How important is affiliation between mutual funds and distributors for fund flows?*

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Abstract

We quantify the importance to mutual fund flows of affiliation between funds and their distributors. Bank failures create exogenous variation in retail customers' exposure to bank-affiliated mutual funds. When a bank fails, its customers are moved to other banks that distribute their own affiliated mutual funds. Following such exogeneous bank shifts, customers sell their fund holdings and replace them with funds affiliated with their new banks. Customers react sequentially over time. After four years, a third of customers' investments have been reallocated. In spite of large reallocations, investors do not end up with better-performing fund portfolios.

Key words: Mutual funds, retail investors, fund flows, distribution channel.

JEL classification: D14, G01, G11, G21

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1. Introduction

What determines whether retail investors decide to buy one mutual fund instead of another? Do investors search all the available funds and choose the best-performing ones, or do they buy funds affiliated with fund distributors even if those funds do not perform particularly well, and investors could freely buy other funds? Although there is agreement in the recent empirical literature that the way funds are distributed to investors influences fund choices,[1] the fact that some studies model fund investments without accounting for the distribution channel (Berk and Green, 2004; and for a survey, Christoffersen, Musto, and Wermers, 2014) but others provide a role for it (Gennaioli, Shleifer, and Vishny, 2015; Garleanu and Pedersen, 2018; Roussanov, Ruan, and Wei, 2021; and Egan, 2019) indicates that there is uncertainty about how important fund distribution is. We address this question. We find that investors have a strong tendency to buy funds that distributors are affiliated with even when those funds are not the best-performing ones. Our results imply that affiliation with a fund distributor is in itself of first-order importance for funds seeking to attract inflows and prevent outflows.

It is difficult to quantify the importance of affiliation between mutual funds and their distributors for mutual fund flows, as one needs a clean identification strategy that allows for causal interpretation and separates out alternative reasons for fund choices. To tackle this challenge, we use unique data from Denmark that offer exogenous variation in investors' exposure to mutual funds. In Denmark, which is typical of Europe, banks are the primary sellers of mutual funds.[2] Banks make distribution agreements with selected mutual funds, so different banks are affiliated with different funds, and all compete for fund inflows. We study what happens to the mutual fund flows of individual investors after they are forced to switch banks for an exogenous reason: their original bank suddenly ceased to exist following the financial crisis of 2008. Because customers' new banks have a pecuniary incentive to guide their investors toward their own affiliated funds, customers switching banks will be presented with information from their new

[1] Bergstresser, Chalmers, and Tufano (2009), Del Guercio, Reuter, and Tkac (2010), Christoffersen, Evans, and Musto (2013), Christoffersen, Musto, and Wermers (2014), Del Guercio and Reuter (2014), Gennaioli, Schleifer, and Vishny (2015), Jenkinson, Jones, and Martinez (2016), Pool, Sialm, and Stefanescu (2016), Foerster, Linnainmaa, Melzer, and Previtero (2017), Sun (2017), Linnainmaa, Melzer, and Previtero (2021), Chalmers and Reuter (2020), Sokolinski (2021), and Cookson, Jenkinson, Jones, and Martinez (2021).

[2] Ferreira, Matos, and Pires (2018) found that bank-affiliated mutual funds often account for more than 70% of mutual fund assets in European markets; i.e., they are clearly the dominant players.

bank about its affiliated funds. The crux of our paper is to test whether a customer who switches from Bank X to Bank Y sells her existing funds and in place of them buys funds affiliated with Bank Y. We test whether customers move their funds all at once (after switching banks) or sequentially over time by examining customers' exposure to common time trends. Evidence in favor of common time trends in fund flows would indicate the importance of shared changes in bank affiliation over individual characteristics in explaining reallocation of funds. We also test whether fund flows are directed toward better-performing funds. We find it particularly interesting to evaluate whether banks are able to convince customers to buy their affiliated funds even if those funds are not performing particularly well, as this would make assets under management less performance sensitive and thereby a stable source of income for the bank.

It is important to note that the customers forced to switch banks in our setting did not have to move their mutual funds holdings. Mutual funds are separate legal entities in Denmark that make distribution agreements with banks; nothing prevents customers from keeping their holdings even after switching banks, as funds affiliated with their old banks continue to operate normally. Funds affiliated with the customers' old banks did not have distribution agreements with their new banks, though, making this an ideal setup to study the importance for mutual funds of being affiliated with a distributor.

To test our hypotheses on the importance of affiliation between mutual funds and their distributors, we use a comprehensive register-based data set that includes all Danish mutual fund investors from 2005–12. We investigate whether customers who were forced to switch banks (because their old banks failed) increased their holdings of mutual funds affiliated with their new banks after doing so. We compare the investment decisions of investors who switched banks and who did not; that is, we make difference-in-differences estimations. Our main finding on how the affiliated distribution of mutual funds influences mutual fund flows is summarized in Figure 1a. Before a bank fails (before year *t* in Figure 1a), a customer typically does not hold funds affiliated with what will be her new bank. After bank switches, large portfolio shifts occur. Immediately after the acquiring bank replaces the failed bank, customers start increasing their holdings of mutual funds affiliated with the acquiring bank. The flows do not change all at once but evolve dynamically over time. Four years after customers have switched banks (our last post-treatment observation), 35% of their total mutual fund investments have been allocated to funds

affiliated with their new banks. We document that these results are highly significant through difference-in-differences regressions in which we compare the treated investors to those who did not switch banks, while controlling for individual-investor (age, gender, income, wealth, etc.) and fund (fees and ratings) characteristics. In terms of wealth, the customers have moved 22% of their net liquid assets into funds affiliated with their new banks four years after switching. In light of the well-known finding that households generally display inertia when making investment decisions (Madrian and Shea, 2001; Bilias, Georgarakos, and Haliassos, 2010; and Calvet, Campbell, and Sodini, 2009), this is a large effect.

We find that when investors reallocate their mutual funds holdings, they typically move their entire holdings to funds affiliated with their new banks. We illustrate this in Figure 1b, which shows the percentages of customers forced to switch banks who hold a certain fraction of their total mutual fund portfolios in funds affiliated with their new banks. This is shown for the year the customers switch banks (time *t*) and four years later. In year *t*, practically no investors (1%) had almost all their investments (90%–100%) in funds affiliated with their new banks. Four years later, 23% of customers have moved all their fund investments into funds affiliated with their new banks. This means that the patterns we document for the average investor (Figure 1a) arise because a significant fraction of people move their entire mutual-fund portfolios into funds affiliated with their new banks. The fact that investors move their entire portfolios obviously also means that they sell their existing holdings of mutual funds to buy funds affiliated with their new banks.

Why do investors reallocate their fund portfolios? This is an important question that we devote considerable attention to. We test whether the decision to reallocate funds is explained by certain individual characteristics or is driven primarily by how long the investors have been customers of the acquiring bank. We find no evidence that reallocating investors possess particular personal characteristics; for instance, low income, low education, or other characteristics that proxy for low financial sophistication. On the other hand, we find strong evidence that by far the main determinant of fund reallocation is the time elapsed since becoming a customer of the acquiring bank. Year-by-year after switching banks, more investors reallocate their entire portfolios to funds affiliated with their new banks, regardless of personal characteristics. The interpretation is that over time, new customers are more and more likely to be convinced by their new banks to

sell their existing holdings and replace them with funds affiliated with customers' new banks. In further support of this, we separately study the outflows of existing (pre-treatment) fund holdings. We find that people who buy funds affiliated with their new banks tend to sell much more of their pre-treatment holdings than those who do not, controlling for both investor characteristics and fund performance. In short, following variation in retail customers' exposure to mutual funds, it is the affiliation of a distributor (a bank, in our setup) with a mutual fund that primarily drives both fund inflows and fund outflows.

We also investigate thoroughly whether people reshuffle their portfolios to improve performance. We know from previous research that mutual-fund ratings, such as Morningstar, are important drivers of retail investors' mutual fund flows; see Del Guercio and Tkac (2008), Khorana and Servaes (2012), and Ben-David, Li, Rossi, and Song (2019). We find that Morningstar ratings are not driving post-treatment fund reallocations of investors forced to switch banks, i.e., the portfolio reallocations we document are not happening because people buy higher-rated funds after switching banks. We also investigate whether the outflows of pre-treatment fund holdings are associated with the purchase of highly rated funds. Again, we conclude that this is not the case: the main determinant of sales of existing funds is that customers buy funds affiliated with their new banks, not that they find new, highly rated funds to invest in. Finally, we examine other performance measures than Morningstar ratings, such as mutual fund fees, realized returns, and portfolio concentration. Collectively, these results make us rule out the hypothesis that people churn their fund portfolios to improve performance.

We devote most of our analyses to exogeneous variations in fund-distributor affiliations, but as a final exercise we look at the total sample of mutual fund holders–not only fund holders in banks that failed after the financial crisis, but all fund holders switching between large Danish banks. Our results are the same. Customers arriving at a new bank sell their existing funds and buy funds affiliated with the new bank. This implies that our results for forced bank shifts are generalizable to the broader setting, even if many bank changes are probably not exogeneous.

We conclude that the affiliation between a fund and a distributor exerts a powerful influence on retail investors' decisions to buy mutual funds. It dominates other potential explanations, such as investor or fund characteristics. People invest in funds affiliated with their banks even when those funds are not performing particularly well. This implies that it is crucial for funds to be

affiliated with a distributor. This finding is important because the literature often models flows between mutual funds as determined by fund performance. Our findings show that affiliation with a distributor is, on its own, of first-order importance for funds seeking to attract inflows and prevent outflows.

1.1 Related literature

Fund investments are often mediated, either by financial advisors or brokers, as in the U.S. (Bergstresser, Chalmers, and Tufano, 2009; Del Guercio and Reuter, 2014) or by banks, as in Europe (Ferreira, Matos, and Pires, 2018). The exogeneous variation in fund-distributor affiliation that is necessary to measure its importance is clearer in markets where bank-affiliated funds dominate, as there is a clear relation between the distributor and the mutual fund in those markets. In the U.S., bank-affiliated mutual funds account for only a small fraction of mutual funds (Del Guercio, Reuter, and Tkac, 2010). Instead, mutual funds there are typically distributed by brokers. Brokers might cater to different mutual funds families, though, making identification less straightforward. Analyses of U.S. data do reveal, however, that fund-distributor relations statistically influence flows there as well (see references in footnote 1). Although we believe that our results, highlighting the importance of funds' being affiliated with distributors, apply more broadly, we acknowledge that the different institutional setup in the U.S. implies that our estimation of the magnitude of the effects is more suitable for Europe. In terms of global coverage, it is relevant that bank distribution of mutual funds, as in Europe, is almost as important globally as the broker-distribution that dominates in the U.S. European mutual funds managed around 35% of worldwide AUMs in 2019, while U.S. funds managed around 45% (ICI, 2019).

Our paper is probably most closely related to Foerster et al. (2017), Chalmers and Reuter (2020), and Sokolinski (2021), who all used clever settings to identify effects of changes in distribution channels on fund flows. These papers focused mainly on conflicts of interest arising from advisor incentives, whereas we study the importance of the distribution channel for funds flows and the dynamics of flows resulting from shifts in the distribution channels.[3]

[3] Other papers in the literature on the distribution channels of mutual funds (i) evaluate the costs and benefits (for customers) of using the distribution channel (Bergstresser, Chalmers, and Tufano, 2009; Christoffersen, Musto, and Wermers, 2014), (ii) study whether advice given by the distribution channel is useful or biased, and the role of

Our findings have implications for modelling mutual fund flows. In their seminal work, Berk and Green (2004) argued that investors learn about the skills of mutual fund managers by observing their past performance. Sirri and Tufano (1998), Bergstresser and Poterba (2002), Del Guercio and Tkac (2002, 2008), Ivkovic and Weisbenner (2009), Spiegel and Zhang (2013), Ferreira, Keswani, Migual, and Ramos (2012), and Christoffersen, Musto, and Wermers (2014) investigated empirically whether this was the case. We find that investors make substantial portfolio shifts following exogenous variation in access to a distribution channel, but that these shifts are not driven by a desire to buy funds with better past performance or higher ratings. Our results thus support the view that a distribution channel plays a separate and important role in fund flow, in agreement with, for example, Gennaioli, Shleifer, and Vishny (2015), Garleanu and Pedersen (2018), Egan (2019), and Roussanov, Ruan, and Wei (2021).

Finally, our paper is related to the literature on financial advice and advertising of one's own products; see for instance Gurun, Matvos, and Seru (2016) for the credit market and Roussanov, Ruan, and Wei (2021) for mutual funds. An important question here is whether financial advisors and advertisements provide consumers with useful information (Nelson, 1974) or lead consumers to make suboptimal decisions (Thaler and Sunstein, 2008). Numerous studies have found that advisors' incentives influence their advice and that investors perform worse after receiving financial advice (Bergstresser, Chalmers, and Tufano, 2009; Bhattacharya, Hackethal, Kaesler, Loos, and Meyer, 2012; Hackethal, Haliassos, and Japelli, 2012; Mullainatha, Nöth, and Schoar, 2012; Christoffersen, Evans, and Musto, 2013; Karabulut, 2013; Chalmers and Reuter, 2020; Foerster, Linnainmaa, Melzer, and Previtero, 2017; Hoechle, Ruenzi, Schaub, and Schmid, 2017, 2018; Egan, 2019; Fecht, Hackethal, and Karabulut, 2018). On the other hand, Kramer (2012), Gaudecker (2015), and Linnainmaa, Melzer, and Previtero (2021) found that financial advice helped investors and was not biased. We find that investors make large portfolio shifts following switches between banks, and that those flows are directed toward funds affiliated with the investors' new banks. In our setting, the investors did not end up with materially better portfolios.

Our paper is organized as follows. In the next section, we provide a brief overview of the mutual

incentives in this regard (Christoffersen, Evans, and Musto, 2013; Jenkinson, Jones, and Martinez, 2016; Coockson, Jenkinson, Jones, and Martinez, 2018; and Linnainmaa, Melzer, and Previtero, 2021), and (iii) analyze whether it pays to have a distribution channel (Knuutila, Puttonen, and Smythe, 2007; Pool, Sialm, and Stefanescu, 2016).

fund sector in Denmark and how the financial crisis affected Danish banks. In Section 3, we describe our data. In Section 4, we explain our treatment and control groups, provide summary statistics, and present the results of static analyses of the likelihood of owning funds affiliated with one's bank. Our main analyses are presented in Sections 5 and 6. In Section 5, we investigate what happens to mutual fund flows when investors are forced to switch banks and argue that the main driver of these funds flows is the fact that investors are presented with a different menu of funds. In Section 6, we analyze whether investors reallocate their portfolios to improve performance and some other alternative explanations. In Section 7, we study all bank switches. We provide our conclusions in the final section.

2. Danish mutual funds and the financial crisis

2.1. Mutual funds in Denmark[4]

A Danish mutual fund family is owned by investors who appoint a management company to take responsibility for the daily operations of the fund. The management company is typically owned by a single bank or a consortium of smaller banks. This means that banks have incentives to promote certain funds, as they make agreements with their affiliated funds that channel revenues into the banks when the banks sell services to the funds. These services include, first and foremost, a distribution channel (for which the bank is paid a distribution fee from the mutual fund). They may also include portfolio advice, legal advice, and execution of trades by the trading desk of the bank (so that the bank earns on the trading activities of the fund), and the assets of the mutual fund might be deposited in the bank (for which the bank receives deposit and custody fees).

Banks earn sizeable revenues from their relationships with affiliated mutual funds. In 2011 (the last year in our sample for which we have independent information on the banks' revenues from retail mutual fund investors; see Morningstar, 2013), the total revenues of Danish banks from affiliated funds was DKK 5bn (about USD 0.8bn at the time of writing). The total revenues of Danish banks that year amounted to DKK 70bn (USD 11bn); of which DKK 50bn were net interest revenues and DKK 20bn were revenues from fees and provisions, so about 25% (5/20)

[4] This section builds upon Bechmann and Rangvid (2006, 2007), in which further information about the Danish mutual fund industry can be found.

of the total fees and provisions in Danish banks came from affiliated mutual funds.

In most cases, particularly for large banks, a bank's relationship with its affiliated mutual fund is clear, even from the names. For instance, the mutual fund family of the largest bank in Denmark, Danske Bank, is Danske Invest. That of the second largest bank, Nordea Bank, is Nordea Invest, that of the third-largest, Jyske Bank, is Jyske Invest, that of Nykredit Bank is Nykredit Invest, that of Sydbank is SydInvest, and so on. For smaller banks, the relationship is less clear, as these banks enter into agreements with fund families that cater to multiple banks. We focus on banks for which the relationship is clear. Our hypothesis is that a customer of, for example, Danske Bank, will be advised to buy mutual funds in Danske Invest, as Danske Bank has a pecuniary incentive to guide investors to Danske Invest.

The banks that went bankrupt after the financial crisis were generally smaller banks. As mentioned, these banks used fund families owned by consortiums of smaller banks.[5] This has two important implications for our study. First, a mutual fund cooperating with one of our failing banks was also cooperating with other banks, so these mutual funds were practically unaffected by the bankruptcies we study. In fact, no major mutual fund disappeared or merged with another during our sample period. This has the important implication that customers of failed banks could have kept their old funds after switching banks. There is no immediate reason for investors to move funds following a bank failure. Second, when there is not a one-to-one relation between smaller banks and mutual funds, banks under financial distress cannot increase fees from mutual funds to increase revenues.[6]

2.2. The financial crisis of 2008–09 in Denmark[7]

The financial crisis took a toll on the Danish economy. Danish GDP fell by around 7% from 2007–09, real house prices dropped by around 20%, and unemployment almost tripled, albeit from a very low level. Many banks failed as losses accumulated. Banks that ceased to exist were

[5] E.g., one of the failed banks was Roskilde Bank (see Section 4); there is no mutual fund family labelled "Roskilde Invest" or the like.

[6] Ferreira et al. (2018) showed that fund managers of bank-affiliated mutual funds support the bank's lending business by investing in firms the bank has lending operations with. This is not the case in our setting of failed banks.

[7] The brief overview in this section builds on the report of the committee investigating the financial crisis in Denmark, the "Rangvid Committee"; see Rangvid et al. (2013), where many more details can be found.

typically acquired by healthier banks. The customers we study were customers of a subsample of these banks. The subsample is described in detail in Section 4.

A main conclusion of Rangvid et al. (2013) is that the authorities (and the banks themselves) did not foresee the crisis, as in many other countries. This conclusion is based on statements and actions by the Financial Supervisory Authority, the Central Bank, the relevant ministries, investors, and the banks themselves. Asset prices, such as CDS spreads on bank debt and stock prices of banks, also reacted late—once the crisis was already occurring, in fact. As the financial crisis was unexpected to banks and authorities—insiders with private information—the only reasonable assumption is that the crisis could not be foreseen by ordinary bank customers either.[8] This means that customers of failed banks can be viewed as a treatment group, as they experienced an unexpected bank-failure shock, and customers in surviving banks can be viewed as a control group that did not experience the same shock.

3. Data

Our data are very comprehensive. They are based on detailed individual-investor register-based data that include all mutual fund holders above the age of 17 in Denmark; that is, we have the total population in our starting sample. We combine three main sources of data.

3.1. Mutual fund holdings of retail investors

From the Danish Tax Authorities, we obtain data on individuals' end-of-the-year mutual fund holdings. These data are based on direct mandatory reporting by Danish financial institutions. The first year in our sample is 2005 and the last is 2012. Our data thus conveniently surround the 2008–09 financial crisis.

The data describe individuals' mutual fund holdings outside retirement accounts. We know the number and value of individual mutual funds held by each investor at year-end. With these data, we can calculate the total value of each individual's mutual fund investments and the value held in the mutual fund family affiliated with a particular bank. We also know the ISIN code of each fund, allowing us to merge it with data on fund characteristics from Morningstar and calculate

[8] One might discuss whether customers increased their assessment of the likelihood of a new bank failing after observing several bank failures, i.e. at later stages of the post-crisis period. Most of our cases deal with the early part of the post-crisis period, when authorities, banks, investors, and customers had not foreseen the crisis.

value-weighted ratings, costs, and the performance of each individual's portfolio of funds.

3.2 Main bank relationship

We are interested in identifying the effect of a change in an individual's main bank. We identify the main bank as the one in which the individual has a so-called *NemKonto* ("Easy Account"). All citizens in Denmark are required to have an Easy Account.[9] This is a normal bank account that the individual herself assigns to handle all monetary interactions with public agencies (tax refunds, child support, housing benefits, etc.). Salaries are generally paid to them too. Individuals typically use an account through which they do their main banking activities as their easy account.[10]

3.3. Other data

In our regressions, we include socioeconomic background data on the individuals, such as age, wealth, income, level of education, gender, and number of children. These data come from Statistics Denmark.

4. Sample of mutual fund holders: Treatment and control groups

We analyze six banks and their associated mutual funds, which are listed alphabetically in Panel A of Table 1. The banks and funds we use meet two crucial criteria. First, there is a clear, direct relationship between the mutual fund and the bank. This rules out any doubt that the bank has an incentive to sell the fund. Second, the bank acquired another bank during the sample period. Banks 2–6 in Panel A of Table 1 fulfill these two criteria; in addition, we include the largest bank in Denmark, Danske Bank, and its associated mutual fund. Danske Bank did not acquire another bank during the sample period, but its inclusion expands our control group significantly.

The number of banks we study might be low (6), but the number of individuals is very high. This is an important fact to remember, as it is not banks as such that we are studying, but bank customers who buy mutual funds. The crucial requirement for our investigation is to have enough information on investors. Panel B of Table 1 provides the number of depositors in the six banks,

[9] See this site: https://www.nemkonto.dk/Servicemenu/Engelsk.

[10] Individuals may have accounts in more than one bank, and banks may contact their account holders (and try to convince them to buy mutual funds) even if the account is not the Easy Account. We choose to assign each person to one main bank because the Easy Account provides a clear and credible identification of customers' main banks. If people have accounts at several banks and the effects we document spill over into those accounts and banks, our estimates will be conservative lower bounds on the overall effect.

the number of holders of the mutual funds affiliated with those banks, and the rest of the market: the total number of depositors in banks in Denmark and the total number of retail investors in Danish mutual funds. The numbers are for year-end 2012, when there were 4,241,715 retail bank depositors in Denmark. This basically corresponds to the total number of residents above the age of 17 at the time. There were 438,278 mutual fund investors at the end of 2012; that is, approximately 10% of Danes owned mutual funds.[11] Panel B reveals that the six banks in Panel A of Table 1 cover about 70% of bank customers in Denmark, and their six affiliated mutual fund families cover more than 80% of retail mutual fund investors.

Confidentiality regulations of Statistics Denmark require published information to be based on at least three banks, mutual funds, or individuals so that data on specific firms or individuals cannot be identified. This is why we collect banks 1–3 and 4–6, respectively, in Panel B of Table 1. The combined balance sheets of the six banks in Table 1 cover more than 85% of the total balance sheet of banks in Denmark. In total, our sample covers a very large majority of the market of Danish banks, depositors in banks, and mutual fund investors.

4.1. Cases of forced switching: The treatment group

An ideal setup to test the hypothesis that an investor's choice of mutual fund is influenced by the distributor of the fund requires two ingredients: (i) identifiable exogeneous variation in investors' exposure to mutual funds affiliated with a distributor, and (ii) an opportunity to test for changes in the investors' holdings of mutual funds resulting from the change in the distribution channel. We have such a setup, as we can compare the mutual fund flows of investors who experienced a change in the funds they were exposed to in their banks because they were forced to switch banks (treatment group) to those of investors who did not switch banks (control group). Note that an investor can always buy any fund she wants: if she does not like the funds a distributor presents, she can buy other, non-affiliated funds. Of course, this requires the investor to make some effort to find other funds, but the investor does not have to follow the recommendations of the bank. We analyze whether they nevertheless do so.

[11] Our data include mutual fund holdings outside retirement accounts. We are interested in cases where the investor herself makes the investment decision. Non-retirement savings are particularly useful in this regard, as most Danish retirement schemes do not allow investors themselves to make investment decisions. (In most retirement schemes, the pension fund company makes investments decisions on behalf of the individual pension savers.)

To find our treatment group, we identify banks that ceased to exist during the 2005–11 period. We carefully screen all cases and select the banks that fulfill two criteria: (i) The bank ceased to exist during the 2005–11 period, and (ii) its retail customers were transferred to an acquiring bank (or more than one) directly affiliated with a mutual fund family.[12] The connection between the acquiring bank and its affiliated mutual fund is identified by a common name (Danske Bank and Danske Invest, e.g.). Six mergers fulfilled both criteria. They are listed in Table A of the appendix, together with the total number of depositors in the six acquired banks, the years in which the acquisition took place, and a short description of each of the six acquisitions. The banking distribution is skewed in Denmark, with a few large banks (those in Table 1) covering the majority of the population and many small banks servicing the rest. The six acquired banks we study were relatively small, with about 120,000 customers in total. One, Roskilde Bank, was among the ten largest banks in Denmark, though, which again emphasizes how the banking distribution is skewed. The fact that our treatment group consists of relatively small banks does not influence the interpretation of our results, as already mentioned, as we focus on the impact of bank shifts on the fund holdings of individual investors, independently of the size of the bank. In Section 7, we also study transitions between large banks and find robust results.

Our treatment group consists of customers of acquired banks who switch to the acquiring bank after the merger. Each branch of a bank is associated with a branch-level code. We identify treated customers via changes in the branch numbers of their "Easy Accounts" or in branch ownership. In other words, when the branch-level code associated with a customer's Easy Account changes from one associated with the acquired bank to a branch-level code of the new, acquiring bank, then the customer is in the treatment group.

4.2. Summary statistics: Mutual fund holders

Table 2 compares summary statistics on mutual fund holders forced to switch banks to those of the total universe of mutual fund holders and the control group (customers of the acquiring banks mentioned in Panel A of Table 1). We show results for the first and the last year in the sample, 2005 and 2012. Table 2 shows that 11,114 mutual fund holders were forced to switch banks. From the appendix, Table A, we know that there were 119,623 depositors in the acquired

[12] The period is 2005–11, as we need at least one year of data following the merger to be able to test for effects of the changes in customers' main banks.

banks in the years the takeovers took place. This means that about 10% of depositors in the acquired banks own mutual funds, which is similar to the number for the total population.

The main takeaway of Table 2 is that mutual fund holders forced to switch banks (the treated individuals) shared characteristics with the typical mutual fund holder in Denmark and the typical fund holder in the control group. For example, they were equally old on average, the same fraction had higher education, they had more or less the same levels of income and wealth, held about the same numbers of mutual funds, and the average values of those funds was about the same. This holds for 2005 and 2012 as well as for the years between (not shown to save space). In other words, the parallel trends assumption is fulfilled.

When describing the treatment and control groups, a relevant question is whether mutual funds offered by small banks are rated higher than those offered by large banks, in which case customers of failed banks might have been attracted to smaller banks before the treatment because their affiliated mutual funds performed better. This is not the case. The average Morningstar rating of Danish mutual funds is 3.3 across funds and years. The average rating of funds affiliated with the acquiring banks in our sample is also 3.3. The average rating of the remaining Danish mutual funds, those affiliated with non-acquiring banks, is 3.3 too. There is also basically no time variation in this pattern: it holds both before and after the financial crisis. We also examine whether the distribution of Morningstar ratings differs across banks, for example, if some banks offer more 1- and 5-star funds. We cannot identify any such pattern. In total, customers of non-acquiring banks did not choose these banks because they were affiliated with better funds.

It is also important to point out that any investor can always buy any fund in Denmark. This means that even if, before their bank switches, investors for some reason preferred the funds of the acquiring banks, they could simply have bought those funds then. If it were the case (which we find no evidence of) that the funds of acquiring banks were better than those of the acquired banks, this would not explain our findings of a large reallocation of mutual funds after the investors switches banks, as the investors could just as well have bought the same funds before switching.

The fact that mutual fund holders forced to switch banks and other mutual fund holders have

the same characteristics, and that the funds offered by acquiring banks are rated similarly to those of non-acquiring banks, is important, as it implies that mutual fund holders forced to switch banks were no different overall from other mutual fund holders. They just happened to be customers of banks – perhaps simply because they lived near them – that ceased to exist following the financial crisis.

4.3. Static analysis: The likelihood of holding a fund affiliated with one's bank

To get a first feeling for the tendency of retail investors to buy mutual funds affiliated with their main banks, we first analyze all fund holders in the six acquiring banks in a static setting.

Figure 2 gives a first impression of this. It shows, for mutual fund holders who are also depositors in banks 1–6 in Table 1, the number of individuals holding funds and the value of their holdings in 2012 (other calendar years are shown in Table B of the appendix). Panel A of Figure 2 shows that 326,857 customers of the six banks had invested in mutual funds in 2012. 256,610 of these held affiliated funds. This means that 78.5% of mutual fund holders bought at least one fund from the mutual fund family affiliated with their main bank. A similar picture emerges from the average values of the mutual fund holdings. Panel B shows that the average value of holdings in 2012 was DKK 436,139. Of this, DKK 309,587 was in funds affiliated with the investors' main banks. This means that 68.7% of the total value invested in mutual funds was invested in the mutual fund families affiliated with the customers' main banks.[13] This snapshot indicates the steady-state magnitude of the impact of affiliated distribution. The upper bound on the role of affiliated distribution is thus 70%–80%. The steady state effect does not, however, tell us about causality—that is, whether this is due to the distribution channel—nor about dynamic responses to shifts in the affiliation of a fund distributor. These issues are addressed in Sections 5 and 6.

To further investigate what predicts the holding of affiliated funds in a steady state, we estimate panel probit regressions in which the outcome variable is a dummy equal to 1 if the investor owns an affiliated mutual fund (i.e., one from a fund familiy affiliated with their main bank) and 0 otherwise. The explanatory variables are dummies for the bank relationship of the customer and other controls. To save space, we delegate the results of these regressions to the appendix (Table C). The main conclusion is that the effect of being a customer in a bank affiliated with the

[13] This number (68.7%) is almost exactly the number mentioned for Denmark in Ferreira et al. (2018), Table 1.

fund is highly important to the decision to buy a mutual fund.

5. Dynamic analysis: What happens to investors' fund holdings after they switch banks?

In this section, we present the main results of our paper: the consequences to fund flows of an exogeneous change in the fund-distributor affiliation that customers are exposed to. We conduct this analysis in two steps. First, we study how investors' holdings of mutual funds change as a result of their change of bank and of exposure to the mutual funds affiliated with their bank. This analysis will tell us whether people end up with more affiliated funds after switching, and whether investor characteristics drive these changes in holdings. Next, in Section 5.2., we study the post-treatment decision to sell pre-treatment fund holdings. This will allow us to test more directly the null hypothesis that affiliation matters for sales and, in the same regression, to test whether people sell funds because they buy well-performing funds—that is, to rule out an alternative explanation.

5.1. Changes in fund holdings

Table 3 shows what happens to investors' holdings of mutual funds from fund families affiliated with their new banks before and after they are forced to switch banks. The switch is forced when the old bank is bought by another bank. We compare these investors' fund holdings with those of customers who do not switch banks, our control group. The results for the treatment group are shown in Panel A and those for the control group in Panel B. We show what happens to the number of individuals holdings funds, the number of different mutual funds in their portfolios, and the values of mutual fund holdings.

Before the mergers, very few *customers* in acquired banks (treatment group) held funds affiliated with the acquiring banks: only around 2%–3% of investors. This means that very few customers in Bank X held mutual funds affiliated with Bank Y before the merger between Banks X and Y. Similarly, Panel A shows that mutual fund investors in the treatment group held very few *funds* affiliated with the acquiring bank before the mergers (about 1.5% or less of their total fund holdings), and had invested only small fractions of their total investments in such mutual funds (<1.5%). These numbers were stable before the mergers: there are no pre-merger trends.

After the mergers, things changed substantially. After just one year, 13.4% of customers of

acquired banks held funds affiliated with their acquiring banks, and this increased to 50.5% after four years. This is a large, material increase in light of the fact that basically none of these individuals held mutual funds affiliated with their acquiring banks before the mergers.[14] Similarly, investors started holding increasing numbers of funds affiliated with their acquiring banks, increasing to 34.4% of their funds after four years (on average, an investor held four funds). This is not because the treated individuals started buying a lot of funds in general after switching banks: the average fractions invested in funds affiliated with non-acquiring banks remained low and stable before and after the merger. The treated individuals only increased their holdings of funds affiliated with the acquiring banks. Finally, the value of the investments in funds affiliated with the acquiring banks increased dramatically as well, reaching 36.7% after four years. This implies that being on the menu of funds that the distributor (the bank) presents to customers drives at least a third of investors' portfolios into new mutual fund holdings. No such trend can be observed in the average fractions of fund values invested in funds affiliated with non-acquiring banks. Figure 1a illustrates these findings.

The economic magnitude of these changes is large. Four years after a merger, investors in the treatment group held on average about DKK 200,000 (approximately USD 31,000) in funds affiliated with their new banks.[15] From Table 2, we know that net liquid assets (the difference between overall wealth and housing wealth) amounts to about DKK 900,000 (USD 140,000) on average. This means that the new bank was able to move 22% of net liquid assets into affiliated funds over the course of four years.

These changes in mutual fund holdings occurred only among customers forced to switch banks as a result of mergers. Customers of the six banks in Table 1 who remained at the same bank throughout our sample period, generally invested heavily in affiliated funds, but no substantial changes occurred. This appears in Panel B of Table 3, which shows statistics for individuals in

[14] The careful reader will notice that the number of mutual fund holders drops significantly after bank switches. Four years after the merger, there were 50% fewer mutual fund holders (5,923 instead of 12,536). This was not due to an unusually high number of customers leaving their new banks, but to the timing of the mergers and the number of years we could follow customers after a merger. One case (Jyske/Fjordbank, see Appendix) leaves the sample at *t+2* in Table 3 and one at *t+4* (Nordea/Fionia), explaining the reduction.

[15] DKK 200,000 is the average value the individuals in the treatment group held in funds affiliated with their new banks. This differs from 452,841·36.7% = DKK 166,000, as the DKK 452,841 and 36.7% reported in Panel A of Table 3 at *t+4* are average total wealth and average fraction, i.e., there is a difference between the average fraction and the fraction of averages.

the control group: mutual fund holders who were non-switching customers of banks that offered affiliated funds. Around 82% of non-switching mutual fund holders held affiliated funds (slightly fewer in 2005 and 2006), and around 73% of invested fund value was invested in affiliated funds. These numbers all remained fairly stable after 2007, so the changes we document in Panel A of Table 3 are particular to customers forced to switch banks.

Do all investors who switch banks increase their holdings of funds affiliated with their new banks little by little, changing a small fraction of their portfolio each year, or do some investors change their portfolios completely one year, others the next year, and so forth? Figure 3 provides a clear answer: It is mainly the second effect that explains our findings. The figure shows the percentages of customers forced to switch bank who held certain fractions of their total mutual fund portfolios in funds affiliated with their new banks in years t, t+1, t+2, t+3, and t+4.[16] For instance, in year t, 98% of customers forced to switch banks had less than 10% of their mutual fund holdings in funds affiliated with their new banks, and only 1% had 90%–100% in such funds. In each successive year, the fraction of customers holding almost nothing (0%–10%) in funds affiliated with their new banks drops, and the fraction holding almost their entire portfolio (90%–100%) in such funds increases. This means that the pattern documented in Table 3 and Figure 1a for the average investor arises largely because more and more people move their entire mutual fund portfolios from funds affiliated with their old banks to funds affiliated with their new banks.

Panel A in Table 3 also shows that treated investors held funds amounting to DKK 370,781 at time t–1, one year before moving to their new banks. By t+4, the value of those funds, the ones the investors held before switching, had decreased to DKK 62,985, a reduction of 83%. The value they held in funds affiliated with their new banks also increased from DKK 3,350 at t–1 to DKK 205,153 at t+4. Clearly, customers sold existing funds to buy the new funds. We examine the sales of existing funds more carefully in Section 5.2.

5.1.1 Regressions

We want to test the hypothesis that individuals in the treatment group (individuals forced to switch banks) reallocate their mutual fund holdings after the treatment, compared to individuals in the control group, while controlling for individual-investor and fund characteristics. To do so

[16] Extending the figure to include *t-1*, *t-2*, etc. provides the same picture: before year *t*, almost 100% of investors had made practically no allocations to funds affiliated with their future banks.

we estimate difference-in-differences panel regressions. We present the results in Table 4. We look at four outcomes: The number of affiliated funds an investor holds, the fraction of mutual funds held in affiliated funds, the value invested in affiliated funds (in logs), and the fraction of total mutual fund investments held in affiliated funds. As we want to evaluate how these variables change after a customer is forced to change banks, we regress the outcome variable on a dummy variable picking out mutual fund holders who were forced to switch banks (the treated individuals), time dummies that take the value 1 in each of the four post-merger years, and, most importantly, the interactions between the two.[17] The interactions capture the dynamic effect of customers' being offered the fund menus of their new banks. Hence, our specification of the time dummies will allow us to investigate whether people move their funds all at once or over time, while controlling for confounding effects. We also include a number of individual-investor control variables (age, education, etc.), fund characteristics (Morningstar ratings and fees), and controls interacted with the treatment dummy and the post-treatment time dummies, as well as year-fixed effects:

$$y_{i,j,t} = \alpha + \beta Treated_{i,j} + \sum_{k=1}^{4} \gamma_k D_{i,j,t+k} + \sum_{k=1}^{4} \delta_k Treated_{i,j} \cdot D_{i,j,t+k}$$

$$+ \sum_{k=1}^{4} \theta_k Treated_{i,j} \cdot D_{i,j,t+k} \cdot Controls_{i,j,t} + Controls_{i,j,t} + \varepsilon_{i,j,t} \qquad (1)$$

where $y_{i,j,t}$ is the outcome variable for individual i in bank j at time t, $Treated_{i,j}$ picks out individual i in bank j who has been forced to switch, $D_{i,j,t+k}$ is a dummy equal to 1 in one of the four years after the merger for which we follow individual i in bank j and 0 in other years, and $Controls_{i,j,t}$ collects control variables and year-fixed effects. In our discussion, we focus on the key estimates of interest: β, δ_1 through δ_4, and the coefficients of the controls interacted with the dummy picking out the treatment group and the time trend. When analyzing the θ-coefficients, we focus on θ_4, the effect of the controls at time t+4, to keep the discussions tractable.

We evaluate the effects of both individual background and fund characteristics. In the first four columns in Table 4, we control with background characteristics but no fund characteristics. In the last four columns of Table 4, we add fund characteristics.

[17] We assume the post-merger period to be 2009–12 for the control group.

Consider first the estimates of β presented in the first row of Table 4, columns 1 to 4. Individuals in the treatment group owned 2.32 fewer funds affiliated with their new banks before the mergers than individuals in the control group. Similarly, the fraction of their funds they had invested in funds affiliated with their new banks was 71.8 percentage points lower, the value of their holdings in funds affiliated with their new banks was 99.97% (= 1 – exp(–8.16)) lower, and the fraction of their fund value invested in mutual funds affiliated with their new bank was 70.0% lower, all in comparison with individuals in the control group.

5.1.2. Effects of time dummies and individual investor characteristics

Consider now the effects of the treatment. The most important point to note from Table 4 is that the coefficients of the post-treatment time dummies (interacted with the dummy picking out treated individuals) are considerably larger than the coefficients of any of the background characteristics. As mentioned in the introduction and the beginning of Section 6.1.1, the interpretation of the post-treatment time dummies is that they capture the common dynamic effect of being presented with the fund menu of a new bank. Our hypothesis is that the new bank gradually persuades more and more of its new customers to change funds. The post-treatment time dummies reveal that people held 5.61 percentage points more in funds affiliated with their new banks one year after the treatment, 20.21 percentage points more after two years, and so on (column 4). Four years after switching banks, treated investors held 28.41% in funds affiliated with their new banks.

Regarding the other outcome variables, we find that the pre-merger differences between treatment and control had after four years been reduced by 0.98 funds, 28.0 percentage points, and 65 times (i.e., the treated investors increased the value of their holdings in funds affiliated with their new banks 65-fold over their pre-treatment holdings, a magnitude explained by the very low pre-treatment holdings in those funds), and 28.4 percentage points for the four outcome variables, respectively. By all measures, this is a large effect. For example, the difference in the fraction of fund values invested in mutual funds affiliated with customers' new banks (column 4) decreased from 70% to about 42% (= 70% – 28.4%) over four years. This means that almost half the transformation of a new customer into a regular customer took place in just four years.

The effect of the time dummies clearly dominates the effects of the individual-investor characteristics. In fact, all the interacted individual-characteristic control variables are

insignificant. Our conclusion is that the common affiliation with the new bank (the treatment itself) is the most important determinant of fund shifts, not the individual characteristics of those treated. The evidence from Figure 1b, showing that when people switch funds many of them switch their complete fund portfolios, further supports this conclusion.[18]

5.1.3. Effects of fund characteristics

In columns 5-8, we add controls for fund characteristics. We control with Morningstar ratings and fees. Morningstar ratings are based on a fund's historical performance (after fees) in comparison with the performance of other funds in the same investment category. The ratings range from 1 (the fund is among the 10% of funds with the historically worst performance in its category) to 5 (among the 10% with the best performance). We calculate the value-weighted rating of each investor's purchased funds, using those funds for which ratings are available. The Morningstar rating is a particularly useful measure of perceived performance in our analysis of the choices of retail investors, as Morningstar ratings are readily available to retail investors and easily understood. Del Guercio and Tkac (2008), Khorana and Servaes (2012), and Ben-David et al. (2019) showed that these ratings are important for the mutual fund flows of retail investors.[19] Fees are the annual net expense ratios (percentages of fund assets paid for operating expenses and management fees). We calculate the portfolio fees as the weighted average of the fees of the individual funds in the portfolio of investor *i*.

The most important thing to notice from the results in columns five to eight of Table 4 is that our key results remain the same as those described above for columns 1-4. After switching banks, treated individuals increase their holdings of funds affiliated with their new banks. The effects are large and occur gradually over time. After four years, treated invesotrs have significantly altered their pre-treatment fund portfolios such that they include a substantial proportion of

[18] For robustness, we also estimate a probit model among the treated, where we investigate what determines the probability that treated individuals hold funds affiliated with their new banks after switching banks. Similarly to Table 4, in this probit estimation the post-treatment time effects clearly dominate the effects of the individual controls. The conditional probability of owning affiliated funds one year after the switch is 10% and rises to 39% four years after the switch. These results are in Table D in the appendix.

[19] We use the main Morningstar rating, i.e. the overall rating, which is a weighted average of the rating of the 3-year, 5-year, and 10-year historical performances of a fund, depending on lifetime of the fund. Notice that ratings are not available for new funds, as they obviously have no historical performance. A fund must have existed for at least three years before Morningstar rates it. Similarly, a fund must have existed for at least five years before a Morningstar rating based on its 5-year historical performance can be calculated. If a fund has existed for, e.g., four years, its overall rating is just its 3-year rating.

funds affiliated with treated investors' new bank.

Regarding the coefficients to Morningstar ratings, we see that treated individuals increase their fraction of funds affiliated with their new bank by 2.65% points more than individuals in the control group when Morningstar ratings increase by one rating notch. As fees go up by 1 basis point, their fraction in affiliated funds decreases by 0.35% points. Finally, we note that the effects of the individual characteristics remain insignificant in regressions 5-8, like in columns 1-4.

The number of observations drop when adding fees and ratings because these data are missing for a significant number of funds. This is a further reason why we show regressions for the full sample of funds/individuals in columns 1-4 and then for regressions with fees/ratings in columns 5-8. Notice also that while the number of observations drops, the number of individuals does not drop as much. This means that individuals hold funds in some years that are without rating/fee data, but have rating/fee data in other years. Our overall result, based on the full sample of observations in the first four columns of Table 4, remains robust in the smaller subset of observations, i.e. those included in columns 5-8.

We conclude that the regressions in Table 4 support our hypothesis that mutual fund holdings of individuals forced to change banks are significantly altered after the treatment, controlling for both individual investor and fund characterics.

5.1.4. Robustness

We slice our sample of treated banks in a different dimension to provide an even more powerful test (though on a smaller subsample of individuals) of the hypothesis that the decision to move funds is driven by the change in the affiliated funds that people are offered, and not by differences in their individual characteristics. Four of the treated banks were sold to one acquiring bank (four separate acquisitions). The remaining two were both sold to multiple acquiring banks. In the latter cases, different banks bought different branches of the failed banks. The interesting feature here is that some of the acquiring banks had affiliated funds and others did not; see Appendix A. Given that the split of customers among new banks was based on branch location, this is as close to a random split of the treated customers as one could get. The results of the tests are largely similar to the ones we presented above. Customers who were moved to banks with affiliated fund families reallocated a much larger fraction of their investments into funds affiliated with their new banks than did customers who were originally in the same failed banks but who were

moved to banks with no directly affiliated fund. This supports the hypothesis that affiliation is a main determinant of fund choices. The results are shown in Table E in the appendix.

In addition to observable characteristics, one might hypothesize that the shock of bank failure influences people's (unobservable) risk aversion. For instance, one could imagine that some treated investors increase their risk aversion and reduce, or even terminate, their fund investment. Similar, a bank failure might affect some peoples' trust in the advice provided by those banks. To test this, we make use of the fact that some investors had more distressed transitions into their new banks than others. Three of the six merged banks in our sample went bankrupt and were taken over by the Danish Financial Resolution Authority before being sold to private commercial banks, whereas the other three were sold in ordinary merger transactions. We find that customers who underwent the apparently greater shock to their risk aversion and trust did not move larger fractions of their fund investments to funds affiliated with their new banks,. These customers were also not more likely to leave the fund market altogether after shifting banks. We relegate the details of these results to Table F in the appendix, but we conclude that the switch to funds affiliated with customers' new banks is difficult to explain by a bank-failure induced change in risk aversion or trust.

In Table 4, we include year-fixed effects to control for macroeconomic events that affect all banks and customers. We also run regressions in which we control for bank-by-year fixed effects, so that we compare treated investors to other customers of the same bank in the same period. Qualitatively, the results remain robust to these additional fixed effects, though with some quantitative amendments. The results are available upon request.

Similarly, in Table 4, we include the largest bank in Denmark, Danske Bank, in the control group to expand the control sample, even though Danske Bank did not buy any failed banks, as explained in Section 4. We have also run the regressions excluding Danske Bank. They remain robust and are available upon request.

5.2. What determines post-treatment sales of funds?

Section 5.1 demonstrates that the mutual fund holdings of investors forced to switch banks changed after the treatment. We now test the hypothesis that treated individuals who buy affiliated funds after the treatment also sell more of the funds they held before the treatment (to

finance the purchase of the new funds).

When investors sell funds, they can do three things with the proceeds: (i) buy funds affiliated with their new banks, (ii) buy other funds, or (iii) liquidate the funds—not buy any new ones. We investigate whether the magnitude of sales of those who buy affiliated funds differ from those who do not—simply put, whether those who buy affiliated funds sell more of their existing fund holdings. We first run the following regression:

$$y_i = \alpha + \beta D_{Aff.buy,i} + \gamma D_{Non\ aff.buy,i} + Controls_i + \varepsilon_i \qquad (2)$$

where y_i is the log of the cumulative outflow in DKK over the period from t to t+4, from funds held at time t–1 (note that this is outflow from any fund, as failed banks do not have specific affiliated funds, as discussed earlier), $D_{Aff.buy}$ is a dummy picking out treated investors who bought funds affiliated with their new banks in the post-treatment period, $D_{Non\ aff.buy}$ picks out treated investors who bought other funds, and $Controls_i$ collects control variables. The sample consists of treated investors who sold funds after treatment. The benchmark group in this regression consists of investors who liquidated: who sold some of the funds they held at t–1 but did not buy new funds in the period from t to t+4.

The results are in Table 5. In the first column, we show the results of interest in the first two rows while suppressing the coefficients of the controls to save space. The dependent variable is given in logs. Our estimate implies that those who bought affiliated funds after treatment sold $e^{0.96} = 2.61$ times more (161% more) of the funds they held at time t–1 than those who liquidated. They also sold considerably more than those who bought other funds. Those who bought non-affiliated funds in post-merger years sold only 13% more ($e^{0.12} = 1.13$) than those who liquidated. The null hypothesis that the two coefficients (0.96 and 0.12) are equal is strongly rejected, with an F-statistic of 195.61. This implies that (i) people generally sell more when buying something else instead than when liquidating, and (ii) in particular, people sell considerably more when they buy affiliated funds. We strongly reject the null hypothesis that affiliation does not matter to peoples' decisions to sell funds. New affiliation has a detrimental effect on assets under the management of funds that are not affiliated with the acquiring bank.

In column 2, we add interactions between the control variables and the dummy picking out those who bought affiliated funds after the treatment, to see whether certain types of individuals are

more likely to sell their funds. As in column 1, we also include non-interacted controls (omitted for brevity). We find that investors who bought affiliated funds sold more of the funds they held before the treatment, similar to results in column 1. Second, few of the interacted controls are significant, and when they are, their economic magnitudes are relatively small. There is statistical evidence that the outflows from pre-treatment fund holdings tended to be lower for older or married people buying affiliated funds. But given the overall modest economic magnitudes, we conclude that outflows to funds affiliated with acquiring banks are not related to particular demographics. This is similar to the conclusion drawn from Table 4, that changes in holdings are not driven by demographic characteristics.

In column 3, we investigate whether people sell more of their holdings when they buy funds that have performed well, i.e. have a higher Morningstar rating. This addresses the hypothesis that if an investor buys a fund she believes performs well, she may sell more of her pre-treatment holdings to finance a larger stake in the new fund. Table 5, column 3, shows that the coefficients of the interactions between the Morningstar ratings of purchased funds and the dummies picking out investors who bought affiliated funds are insignificant (as are the coefficients to the non-affiliated, for that matter). This means that a higher Morningstar rating of bought funds does not affect the correlation between selling funds and buying either affiliated or non-affiliated funds. Simply put, past performance does not explain the flow from old to new funds in the sample of treated investors. In the next section, we show that performance does not drive changes in fund purchases either—that is, it does not drive sales of pre-treatment fund holdings (this section) nor fund portfolio reallocations (next section).

Finally, in column 4, we include both Morningstar ratings and individual investor characteristics, all interacted with the dummy picking out people buying affiliated funds. The conclusion remains the same as in the previous regressions.

We conclude that the results in Table 5 support our hypothesis that investors buying funds affiliated with their new banks sell more of their pre-treatment fund holdings than other treated investors selling funds, and that this is not driven by demographics nor by performance chasing.

6. Fund ratings and performance

We argue that large portfolio reallocations occur after investors switch banks because the

investors are presented with new menus of funds. There is a natural alternative explanation that we need to examine: Perhaps investors simply reallocate their fund portfolios to improve them. In Section 5.2., we showed that people buying better-rated funds do not sell more of their pre-treatment fund holdings (to obtain money to buy new funds) than people buying lower-rated funds. Even so, it might still be the case that people reallocate their portfolios to buy funds affiliated with their new banks because, for example, those funds are better. To address this, we investigate the hypothesis that treated individuals in particular buy better-rated or better-performing funds. First, we test whether inflows into new funds are driven by Morningstar ratings (Section 6.1). Then, we explicitly examine the ratings of bought funds (Section 6.2). Finally, we study other performance measures than Morningstar ratings (Section 6.3).

Before examining our treated investors, we notice that Danish investors generally have a strong preference for high-rated funds, similar to the US investors that Del Guercio and Tkac (2008), Khorana and Servaes (2012), and Ben-David et al. (2019) study. Figure 4 shows the distribution of ratings of bought funds across all investors during our entire sample period. We find that only 3% of purchases were of one-star rated funds, but 17% were of five-star rated funds. This should be compared to the symmetric construction of Morningstar ratings, which secures an equal number of funds within those categories (10% of funds have one star and 10% five). Similarly, 16% were purchases of one- or two-star funds, and 45% were of four- or five-star funds. Again, the symmetric construction of Morningstar ratings secures one- or two-star ratings to 32.5% of funds and four- or five star ratings to 32.5% of funds. The average rating of bought funds was 3.45. This is statistically significantly higher than the average Morningstar rating of all funds. As for robustness, we find in unreported results (available upon request) that the tendency to buy high-rated funds holds year-by-year.

6.1. Are flows of treated individuals driven by Morningstar ratings?

The first hypothesis we want to examine is whether the strong portfolio turnovers of treated individuals, documented in the previous parts of our analysis, is driven by Morningstar ratings. Simply, are Morningstar ratings a factor explaining the treatment group's purchases of funds after the treatment, compared to the control group, controlling for background characteristics of the individuals (age, gender, etc.) and year-fixed effects? The results are in Columns 1 and 2 of Table 6. The dependent variable is the amount of bought funds. The regressions are triple Difference-

in-Differences panel-regressions, picking out how bought amounts associate with Morningstar ratings of purchased funds among treated investors after the treatment. In column 1, we look at all post-treatment purchases of treated individuals and in column 2, we look specifically at purchases of funds affiliated with treated customers' new bank. The main coefficient of interest is the one relating to the Morningstar rating of treated individuals' post-treatment purchases, i.e., the first row of columns 1 and 2 in Table 6 (that we highlight in bold typeface for ease of interpretation).

The main coefficient of interest is the '-0.32' in column 1 and the '-0.38' (but insignificant) in column 2. The negative or insignificant sign to the coefficients means that we reject the hypothesis that the post-treatment portfolio turnovers we have documented are driven by Morningstar ratings. If anything, a higher Morningstar rating is negatively associated with the treatment group's purchases of funds after the treatment, relative to the control group. This goes for post-treatment purchases in general and for purchases of affiliated funds. Simply, the large portfolio turnovers we see after people switch banks are not because treated individuals buy higher-rated funds.

6.2. What is the Morningstar rating of bought funds?

How can we reconcile the difference between the strong tendencies among investors in general to buy high-rated funds, as mentioned in the beginning of this section, with the finding that Morningstar ratings are not driving the post-treatment purchases of funds for our treated investors?

In Figure 5, we look at purchases of mutual funds by our treatment group before and after they switched banks. We sort the purchases by Morningstar rating. Before the treatment, the treated investors had a clear preference for buying high-rated funds, like the general population. A high proportion of their purchases were 4- or 5-star funds, and only few were of 1- or 2-star funds. After treatment, fewer of treated investors' purchases of new funds were 4- or 5-star funds and relatively more were of 1- or 2-star funds. People thus still preferred high-rated funds after switching, but the tendency to buy the very best-rated funds was reduced.

The numbers in Figure 5 are suggestive, but there are no standard errors, so they do not represent a test of a hypothesis. To test the hypothesis that the ratings of funds bought by treated investors

after the treatment are not higher than the ratings of funds bought by the control group, we regress the Morningstar ratings across fund holders' bought funds on dummies picking out treated individuals and the post-treatment period, the interaction thereof, controls and year-fixed effects. The results are in columns 3 and 4 of Table 6. In column 3, we examine all post-treatment purchases of treated investors and in column 4 their purchases of funds affiliated with their new banks. Columns 3 and 4, thus, test if the treatment subsequentially has an impact on the tendency to buy high-rated funds, i.e., whether there is an effect from treatment to the tendency to buy high-rated funds.

The main coefficient of interest is the '-0.56' in column 3 and the '-0.55' in column 4. The interpretation of these coefficients is that, post-treatment, treated investors buy funds that are rated 0.56 rating notches lower than those bought by investors in the control group. Most of the funds bought by treated investors after their treatment are affiliated funds, and their rating is 0.55 notches lower. We notice that this lines up with the findings from Figure 5, i.e., this is a post-treatment effect. Before the treatment, treated investors bought funds that were higher rated (0.60 rating notches higher in column 3 and 0.62 in column 4) than those bought by investors in the control group. We conclude that treated investors do not buy higher-rated funds after switching banks. In fact, they buy relatively lower-rated funds. This supports our hypothesis that the large post-treatment portfolio turnovers are not driven by a desire to improve investors' portfolio ratings.

6.3 Performance after switching banks

The advantage of looking at Morningstar ratings is that they contain information that investors rely on when deciding on fund investments. On the other hand, these ratings do not fully capture the welfare gains from switching funds. To address this, we now look at the risk-adjusted returns (Sharpe's ratio), fees, and portfolio concentration (as a measure of portfolio diversification) of investors' fund portfolios. We calculate Sharpe's ratio as returns divided by standard deviation, assuming a risk-free rate of zero. The overall Sharpe's ratios are calculated as the weighted average of the Sharpe's ratios of the individual funds in the portfolio of investor *i*. To measure portfolio concentration, we calculate for each investor the Herfindahl-Hirschman Index (HHI), the sum of squared portfolio weights: If an investor has 50% in each of two funds, HHI = $0.5^2 + 0.5^2$ = 0.5. The lower is HHI, the less concentrated the portfolio is.

Table 6, columns 5–8 show the results of Difference-in-Differences regressions. The dependent variables are the different performance measures, i.e., the hypothesis we test is whether treated investors buy better-performing funds after the treatment, compared to individuals in the control group.

In total, we find that individuals in the treatment group held portfolios after the treatment that were more concentrated (less diversified), but had higher Sharpe ratios and lower fees than those of the control group. The economic magnitudes are small, though. For instance, the average Sharpe's ratio across the treated and control groups is around 1.5 (1.45 for treated and 1.58 for control). In this light, a 4-basis-point increase (column 5 in Table 6) in the Sharpe ratio is economically small. Similarly, fees paid by treated individuals were 7 basis points lower afterward than those paid by individuals in the control groups (column 6). These lower annual fees must be compared with the one-time transaction costs of selling old funds and buying new ones. We cannot see those costs in our data, but we know that the cost of selling one mutual fund and buying another amounts to 2%–4% of the invested wealth.[20] In this light, the annual 7-basis-point reduction more than cancels out. Lastly, in column 8, we compare the returns investors realized after switching banks to the hypothesized returns they would have realized had they kept the portfolio they held one year before switching. Given that people in general may get better returns if they regularly reoptimize their portfolios, we compare this to the same difference for the control group: the actual returns of investors in the control group minus their hypothesized returns if they had kept the portfolios they held in 2007. Column 8 shows that the extra returns the treated investors realized over and above what they would had realized had they not switched portfolios was 0.26% higher than that of the control group. This hypothetical return is not risk-adjusted, however, whereas the Sharpe's ratio is. Neither of them includes transaction costs, which would further reduce performance.

We conclude that after switching banks and reallocating their funds, treated investors ended up with more concentrated and marginally lower-rated portfolios. They also did not buy funds as highly rated as they had before the treatment. Finally, the only improvements in performance or fees we observed were economically negligible, in particular given the costs of reallocating the

[20] Bechmann and Rangvid (2007) showed that front-end load fees in Danish mutual funds typically amount to 1.5%–2.5% and back-end load fees to around 0.2%–0.8%. In addition, brokerage fees add something like 0.5%–1% to the sum of the load fees.

portfolios. We can rule out the hypothesis that people churn their fund portfolios to improve them.

6.4 Other potential advantages of holding affiliated funds

Investors might save on other products bought in a bank if they buy affiliated funds. This could happen, for example, through lower fees on security trades or bank transactions, or better interest rates. Customers can typically obtain such advantages if they become eligible for "preferred customer" plans. We cannot see in our data whether someone is a preferred customer, but we have screened the requirements to become one. In general, two conditions must be met: The customer's total activities with the bank must exceed a certain threshold, and the customer must have bought a certain number of products from the bank. Total activities include deposits, loans, mortgage loans, and the like. The value of the assets in the individual's depot counts as well, including their mutual funds. All funds count, however: it does not matter whether the funds are from fund families affiliated with the bank. This thus cannot explain the portfolio turnovers that we see. The second requirement is typically that the customer buys, for example, five of 15 products. One of these 15 might be affiliated mutual funds. There are no requirements on the value of such funds, though. The requirements are on the number of products, not the value. Hence a customer can meet this criterion by buying affiliated funds in only small amounts. There is no reason for the customer to churn 35%–40% of her mutual fund holdings and pay the associated transaction costs, to fulfill just one of the many criteria needed to become a preferred customer. Our conclusion is that such considerations cannot reasonably explain the large turnover we observe.

7. The total sample of people switching banks

We have so far studied a sample of investors forced to switch banks because their old banks merged with others. The advantage of looking at people forced to switch banks is that we could examine exogeneous variation in bank relationships. Nothing, though, prevents us from studying a larger sample consisting of all investors who switched between the six banks listed in Panel A of Table 1. Most of those switches were probably not exogenous, but they can provide us with other insights. First, those switches were between banks that survived the financial crisis. Studying them could shed light on the hypothesis that investors in failed banks transfer a loss of trust in their old bank, due to its failure, to the advice received from that bank, and sell funds

that they bought upon that advice.[21] If investors in failed banks only shift mutual funds because of losing trust in their old banks, we should not see investors in strong banks shifting funds after voluntarily changing banks. Second, these cases provide us with an opportunity to investigate directly what happens to investments in funds affiliated with people's old banks. This wasn't possible for the acquired banks studied in the previous sections, as those banks did not have clear affiliations with single mutual funds.[22] That is also why in Section 6.2, we studied sales of all mutual funds after treatment, not just of certain mutual funds.

To have a well-defined switching time, we study individuals who held mutual funds both before and after switching banks and who switched banks once within our 2005–12 sample period. 78% of the individuals never switched during 2006–12 (we need an initial year, i.e. 2005, before we could identify a switch), 17% switched once, the rest switched twice or more. In other words, almost a quarter of customers shifted banks during a seven-year period.

We summarize our findings in Figure 6 and relegate the details to Table G in the appendix. A switch between banks is dated t in Figure 6. We observe the first switch in 2006, and we can follow the holdings up to 2012, or t+6. The last switch occurred in 2012, and we can follow those holdings back to 2005, or t–7.

Our qualitative conclusions about investors joining new banks are similar to those for people forced to switch banks. After customers switched to new banks, there was a massive increase in the value they had invested in funds affiliated with the new banks. For instance, six years after joining a new bank, the value of a customer's investments in mutual funds affiliated with that bank would have increased by almost 50 percentage points.

One advantage of studying this sample of all investors is that we can analyze what happens to investments in funds associated with the bank the customer left. Figure 6 reveals that the wealth invested in those funds fell substantially after the investors switched banks. This means that

[21] Sialm and Tham (2016) showed that investors react to the performance of a management company even when this performance is unrelated to the performance of the funds those investors hold. One might similarly hypothesize that investors react to the performance of a bank even when that is unrelated to the performance of funds affiliated with the bank.

[22] It is not possible to determine the contract that each failed banks held with particular mutual funds. For this reason, it is also not possible to identify links between each failed bank and the mutual funds it had incentives to guide customers toward.

customers sell funds affiliated with their old banks and buy funds affiliated with their new ones.

We estimate these effects in controlled regressions, which confirm that the findings visualized in Figure 6 are economically and statistically significant: Investors increase their holdings in funds affiliated with their new banks after switching and reduce their holdings affiliated with their old banks. To save space, we make these results available upon request.

The results in this section, even if not based on exogeneous variation in the distribution of funds, tell us that the mutual fund flows of people forced to switch banks probably did not happen because these customers lost trust in the recommendations given by their old banks, nor because other unobservable individual characteristics, such as risk aversion, were correlated with forced bank switches, in accordance with our results in Section 5.1.4 on risk aversion. If that had been the case, we should have significantly larger effects for treated individuals than for voluntary moves between generally healthy banks. We instead found that mutual fund flows following voluntary shifts were equally large.

8. Conclusion

We show the importance for mutual fund inflows and outflows of affiliation with a distributor. In our setting, different banks are affiliated with different mutual funds. Bank X distributes one mutual fund and Bank Y distributes another. When people switch banks, the mutual funds affiliated with the new banks gain access to these new customers. We mainly study customers forced to switch because of bank failures following the financial crisis, in order to get exogenous variation in funds' access to customers. Our main analysis is three-fold. First, we establish a causal relation between customers arriving in a bank and their subsequent choice of mutual funds. Second, we document how investors reallocate their fund portfolios over time following bank shifts. Finally, we investigate the reasons people reallocate their funds.

We find that at least a third of investors' mutual fund choices are driven by variation in the funds they are presented with. When investors reallocate their mutual funds holdings, they typically move their entire holdings to funds affiliated with their new bank. Our results also show that investors do not change funds to improve their portfolios. Nevertheless, after switching banks, more and more investors reallocate their funds. Our interpretation is that more and more new customers are convinced by their new banks to replace their holdings with funds affiliated with

their new banks even when there is no good reason to do so. Because these flows are not determined by fund performance or fees, this also means that the assets under management are less likely to drop when the funds perform poorly. In this sense, they serve as captive assets for the bank and provide the bank with a stable source of income.

Our results show that customers buy the funds they are exposed to through their banking relationships. For mutual funds competing for assets under management, this implies that affiliation with a distributor is of first-order importance and often dominates other potential determinants of fund flow, such as fees or performance. This contrasts with the literature, which models investors' fund choices as determined by fund performance. Our results imply that affiliation between funds and distributors is an independent and important determinant of which funds people buy.

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Figure 1. Development of Fund Holdings Affiliated with Customers' New Banks

Figure 1a shows the value of holdings in mutual funds affiliated with the new banks of customers forced to change banks and the average value held in funds affiliated with other banks. Holdings are normalized to 100 in year *t*-1, where *t* is the year customers switch banks. Figure 1b shows the proportion of individuals who have 0%–10%, 11%–90%, and 91%–100% of the value of their mutual fund holdings in funds affiliated with their new banks. This is shown separately for the merger year (*t*) and for four years afterward (year *t*+4). For example, 98% of individuals have 0%–10% of their mutual fund value in funds affiliated with their new banks in the merger year, and this drops to 50% four years later.

Figure 1a. Affiliated Holdings over Time

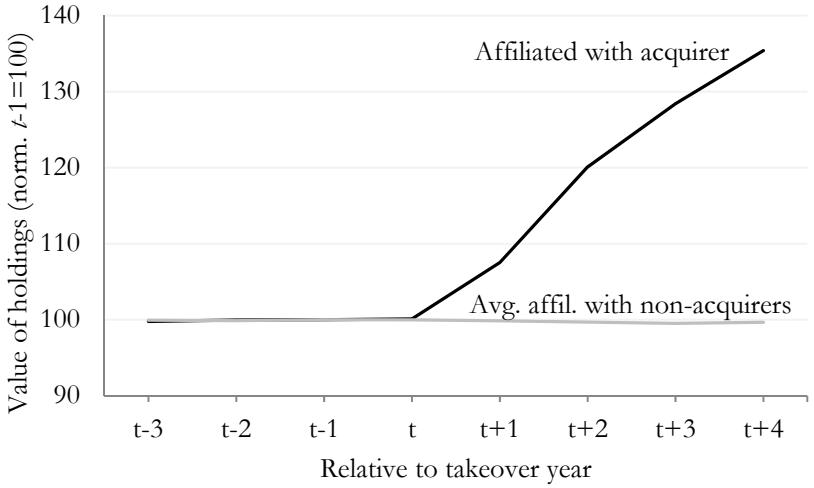

Figure 1b. Fraction of Investors with Low/Middle/High Allocation to Funds Affiliated with Customers' New Banks

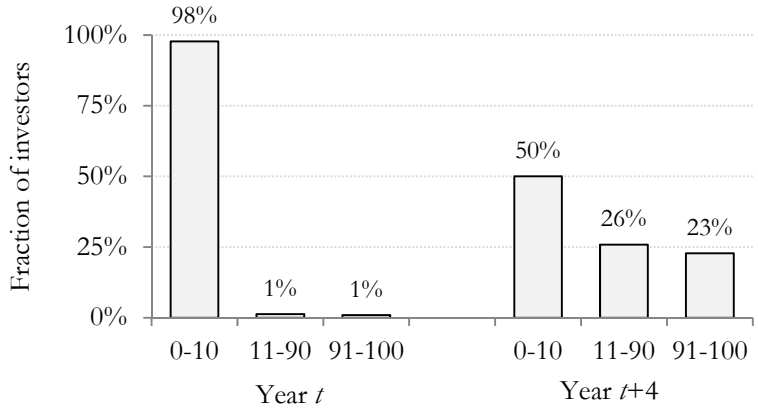

Figure 2. Affiliated holdings

Figure 2A shows the total number of individuals holding mutual funds and the numbers holding affiliated and non-affliated funds, respectively. Figure 2B shows the average value of total mutual fund holdings and the average value of holdings of affiliated and non-affiliated funds, respectively. Sample: Depositors in the six banks listed in Table 1 in 2012. The same information is outlined year by year in Table B in the appendix.

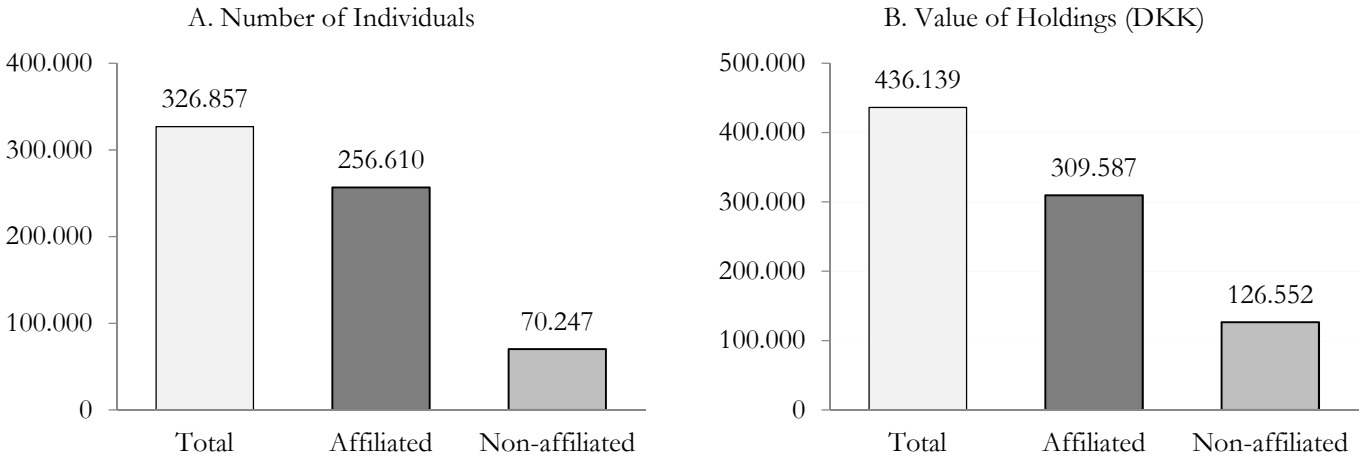

Figure 3. Distribution of Affiliated Holdings over Time

The figure shows the proportion of individuals who have 0%–10%, 11%–20%, . . . , and 91%–100% of the value of their mutual fund holdings in funds that are affiliated with their new banks. This is shown separately for the merger year (*t*) and each available year thereafter. For example, 98% of individuals have 0%–10% of their mutual fund value in connected funds in the merger year, and this drops to 50% four years later.

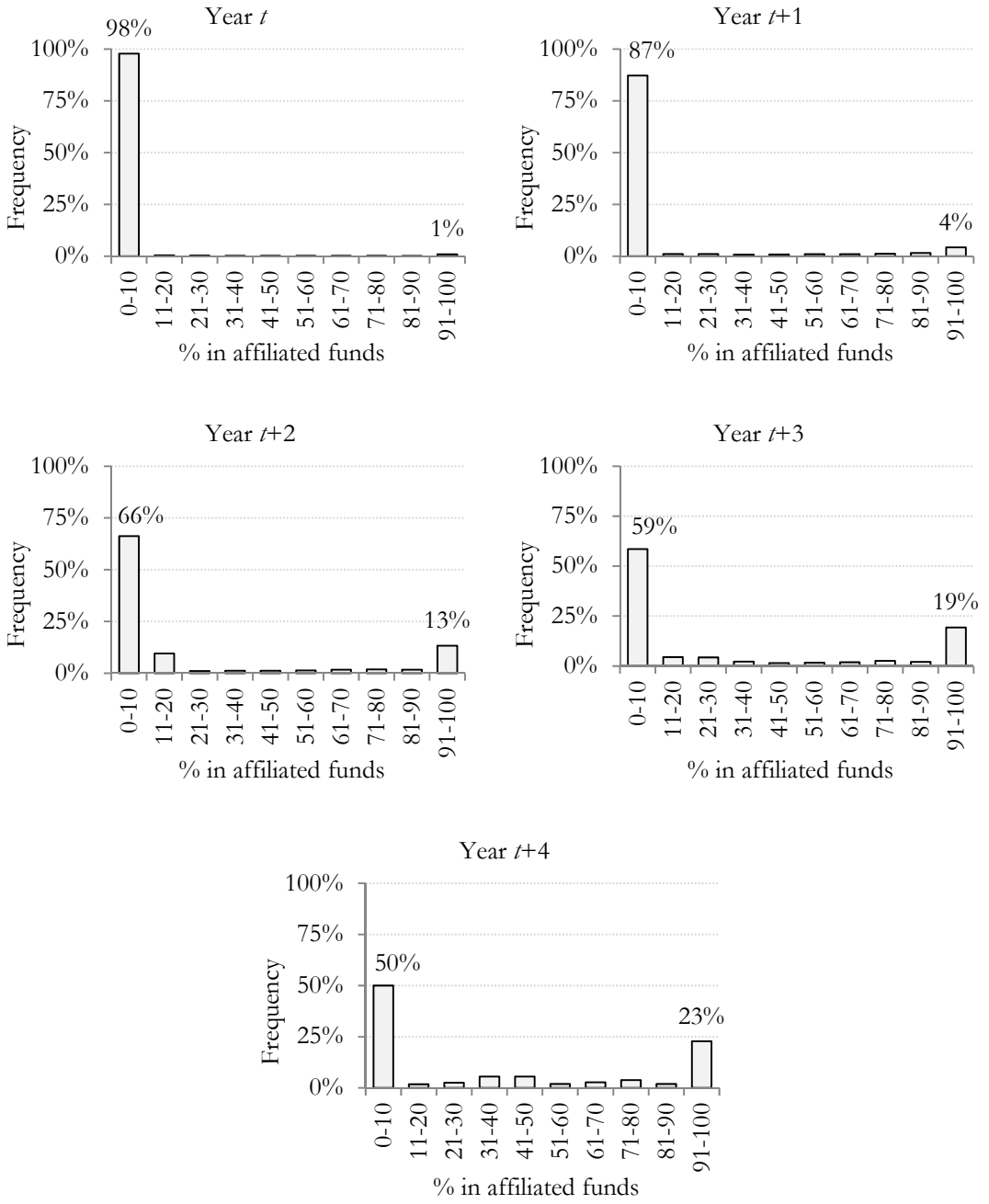

Figure 4. Rating Choices of Population

The figure shows the fraction of fund purchases made across the whole population by fund rating over the sample period of 2005–12. For example, 39% of all fund purchases in 2005–12 were of 3-star rated funds. The ratings are calculated across all fund purchases, and the average rating is 3.45.

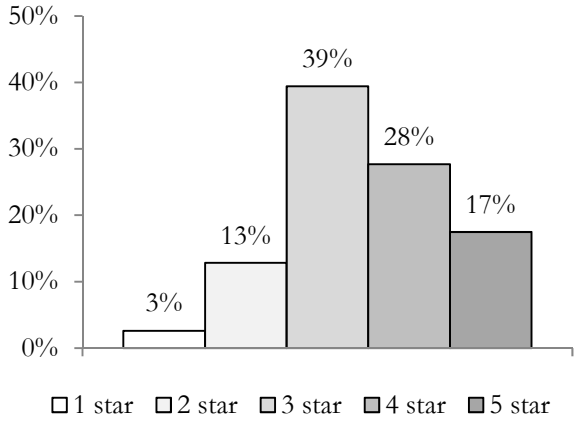

Figure 5. Performance Choice at Time of Trade

The figure shows the proportion of purchases made in each category of Morningstar-rated funds, from 1–5, before and after an exogenous bank switch (using the end-of-year rating prior to purchase). Relative to takeover year *t*, the post-switch period is years *t*+1, . . ., *t*+4, and the pre-switch period is years *t*–3, . . ., *t*. We count the number of specific star purchases and the total number of purchases (approx. 16,000 pre- and 27,000 post-purchases) and take a simple ratio of those two numbers (implying no distribution or inference).

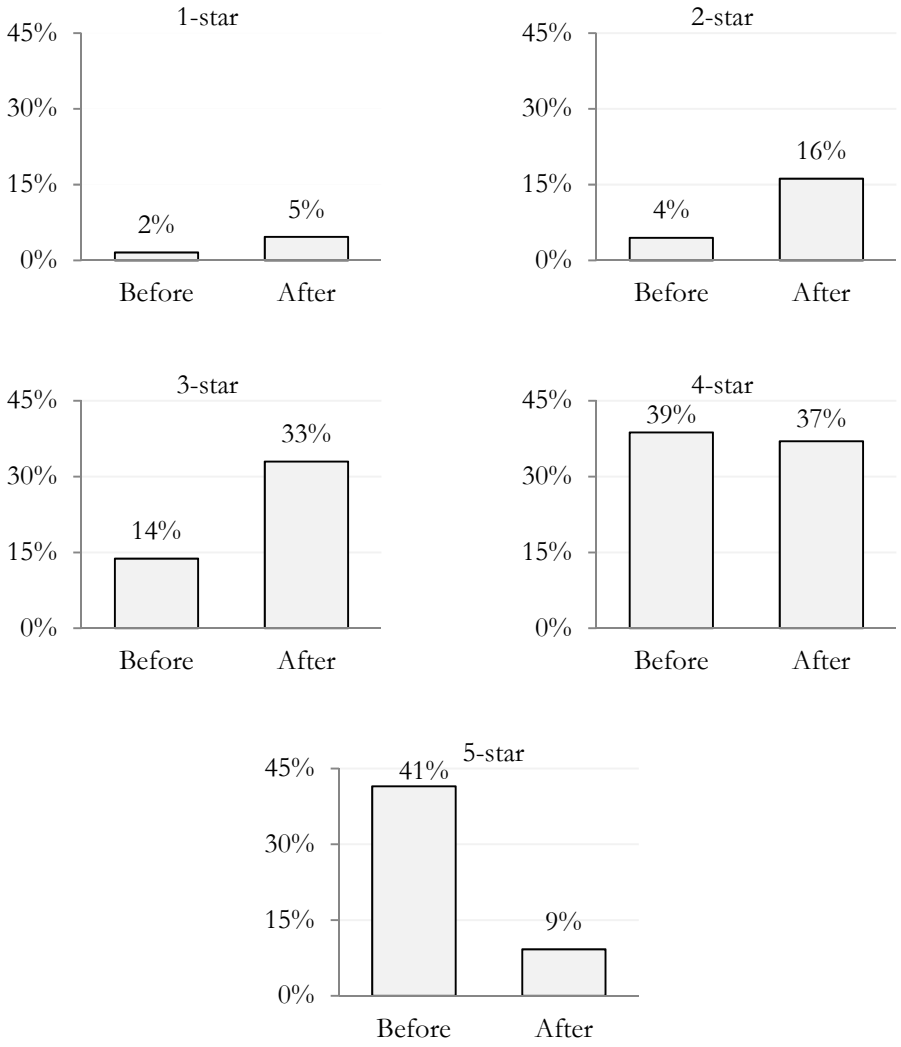

Figure 6. Affiliated Holdings over Time: All Bank Changes

The figure visualizes, separately for all mutual fund holders either joining or leaving banks, the evolution of (i) the proportion of their portfolio value affiliated with their old and new banks, and (ii) the average value of the funds affiliated with neither the old nor the new bank (e.g., if a person switches from Bank A to Bank B, this shows the average holding in non-BankA and non-BankB mutual funds). Holdings are normalized to be 100 in year *t*–1, where year *t* is the year of the bank switch.

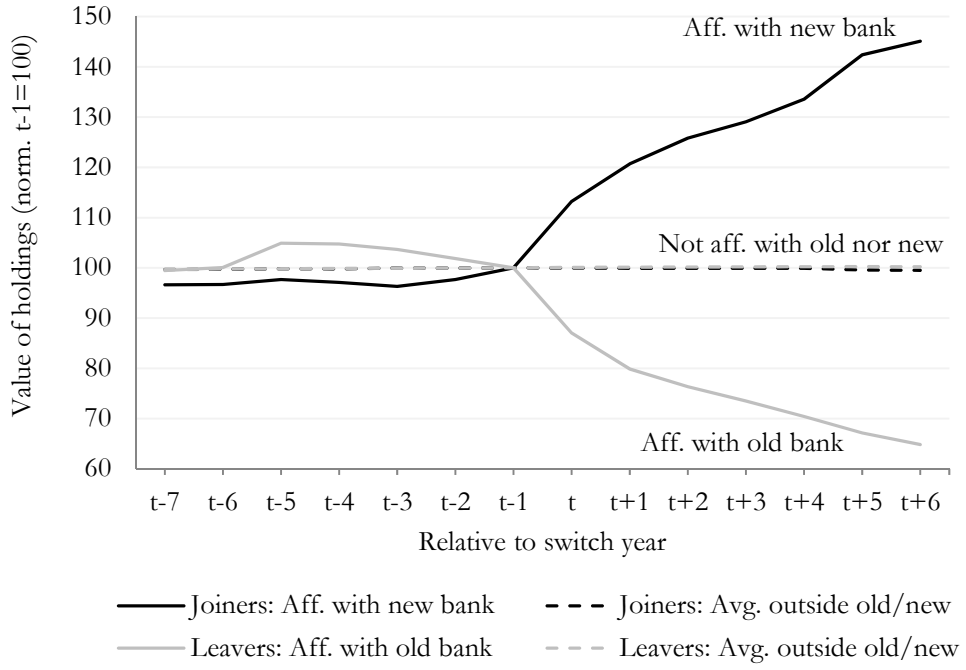

Table 1. Banks and Mutual Fund Families

Panel A alphabetically lists the banks operating in Denmark that (i) are affiliated with a mutual fund association and (ii) acquired another bank during the 2005–12 sample period. In addition, the largest Danish bank, Danske Bank, is included. Panel A also lists the mutual fund family associated with each bank. Panel B shows the number of depositors at year-end 2012 (i) in the six banks listed in Panel A, (ii) in all other banks, and (iii) the whole country. Panel B also shows the number of fund holders (i) in the six mutual fund families listed in Panel A, (ii) in all other funds, and (iii) in the whole country. The data are restricted to individuals above the age of 17.

Panel A.

	Bank	Mutual fund family
1	Danske Bank	Danske Invest
2	Handelsbanken	Handelsinvest
3	Jyske Bank	Jyske Invest
4	Nordea Bank Danmark	Nordea Invest
5	Nykredit Bank	Nykredit Invest
6	Sydbank	Sydinvest

Panel B.

	Bank			Mutual fund family	
	Depositors	%		Fund holders	%
In banks 1–3	1,573,291	37.1%	In fund families 1-3	203,697	46.5%
In banks 4–6	1,320,452	31.1%	In fund families 4-6	161,804	36.9%
In all other	1,347,972	31.8%	In all other	72,777	16.6%
Country total	4,241,715	100%	Country total	438,278	100%

Table 2. Summary Statistics: Mutual Fund Holders

The table shows the means and the standard deviations (in parentheses below the means) for all mutual fund holders (people owning at least one mutual fund) who are above the age of 17 and were registered in Denmark, for 2005 and 2012. "Treatment sample" are mutual fund holders who are depositors in one of the acquired banks detailed in Table A in the appendix. "Control sample" are the fund holders who are depositors in one of the six acquiring banks detailed in Panel A of Table 1. All variables presented in Danish kroners are inflation adjusted with August 2016 as the base. Higher education is defined as a university bachelor's degree or higher. The children-in-household dummy equals 1 if the household includes children younger than 25 years old who live at home and are unmarried. The immigration dummy is equal to 1 for foreign nationals with a registered immigration date. The income variable is defined as total income before taxes. This includes regular salary, pension, public income transfers, irregular income (e.g., honorary income, consulting income, etc.), income from self-owned firms, capital income, foreign income, etc. Net overall wealth is net wealth at year-end, excluding pension savings. All other registered wealth is included (i.e., only private cash holdings and private debt are excluded), such as net registered property value (value of motor vehicles and boats is unregistered). Net house wealth is calculated as the year-end value of residential housing as evaluated by tax authorities, minus the market value of bond debt. Variables in DKK terms are winsorized within each year at the bottom 0.1 and top 99.9 percentiles.

	2005			2012		
	All fund holders (N = 525,955)	Control sample (N = 315,330)	Treatment sample (N = 12,567)	All fund holders (N = 438,278)	Control sample (N = 277,999)	Treatment sample (N = 11,114)
Age	57.8	59.5	56.9	59.6	61.0	61.2
	(17.7)	(17.1)	(17.5)	(17.9)	(17.8)	(16.3)
Female dummy	0.51	0.51	0.50	0.51	0.52	0.50
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)
Married dummy	0.51	0.51	0.52	0.51	0.50	0.53
	0.50	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)
Higher educ. dummy	0.10	0.10	0.09	0.13	0.13	0.12
	(0.30)	(0.30)	(0.28)	(0.34)	(0.33)	(0.33)
Children in househ. dummy	0.19	0.17	0.19	0.20	0.18	0.18
	(0.39)	(0.38)	(0.39)	(0.40)	(0.38)	(0.38)
Immigration dummy	0.01	0.01	0.00	0.01	0.01	0.01
	(0.09)	(0.09)	(0.07)	(0.09)	(0.09)	(0.07)
Income	327,931	327,819	331,197	346,113	341,735	342,607
	(291,974)	(295,191)	(2,892,354)	(328,538)	(3,514,782)	(2,960,218)
Net overall wealth	1,543,212	1,647,394	1,648,348	1,641,136	1,746,318	1,633,419
	(2,999,734)	(3,212,286)	(2,892,354)	(3,300,027)	(3,514,782)	(2,960,218)
Net house wealth	766,494	823,120	786,708	791,582	839,658	775,092
	(1,383,634)	(1,430,884)	(1,437,218)	(1,606,236)	(1,636,852)	(1,588,597)
Value of funds	399,670	426,009	384,806	404,727	438,124	410,660
	(723,900)	(757,298)	(706,417)	(855,963)	(907,971)	(789,674)
No. of funds	2.74	2.95	2.79	3.45	3.65	3.66
	(2.50)	(2.66)	(2.79)	(3.26)	(3.33)	(3.86)

Table 3. Exogenous Bank Switches

The table shows the number of individuals holding mutual funds, the average number of funds held and the value of those. In Panel A, the affiliated funds are those issued by a mutual fund association associated with the treatment group's (soon-to-be) new bank, and in Panel B they are those associated with the control group's ongoing bank. Panel A also reports the average fraction held in funds that are affiliated with a non-acquiring bank, i.e. the average fraction held in funds affiliated with banks 1–6 in Table 1, excluding the acquiring bank. Similarly, Panel B reports the average fraction held in funds affiliated with banks 1–6 in Table 1, other than the person's ongoing bank. The last column reports and tests the difference in holdings between periods t–3 and t+4, with statistical significance being reported at the 1% level (marked *). Statistical difference in the number of individuals cannot be tested because there is no underlying distribution.

Panel A. Treatment group

	Relative to takeover year t								Stat. diff.
	t–3	t–2	t–1	t	t+1	t+2	t+3	t+4	t–3 vs. t+4
Number of individuals									
Holding mutual funds	12,577	13,429	13,295	12,536	11,476	9,788	8,969	5,923	
Fraction of indiv. with funds aff. with acquirer	1.9%	2.1%	2.3%	2.6%	13.4%	35.6%	42.5%	50.5%	
Number of holdings (conditional on holding any)									
Total	2.90	3.30	3.41	3.37	3.61	3.76	3.79	4.02	1.12*
Fraction of funds affiliated with acquirer	1.2%	1.3%	1.4%	1.5%	8.6%	20.8%	28.8%	34.4%	33.3%*
Avg. fraction aff. with a non-acquiring bank	3.3%	3.2%	3.4%	3.4%	3.2%	3.0%	2.8%	2.9%	–0.4%*
Value of holdings (conditional on holding any)									
Total	388,219	460,972	370,781	292,268	343,345	369,929	389,390	452,841	64,622*
Fraction of value affiliated with acquirer	1.1%	1.3%	1.3%	1.4%	8.9%	21.4%	29.7%	36.7%	35.6%*
Avg. fraction aff. with a non-acquiring bank	3.1%	3.1%	3.2%	3.2%	3.1%	2.9%	2.7%	2.9%	–0.3%

Panel B. Control group

	Calendar year								Stat. diff.
	2005	2006	2007	2008	2009	2010	2011	2012	2005 vs. 2012
Number of individuals									
Holding mutual funds	315,330	344,675	327,792	302,852	293,764	292,476	284,954	277,999	
Fraction of indiv. with funds aff. with bank	72.7%	75.2%	82.6%	82.8%	82.2%	82.7%	83.0%	83.1%	
Number of holdings (conditional on holding any)									
Total	2.95	3.48	3.17	3.21	3.26	3.49	3.49	3.65	0.70*
Fraction of funds affiliated with bank	61.8%	63.1%	74.8%	75.2%	73.7%	74.0%	74.1%	73.7%	11.9%*
Avg. fraction aff. with other banks	1.3%	1.2%	1.4%	1.4%	1.5%	1.5%	1.5%	1.6%	0.4%*
Value of holdings (conditional on holding any)									
Total	426,009	651,333	396,106	307,566	352,879	401,201	389,692	438,124	12,115*
Fraction of value affiliated with bank	58.4%	60.2%	73.8%	73.8%	71.9%	72.7%	72.9%	73.4%	15.0%*
Avg. fraction aff. with other banks	1.2%	1.2%	1.3%	1.4%	1.4%	1.5%	1.5%	1.6%	0.4%*

Table 4. Exogenous Bank Switches: Regressions

The table shows estimates from regressions in which the dependent variable is the (1) number of affiliated funds, (2) fraction of funds in affiliated funds, (3) log value of affiliated funds, or (4) fraction of value in affiliated funds. The *Treatment group* variable takes the value 1 for fund holders who are forced to a new bank that offers affiliated funds, where the underlying control group is those who always remain at the same bank (among banks in Table 1) in the 2005–12 sample period. The year of switching between banks is denoted *t*, and all regressions also include dummies D_{t+1}, . . ., D_{t+4}, which take the value 1 in the respective post-switch period and 0 otherwise. For the control group, we define the post-switch period as 2009–12. Control variables (age, gender, etc.) are defined in Table 2 and the variables *Morningstar* and *Fees* are the value-weighted Morningstar rating (rated 1-5) and fees (in basis points) of each individual's fund portfolio. Standard errors are clustered by individuals, and corresponding *t*-statistics are reported in parentheses. Star-marked coefficients are statistically significant at the 1% level.

	(1) No. aff. funds	(2) % aff. funds	(3) Value aff. Funds	(4) % value aff. funds	(5) No. aff. funds	(6) % aff. funds	(7) Value aff. Funds	(8) % value aff. funds
Treatment group	–2.32*	–71.78*	–8.16*	–69.98*	-2.37*	-66.89*	-9.05*	-64.38*
	(–114.26)	(–140.28)	(–131.33)	(–135.89)	(-438.89)	(-611.87)	(-591.98)	(-580.44)
Treatment group × D_{t+1}	0.36*	5.91*	1.29*	5.61*	0.00	-0.87*	0.52*	-1.16*
	(7.31)	(5.88)	(8.36)	(5.44)	(0.29)	(-3.10)	(11.62)	(-4.04)
Treatment group × D_{t+2}	0.73*	21.08*	3.59*	20.21*	0.34*	13.14*	3.63*	12.76*
	(10.67)	(12.44)	(13.71)	(11.65)	(17.15)	(28.36)	(48.40)	(26.63)
Treatment group × D_{t+3}	0.83*	25.69*	3.94*	25.24*	0.66*	21.10*	4.53*	21.20*
	(10.07)	(13.31)	(13.52)	(12.75)	(27.27)	(38.75)	(55.04)	(37.75)
Treatment group × After	0.98*	27.96*	4.17*	28.41*	-0.39	46.63*	4.13*	46.64*
	(7.90)	(9.90)	(9.84)	(9.70)	(-2.23)	(9.98)	(6.22)	(9.70)
Treatm. gr. × After × Age	–0.00	0.05	0.02*	0.04	0.01*	0.08	0.03*	0.08
	(–0.18)	(1.18)	(3.86)	(1.07)	(3.16)	(1.68)	(4.23)	(1.59)
Treatm. gr. × After × Female	–0.03	0.24	–0.19	0.33	-0.05	-2.43	-0.44	-2.46
	(–0.62)	(0.21)	(–1.15)	(0.29)	(-0.78)	(-1.91)	(-2.30)	(-1.88)
Treatm. gr. × After × Married	0.14*	–0.51	0.09	–0.03	0.17*	0.73	0.35	1.48
	(2.62)	(–0.45)	(0.51)	(–0.02)	(2.88)	(0.57)	(1.84)	(1.12)
Treatm. gr. × After × Higher educ.	0.02	–3.33	–0.32	–3.34	-0.03	-3.08	-0.31	-3.21
	(0.24)	(–2.04)	(–1.23)	(–1.99)	(-0.27)	(-1.62)	(-1.04)	(-1.65)
Treatm. gr. × After × Chi. in house.	–0.07	–0.93	–0.53	–1.49	-0.09	0.71	-0.26	-0.40
	(–1.01)	(–0.61)	(–2.28)	(–0.93)	(-1.01)	(0.37)	(-0.95)	(-0.21)

Treatm. gr. × After × Immigrant	0.13	7.99	1.32	6.45	-0.10	2.44	0.54	1.06
	(0.52)	(1.21)	(1.34)	(0.97)	(-0.28)	(0.35)	(0.46)	(0.15)
Treatm. gr. × After × Income	0.00	–0.32	–0.03	–0.28	0.05*	0.30	0.12*	0.48
	(0.37)	(–1.69)	(–0.98)	(–1.39)	(2.62)	(1.04)	(2.61)	(1.61)
Treatm. gr. × After × Net ov. wealth	0.00	0.00	0.01*	–0.00	0.01*	-0.02	0.02*	-0.01
	(1.93)	(0.00)	(3.47)	(–0.13)	(3.19)	(-1.31)	(2.87)	(-0.66)
Treatm. gr. × After × Morningstar					0.31*	2.37*	0.86*	2.65*
					(12.19)	(2.96)	(7.93)	(3.25)
Treatm. gr. × After × Fees					-0.00*	-0.34*	-0.04*	-0.35*
					(-6.52)	(-22.48)	(-21.40)	(-23.30)
Observations	2,528,774	2,528,774	2,528,774	2,528,774	1,674,787	1,674,787	1,674,787	1,674,787
R-squared	0.05	0.10	0.12	0.10	0.04	0.10	0.10	0.10
Number of indiv.	471,230	471,230	471,230	471,230	425169	425169	425169	425169
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5. Outflows from Existing Funds and Inflows to Affiliated Funds

The table shows estimates from regressions in which the dependent variable is the cumulative outflow in DKK over the post-merger period from t to t+4. The regressions include treated individuals who sell some of their existing funds during this period. The $D_{Aff.\ buy}$ dummy ($D_{Non\text{-}aff.\ buy}$) takes the value 1 for fund holders who buy affiliated (non-affiliated) funds during the period; otherwise it is 0. The benchmark group is therefore those who liquidate, i.e. do not buy any funds, in this sample of individuals who sell funds. The variable *M.star of new funds* (*M.star of existing funds*) is the value-weighted Morningstar rating of bought funds in the post-merger period (funds held at time t–1). Control variables (age, gender, etc.) are defined in Table 2 and are averaged across the post-treatment period for each individual. All regressions all include standard control variables (non-interacted), but these are omitted from the table for brevity. The t-statistics for robust standard errors are reported in parentheses. Star-marked coefficients are statistically significant at the 1% level.

	(1) Ln(outflow)	(2) Ln(outflow)	(3) Ln(outflow)	(4) Ln(outflow)
$D_{Aff.\ buy}$	0.96*	1.68*	0.72*	1.51*
	(26.80)	(7.33)	(2.86)	(4.06)
$D_{Non\text{-}aff.\ buy}$	0.12*	0.10*	0.52	0.59
	(3.02)	(2.63)	(1.98)	(2.26)
$D_{Aff.\ buy}$ × Age		–0.01*		-0.01
		(–2.99)		(-2.04)
$D_{Aff.\ buy}$ × Female		0.18		0.18
		(2.38)		(1.83)
$D_{Aff.\ buy}$ × Married		–0.26*		-0.25
		(–3.48)		(-2.56)
$D_{Aff.\ buy}$ × Higher educ.		0.19		0.09
		(1.49)		(0.58)
$D_{Aff.\ buy}$ × Chi. in house.		0.15		0.37
		(1.12)		(2.02)
$D_{Aff.\ buy}$ × Immigrant		–1.06		-2.43*
		(–2.26)		(-3.36)
$D_{Aff.\ buy}$ × Income		0.01		0.02
		(0.56)		(0.58)
$D_{Aff.\ buy}$ × Net overall wealth		–0.00		-0.00
		(–0.87)		(-1.20)
$D_{Aff.\ buy}$ × M.star new funds			0.08	0.03
			(1.15)	(0.44)
$D_{Non\text{-}aff.\ buy}$ × M.star new funds			–0.01	-0.05
			(–0.15)	(-0.61)
M.star of existing funds			0.17*	0.16*
			(6.54)	(6.38)
Observations (no. of individuals)	5,697	5,697	3,046	3,046
R-squared	0.24	0.25	0.31	0.33
Control variables	Yes	Yes	Yes	Yes

Table 6. Chasing Ratings or Performance

In regressions 1–2, the dependent variable is the log-amount of bought funds (regression 1) and bought affiliated funds (regr. 2). In regressions 3-4, the dependent variable is Morningstar ratings across fund holders' bought funds (regr. 3) and bought affiliated funds (regr. 4). In regressions 5–8, the dependent variables are respectively the (5) Sharpe's ratio of the fund portfolio of an investor, (6) fund portfolio fee levels, (7) concentration of the fund portfolio of the investor, and (8) realized value minus hypothetical returns the investors would have obtained had they not switched portfolios. The regression includes fund holders who were forced to switch to another bank due to takeovers as well as a control group of fund holders who remained at the same bank (among the banks in Table 1) throughout the 2005–12 sample period. The *Treatment group* variable takes the value 1 for fund holders who were forced to switch between banks and 0 for other fund holders. The *After* variable takes the value 1 in the post-switch period (years t+1, . . ., t+4, relative to the takeover year t) and 0 otherwise (years t–3, . . ., t). For the control group, we define the post-switch period as 2009–12. All regressions control for age, gender, marital status, education, children in household, immigrant status, income, and wealth, all defined as in Table 2. Standard errors are clustered by individuals, and corresponding t-statistics are reported in parentheses. Star-marked coefficients are statistically significant at the 1% level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ln(Inflow)	Ln(Affiliated inflow)	Morningstar of bought funds	Morningstar of bought affiliated funds	Sharpe's ratio	Fees	Concentration	Real – hypoth. return
M.star new funds × Treatm.gr. × After	**-0.32***	**-0.38**						
	(-3.83)	**(-1.91)**						
M.star new funds × Treatm.gr.	0.05	0.03						
	(1.18)	(0.18)						
M.star new funds × After	0.14*	0.17*						
	(5.70)	(5.77)						
M.star new funds	0.01	0.02						
	(1.36)	(1.56)						
Treatm.gr.× After	2.01*	1.60	**–0.56***	**–0.55***	**0.04***	**–0.07***	**0.03***	**0.26***
	(4.76)	(1.56)	**(–27.28)**	**(–23.10)**	**(5.21)**	**(–20.97)**	**(11.44)**	**(6.93)**
Treatm.gr.	0.00	0.06	0.60*	0.62*	-0.19*	0.18*	-0.01*	-0.00*
	(0.02)	(0.09)	(38.13)	(38.54)	(-28.93)	(57.21)	(-3.46)	(-5.43)
After	-1.21*	-1.54*	0.47*	0.48*	0.19*	0.01	-0.05*	0.56*
	(-8.41)	(-5.48)	(12.80)	(13.10)	(12.98)	(1.45)	(-9.38)	(80.59)
Constant	9.34*	9.21*	3.54*	3.51*	2.02*	0.88*	0.67*	0.02
	(172.05)	(147.03)	(320.64)	(290.06)	(368.68)	(375.60)	(318.14)	(2.08)
Observations	162,492	135,946	162,172	128,139	1,852,456	1,858,775	1,917,724	2,071,550

R-squared	0.12	0.13	0.13	0.16	0.48	0.13	0.05	0.02
Number of indiv.	119,503	99,607	119,272	95,868	439,159	440,008	445,348	416,794
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Appendix

Table A. Bank Acquisitions

The table summarizes the acquired and acquiring banks, the years in which the takeovers occurred (year *t*), and the pre- and post-merger years available in our 2005–12 sample period. The table also shows the number of people exposed to a merger in year *t*. We track individuals exposed to takeover both forward in time, when they were customers of the new bank (from *t*+1 to *t*+4, where the number of observations drops due to death, emigration, individuals voluntarily switching banks, and data ending in 2012), and backward in time, when they were customers of the old bank (from *t*–1 to *t*–4, where the number of observations gradually drops due to individuals being less than 18 years old, not having immigrated yet, not yet having joined the soon-to-be-acquired bank, and the data sample starting in 2005). We further drop person-year observations from the pre-merger period when a person was customer in the acquiring bank (e.g., for a person at Bank A in 2005–06, then at Bank B in 2007, and finally forced back to Bank A in 2008–12, we drop the years 2005–06 from the treatment sample). We suppress the total number of individuals affected at *t*–6, *t*–5 and *t*–4 due to Denmark Statistics' confidentiality restrictions, which require any reported number to contain least three underlying institutions.

	Date	Acquirer	Acquired bank	*t*–6	*t*–5	*t*–4	*t*–3	*t*–2	*t*–1	*t*	*t*+1	*t*+2	*t*+3	*t*+4
1	2008, Mar.	Sydbank	Bank Trelleborg				2005	2006	2007	2008	2009	2010	2011	2012
2	2008, Sept.	Nordea Bank	Roskilde Bank				2005	2006	2007	2008	2009	2010	2011	2012
3	2008, Oct.	Nykredit Bank	Forstædernes Bank				2005	2006	2007	2008	2009	2010	2011	2012
4	2008, Oct.	Handelsbanken	Lokalb. Nordsjæl.				2005	2006	2007	2008	2009	2010	2011	2012
5	2009. Nov.	Nordea Bank	Fionia Bank			2005	2006	2007	2008	2009	2010	2011	2012	
6	2011, Sept.	Jyske Bank	Fjordbank Mors	2005	2006	2007	2008	2009	2010	2011	2012			
			Total no. of individuals affected:	Suppr.	Suppr.	Suppr.	112,295	116,663	119,346	119,623	109,009	90,034	83,796	52,096

Case 1

On January 28, 2008, bankTrelleborg A/S notified the Copenhagen Stock Exchange that the Danish Financial Supervisory Authority, on January 21, 2008, had approved the Foundation "Fonden for bankTrelleborg" to be majority owner of bankTrelleborg, forcing minority shareholders to redeem their shares. On February 1, 2008, Sydbank notified the Copenhagen Stock Exchange that the Foundation "Fonden for bankTrelleborg," on February 1, 2008, had forced its minority shareholders to redeem their shares and sold the equity capital to Sydbank. On March 27, 2008, Sydbank notified the Copenhagen Stock Exchange that the board of directors of Sydbank and BankTrelleborg had approved the merger between the two banks, with Sydbank as the continuing company.

Case 2

Roskilde Bank A/S was acquired by three different banks. On September 29, 2008, the "Bankaktieselskabet af 24. august 2008" (an interim financial resolution authority that was created to take over the original Roskilde Bank) notified the Copenhagen Stock Exchange that, as of September 28,

(i) Nordea had bought the branches Algade (Team A+C), Ringsted, Greve, Køge, Solrød, Taastrup, Osted, Kirke Hyllinge, and Hyrdehøj. This sale is the one we study in the present paper, as Nordea Bank is directly associated with Nordea Invest.

(ii) Spar Nord Bank bought the branches Holbæk, Helsingør, Hvalsø, Køgevej, Jyllinge, Svogerslev, and Himmelev.
(iii) Arbejdernes Landsbank bought the branches København, Kalundborg, Lyngby, Frederikssund, and Ro´s Torv.

Case 3
On September 15, 2008, Forstædernes Bank A/S notified the Copenhagen Stock Exchange that Nykredit had made an offer to purchase all the shares in Forstædernes Bank A/S. On October 21, 2008, notification was given to the Copenhagen Stock Exchange that Nykredit Realkredit owned 98.1% of the outstanding shares in Forstædernes Bank. On October 21, 2008, notification was given to the Copenhagen Stock Exchange that Nykredit Realkredit A/S had decided to force all remaining shareholders in Forstædernes Bank A/S to redeem their shares. They had four weeks to do so. Against this background, Forstædernes Bank was delisted from the Copenhagen Stock Exchange, with its last day of trading being October 31, 2008.

Case 4
On September 15, 2008, Lokalbanken i Nordsjælland notified the Copenhagen Stock Exchange that Handelsbanken had made an offer to purchase all shares in Lokalbanken. On October 15, 2008, notification was given to the Copenhagen Stock Exchange that Handelsbanken owned 97.7% of outstanding shares. On October 22, 2008, notification was received from Copenhagen Stock Exchange that Lokalbanken had been delisted from the exchange, with its last day of listing being October 28, 2008, after which the remaining minority shareholders would be forced to redeem their shares.

Case 5
On August 31, 2009, "Finansiel Stabilitet," the Danish financial resolution authority, announced in a press release that an agreement had been made with Nordea regarding the sale of Fionia Bank, except for some particularly risky corporate exposures, subject to approval by the Danish FSA and competition authorities. The same day, Nordea announced in a press release that it had acquired 29 Fionia Bank branches with 400 employees, 75,000 retail customers, and 9,500 corporate customers. On November 25, 2009, Finansiel Stabilitet sent out a press release saying that the competition authorities had approved the sale, which was expected to take effect on November 30, 2009. Note that Fionia Bank established a mutual fund (Fionia Invest) in 2007. This fund was bought by Nordea in 2010. Fund holders observing a name shift in their funds in 2010 for this reason are not treated as selling Fionia Invest and buying Nordea Invest, as this was an automatic name shift.

Case 6
Fjordbank Mors was sold by Finansiel Stabilitet to four different banks. On June 26, 2011, the branch in Århus was sold to Sparekassen Kronjylland. On July 8, 2011, the branches in Struer and Thisted were sold to Sparekassen Thy. On July 18, 2011, the branches in Durup, Roslev, Glyngøre, and Fur were sold to Sparbank. On September 30, 2011, the activities of Fjordbank Mors on the island of Mors were sold to Jyske Bank (47,000 customers). This sale is the one we study in the present paper, as Jyske Bank is directly associated with Jyske Invest.

Table B. Affiliated Holdings

The table shows the annual (i) number of individuals, (ii) number of mutual funds held, and (iii) value of mutual fund holdings for depositors in the six banks listed in Table 1. In Panels A and B, the proportion held in affiliated mutual funds does not necessarily correspond to the fraction of the two corresponding numbers reported in the table (e.g., 1.96/2.92 ≠ 60.9%), because the table reports the average proportion on the basis of first calculating the proportion for each individual fund holder and then taking an average of the results. The statistical significance of the difference is reported (marked *) at the 1% level. The statistical difference in the number of individuals cannot be tested because there is no underlying distribution.

	Calendar year								Stat. diff.
	2005	2006	2007	2008	2009	2010	2011	2012	2005 vs. 2012
Panel A. Number of individuals									
Holding mutual funds	357,925	390,041	368,648	350,785	343,294	342,639	335,399	326,857	
Holding affiliated mutual funds	256,291	288,032	298,367	274,372	263,599	267,165	262,449	256,610	
Fraction of affiliated holding	71.6%	73.8%	80.9%	78.2%	76.8%	78.0%	78.2%	78.5%	
Panel B. Number of holdings (conditional on holding any)									
Total	2.92	3.46	3.17	3.22	3.27	3.50	3.52	3.67	0.76*
Affiliated mutual funds	1.96	2.29	2.40	2.36	2.32	2.50	2.49	2.56	0.60*
Fraction of affiliated mutual funds	60.9%	61.9%	73.1%	70.8%	68.4%	69.0%	69.1%	68.8%	7.9%*
Panel C. Value of holdings (conditional on holding any)									
Total	411,820	628,723	388,708	300,186	345,849	396,219	386,806	436,139	24,319*
Value of affiliated mutual funds	245,270	378,337	281,362	213,753	234,031	274,184	270,107	309,587	64,317*
Fraction of affiliated value	57.6%	59.2%	72.1%	69.5%	66.8%	67.9%	68.1%	68.7%	11.0%*

Probit regressions reported in Table C

Figure 2 of the paper presents unconditional averages across individuals. The decision to purchase certain mutual funds might depend on investor characteristics and macroeconomic trends. We are interested in whether investors decide to buy certain funds because they are affiliated with those investors' main banks. To evaluate the strength of the bank-connection channel and at the same time control for investor characteristics and year-fixed effects (to account for macroeconomic trends affecting all investors), we estimate panel probit regressions in which the outcome variable is a dummy equal to 1 if the investor owns an affiliated mutual fund (i.e., one from a fund family affiliated with their main bank) and 0 otherwise. The explanatory variables are dummies for the bank relation of the customer and other controls. The six regressions take the following form:

$$P(I_{MutualFundFamilyA,it}|X) = a + \sum_{j=A}^{F} \beta_1 Bank_{j,it} + Controls + \varepsilon_{A,it}$$

$$P(I_{MutualFundFamilyB,it}|X) = a + \sum_{j=A}^{F} \beta_1 Bank_{j,it} + Controls + \varepsilon_{B,it}$$

$$\vdots$$

$$P(I_{MutualFundFamilyF,it}|X) = a + \sum_{j=A}^{F} \beta_1 Bank_{j,it} + Controls + \varepsilon_{F,it}$$

$P(I_{\text{Mutual Fund Family A, }it})$ takes the value 1 if individual i owns a mutual fund affiliated with mutual fund family A at time t, $P(I_{\text{Mutual Fund Family B, }it})$ takes the value 1 if an individual owns a mutual fund affiliated with mutual fund family B, etc., for all six banks.[23] The binary dummy $Bank_{j,it}$ takes the value 1 if individual i is a customer of bank j at time t. The other bank dummy variables are defined similarly.

The controls includes age of the investor, a gender dummy, and so on; see the text accompanying Table 2. Standard errors are clustered by individuals, and the regressions include time-fixed effects to account for common time trends that affect all individuals. The sample includes all investors holding funds in one of the six fund families mentioned in Table 1.

Table C contains the results of the six probit estimations, one for each bank.[24] The coefficient estimates are marginal effects of the explanatory variables calculated at their means. The main conclusion to be drawn from Table C is that the effect of being a customer of a bank affiliated with the mutual fund dominates all the other controls. There are several ways of illustrating this. First, the marginal effects of the own-bank dummies are much higher than any other marginal effects and are very significant. These effects are highlighted in Table C and range from 0.37 to 0.81. The average is 0.60. This means that the probability of owning mutual funds affiliated with your main bank is 37%–81% higher if you are a customer of the bank that is affiliated with the fund, holding all control variables constant at their means. The average of the other bank dummies is negative: –0.02. The marginal effects of the controls (age, gender, etc.) are tiny in

[23] It is important to stress that Bank A is not necessarily Bank 1 (Danske Bank) from Table 1, Bank B not necessarily Bank 2 (Handelsbanken), etc. The reason is that confidentially rules of Statistics Denmark prevent us from publishing results for individual firms in ways that let those firms be identified.

[24] Each panel regression includes 737,074 individuals. The total number of individuals included in the regressions is considerably higher than the number for a single year (e.g. 438,278 in 2012, cf. Table 2), as the number of fund holders is not the same every year and the fund holders are not the same either. The total pool of people holding funds (with available data to be included in the regressions) at any time across eight years is 737,074.

comparison to the effect of being a customer of the bank affiliated with the mutual fund.

There is a second way of illustrating the strong effect of being customer of a bank affiliated with a fund, inspired by Foerster, Linnainmaa, Melzer, and Previtero (2017). They found that fixed-advisor effects increased the explanatory power of investors' portfolio characteristics from 12% to 32%. We can perform a similar exercise. We exclude all bank dummies from the regressions; that is, let choice of mutual fund family be determined by individual background characteristics and performance only. Such regressions (not shown but available) produce a pseudo-R^2 of, respectively, 5%, 1%, 3%, 1%, 18%, and 16%. The average is 7%. This can be compared to the pseudo-R^2s reported in Table C, which range from 31% to 62%, with an average is 45%. Including bank-relation dummies thus increases the average explanatory power by a factor of more than six. This effect is large compared to the effect identified by of Foerster et al. (2017).

Table C. Affiliated Holdings: Probit Regressions

The table shows the marginal effects estimated from the probit regressions presented in section 5.1, where the dependent variable is an indicator of owning at least one affiliated mutual fund in particular fund families. For example, in equation (1) the dependent variable $P(I_{(MutualFundFamilyA)})$ takes the value 1 if an individual owns a mutual fund affiliated with this particular mutual fund, the binary dummy "*Depositor in bank A*" takes the value 1 if an individual is a customer of Bank A, etc. The banks and funds are those listed in Table 1. Marginal effects of the explanatory variables on affiliated fund ownership are calculated at their means. Control variables are defined in Table 2. The sample consists of all fund holders (cf. the summary statistics in Table 2). Standard errors are clustered by individuals, and the corresponding z-statistics testing for zero marginal effects (i.e. the ratio of the marginal effect estimate to the standard errors of the respective predictor) are reported in parentheses. Star-marked coefficients are statistically significant at the 1% level.

	(1) Holdings in fund family A	(2) Holdings in fund family B	(3) Holdings in fund family C	(4) Holdings in fund family D	(5) Holdings in fund family E	(6) Holdings in fund family F
Depositor in bank A	**0.65***	–0.03*	–0.02*	–0.04*	–0.00*	–0.00*
	(575.07)	(–26.34)	(–23.79)	(–69.29)	(–13.20)	(–7.15)
Depositor in bank B	–0.16*	**0.59***	–0.01*	–0.03*	–0.00*	–0.00*
	(–97.53)	**(367.06)**	(–15.96)	(–56.03)	(–6.26)	(–11.77)
Depositor in bank C	–0.17*	–0.01*	**0.79***	–0.04*	–0.00*	–0.00*
	(–72.18)	(–5.43)	**(385.61)**	(–57.12)	(–2.81)	(–9.38)
Depositor in bank D	–0.17*	–0.06*	–0.03*	**0.73***	–0.00*	–0.01*
	(–73.10)	(–33.96)	(–27.72)	**(305.34)**	(–7.71)	(–11.85)
Depositor in bank E	–0.13*	0.01	0.01*	–0.02*	**0.47***	–0.00*
	(–24.65)	(1.18)	(3.64)	(–9.92)	**(63.48)**	(–4.28)
Depositor in bank F	0.16*	0.03*	0.04*	0.05*	–0.00	**0.46***
	(38.00)	(10.19)	(20.11)	(25.33)	(–1.61)	**(103.15)**
Age	0.00*	–0.00*	–0.00*	–0.00*	–0.00*	0.00
	(16.49)	(–13.58)	(–12.50)	(–18.63)	(–2.93)	(1.40)
Female	0.02*	–0.02*	–0.01*	–0.01*	–0.00	–0.00*
	(11.95)	(–19.55)	(–11.24)	(–17.02)	(–2.19)	(–2.64)
Married	–0.03*	0.02*	0.00*	0.01*	–0.00	0.01*
	(–20.19)	(17.90)	(6.36)	(20.11)	(–1.72)	(23.18)
Higher educ.	0.06*	0.03*	0.02*	0.02*	–0.00	–0.00
	(24.63)	(19.22)	(20.97)	(17.31)	(–1.40)	(–0.56)
Children	–0.01*	–0.00*	0.00*	–0.00	–0.00	0.00*
	(–5.98)	(–4.06)	(2.76)	(–1.12)	(–1.80)	(3.97)
Immigrant	0.05*	0.01*	0.01*	0.01*	0.00	0.00
	(5.79)	(2.59)	(3.21)	(2.73)	(0.06)	(2.37)
Income/100,000	–0.00	0.00*	0.00*	0.00*	–0.00	0.00*
	(–0.35)	(12.88)	(5.44)	(15.87)	(–1.90)	(4.45)
Wealth/100,000	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*
	(19.72)	(30.91)	(30.11)	(39.37)	(8.00)	(21.84)
Observations	3,897,341	3,897,341	3,897,341	3,897,341	3,897,341	3,897,341
Pseudo-R2	0.41	0.40	0.43	0.38	0.56	0.27
Number of individuals	737,074	737,074	737,074	737,074	737,074	737,074
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Table D. Probability of Having Affiliated Funds after Bank Switch, Treated Individuals Only

The table shows the marginal effects estimated from probit regressions, where the dependent variable is equal to 1 if the investor holds at least 80% of her fund portfolio in affiliated funds and 0 otherwise. The sample is restricted to people owning funds to begin with and then being forced to switch to a bank offering affiliated funds. The marginal effects of the explanatory variables are calculated at their means. The control variables are defined in Table 2. Standard errors are clustered by individuals, and corresponding z-statistics testing for zero marginal effects (i.e., the ratio of the marginal effect estimate to the standard errors of the respective predictor) are reported in parentheses. Star-marked coefficients are statistically significant at the 1% level.

	Prob. of holding affiliated fund
D_{t+1}	0.10*
	(9.54)
D_{t+2}	0.21*
	(12.67)
D_{t+3}	0.30*
	(13.71)
D_{t+4}	0.39*
	(13.27)
Age	0.00
	(0.71)
Female	0.00
	(0.75)
Married	0.00
	(0.73)
Higher educ.	–0.02*
	(–4.07)
Children	–0.02*
	(–3.71)
Immigrant	0.03
	(1.08)
Income/100,000	–0.00
	(–1.74)
Wealth/100,000	–0.00
	(–1.71)
Observations	44,620
Pseudo R2	0.17
Number of clusters	14,282

Table E. Failed Banks with Multiple Buyers

The table shows estimates from regressions in which the dependent variable is the (1) number of affiliated funds, (2) fraction of invested wealth in affiliated funds, (3) log-value of affiliated funds, or (4) fraction of value in affiliated funds. The *Forced to offering bank* variable takes the value 1 for fund holders who are forced into a new bank that offers affiliated funds. The underlying control group is those who are forced from the same bank but into a new bank that does not offer affiliated funds. The year of the bank switch is denoted t, and all regressions also include dummies $D_{t+1}, \ldots, D_{t+4}$ that take the value 1 in the respective post-switch period (estimates are not reported) and 0 otherwise. Control variables (age, gender, etc.) are defined in Table 2. Standard errors are clustered by individuals, and corresponding t-statistics are reported in parentheses. Star-marked coefficients are statistically significant at the 1% level.

	(1) No. aff. funds	(2) % aff. funds	(3) Value aff. funds	(4) % value aff. funds
Forced to offering bank	–0.00	0.47	0.01	0.56
	(–0.16)	(0.85)	(0.14)	(1.04)
Forced to offering bank × D_{t+1}	0.65*	7.92*	1.43*	7.91*
	(13.62)	(12.72)	(13.86)	(12.75)
Forced to offering bank × D_{t+2}	0.88*	14.40*	2.46*	13.96*
	(11.42)	(12.27)	(13.64)	(12.02)
Forced to offering bank × D_{t+3}	1.12*	21.54*	3.40*	21.31*
	(13.58)	(14.97)	(16.17)	(14.74)
Forced to offering bank × D_{t+4}	1.29*	26.42*	4.03*	26.46*
	(14.86)	(16.48)	(17.59)	(16.37)
Observations	25,042	25,042	25,042	25,042
R-squared	0.11	0.09	0.11	0.09
Number of indiv.	5,214	5,214	5,214	5,214
Control variables	Yes	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	Yes

Risk aversion and trust in Table F

In addition to observable characteristics, such as gender, income, and passage of time, one might hypothesize that the shock of a bank failure itself influences people's (unobservable) risk aversion. For instance, investors might increase their risk aversion and reduce or terminate their fund investments altogether after the distress of having their bank go under. A related hypothesis is that a bank's failure might affect people's trust in the advice previously given by it. If people lose trust in the recommendations given by their failed banks, they might want to switch funds. It is difficult to distinguish between risk aversion and trust in the data, but we can test whether customers of failed banks are more likely to leave mutual funds altogether (the extensive margin) or to shift their investments to funds affiliated with their new banks (the intensive margin).

To evaluate the intensive and extensive margins, we make use of the fact that the bank mergers took different forms. Three of the six merged banks in our sample went bankrupt. These banks were initially taken over by the Danish Financial Resolution Authority before being sold to private commercial banks. The other three were sold in ordinary merger transactions. These banks were generally also challenged, but they managed to merge with others before going bankrupt. Table A in the internet appendix describes the details of the mergers. Customers of the three banks that merged in orderly ways with stronger banks had less distressed transitions to their new banks.[25] We compare the behavior of customers in banks that went fully bankrupt with that of customers in banks that were taken over by healthier banks.

Intensive margin

Table F shows the results of regressions that test whether customers of banks that went bankrupt had an even greater tendency to buy affiliated funds (the intensive margin). The regression equation is the same as in Eq. 1, but the sample now consists of treated individuals only. The treatment dummy picks out customers of the three banks that went bankrupt, and the control sample consists of customers of the other acquired banks. Columns 1 to 4 show results for the same outcome variables as in Table 4. We find that customers of banks that went bankrupt did not have a greater tendency to invest in funds affiliated with their new banks. For instance, column 4 of Table F shows that four years after the mergers, customers of failed banks had an 8.5 percentage-point lower fraction of funds affiliated with their new banks. This means that customers who supposedly experienced larger shocks to their risk aversion and trust (due to their banks going bankrupt) did not move larger fractions of their original fund investments into funds affiliated with their new banks.

Extensive margin

We conduct two tests of whether customers of failed banks have a higher tendency to sell their fund investments altogether after the failures of their banks (the extensive margin). First, in column 5 of Table F, we show results for the number of mutual funds held in total. Four years after the takeovers, there was no difference between customers of banks that went bankrupt and of banks that merged. That is, customers of failed banks did not hold fewer funds than customers of merged banks. Second, we estimate a probit model in which we investigate whether customers of bankrupt banks were more likely to sell all their fund investments. To save space, we have made these results available upon request. We find no significant difference between the customers of the three bankrupt banks and of the three banks that underwent less

[25] For instance, the Financial Resolution Authority is required to charge relatively high interest rates and fees so as not to expose private commercial banks to undue competition. This makes the transition more painful for customers of banks that are first taken over by the Resolution Authority and then eventually sold to private banks, than for customers of banks that directly merge with other private banks. Hence, the shock to trust and risk aversion might be larger for people in banks that take a detour through the Resolution Authority before being sold to other private banks.

distressed mergers. In conclusion, customers who experience more dramatic takeovers are not more likely to leave the fund market altogether after changing banks. As a result, the switch to funds affiliated with their new banks seems difficult to explain by bank-failure induced changes in the risk aversion or the trust of the treated customers.

Table F. Risk Aversion and Trust

The table shows estimates from regressions in which the dependent variable is the (1) number of affiliated funds, (2) fraction of funds in affiliated funds, (3) log-value of affiliated funds, (4) fraction of value in affiliated funds, or (5) number of funds in general. The *Forced to failed bank* variable takes the value 1 for fund holders who were forced into a new bank because their old one went bankrupt. The underlying control group consists of those who were forced to switch banks as a result of an ordinary merger transaction. The year of the bank switch is denoted *t*, and all regressions also include dummies $D_{t+1}, \ldots, D_{t+4}$, which take the value 1 in the respective post-switch period (estimates are not reported) and 0 otherwise. The control variables (age, gender, etc.) are defined in Table 2. Standard errors are clustered by individuals, and corresponding *t*-statistics are reported in parentheses. Star-marked coefficients are statistically significant at the 1% level.

	(1) No. aff. funds	(2) % aff. funds	(3) Value aff. funds	(4) % value aff funds.	(5) No. funds
Forced to failed bank	0.07*	1.97*	0.31	1.83*	–1.32*
	(9.92)	(10.16)	(10.88)	(9.59)	(–31.15)
Forced to failed bank × D_{t+1}	0.36*	2.87*	0.59*	3.02*	–0.12
	(12.46)	(5.93)	(7.37)	(6.13)	(–2.17)
Forced to failed bank × D_{t+2}	–0.21*	–5.63*	–2.08*	–6.11*	–0.42*
	(–5.25)	(–7.17)	(–16.75)	(–7.58)	(–5.49)
Forced to failed bank × D_{t+3}	–0.33*	–6.25*	–2.01*	–7.50*	–0.24*
	(–6.57)	(–6.54)	(–14.05)	(–7.66)	(–2.86)
Forced to failed bank × D_{t+4}	–0.10	–5.66*	–2.03*	–8.51*	0.15
	(–1.15)	(–3.37)	(–8.46)	(–5.02)	(1.21)
Observations	99,163	99,163	99,163	99,163	99,163
R-squared	0.19	0.20	0.27	0.21	0.08
Number of indiv.	18,856	18,856	18,856	18,856	18,856
Control variables	Yes	Yes	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	Yes	Yes

Table G. All Bank Switches

The table shows the magnitude of affiliated mutual fund holdings in terms of the (i) number of individuals, (ii) number of mutual funds, and (iii) value of mutual fund holdings. These statistics are summarized for individuals who owned at least one mutual fund (both before and after) and joined or left one of the six banks that offer affiliated mutual funds (cf. Table 1). To conserve space, we do not report years *t*–6, *t*–4, *t*–2, *t*+3, or *t*+5 in the table, but the complete pattern is summarized in Figure 7. The statistical significance of the difference is reported at the 1% level (star-marked*). The statistical differences in the numbers of individuals cannot be tested because there is no underlying distribution.

Panel A: Joining

	Relative to bank switch year *t*									Stat. diff.
	t–7	*t*–5	*t*–3	*t*–1	*t*	*t*+1	*t*+2	*t*+4	*t*+6	*t*–7 vs. *t*+6
Number of individuals										
Holding mutual funds	4,644	15,238	35,868	45,850	44,462	39,404	33,665	20,554	4,519	
Fraction of indiv. with funds with new bank	13.6%	15.1%	12.7%	17.3%	33.1%	42.4%	50.1%	58.2%	69.4%	
Number of holdings (conditional on holding any)										
Total	2.59	2.89	2.87	3.08	3.40	3.58	3.67	3.88	4.07	1.47*
Fraction of funds affiliated with new bank	9.8%	10.8%	9.3%	13.0%	26.0%	33.2%	38.3%	45.6%	56.6%	46.8%*
Avg. fraction aff. with neither old nor new bank	1.8%	1.9%	2.1%	2.1%	2.1%	2.1%	2.0%	2.0%	1.6%	–0.3%
Value of holdings (conditional on holding any)										
Total	341,893	377,995	355,034	347,926	356,193	364,411	365,715	410,521	393,219	51,326*
Fraction of value aff. with new bank	9.4%	10.4%	9.1%	12.7%	25.9%	33.5%	38.6%	46.3%	57.8%	48.5%*
Avg. fraction aff. with neither old nor new bank	1.7%	1.9%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	1.6%	–0.2%

Panel B: Leaving

	Relative to bank switch year *t*									Stat. diff.
	t–7	*t*–5	*t*–3	*t*–1	*t*	*t*+1	*t*+2	*t*+4	*t*+6	*t*–7 vs. *t*+6
Number of individuals										
Holding mutual funds	5,296	14,481	24,653	36,155	33,280	27,857	23,220	14,593	4,832	
Fraction of indiv. with funds with old bank	68.1%	71.4%	70.1%	66.2%	53.1%	46.0%	42.4%	36.1%	30.8%	
Number of holdings (conditional on holding any)										
Total	2.70	3.02	2.99	3.03	3.25	3.34	3.36	3.47	3.65	0.94*
Fraction of funds affiliated with old bank	58.3%	62.8%	61.6%	57.8%	44.5%	37.3%	33.8%	27.7%	22.0%	–36.3%*
Avg. fraction aff. with neither old nor new bank	1.2%	1.3%	1.4%	1.5%	1.6%	1.6%	1.7%	1.7%	1.7%	0.5%*
Value of holdings (conditional on holding any)										
Total	317,214	359,877	324,814	327,713	349,755	331,597	316,905	343,495	354,819	37,606
Fraction of value affiliated with old bank	56.0%	61.5%	60.3%	56.6%	43.7%	36.5%	33.0%	27.0%	21.4%	–34.6%*
Avg. fraction aff. with neither old nor new bank	1.1%	1.3%	1.4%	1.4%	1.6%	1.6%	1.6%	1.7%	1.7%	0.6%*