low RoA	-0.003	0.002	-0.001	0.003	0.002
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
After reform	0.020***	0.002	(dropped)	(dropped)	(dropped)
	(0.001)	(0.001)			
Exposed bank x After reform	-0.010***	-0.005**	-0.007***	-0.021***	(dropped)
	(0.002)	(0.002)	(0.002)	(0.004)	
Low RoA x After reform	-0.011***	-0.006***	-0.008***	(dropped)	(dropped)
	(0.002)	(0.002)	(0.002)		
Exposed bank x Low RoA x After reform	0.003	0.004	0.007***	0.012**	0.008*
	(0.002)	(0.003)	(0.002)	(0.005)	(0.005)
Observations	735,023	723,045	730,352	404,808	404,805
R2	0.01	0.13	0.09	0.43	0.46
Firm FE		Y			
Bank FE			Y	Y	
Bank-Year FE					Y
Firm-Year FE				Y	Y
ILST FE			Y		

Notes: This table presents regression results analyzing the creation of new lending relationships of exposed banks to firms with varying levels of profitability. The dependent variable, *New lending relationship*, is an indicator variable equal to one in the first year that a bank-firm lending relationship is observed. Key independent variables include *Exposed Bank*, identifying banks with higher exposure risk; *Low RoA*, an indicator for firms with below-median return on assets in the previous year. Standard errors are reported in parentheses and clustered at the bank-firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.6: Exposed Banks, (Un)profitable firms, and Termination of Lending Relationships

	(1)	(2)	(3)	(4)	(5)
Outcome: Terminated lending relationship					
Exposed bank	0.014***	0.030***	(dropped)	(dropped)	(dropped)
	(0.002)	(0.002)			
Low RoA	0.044***	0.016***	0.039***	(dropped)	(dropped)
	(0.002)	(0.002)	(0.002)		
Exposed bank x Low RoA	-0.012***	-0.011***	-0.012***	-0.015***	-0.012***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
After reform	-0.001	0.062***	(dropped)	(dropped)	(dropped)
	(0.002)	(0.002)			
Exposed bank x After reform	0.003	0.021***	0.013***	0.024***	(dropped)
	(0.002)	(0.003)	(0.002)	(0.004)	
Low RoA x After reform	-0.005**	0.021***	-0.002	(dropped)	(dropped)
	(0.002)	(0.002)	(0.002)		
Exposed bank x Low RoA x After reform	0.006	0.004	0.008**	0.007	0.006
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
Observations	735,023	723,045	730,352	404,808	404,805
R2	0.01	0.22	0.10	0.63	0.67
Firm FE		Y			
Bank FE			Y	Y	
Bank-Year FE					Y
Firm-Year FE				Y	Y
ILST FE			Y		

Notes: This table presents regression results analyzing the termination of lending relationships between exposed banks and firms with varying levels of profitability. The dependent variable, *Terminated lending relationship*, is an indicator variable equal to one in the last year that a bank-firm lending relationship is observed. Key independent variables include *Exposed Bank*, identifying banks with higher exposure risk; *Low RoA*, an indicator for firms with below-median return on assets in the previous year. Standard errors are reported in parentheses and clustered at the bank-firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.7: Exposed Banks, (Un)profitable firms, and Termination of Lending Relationships

	(1)	(2)	(3)	(4)	(5)
Outcome: Interest rate					
Exposed bank	0.003***	0.002**	(dropped)	(dropped)	(dropped)
	(0.001)	(0.001)			
Low RoA	0.006***	0.001***	0.005***	(dropped)	(dropped)
	(0.000)	(0.000)	(0.000)		
Exposed bank x Low RoA	-0.002***	-0.001	-0.001**	-0.003**	-0.003*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
After reform	-0.000	-0.003***	(dropped)	(dropped)	(dropped)
	(0.000)	(0.000)			
Exposed bank x After reform	-0.001	0.002***	-0.000	-0.001	(dropped)
	(0.001)	(0.001)	(0.001)	(0.002)	
Low RoA x After reform	-0.003***	0.000	-0.002**	(dropped)	(dropped)
	(0.001)	(0.001)	(0.001)		
Exposed bank x Low RoA x After reform	0.003***	-0.001	0.002*	0.000	-0.002
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
Observations	92,823	79,861	86,162	11,310	11,085
R2	0.15	0.71	0.34	0.68	0.71
Firm FE		Y			
Bank FE			Y	Y	
Bank-Year FE					Y
Firm-Year FE				Y	Y
ILST FE			Y		

Notes: This table presents regression results analyzing interest rates on loans between exposed banks and firms with varying levels of profitability. The dependent variable, *Interest rate*, denotes the interest rate on loans, imputed according to equation 3. Key independent variables include *Exposed Bank*, identifying banks with higher exposure risk; *Low RoA*, an indicator for firms with below-median return on assets in the previous year. Standard errors are reported in parentheses and clustered at the bank-firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.8: How Do Exposed Banks' Lending Patterns Vary with Firm Productivity?

	(1)	(2)	(3)	(4)	(5)
Outcome: Total credit (log)					
Exposed bank	-1.09***	-1.00***	(dropped)	(dropped)	(dropped)
	(0.03)	(0.04)			
Low VA/Capital	0.08***	-0.15***	0.02	(dropped)	(dropped)
	(0.02)	(0.02)	(0.02)		
Exposed bank x Low VA/Capital	0.45***	0.31***	0.15***	0.46***	0.47***
	(0.03)	(0.03)	(0.03)	(0.09)	(0.09)
Observations	324,130	309,926	318,416	81,252	81,180
R2	0.09	0.53	0.23	0.58	0.59
Firm FE		Y			
Bank FE			Y	Y	
ILST FE			Y		
Firm-Year FE				Y	Y
Bank-Year FE					Y
Firm-Bank FE					

Notes: This table presents regression results analyzing lending patterns of exposed banks to firms with varying levels of lagged productivity. The dependent variable, *Total credit (log)*, represents the logarithmic value of total bank credit. Key independent variables include *Exposed Bank*, identifying banks with higher exposure risk; *Low VA/Capital*, indicating firms with a lower ratio of value-added to physical capital which is a proxy for productivity. Standard errors are reported in parentheses and clustered at the bank-firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.9: How Did the Deposit Insurance Reform Impact Lending Practices of Exposed Banks? Results on Firm Productivity

	(1)	(2)	(3)	(4)	(5)
Outcome: Total credit (log)					
Exposed bank	-1.12***	-1.04***	(dropped)	(dropped)	(dropped)
	(0.03)	(0.04)			
Low VA/Capital	0.05*	-0.12***	-0.02	(dropped)	(dropped)
	(0.03)	(0.03)	(0.03)		
Exposed bank x Low VA/Capital	0.50***	0.36***	0.19***	0.40***	0.39***
	(0.04)	(0.04)	(0.04)	(0.10)	(0.10)
After reform	-0.29***	-0.14***	(dropped)	(dropped)	(dropped)
	(0.02)	(0.02)			
Exposed bank x After reform	-0.02	-0.00	-0.15***	-0.32**	(dropped)
	(0.04)	(0.04)	(0.04)	(0.14)	
Low VA/Capital x After reform	0.09***	-0.05	0.08**	(dropped)	(dropped)
	(0.03)	(0.03)	(0.03)		
Exposed bank x Low VA/Capital x After reform	-0.12**	-0.14***	-0.06	0.19	0.21
	(0.05)	(0.05)	(0.05)	(0.16)	(0.17)
Observations	324,130	309,926	318,416	81,252	81,180
R2	0.09	0.53	0.23	0.58	0.59
Firm FE		Y			
Bank FE			Y	Y	
Firm-Bank FE					
Bank-Year FE					Y
Firm-Year FE				Y	Y
ILST FE			Y		

Notes: This table presents the results of lending regression analysis, using a difference-in-difference approach, to evaluate the impact of the deposit insurance reform on exposed banks' lending practices. The dependent variable, *Total credit (log)*, represents the logarithmic value of total bank credit. Key independent variables include *Exposed Bank*, identifying banks with higher exposure risk; *Low VA/Capital*, indicating firms with a lower ratio of value-added to physical capital which is a proxy for productivity; and *After reform*, an indicator for the post-reform period. Standard errors are reported in parentheses and clustered at the bank-firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.10: How Do Exposed Banks' Lending Patterns Vary with Ex-ante Firm Sales Volatility?

	(1)	(2)	(3)	(4)	(5)
Outcome: Total credit (log)					
Exposed bank	-0.89***	-0.83***	(dropped)	(dropped)	(dropped)
	(0.02)	(0.04)			
High Sales volatility	-0.00	0.02	-0.01	(dropped)	(dropped)
	(0.02)	(0.12)	(0.02)		
Exposed bank x High Sales volatility	0.10**	0.04	0.09**	-0.02	-0.02
	(0.05)	(0.07)	(0.04)	(0.11)	(0.11)
Observations	321,011	313,226	315,287	80,445	80,368
R2	0.09	0.53	0.23	0.58	0.59
Firm FE		Y			
Bank FE			Y	Y	
ILST FE			Y		
Firm-Year FE				Y	Y
Bank-Year FE					Y

Notes: This table presents regression results analyzing lending patterns of exposed banks to firms with varying levels of lagged sales volatility. The dependent variable, *Total credit (log)*, represents the logarithmic value of total bank credit. Key independent variables include *Exposed Bank*, identifying banks with higher exposure risk; *High Sales Volatility*, indicating firms with higher volatility of sales which is a proxy for risk. Standard errors are reported in parentheses and clustered at the bank-firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.11: How Did the Deposit Insurance Reform Impact Lending Practices of Exposed Banks? Results on Firm Sales Volatility

	(1)	(2)	(3)	(4)	(5)
Outcome: Total credit (log)					
Exposed bank	-0.89***	-0.84***	(dropped)	(dropped)	(dropped)
	(0.03)	(0.04)			
High Sales volatility	0.04	-0.03	0.03	(dropped)	(dropped)
	(0.03)	(0.12)	(0.03)		
Exposed bank x High Sales volatility	0.12**	0.06	0.10**	0.05	0.03
	(0.05)	(0.08)	(0.05)	(0.13)	(0.13)
After reform	-0.22***	-0.18***	(dropped)	(dropped)	(dropped)
	(0.02)	(0.02)			
Exposed bank x After reform	-0.07**	-0.07**	-0.18***	-0.13	(dropped)
	(0.03)	(0.03)	(0.03)	(0.09)	
High Sales volatility x After reform	-0.07*	0.06	-0.09**	(dropped)	(dropped)
	(0.04)	(0.04)	(0.04)		
Exposed bank x High Sales volatility x After reform	-0.09	-0.01	-0.05	-0.18	-0.14
	(0.07)	(0.07)	(0.06)	(0.19)	(0.19)
Observations	321,011	313,226	315,287	80,445	80,368
R2	0.09	0.53	0.23	0.58	0.59
Firm FE		Y			
Bank FE			Y	Y	
Bank-Year FE					Y
Firm-Year FE				Y	Y
ILST FE			Y		

Notes: This table presents the results of lending regression analysis, using a difference-in-difference approach, to evaluate the impact of the deposit insurance reform on exposed banks' lending practices. The dependent variable, *Total credit (log)*, represents the logarithmic value of total bank credit. Key independent variables include *Exposed Bank*, identifying banks with higher exposure risk; *High Sales Volatility*, indicating firms with higher volatility of sales which is a proxy for risk; and *After reform*, an indicator for the post-reform period. Standard errors are reported in parentheses and clustered at the bank-firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.12: How Do Exposed Banks' Lending Patterns Vary with Ex-ante Firm Leverage?

	(1)	(2)	(3)	(4)	(5)
Outcome: Total credit (log)					
Exposed bank	-0.93***	-0.77***	(dropped)	(dropped)	(dropped)
	(0.03)	(0.04)			
High Leverage	0.70***	0.18***	0.64***	(dropped)	(dropped)
	(0.02)	(0.02)	(0.02)		
Exposed bank x High Leverage	0.16***	-0.05	0.04	-0.30***	-0.29***
	(0.03)	(0.03)	(0.03)	(0.09)	(0.09)
Observations	301,260	286,052	295,544	77,056	76,974
R2	0.11	0.53	0.25	0.58	0.59
Firm FE		Y			
Bank FE			Y	Y	
ILST FE			Y		
Firm-Year FE				Y	Y
Bank-Year FE					Y

Notes: This table presents regression results analyzing lending patterns of exposed banks to firms with varying levels of lagged leverage. The dependent variable, *Total credit (log)*, represents the logarithmic value of total bank credit. Key independent variables include *Exposed Bank*, identifying banks with higher exposure risk; *High Leverage*, indicating firms with higher leverage which is a proxy for risk. Standard errors are reported in parentheses and clustered at the bank-firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.13: How Did the Deposit Insurance Reform Impact Lending Practices of Exposed Banks? Results on Firm Leverage

	(1)	(2)	(3)	(4)	(5)
Outcome: Total credit (log)					
Exposed bank	-0.94***	-0.82***	(dropped)	(dropped)	(dropped)
	(0.03)	(0.04)			
High Leverage	0.55***	0.09***	0.49***	(dropped)	(dropped)
	(0.02)	(0.02)	(0.02)		
Exposed bank x High Leverage	0.18***	0.00	0.07*	-0.24**	-0.25**
	(0.04)	(0.04)	(0.04)	(0.10)	(0.10)
After reform	-0.47***	-0.29***	(dropped)	(dropped)	(dropped)
	(0.03)	(0.03)			
Exposed bank x After reform	-0.11**	-0.01	-0.19***	-0.09	(dropped)
	(0.05)	(0.04)	(0.05)	(0.12)	
High Leverage x After reform	0.30***	0.19***	0.28***	(dropped)	(dropped)
	(0.03)	(0.03)	(0.03)		
Exposed bank x High Leverage x After reform	0.04	-0.09*	0.00	-0.15	-0.12
	(0.06)	(0.05)	(0.06)	(0.16)	(0.16)
Observations	301,260	286,052	295,544	77,056	76,974
R2	0.11	0.53	0.25	0.58	0.59
Firm FE		Y			
Bank FE			Y	Y	
Bank-Year FE					Y
Firm-Year FE				Y	Y
ILST FE			Y		

Notes: This table presents the results of lending regression analysis, using a difference-in-difference approach, to evaluate the impact of the deposit insurance reform on exposed banks' lending practices. The dependent variable, *Total credit (log)*, represents the logarithmic value of total bank credit. Key independent variables include *Exposed Bank*, identifying banks with higher exposure risk; *High Leverage*, indicating firms with higher leverage which is a proxy for risk; and *After reform*, an indicator for the post-reform period. Standard errors are reported in parentheses and clustered at the bank-firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.