When Information Is Disclosed, How Does The Large Deposit Market Work?

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Abstract

The market for *large bank deposits* traditionally operates through private channels between banks and firms, unlike the open retail deposit market. This setup makes it an opaque market for market participants and an inconvenient one to study due to limited data availability. We contribute to this underexplored area by examining the dynamics of an online deposit platform, where banks must disclose deposit offers' terms and firms can browse and select suitable offers. We find that risk and return trade-offs crucially drive market behavior: bank risk levels dictate both banks' offered rates and depositors' cash allocation, and there is no evidence of relationship banking—depositors diversify risk by depositing to several banks with attractive rates. This type of marketplace opens a channel for banks to reach new clients while creating an accessible and informative market for depositors, promoting innovative alternative markets for large deposits.

JEL Codes: D47, E43, G20, G21

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1. Introduction

For firms and organizations, cash management is an important everyday activity that often involves depositing large amounts of money over short periods of time. Duchin et al. (2017) find that firms deposit in banks when they have excess capital from external sources that is not immediately used for real investments.[2] For banks, these funds from firms' liquidity management are compelling as they are more affordable than those in the interbank market (Imbierowicz et al., 2024). However, the market for *large bank deposits* is hardly approachable to both market participants and academics.

To learn about deposit conditions, firms must contact and negotiate with one or more banks. This task can be tedious and costly in terms of both time and money due to the informationally opaque market environment for corporate depositors, unlike the readily available information for retail depositors. On the other side of the market, to actively get corporate deposits, banks must contact their business customers who are likely to have excess liquidity for a special private deal. This approach reflects that banks typically rely on past transactions and that finding new clients for large deposits is not straightforward. Due to the lack of market transparency, and hence data availability, the large deposit market is challenging for

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[1]The paper was written initially while Nguyen was a Ph.D student at the Norwegian University of Science and Technology. She continued to work on the paper at BI Norwegian Business School, where she is now working at.

[2]Duchin et al. (2017) find that firms invest in safe assets from external funding and in risky assets from operating cash flows.

both sides of the market as well as to study academically. In this paper, we provide insights into the market dynamics for large deposits via access to data on an online platform—one that provides a marketplace with a full overview of deposit rates and conditions offered by the platform's member banks all in one place.

This online marketplace serves as a bridge connecting corporate depositors to banks in need of liquidity. Banks join the platform and make advertisements for their deposits with required full information. Potential depositors, i.e., firms and organizations, register as customers of the marketplace to gain access to these offers, allowing them to pick the most suitable one(s) just by a simple click.[3] The process of making large deposits becomes more transparent and less daunting for depositors than in the traditional market setup, while at the same time, banks can instantly reach out to potential depositors with excess liquidity.

Having access to the data of this marketplace allows us to examine the market operations of large deposits when information is disclosed—customers see the offered deposit rates and conditions by multiple banks, and banks can see each other's offers. Here, banks offer two types of deposits: floating-interest rate offers and fixed-interest rate offers. The floating type is quoted by a spread over the Norwegian Interbank Offer Rate (NIBOR), while the fixed type is quoted by the level of interest rate. By analyzing data at the offer and deposit levels, we find that there is a clear trade-off between risk and return. Riskier (and smaller) banks need to offer higher deposit rates to attract depositors. This finding is in line with the *bank deposits* literature on the relationship between bank risk and interest rates: bank risk is relevant for pricing deposit rates (both insured and uninsured deposits),[4] and attractive interest rates can contribute to depositor discipline.[5] Furthermore, we find that differences in withdrawal notice periods for on-demand deposits and in maturities for fixed deposits are reflected in deposit rates, i.e., banks embed adjustments aligned with the expected minimum deposit maturity.

To further investigate the pattern and preferences for deposit allocation, we analyze factors influencing the likelihood of a deposit made on this platform. We document that the daily number of deposits follows the current supply of the market and depositors tend to pick offers with higher interest rates.[6] But do banks with the best deposit rate get all the deposits? We then examine the risk diversification behaviors of depositors. The transactions on the platforms, which mostly exceed the coverage by the Norwegian Banks' Guarantee Fund,[7] expose the depositors to credit risk. We find that many depositors indeed diversify risk through a deposit cluster—they tend to place deposits across multiple banks around the same time. Our data suggests that banks within a deposit cluster often have similar levels of risk. Conditioned on the deposit rate level, the proportion of mid- to low-rated banks is high in these clusters. This observation indicates that while firms may diversify to mitigate credit risk, they prefer high deposit rates to compensate for associated bank risks rather than depositing a large amount in less risky banks for lower rates. This behavior shows that despite the safe banking environment in Norway, offering higher deposit rates is still a good strategy for lower-rated banks.

Finally, we find no evidence of banking relationships on the platform.[8] Although we

[3]Customers on this platform, who must have a valid registered organization number, use the platform free-of-charge. The service charge is only for member banks.

[4]See Hannan and Hanweck (1988), Egan et al. (2017), Martin et al. (2018), and Chen et al. (2022) for more details on bank risk and deposit rates.

[5]See Martinez Peria and Schmukler (2001); Maechler and McDill (2006); Imbierowicz et al. (2024) for empirical evidence on depositor discipline.

[6]This is a consistent finding with those in the literature—paying higher interest rates is an effective way for depositor attraction (Acharya and Mora, 2015; Imbierowicz et al., 2024).

[7]The current coverage by the Norwegian Banks' Guarantee Fund is NOK 2 million per depositor per bank.

[8]Unlike bank deposits, *firm* or *bank loans*—banks lending money to firms—is an area with a rich literature, of which bank-firm relationships have been found to be a critically beneficial factor for both interest rates and loans' readiness. See Petersen and Rajan (1994), Boot and Thakor (1994), Berlin and Mester (1999), and López-Espinosa et al. (2017) for references. Several studies argue that a bank-firm relationship strongly influences a firm's cash holding, and this influence depends on the market power of banks (Hubbard et al., 2002; Pinkowitz and Williamson, 2015; Nakajima and Sasaki, 2016; Cui et al., 2020).

cannot observe whether banks and depositors form relationships outside the platform, it is a fact that most member banks and firms repeatedly use the platform. It is therefore unlikely that they enter the platform to find a new partner to transact money with offline. Additionally, we find very few depositors to return to the same bank more than once. In cases where deposits are made to the same bank(s), the timing of the deposits does not suggest any form of banking relationship. This observation suggests that firms solely aim for attractive (risk-adjusted) returns on their cash holdings.

The aforementioned findings of this platform suggest that such innovative platforms can trigger a potential systematic transformation. Since the platform operates in Norway, a country that is highly financially-developed and among the world's top technology adopters,[9] innovative platforms can introduce fundamental changes in the Norwegian large deposit markets.[10] Some might argue that banks on the studied platform only join to observe the deposit rates offered by other banks. However, we should note that the platform is not free for its member banks, and there is a growing number of member banks and transactions on this marketplace. In fact, the platform claims that the deposit rates on this marketplace are higher than the average interest rates for corporate depositors, which indicates a strong competition among member banks. Although using the platform comes with higher prices for banks and they no longer benefit from information asymmetry as in the traditional setup, roughly 60% of banks with headquarter in Norway have decided to join the platform. This fact emphasizes the value of such marketplaces not only for depositors but for banks as well, and that the large deposit market should adjust to the changing environment.

Marketplaces for digital deposits are relatively new. The pioneers are Deposit Solutions and Raisin, founded in Germany in 2011 and 2012, respectively. One of the core services of these fintech firms is enabling customers to easily receive services from a third-party bank with better rates than their main bank offers, which is operated via open banking. Both of these platforms connected European partner banks and were backed by renowned investors. In June 2021, shortly after having launched the platforms in the U.S. markets, the two rivals merged to create Raisin DS, forming a fintech giant with global ambitions of providing innovative services in the savings and investment market. There are key differences between the platform studied in this paper and these other two providers (which are now one pan-European firm). First, customers on the studied platform are strictly firms and organizations, i.e., only corporate depositors, while customers of the other two can be both individuals and corporations. Second, customers in our study are not tied to one main bank. They come and go as pleased, free of charge. Therefore, while the features of the platform studied in this paper are not entirely unique, it has an original approach with potentially major contributions to the Norwegian deposit market and other alike markets.

A recent study by Imbierowicz et al. (2024) is the closest one to ours. The authors analyze microdata at the within-transaction level of an auction intermediary for bank deposits from firms. Observing bids of borrowing banks for firms' deposit offers, they find that banks can increase their chance of auction winning by bidding a high interest rate, and that firms prefer less risky banks, conditional on the same interest rate bid. They also find that banks are dependent on funding from such a platform in both stress and non-stress economic times. However, there are several fundamental distinctions in the setup of this auction platform compared to the one in our study: 1. firms offer deposits to a selection of banks, 2. banks bid for the offered deposit, 3. banks do not observe other banks' bids. Despite these distinctive operational setups, the empirical results in this study and ours show a consistent finding, hence, well-grounded uncovering of the large deposit market: the market's dynamics is centered on the risk and return trade-off mechanism. When the choice is up to firms, banks

[9] According to the Global Competitiveness Report from World Economic Forum by Schwab et al. (2019), Norway is ranked number 1 in *macroeconomic stability* and number 10 in ICT adoption.

[10] This platform contains all pillars mentioned in Gomber et al. (2018) that constitute the so-called *Fintech Revolution*: technology innovation, process disruption and transformation of services. Upon discussing the existential threat to traditional financial intermediation, Thakor (2020) concludes that banks will eventually either build their own version of peer-to-peer (P2P) platforms or acquire such a platform for customer retention and acquisition. This conjecture, to some extent, is validated by the establishment and progression of the platform studied in this paper.

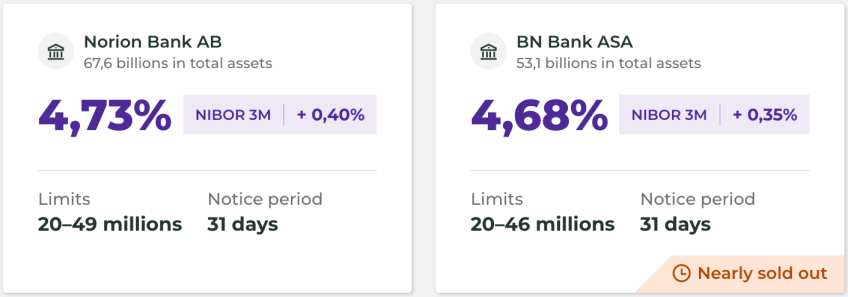


Figure 1: Examples of advertisements of offers on the platform This figure shows how offers from the platform's member banks look for depositors at a given time. Both of the offers above belong to floating-interest rate deposits, where the deposit rate is the sum of the Norwegian money market rate (NIBOR) and an interest spread. The offer on the right has a warning label it will soon be unavailable.

must offer competitive rates relative to their risk level in order to receive large deposits.

We structure the rest of the paper as follows: Section 2 introduces the institutional background of the marketplace; Section 3 presents data and essential information to the paper's analyses; Section 4 provides the findings to our research questions of the study; and Section 5 concludes the paper. We also include an Appendix for a summary of the data overview and additional tables and figures for further understanding of the study.

2. Institutional background

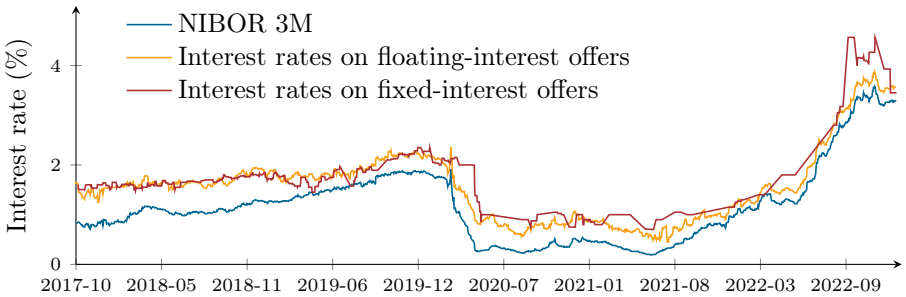
The data we analyze in this paper comes from activities on an online platform provided and run by Fixrate AS, a Norwegian fintech company established in October 2017. The users of this platform include banks, who initiate offers to receive deposits, and private firms and public organizations, who look for attractive offers to deposit a large sum of money. The member banks of this platform can easily advertise their offers to reach new and existing depositors, and depositors can view all the posted offers and choose the most attractive deal available through a simple process. For banks, there is an annual fee of 8 bps for deposits brokered through its platform in addition to a fixed, monthly fee.[11] For depositors, usage is free of charge.

On the platform, banks announce the terms and conditions of their offers through advertisements. These offers consist of the interest rate on the deposits, total asked volume, minimum and maximum sizes for each deposit, and withdrawal notice period or the deposit maturity. It is worth repeating that this type of information is not easily available in the traditional markets, neither for competitor banks nor depositors. Banks can offer two types of interest rates on this platform. The most common type is a floating interest rate, which is specified as an *interest spread* over the daily three-month Norwegian Interbank Offered Rate (NIBOR)—a commonly used money market rate for pricing financial instruments in Norway.[12] These floating-interest rate deposits are time unlimited with withdrawal notice periods of 31 or 90 days. The other type of offers has nominal fixed interest rates. These fixed-interest deposits have maturities of three, six, or twelve months. Figure 1 gives an example of how offers typically appear on the platform. The minimum deposit amount was initially set at NOK 5 million but was reduced to NOK 1 million in early 2020 in response to inquiries from potential customers.[13] Note that deposits up to NOK 2 million per bank

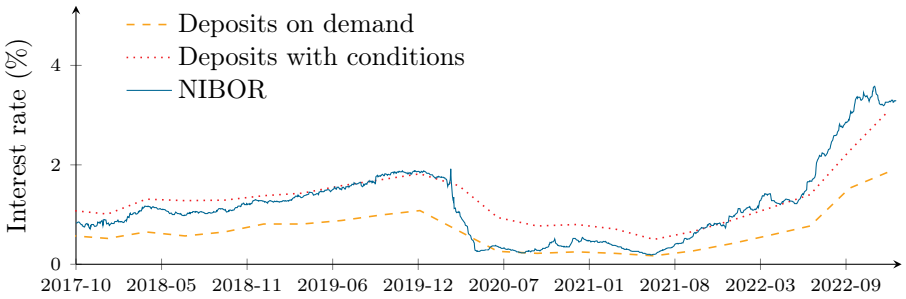
[11] The information was retrieved through private interview with the founder of Fixrate AS in 2022.

[12] NIBOR corresponds to the more well-known LIBOR and EURIBOR. It is adjusted at noon every weekday by Norske Finansielle Referanser.

[13] We plot the deposit amount over time in Figure 11 in the Appendix. We observe an immediate spike in the number of transactions following this policy change; however, the deposit volumes were still generally over NOK 5 million. The sample period largely covers the COVID-19 pandemic, with the policy change coincidentally occurring around the beginning of the pandemic.



(a) Deposit rates on the platform



(b) Deposit rates for non-financial corporations in Norway

Figure 2: Overview of deposit rates Figure 2a illustrates daily deposit rates on *floating-interest* offers (sum of the offered spread and the Norwegian money market (NIBOR) on the corresponding day) and on *fixed-interest* offers on the Fixrate platform. Figure 2b plots average quarterly deposit rates for non-financial corporations in Norway for two types of deposits: *on demand* and *with conditions*—the data is retrieved from Statistics Norway (SSB). For comparison, the daily observations of the interest rates of the NIBOR is plotted in the blue solid line for both figures. The figures cover the sample period in the paper, from October 2017 through January 2023.

are insured by the Norwegian Banks' Guarantee Fund.[14]

The depositors on the platform include non-financial corporations in Norway, as well as municipalities and counties. When potential depositors decide on an online offer, they can accept the offer unless it has expired, i.e., the offer's total asked volume has been fulfilled or the offering bank has withdrawn the offer. Acceptance by depositors establishes a binding agreement which banks cannot reject. Banks and potential depositors must confirm the terms before entering a contract. The interest rates on all deposits are the same as the interest rates stated in the corresponding offer posts. The process of entering a contract and transferring the money can take less than 10 minutes.

To visualize the daily money market rates and the general deposit rates in the Norwegian markets, we plot the NIBOR and these deposit rates in Figure 2. In Figure 2a, we include the daily average deposit rates on the two product types on the platform. Throughout the sample period, banks offer deposit rates above the NIBOR. The floating-interest rates (sum of the offered interest spreads and the NIBOR) and the fixed-interest rates generally follow each other closely. In Figure 2b, we plot the average quarterly deposit rates for non-financial corporations in Norway on two types of deposits: *deposits on demand* and *deposits with conditions*, retrieved from the national statistical institute of Norway, Statistics Norway (SSB). Deposits on demand are those that are available on demand and can be used without incurring costs beyond the normal transaction fees. Deposits with conditions are those

[14]In accordance with the Norwegian Banks' Guarantee Fund (Bankenes sikringsfond), most types of deposits are covered by the Norwegian deposit guarantee scheme of NOK 2 million (approximately USD 195,000 or € 168,000, at the time of writing in August 2025) per depositor per bank, such as those on savings, current accounts, share savings accounts, credit cards, and other credits, where the depositors are individuals, corporations, and associations. Depositors from credit and financial situations like other banks, insurance companies, or public authorities are non-eligible for this scheme.

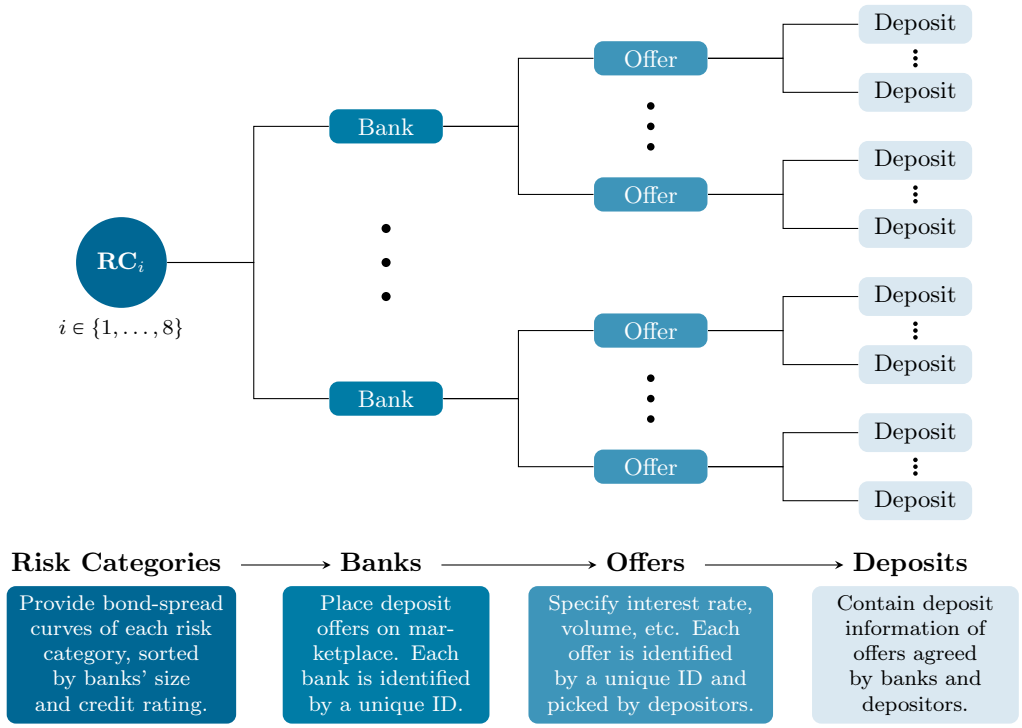


Figure 3: Data visualization This figure visualizes the interrelationship between observations in the data set. *Banks*, *Offers*, and *Deposits* are data types from the platform, and *Risk Categories* are market-wide consensus of bank categorizations.

that cannot be used within one month without incurring costs and must be used for a predetermined purpose. Therefore, they naturally offer a higher deposit rate. We see that the deposit rates for non-financial corporations have historically been close to the NIBOR, and mostly lower than those on this platform.

3. Descriptions of Data Sample and Marketplace

We use data from three main different sources in our study.[15] We received data on platform activities directly from Fixrate. Data on riskiness of banks, through bank credit ratings and credit spreads, was obtained through Nordic Bond Pricing AS (NBP), an infrastructure company in the bond market. For further analyses, we retrieve time series of daily observations for the NIBOR, returns on the STOXX Europe 600 Banks Index, and returns on Europe STOXX 50 Volatility Index from Refinitiv Eikon. The volatility index represents market expectations of market volatility by referencing to the implied volatility across all options of 50 blue-chip European stocks. The bank index reflects the European banking sector. Figure 10 in the Appendix illustrates the time series of daily observations of these indices.

From the data collected, we sort and build a data set of four main data types: risk categories (RC) of banks, banks, offers, and deposits. Figure 3 illustrates the hierarchy of the data set and the function of each data type. The smallest data element is a *deposit*, which is made from an *offer* placed on the platform by a *bank*. According to NBP, banks in Norway are sorted into eight different *risk categories* based on their credit ratings. The corresponding bond spread curves, i.e., *credit spreads*, of these risk categories serve as a market-wide consensus for banks' credit risk in the Norwegian bond market. These credit spreads—the differences to the NIBOR—are based on broker quotes with possible adjustments when necessary (trade, new issues, or discretion adjustments).

[15] An overview of the data used in our study is presented in Table A1 in the Appendix.

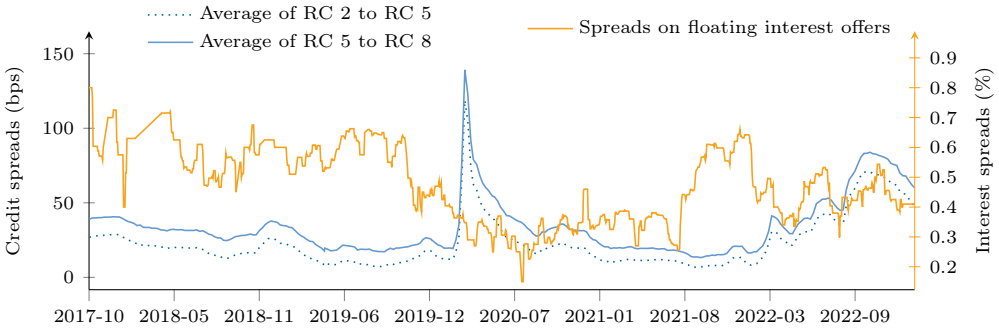


Figure 4: Banks' credit spreads This figure depicts the average weekly credit spreads of one year maturity bonds and daily interest spreads on floating-interest offers on the platform. Each credit spread curve represents the average of four risk categories: the dotted blue line for higher-rated risk categories in the data (Risk Category 2 to Risk Category 5); and the solid blue line for lower-rated risk categories in the data (Risk Category 5 to Risk Category 8).

The largest and highest-rated bank in Norway constitutes Risk Category 1, a one-bank category. This bank is not a member bank of the platform and hence is not part of our data set. We therefore have Risk Category 2 to Risk Category 8 in our data. The ratings by NBP follow the risk categories in descending order with Risk Category 8 containing the lowest-rated banks. Figure 4 depicts the representative weekly average credit spreads of one-year term bonds (differences to the NIBOR, as mentioned earlier) for higher-rated and lower-rated risk categories in the data. We also plot the average interest spreads on the floating-interest offers on the platform for reference. The risk categories with higher-rated banks clearly have tighter credit spreads compared to those with lower-rated banks. The deposit interest spreads offered on the platform are more volatile than the member banks' average credit spreads.

Our data set spans from October 2017 through January 2023. We have data on all offers made by the member banks and all transactions made by the depositors, which are connected to the corresponding offers. The identities of the depositors are anonymized by unique IDs. The member banks are representative small- and medium-sized banks in Norway, with the majority being savings banks.[16] While we know which banks are members of the platform, they are also anonymized in the data set by a unique ID. We thus do not know the names of banks associated with each offer and deposit, although we can track their activities on the platform and the consequent deposits connected to their offers when they take place. To help us identify the risk of the member banks while keeping them anonymized, the operations architect of Fixrate placed the banks in the relevant risk categories provided to us from NBP.

In Table 1, we present descriptive statistics of the data sample. Panel A reports the characteristics of the data set in terms of banks, offers, and their subsequent deposits, sorted by year. Up to January 31st, 2023, there have been 2,786 deposits from 1,100 unique offers. There are 66 different banks that have registered and placed an offer on the platform, of which 56 have successfully received deposits as of January 31st, 2023. The number of banks and depositors joining the platform increases rapidly over time, and the common product is floating-interest deposits.

The average money market rates (NIBOR) fluctuate in the sample period. The average interest spreads offered per calendar year range from 0.26% to 0.61%, while fixed interest rates vary from a low of 0.91% in 2021 to a high of 3.5% in 2022. As a result, the total interest rates on both of these deposit types follow each other closely as we have seen in

[16] According to statistics from the Norwegian Banks' Guarantee Fund in 2022, Norway has 87 savings banks, with average total assets of 21 billion and a median of 6.72 billion (in NOK). Among 22 commercial banks in the country, the average total assets is 23.3 billion (DnB Bank ASA is excluded due to its 49.5% market share—the only bank in Risk Category 1—which is also not a member bank of the platform) and the median is 5.75 billion.

Table 1: Descriptive Statistics of Data Sample by Year

The table shows descriptive statistics of data from October 2017 to the end of January 2023 sorted by year. Panel A reports data set characteristics with two types of offers: *Floating interest* with interest rates specified by a *spread* on top of the concurrent NIBOR, and *Fixed interest* with nominal interest rates. Panel B provides deposit characteristics categorized by the two types of deposits on the platform. All variables on interest rates are in percentages and those on volume are reported in Norwegian Kroner (NOK).

PANEL A: DATA SET CHARACTERISTICS

	10–12/2017	2018	2019	2020	2021	2022	01/2023	Total
Banks								
With offers	12	27	39	38	36	52	12	66
With trans.	7	25	37	38	39	45	24	56
Offers	45	171	207	210	159	288	20	1,100
Type I: Floating	18	89	140	182	142	260	19	850
Type II: Fixed	27	82	67	28	17	28	1	250
Asked vol. (bil.)	2.61	9.24	26.10	21.92	14.83	39.13	2.03	115.85
Type I: Floating	1.43	5.46	16.56	19.40	13.45	31.23	2.01	89.54
Type II: Fixed	1.19	3.79	9.54	2.52	1.38	7.90	0.02	26.32
Deposits $_t$:	20	238	346	445	400	1204	133	2,786
From offers $_t$	20	212	306	398	339	1133	87	–
From offers $_{t-1}$	0	26	37	47	57	70	46	–
From offers $_{t-2}$	0	0	3	0	4	0	0	–
From offers $_{t-3}$	0	0	0	0	0	1	0	–
From offers $_{t-4}$	0	0	0	0	0	0	0	–
Avg. rates								
NIBOR 3M	0.81	1.06	1.55	0.7	0.47	2.07	3.26	–
Type I spreads	0.61	0.58	0.37	0.45	0.3	0.26	0.26	–
Type II rates	1.54	1.67	1.84	1.58	0.91	3.5	3.45	–

PANEL B: DEPOSIT CHARACTERISTICS

	10–12/2017	2018	2019	2020	2021	2022	01/2023	Total
Floating type	15	189	297	402	378	1,188	133	2,602
31 day notice	12	168	280	399	366	1178	127	2,530
90 day notice	3	21	17	3	12	10	6	72
Avg. spreads	0.71	0.63	0.43	0.48	0.37	0.26	0.28	–
Volume (bil.)	0.25	2.92	5.26	7.37	6.24	14.42	0.97	37.43
Vol./dep. (mil.)	16.6	15.43	17.72	18.34	16.52	12.13	7.27	–
Depositors	9	39	83	94	112	426	85	626
Fixed type	5	49	49	43	22	16	0	184
3m maturity	1	9	1	0	8	4	0	23
6m maturity	0	8	16	16	4	8	0	52
12m maturity	4	32	32	27	10	4	0	109
Avg. rates	1.65	1.72	1.94	1.7	0.96	3.63	–	–
Volume (bil.)	0.07	0.63	1.91	1.06	0.94	0.17	0	4.77
Vol./dep. (mil.)	13.4	12.78	38.92	24.53	42.82	10.75	–	–
Depositors	3	13	9	17	10	14	0	40

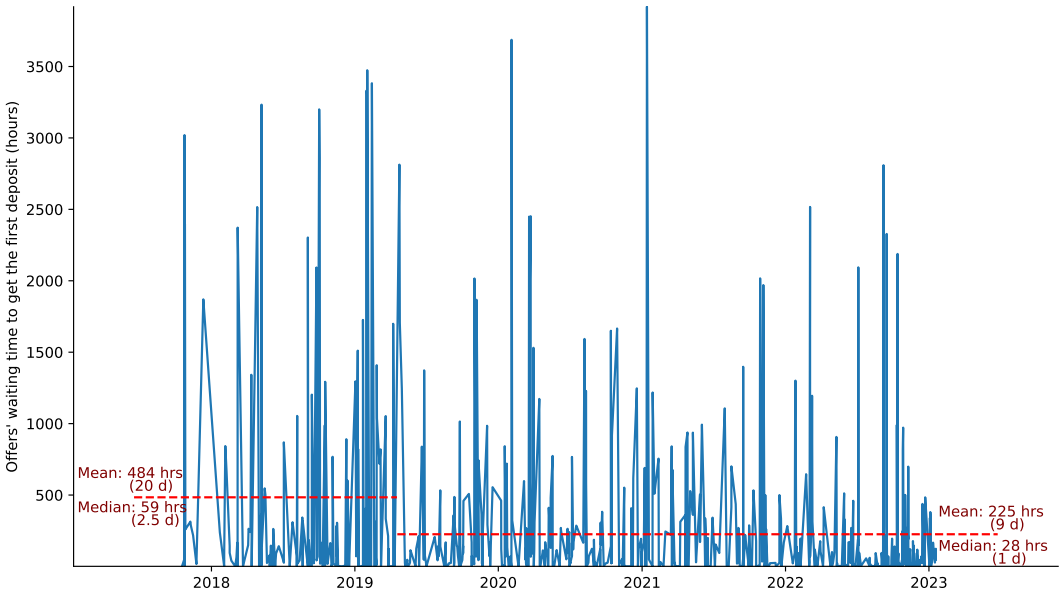


Figure 5: Deposit waiting time This figure illustrates the waiting time for an offer to get its first deposit. We split the sample period into two subsamples. The split is at one and a half years after the platform was establishment.

Figure 2a.

Panel B shows characteristics of the two types of deposits, also sorted by year as in Panel A. The total deposit volume is roughly NOK 42 billion from both floating-interest and fixed-interest deposits, with the floating-interest deposits accounting for nearly 90% of the deposit volume. Panel A shows that the number of fixed-interest offers declined significantly from 2020 with the onset of the COVID-19 pandemic. We have a total of 638 unique depositors in the sample period, where 626 have made floating-interest deposits, and 40 have made fixed-interest deposits.

In Figure 5, we plot the waiting time for an offer to get its first deposit. We measure this variable in two different periods. The initial period is the first one and a half years after its establishment, where it is believed to be in its initial phase,[17] and the rest of the sample period. We find that offers must wait around 20 days on average and a median of 2.5 days to get their first deposit in the initial period. This number is reduced to only 9 days (median of 1 day) in the following period. This observation suggests that the market has become more efficient over time in terms of banks' waiting time for a deposit.

To better understand the market dynamics, we provide statistics on offers and deposits that are sorted by product type in Table 2. Although the average total asked volume per offer is approximately NOK 105 million (median of NOK 50 million) for both product types, the percentage of offers being fulfilled is around 34% for floating-interest offers and only 19% for fixed-interest offers.[18] Of these offers, most are fulfilled within the same day they are placed on the platform. In terms of transactions, the average volume per deposit (both mean and median) is higher for fixed-interest type, however, most offers of this deposit product only receive around 0–4 deposits; while most offers of floating-interest type receive

[17]This cut-off point is chosen based on a discussion with the CEO of Fixrate AS.

[18]Note that banks may intentionally set the total asked volume higher than their actual needs to avoid missing potential opportunities for securing additional funds.

Table 2: Statistics on Offers and Deposits Sorted by Product Type

The table gives an overview of the statistics on offers and deposits according to product types on the market: Floating-interest deposits and Fixed-interest deposits. The statistics include the proportions of offers (%) with certain thresholds of deposits and fulfillment periods, the average amount of total asked volume per offer, deposit volume per deposit, as well as statistics on number of deposits per offer for each of these products.

	Floating-interest	Fixed-interest
Percentage of offers:		
Fulfilled	34	19
With no. of deposits $\geqslant 1$	77	41
With no deposits	23	59
With deposit volume $\geqslant$:		
50% asked volume	58	29
30% asked volume	66	32.5
Percentage of offers fulfilled in:		
$\leqslant 1$ day	51	68
1–5 days	6	0
5–10 days	9	13
10–20 days	8	6
20–30 days	6	7
30+ days	21	6
Asked volume per offer (NOK mil.):		
Mean	105	105
Median	50	50
Deposit volume per deposit (NOK mil.):		
Mean	14	26
Median	5	20
No. of deposits per offer:		
Average	3.06	0.74
$[P_5, P_{95}]$	0–11	0–4

Table 3: Bank information

The table reports information on the banks that placed offers on the platform from its establishment up to January 2023. We sort the banks by the size of their total assets. For each asset group, we report the number of banks, corresponding risk categories, average/median duration of deposits, number of offers placed, number of deposits made, and total amount of asked volume and deposit volume (NOK mil.). RC is risk category.

Asset size	**NOK 0–5 bil.**	**NOK 5–10 bil.**	**NOK 10+bil.**
No. of banks	28	13	25
Bank category	RC5: 1; RC6: 3 RC7: 12; RC8: 12	RC4: 1, RC5: 6; RC6: 5, RC7: 1	RC2: 5; RC3: 8 RC4: 4; RC5: 8
Weighted average risk category	RC7	RC5 ∼ RC6	RC3 ∼ RC4
Average deposit duration (days)	329	417	297
Median deposit duration (days)	224	350	186
No. of offers	471	230	399
Floating type	383	133	334
Fixed type	88	97	65
No. of deposits	1385	377	1024
Floating type	1334	306	962
Fixed type	51	71	62
Volume (NOK mil.)			
Asked	20,810	11,769	83,275
Deposit	10,382	5,068	26,744

approximately 0–11 deposits per offer.

On to the member banks of the marketplace, we report bank characteristics in Table 3. Banks are sorted by total assets (in NOK): 0–5 billion, 5–10 billion, and 10+ billion. Data on *Bank category* shows the number of banks from the risk categories that fall into the three asset-size categories. For instance, "RC4: 1" in the asset size of NOK 5–10 billion shows that there is only one bank from risk category 4 in this asset-size category. The statistics in the table indicate that larger banks tend to have higher ratings. Using risk category counts as weights, the table also shows the weighted average risk category to confirm the fact that larger banks are associated with better ratings, i.e., lower credit spreads as seen in Figure 4. Additionally, we provide the number of offers and deposits, along with total amount of asked volume and deposit volume for the banks in each asset-size category. The data show that smaller banks place more offers and receive a greater deposit amount relative to the volume they ask for, compared to larger banks. However, in absolute terms, larger banks receive a higher total deposit amount.

We provide further statistics and visualizations on offers and deposits connected to characteristics of member banks in Table A2, and Figures 12 and 13 in the Appendix, where banks are categorized by both risk level and asset size. Here are some notable observations:

- Among the offers with total asked volume fulfilled, 95% of them are fulfilled on the same day of the offer's placement if they are placed by banks in risk category 2 (best-rated category among the member banks);
- Highest-rated (and largest-asset) banks ask for much higher deposit volume per offer, and in return, they receive more deposit amount per offer;
- Banks from mid- to low-rated categories (from risk categories 4 to 7) place more offers and receive more transactions.

Finally, we present the descriptive statistics of the data on daily activities of this marketplace in Table 4. The variables of interest include the daily number of: deposits, deposits

Table 4: Descriptive Statistics of Daily Activity on the Platform

The table shows descriptive statistics of the data on the daily activities of the platform from October 2017 through January 2023. We report floating-interest related activities separately from the fixed-interest related activities. The reported daily activities include: number of deposits, number of deposits conditioned only on days with corresponding deposits, number of new offers, and deposit amount conditioned only on days with corresponding deposits (in NOK million). The last descriptive statistic is the interval between the 5^{th} percentile and 95^{th} percentile.

	Mean	Median	Min	Max	St.Dev.	$[P_5, P_{95}]$
Deposits	1.4	0	0	28	2.8	[0, 7]
Floating-interest	1.3	0	0	28	2.7	[0, 7]
Fixed-interest	0.1	0	0	5	0.5	[0, 1]
Deposits (cond.)	3.3	2	1	28	3.4	[1, 10]
Floating-interest	3.3	2	1	28	3.4	[1, 10]
Fixed-interest	1.6	1	1	5	1.0	[1, 4]
New offers	0.6	0	0	20	1.2	[0, 3]
Floating-interest	0.4	0	0	9	0.9	[0, 2]
Fixed-interest	0.1	0	0	11	0.5	[0, 1]
Deposit amount (cond.)	50.3	25	1	920	80.7	[2, 168.5]
Floating-interest	47.1	20	1	920	79.6	[2, 169.4]
Fixed-interest	42.2	25	5	325	59.1	[10, 179.2]

but conditioned only on days with deposits, newly placed offers, and deposit amount conditioned only on days with deposits (in NOK mil.). The daily number of deposits is generally low, mostly ranging from 0 to 7. When conditioned on days with deposits, this number ranges largely from 1 to 10. The likely number of new offers placed on the market daily is approximately 0–3, and the deposit amount lies in the large interval of NOK 2–168.50 million (median: NOK 25 million, maximum: NOK 920 million) on any given day with deposits.

4. Analyses and Results

In the following analyses, we distinguish between the two deposit types offered on this marketplace: floating-interest and fixed-interest. As a reminder, a floating-interest offer gives an *interest spread*, for example 0.4%, on top of the concurrent money market rate, NIBOR, on the deposit's transaction date. These offers come with a condition on deposits' withdrawal notice period of either 31 or 90 days. For the fixed-interest type, banks offer a nominal *fixed interest rate*, for example 2%, and a deposit maturity of either three, six, or twelve months. We also use *credit spreads* on one-year bank bonds (according to risk category sorting) as a proxy for *bank risk* in our analyses.[19] We first start with the analysis of risk and return trade-offs.

4.1. Risk and Return Trade-off

In Figure 6, we present the rolling average of the offered rates throughout the sample period, October 2017 until the end of January 2023, segmented by aggregated bank risk (26 higher-rated banks (RC 2–5) versus 26 lower-rated banks (RC 6–8)) for the two deposit types on the market. While deposit rates closely track each other between the two aggregated risk categories, it is evident that lower-rated banks tend to offer higher interest rates for both deposit products.

The deposit rates are depositors' promised returns and banks' expenses. As banks are those that determine the deposit rates on this platform, we investigate the relationship between the offered deposit rates and bank risk. We regress the offered interest rate r_{it} of

[19]The reason for choosing bond spreads of one year maturity bonds as a proxy for banks' credit spreads is because this term is similar to the median deposit duration on the platform, as shown in Table 3.

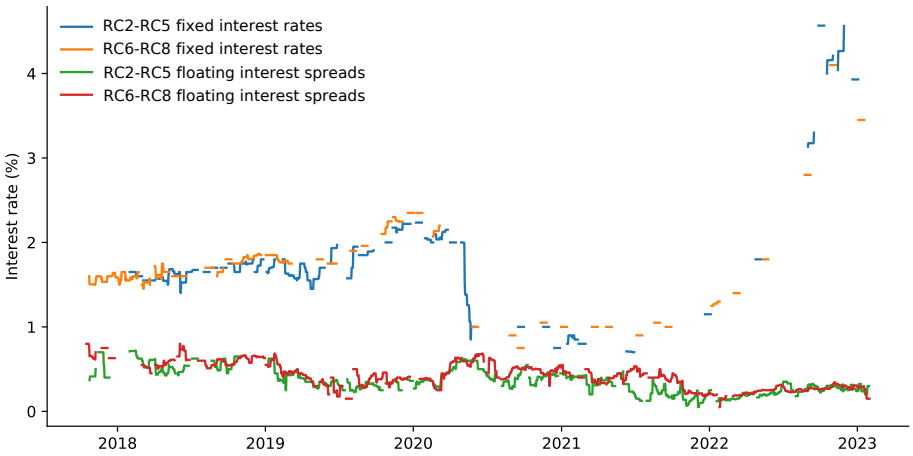


Figure 6: Offered interest rates by banks' risk categories This figure illustrates the rolling average of offered rates over time by banks according to their risk categories. There are 26 banks on the platform that are rated within RC2–RC5 and 26 banks within RC6–RC8. The illustration separates the two types of offered rates, nominal rates for fixed-interest deposits and interest spreads for floating-interest deposits.

offer i at time t on the bank's corresponding risk group g (estimated by bank risk category's credit spreads at time t), the money market rate at time t, and a set of other control variables, such as the conditions of deposit offer i (total asked volume, the allowed minimum and maximum amount per deposit, withdrawal notice period or maturity), bank size (measured by total assets), and market condition variables at time t (either by bank index or by volatility index). We also consider bank fixed effects in one of the models in our analysis.[20]

The dependent variable is the offered rates: interest spreads for floating-interest offers and interest rate for fixed-interest offers.[21] We use a regression model of the form

$$r_{it} = \alpha_0 + \alpha_1 risk_{gt|i\in g} + \alpha_2 NIBOR_t + \boldsymbol{\beta^T X_{it}} + \gamma_{b|i\in b} + \epsilon_t.$$

We conduct separate analyses at the offer level by banks and at the deposit level by firms independently. This separation enables us to uncover preference differences between the two sides of the market: while banks offer deposit rates according to the prevailing market situation, firms select offers to deposit that suit their own objectives.

Prior to the analyses, we run several statistical tests (White test and Breusch-Pagan test for homoskedasticity, Durbin-Watson test for autocorrelation, and Hausman test for endogeneity checks) and conclude that random effects (RE) models are most suitable to capture interest spreads on *floating-interest offers*. For interest spreads on *floating-interest deposits*, we use fixed effects (FE) models. We also use FE models for interest rates on both *fixed-interest offers* and *deposits*. We present the results of all models for a general overview and comparisons: pooled OLS (POLS) and RE models with robust standard errors clustered at the bank level, FE models with clustered standard errors and bank fixed effects.[22] Models of different market variables (returns and bank index or volatility index) serve as robustness checks.

We first analyze the *floating-interest* offers and deposits and report the regression results

[20] We do not include time fixed effects because the daily money market rate NIBOR is one of the variables of interest in the regression, which already captures the time-effects of surrounding economic events.

[21] The deposit rates on all deposits are the same as the offered interest rates (fixed or floating) provided in the corresponding offer posts.

[22] Covariance estimators are no longer robust against entity effects, so FE models require clustered standard errors.

Table 5: Determinants of floating-interest rates

In this table, we report the regression results of the floating-interest rates on top of the NIBOR offered by banks on a set of control variables. The data is from floating-interest offers (models (I) to (III)) and floating-interest deposits (models (IV) to (VI)) from October 2017 through January 2023. The control variables include characteristics of: the offering bank (bank risk, i.e., one-year bond's credit spreads, and bank assets), the deposit offer (asked volume, deposit amount and withdrawal notice period), and the market (bank index return and the NIBOR). Model (I) and (IV) represent the POLS model, model (II) and (V) RE model, and model (III) and (VI) FE model. Models (II*) and (VI*) are robustness checks for Model (II) and Model (VI), respectively, using volatility index instead of bank index. Clustered standard errors are at the bank level. This table uses the base model with banks of the NOK 0–5 billion asset group and with the withdrawal notice period of 31 days. *, **, *** indicates statistical significance level at 10%, 5%, and 1%, respectively.

Dependent variable: **Offered interest spreads (%)**								
	Offers				Deposits			
	(I)	(II)	(II*)	(III)	(IV)	(V)	(VI)	(VI*)
Constant	0.427***	0.414***	0.413***	0.387***	0.436***	0.421***	0.419***	0.419***
	(0.011)	(0.010)	(0.010)	(0.009)	(0.006)	(0.012)	(0.006)	(0.006)
Credit spreads (%)	0.205***	0.221***	0.224***	0.202***	0.242***	0.259***	0.258***	0.258***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.014)	(0.013)	(0.014)	(0.014)
Bank assets (NOK)								
10+ bil.	-0.046***				-0.005			
	(0.011)				(0.006)			
5–10 bil.	0.028**				0.032***			
	(0.014)				(0.008)			
Total asked volume (mil.)	6.4e-06	-8.2e-05	-8.3e-05	-5.2e-05	-2.2e-05	-1.6e-04***	-1.6e-04***	-1.6e-04**
	(6.2e-05)	(5.8e-05)	(5.8e-05)	(6.4e-05)	(2.4e-05)	(3.3e-05)	(3.7e-05)	(3.7e-05)
Asked per deposit (mil.)								
Min amount	2.6e-04**	1.0e-04	1.0e-04	2.7e-04**	2.0e-06	8.4e-05	1.6e-04	1.6e-04
	(1.2e-04)	(1.2e-04)	(1.2e-04)	(1.1e-04)	(1.2e-04)	(1.2e-04)	(1.3e-04)	(1.2e-04)
Max amount	-2.9e-04**	-1.6e-04	-1.5e-04	1.3e-04	1.3e-05	4.3e-04***	4.7e-04***	4.7e-04***
	(1.3e-04)	(1.2e-04)	(1.2e-04)	(1.3e-04)	(6.8e-05)	(8.6e-05)	(1.0e-04)	(1.0e-04)
90-day notice period	0.073***	0.078***	0.078***	0.039*	0.196***	0.132***	0.128***	0.128***
	(0.023)	(0.023)	(0.023)	(0.022)	(0.020)	(0.023)	(0.023)	(0.023)
NIBOR (3M) (%)	-0.080***	-0.082***	-0.082***	-0.070***	-0.106***	-0.100***	-0.099***	-0.099***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.003)	(0.003)	(0.003)	(0.003)
Bank index return (%)	-1.6e-03	-1.8e-03		-1.5e-03	-0.000	-0.000	-0.000	
	(1.8e-03)	(1.7e-03)		(1.8e-03)	(0.001)	(0.001)	(0.001)	
Volatility index return (%)			4.8e-04					-4.1e-04
			(6.1e-04)					(3.8e-04)
Bank Fixed Effects				Yes			Yes	Yes
No. of observations	850	850	850	850	2602	2602	2602	2602
Adjusted R^2	0.28	0.24	0.24	0.16	0.36	0.33	0.29	0.29
Standard Error	Robust	Robust	Robust	Clustered	Robust	Robust	Clustered	Clustered

in Table 5. For both offers and deposits, bank risk (credit spreads (%) used as a proxy) is consistently a strong, positive, and significant variable in all model specifications. An increase of one percentage point in the credit spread increases the offered interest spread by more than 22 bps (model II RE). The corresponding increase in the interest spreads for deposits is almost 26 bps (model VI FE). These results show that there is a trade-off between risk and return—riskier banks offer higher interest spreads and depositors indeed demand higher deposit spreads to make transactions. Bank size (measured by total assets) is also an important factor: larger banks offer significantly lower interest spreads. Similarly from the demand side, depositors choose higher interest spreads for smaller banks, which is indicated by the non-significance in the coefficient for larger banks and the strong significance for smaller banks.

The total size of the offers—the asked volume—does not seem to affect the offered interest spreads, but has a negative, albeit rather small, effect on the deposits. However, larger maximum possible deposit amount per transaction positively affects the interest spreads on the deposits, but not on the offers. Depositors seek higher compensation for larger transaction amounts, but banks appear not to factor transaction size into their offered rates. Regarding notice period, banks offer to pay better rates for the longer withdrawal wait from 31 to 90 days. This estimate is significantly larger for deposits—depositors require to be better compensated for extending the period where they do not have access to the liquid funds.

The money market rate NIBOR has a strong negative effect on the offered interest spreads, and even more so for the deposits. For every one percentage point increase in the NIBOR, banks reduce the offered *interest spread* by 8 bps. Therefore, if we consider the total nominal *interest rate* (sum of interest spreads and the NIBOR) on floating-interest offers, a one percentage point increase in the NIBOR is associated with an increase of 92 bps in the total offered interest rate. Therefore, the offered deposit rates do not have a one-to-one correspondence with the fluctuations in the money market. As we have seen from previous findings, banks and depositors find bank risk, bank size, and accessibility to funds to be also relevant for the pricing of deposit rates. Other market variables (bank index returns or volatility returns) do not affect these deposit spreads.

We provide further robustness checks for the results above in Table A3 in the Appendix. Here, instead of quantifying bank risk and the risk and return trade-off by the use of credit spreads, we control for banks' risk categories as dummy variables. The results show clearly that lower-rated banks offer significantly higher deposit rates. Other findings are consistent with what we have seen.

For *fixed-interest* offers and deposits, we report the results in Table 6 (with further robustness checks of consistent findings in Table A4 in the Appendix). The findings are largely similar to that of floating-interest type. However, bank risk exhibits a much more important effect for this deposit type. A one percentage point higher credit spread leads to an 85 bps increase in the offered deposit rates and almost 72 bps higher interest rate in the deposits based on the preferred FE models, models (III) and (VI) (for other models, this effect is larger than one-to-one). Again, we see a term-premium effect for the offers—banks offer lower deposit rates for offers with shorter maturities (three and six months versus 12 months in the base models). However, the analysis of deposits gives no significant difference between these maturities, indicating that this premium is not of depositors' concern when it comes to a fixed-term deposit. The NIBOR plays a key role in pricing the interest rates associated with fixed-interest offers and deposits. A one percentage point increase in the NIBOR is associated with an 80 bps increase in the offered deposit rate and an 82 bps increase in the deposit rate observed in transactions.

To quantify the cross-sectional differences in the effects of bank risk and the money market rate (NIBOR) on the two deposit offer types, we write simplified regression versions of the total offered deposit rate, i.e., interest spreads plus the NIBOR for floating-interest offers and nominal interest rates for fixed-interest offers, with only consistently significant and nontrivial-sized factors from the two analyses as

$$r_{\text{floating, RE}} = 0.41 + 0.22 \cdot \text{Credit spreads} + 0.92 \cdot \text{NIBOR}$$

Table 6: Determinants of fixed-interest rates

In this table, we report the regression results of the fixed interest rates offered by banks on a set of control variables. The data is from fixed-interest offers (models (I) to (III)) and fixed-interest deposits (models (IV) to (VI)) from October 2017 through January 2023. The control variables include characteristics of: the offering bank (bank risk, i.e., one-year bond's credit spreads, and bank assets), the deposit offer (asked volume, deposit amount and maturity), and the market (bank index return and the NIBOR). Model (I) and (IV) represent the POLS model, model (II) and (V) RE model, and model (III) and (VI) FE model. Models (III*) and (VI*) are robustness checks for Model (III) and Model (VI), respectively, using volatility index instead of bank index. Clustered standard errors are at the bank level. This table uses the base model with banks of the NOK 0–5 billion asset group and with the maturity of 12 months. *, **, *** indicates statistical significance level at 10%, 5%, and 1%, respectively.

Dependent variable: *Offered interest rates (%)*								
	Offers				Deposits			
	(I)	(II)	(III)	(III*)	(IV)	(V)	(VI)	(VI*)
Constant	0.332***	0.362***	0.632***	0.640***	0.497***	0.530***	0.882***	0.842***
	(0.068)	(0.065)	(0.084)	(0.088)	(0.062)	(0.050)	(0.145)	(0.136)
Credit spreads (%)	1.177***	1.127***	0.851***	0.832***	1.095***	1.009***	0.717***	0.779***
	(0.173)	(0.158)	(0.165)	(0.184)	(0.185)	(0.179)	(0.205)	(0.193)
Bank assets (NOK)								
10+ bil.	0.119*				0.178***			
	(0.060)				(0.047)			
5–10 bil.	0.063**				0.017			
	(0.028)				(0.033)			
Total asked volume (mil.)	1.8e-04	2.9e-04	-5.6e-04	-5.5e-04	4.7e-04*	7.0e-04**	-1.4e-03	-1.3e-03
	(2.8e-04)	(2.7e-04)	(3.7e-04)	(3.7e-04)	(2.5e-04)	(3.1e-04)	(9.4e-04)	(8.4e-04)
Asked per deposit (mil.)								
Min amount	3.7e-04	7.1e-04**	2.0e-05	4.7e-05	-7.0e-04	1.4e-05	-1.3e-03**	-1.3e-03**
	(3.1e-04)	(2.7e-04)	(3.5e-04)	(3.5e-04)	(8.5e-04)	(4.9e-04)	(5.8e-04)	(5.1e-04)
Max amount	-3.5e-04	-3.4e-04	2.6e-04	2.3e-04	-9.8e-04***	-1.2e-03***	-1.1e-03*	-1.0e-03*
	(3.5e-04)	(3.7e-04)	(4.3e-04)	(4.2e-04)	(3.0e-04)	(3.6e-04)	(6.6e-04)	(5.6e-04)
Shorter maturity	-0.076***	-0.071***	-0.069**	-0.066**	0.015	0.027	-0.033	-0.026
	(0.025)	(0.025)	(0.027)	(0.028)	(0.027)	(0.029)	(0.041)	(0.040)
NIBOR (3M) (%)	0.874***	0.889***	0.798***	0.795***	0.792***	0.808***	0.822***	0.822***
	(0.039)	(0.040)	(0.033)	(0.033)	(0.018)	(0.020)	(0.023)	(0.022)
Bank index return (%)	9.9e-03	9.5e-03	9.0e-03		-0.013	-0.012	-0.012*	
	(1.6e-02)	(1.6e-02)	(1.4e-02)		(0.009)	(0.009)	(0.006)	
Volatility index return (%)				-0.000				5.4e-03***
				(0.002)				(1.5e-03)
Bank Fixed Effects			Yes	Yes			Yes	Yes
No. of observations	250	250	250	250	184	184	184	184
Adjusted R^2	0.939	0.936	0.832	0.831	0.946	0.942	0.917	0.921
Standard Error	Robust	Robust	Clustered	Clustered	Robust	Robust	Clustered	Clustered

and

$$r_{\text{fixed, FE}} = 0.63 + 0.85 \cdot \text{Credit spreads} + 0.80 \cdot \text{NIBOR}.$$

One possible interpretation of the difference in the intercepts is that a higher base-rate is required for the fixed interest-rate offers. The notice periods for the floating-interest rate offers are either 31 days or 90 days, while the deposit maturities for the fixed-interest rate offers are three, six, or 12 months. Therefore, on average, the floating interest-rate deposits have a shorter expected minimum maturity. The other parameters demonstrate that both types of offered interest rates are very sensitive to changes in the money market (NIBOR).

Additional investigation (results reported in Table A5 in the Appendix) shows that there is an asymmetrical money market rate effect on the offered interest rates on this platform: an increase in the NIBOR from the previous day has a significant effect on the offered interest rates, while a reduction in the NIBOR does not have a significant effect. However, floating deposit rates are more affected by the money market fluctuations. There is also a large asymmetry in sensitivity to changes in bank risk (credit spreads of sorted risk categories) between the two types. The interest rates of fixed-interest offers are more tied to bank risk due to the riskier nature of longer expected deposit maturity.

In short, the regression results demonstrate that both the supply and demand sides of the large deposit market follow the money market closely and take bank risk into account when considering deposit rates. Riskier banks offer higher interest rates, and depositors indeed require higher rates from these banks. Depositors' access to liquidity is also a determinant for banks to price deposit rates.[23]

4.2. Deposit activities and allocation

Determinants of deposit transactions To capture the dynamics of the marketplace, specifically, the determinants of the daily deposits, we collect data on the platform activities (including posted offers and depositors), the money market, and the offering banks. Our dependent variable—the number of deposits on day t ($deposits_t$)—is always a non-negative integer, i.e., a count data. Additionally, as documented in Section 3, the platform's daily activity is low with the median of transactions and offers being zero. We therefore include the Zero-inflated models. Thus, besides the conventional regression model choice as the OLS, we choose the following regression models to predict the daily number of deposits on the platform: Poisson, Zero-inflated Poisson, Negative Binomial (NB), and Zero-inflated NB. These models are more appropriate to handle count data than the OLS model.

We capture $deposits_t$ by two parts: $deposits_t = I + II$. I denotes the regular process (Poisson or NB) that predicts the daily number of deposits for observations that are *not* in the *certain zero group*, and II denotes the zero inflation process, which predicts the likelihood of the daily number of deposits that are in the *certain zero group*. Both processes include the same control variables. Consider the regression model

$$deposits_t = \alpha_0 + \boldsymbol{\alpha}^{\boldsymbol{T}} \text{platform activities}_t + \boldsymbol{\beta}^{\boldsymbol{T}} \text{market conditions}_t + \boldsymbol{\gamma}^{\boldsymbol{T}} \text{banks}_t + \epsilon_t.$$

In short, Zero-inflated models deal with count data containing frequent zero-valued observations. These models are able to detect an underlying process (zero inflation process) in the data that is likely to cause zeros in the observations. If a count data is recognized to not be in this zero-inflate process, i.e, the number of deposits on days that are not certainly zero, the regular chosen process takes over to determine its value based on the choice of model (Poisson or NB in our case). Hence, the zero-inflate process part predicts whether the number of deposits on a given day is likely to be zero based on the provided data. The coefficients of the zero-inflate part of the models help us disentangle the excess zeros in the dependent variable.

[23] This factor is more relevant for customers of on-demand (floating-rate) deposits than for those of fixed-term deposits.

On any given day, we record the following data points: number of newly placed offers over the last 15 days, average number of deposits per day the last five days, daily changes in the number of existing available offers,[24] average offered interest rates, and data on depositors, indicated by the proportion of depositors making transaction(s) that day and having made other deposit(s) in the previous 10 days. We also collect the returns of the bank index and the NIBOR for the analysis. To capture the characteristics of the offering banks, we include bank asset size and the two-week change in credit spreads of the representative bank group (risk category 5) as a proxy for changes in perceived bank risk at the time.

Based on the Pseudo R^2 and the AIC criterion among the five models in the analysis, as well as the ability to capture the excess zeros in the data, we choose the Zero-inflated models (with Poisson and NB regression models) as our preferred models—columns (II) and (IV) in Tables 7 and 8. The discussions follow the results of these models.

Table 7 provides the analysis results for floating-interest deposits and Table 8 for fixed-interest deposits. In both tables, the results show that the daily number of deposits is significantly and positively associated with the number of newly placed offers and existing available offers. The zero-inflated process verifies that fewer newly placed offers and a decreasing number of existing available offers significantly increase the odds that there are no deposits that day.

We take a closer look at each type of deposits. For fixed-interest type, we find that a depositor who has made at least one deposit in the previous 10 days is less likely to make a fixed-interest deposit on that particular day. This negative relationship, therefore, indicates a certain temporal pattern in depositors' behavior. Moreover, the attractiveness of offered deposit rates emerges as a robust and significantly positive contributor to the number of fixed-interest deposits.

However, the offered interest spreads do not exhibit such an influence on the floating-interest type, transactions are rather influenced positively by the concurrent market rate, NIBOR. A higher NIBOR implies that the cost of acquiring deposits can be larger for banks. Banks may therefore be less inclined to make new fixed-interest offers when the market rate is high, as we have seen the high correspondence of the deposit rates for fixed-interest type to NIBOR in previous analysis. This conjecture is also substantiated by the opposing signs in the regression coefficients of newly placed offers and the NIBOR.

Similarly, depositors are less likely to make fixed-interest deposits when the NIBOR is high, as they might prefer investing in the money markets to depositing to banks. This observation aligns with the earlier findings presented in Table 6, which illustrated that changes in the NIBOR have less than a one-to-one relationship with the offered fixed-interest rates. On this note, we investigate specifically the changes in the platform activities according to the fluctuations in the money market, with results in Table 9. Referring to the activities when the change in NIBOR is random as the base of normality, we confirm that depositors make significantly more floating-interest deposits when the money market rates have a positive trend.

As a quick summary, we empirically confirm that the likelihood of firms making large bank deposits is strongly associated with the availability of both new offers and existing offers. We also find that the money market rate (NIBOR) is a positive key factor for corporate depositors with on-demand (floating-rate) deposits, while attractiveness of deposit rates are crucial for fixed-interest deposits. Banks do not seem to benefit from the increases in the NIBOR if they offer fixed-interest deposits.

Depositor cash allocation To further study depositors' cash allocation, we investigate the transaction behavior of depositors. Figure 7 illustrates every deposit made on the platform throughout the sample period. Each horizontal gray line represents one unique depositor, and we depict every transaction made by a depositor as a transparent circle whose area is proportional to the deposit amount. Because of the transparent circles, darker shades along

[24] We define an offer to be expired if there has not been any new deposit in a one-year period or that its remaining asked volume is smaller than the required minimum volume per deposit. Otherwise, an offer is considered to be available.

Table 7: Determinants of daily number of floating-interest deposits

In this table, we report the regression results of the daily number of *floating-interest* deposits on the platform (from October 2017 through January 2023) on a set of control variables on any given day of: platform's activities (newly *floating-interest* offers the last 15 days, average number of floating-interest deposits per day the last five days, the changes in the number of *available* floating-interest offers from the previous day, average offered interest spread, and the proportion of depositors who have made other deposit(s) in the previous 10 days), the money market (bank index return and the NIBOR), and the offering banks (assets, change in credit spreads). We present the models as: (I)—Poisson regression model, (II)—Zero-inflated Poisson regression model, (III)—Negative Binomial (NB) regression model (based on the Poisson and auxiliary OLS to estimate the input parameters for the main NB model), (IV)—Zero-inflated NB regression model, and (V)—the OLS model. For the nested *zero-inflate* process, we do not report the standard error for the parameter estimates for brevity. *,**,*** indicates statistical significance level of 10%, 5%, and 1%, respectively.

Dependent variable: **Number of deposits**					
	(I)	(II)	(III)	(IV)	(V)
Constant	-0.310	0.530***	-0.383	0.332	-0.337
	(0.244)	(0.151)	(0.262)	(0.236)	(0.299)
Newly placed offers	0.056***	0.031***	0.064***	0.032***	0.120***
	(0.009)	(0.005)	(0.010)	(0.009)	(0.017)
Avg. deps./day last 5 days	0.020	0.024*	0.060*	0.059**	0.202**
	(0.024)	(0.012)	(0.027)	(0.024)	(0.066)
$\Delta_{t-1,t}$ in avail. offers	0.160***	0.090***	0.199***	0.098***	0.435***
	(0.020)	(0.011)	(0.030)	(0.019)	(0.061)
Offered interest spread	-1.542	-0.697	-1.632	-0.703	-0.995
	(0.265)	(0.172)	(0.287)	(0.265)	(0.293)
Recent depositor	0.952***	-0.044	1.667***	0.068	1.343***
	(0.089)	(0.064)	(0.105)	(0.103)	(0.176)
Bank index return	-0.001	-0.003	-0.005	-0.003	0.007
	(0.026)	(0.011)	(0.023)	(0.017)	(0.036)
NIBOR	0.311***	0.239***	0.163**	0.196***	0.597***
	(0.066)	(0.034)	(0.066)	(0.054)	(0.101)
$\Delta_{t-14,t}$credit spreads	-0.084	-0.095	-0.532	-0.322	-1.087*
	(0.358)	(0.225)	(0.373)	(0.385)	(0.555)
Bank assets	0.023	0.038	0.090	0.072	0.090
	(0.080)	(0.053)	(0.087)	(0.082)	(0.082)
Zero-inflate:					
Constant		0.591		0.204	
Newly placed offers		-0.086***		-0.090***	
Avg. deps./day last 5 days		-0.010		0.010	
$\Delta_{t-1,t}$ in avail. offers		-0.348***		-0.348***	
Offered interest spread		1.793***		1.914***	
Recent depositor		-195.02		-140.92	
Bank index return		-0.012		-0.015	
NIBOR		0.108		0.142	
$\Delta_{t-14,t}$credit spreads		0.617		0.562	
Bank assets		-0.137		-0.123	
Number of observations	1910	1910	1910	1910	1910
(Pseudo) R^2	N/A	0.21	N/A	0.13	0.31
AIC	6466	5279	5330	4939	8531
Standard error	Robust	Robust	Robust	Robust	Robust

Table 8: Determinants of daily number of fixed-interest transactions

In this table, we report the regression results of the daily number of *fixed-interest* transactions on the platform (from October 2017 through January 2023) on a set of control variables on any given day of: platform's activities (newly *fixed-interest* placed offers the last 15 days, average number of fixed-interest transactions per day the last five days, the changes in the number of *available* fixed-interest offers from the previous day, and average offered interest rate), the market (bank index return and the NIBOR), the offered banks (assets, change in credit spreads), and the depositors (the proportion of depositors who have made other transaction(s) in the previous 10 days). We present the models as: (I)—Poisson regression model, (II)—Zero-inflated Poisson regression model, (III)—Negative Binomial (NB) regression model (based on the Poisson and auxiliary OLS to estimate the input parameters for the main NB model), (IV)—Zero-inflated NB regression model, and (V)—the OLS model. For the *zero-inflate* cases, we do not report the standard error for the parameter estimates for brevity. *,**,*** indicates statistical significance level of 10%, 5%, and 1%, respectively.

Dependent variable: *Number of transactions*					
	(I)	(II)	(III)	(IV)	(V)
Constant	-4.923***	-1.030***	-5.891***	-1.979***	-0.081***
	(0.390)	(0.339)	(0.482)	(0.471)	(0.031)
Newly placed offers	0.204***	0.141***	0.242***	0.248***	0.027***
	(0.032)	(0.026)	(0.066)	(0.045)	(0.007)
Avg. trans./day last 5 days	0.040	0.731**	-1.345**	0.492	0.007
	(0.327)	(0.302)	(0.548)	(0.460)	(0.067)
$\Delta_{t-1,t}$ in avail. offers	0.384***	0.136***	0.4825***	0.125**	0.048***
	(0.067)	(0.045)	(0.098)	(0.062)	(0.012)
Recent depositor	1.154***	-1.416***	2.111***	-0.881***	0.199***
	(0.247)	(0.230)	(0.423)	(0.320)	(0.045)
Offered interest rate	1.813***	0.461	3.125***	1.118***	0.113***
	(0.343)	(0.306)	(0.331)	(0.369)	(0.025)
Bank index return	0.076	0.067	0.015	0.099*	0.007
	(0.067)	(0.043)	(0.064)	(0.054)	(0.007)
NIBOR	-1.876***	-0.581*	-2.907***	-1.419***	-0.102***
	(0.343)	(0.306)	(0.345)	(0.363)	(0.020)
$\Delta_{t-14,t}$credit spreads	-0.377	0.276	-1.801*	0.258	-0.144
	(0.559)	(0.829)	(0.965)	(1.109)	(0.095)
Bank assets	0.323*	0.119	0.193	0.062	0.0.020
	(0.189)	(0.134)	(0.209)	(0.173)	(0.015)
Zero-inflate:					
Constant		4.743***		3.995***	
Newly placed offers		-0.081*		0.051	
Avg. trans./day last 5 days		1.633**		2.336**	
$\Delta_{t-1,t}$ in avail. offers		-0.493***		-0.686***	
Recent depositor		-10.050***		-39.026	
Offered interest rate		-2.483***		-2.295***	
Bank index return		0.065		0.233*	
NIBOR		2.539***		1.751**	
$\Delta_{t-14,t}$credit spreads		1.249		1.891	
Bank assets		-0.249		-0.087	
Number of observations	1910	1910	1910	1910	1910
(Pseudo) R^2	N/A	0.19	N/A	0.20	0.08
AIC	1095	913	1370	899	2254
Standard error	Robust	Robust	Robust	Robust	Robust

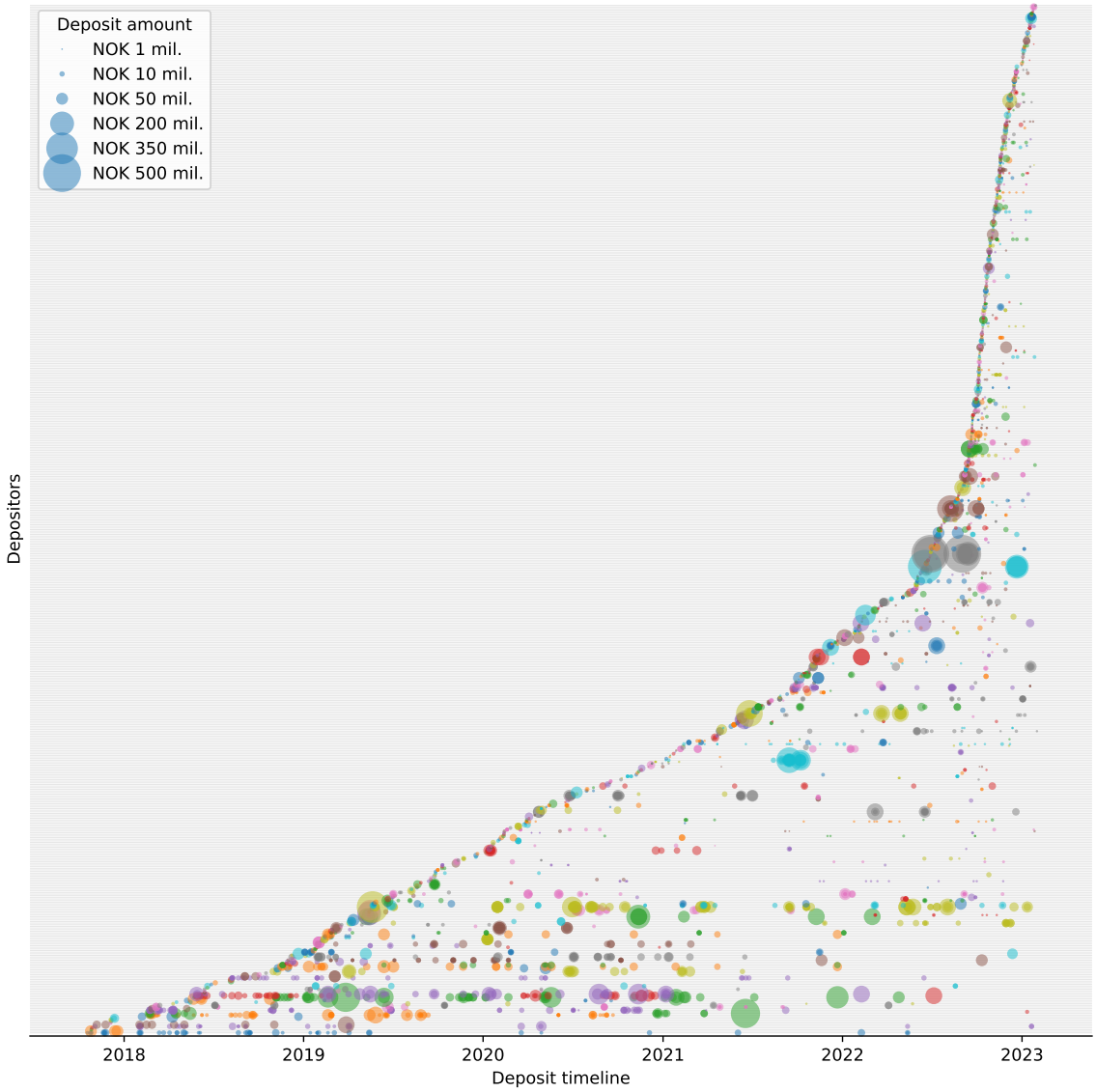


Figure 7: Deposit timeline of all depositors Each of the 638 unique depositors on the platform is represented by a horizontal line, and each deposit is represented by a circle whose size is proportional to the deposit amount. As the circles are transparent, darker colors on one line represent a cluster of transactions of that depositor.

Table 9: Platform Activities with Fluctuations in the Money Market

The table shows the average number of new deposits and newly placed offers on a given day according to the fluctuation patterns of the money market, NIBOR. The first variable, $\Delta_t \uparrow\downarrow$, depicts days where the change in NIBOR is random, with no consistent trends in the last few days. Variables $\Delta_t > 0$ and $\Delta_t < 0$ indicate days where there is an increase or decrease in NIBOR, respectively. The last two variables, $\Delta_{t-i|i=\{0,\ldots,2\}} > 0$ and $\Delta_{t-i|i=\{0,\ldots,2\}} < 0$ specify days where the change in NIBOR has followed a consistent pattern, either increasing or decreasing, in the previous three days.

Change in NIBOR	Avg. no. of new deposits		Avg. no. of new offers	
	Floating	Fixed	Floating	Fixed
$\Delta_t \uparrow\downarrow$	1.2	0.1	0.4	0.1
$\Delta_t > 0$	1.7	0.1	0.5	0.1
$\Delta_t < 0$	1.2	0.1	0.4	0.1
$\Delta_{t-i\|i=\{0,1,2\}} > 0$	2.7	0.1	0.6	0.1
$\Delta_{t-i\|i=\{0,1,2\}} < 0$	1.8	0.2	0.5	0.1

a depositor line indicates a cluster of transactions of that depositor.[25]

By analyzing the transaction data from depositors, we find that a number of very large deposits (volume of at least NOK 200 million) occurred within 2019 and then resumed mid-2021. Perhaps up until 2019, the platform was perceived as an immature marketplace and the market participants were not willing to take such high risks. In early 2020 until mid-2021, the world economy was hit by the COVID-19 pandemic which might lead to the number of deposits with such large volumes to decrease significantly. Additionally, at least 51% of the depositors make at least several deposits around the same time. We check whether the reason behind it could be that firms tend to deposit less than NOK 2 million per bank to be less exposed to credit risk under the Norwegian deposit guarantee scheme. However, this justification turns out not to be the case. We then test whether these deposits serve as diversification.

We define a *deposit cluster* as one that contains at least two deposits within one calendar week from the same depositor. We find a total of 570 deposit clusters. Of these clusters, 254 have the same deposit amount and 61 have the same deposit rate.[26] We investigate the distribution of interest rates in these clusters.

Figure 8 demonstrates histograms of deviations from the mean interest rate of each deposit cluster, both in raw (percentage points, pp) and relative terms (%). There are more clusters in floating-interest deposits than in fixed-interest deposits. Most of the interest deviations are concentrated around 0, which indicates that depositors tend to choose similar offered interest rates in their transaction clusters. However, in the extreme and very rare cases, these deviations can be 28bps higher than the mean in the raw deviation and 69% lower than the mean interest rate in relative deviation for floating-interest deposit clusters. For the fixed-interest deposit clusters, the most extreme cases are when the deviation is 55bps lower than the mean in raw term and 32% lower than the mean interest rate in a cluster in relative terms. Overall, depositors make deposit clusters and tend to choose those with similar offered interest rates.

To further understand the behavior of depositors when they diversify deposits, we examine the choice of banks in these deposit clusters in terms of risk level and asset size. Because of the finding on similar deposit rates per cluster, we check the average proportion of banks' category (risk rating and asset size) per cluster if all transactions in a cluster have the same deposit rate. Figure 9 shows that these clusters have a high proportion of mid- to low-rated

[25] In Figure 15 in the Appendix, we illustrate the deposit duration.

[26] For fixed-interest transactions, the deposit rate is equal to the offered interest rate. For floating-interest deposits, deposit rate on a day is the sum of the offered interest spread from that offer and the NIBOR of that given day.

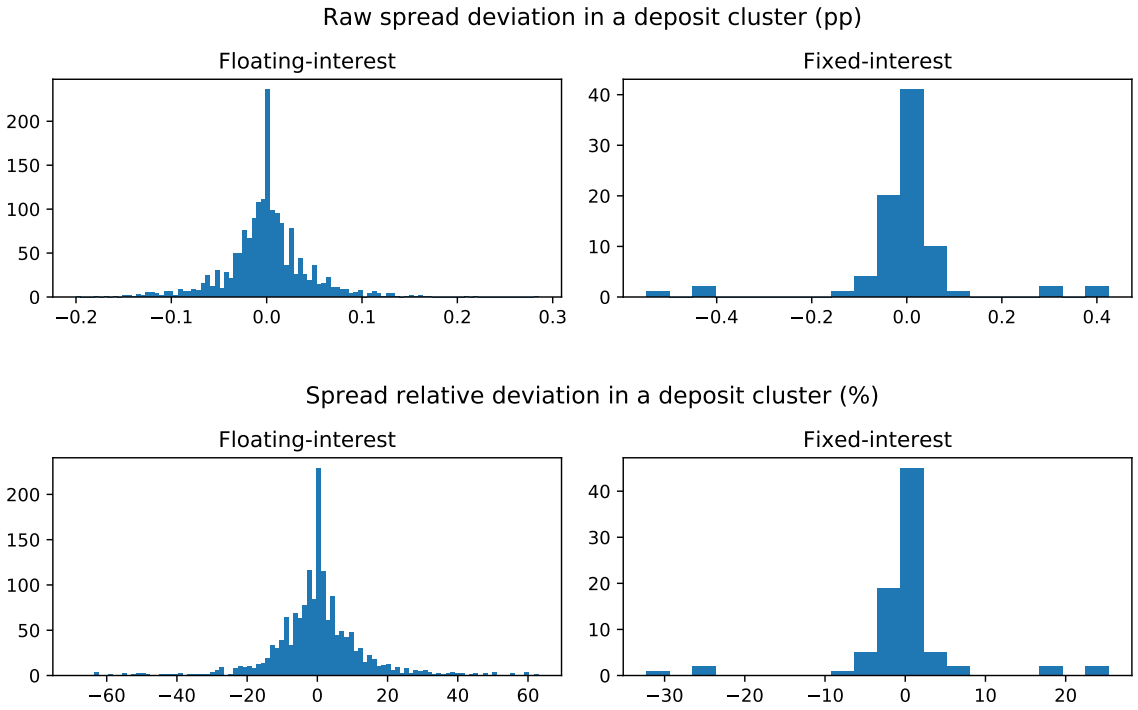


Figure 8: Histograms of interest rate deviations in deposit clusters. These histograms demonstrate the deviations from the mean in the interest rates of each depositor's deposit clusters. We define each cluster as multiple deposits from the same depositor in a period of seven days and separate the cases for two types of deposits. The top histograms are expressed in raw term (percentage points), while the bottom ones are expressed in relative term (percentage) with the mean interest rate of each deposit cluster.

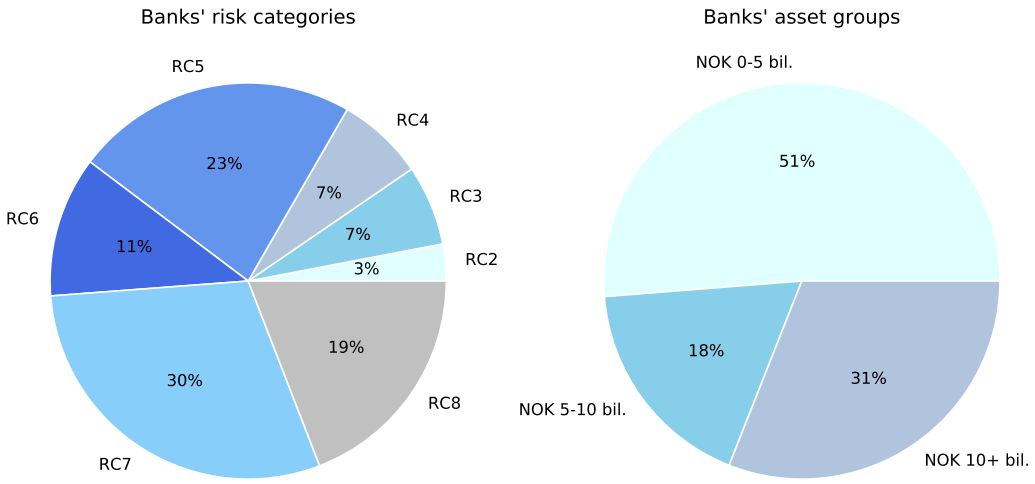


Figure 9: Banks' categories in deposit clusters with the same deposit rate This figure illustrates the average proportion of each bank-risk and bank-asset category per deposit cluster conditioned on the same deposit rate. In other words, if all transactions in a deposit cluster have the same deposit rate, the proportion of each bank category (either by risk or asset size) received deposits in this cluster is registered, and this figure shows the average over all such clusters.

Table 10: Relationship between banks and depositors

In this table, we report the proportions of depositors, banks, and deposits on the platform that have established a *bank-firm relationship*. We define a relationship as one where a depositor has made at least X number of deposits to the same bank.

Relationship: *At least X deposits to the same bank by a depositor*			
	$X = 3$	$X = 4$	$X = 5$
Out of 638 depositors:			
Depositors with at least X trans	284	211	162
Relationship depositors	36	15	9
Out of 56 banks:			
Banks with at least X trans	53	52	51
Relationship banks	32	24	13
Out of 2786 deposits:			
Relationship deposits	109	42	18
Avg. deposits per relationship	4	5	6
Avg. days between deposits	228	202	162
Avg. amount per deposit (NOK mil.)	20	21	27

banks (RC 5 to RC 8), which also translates to smaller banks. As we learn from before, these banks tend to offer higher deposit rates.[27]

Without the condition of the same deposit rate, as illustrated in Figure 14 in the Appendix, we find that most depositors make a deposit cluster to banks that are in the similar risk categories (67% of the clusters have two risk category jumps or fewer). Only 1% of the clusters have an extreme jump of six risk categories, i.e., depositors depositing in both Risk Category 2 (highest-rated banks on the platform) and Risk Category 8 (lowest-rated banks on the platform) in a period of seven days. Regarding banks' asset size, 42% of the clusters stay within the same bank size category in a deposit cluster.

The distribution of banks' risk rating (and jumps between categories) within a deposit cluster suggests that most depositors, when making deposit clusters, prioritize high deposit rates and they are not willing to make deposits into banks that are far from their risk-return preference. We therefore conclude that while depositors diversify by making deposit clusters, they have a certain preference for promised returns and associated bank risk.

4.3. Is this type of market competitive?

Banks traditionally like to establish a long-lasting relationship with stable and secure depositors. In return, firms like to get offers from reliable banks that they have previously worked with. On this platform, however, depositors can easily observe various offers from different banks, and both firms and banks have access to information that was not available before. An examination into competitiveness on such a marketplace can shed light on the likelihood of such platforms to expand in the large deposit market. We empirically investigate whether there exists a certain relationship between banks and depositors on the platform. If the platform offers a competitive market, depositors should only seek for suitable offers to their needs instead of establishing a relationship with certain banks. We therefore hypothesize that such a bank-firm relationship is unlikely to be established in this type of marketplace.

We operationalize the concept of a *relationship* in terms of the minimum number of deposits. Specifically, we consider a relationship to be established if a depositor makes at least the following number of deposits to the same bank: 1. three deposits, 2. four deposits, and 3. five deposits. We then explore whether such relationships exist among the 638

[27] Despite the fact that firms transact more often with lower-rated banks, their deposit amount per transaction is also much lower with these banks—as shown in Table A2 in the Appendix.

depositors and 56 banks (out of a total of 66 banks) actively participating in transactions in this marketplace.

We summarize the findings in Table 10. Among 638 depositors, of which 284 make at least three deposits, only 36 (12.7%) transact with the same bank at least three times. Seven percent of those who transact at least four times on this market deposit in the same bank. Of 162 depositors with at least five deposits, only nine (5.6%) deposit to the same bank at least five times. These relationship-deposits lead to 32 "relationship banks", if defined by those receiving at least three deposits by one depositor, or 13 relationship banks if the condition is at least five deposits. Compared to the total number of deposits on the platform, the proportion of relationship deposits is trivial. Considering the time between these "relationship deposits", there is a long period between the deposits to the same bank by a depositor (see Figure 16 in the Appendix). The deposit amount is not especially large either.

Hence, we do not find evidence of relationship banking in this marketplace. This finding aligns with the inherent nature of this online platform, which is designed to provide transparency and facilitate easy access to information. Establishing relationships would run counter to the main motivation of joining the platform for both banks and firms. As we have examined, depositors base their allocation decisions primarily on their preferences of risk and return trade-offs of the offers and the prevailing money markets, rather than being influenced solely by offers from specific banks. It is, however, important to note that we cannot verify whether depositors and banks, while using the platform, also attempt to establish relationships outside this marketplace. Nevertheless, we know for a fact that customers of this platform, both banks and firms, use its service repeatedly.

In summary, the results do not support any evidence of bank-firm relationships. This platform serves as a useful avenue for banks to attract new depositors as long as they consistently offer competitive deposit rates that appropriately compensate for associated risks. The benefits for depositors are clear, as the information asymmetry gap is reduced significantly compared to traditional markets.

5. Conclusions

In this paper, we utilize a unique data set on an innovative deposit marketplace to contribute to the workings of the large deposit markets—an understudied research area. Our paper provides empirical and in-depth findings on the market operation. We investigate three important aspects of a financial market: risk and return trade-off, deposit allocation, and competitiveness.

First, we find clear evidence that the mechanism underlying the risk–return trade-off is a key driver for both sides of the large deposit market. When pricing deposit rates, banks take into account their credit rating, the prevailing money market rates, and depositors' access to liquidity. In turn, firms demand deposit rates that compensate for bank risk while also aligning with current money market conditions.

Second, the empirical analyses confirm that the likelihood of a deposit is strongly linked to the availability of the offers and the money market rates. The findings also suggest that corporate depositors mitigate risk through diversification while adhering to specific risk-return preferences. These results serve as further validation of a prominent risk-return trade-off mechanism.

Finally, we investigate the competitiveness of this marketplace by examining bank-firm relationships. The findings indicate that firms make deposits based on the attractiveness of the offers rather than establishing a relationship with a bank. Activity patterns verify the objectives of the users of this marketplace: banks look for new customers and depositors look for competitive rates.

In general, our findings highlight a strong foundation of risk and return trade-offs in the large deposit market. Marketplaces that provide better information facilitate more efficient connections between banks and depositors while fostering competition among banks. As long as banks are willing to join such marketplaces, this type of market can expand and potentially alter the nature of traditional markets. Banks must therefore be alert to adapt

quickly to the changing market dynamics and be strategic towards customer retention and acquisition when it comes to corporate deposits.

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Declaration of generative AI in scientific writing During the preparation of this work the authors used ChatGPT in order to spell check the manuscript. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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Appendix

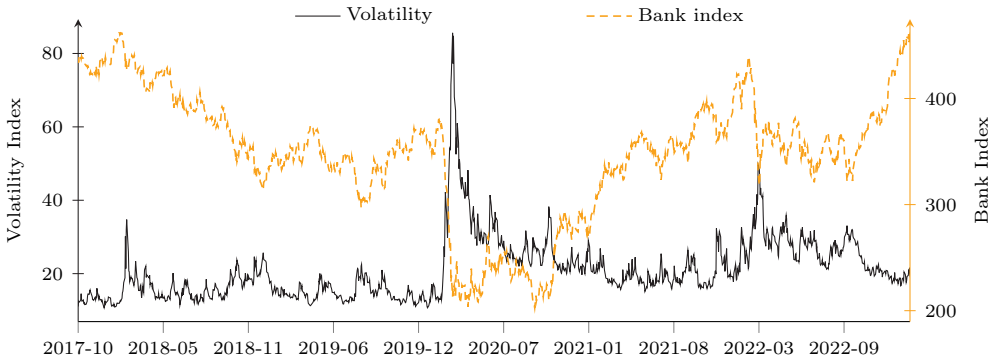

Figure 10: Bank index and volatility This figure illustrates the EURO STOXX 50 Volatility Index, and the STOXX Europe 600 Banks Index.

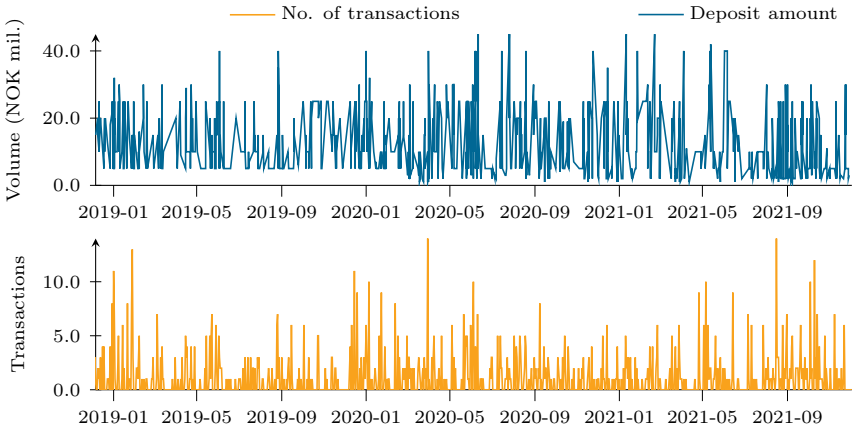

Figure 11: Transactions around the policy change of minimum deposit amount This figure illustrates the transaction volume and numbers from 2019 through 2021. In March 2020, Fixrate lowered the minimum deposit amount from NOK 5 million to NOK 1 million per transaction. We plot the deposit amount per transaction (upper plot) and number of transactions (lower plot) on the platform in the period around this policy change. Only deposits less than NOK 40 million are included in the figure to make it easy to observe the change.

Table A1: Data Overview

The table gives an overview of the main data used in our study. The overview includes the data elements and their short description and source. The sources include Fixrate, Nordic Bond Pricing (NBP), and Refinitive Eikon.

Element	Description	Source	
Offer ID	An anonymized ID connected to each offer	Fixrate	
Bank	A unique and anonymized ID connected to each bank making offers	Fixrate	
Bank group	Banks are divided into eight groups, B1 (safest) – B8 (least safe) according to their size and credit ratings	NBP	
Credit spreads	Average weekly bond spreads (broker quotes – NIBOR 3M) of eight bank groups. Range: March 2014 to February 2023	NBP	
Published time	Published time of offers. Format: UTC YYYY-MM–DD hh:mm:ss	Fixrate	
Bank assets	Categorical variable sorted in NOK billion: 0–5, 5–10, 10+	Fixrate	
Total volume	Total asked volume of each offer in NOK million. Range: 1–1000. Mean: 105; Median: 50	Fixrate	
Min volume	Minimum asked volume of each offer in NOK million. Range: 1–500. Mean: 17; Median: 5	Fixrate	
Max volume	Maximum asked volume of each offer in NOK million. Range: 1–500. Mean: 50; Median: 25	Fixrate	
Offer type	Either *Floating-interest* offers or *Fixed-interest* offers	Fixrate	
Interest rate*	Floating offer: the offered *interest spread* on top of the NIBOR 3M Fixed offer: the offered *interest rate* on top of the NIBOR 3M	Fixrate	
Withdrawal time	Floating: notice period before withdrawal (days) — 31 or 90 Fixed: deposit duration before withdrawal (months) — 3, 6 or 12	Fixrate	
Transaction ID	An anonymized ID connected to each deposit	Fixrate	
Depositor ID	A unique and anonymized ID connected to each depositor	Fixrate	
Created time	Created time of transactions. Format: UTC YYYY-MM–DD hh:mm:ss	Fixrate	
Volume	Deposit amount in NOK million. Range: 1–500. Mean: 15; Median: 6	Fixrate	
NIBOR 3M	Norwegian Interbank Offered Rate, representing short-term Norwegian money market rates. Standard pricing financial instrument	Refinitiv Eikon	
Bank index	Daily return of STOXX Europe 600 Banks EUR net return index. Refinitiv Eikon instrument code: .SX7R	Refinitiv Eikon	
Volatility index	Daily return of Europe STOXX 50 volatility index. Refinitiv Eikon instrument code: .V2TX	Refinitiv Eikon	

* The interest rates on deposits are the same as the offered interest rates for all transactions.

Table A2: Statistics on Offers and Deposits Sorted by Banks

The table gives an overview of the statistics on offers and deposits according to two classifications of banks: risk category and total asset size. The statistics include the proportions of offers (%) with certain thresholds of deposits and fulfillment periods, the average amount of total asked volume (AV), deposit volume per offer, and deposit amount per deposit, as well as number of offers and deposits by each interest type.

	Risk categorgy							Asset size (NOK bil.)		
	RC 2	RC 3	RC 4	RC 5	RC 6	RC 7	RC 8	0–5	5–10	10+
% of offers:										
Fulfilled	24	39	35.5	30	26	28	34.5	29	28.5	34
Deposits ⩾ 1	59.5	70	61	67	64	72	80	73.5	63	67.5
No deposits	40.5	30	39	33	36	28	20	26.5	37	32.5
Dep. volume ⩾ 50% AV	39	50	47	53	48	53	57	53	50	50
Dep. volume ⩾ 30% AV	47	60	54	58	54	59	69	61	53	58
% of offers fulfilled in:										
⩽ 1 day	95	67	64	49	47	48	37	45	49	64
1–5 days	0	2	0	5	3	12	8	8	3	2
5–10 days	0	10	6	10	16	12	6	9	16	6
10–20 days	5	2	6	6	12	9	10	8	11	5
20–30 days	0	2	12	10	6	7	6	6	8	7
30+ days	0	17	12	21	16	12	39	24	14	17
Amount (NOK mil.):										
Asked volume/offer	460	133	192	82	52	41	47	44	52.5	220.5
Deposit volume/offer	98	63	44	40	24	21	25	22	25	69
Deposit volume/deposit	103	33	17	16	8	8	7	7.5	13	28
No. of offers pr. bank:										
Floating-interest	13.4	11.6	14.8	12.8	9.8	15.8	11.7	13.7	10.2	13.4
Fixed-interest	2.4	1.75	3.8	6.1	5.5	4.5	1	3.1	7.5	2.6
Total no. of offers:										
Floating-interest	67	93	74	192	78	206	140	383	133	334
Fixed-interest	12	14	19	91	44	58	12	88	97	65
No. of deposits pr. bank:										
Floating-interest	13.8	23.6	46.2	41.3	43.4	49.1	42.4	47.6	23.5	38.5
Fixed-interest	1.2	1.6	1.6	5.3	2.6	3.5	0.8	1.82	5.5	2.5
Total no. of deposits:										
Floating-interest	69	189	231	619	347	638	509	1334	306	962
Fixed-interest	6	13	8	80	21	46	10	51	71	62

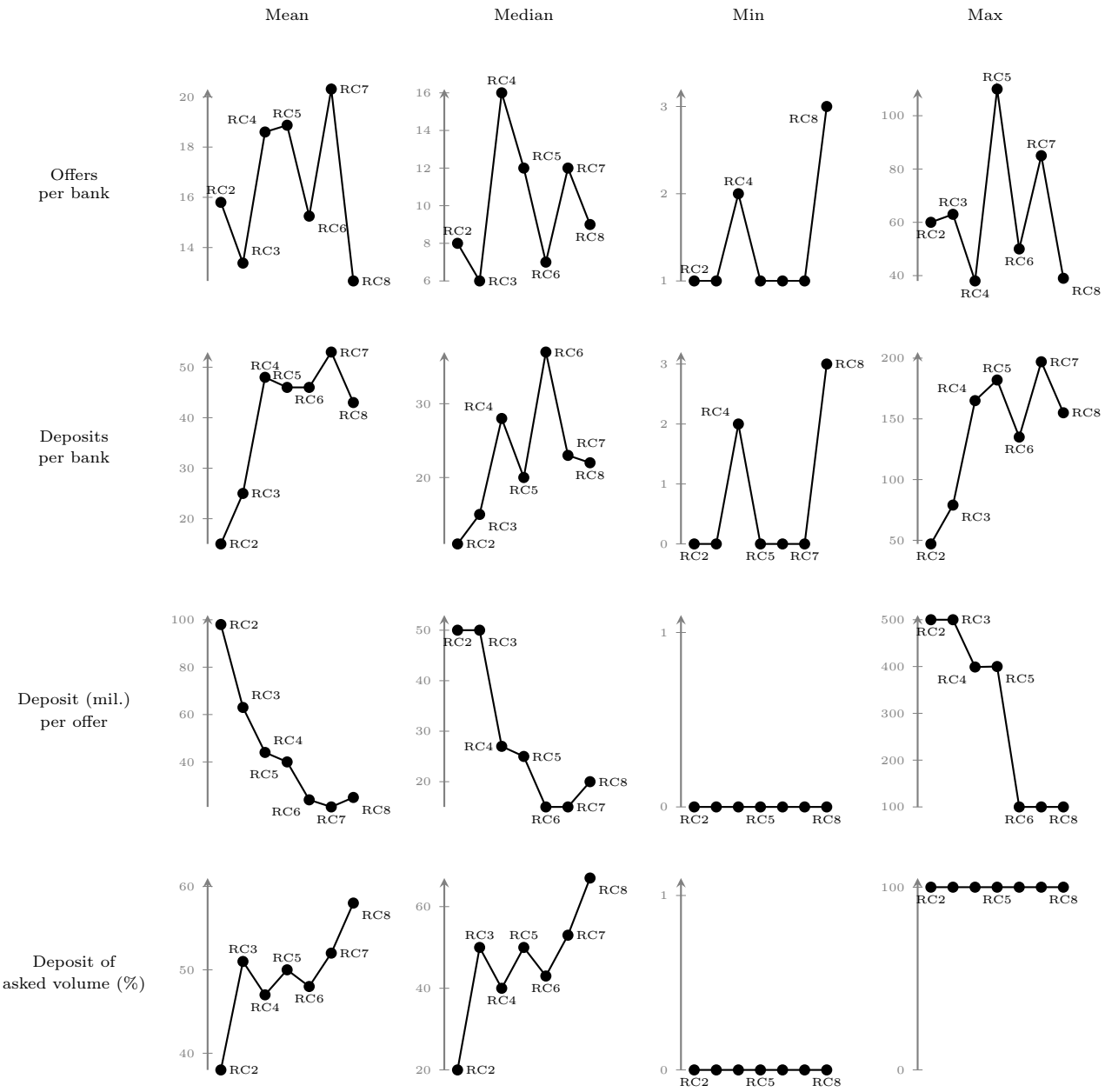

Figure 12: Offers and deposits sorted by banks' risk category This figure visualizes the statistics on the number offers and deposits on the platform according to risk categories of the member banks.

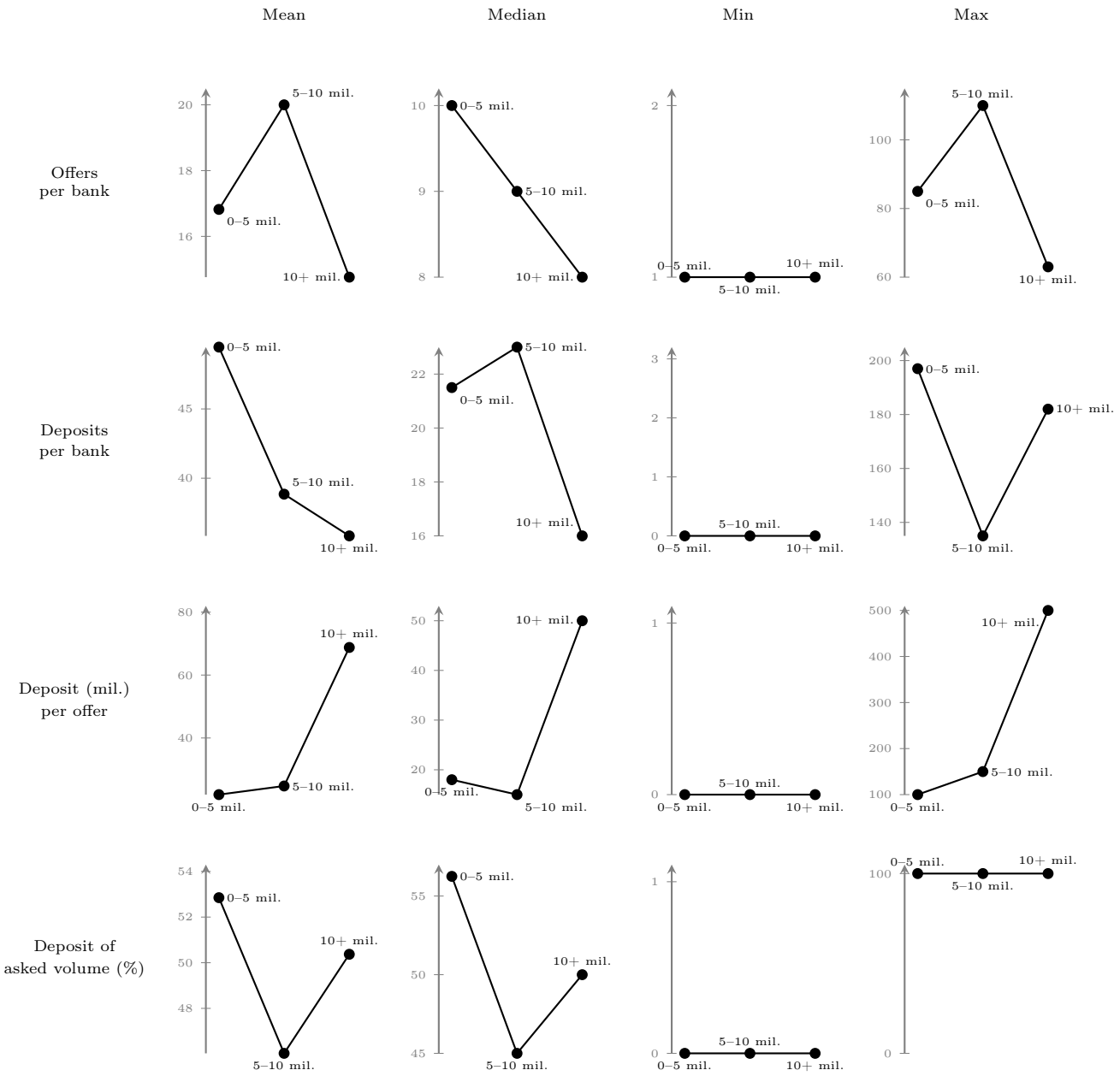

Figure 13: Offers and deposits sorted by banks' risk category This figure visualizes the statistics on the number offers and deposits on the platform according to risk categories of the member banks.

Table A3: Robustness checks: Determinants of floating-interest rates

In this table, we report the regression results of floating-interest rates on top of the NIBOR, i.e., interest spreads, offered by banks on a set of control variables. The data is from floating-interest offers (models (I) to (III)) and floating-interest deposits (models (IV) to (VI)) from October 2017 through January 2023. The control variables include characteristics of: the offering bank (risk category (RC)), the deposit offer (asked volume, deposit amount and withdrawal notice period), and the market (bank index return and the NIBOR). Model (I) and (IV) represent the POLS model, model (II) and (V) RE model, and model (III) and (VI) FE model. Clustered standard errors are at the bank level. This table uses the base model with banks in the RC 2 and 3, and with the withdrawal notice period of 31 days. *, **, *** indicates statistical significance level at 10%, 5%, and 1%, respectively.

Dependent variable: **Offered interest spreads (%)**						
	Offers			Deposits		
	(I)	(II)	(III)	(IV)	(V)	(VI)
Constant	0.379***	0.445***	0.415***	0.412***	0.449***	0.451***
	(0.014)	(0.011)	(0.009)	(0.009)	(0.012)	(0.006)
Risk category (RC) of the offering bank						
RC4	0.037**			0.071***		
	(0.019)			(0.011)		
RC5	0.058***			0.050***		
	(0.014)			(0.009)		
RC6	0.059***			0.036***		
	(0.020)			(0.010)		
RC7	0.109***			0.084***		
	(0.015)			(0.009)		
RC8	0.114***			0.069***		
	(0.018)			(0.010)		
Total asked volume (mil.)	2.1e-05	-6.2e-05	-3.6e-06	-5.0e-05	-1.3e-04***	-1.2e-04***
	(6.5e-05)	(6.0e-05)	(6.6e-05)	(3.1e-05)	(3.4e-05)	(3.9e-05)
Asked per deposit (mil.)						
Min amount	2.7e-04**	8.4e-05	3.0e-04***	-2.1e-05	4.6e-05	1.5e-04
	(1.2e-04)	(1.3e-04)	(1.1e-04)	(1.2e-04)	(1.1e-04)	(1.2e-04)
Max amount	-3.4e-04**	-2.4e-04**	4.3e-05	3.9e-05	3.2e-04***	3.9e-04***
	(1.3e-04)	(1.2e-04)	(1.3e-04)	(7.2e-05)	(8.0e-05)	(9.7e-05)
90-day notice period	0.084***	0.076***	0.040*	0.193***	0.116***	0.109***
	(0.023)	(0.024)	(0.023)	(0.020)	(0.024)	(0.025)
NIBOR (3M) (%)	-0.049***	-0.046***	-0.040***	-0.062***	-0.054***	-0.054***
	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)
Bank index return (%)	-2.6e-03	-2.3e-03	-2.4e-03	-1.5e-03	-1.3e-03	-1.3e-03
	(2.0e-03)	(1.9e-03)	(2.0e-03)	(1.4e-03)	(1.3e-03)	(1.4e-03)
Bank Fixed Effects			Yes			Yes
No. of observations	850	850	850	2602	2602	2602
Adjusted R^2	0.22	0.16	0.08	0.31	0.26	0.21
Standard Error	Robust	Robust	Clustered	Robust	Robust	Clustered

Table A4: Robustness checks: Determinants of fixed-interest rates

In this table, we report the regression results of the fixed interest rates offered by banks on a set of control variables. The data is from fixed-interest offers (models (I) to (III)) and fixed-interest deposits (models (IV) to (VI)) from October 2017 through January 2023. The control variables include characteristics of: the offering bank (risk category (RC)), the deposit offer (asked volume, deposit amount and maturity), and the market (bank index return and the NIBOR). Model (I) and (IV) represent the POLS model, model (II) and (V) RE model, and model (III) and (VI) FE model. Clustered standard errors are at the bank level. This table uses the base model with banks in the RC 2 and 3, and with the maturity of 12 months. *, **, *** indicates statistical significance level at 10%, 5%, and 1%, respectively.

Dependent variable: **Offered interest spreads (%)**						
	Offers			Deposits		
	(I)	(II)	(III)	(IV)	(V)	(VI)
Constant	0.653***	0.630***	0.931***	0.659***	0.836***	1.223***
	(0.065)	(0.048)	(0.076)	(0.098)	(0.052)	(0.122)
Risk category (RC) of the offering bank						
RC4	1.128***			0.458		
	(0.178)			(0.340)		
RC5	0.135**			0.260***		
	(0.061)			(0.079)		
RC6	0.185***			0.195**		
	(0.062)			(0.083)		
RC7	0.184***			0.202**		
	(0.063)			(0.078)		
RC8	0.178***			0.143		
	(0.066)			(0.089)		
Total asked volume (mil.)	-4.2e-04	8.6e-04***	-6.2e-04*	1.2e-03	1.1e-03**	-2.0e-03
	(3.0e-04)	(2.8e-04)	(3.7e-04)	(7.4e-04)	(4.9e-04)	(1.4e-03)
Asked per deposit (mil.)						
Min amount	-2.6e-04	8.7e-05	-4.9e-04 -7.2e-04	-4.3e-04	-2.2e-03***	
	(5.1e-04)	(3.7e-04)	(4.2e-04)	(8.8e-04)	(7.1e-04)	(6.9e-04)
Max amount	5.0e-04	-1.5e-03***	-1.0e-04	-1.3e-03*	-2.6e-03***	-1.9e-03*
	(3.9e-04)	(3.3e-04)	(4.8e-04)	(6.9e-04)	(6.1e-04)	(1.1e-03)
Shorter maturity	-0.062**	-0.084**	-0.070**	0.026	-0.026	-0.090*
	(0.029)	(0.033)	(0.031)	(0.049)	(0.038)	(0.048)
NIBOR (3M) (%)	0.792***	0.956***	0.792***	0.781***	0.855***	0.846***
	(0.042)	(0.051)	(0.047)	(0.054)	(0.037)	(0.042)
Bank index return (%)	-2.3e-04	3.5e-03	7.2e-04	8.0e-04	-7.5e-03	-9.4e-03
	(1.2e-02)	(1.3e-02)	(1.1e-02)	(1.6e-02)	(1.1e-02)	(6.5e-03)
Bank Fixed Effects			Yes			Yes
No. of observations	250	250	250	184	184	184
Adjusted R^2	0.93	0.90	0.78	0.88	0.88	0.88
Standard Error	Robust	Robust	Clustered	Robust	Robust	Clustered

Table A5: Offered interest rate asymmetry

In this table, we report the regression results of the offered floating-interest rates and fixed-interest rates for fixed offers on the changes in daily NIBOR. The data is from October 2017 through January 2023. The other control variables include characteristics of: the deposit offer (asked volume, deposit amount and withdrawal notice period/maturity), the offering bank (bank risk, i.e., one-year bond's credit spreads, and bank assets), and bank index return. For both offers, we present the POLS and RE models, where the RE models are preferred according to the endogeneity test. This table uses the base model with banks of the NOK 0–5 billion asset group, withdrawal notice period of 31 days for floating offers and 12-month maturity for fixed offers, and with the NIBOR unchanged from the previous day. *, **, *** indicates statistical significance level of 10%, 5%, and 1%, respectively.

Dependent variable: **Offered interest rates (%)**				
	Floating spreads		Fixed rates	
	Pooled OLS	RE	Pooled OLS	RE
Constant	0.419***	0.371***	0.821***	0.976***
	(0.013)	(0.014)	(0.166)	(0.134)
Changes in NIBOR				
Decreases	-0.017	-0.009	0.010	0.016
	(0.013)	(0.013)	(0.076)	(0.076)
Increases	-0.054***	-0.052***	0.242***	0.258***
	(0.012)	(0.011)	(0.073)	(0.079)
Credit spreads (%)	0.021	0.044**	2.162***	2.035***
	(0.019)	(0.018)	(0.480)	(0.454)
Total asked volume (mil.)	-1.8e-05	-1.1e-04**	2.7e-03***	3.3e-03***
	(5.7e-05)	(5.1e-05)	(6.3e-04)	(5.3e-04)
Asked per deposit (mil.)				
Min amount	2.0e-04*	2.3e-05	4.3e-04	1.8e-03
	(1.1e-04)	(9.4e-05)	(1.7e-03)	(1.3e-03)
Max amount	-2.7e-04**	3.4e-05	-3.4e-03***	-3.5e-03***
	(1.2e-04)	(1.0e-04)	(7.9e-04)	(7.2e-04)
Bank index return (%)	-2.6e-03	-2.6e-03	-5.6e-03	-8.4e-03
	(2.1e-03)	(1.9e-03)	(3.0e-02)	(2.8e-02)
Bank assets (NOK)				
10+ bil.	-0.074***		0.456***	
	(0.012)		(0.154)	
5–10 bil.	0.009		0.237***	
	(0.015)		(0.076)	
90-day notice period	0.088***	0.065***		
	(0.023)	(0.023)		
Shorter maturity			-0.098	-0.080
			(0.065)	(0.065)
No. of observations	850	850	250	250
Adjusted R^2	0.15	0.14	0.60	0.57
Standard Error	Robust	Robust	Robust	Robust

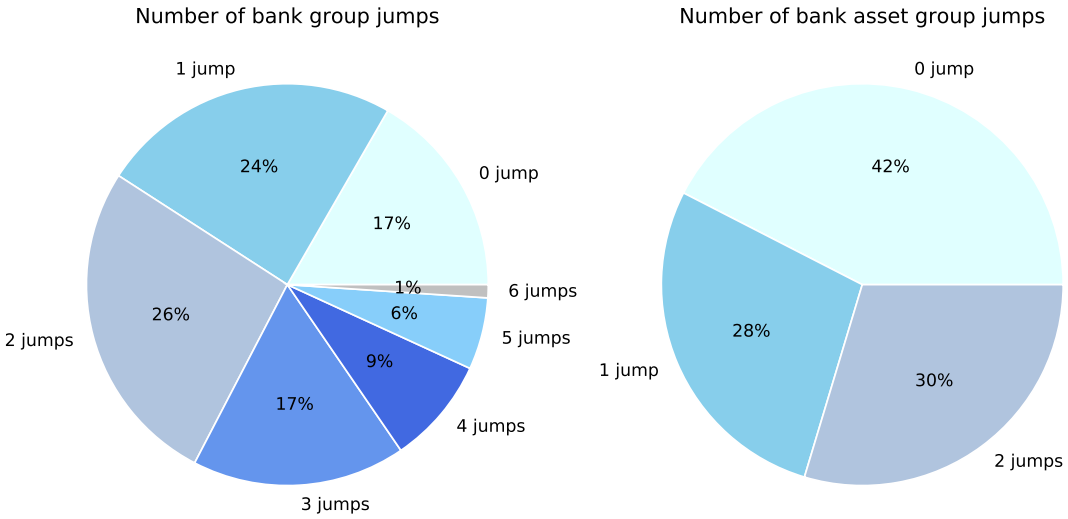

Figure 14: Bank group jumps in deposit clusters. These pie charts illustrate the difference in risk categories (ranging from RC2 to RC8) and bank asset groups in deposit clusters made by depositors.

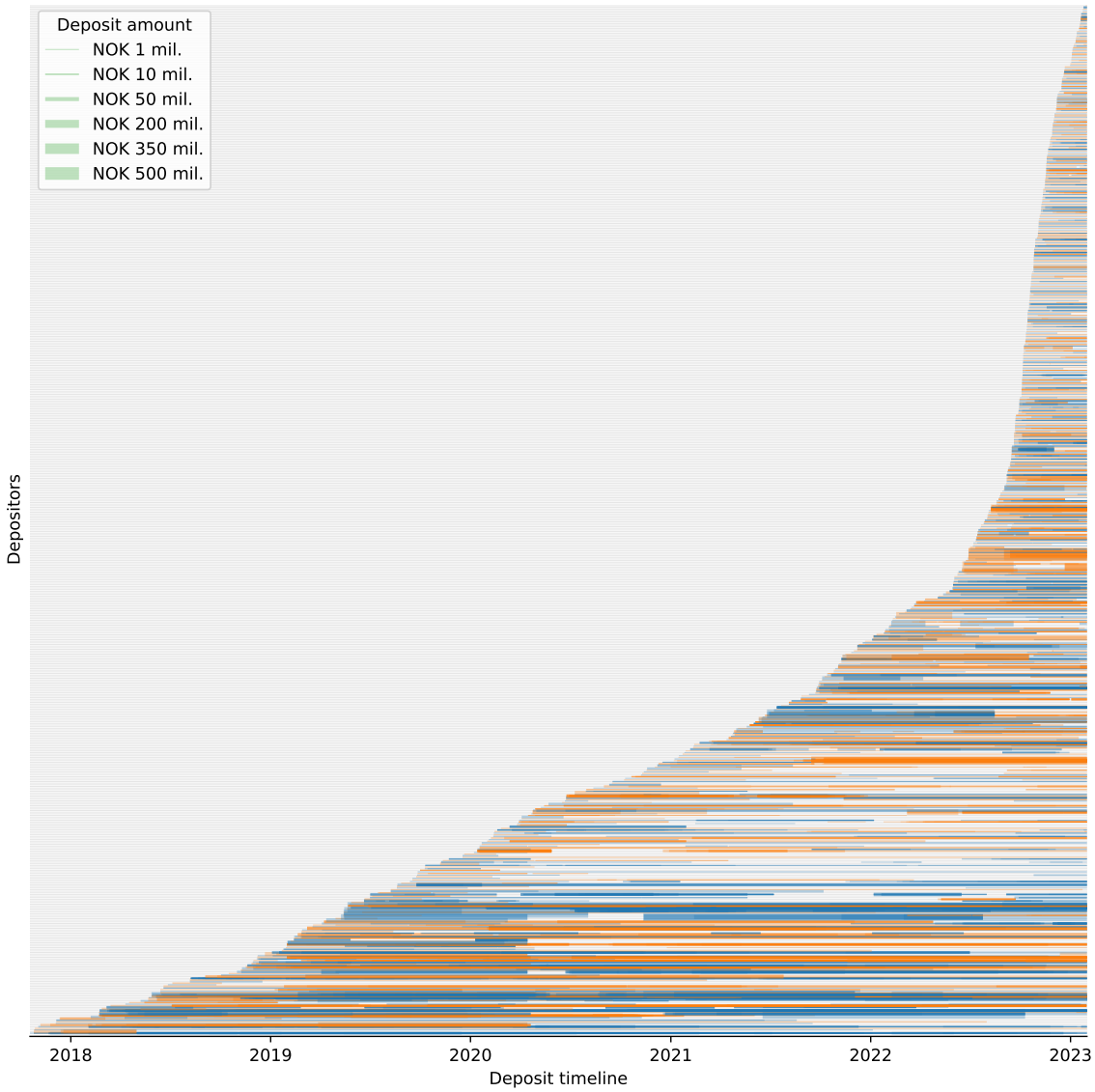

Figure 15: Deposit duration and timeline of all depositors Each of the 638 unique depositors on the platform is represented by a horizontal gray line, and each deposit is represented by a line with thickness corresponding to its volume and length corresponding to its duration. As the deposit lines are transparent, darker shades along one depositor line represent a cluster of transactions of that depositor. The colors alternate between each depositor for readability.

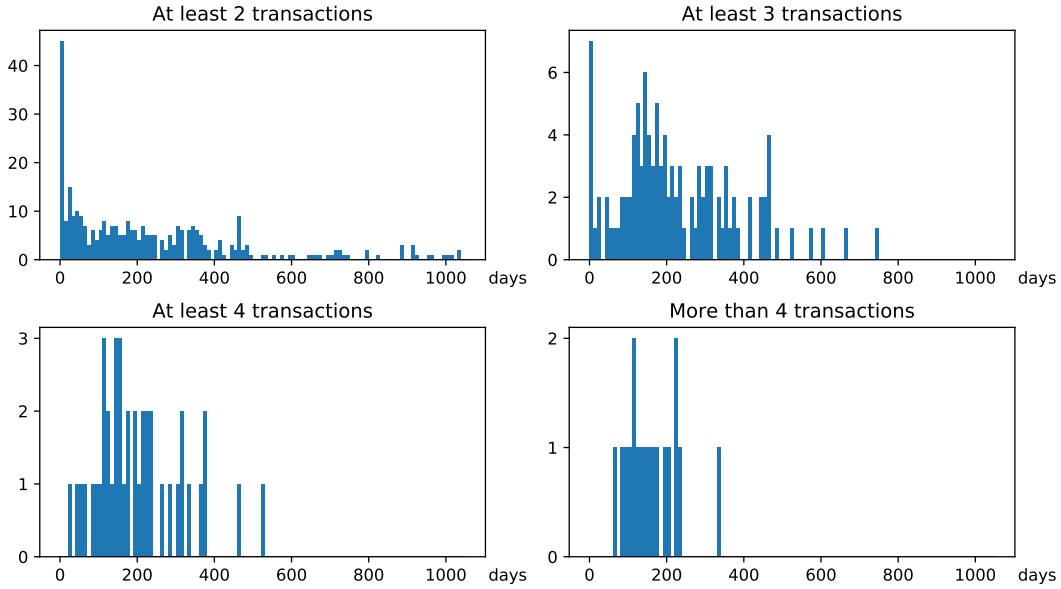

Figure 16: Average waiting time between relationship transactions Depending on how a relationship is defined, we plot the average time between relationship transactions made by each depositor in days.