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Liquidity support and distress resilience in bank-affiliated mutual funds

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Abstract

Flows of funds run by banks or by firms that belong to the same financial group as a bank are less volatile and less sensitive to bad past performance. This enables bank-affiliated funds to better weather distress and to hold lower precautionary cash buffers in comparison with their unaffiliated peers. Banks provide liquidity support to distressed affiliated funds by buying shares of those funds that are experiencing large outflows. This, in turn, diminishes the severity of strategic complementarities in investors' redemptions. Liquidity support and other benefits of bank affiliation are conditional on the financial health of the parent company. Distress in the banking system spills over to the mutual fund sector via ownership links. Our research highlights substantial dependencies between the banking system and the asset management industry, and identifies an important channel via which financial stability risks depend on the organisational structure of the financial sector.

Keywords: Mutual funds, Bank affiliation, Redemptions
JEL codes: G2; G23; G3

Non-technical summary

The interconnectedness between banks and other financial intermediaries is a key area of concern for financial stability as it relates to the effectiveness of macro-prudential policies, which are often implemented in the realm of the tightly regulated banking sector. Due also to secular trends like population ageing and a persistent low interest rate environment, asset management companies, in particular investment funds, gained substantially in importance in the last decade. This development was particularly notable in Europe, where the sector was relatively less developed compared – for example – to the US financial sector. Of course, this heightened the concerns related to the stability of these financial intermediaries and the possible effects on the strength of the financial system as a whole.

In most countries – especially in continental Europe – asset management companies and their investment funds are often part of a bank holding company. This implies that banks can provide liquidity support to funds and mitigate excess volatility during periods of market stress in which funds are subject to sudden withdrawals. At the same time, this liquidity support might affect parent banks' resilience and lead to financial contagion.

This study investigates the liquidity support of parent banks to affiliated investment funds and the resulting spill-overs between these entities. In particular, the analysis shows that parent banks purchase shares of affiliated funds when the funds experience significant outflows, a novel channel of liquidity support that had not been previously investigated. Nevertheless, this liquidity support depends on the parent bank's financial health. Investment funds affiliated to financially solid parent banks maintain lower cash buffers while showing lower flows volatility. At the same time, distress in the banking system may spill over to the mutual fund sector via ownership links.

Overall, this research highlights substantial dependencies between the banking system and the asset management industry and shows that financial stability risks also depend on the organisational structure of the financial sector.

1 Introduction

The interconnectedness between banks and non-bank financial intermediaries is a key concern for financial stability and a major challenge for the effectiveness of macro-prudential policies, which are often implemented in the perimeter of tightly regulated financial institutions (European Central Bank, 2020). Due also to secular trends like population ageing and a persistent low interest rate environment, asset management companies, particularly investment funds, gained substantially in importance in the last decade (Financial Stability Board, 2020).

In most countries – especially in continental Europe – asset management companies and their investment funds are often part of a bank holding company (cf. Figure 2). Parent banks can therefore provide liquidity support to funds in their group to mitigate the excess volatility in affiliated funds' flows arising from periods of market distress and thereby contain funds' fragility (Franzoni and Giannetti, 2019; Fecht et al., 2020). At the same time, changes in parent banks' ability to provide liquidity support, or emerging doubts among investors concerning the banks' willingness to do so, can lead to excessive fund outflows, undermining the stability of investment funds.

In this paper, we empirically investigate the liquidity support of parent banks to their affiliated investment funds and the resulting spillovers between these entities. In particular, we document that parent banks purchase shares of their affiliated funds when the funds experience significant outflows – a novel channel of support from banks to funds not previously studied. However, liquidity support depends on the parent bank's financial health. Investment funds affiliated to financially solid parent banks maintain lower cash buffers while benefiting from lower flow volatility and muted performance sensitivity.

We leverage a comprehensive data set on the portfolio composition, performance, and flows of 30 thousand EU investment funds matched with the proprietary investment fund share holdings of the largest 26 EU banking groups on a security-by-security level for the period 2013Q4–2020Q1. We show that parent banks buy fund shares of their distressed affiliated funds on their own account. Specifically, when an affiliated fund experiences large net withdrawals from other investors, the parent bank buys fund shares to (partially) offset the liquidity outflow and contain the fund's need to liquidate parts of its portfolio. Since banks do not purchase shares of other distressed funds not affiliated to them, the observed investment behaviour of banks cannot be explained by a general contrarian trading strategy. This is a novel channel of support not previously identified in the literature.[1] Our results further show that affiliated funds' flows display lower volatility and lower sensitivity to negative performance, although these funds also hold lower precautionary cash buffers. This corroborates the view that the liquidity support from parent banks indeed attenuates negative complementarities in investors' redemptions.

Next, we show that the liquidity support depends on the parent banks' financial strength. When regressing affiliated funds' cash ratios on parent banks' health proxies, such as their

[1]Franzoni and Giannetti (2019) provide evidence suggesting that affiliated hedge funds obtain liquidity support, but they do not identify the channels. Fecht et al. (2020) show that German banks direct their clients' portfolios towards shares of distressed affiliated funds, but do not invest in these assets on their own account.

capital ratios and CDS spreads, we find that funds affiliated to less risky banks maintain a lower cash ratio, even when controlling for the fund's investment style. This is evidence of parent banks' health (positively) affecting their affiliated mutual funds. In line with this pattern, we find that well-capitalised and low-CDS-spread banks purchase more shares of their distressed affiliated funds.

Naturally, unobserved heterogeneity between bank-affiliated and unaffiliated investment funds might also explain the observed differences in the volatility of flows and in the flow-performance sensitivity. The COVID-19 crisis provides an opportunity to improve the identification of these differences and inspect the resilience of affiliated funds during an exogenous stress event. We show that bank-affiliated funds in March 2020 overall experienced lower outflows than comparable unaffiliated funds. However, funds whose shares were in the portfolio of riskier parent banks did not receive liquidity support – on the contrary, they were part of banks' deleveraging investment efforts. This highlights the limitations of the support provided by parent banks when they are themselves affected by a broad-based financial shock.

The COVID-19 shock was broad-based and affected the entire financial system. However, other shocks that impacted selected financial intermediaries represent ideal natural experiments to better identify the effect of the parent banks' support. We exploit two exogenous shocks to specific segments of the financial markets: the outcome of the Brexit referendum in June 2016 and unexpected distress in the market for Italian sovereign bonds in May 2018 caused by political uncertainty following national elections in Italy. Looking at these localised distress events allows us to distinguish affected banks and funds from entities not exposed to the shock. We find confirmation that, among funds highly exposed to UK financial securities and to Italian government bonds, bank-affiliated funds were insulated from investor withdrawals, provided that the parent bank was not exposed to the shock and was financially solid. Conversely, we also gather evidence that an increase in bank risk as a result of the exposure to Brexit and to the Italian sovereign was linked to outflows from funds affiliated to the distressed institution even when these funds did not hold a direct portfolio exposure to the affected assets. This finding highlights a novel channel of financial contagion between banks and affiliated funds via investor expectations on the basis of ownership links.

Our results have significant policy implications. They highlight an important mechanism that improves the resilience of bank-affiliated investment funds facing distress. At the same time, they show that liquidity support and investors' expectations of it crucially depend on the parent banks' financial health. These dependencies can lead to financial contagion between banks and the investment fund sector, especially in the case of large, systemic shocks. Thus, our findings contribute to the literature that explores how the interrelationships between the different business units of a financial conglomerate affect financial stability.

The rest of the paper is organised as follows. Section 2 reviews the related literature. Section 3 describes the data and the main variables used for the empirical analysis. Section 4 provides evidence of banks' liquidity support to affiliated funds via share purchases. Section 5 examines whether affiliated funds and their investor flows appear more stable than non-affiliated funds. Section 6 validates the evidence collected in the previous sections against the exogenous COVID-19 shock. Section 7 leverages the Brexit vote and the Italian sovereign distress shocks to further assess the channels of contagion between banks and funds. Section 8 concludes.

2 Related literature

Our paper is related and contributes to various strands of the literature on bank holding companies and mutual funds. First, it speaks to the research studying the relationship between flows and performance in mutual funds and strategic complementarities in fund investors' redemptions. Previous literature has highlighted the role of specific investors. In particular, Chen et al. (2010) show that investors in equity funds with illiquid assets (where complementarities are stronger) overreact to bad performance compared to investors in liquid equity funds. However, this pattern disappears in funds where the shareholder base is composed mostly of large investors, which are more likely to internalise the externalities of large redemptions. Goldstein et al. (2017) present similar findings for bond funds. Our results suggest that the presence of an external "investor of last resort" – such as the parent bank – which would internalise the cost of fund failure (e.g. reputational) similarly mitigates fund investors' first-mover advantage.

Second, our paper contributes to an emerging literature investigating how financial institutions direct investment from healthy business units to business units in financial distress. Our analysis confirms and complements the findings in Franzoni and Giannetti (2019). They show that, while financial-conglomerate-affiliated hedge funds perform worse than other hedge funds on average, they also have a lower flow-performance sensitivity, and this difference is particularly pronounced during financial turmoil. Our paper builds on similar findings, but it adds novel evidence under two main dimensions. First, we identify a novel channel via which bank affiliation makes funds more stable, namely banks' direct intervention to purchase shares of distressed funds. Second, we establish a clear link between the support provided by banks and their financial stability. In this respect, Fecht et al. (2020) also find direct evidence of liquidity support from banks to mutual funds. They show that banks use their distribution network to generate liquidity inflows from their clients into affiliated funds that otherwise experience excessive outflows. We complement this analysis and show that the reliance of funds on a safety net within the conglomerate may lead to financial contagion from the parent bank as shocks spill over to the conglomerate's asset management arm. Our results are also consistent with the findings in Sialm and Tham (2016), who show that the prior stock price performance of US parent companies is positively correlated with the flows of their affiliated mutual funds.

Other studies find evidence that funds derive benefits from their affiliation to a financial conglomerate. Fecht and Wedow (2014) give evidence that banks also provide liquidity support for their troubled open-end real estate funds that are under outflows pressure. Kacperczyk and Schnabl (2013) show that money market funds that were part of a financial conglomerate were more likely to receive direct support from their sponsors in the week after Lehman's bankruptcy. We confirm the existence of these support channels in bank holding companies; however, we also highlight their limitations, since parent banks intervene when they are not directly affected by the shock and when they are financially solid.

Our paper is also closely related to other recent studies investigating conflicts of interest in asset management firms that are part of a financial conglomerate and opportunistic behaviour of multi-unit bank holding companies that could damage affiliated investment funds. Funds could act as funding vehicles for their parent banks: Golez and Marin (2015) provide evidence that Spanish funds support the stock price of the parent bank, in particular after bad news and around seasoned equity offerings. Gil-Bazo et al. (2019) find that the same funds provide funding support to their parent company via purchases of bonds in the primary market, especially in times of financial stress and to riskier banks with limited access to funding. Additionally, affiliated funds could be used to redistribute risk from the parent bank to unleveraged investors: Bagattini et al. (2019) document that German banks benefited from the support of their mutual funds by shifting risky euro-area sovereign bonds from their portfolio during the sovereign debt crisis. In light of our analysis, we argue that these results do not necessarily imply that banks "abuse" their mutual funds. Most of the findings in this literature are consistent with bank holding companies using their different entities to achieve a mutual liquidity insurance, which could have desirable effects from a financial stability point of view.

Beyond direct liquidity and funding support, other linkages between banks and affiliated funds were uncovered by previous studies. Fund managers have been found to support the parent bank's lending business by steering their investment policy towards stocks of the bank's clients (Ferreira et al. (2018)) and by overpaying for bank-underwritten IPOs (Ber et al. (2001)), at the expense of the investors in the fund. Other authors show that close ties between asset managers and financial institutions can benefit fund investors. Massa and Rehman (2008) offer evidence that bank-affiliated mutual funds benefit from private information obtained by the controlling bank in its lending business with the respective firm. Mola and Guidolin (2009) find that brokerage analysts are likely to assign favourable ratings to stocks that are included in the portfolios of mutual funds to which they are affiliated. While we do not specifically address these issues, all these factors may reinforce the linkages between parent banks and affiliated funds, increasing incentives to provide liquidity support.

Finally, several papers study how liquidity insurance within asset management firms and the optimisation of performance at the firm level can generate distortions in delegated asset management and lead to a redistribution of wealth across mutual fund investors. Gaspar et al. (2006) and Eisele et al. (2020) show that mutual fund families strategically reallocate performance among sibling funds to increase overall family profits. Bhattacharya et al. (2013) find evidence for liquidity insurance within mutual fund families which appears to benefit both the investment firm and the investors of funds suffering liquidity withdrawals, at the expense of the shareholders of the liquidity-supplying funds. The support channels that we uncover in this study may similarly entail redistributive effects between bank and fund investors.

3 Data and sample construction

For our empirical analysis, we use two key data sets: the first is from the Eurosystem securities holdings statistics by banking group (SHSG) and reports the proprietary security holdings of the 26 largest banking groups operating in the euro area. The second data set comprises information on balance sheet and securities holdings for open-end mutual funds domiciled in the EU from Refinitiv Lipper.

The *first sample* we construct focuses on banks' holdings of mutual funds' shares. The data set for the securities holdings statistics lists the quarterly holdings of banks on a security-by-security basis for the period 2013Q4 to 2020Q1. For our analysis, we keep instruments classified as investment fund shares (instrument ESA classification F511), which include mutual funds, ETFs and (in minor part) other fund types, such as private equity funds and hedge funds. As our analysis focuses on mutual funds, we use the ECB's investment fund statistics and Lipper to identify the fund type and keep only mutual funds, while dropping ETFs and other fund types. Then, we use a hand-collected matching list to match banks to their affiliated asset management companies and, ultimately, to the asset management companies' mutual funds. We consider as affiliated those asset management companies that are wholly owned or majority-owned by a bank. In doing so, we also take into account changes in the ownership structure of asset management companies that occurred during the sample period. Panel A of Table 2 shows the resulting statistics for each banking group in our sample.

In total, the 26 banks held 25,490 different investment fund share classes (identified by their ISIN) over the sample period. We match the bank holdings on a security-quarter basis with fund data from Lipper, such as size, flows, performance and cash holdings. We find that 87% of the funds are covered in Lipper (although additional reporting gaps occasionally occur for single attributes) and keep a final 15,788 ISIN identified as mutual funds. Panel B of Table 2 presents summary statistics for banks' portfolios of mutual funds. Although these holdings amount to less than €1 billion per bank on average, they represent a significant investment for some banks (in 5% of the cases, their market value exceeds one-tenth of the bank's CET1 capital). A large part of the holdings is in affiliated funds: Figure 1 shows that, overall, the market value of shares of affiliated funds held by the parent banks is similar to the market value of all other mutual fund shares in the portfolio of the 26 banking groups.

We are interested in identifying fund flows (i.e. share redemptions and purchases) generated by banks in our sample and distinguishing them from flows ascribable to all other investors. First of all, net flows at the fund share class level over a quarter are provided by Lipper based on the following formula, which uses the evolution of a fund's total net assets (TNA) while netting out the assets' return:

$$\text{Share-class flows}_{kt} = \text{TNA}_{kt} - \text{TNA}_{kt-1} \times (1 + R_{kt}) \tag{1}$$

where k denotes the fund share, t denotes the quarter, and R_{kt} is the return of the fund's portfolio in period t. Typically, in a mutual fund offering multiple share classes, share withdrawals and purchases across different share classes are pooled together and netted, after which the manager purchases or sells the necessary amount of securities to meet investor flows. As a consequence, our variable of interest is percent flows at the fund level. We calculate this quantity via the following formula:

$$\text{Fund flows}_{jt} = \left(\sum_{k=1}^{K_j} \text{Share-class flows}_{kt} \Bigg/ \sum_{k=1}^{K_j} \text{TNA}_{kt-1} \right) \times 100, \tag{2}$$

where total net flows are summed over all share classes $k \in \{1, \dots, K_j\}$ belonging to fund j, and scaled by the fund's aggregate assets over all share classes.[2]

To construct the fund flows generated by the trade of a single bank, we calculate the quarter-on-quarter changes in the market value of the fund shares held by the bank that are due to share sales or purchases:

$$\text{Bank trade}_{ijt} = \sum_{k=1}^{K_j} \left(\frac{\text{Market Value Held}_{ikt} - \text{Market Value Held}_{ikt-1} \times (1 + R_{kt})}{\sum_{k=1}^{K_j} \text{TNA}_{kt-1}} \right) \times 100 \tag{3}$$

where R_{kt} is fund share k's net return provided by Lipper, and each of the ratios in parentheses represents the percent flows generated by bank i by buying or selling fund share k. In this way, we obtain a quantity with the same unit of measure as the fund flows computed in (2), with the difference that the percent flows in formula (3) are those generated by a single investor (bank i) trading fund j.[3]

Finally, as in Bhattacharya et al. (2013), we aggregate at the fund level all flows generated by bank trades in our sample to obtain our last key variable, i.e. fund flows generated by outside investors:

$$\text{Non-bank flows}_{jt} = \text{Fund flows}_{jt} - \sum_{i=1}^{26} \text{Bank trade}_{ijt}. \tag{4}$$

Computing the flows from outside investors by deducting the flows from each bank $i \in \{1, \dots, 26\}$ from the total flows allows us to obtain a variable dependent on fund j and quarter t, but independent of bank i. Exogeneity with respect to the sample of bank holdings is key to identifying the effect of *Non-bank flows* on the investment decisions of different banks.

Table 3 presents the summary statistics for all variables in our sample. Panel A presents the summary statistics for bank holdings. The contribution to fund flows stemming from banks' trades is null in approximately two-thirds of the observations, reflecting periods when banks do not adjust their holdings. However, in around 5% of the observations, banks execute sizeable trades that generate flows amounting to over 1% of the fund's total assets under management. The mutual funds in banks' portfolios affiliated to the holding bank make up 17% of the observations. Given that, conversely, affiliated funds outweigh other

[2] After this step, we drop any observation where the resulting percent flow is greater than 200% or less than −60%. Flows of that size are rare and are typically related to structural changes in the fund, e.g. mergers (cf. Coval and Stafford (2007)).

[3] To temper the effect of outliers, micro-funds, and possible inconsistencies between the market values provided by Lipper and those reported in the SHSG, we execute several data cleaning steps: we drop observations when the market value held by a bank exceeds the aggregate fund value and when the aggregate fund value is lower than €5 million, and we winsorise *Bank trade* and *Non-bank flows* at values of the variables of ±30%.

funds in market value terms (cf. Figure 1), it follows that bank holdings of affiliated funds tend to be larger. On average, across the sample, banks own shares amounting to 1.9% of a mutual fund's value.

The *second sample*, described in Panel B of Table 3, focuses on mutual funds domiciled in the EU and is drawn from Lipper at a monthly frequency, subsequently aggregating different share classes into a single fund. We collect time-invariant fund attributes, such as asset type, investment style, client type (institutional or retail), and management company, as well as time-varying characteristics at a monthly frequency, such as portfolio allocations, size, performance, and flows.

Lipper also lists the ultimate parent of a fund's management company. However, this attribute is static and is sometimes inaccurate. Therefore, we manually validate this information by researching possible changes in ownership during the sample period in holding companies' accounts, management companies' websites and financial news outlets. To be able to do this, we limit our search to those parent companies (as provided by Lipper) that, for at least one month, are associated to at least 20 mutual funds or exceed €5 billion in TNA.

The resulting sample covers 85% of the mutual funds registered in Lipper and 95% of their TNA. We drop closed-end mutual funds, funds that track an index and private funds, as well as real estate and commodities funds, and we are left with a sample of 31,903 primary mutual funds. Then, we also drop 2,056 small funds with TNA under €5 million. Our final sample is composed of 33% equity funds, 31% mixed-asset funds, and 26% bond funds. 6% are alternative assets funds and 4% money market funds (see Table 3). The funds' assets under management vary between €4.8 trillion in January 2014 and €7.6 trillion in March 2020.

Figure 2 shows that affiliated funds make up the better part of Europe's open-end mutual funds industry. They represent between 57% and 65% of the total and hold over half of the aggregate TNA. Our sample contains funds domiciled in 25 countries (all the EU28 countries except Croatia, Bulgaria and Romania). Overall, more than one-third of the funds are domiciled in Luxembourg, 12% in France, followed by Great Britain, Spain, and Ireland. Figure 3 shows that, also in terms of assets under management, Luxembourg is home to the largest share of both affiliated and unaffiliated funds. As Luxembourg-domiciled funds are owned mainly by foreign asset management companies or by Luxembourgian subsidiaries created ad-hoc, the picture changes when we look at the nationality of the funds' ultimate parents. As it emerges from Figure 4, the US are among the most important countries that host financial corporations owning EU mutual funds. With respect to banking conglomerates, the relative majority of funds by TNA is ultimately ascribable to French holding companies, followed in the EU by German and Italian. Switzerland also plays a relevant role, hosting some universal banks and banks focusing on private wealth management that lead sizeable asset management businesses.

We have securities holdings information only for some parent banks in this larger sample of EU funds. Therefore, instead of looking for direct evidence of liquidity support to affiliated mutual funds, we study the effect of bank affiliation on the overall behaviour of fund investors, which is reflected in fund flows and funds' management of cash buffers. For funds affiliated to a euro-area bank, we also examine the influence of the parent bank's financial health and portfolio composition. To this end, we merge a subsample of the data from bank-affiliated funds with key items from their ultimate parent's balance sheet, drawn from the COREP and FINREP datasets (supervisory templates) of euro-area significant institutions (SIs) and less significant institutions (LSIs). In particular, we use banks' capital and liquidity ratios and on-balance-sheet exposure to specific countries relative to total assets. We match between 40% (liquidity coverage ratio) and 59% (capital ratio) of the observations in our sample of affiliated funds. Finally, we retrieve CDS spreads from Refinitiv's Eikon for all banks in our sample, whenever available, matching 51% of bank-affiliated funds.[4] As a result, over 70% of the affiliated funds are matched to at least one of the three measures of parent bank solidity (capital, liquidity and CDS spread).

The raw data at the share class level also contain a variable indicating whether the fund is open to retail investors or dedicated to institutional investors, with the latter being the case in approximately one-fourth of the observations. In our data at the fund level, we collapse this variable into a value-weighted average, representing the fraction of fund assets owned by institutional investors.

Panel B of Table 3 presents summary statistics for the sample of EU funds, broken down into affiliated and unaffiliated. Affiliated funds are smaller (median TNA of €71 million versus €94 million) and cater to a lower proportion of institutional investors (on average, 16% of TNA versus 24%). Affiliated funds tend to have slightly lower fees, but they also appear to underperform compared to unaffiliated funds both in terms of raw returns and in terms of risk-adjusted returns (Jensen's alpha). However, as both return measures also display a lower standard deviation in affiliated funds, their underperformance might be due to unaffiliated funds being riskier or differentiating their investment strategy to a greater extent from the provided benchmark.

Our two samples allow two sets of distinct but complementary analyses. Thanks to the bank holdings sample, we provide robust evidence of a new support channel that banks use to provide a liquidity backstop to affiliated funds. The larger, higher-frequency panel of fund data allows us to pin down differences between bank-affiliated funds and their unaffiliated peers that derive from banks' support.

4 Banks' liquidity support to affiliated funds

In times of extreme or unexpected outflows, parent banks can defuse risks of a fund run if they step in and provide liquidity to affiliated funds, preventing them from depleting their cash buffers, decreasing the quality of their asset portfolio and incurring high liquidation costs. Banks' incentives may arise from reputational risks, a mutual liquidity insurance scheme, and expected losses they would internalise if they already hold a stake in the fund. We search for evidence of banks' liquidity support to affiliated funds in the form of direct purchase of funds' shares.[5] In order to do this, we explore banks' investment patterns leveraging our sample of banks' securities holdings.

[4] We use CDS with a 5-year tenor, as these are usually the most liquid contracts.

[5] In principle, banks have at least two other ways to support their affiliated funds: first, they may provide liquidity via lending, for example in the form of repurchase agreements; second, they may buy illiquid

We construct the fund flows (in other words, trades in fund shares) originating from banks and from all other investors as in expressions (3) and (4).[6] First, we study whether banks put in place a backstop for affiliated funds when these have to meet large outflows. One challenge to identifying these mechanisms is that the banks in our sample might purchase distressed funds because they are contrarian investors or because they act as market makers. We account for these effects via a panel fixed-effects specification that allows us to control for observed and unobserved time-varying heterogeneity across banks and funds using bank-quarter and fund-quarter fixed effects. To identify whether outflow pressure in affiliated funds leads the parent bank to provide liquidity by purchasing shares, we estimate the following regression model:

$$\begin{aligned}&\text{Bank trade}_{ijt} = \beta_1 \cdot \text{Non-bank flows}_{jt} \times \text{Affiliated}_{ijt} + \\ &+ \beta_2 \cdot \text{Non-bank flows}_{jt} \times \text{Is Outflow}_{jt} \times \text{Affiliated}_{ijt} + \alpha_{it} + \gamma_{jt},\end{aligned} \tag{5}$$

with

$$\text{Affiliated}_{ijt} = \begin{cases} 1 & \text{if fund } j \text{ is affiliated to bank } i \text{ at date } t, \\ 0 & \text{otherwise.} \end{cases}$$

Is Outflow$_{jt}$ is a dummy that is equal to 1 if *Non-bank flows*$_{jt}$ is negative, and 0 otherwise, while γ_{jt} and α_{it} are, respectively, fund-quarter fixed effects and bank-quarter fixed effects.

Table 4 shows the results of our analysis based on specification (5). In columns (1) to (3), we estimate model (5) with an increasingly comprehensive set of fixed effects. Columns (1) and (2) show that, generally, there is a negative correlation between the investment decisions of the banks in our sample and the trades of the rest of the fund investors when these non-bank-investors are redeeming shares (coefficient of -0.009 for *Non-bank flows*$\times$*Is Outflow*). However, banks' contrarian behaviour when the fund is experiencing outflows is by far more marked for funds affiliated to the bank: in this case, there is a strongly significant additional negative correlation (coefficients -0.055 and -0.053 of *Non-bank flows*$\times$*Is Outflow*$\times$*Affiliated*). Hence, banks specifically react to outflows in affiliated funds by purchasing more fund shares, thereby decreasing net outflows. The effect is economically significant. The trade of a single bank offsets 5% of its affiliated funds' outflows, on top of its contrarian trading behaviour involving both affiliated and unaffiliated fund shares.

When we saturate the regression with fund-specific time-varying fixed effects, banks' contrarian trades are estimated to be smaller (coefficient of -0.033 in column (3), significant at the 10% level). However, in this restrictive estimation, the sample size is reduced by more than half. This is because the overlap between different banks' portfolios of mutual funds is limited: a fund share is often held by only one bank in our sample. Thus, when we control for fund-quarter fixed effects, a large part of the bank holdings do not contribute to the estimation.

Our initial assessment disregards the constraints that banks face when expanding their

securities that the fund manager intends to liquidate. As we focus on just one of the possible channels, our results provide a lower bound for banks' liquidity support to affiliated funds.

[6] As explained in Section 3, we do this by aggregating purchases and sales of different share classes of the same fund. Given that net flows at the fund level determine whether the fund manager has to liquidate or purchase assets, it is reasonable to expect a bank's decision to provide liquidity support to depend on aggregate fund outflows rather than outflows from a single share class.

investment portfolios by purchasing fund shares to alleviate funds' liquidity shocks. Banks perceived as risky by investors might be more monitored and might find it more costly to increase balance-sheet exposures. Banks' actions are also likely to be constrained by their available capital.[7] Lastly, banks' ability to intervene and contain fund outflows might rest on their available liquidity, as they can more easily purchase additional fund shares by using their available liquidity than by liquidating part of their securities portfolio. To investigate whether these factors affect banks' propensity to provide liquidity support to affiliated funds, we include them in regression (5).

First, we introduce a binary variable for banks with a high CDS spread, which proxies the market's perception of a bank's riskiness. This is equal to 1 if the bank's CDS spread at the end of the previous quarter is in the top quartile of the sample and 0 otherwise. Interacting all the regressors with this dummy allows us to estimate the trading behaviour of riskier banks compared to other banks. The results are reported in column (4) of Table 4. Although not statistically significant, the positive offsetting coefficient for the four-way interaction *Non-bank flows*×*Is Outflow*×*Affiliated*×*High CDS* suggests that banks with a high CDS, differently from the others, do not react to outflows in affiliated funds. Next, we examine whether more convincing evidence emerges when looking at trades of banks that are particularly fragile in terms of capitalisation. We identify via a dummy variable "Low capital" the bottom 25% of observations in the sample of holdings ordered by the banks' total capital ratio at the end of the previous quarter.[8] The estimation shows that the investment choices of worse-capitalised banks are markedly different. For better-capitalised banks, a strong contrarian trading reaction ($\beta = -0.048$, $p < 0.05$) persists in response to outflows in affiliated funds even in the most restrictive specification with time-varying bank and fund fixed effects (column (5)). This effect is absent for low-capital banks ($\beta = 0.055$ on *Non-bank flows*×*Is Outflow*×*Affiliated*×*Low cap*, $p < 0.05$). We also study whether a high ratio of illiquid exposures constrains a bank's ability to provide liquidity to affiliated funds. To check this conjecture, in column (6) we introduce a dummy variable which identifies the bottom 25% of observations in the sample of holdings ordered by the bank's liquidity coverage ratio at the end of the previous quarter.[9] Indeed, there is a clear difference between banks with a lower share of liquid assets and other banks. While other banks offset on average 8% of their affiliated funds' outflows, banks with lower liquidity ratios do not do so (offsetting coefficient of 0.102 on *Non-bank flows*×*Is Outflow*×*Affiliated*×*Low liq*).

Finally, to further investigate banks' motives, we address the question of whether banks tend to provide liquidity support in the wake of a systematic shock to their asset management business or, rather, when distress is limited to a fund or sector without affecting all funds affiliated to the bank. In order to do this, we compute the aggregate flows for each bank's affiliated funds (including those not in the bank's portfolio). We define a systematic shock

[7] Investing in mutual funds likely causes an increase in the bank's risk-weighted assets (unless it is matched by a corresponding divestment from similar assets), thereby driving down regulatory capital ratios. This may force the bank to set aside more equity to prevent a capital shortfall. Hence, a low regulatory capital ratio is more likely to represent a binding constraint in banks' strategic decisions to provide liquidity support to distressed affiliated funds.

[8] This variable is not merely a substitute of the variable "High CDS": first, the two variables are positively but not perfectly correlated ($\rho = 36\%$); second, the capital ratio is available for more observations in the sample than the CDS spread.

[9] The correlation of this variable with the low capital ratio dummy is 29%; with the high CDS dummy it is even negative, at -15%.

to the bank's asset management business when aggregate affiliated fund flows are negative. Column (7) of Table 4 shows that banks' trades of fund shares do not significantly differ when there is no systematic distress and when most of the banks' funds are experiencing outflows (all interaction terms with *Sys. shock* are insignificant).

To delve deeper into the patterns of liquidity support, we also investigate whether parent banks' intervention in the market is stronger when affiliated funds are experiencing extreme outflows. To this end, we consider only trades which respond to fund outflows ($\textit{Is Outflow}_{jt} = 1$), and estimate the following regression:

$$\text{Bank trade}_{ijt} = \beta_1 \cdot \text{Affiliated}_{ijt} + \beta_2 \cdot \text{Distress}_{jt} \times \text{Affiliated}_{ijt} + \alpha_{it} + \gamma_{jt}. \tag{6}$$

We define distress at fund j in quarter t as

$$\text{Distress}_{jt} = \begin{cases} 1 & \text{if Non-bank flows}_{jt} < \mathcal{Q}(5\%) = -16.5\%, \\ 0 & \text{otherwise,} \end{cases}$$

where $\mathcal{Q}$ is the quantile function associated to the variable *Non-bank flows*. In other words, $\textit{Distress}_{jt}$ marks the 5%-tail of the distribution of flows where non-bank investors of fund j withdraw more than 16.5% of TNA during quarter t.

Testing specification (6) restricted only on the sample of fund outflows allows us to study whether banks' contrarian behaviour in trading affiliated funds' shares, which emerged from regression (5), depends on the severity of fund outflows. Columns (1)-(3) of Table 5 report the results of the regression with different sets of fixed effects. On average, if a fund is experiencing extreme outflows ($\textit{Distress} = 1$, outflows larger than -16.5%), its parent bank is responsible for an inflow of 1.6% (coefficient of $\textit{Distress}\times\textit{Affiliated}$ in column (1)), which decreases to 1.46% when we control for bank-time fixed effects (column (2)), and to 0.45% when further adding fund-time fixed effects (column (3), $p < 0.1$). However, the economic and statistical significance of the results in the last restrictive specification clearly increases if the estimation excludes riskier, less capitalised or less liquid banks by adding a distinct set of coefficients for these banks (resp. in columns (4), (5) and (6)). Finally, we look at the effect of generalised distress at the banks' mutual funds. Column (7) shows that – as for the results shown in Table 4 – there is no significant effect of a systematic shock on liquidity support.

To conclude, the analysis in this section suggests that banks provide a liquidity backstop to affiliated funds experiencing abnormal outflows. This pattern is confirmed even in the smaller sample where we compare a parent bank's reaction to distress at one of its funds directly with the reaction of another bank for the same fund. However, riskier, less capitalised and less liquid parent banks do not act countercyclically with respect to outflows of affiliated funds. This result reveals that the solidity of the parent bank is a crucial factor in determining its ability to support distressed affiliated funds.

5 Does bank affiliation affect funds' stability?

Potential liquidity support from their parent bank may benefit mutual funds belonging to banking conglomerates beyond the direct effect of the support. Specifically, the liquidity insurance put in place by banks may attenuate affiliated fund investors' incentive to front-run their peers when they foresee possible distress, with favourable implications for these funds' stability. We test this hypothesis on our comprehensive sample of affiliated and unaffiliated funds.

The propensity of fund investors to swiftly react to signals is reflected in the sensitivity of fund flows to performance. Mutual funds tend to experience outflows if they performed poorly in recent periods. If parent banks act as stabilisers of their funds in bad times, attenuating the first-mover advantage in redemptions, we expect the effect of bad performance on flows to be more moderate in affiliated funds.

Previous literature highlights important differences between the behaviour of retail and institutional investors in this context (see e.g. Goldstein et al. (2017)). While institutional investors are more sensitive to underperformance (possibly as a result of increased monitoring), they are less sensitive to the composition of the fund's portfolio. In order to disentangle the effect of bank affiliation from that of institutional investors, in this section we exclude funds predominantly held by institutional investors.[10]

We test our conjecture via the following regression:

$$\begin{aligned}\text{Fund flows}_{jt} = {} & \beta_1 \cdot \text{Alpha}_{j,t-1} \times \mathbb{1}_{\text{Alpha}_{j,t-1}>0} + \beta_2 \cdot \text{Alpha}_{j,t-1} \times \mathbb{1}_{\text{Alpha}_{j,t-1}<0} \\ & + \beta_3 \cdot \text{Alpha}_{j,t-1} \times \mathbb{1}_{\text{Alpha}_{j,t-1}>0} \times \text{Affiliated}_{jt} + \\ & \beta_4 \cdot \text{Alpha}_{j,t-1} \times \mathbb{1}_{\text{Alpha}_{j,t-1}<0} \times \text{Affiliated}_{jt} + Controls_{jt} + \gamma_{ft},\end{aligned} \tag{7}$$

where $Alpha_{j,t-1}$ is fund j's "alpha" over months $t-6$ to $t-1$ calculated via a one-factor model that uses as a benchmark the fund's Lipper Global classification group, and γ_{ft} represents sets of dummies for each combination of month t and fund style f. We define the fund style as a set of three characteristics: asset type, geographical focus and classification group. Including these fixed effects allows us to benchmark the sensitivity of flows on a sample of similar funds in terms of asset composition and investment objective. Time-varying fund controls include the logarithm of the fund's TNAs, the total expense ratio, the age of the fund and the TNA-weighted average of institutional share classes.

In model (7), the coefficients β_1 and β_2 are expected to be positive, as investor demand for a fund typically increases following good performance and decreases following bad performance. The coefficients β_3 and β_4 measure whether the sensitivity of flows to performance is different in bank-affiliated funds.

Columns (1) and (2) of Table 6 present the results of the estimation on the full sample, with resp. month fixed effects and month-fund style fixed effects. In line with the evidence in previous literature on mutual fund flows, past performance, as measured by the fund's

[10] We identify these funds via share classes marked as exclusively institutional. The fraction of TNA attributed to these share classes out of the fund's overall TNA provides a lower bound for the proportion of TNA held by institutional investors. We drop funds where these share classes account for more than 50% of the fund's TNA (amounting to 19% of the original observations).

alpha over the previous six-month period, is a strong predictor of fund flows regardless of its sign (coefficients of *Alpha* interacted with sign dummies). The reaction to negative performance is slightly larger than to positive performance and is economically significant: in column (2), one standard deviation lower alpha translates into 0.58 percentage points larger monthly outflows. However, in the case of bank-affiliated funds, the sensitivity to negative performance decreases by 38% (the estimated coefficient of 0.24 common to all funds is offset by a coefficient of -0.09 for affiliated funds). We also observe a smaller but significant reduction in flow sensitivity following positive performance (24% lower, from 0.21 to 0.16).

This first estimation disregards substantial heterogeneity between funds that might affect the flow-performance relationship.[11] In particular, funds' illiquidity has been shown to aggravate the first-mover advantage, thereby increasing the sensitivity of flows to underperformance (Chen et al. (2010) and Goldstein et al. (2017)). In this respect, bond funds – which are typically less liquid than funds investing in stocks or in the money market – may be particularly fragile. At the same time, this channel should be muted when investors' actions are not conditioned by strategic complementarities, i.e. in affiliated funds. We test this conjecture by estimating regression (7) separately on the sample of bond funds. The results in columns (3) and (4) of Table 6 show that the flow-performance sensitivity for unaffiliated funds is considerably higher in bond funds than in the full sample (0.36 versus 0.21 for outperformance and 0.28 versus 0.24 for underperformance). This finding is consistent with existing evidence that retail investors in illiquid funds tend to be more sensitive to past performance. However, as regards affiliated funds, it appears that the lower sensitivity to negative performance identified in the full sample is magnified when looking at bond funds (opposing negative coefficient of -0.16 in the estimation with fund style fixed effects, or a 57% decrease compared with the baseline coefficient of 0.28). Figure 5 displays the different flow-performance relationships estimated for affiliated and unaffiliated bond funds.

In summary, the analysis of model (7) yields two main insights. First, investors of bank-affiliated funds seem less inclined to run for the exit following underperformance. Second, while for unaffiliated funds we confirm past evidence that the fund assets' illiquidity exacerbates outflows, this aspect does not seem to matter for bank-affiliated funds: flows at these funds react to underperformance similarly in the full sample and in bond funds (net coefficients of 0.15 and 0.12 respectively).

A further characteristic of affiliated funds may be an overall lower volatility of investor flows. A low volatility of flows is desirable for fund managers because it reduces the optimal precautionary cash buffer they have to hold to meet unexpected outflows. Affiliated funds' flows may be less volatile for two reasons: first, the parent bank's liquidity support may smooth net flows via share purchases when other investors are selling; second, investors may buy and sell funds' shares less frequently in the first place, absent a first-mover advantage which exacerbates market movements. We estimate the effect of bank affiliation on flow

[11] For example, Goldstein et al. (2017) document a concave flow-performance relationship in corporate bond funds (outflows are more sensitive to underperformance than inflows to outperformance). In contrast, this relationship was frequently found to be convex in equity funds.

volatility via the following model:

$$\sigma(\text{Flows})_{jt} = \beta_1 \cdot \text{Affiliated}_{j,t-12} + \beta_2 \cdot \sigma(\text{Return})_{jt} + Controls_{j,t-12} + \gamma_{ft}, \tag{8}$$

where the standard deviation of monthly flows is computed over the 12 months to month t and the standard deviation of monthly fund returns over months $t-12$ to $t-1$. We control for the standard deviation of fund returns because, as flows react to performance, we expect a more volatile return to lead to more volatile flows.

Table 7 presents the results of the estimation of regression (8). In column (1), we start by including only month fixed effects. As expected, we find evidence that funds with more volatile performance have more volatile flows ($\beta_2 = 0.17$, $p < 0.01$). In addition, flows of affiliated funds are markedly less volatile ($\beta_1 = -0.28$, $p < 0.01$). Time-varying fund style fixed effects only partly explain this difference ($\beta_1 = -0.13$ in column (2), $p < 0.01$). In both specifications, a high share of institutional investors is also associated with more volatile flows. Flows of bigger, more expensive and older funds instead fluctuate less.

In column (3), we add fund fixed effects to the estimation. This allows us to identify the effect of affiliation specifically for those funds whose affiliation status changed over the sample period. In other words, we look at whether a *change in ownership* of a mutual fund impacts the variability of its flows. The effect of becoming bank-affiliated (resp. unaffiliated) is estimated to be stronger than before and statistically significant and decreases (resp. increases) the volatility of fund flows by 0.35, or 10% of the sample mean, in the estimation with month-fund style and fund fixed effects. In this within-fund estimation, the volatility of performance does not significantly impact the volatility of flows. Column (4) shows that, on the sample of bond funds, the effect of a change in affiliation more than doubles (-0.75, or 18% of the sample mean).

Finally, we study affiliated funds' holdings of cash and cash equivalents. Cash buffers address unexpected outflows, but they involve an opportunity cost as fund managers forgo profitable investments.[12] Affiliated funds may be able to set their precautionary cash buffer at a lower level because they can potentially rely both on less volatile flows (as shown in Table 7) and on emergency sources of liquidity from their parent bank, such as repos at favourable prices. We test this hypothesis by using funds' cash holdings as a dependent variable in the following regression:[13]

$$\text{Cash}_{jt} = \beta \cdot \text{Affiliated}_{jt} + Controls_{jt} + \gamma_{ft}, \tag{9}$$

where $Cash_{jt}$ is the level of cash the fund holds in percent of total assets at the end of month t. Fund controls include the volatility of monthly fund flows $\sigma(\textit{Fund flows})_{jt}$, computed over months $t-11$ to t, the contemporaneous flows, as well as the log of fund TNA and age, the total expense ratio, institutional ownership and six-month alpha.

[12] Asset managers appear to actively manage their liquidity risks with precautionary cash buffers in view of possible idiosyncratic or systematic outflow pressure. IMF (2015) finds that funds hold higher cash buffers when they face more volatile flows from investors (in line with a precautionary motive) and when these investors are primarily (less stable) retail investors.

[13] For this estimation we exclude money market funds as these funds hold mostly liquid assets and cash-like assets customarily as part of their investment strategy.

Table 8 presents the results of the estimation. The coefficients in column (1) show that unaffiliated funds allocate to cash 0.6% of their portfolio in excess of the holdings of comparable affiliated funds, which is significant given that affiliated funds hold on average 5.7% of their portfolio in cash. The volatility of fund flows during the previous year is positively related to cash holdings. Furthermore, larger, cheaper, and older funds tend to hold less cash.

Another way of assessing the effect of bank affiliation on funds' capacity to reduce their cash holdings while assuaging the concern that this is due to differences in portfolio composition is to perform a within-fund estimation. To this end, we exploit those funds whose company's structure changed as a consequence of a merger or an acquisition. This allows us to study how becoming bank-affiliated changes the fund's liquidity management strategy. In column (2), we do this by testing regression (9) with fund fixed effects. The estimation reveals that, after being acquired by a bank holding company or by a financial conglomerate that includes a bank, funds decrease their cash buffer by 0.7 percentage points on average.

In further tests, we repeat regression (9) on bond funds. While different affiliated and unaffiliated bond funds seem to hold a similar level of cash (column (3)), those bond funds which become affiliated (resp. unaffiliated) decrease (resp. increase) their cash holdings by 1.28% ($p < 0.06$, column (4)).

As affiliated funds' ability to hold lower cash buffers may depend on the availability of direct liquidity support from their parent bank, it is natural to test whether funds' cash allocation is affected by the bank's balance-sheet strength. Restricting the sample to bank-affiliated funds, we estimate the following regression:

$$\text{Cash}_{jt} = \beta \cdot \text{Low capital}_{j,t-1} + Controls_{jt} + \gamma_{ft}, \tag{10}$$

where *Low capital* equals 1 if the parent bank's total capital ratio is below 15% – the 25th percentile in this sample. Columns (5) and (6) of Table 8 show that a lower-capitalised parent bank (*Low capital* = 1) corresponds to a 1.5% higher cash buffer in bank-affiliated funds and a 2.6% higher cash buffer in bond funds. Hence, while model (9) showed that the average bond fund does not benefit from affiliation by retaining lower cash holdings, model (10) reveals a marked heterogeneity depending on the parent bank's balance-sheet position. Cash holdings in affiliated funds also markedly depend on the volatility of flows, especially in bond funds (coefficient of 0.22 on $\sigma(Flows)$, compared to 0.12 for all affiliated funds and 0.08 in the full sample).

Finally, we reproduce the results of regression (10) replacing the capital dummy with a high CDS spread dummy.[14] Testing regression (10) with the CDS spread yields evidence that bond funds of banks that are considered to be less risky (CDS spread not in the upper quartile) keep lower cash holdings by 0.9 percentage points (columns (7)). This difference increases to 1.6 percentage points if we restrict the estimation to bond funds (column (8)).[15]

[14] The CDS spread is arguably a better measure of investors' perception of the financial strength of a bank because it captures expectations of financial markets as to a possible default of the institution, and it instantaneously incorporates innovations.

[15] We do not find any effect of the capital ratio and the CDS spread in the within-fund estimation with fund

In conclusion, these results suggest that the financial position of a bank is an important factor in determining its ability to step in to support distressed affiliated funds, as well as cementing the corresponding perception of stability among fund investors. This link is in line with the findings in Sialm and Tham (2016), which show that the prior performance of the management company's stock spills over to the affiliated mutual fund flows even though it has no correlation with the subsequent performance of the fund.

6 Banks and affiliated funds during COVID-19

The COVID-19 crisis unfolded quickly in the EU and around the world in early 2020, precipitating a sharp sell-off across the capital markets, including the mutual fund sector (see e.g. Falato et al. (2021) and Figure 6). This is the perfect setup to validate the evidence of banks' liquidity support and affiliated funds' higher stability highlighted in the previous sections by examining how different investors reacted to this exogenous shock.

First of all, our previous analysis of bank trades uncovered evidence that banks support distressed affiliated funds that are subject to redemptions from other investors. This identification rests on the assumption that – when a bank observes that one of its affiliated funds is in distress – it leans against the wind by purchasing fund shares so as to offset large outflows from the fund. Investigating banks' reaction in the context of a large exogenous shock allows us to rule out some degree of endogeneity in how banks' and other investors' decisions are determined. In order to do this, we modify regression (6) replacing the distress variable based on outflows with a time dummy for the quarter 2020Q1. We also include interactions with a lag of the bank's CDS spread as an indicator of a conglomerate's financial solidity:

$$\begin{aligned} \text{Bank trade}_{ijt} = \beta_1 \cdot \text{Affiliated}_{ijt} + \beta_2 \cdot \text{Q1'20}_t \times \text{Affiliated}_{ijt} + \\ \beta_3 \cdot \text{Affiliated}_{ijt} \times \text{High CDS}_{i,t-1} + \beta_4 \cdot \text{Q1'20}_t \times \text{Affiliated}_{ijt} \times \text{High CDS}_{i,t-1} + \alpha_{it} + \gamma_{jt}. \end{aligned} \tag{11}$$

While the previous analysis showed that capital and liquidity ratios influence banks' supporting trades significantly, these supervisory measures are less likely to closely track the capacity of a bank to weather the sudden COVID-19 mayhem while potentially supporting distressed business units. This is particularly true since regulators acted swiftly to release capital and liquidity buffers with the objective to provide banks with operational leeway and support their financing capacity.[16] Given the nature of the financial system's distress, also originating in investors' panic-driven flight to cash, in this context a market-based perception of banks' viability such as the CDS spread appears better placed to capture relevant differences between banks.

fixed effects, which would require funds affiliated to banks whose capital ratios or CDS spreads deteriorate (resp./ improve) to react by increasing (resp./ decreasing) their precautionary cash buffer. We also do not find any beneficial effect of a bank's liquidity coverage ratio on cash holdings.

[16] On 12 March 2020, the ECB announced that banks could fully use capital and liquidity buffers. Cf. https://www.bankingsupervision.europa.eu/press/pr/date/2020/html/ssm.pr200312~43351ac3ac.en.html

Table 9 shows the results of the estimation of 11. In these regressions, the threshold for the dummy variable *High CDS* depends on the quarter and is the median of the cross-sectional distribution of CDS spreads in that quarter.[17] In column (1), we start with a regression without fixed effects. This reveals that banks decreased their holdings of unaffiliated fund shares in 2020Q1 by 0.37% of the fund's TNA. The same does not hold for affiliated shares, for which an offsetting coefficient (0.42%) is estimated. However, banks with a high CDS spread sold off an additional 1.16% in affiliated funds. This pattern is strengthened by adding in sequence bank-quarter fixed effects (column (2)) and fund-quarter fixed effects (column (3)) to the estimation. The regressions in columns (4), (5) and (6), where the high CDS dummy is replaced by the continuous CDS spread, yield similar results. In the last regression with full fixed effects, a bank with a CDS spread of zero would be estimated to have acted countercyclically during the COVID-19 shock by an average of 1.4% of a fund's TNA. Given the within-fund and within-bank nature of the estimation, we cannot quantify the amount due to actual buy trades and the amount that stems from banks selling off unaffiliated shares while taking a neutral stance vis-à-vis affiliated ones. In any case, this contrarian behaviour is cancelled out when the bank's CDS spread exceeds the value of 45 bps (1.4/0.031), which is about the median CDS spread in that quarter. Above this threshold, banks appear to have even penalised their affiliated funds by selling more of their shares. This may be because distressed banks, in a deleveraging effort, were forced to close positions in affiliated funds to which they had substantial exposure.

To complement these findings, we exploit the outbreak of the COVID-19 pandemic and the ensuing turmoil to determine whether affiliated funds' higher stability led them to experience less mayhem than other comparable funds during an unexpected, broad-based shock. Figure 6 shows that investors reacted by selling shares of EU-domiciled affiliated and unaffiliated funds alike, although overall outflows were slightly less severe for the former. However, this picture does not take into account the different severity of the COVID-19 shock on different funds. To address this shortcoming, we estimate the following regression model:

$$\text{Flows}_{jt} = \beta_1 \cdot \text{Affiliated}_{jt} + \beta_2 \cdot \text{Affiliated}_{jt} \times \text{March '20}_t + Controls_{jt} + \gamma_{ft} + \delta_j, \quad (12)$$

where *March '20* is a dummy variable that marks the month of the escalation of the COVID-19 crisis, and we use different sets of fixed effects to absorb the heterogeneity in how funds were hit by the shock, which could otherwise confound the effect of bank affiliation. Fund controls include size, age, and share of institutional ownership. Table 10 presents the result of the estimation. Affiliated funds' flows were only slightly more positive in the model with only month and fund fixed effects (column (1)). This estimation entails comparing funds that may have been hit very differently by the shock. However, this difference becomes more significant when controlling for the country of the fund's parent company (column (2)): once affiliated and unaffiliated funds belonging to a company headquartered in the same country are compared, the former are estimated to have experienced 0.43% lower outflows on average.

[17] With this definition, observations are split between high and low CDS spread in such a way that all interaction terms can be estimated even with bank-quarter and fund-quarter fixed effects. The estimation was not possible when using as a threshold the upper quartile for each period or any quartile calculated on the overall sample.

This difference decreases to 0.2% when additionally comparing funds within the same style, although it is still statistically significant (column (3)). In column (4), we further add the aggregate flows of funds at the parent company level as a control variable. Not surprisingly, there is a strong positive correlation between the flows of a single fund and those of all funds affiliated to its parent (coefficient of 0.27, $p < 0.01$). Accounting for this correlated behaviour of investors in the same firm allows us to control for further heterogeneity in how the shock affected clusters of funds across different styles and domiciles, and net it out from the estimated effect of affiliation. Even so, the effect of affiliation is only slightly reduced to 0.17%. Finally, we test whether this benefit also accrued to funds affiliated to banks with a high CDS spread. We replace the variable *Affiliated* in (12) with a variable *High CDS* that is 1 if the parent bank's CDS spread is above the 75th percentile of the distribution in March 2020 ($\sim$ 68 bps), and estimate the regression only on affiliated funds. Column (5) shows that funds affiliated to banks with a high CDS spread suffered slightly more outflows compared to other affiliated funds (-0.31%, $p < 0.1$).

7 Assessing the affiliation link: from funds' shock resilience to contagion effects

The evidence gathered in the previous section suggests that bank-affiliated funds are perceived to be more stable by investors in the wake of a large shock such as COVID-19, but banks' ability to provide liquidity support depends on their financial health. However, the systematic nature of the COVID-19 shock makes it difficult to fully assess the implications of banks' different financial conditions on funds' resilience to distress. To address this shortcoming, we look at developments around two exogenous shocks to specific segments of the financial markets: the outcome of the Brexit referendum in June 2016 and unexpected distress in the market for Italian sovereign bonds in May 2018 caused by political uncertainty following national elections in Italy.

7.1 Brexit referendum

The outcome of the Brexit referendum of 23 June 2016 was deemed as largely unexpected. The decision to leave the EU threw the UK financial services industry into disarray and spooked investors in UK-focused investment funds (Lewin (2016) and Figure 7). We study how this shock affected affiliated and unaffiliated mutual funds by estimating the following fixed-effects specification at a monthly frequency:

$$\begin{aligned} \text{2-month flows}_{jt} &= \beta_1 \cdot \text{Fund Exp}^{UK}_{j,t-1} \times \text{June '16}_t \\ +\beta_2 \cdot \text{Fund Exp}^{UK}_{j,t-1} &\times \text{Affiliated}_{jt} \times \text{June '16}_t + Controls_{jt} + \gamma_{ft} + \delta_j, \end{aligned} \tag{13}$$

where the dependent variable is the cumulative two-month flows of months t and $t+1$ at the fund level, and *Fund* $Exp^{UK}_{j,t}$ is a dummy variable that is equal to 1 if more than 20% of fund j's portfolio is invested in UK assets at the end of month t. *June '16* takes the value of 1 for observations referred to June 2016 and 0 otherwise. Given that the sterling depreciated starkly after the Brexit referendum, to avoid confounding effects of exchange rate fluctuation on investors' behaviour, for these regressions we drop share classes denominated in GBP from our data before aggregating different share classes to the fund level.

The results of a first estimation without controlling for fund style in column (1) of Table 11 confirm the hypothesis that UK-exposed funds were met with abnormal outflows in June and July 2016: for non-affiliated funds with above-threshold exposure to the UK in the wake of the referendum, the flows are estimated to have been 2.65% lower after controlling for month and fund fixed effects, past performance and other fund characteristics (coefficient of $\textit{Fund Exp}^{UK} \times$ *June '16*, $p < 0.01$). However, bank-affiliated funds were partially shielded from the shock: they incurred 0.72% lower outflows compared to their unaffiliated peers (coefficient of $\textit{Fund Exp}^{UK} \times \textit{Affiliated} \times$ *June '16*, $p < 0.01$). In column (2), we include fixed effects that control for the fund style. In this case, the coefficients are estimated based on a comparison between UK-exposed and non-exposed funds that are otherwise exposed to similar macro trends. These fixed effects absorb part of the outflows that were specific to UK-exposed funds (now estimated at only -0.84%), but do not substantially affect the positive coefficient for affiliated funds (0.62%).

In a further attempt to identify more precisely the funds most adversely hit by the shock, we look at their portfolio allocation in terms of industry sector, leveraging the data on funds' portfolio allocation by industry reported by Lipper. The UK financial sector was arguably the most exposed to risks resulting from a disorderly exit from the EU. Therefore, we construct a dummy $\textit{Fund Exp}^{UK\ Fin}$ which is equal to 1 when $\textit{Fund Exp}^{UK} = 1$ and additionally the portfolio allocation to the financial sector is greater than 25%. Columns (3) and (4) of Table 11 show that, as expected, the estimated outflows in June 2016 for unaffiliated funds with a large exposure to both UK assets and the financial sector were more than double those estimated previously for funds with $\textit{Fund Exp}^{UK} = 1$ (-3.10%, or -4.69% without fund style fixed effects). However, affiliated funds were still remarkably insulated from the shock, with no abnormal outflows consistently detected (offsetting coefficient of 4.94%, or 3.44% without fund style fixed effects).

The analysis of direct bank support via share purchases and of fund precautionary cash holdings revealed that differences in banks' financial health help explain the average benefit yielded by bank affiliation. As affiliated funds did not seem to be affected by the Brexit referendum on average, we investigate whether this is also true for funds affiliated to potentially vulnerable banks. Such banks may fail to meet investors' expectations of liquidity support to UK-exposed funds in the aftermath of the Brexit vote upheaval.

The study of the effects of the COVID-19 shock suggests that the CDS spread proxies well a bank's exposure to sudden distress or, in contrast, its stability. Thus, focusing on the sample of affiliated funds and their parent banks for which a CDS spread is available, we include in the regression a binary variable that takes the value of 1 if the CDS spread of the bank is above 100 bps – approximately the 75th percentile in the sample – and 0 otherwise. Columns (5) and (6) of Table 11 present the result of the estimation of regression (13) with the addition of the dummy *High CDS*. Interestingly, riskier banks had an adverse effect not only on highly UK-exposed funds (coefficients of -3% and -2.27% for $\textit{Fund Exp}^{UK} \times$ *June '16*$\times$*High CDS*), but also – less markedly – on other funds (coefficients of -0.19% and -

0.66% for *June '16×High CDS*). Funds with a high financial sector exposure are taken into account in columns (7) and (8). The correlation with the bank's CDS spread is even more evident for these funds, which in June and July 2016 suffered larger outflows by an amount estimated between -2.6% and -4%.

These results suggest that the financial conditions of the banks – in particular for vulnerable institutions – influenced the investment decisions of investors in the group's funds following the Brexit shock. The analysis of fund flows suggests that a bank's fragility particularly exacerbated distress in those funds exposed to the shock. In our final test, we further explore how investors in funds not heavily exposed to the Brexit vote but belonging to a British financial conglomerate or asset management company reacted following the event. To this end, we focus on affiliated and unaffiliated funds not heavily invested in UK assets, excluding all funds with exposure higher than 20% (i.e. $Fund\ Exp^{UK} = 1$). We then introduce a dummy variable that indicates whether the fund's ultimate parent is a UK company. Outflows at these funds should be motivated mainly by the uncertainty surrounding the prospects of the fund's company and the doubts about its continued ability to provide financial guarantees to its mutual funds business.[18]

Column (10) illustrates the results. Investors of funds belonging to UK companies – including banks, independent asset managers and other financial firms – withdrew on average 1.22% more of the fund's TNA in two months, compared to funds operated by non-UK companies but investing in the same asset type, with the same benchmark and geographical focus (coefficient of *June '16× UK parent*). Additionally, the interaction with the *Affiliated* dummy shows that the fallout was more sizeable specifically for funds belonging to UK banks: in this case, average outflows increased by an additional 1% (coefficient of *Affiliated× June '16× UK parent*).

Our findings have important implications. On the one hand, the analysis of the mutual fund sector following the surprise Brexit vote shows that funds belonging to a financially sound banking conglomerate were shielded from shocks that did not affect their parent bank. This suggests that these affiliated funds were perceived to be safer by investors. On the other hand, it also suggests that if shocks directly affect the parent bank – such as with the unexpected outcome of the Brexit vote for UK financial institutions – distress can spill over to its affiliated asset management business. Fund investors might be led to withdraw capital because they fear that the protection afforded by the parent bank has ceased or that a deteriorating financial condition at the bank might adversely affect other parts of the conglomerate.

7.2 Italy's 2018 political uncertainty

In the middle of May 2018, tensions started to loom over Italian sovereigns due to expectations that a new populist and anti-euro government would form. As investors cut down their exposure, the spread between 10-year Italian and German government bond yields increased from 123 bps to 243 bps in May and June and remained at that level over the

[18] We also use the exposure of a fund's parent bank to UK assets, but we do not find this to influence fund flows significantly.

following months. An analysis of fund flows shows that deleveraging also occurred in the asset management market, with investors fleeing those mutual funds characterised by a portfolio highly tilted towards Italian sovereign bonds. To see this, we estimate the following fixed-effects specification on our sample of EU funds. In these regressions, we drop equity funds, which hold little or no sovereign bonds.

$$\begin{aligned}\text{2-month flows}_{jt} = \beta_1 \cdot \text{Fund Exp}^{Ita\ sov}_{j,t-1} \times \text{May '18}_t \\ +\beta_2 {\cdot} \text{Fund Exp}^{Ita\ sov}_{j,t-1} \times \text{Affiliated}_{jt} \times \text{May '18}_t + Controls_{jt} + \gamma_{ft} + \delta_j,\end{aligned} \tag{14}$$

where the dependent variable is the cumulative two-month flow of months t to $t+1$ at the fund level and $Fund\ Exp^{Ita\ sov}_{j,t-1}$ is a dummy variable that is equal to 1 if the fund's stated geographical focus is Italy, more than 25% of fund j's portfolio is invested in Italian bonds, or more than 20% is invested in Italian sovereign bonds.[19] $May\ '18$ takes the value of 1 for observations referred to May 2018 (where cumulative 2-month flows correspond to May and June) and 0 otherwise. The results of a first estimation without controlling for fund style confirm that Italy-exposed funds (affiliated and unaffiliated alike) were met with abnormal outflows in May and June 2018 (-1.34%, $p < 0.01$ in column (1) of Table 12). This effect increases substantially to -1.97% when including time-varying fund style fixed effects (column (2)). Once this heterogeneity is taken into account, bank-affiliated funds were subject to comparatively smaller outflows (offsetting coefficient of 1.05%, $p < 0.01$).

Next, we further investigate the mitigated impact of the Italian crisis on affiliated funds observed in column (2) of Table 12 by exploring the cross-section of parent banks. In columns (3) and (4) we see that, with different sets of fixed effects, banks' riskiness (as proxied by the dummy *High CDS* marking banks with a CDS spread above 100 bps) plays an important role in characterising outflows from their affiliated mutual funds. First, as before, funds exposed to Italy suffered relatively more outflows (-1.67% to -1.74%, coefficients of $Fund\ Exp^{Ita\ sov} \times May\ '18$). Additionally, riskier banks are associated with larger outflows, but this is true specifically at those affiliated funds *without* a large exposure to Italy, and thus not already affected by the shock (-1.25% to -1.55%, coefficients of $May\ '18 \times High\ CDS$). Conversely, affiliated funds of the same banks themselves exposed to Italy did not seem to be additionally penalised by the bank's fragility (offsetting positive coefficients of $Fund\ Exp^{Ita\ sov} \times May\ '18 \times High\ CDS$).

In light of this finding, it is natural to ask whether banks' exposure to the same shock may have negatively affected fund investors. Indeed, many of the banks in the sample with high CDS spreads are Italian. These banks were highly exposed to shocks around the Italian sovereign because of the home bias in their bond portfolio and the sovereign-bank nexus. The latter posits that the deep dependence of banks on their sovereign means that a sovereign default would inevitably lead to a default of its banks irrespective of their financial solidity. As a consequence, the outcome of the regression with the CDS spread may essentially be capturing banks' direct exposure to the Italian sovereign. To shed light on this aspect, in columns (5) and (6) we study the effect of parent banks' exposure to the shock by directly

[19] To construct this measure, we primarily use the fund's portfolio allocation to Italian fixed-income assets provided by Lipper. When this is missing but full fund holdings are available, we use those to compute the percentage allocation to Italian sovereign bonds. We use up to two monthly lags of both variables to fill in missing values.

juxtaposing Italian and non-Italian banks. First, in this sample, exposed funds incurred 1.2% to 1.5% more outflows on average during the crisis. Moreover, the estimation reveals that funds affiliated to Italian banks also suffered around 2.3% higher outflows. However, as in the regression with the *High CDS* dummy, this additional effect vanishes for funds themselves exposed to the shock (offsetting coefficient of 2.5%).[20]

In summary, the analysis of local shocks affecting a specific segment of financial markets corroborates previous evidence that banks generally help affiliated funds to better withstand distress: these funds were less likely to experience severe outflows. However, it also reveals the existence of the opposite channel: mutual funds with a fragile parent were subject to outflows even if they did not have a large exposure to the shock via holdings of distressed assets. This result suggests that the dependence of a business unit on expectations of a safety net within its financial conglomerate may lead to financial contagion as a consequence of these expectations being undermined by distress outside the unit.

8 Conclusion

In this paper, we show that banks provide liquidity insurance to distressed affiliated funds by increasing their stakes in those funds that are experiencing large outflows – a novel channel of intra-group financial support not previously uncovered. This mechanism is relevant because it potentially dampens the severity of strategic complementarities in investors' redemptions and thus diminishes the propensity of a run among investors. Indeed, investor flows of bank-affiliated funds tend to be less volatile and less sensitive to bad performance, allowing these funds to hold lower precautionary cash buffers. We also show that these beneficial effects are particularly strong if the parent bank is less risky and better capitalised. This suggests that those funds that are part of a multi-unit financial group benefit directly from the financial stability of the parent institution.

Consistently with the logic above, we provide evidence that a worsening of a conglomerate's financial health or adverse shocks to the banking business may spill over to the asset management side, even absent a direct portfolio exposure in the latter. First, more affected banks had to sell off affiliated fund shares during the COVID-19 outbreak in 2020, potentially jeopardising their funds' resilience to the crisis. Second, although funds invested in Italy and the UK were more resilient to episodes of distress in their respective markets if they were affiliated to solid banks, investors withdrew from funds that were not directly exposed to the shock if the parent bank was distressed.

By uncovering these novel dynamics, this paper contributes to assessing the substantial interconnections between the financial stability of the banking and investment fund sectors in Europe. Our results highlight that the organisational structure of the financial system potentially shapes financial contagion risks and influences how shocks impact different financial intermediaries.

[20] We obtain very similar results if we replace the dummy variable *Italian parent* with a bank's exposure to the Italian sovereign relative to total assets.

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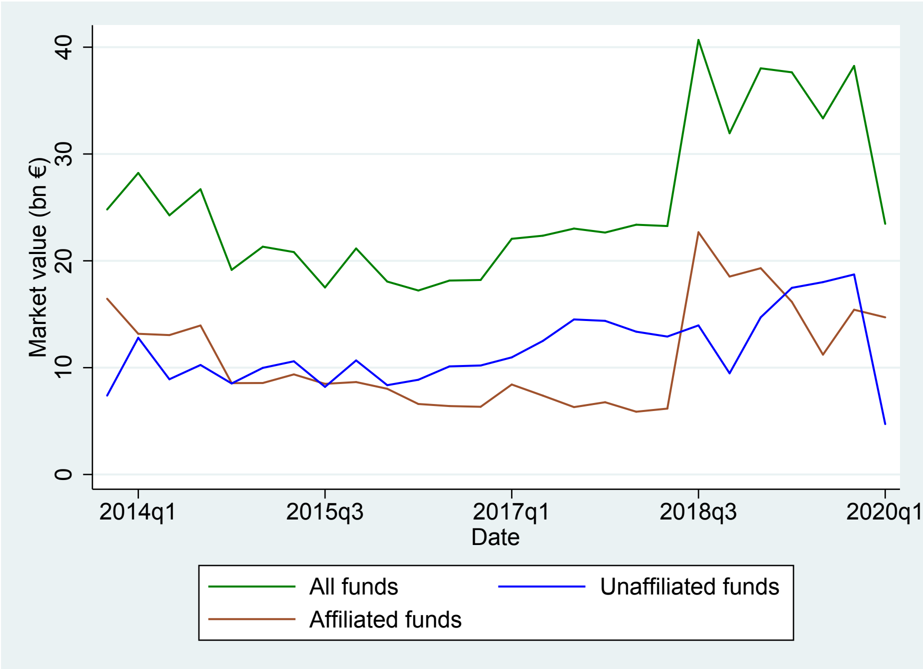
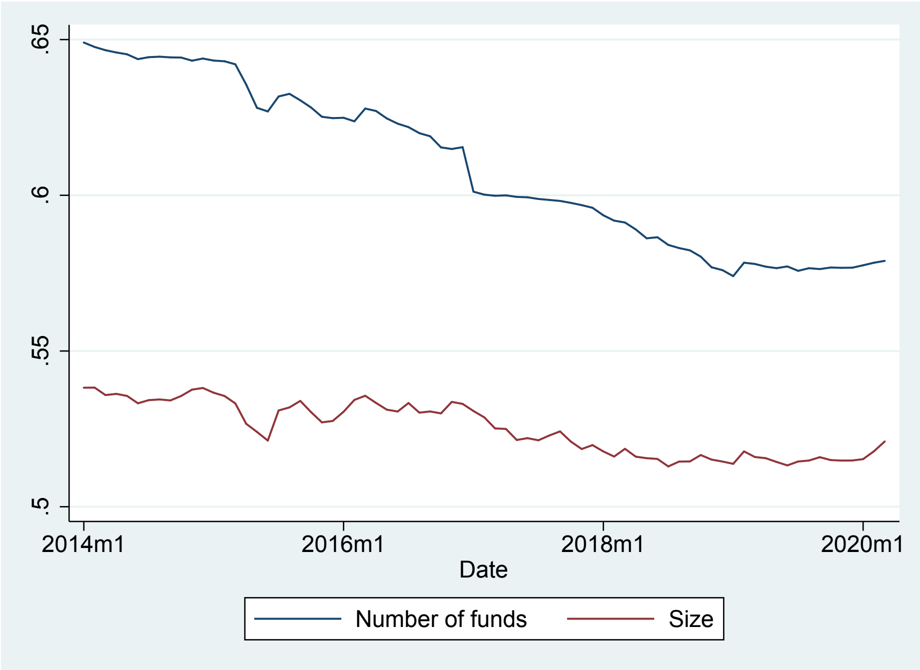
A Figures

Figure 1: Banks' holdings of mutual fund shares.



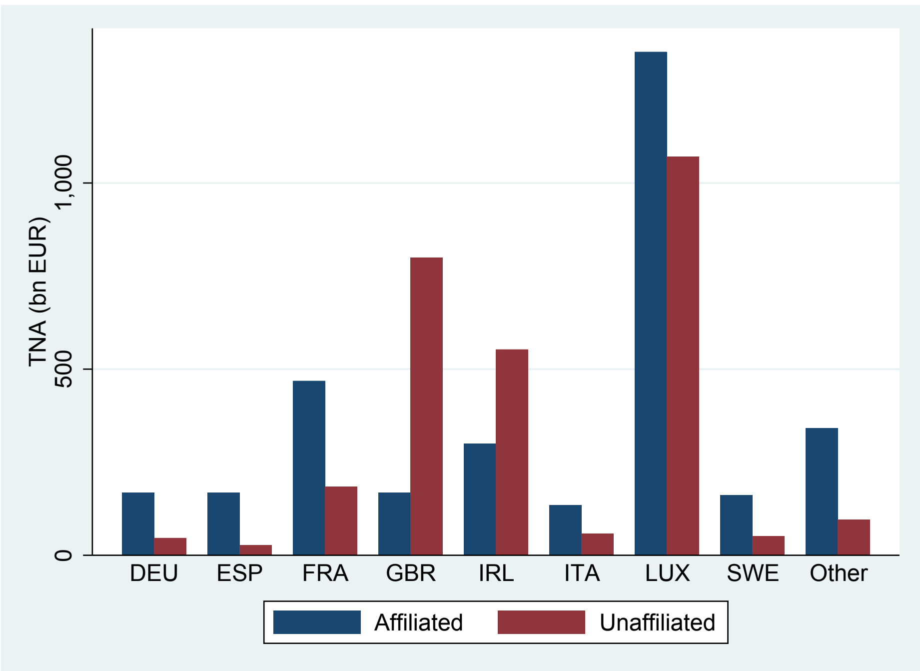
The graph plots the market value of shares of mutual funds affiliated to the holding bank (brown line), mutual funds not affiliated to the holding bank (blue line) and total mutual fund shares (green line) in the portfolios of 26 banking groups reporting for the Securities Holdings Statistics.

Figure 2: Share of EU funds affiliated to a bank.



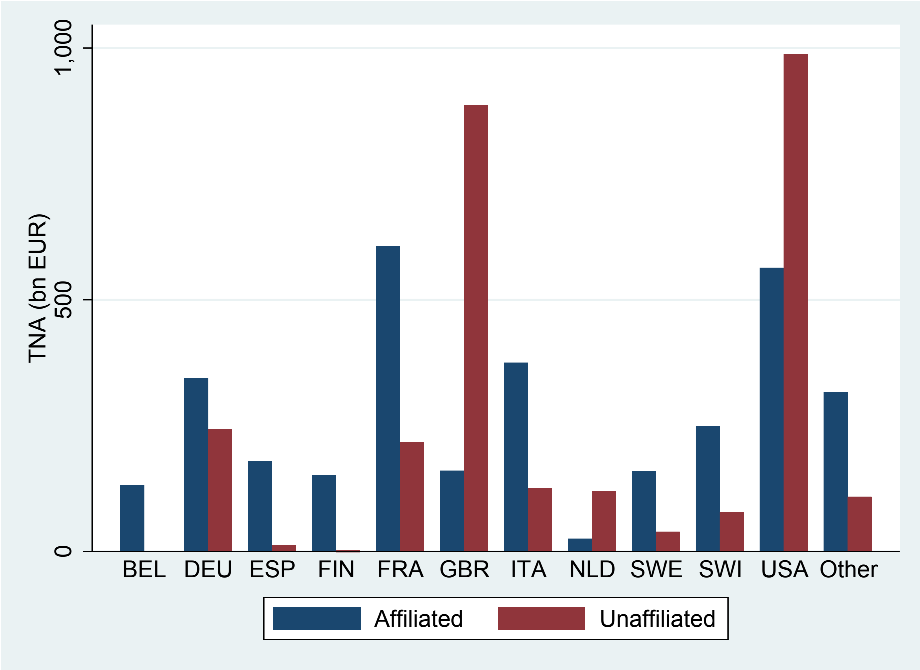
The graph plots the share of bank-affiliated funds in the Lipper sample of mutual funds domiciled in the EU in terms of the number of primary funds (blue line) and the funds' aggregate TNA (red line).

Figure 3: Domicile country of EU mutual funds.



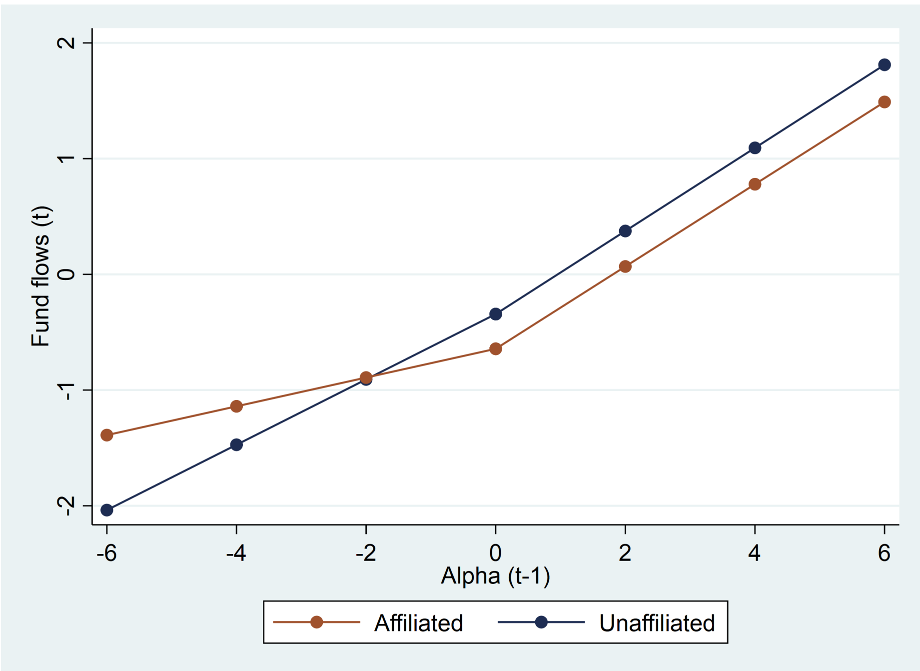
This figure shows the aggregate TNAs of bank-affiliated funds (blue bars) and unaffiliated funds (red bars) broken down by country of domicile in the Lipper sample of mutual funds domiciled in the EU. The values refer to June 2016.

Figure 4: Country of EU mutual funds' ultimate parents.



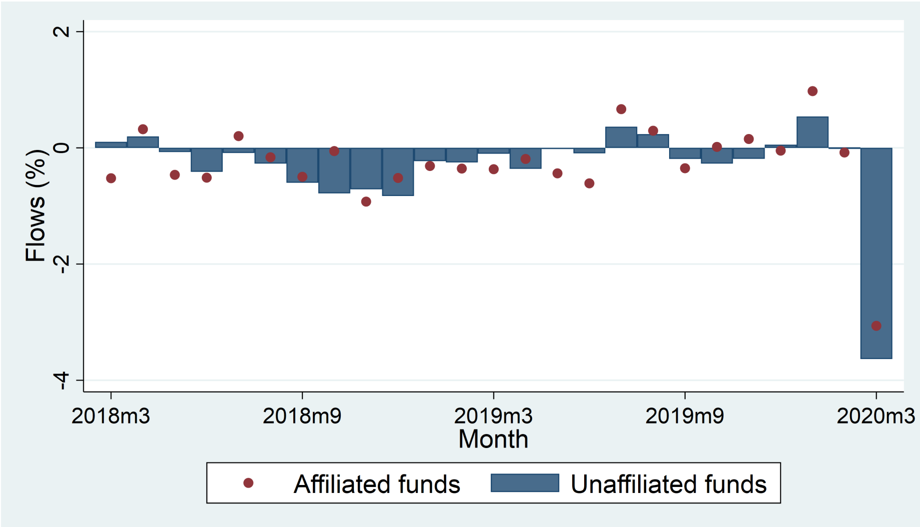
This figure shows the aggregate TNAs of bank-affiliated funds (blue bars) and unaffiliated funds (red bars) broken down by country of their ultimate parent in the Lipper sample of mutual funds domiciled in the EU. The values refer to June 2016.

Figure 5: Flow-performance sensitivity in bond funds.



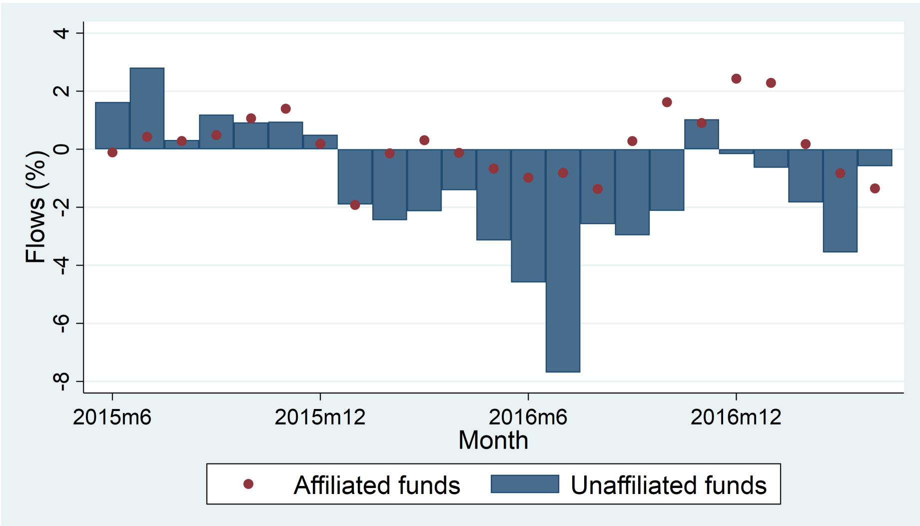
The graph plots the relationship between flows and performance for affiliated and unaffiliated bond funds, based on the estimates in column (4) of Table 6.

Figure 6: Investor flows to/from EU mutual funds.



This figure shows the aggregate flows (as a percentage of total net assets) for bank-affiliated and unaffiliated funds in the Lipper sample of mutual funds domiciled in the EU.

Figure 7: Investor flows to/from EU mutual funds investing in the UK and in the financial sector.



This figure shows the aggregate flows (as a percentage of total net assets) for bank-affiliated and unaffiliated funds investing at least 20% of their portfolio in UK-domiciled assets and at least 25% in the financial sector.

B Tables

Table 1: Definition of variables.

Dependent variables	
Bank trade$_{ijt}$	Percent fund flows originated by bank i trading fund j during quarter t (see definition (3)). This variable exists if fund j is in bank i's portfolio in at least quarter $t-1$ or quarter t.
Fund flows$_{jt}$	Percent flows for fund j in month t (see definition (2)).
σ(Flows)$_{jt}$	Standard deviation of monthly flows for fund j computed over a 12-month period from $t-11$ to t if at least 5 data points are not missing.
Cash %$_{jt}$	Percent portfolio allocation to cash and cash-like instruments for fund j at the end of month t.
2-month flows$_{jt}$	Cumulative percent flows for fund j in months t and $t+1$.
Independent variables	
Affiliated$_{ijt}$	In the bank holdings sample, binary variable which is equal to 1 if mutual fund j is affiliated to bank i at the end of quarter t and 0 otherwise; in the fund-level sample (without index i), it is equal to 1 if fund j in month t is part of a bank holding company or a financial conglomerate which includes a bank.
Non-bank flows$_{jt}$	Percent flows for fund j in quarter t, net of flows originating from trades of banks in the bank holdings sample (see definition (4)).
Is outflow$_{jt}$	Binary variable which is equal to 1 if Non-bank flows$_{jt}$ is strictly negative, 0 otherwise.
Distress$_{jt}$	Binary variable which is equal to 1 if Non-bank flows$_{jt}$ is below the 5th percentile in the corresponding sample, 0 otherwise.
CDS spread$_{it}$	5-year CDS spread of bank i in month t (normally 2014 modified-modified restructuring contracts in Euro).
High CDS$_{it}$	In the bank holdings sample, binary variable which is equal to 1 if bank i's CDS spread is above the 75th percentile in the sample of bank holdings (146 bps), 0 otherwise. In Table 9, the threshold is set to the median CDS spread for the respective time period. In the fund-level sample, it is equal to 1 if the CDS spread of the parent bank of fund i in month t is above the 75th percentile in that sample (100 bps). In Table 10, the threshold is set to the 75th percentile of the distribution in March 2020 (68 bps).
Low capital$_{it}$	Binary variable which is equal to 1 if bank i's total capital ratio is below the 25th percentile in the sample of bank holdings (14.63%), 0 otherwise. In the fund-level sample, it is equal to 1 if the capital ratio of the parent bank of fund i in month t is above the 75th percentile in that sample (15%).
Low liquidity$_{it}$	Binary variable which is equal to 1 if bank i's liquidity coverage ratio is below the 25th percentile in the sample of bank holdings (1.32), 0 otherwise.
Systematic shock$_{it}$	Binary variable which is equal to 1 if the aggregate flows of funds affiliated to bank i during quarter t are negative, 0 otherwise.
Q1'20$_t$	Binary variable which is equal to 1 if quarter t is 2020Q1, 0 otherwise.
Bank holding$_{ijt}$	Market value of holding of bank i in mutual fund j at the end of quarter t divided by the TNA of fund j.
Alpha$_{jt}$	Jensen's alpha of fund j over months $t-5$ to t, computed based on the fund's Lipper Global classification benchmark.

Table 1: Definition of variables.

Log(TNA)_{jt}	Natural logarithm of fund j's Total Net Assets (in € million) at the end of month t.
Fund TER_{jt}	Total expense ratio of fund j in month t.
Log(Age)_{jt}	Natural logarithm of fund j's age (expressed in months) at month t.
Institutional ownership_{jt}	Value-weighted fraction of fund j's share classes reserved for institutional investors in month t.
$\sigma\text{(Return)}_{jt}$	Standard deviation of fund j's monthly returns computed over a 12-month period from $t-12$ to $t-1$ if at least 5 data points are not missing.
$\sigma\text{(Flows)}_{jt}$, Fund flows_{jt}	See *Dependent variables.*
March '20_t	Binary variable which is equal to 1 if month t is March 2020, 0 otherwise.
Parent-level flows_{jt}	Aggregated percent flows in month t for all funds in the sample affiliated to the parent bank of fund j (for bank-affiliated funds) or to the parent management company (for unaffiliated funds).
Fund Exp_{jt}^{UK}	Binary variable which is equal to 1 if at least 20% of fund j's portfolio is invested in United Kingdom securities (according to reported securities holdings or geographical portfolio allocation) at the end of month t, or if the geographical focus in the fund prospectus is the United Kingdom; 0 otherwise.
Fund $\text{Exp}_{jt}^{UK\ Fin}$	Binary variable which is equal to 1 if at least 20% of fund j's portfolio is invested in United Kingdom securities and at least 25% in financial sector assets at the end of month t; 0 otherwise.
UK parent_{jt}	Binary variable which is equal to 1 if the ultimate parent of fund j's asset management company is from the United Kingdom; 0 otherwise.
June '16_t	Binary variable which is equal to 1 if month t is June 2016, 0 otherwise.
Fund $\text{Exp}_{jt}^{Ita\ Sov}$	Binary variable which is equal to 1 if at least 20% of fund j's portfolio is invested in Italian sovereign bonds (for those funds reporting securities holdings) or at least 25% in Italian bonds (for those funds reporting a geographical portfolio allocation) at the end of month t, or if the geographical focus in the fund prospectus is Italy; 0 otherwise.
Italian parent_{jt}	Binary variable which is equal to 1 if the ultimate parent of fund j's asset management company is Italian; 0 otherwise.
May '18_t	Binary variable which is equal to 1 if month t is May 2018, 0 otherwise.

Table 2: Descriptive statistics on main EU banks.

Panel A: Number of affiliated mutual funds and their assets under management.

	Minimum		Maximum	
	Affiliated funds (#)	AUM (€ bn)	Affiliated funds (#)	AUM (€ bn)
Bank				
ABN Amro	78	12	110	18
BBVA	353	49	505	87
BNP Paribas	913	181	1615	234
BPCE	525	211	692	317
Banca MPS	0	0	0	0
Banco Santander	1209	145	1766	214
Bankia	110	12	208	26
Bayerische Landesbank	14	.42	40	3.7
Belfius Banque	35	8.2	57	18
Caixa Bank	200	33	388	71
Commerzbank	2	16	135	27
Crédit Agricole	1298	279	1802	611
Crédit Mutuel	409	75	459	97
DZ Bank	412	116	548	199
Deutsche Bank	786	271	1101	389
Deutsche Pfandbriefbank	0	0	0	0
Erste Bank	215	22	338	30
Helaba	24	2.7	31	5.3
ING	30	2.8	416	97
Intesa Sanpaolo	527	116	794	205
KBC	1036	75	1617	122
Landesbank Baden-Wuerttemberg	46	4.7	56	6.6
Norddeutsche Landesbank	0	0	22	1.5
Rabobank	0	0	0	0
Société Générale	463	50	579	107
Unicredit	56	4.4	659	180

Panel B: Size of banks' proprietary portfolios of mutual fund shares.

	Mean	p5	p25	Median	p75	p95	N
Affiliated funds							
Market value (€ bn)	0.4	0	0	0.1	0.5	1.4	650
Market value (% of CET1)	1.5	0	0	0.4	1.6	6.4	612
Market value (% of headroom)	10.4	0	0	1.4	7	81.1	587
All funds							
Market value (€ bn)	0.9	0	0	0.2	1.1	3.2	650
Market value (% of CET1)	2.9	0	0.3	1.1	3.9	11.5	612
Market value (% of headroom)	19.4	0.1	1.1	4.9	20.7	100	587

Observations are at the bank-quarter level for the 26 EU banks in the Securities Holdings Statistics. Panel A shows the number of mutual funds affiliated to each bank and their assets under management. Panel B presents statistics on the banks' proprietary holdings of mutual fund shares in euro amount, as a percentage of a bank's total capital, and as a percentage of a bank's capital headroom. Capital headroom is defined as the difference between the available capital and the overall capital requirements. Where the percentage exceeded 100, and for negative capital headroom, the value was set to 100%.

Table 3: Summary statistics for main dependent and independent variables.

Panel A: sample of bank holdings of mutual fund shares.

	Mean	St. dev.	p1	p5	p25	Median	p75	p95	p99	N
Bank trade (%)	-0.03	2.33	-4.68	-0.22	-0	0	0	0.19	3.47	122433
Non-bank flows (%)	-0.25	13.77	-32.09	-16.51	-5.15	-1.29	2.48	19.43	49.43	122433
Is outflow	0.62	0.49	0	0	0	1	1	1	1	122433
Distress	0.05	0.22	0	0	0	0	0	0	1	122433
Affiliated	0.17	0.37	0	0	0	0	0	1	1	122433
CDS spread (bps)	105	46	23	35	74	101	146	179	190	105378
Capital ratio (%)	16.4	2.3	11.7	13.4	14.7	16.4	17.8	20.9	21.9	116885
Liquidity coverage ratio	1.42	0.26	0	1.19	1.30	1.39	1.47	1.99	2.27	85147
Systematic shock	0.41	0.49	0	0	0	0	1	1	1	122125
Bank holding (% of TNA)	1.91	10.30	-0	0	0	0	0.06	5.91	70.40	122370

Panel B: sample of EU mutual funds.

	Mean	St. dev.	p1	p5	p25	Median	p75	p95	p99	N
Affiliated funds										
Fund flows (%)	-0.19	7.49	-20.46	-7.33	-1.55	-0.29	0.55	7.22	22.65	874642
Fund return (%)	0.27	2.45	-7.95	-3.93	-0.49	0.16	1.24	4.34	7.72	874642
Alpha (%)	0.15	2.37	-7.10	-3.64	-0.90	0.04	1.20	4.12	7.77	874642
Cash (%)	5.71	9.47	-9.23	-0.25	1.25	3.17	6.87	19.75	46.09	359636
Fund Exp.$^{Ita\ Sov}$	0.09	0.29	0	0	0	0	0	1	1	314229
Fund Exp.^{UK}	0.04	0.20	0	0	0	0	0	0	1	491130
Fund Exp.$^{UK\ Fin}$	0.01	0.11	0	0	0	0	0	0	1	289210
UK parent	0.02	0.15	0	0	0	0	0	0	1	832213
Italian parent	0.11	0.31	0	0	0	0	0	1	1	581177
Log(TNA)	4.36	1.51	1.71	2.07	3.20	4.26	5.37	6.99	8.18	874642
Fund TER (%)	1.34	0.71	0.09	0.28	0.81	1.29	1.80	2.55	3.29	823232
Log(Age)	4.40	0.95	2.08	2.64	3.76	4.54	5.15	5.69	6.00	874563
Institutional ownership	0.16	0.32	0	0	0	0	0	1	1	874642
Bond fund	0.28	0.45	0	0	0	0	1	1	1	874642
Equity fund	0.33	0.47	0	0	0	0	1	1	1	874642
Mixed fund	0.31	0.46	0	0	0	0	1	1	1	874642
Alternative fund	0.05	0.21	0	0	0	0	0	0	1	874642
Money market fund	0.04	0.20	0	0	0	0	0	0	1	874642
Parent-level flows (%)	-0.01	1.90	-5.90	-2.70	-0.73	0.02	0.76	2.67	4.75	870405
Capital ratio (%)	17.05	2.68	11.4	12.6	15.1	17.2	18.7	21.3	23.7	473496
CDS spread (bps)	84.02	65.60	22	28	53	71	98	174	247	442779
Unaffiliated funds										
Fund flows (%)	0.22	7.57	-18.95	-6.73	-1.26	-0.06	1.01	7.72	23.33	563512
Fund return (%)	0.32	2.70	-8.34	-4.50	-0.69	0.29	1.59	4.80	7.91	563512
Alpha (%)	0.21	2.53	-7.40	-3.90	-1.00	0.10	1.40	4.50	8.08	563512
Cash (%)	5.87	9.46	-10.00	-0.16	1.23	3.25	7.18	20.56	46.59	276943
Fund Exp.$^{Ita\ Sov}$	0.06	0.24	0	0	0	0	0	1	1	204269
Fund Exp.^{UK}	0.07	0.25	0	0	0	0	0	1	1	274630
Fund Exp.$^{UK\ Fin}$	0.01	0.12	0	0	0	0	0	0	1	178298
UK parent	0.16	0.37	0	0	0	0	0	1	1	420974
Italian parent	0.10	0.31	0	0	0	0	0	1	1	331219
Log(TNA)	4.63	1.60	1.73	2.16	3.41	4.54	5.73	7.40	8.51	563512
Fund TER (%)	1.39	0.74	0.07	0.26	0.86	1.37	1.81	2.64	3.58	534533
Log(Age)	4.40	0.93	2.08	2.64	3.80	4.52	5.10	5.72	6.05	563115
Institutional ownership	0.24	0.38	0	0	0	0	0	1	1	563512
Bond fund	0.24	0.43	0	0	0	0	0	1	1	563512
Equity fund	0.40	0.49	0	0	0	0	1	1	1	563512
Mixed fund	0.30	0.46	0	0	0	0	1	1	1	563512
Alternative fund	0.04	0.19	0	0	0	0	0	0	1	563512
Money market fund	0.03	0.16	0	0	0	0	0	0	1	563512
Parent-level flows (%)	0.11	2.07	-6.05	-2.36	-0.66	0.05	0.84	2.67	6.60	547561
Capital ratio (%)	.	.	.	.	.	.	.	.	.	0
CDS spread (bps)	.	.	.	.	.	.	.	.	.	0

Table 4: Banks' investment patterns in fund shares.

	(1) Bank trade	(2) Bank trade	(3) Bank trade	(4) *X=High CDS*	(5) *X=Low cap.*	(6) *X=Low liq.*	(7) *X=Sys. shock*
Affiliated	-0.357***	-0.390***	-0.189***	-0.200**	-0.233***	-0.263**	-0.230**
	(-4.29)	(-3.94)	(-3.01)	(-2.63)	(-3.06)	(-2.57)	(-2.38)
Non-bank flows	0.00139	0.00150					
	(0.60)	(0.65)					
Is Outflow	0.0263	0.0236					
	(1.24)	(1.10)					
Non-bank flows × Is Outflow	-0.00865***	-0.00910***					
	(-3.17)	(-3.06)					
Non-bank flows × Affiliated	-0.00561	-0.00515	0.00629	0.0158	0.0108	0.0239	0.0105
	(-1.06)	(-0.95)	(0.62)	(1.04)	(0.83)	(1.37)	(0.80)
Non-bank flows × Is Outflow × Affiliated	-0.0551***	-0.0527***	-0.0327*	-0.0439	-0.0477**	-0.0848***	-0.0383
	(-3.11)	(-2.92)	(-2.02)	(-1.70)	(-2.45)	(-2.89)	(-1.56)
Affiliated × *Variable X*				0.192*	0.195**	0.252	0.0783
				(1.85)	(2.63)	(1.69)	(0.64)
Non-bank flows × *Variable X*				-0.000226	0.000416	0.00990	0.00233
				(-0.12)	(0.25)	(1.63)	(0.65)
Is Outflow × *Variable X*				-0.0274	-0.0147	0.0260	0.00812
				(-0.98)	(-0.46)	(0.59)	(0.20)
Non-bank flows × Is Outflow × *Variable X*				-0.00341	0.00111	-0.00768	0.000376
				(-0.70)	(0.26)	(-1.21)	(0.08)
Non-bank flows × Affiliated × *Variable X*				-0.0427	-0.0161	-0.0371*	-0.00958
				(-1.58)	(-1.20)	(-1.85)	(-0.37)
Non-bank flows × Is Outflow × Affiliated × *Variable X*				0.0538	0.0549**	0.102***	0.0118
				(1.52)	(2.81)	(3.14)	(0.31)
Constant	Yes	No	No	No	No	No	No
Bank-quarter fixed effects	No	Yes	Yes	Yes	Yes	Yes	Yes
Fund-quarter fixed effects	No	No	Yes	Yes	Yes	Yes	Yes
Observations	127081	127057	59097	47426	56017	31609	58827
R^2	0.010	0.048	0.487	0.488	0.489	0.474	0.484

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports coefficient estimates of different versions of regression (5) where the dependent variable *Bank trade* is a bank's net purchase/sale of a mutual fund share expressed in percent of the fund's TNA. The t-statistics reported in parentheses use standard errors clustered at the fund level and at the bank level.

Table 5: Banks' investment in funds subject to outflows.

	(1) Bank trade	(2) Bank trade	(3) Bank trade	(4) *X=High CDS*	(5) *X=Low cap.*	(6) *X=Low liq.*	(7) *X=Sys. shock*
Affiliated	-0.0673	-0.143	-0.0532	-0.0474	-0.0556	-0.00355	-0.0622
	(-0.90)	(-0.99)	(-1.20)	(-0.96)	(-0.82)	(-0.05)	(-0.95)
Distress	0.170**	0.169**					
	(2.52)	(2.68)					
Distress × Affiliated	1.598***	1.458***	0.452*	0.598*	0.657*	1.081*	0.762
	(3.16)	(3.07)	(1.74)	(1.92)	(1.97)	(1.79)	(1.43)
Affiliated × *Variable X*				0.157*	0.0327	-0.0553	0.0137
				(2.02)	(0.40)	(-0.47)	(0.19)
Distress × *Variable X*				0.204*	0.0279	-0.114	-0.0928
				(1.81)	(0.25)	(-1.39)	(-1.03)
Distress × Affiliated × *Variable X*				-0.673*	-0.688*	-0.779	-0.503
				(-1.97)	(-1.91)	(-1.12)	(-0.90)
Constant	Yes	No	No	No	No	No	No
Bank-quarter fixed effects	No	Yes	Yes	Yes	Yes	Yes	Yes
Fund-quarter fixed effects	No	No	Yes	Yes	Yes	Yes	Yes
Observations	78742	78692	36736	29138	34932	20124	36578
R^2	0.012	0.068	0.499	0.499	0.497	0.478	0.498
Sample	Outflows	Outflows	Outflows	Outflows	Outflows	Outflows	Outflows

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports coefficient estimates of different versions of regression (6) where the dependent variable *Bank trade* is a bank's net purchase/sale of a mutual fund share expressed in percent of the fund's TNA. The sample contains only observations where *Is Outflow* = 1. The t-statistics reported in parentheses use standard errors clustered at the fund level and at the bank level.

Table 6: Sensitivity of fund flows to performance.

	(1) Fund flows	(2) Fund flows	(3) Fund flows	(4) Fund flows
Alpha $\times \mathbb{1}_{\text{Alpha}>0}$	0.205***	0.212***	0.370***	0.359***
	(10.56)	(11.00)	(6.67)	(5.98)
Alpha $\times \mathbb{1}_{\text{Alpha}>0} \times$ Affiliated	-0.0253	-0.0517***	-0.0107	-0.00352
	(-1.26)	(-2.80)	(-0.19)	(-0.06)
Alpha $\times \mathbb{1}_{\text{Alpha}<0}$	0.245***	0.238***	0.275***	0.282***
	(18.21)	(17.61)	(4.92)	(5.10)
Alpha $\times \mathbb{1}_{\text{Alpha}<0} \times$ Affiliated	-0.134***	-0.0897***	-0.128**	-0.158***
	(-8.17)	(-5.62)	(-2.04)	(-2.73)
Affiliated	-0.487***	-0.219***	-0.571***	-0.300***
	(-12.17)	(-5.71)	(-7.50)	(-3.86)
Log(TNA)	0.102***	0.0462***	0.138***	0.0281
	(7.77)	(4.04)	(6.08)	(1.27)
Fund TER	0.0417	-0.116***	-0.129	-0.194**
	(1.18)	(-3.98)	(-1.60)	(-2.34)
Log(Age)	-0.387***	-0.542***	-0.155***	-0.437***
	(-16.40)	(-21.58)	(-3.99)	(-10.96)
Institutional ownership	-0.156	-0.270*	0.667**	0.0388
	(-0.89)	(-1.73)	(2.21)	(0.14)
Month fixed effects	Yes	No	Yes	No
Month-fund style fixed effects	No	Yes	No	Yes
Observations	1077470	1054876	260729	253441
R^2	0.010	0.070	0.011	0.088
Sample	Full	Full	Bond funds	Bond funds

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports coefficient estimates of regression (7), where the dependent variable is monthly percent fund flows. The sample includes funds where retail share classes exceed 50% of the TNA. In columns (3) and (4) the sample is restricted to bond funds. Fund style fixed effects represent dummy variables for each combination of a fund's asset type, Lipper Global classification scheme and geographical focus. The t-statistics reported in parentheses use standard errors clustered at the fund level and at the month level.

Table 7: Volatility of fund flows.

	(1) σ(Flows)	(2) σ(Flows)	(3) σ(Flows)	(4) σ(Flows)
Affiliated $_{t-12}$	-0.278***	-0.132***	-0.349***	-0.747**
	(-5.53)	(-2.67)	(-2.67)	(-2.58)
σ(Return)	0.172***	0.183***	0.0391	0.226**
	(7.63)	(5.63)	(1.32)	(2.05)
Institutional ownership $_{t-12}$	4.340***	2.480***	1.589***	2.710***
	(20.12)	(12.24)	(3.97)	(3.66)
Log(TNA) $_{t-12}$	-0.228***	-0.333***	-1.623***	-1.711***
	(-15.31)	(-21.72)	(-18.83)	(-12.44)
Fund TER $_{t-12}$	-0.800***	-0.443***	0.121	1.066***
	(-19.80)	(-10.58)	(1.59)	(4.06)
Log(Age) $_{t-12}$	-0.274***	-0.534***	-0.188**	0.205
	(-10.94)	(-21.33)	(-2.41)	(1.34)
Month fixed effects	Yes	No	No	No
Month-fund style fixed effects	No	Yes	Yes	Yes
Fund fixed effects	No	No	Yes	Yes
Observations	841532	823178	822898	196810
R^2	0.032	0.155	0.546	0.523
Sample	Full	Full	Full	Bond funds

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports coefficient estimates of different versions of regression (8) where the dependent variable is the volatility of monthly fund flows over the previous 12 months. The sample includes funds where retail share classes exceed 50% of the TNA. In column (4) the sample is restricted to bond funds. All regressors except $\sigma(Return)$ are at month $t-12$. $\sigma(Return)$ is the volatility of monthly fund returns over months from $t-12$ to $t-1$. Fund style fixed effects represent dummy variables for each combination of a fund's asset type, Lipper Global classification scheme and geographical focus. The t-statistics reported in parentheses use standard errors clustered at the fund level and at the month level.

Table 8: The influence of parent banks on funds' cash buffers.

	(1) Cash %	(2) Cash %	(3) Cash %	(4) Cash %	(5) Cash %	(6) Cash %	(7) Cash %	(8) Cash %
Affiliated	-0.581***	-0.688**	-0.0515	-1.278*				
	(-4.75)	(-2.47)	(-0.19)	(-1.94)				
Low capital					1.525***	2.582***		
					(5.32)	(4.91)		
High CDS							0.873***	1.558***
							(3.56)	(3.17)
σ(Flows)	0.0789***	0.0523***	0.0958***	0.100***	0.121***	0.216***	0.0809***	0.149**
	(5.93)	(6.82)	(3.48)	(5.41)	(4.27)	(3.70)	(3.18)	(2.44)
Log(TNA)	-0.354***	-0.340***	-0.349***	-0.770***	-0.425***	-0.362***	-0.345***	-0.322***
	(-9.23)	(-4.01)	(-4.77)	(-4.07)	(-6.14)	(-2.85)	(-4.82)	(-2.69)
Fund TER	0.475***	0.0834	1.269***	2.121***	0.164	1.080**	-0.285	0.438
	(4.31)	(0.57)	(4.63)	(3.33)	(0.93)	(2.20)	(-1.37)	(0.99)
Log(Age)	-0.266***	0.169	-0.190	0.303	-0.0637	0.126	-0.0110	-0.192
	(-3.74)	(1.02)	(-1.30)	(0.87)	(-0.48)	(0.50)	(-0.09)	(-0.71)
Institutional ownership	-1.463***	1.279***	-1.633**	5.819***	-4.011***	-5.249***	-1.524	-2.419
	(-3.70)	(2.90)	(-2.11)	(5.83)	(-4.08)	(-3.55)	(-1.50)	(-1.31)
Fund flows	0.0237***	0.0341***	0.000609	0.0135*	-0.00961	-0.0650**	0.0185**	-0.0154
	(6.03)	(11.54)	(0.05)	(1.71)	(-0.95)	(-2.52)	(2.25)	(-0.69)
Alpha	-0.0800***	-0.00276	-0.0942	0.0294	-0.140***	-0.219*	-0.0654*	-0.172
	(-4.13)	(-0.32)	(-1.48)	(1.01)	(-4.07)	(-1.96)	(-1.72)	(-1.50)
Month-fund style fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund fixed effects	No	Yes	No	Yes	No	No	No	No
N	459739	458863	113250	112983	127754	35674	128206	37181
R^2	0.226	0.703	0.193	0.659	0.268	0.253	0.269	0.271
Sample	Full	Full	Bond funds	Bond funds	Full	Bond funds	Full	Bond funds

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports coefficient estimates of regressions (9) and (10) where the dependent variable is a fund's percent portfolio allocation to cash and cash equivalents. The sample includes funds where retail share classes exceed 50% of the TNA. In columns (3), (4), (6) and (8) the sample is restricted to bond funds. Fund style fixed effects represent dummy variables for each combination of a fund's asset type, Lipper Global classification scheme and geographical focus. The t-statistics reported in parentheses use standard errors clustered at the fund level and at the month level.

Table 9: Bank support to affiliated funds during COVID-19 shock.

	(1) X = *High CDS*	(2) X = *High CDS*	(3) X = *High CDS*	(4) X = *CDS*	(5) X = *CDS*	(6) X = *CDS*
Affiliated	-0.261* (-1.82)	0.0230 (0.40)	-0.0719* (-1.75)	-0.307 (-1.22)	0.116 (1.42)	-0.00607 (-0.11)
Q1'20	-0.368** (-2.34)			-0.445* (-1.90)		
Q1'20 × Affiliated	0.419** (2.14)	0.702** (2.87)	0.601** (2.75)	0.821* (1.98)	1.885*** (3.73)	1.403** (2.62)
Variable X	-0.00383 (-0.30)	-0.00674 (-0.55)		0.000153 (1.02)	-0.000243 (-1.02)	
Affiliated × *Variable X*	0.150 (0.67)	-0.111 (-1.06)	0.0841* (1.88)	0.00106 (0.53)	-0.00145** (-2.19)	-0.000405 (-0.84)
Q1'20 × *Variable X*	0.240 (1.53)	0.231** (2.49)		0.00394 (1.29)	0.00572** (2.79)	
Q1'20 × Affiliated × *Variable X*	-1.162*** (-3.12)	-1.494*** (-3.95)	-1.051*** (-3.02)	-0.0190 (-1.58)	-0.0443*** (-3.79)	-0.0309** (-2.50)
Constant	Yes	No	No	Yes	No	No
Bank-quarter fixed effects	No	No	Yes	No	No	Yes
Fund-quarter fixed effects	No	Yes	Yes	No	Yes	Yes
N	109683	47589	47542	109683	47589	47542

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports coefficient estimates of regressions based on model (11). The dependent variable *Bank trade* is a bank's net purchase/sale of a mutual fund share expressed in percent of the fund's TNA. Q1'20 is a dummy variable for observations in quarter 2020Q1. *Variable X* in columns (1) to (3) is a dummy variable which is 1 if the parent bank's CDS spread is above the median CDS spread in the cross-section of holdings in the respective time period, and 0 otherwise; in columns (4) to (6) it is the continuous CDS spread. The t-statistics reported in parentheses use standard errors clustered at the fund level and at the bank level.

Table 10: Impact of COVID-19 shock on fund flows.

	(1) Fund flows	(2) Fund flows	(3) Fund flows	(4) Fund flows	(5) Fund flows
Affiliated	-0.177	0.0203	-0.207	-0.335	
	(-1.62)	(0.07)	(-0.64)	(-0.56)	
March '20 × Affiliated	0.0590*	0.430***	0.203***	0.168***	
	(1.73)	(10.82)	(4.63)	(3.65)	
High CDS					0.142
					(1.33)
March '20 × High CDS					-0.309*
					(-1.73)
Parent-level flows				0.266***	0.166***
				(19.59)	(6.02)
Fund controls	Yes	Yes	Yes	Yes	Yes
Month F.E.	Yes	No	No	No	No
Month-parent country F.E.	No	Yes	No	No	No
Month-style-parent country F.E.	No	No	Yes	Yes	Yes
Fund F.E.	Yes	Yes	Yes	Yes	Yes
N	1404017	1391341	1266889	1248489	371565
Sample	Full	Full	Full	Full	Affiliated

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports coefficient estimates of different versions of regression (12) where the dependent variable is monthly percent fund flows. The sample in column (5) is restricted to bank-affiliated funds. In this regression, *High CDS* is a dummy variable which is 1 if the parent bank's CDS spread is above the 75th percentile of the distribution in March 2020 (∼68 bps), and 0 otherwise. *Parent-level flows* are percent flows aggregated at the fund's parent bank level (for bank-affiliated funds) or parent management company level (for unaffiliated funds). Further fund controls include 6-month alpha, Log(TNA), Log(Age) and institutional ownership, all lagged at time $t-1$. Style-parent country-month fixed effects represent dummy variables for each combination of month, the country of the fund's parent company, the fund's asset type, its Lipper Global classification scheme and its geographical focus (the last three attributes defining a fund's style). The t-statistics reported in parentheses use standard errors clustered at the fund level and at the month level.

Table 11: Impact of Brexit referendum shock on fund flows.

	(1) X = *Affiliated*	(2) X = *Affiliated*	(3) X = *Affiliated*	(4) X = *Affiliated*	(5) X = *High CDS*	(6) X = *High CDS*	(7) X = *High CDS*	(8) X = *High CDS*	(9) X = *UK parent*	(10) X = *UK parent*
Fund Exp.^{UK}	-0.0908	-0.0752			-0.305	-0.341				
	(-0.26)	(-0.22)			(-0.86)	(-0.91)				
Fund Exp.^{UK} × June '16	-2.649***	-0.840***			-0.124	2.147***				
	(-12.47)	(-4.09)			(-0.55)	(7.66)				
Variable X	-0.563**	-0.488**	-0.443*	-0.653**	0.0929	-0.249	-0.432*	-0.485*	0.586	0.442
	(-2.54)	(-2.20)	(-1.71)	(-2.52)	(0.52)	(-1.35)	(-1.89)	(-1.99)	(1.13)	(0.85)
Fund Exp.^{UK} × *Variable X*	0.208	0.00952			0.596	0.503				
	(0.48)	(0.02)			(1.00)	(0.87)				
June '16 × *Variable X*	-0.186**	-0.253***	-0.714***	-0.831***	-0.188*	-0.661***	-1.306***	-1.578***	-1.486***	-1.224***
	(-2.64)	(-3.83)	(-8.94)	(-9.94)	(-1.79)	(-6.03)	(-9.39)	(-10.82)	(-10.09)	(-8.29)
Fund Exp.^{UK} × June '16 × *Variable X*	0.722***	0.624***			-3.006***	-2.274***				
	(3.54)	(2.89)			(-7.63)	(-5.70)				
Fund Exp.$^{UK\ Fin.}$			-0.143	-0.436			-0.912	-0.907		
			(-0.22)	(-0.72)			(-1.19)	(-1.29)		
Fund Exp.$^{UK\ Fin.}$ × *Variable X*			0.610	0.735			3.054**	2.081		
			(0.77)	(0.97)			(2.16)	(1.48)		
Fund Exp.$^{UK\ Fin.}$ × June '16			-4.686***	-3.104***			1.602***	2.848***		
			(-11.65)	(-8.49)			(4.53)	(5.73)		
Fund Exp.$^{UK\ Fin.}$ × June '16 × *Variable X*			3.441***	4.942***			-4.051***	-2.617**		
			(8.77)	(12.92)			(-3.72)	(-2.42)		
Affiliated									-0.134	-0.141
									(-0.33)	(-0.38)
Affiliated × June '16									-0.356***	-0.344***
									(-4.75)	(-4.77)
Affiliated × June '16 × *Variable X*									-0.118	-0.996***
									(-0.69)	(-5.02)
Fund controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Month-fund style fixed effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	745237	726234	453841	442881	238096	225475	135045	127967	703068	684686
R^2	0.176	0.230	0.189	0.235	0.180	0.268	0.201	0.264	0.179	0.234
Sample	Full	Full	Full	Full	Affiliated	Affiliated	Affiliated	Affiliated	Not UK-exposed	Not UK-exposed

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports coefficient estimates of different versions of regression (13). The dependent variable represents cumulative percent fund flows for months t and $t+1$. All models exclude share classes denominated in GBP. The sample in columns (5) to (8) is restricted to bank-affiliated funds, and in columns (9)-(10) funds with an exposure to UK assets higher than 20% are excluded. *Variable X* in columns (1) to (4) is the dummy *Affiliated*; in columns (5) to (8) it is a dummy variable which is 1 if the CDS spread of the fund's parent bank is above the 75th percentile in the sample (100 bps); in columns (9) and (10) it is a dummy variable which is 1 if the fund's parent company is from the UK. Fund controls include 6-month alpha, Log(TNA), Log(Age) and institutional ownership, all lagged at time $t-1$. Fund style fixed effects represent dummy variables for each combination of a fund's asset type, Lipper Global classification scheme and geographical focus. The t-statistics reported in parentheses use standard errors clustered at the fund level and at the month level.

Table 12: Impact of Italian sovereign distress on fund flows.

	(1) X = *Affiliated*	(2) X = *Affiliated*	(3) X = *High CDS*	(4) X = *High CDS*	(5) X = *Italian parent*	(6) X = *Italian parent*
Fund Exp.$^{Ita\ sov}$	-0.693	-0.848	-0.673	-0.752	-0.370	-0.210
	(-1.27)	(-1.57)	(-1.05)	(-1.16)	(-0.81)	(-0.47)
Fund Exp.$^{Ita\ sov}$ $\times$ May '18	-1.342***	-1.973***	-1.672***	-1.736***	-1.500***	-1.174***
	(-5.96)	(-8.72)	(-8.41)	(-6.84)	(-10.91)	(-8.43)
Variable X	-0.944***	-0.968***	0.101	-0.363	2.754***	2.450***
	(-3.52)	(-3.66)	(0.48)	(-1.57)	(3.63)	(3.22)
Fund Exp.$^{Ita\ sov}$ $\times$ *Variable X*	0.580	0.753	0.581	1.104**	0.745	0.154
	(0.90)	(1.14)	(1.44)	(2.53)	(0.69)	(0.14)
May '18 $\times$ *Variable X*	-0.116	-0.111	-1.550***	-1.253***	-2.221***	-2.325***
	(-1.38)	(-1.29)	(-8.03)	(-5.46)	(-11.46)	(-13.60)
Fund Exp.$^{Ita\ sov}$ $\times$ May '18 $\times$ *Variable X*	0.00748	1.049***	1.697***	1.295**	2.480***	2.510***
	(0.04)	(4.76)	(3.96)	(2.56)	(11.49)	(12.51)
Fund controls	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	No	Yes	No	Yes	No
Month-fund style fixed effects	No	Yes	No	Yes	No	Yes
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	507581	493522	158138	148986	307455	296494
R^2	0.200	0.255	0.208	0.299	0.204	0.270
Sample	Full	Full	Affiliated	Affiliated	Affiliated	Affiliated

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports coefficient estimates of different versions of regression (14) where the dependent variable represents cumulative percent fund flows for months t and $t+1$. The sample contains bond, mixed-asset, money market and alternative funds. The sample in columns (3) to (6) is restricted to bank-affiliated funds. *Variable X* in columns (1) and (2) is the dummy *Affiliated*; in columns (3) and (4) it is a dummy variable which is 1 if the CDS spread of the fund's parent bank is above the 75th percentile in the sample (100 bps); in columns (5) and (6) it is a dummy variable which is 1 if the fund's parent company is Italian. Fund controls include 6-month alpha, Log(TNA), Log(Age) and institutional ownership, all lagged at time $t-1$. Fund style fixed effects represent dummy variables for each combination of a fund's asset type, Lipper Global classification scheme and geographical focus. The t-statistics reported in parentheses use standard errors clustered at the fund level and at the month level.

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