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Redemption in Kind and Mutual Fund Liquidity Management

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Open-end mutual funds can use redemption in kind to satisfy investor redemptions by delivering securities instead of cash. We find that funds that reserve their rights to redeem in kind experience less redemption after poor performance. Evidence from actual in-kind transactions reveals several unique mechanisms for redemption in kind to mitigate fund runs, including the delivery of more illiquid stocks and stocks with greater tax overhang. Funds suffer less from the adverse impact of outflows on their performance. However, redeeming investors bear significant liquidation costs when they sell securities, which is associated with destabilization in the prices of these securities.

JEL classification: G23, G28, H25

Keywords: redemption in kind, mutual funds, liquidity management, financial fragility, tax overhang

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1. Introduction

Open-end investment funds typically invest in illiquid assets while offering more generous liquidity terms to their investors. However, large investor redemptions can exacerbate liquidity mismatch and result in severe consequences such as strategic complementarities or run-like behavior (Chen, Goldstein, and Jiang, 2010; Goldstein, Jiang, and Ng, 2017) as well as adverse effects on asset prices (Coval and Stafford, 2007) and fund performance (Edelen, 1999). In this paper, we provide the first investigation of redemption in kind (hereafter RIK) as a liquidity management tool that has received growing attention from regulators and practitioners.[1] RIK allows fund managers to deliver a portfolio of securities in lieu of cash to redeeming investors. Is RIK effective in reducing investor runs and associated financial fragility through the suspension of funds' liquidity transformation services? What are the implications of RIK for fund performance, redeeming and non-redeeming investors, and financial stability more broadly? We attempt to answer these questions in this study.

The impact of RIK on financial stability is ambiguous. On one hand, RIK may mitigate run-like behavior and improve stability through several unique channels. First, through the delivery of securities in lieu of cash, funds pass the transaction costs associated with security sales to redeeming investors. Remaining (i.e., non-redeeming) investors therefore have less incentive to run on the fund because they are less subject to the costs from asset sales. Second, funds have discretion in selecting the securities to deliver via RIK, such as relatively illiquid securities.[2] Consequently, RIK should help discourage redemption and, in turn, alleviate strategic complementarities among investors. Third, facing investor redemption, fund managers may be

[1] Securities and Exchange Commission (SEC) Release No. 33-10233, Sec. III.F available at https://www.sec.gov/rules/final/2016/33-10233.pdf.

[2] Funds may choose whether or not to deliver securities on a pro rata basis. We provide detailed discussion of the institutional background in Section 2.

forced to sell securities with built-in capital gains and by law must distribute such gains to the remaining investors (Dickson, Shoven, and Sialm, 2000; Bergstresser and Poterba, 2002, Sialm and Zhang, 2019). This negative tax externality can further amplify strategic complementarities and fragility. However, when managers deliver securities with built-in capital gains through RIK, funds do not distribute gains for tax purposes. RIK mitigates adverse tax consequences for non-redeeming investors, and encourage them to stay invested.

On the other hand, RIK can compromise financial stability. When redeeming investors sell the securities delivered through RIK on their own, it may increase the price pressure on those securities, which hurts the redeeming investors and other market participants who hold those securities. Extension of price pressure beyond the fund investors to other market participants also makes RIK a distinct liquidity management tool compared to other tools such as cash holdings, borrowing, interfund lending (Agarwal and Zhao, 2019), and swing pricing (Jin et al., 2022).

To the best of our knowledge, there is little empirical evidence on the extent to which funds utilize RIK as a liquidity management tool, and its efficacy for funds and investors. We fill this gap in the literature by conducting the first comprehensive study of RIK for which we manually collect data in mutual fund prospectuses and Form N-18F-1 filings. We identify all U.S. domestic equity funds that reserve the right to use RIK (hereafter RIK funds) from 1997 to 2017. We observe a significant increase in the proportion of RIK funds over time: 27.9% of the sample funds start as RIK funds in 1997, 41.8% reserve RIK between 1998 and 2017, and the remaining 30.3% stay as non-RIK funds. We find that funds following illiquid investment styles are more likely to reserve RIK. Moreover, we observe weak correlations between RIK and other liquidity management tools such as cash holdings and borrowing, consistent with the distinctive benefits of RIK such as mitigating liquidation costs and negative tax externalities for non-redeeming investors.

Next, we examine whether RIK mitigates investor runs. Following the literature, we use the sensitivity of investor flows to poor past performance to capture run-like behavior.[3] We find that the sensitivity of flows to poor performance reduces significantly when funds reserve RIK. We conduct a number of economically motivated tests to further corroborate our findings, such as (i) matching RIK funds with non-RIK funds on fund characteristics, (ii) exploiting shocks to investor redemptions during systemic market distress; (iii) separately examining retail and institutional shares; (iv) focusing on a subsample of funds switching from non-RIK to RIK; (v) investigating illiquid equity funds and bond mutual funds, and (vi) comparing the flow-performance sensitivity for funds with more versus less investor awareness about RIK. Although these results collectively show that RIK reduces fund runs after poor performance, we find some evidence that funds attract less flows after RIK adoption, since investors may be concerned about the risk of receiving their shares in kind.

To understand the extent and magnitude of RIK usage, we manually collect data on actual RIK transactions from funds' shareholder reports. 13.1% of the funds that reserve RIK actually engaged in in-kind redemptions at least once during our sample period.[4] Moreover, the disclosed RIK transaction amounts are economically large. The mean and median dollar amounts are $153 million and $70 million. The mean and median percentage amounts (when scaled by the assets under management) are 10% and 4%, respectively. These figures compare favorably to those for other liquidity management tools such as cash holding (mean: 3.37%, median: 1.98%) and interfund lending (mean: 3.11%, median: 0.90%). We also find that funds use in-kind redemptions

[3] See, e.g., Chen, Goldstein, and Jiang (2010), Goldstein, Jiang, and Ng (2017), and Franzoni and Giannetti (2019).
[4] The RIK usage we document is likely to be a lower bound because there is no regulatory requirement for funds to disclose their RIK activities during our sample period.

when they have emergency liquidity needs after large outflows. Overall, this evidence suggests that RIK is a prominent liquidity management tool and warrants more public attention.

Based on the RIK usage data, we next document several novel findings that shed light on the channels through which RIK mitigates fund runs. First, we examine changes in portfolio holdings of funds that experience investor outflows. When funds do not use RIK, they first sell liquid holdings to meet investor redemptions. In contrast, during events of RIK utilization, we observe disproportionally larger declines in funds' illiquid holdings, suggesting that they deliver illiquid securities to redeeming investors. Since remaining investors are left with a relatively liquid portfolio, they should be more likely to stay invested due to less liquidation costs and muted strategic complementarities (Chen, Goldstein, and Jiang, 2010). Interestingly, we do not find similar evidence for securities with ex-ante poor performance (i.e., abnormal short interest), suggesting that getting rid of "lemons" is not a channel through which RIK mitigates fund runs.

Second, if redeeming investors rush to sell securities received in RIK transactions, the associated price pressure may adversely affect remaining investors if funds continue to hold a significant portion of these securities. We find that funds anticipate the selling pressure from redeeming investors and are more likely to completely sell or largely offload illiquid securities during RIK transactions.

Third, we find that funds use RIK to mitigate the negative tax externalities from investor redemptions. Specifically, during the events of RIK utilization, we observe disproportionally larger reductions in securities with more built-in capital gains, which we estimate based on Jin (2006). This is in sharp contrast to funds' trading behavior in the absence of RIK usage, where capital gains overhang reduces their propensity to sell securities with more capital gains (Jin, 2006).

Consequently, remaining investors should be more likely to stay invested in the fund because RIK reduces fund's tax overhang and investors' strategic redemption to avoid capital gain distributions.

Fourth, at the stock level, we find that stocks sold due to extreme investor outflows suffer from greater price pressure after RIK transactions. This suggests that redeeming investors bear higher selling costs compared with selling by fund managers, possibly because funds can lower transaction costs through economies of scale and longstanding relation with brokers. Such costs should further discourage redemptions. Finally, at the fund level, we find that RIK utilization alleviates the adverse impact of large outflows on fund performance, which again attenuates runs.

Overall, by investing in a RIK fund, investors may receive illiquid securities exactly when they need liquidity. Offsetting this potential cost, investors enjoy several benefits of investing in RIK funds, including less strategic complementarity and greater tax advantage. From the fund's perspective, the tradeoff associated with the RIK is that funds benefit from less net outflows after poor performance but may bear the cost in terms of less net inflows during good times since RIK potentially disenfranchises flows from investors capable of triggering RIK.

During the regulatory reforms of open-end funds, RIK received a lot of attention from the SEC as a potentially important and effective liquidity management tool (Release No. 33-10233, Sec. III.F). We find that given the threat of receiving in-kind securities, RIK reduces strategic redemptions after poor performance (including periods of systemic market distress), helping improve financial stability. On the other hand, RIK transactions exacerbate price pressure on the delivered securities, thus threatening financial stability because of the adverse consequences for other market participants who hold these securities. Our analyses of these costs and benefits of

RIK should help the regulators in policymaking, and contribute to the recent literature on financial fragility in the shadow banking system and on the liquidity management tools to alleviate fragility.[5]

2. Institutional background

Laws governing the use of RIK

Mutual funds have the discretion to reserve their rights to redeem in kind based on the regulatory requirements. Section 2(a)(32) of the 1940 Act defines "redeemable security" as a security whose holder is entitled to receive approximately his/her proportionate share of the issuer's current net assets, or the cash equivalent thereof and this provision "has traditionally been interpreted as giving the issuer the option of redeeming its securities in cash or in kind" (SEC Release No. 6401). Practitioners note that redemption in kind is "perfectly legitimate"[6] and "the Investment Company Act generally gives the decision whether to redeem in cash or in kind to the management of the fund".[7]

Mutual funds may reserve their rights to redeem in kind by filing Form N-18F-1 to the SEC. By filing this form, a fund reserves the right to deliver a selection of securities at its discretion for redemption amounts over $250,000 or 1% of the net asset value (NAV) during any 90-day period (although for small redemptions less than $250,000, the fund commits to pay cash). These redemption thresholds apply to each investor redemption, rather than the aggregate amount of redemption from all investors during the 90-day period (17 C.F.R. § 270.18f-1(a)). Although one can still avoid triggering RIK by redeeming, e.g., $250K on day 1 and $250K on day 91, RIK

[5] Specifically, fragility has been documented for equity mutual funds (Chen, Goldstein, and Jiang, 2010), bond mutual funds (Goldstein, Jiang, and Ng, 2017; Chen and Qin, 2017), and money market funds (Kacperczyk and Schnabl, 2013; Schmidt, Timmermann, and Wermers 2016). Even hedge funds that have more discretion in dealing with investor redemptions (Aiken, Clifford, and Ellis, 2015) can experience fragility (Agarwal, Aragon, and Shi, 2019; Aragon, Nanda, and Zhao, 2021). Funds can manage liquidity with cash holdings (Chernenko and Sunderam, 2016; Zeng, 2017), interfund lending (Agarwal and Zhao, 2019), financial conglomerate affiliation (Franzoni and Giannetti, 2019), and swing pricing (Lewrick and Schanz, 2017; Jin et al., 2022).

[6] See https://www.wsj.com/articles/clients-pull-cash-from-valeant-investor-get-stock-instead-1460131047.

[7] See https://www.sec.gov/divisions/investment/noaction/1999/signaturefinancial122899.pdf.

would still significantly alleviate funding liquidity issues compared with the situation without RIK where investors can redeem in cash as much as they wish over a relatively shorter period. Form 18F filings are irrevocable unless the funds can prove the withdrawal of the filing is "appropriate in the public interest and consistent with the protection of investors" (17CFR §270.18f-1). We do not observe any Form 18F withdrawal event in our sample.

From a client relationship management perspective, fund managers may seek investor agreement before utilizing RIK to avoid disenfranchising investors. However, since legally fund managers have significant discretion on whether and how to use in-kind redemptions as mentioned above, managers may still choose to utilize RIK without consulting with shareholders if they face emergency liquidity needs. For example, T. Rowe Price Blue Chip Growth Portfolio mentions in its prospectus that "Large redemptions (for example, $250,000 or more) can adversely affect a portfolio manager's ability to implement a fund's investment strategy by causing the premature sale of securities that would otherwise be held longer. Therefore, the fund reserves the right (*without prior notice*) to redeem in-kind."[8] Moreover, RIK transactions benefit the remaining (i.e., non-redeeming) shareholders since they pay less tax on capital gain distributions and enjoy better fund performance. Therefore, redeeming investors may voluntarily agree to RIK transactions if they still have a substantial amount invested in the fund after redeeming.

Securities delivered under RIK

An interesting feature of RIK is that funds do not have to deliver pro rata shares to investors when utilizing in-kind redemptions. For example, several funds disclose explicitly that securities delivered via RIK will be selected at the sole discretion of the funds and will not necessarily be

[8] See https://doc.morningstar.com/docdetail.aspx?clientid=cuna&key=21d881d9a676ad8e&documenttype=124 &invest menttype=1&sourceid=208&investmentid=FVUSA002IB.

representative of their entire portfolios.[9] The SEC recently mandated mutual funds to establish policies and procedures regarding how they select securities for in-kind redemption, such as illiquid or restricted securities, or whether they plan to redeem only as a pro rata ratio of their holdings (Release No. 33-10233).

Tax consequences

The tax consequences for redeeming investors are the same whether they receive cash or a portfolio of securities. However, funds do not recognize or distribute any gains or losses when redeeming in kind, i.e., there are no tax consequences for remaining investors because USC §852(b)(6) exempts registered investment companies from capital gain recognition for in-kind redemptions. This scenario is different from redemption in cash, where any built-in capital gain for securities sold must be distributed to the remaining shareholders by the year-end even if the distribution is actually reinvested into the fund (Dickson, Shoven, and Sialm, 2000; Bergstresser and Poterba, 2002; Colon, 2017). In other words, remaining shareholders can avoid (immediate) recognition of taxable gains when funds deliver securities with built-in capital gains using in-kind redemptions. Note that this does not mean that investors never have to pay taxes on the gains because the gains are still reflected in the appreciation of the fund's NAV, i.e., investors remaining in the fund essentially defer capital gain taxes until they eventually sell their fund shares. However, benefits of tax deferral can be substantial. For example, investors can indefinitely defer and avoid paying capital gain taxes as long as they stay invested. In Appendix A, we provide a numerical

[9] For example, see the disclosure documents of several funds from Third Avenue (https://thirdave.com/wp-content/uploads/2018/08/2018-TAM-Prospectus-revised-8.29.18.pdf), Mutual Fund Series Trust (https://www.sec.gov/Archives/edgar/data/1355064/000116204413000581/catalystemp497201305.htm), Brown Advisory (https://www.brownadvisory.com/sites/default/files/Brown_Advisory_Statutory_Prospectus_8.pdf), and Bragg Capital (https://www.sec.gov/Archives/edgar/data/1170611/000116204406000496/queens497200609.htm).

example to illustrate the tax consequences of cash and in-kind redemptions for both redeeming and non-redeeming investors when securities sold have built-in capital gains.

If distributed securities have built-in losses, according to USC §311(a) no loss is immediately recognized at the fund level regardless of whether redemption is in cash or in kind. Note that this is different from the case of built-in capital gains where gains are immediately recognized for cash redemption but not for in-kind redemption as mentioned earlier. This asymmetry in the recognition of built-in capital gains versus losses provides incentive for the fund to engage in RIK for securities with built-in capital gains.

3. Hypothesis

We hypothesize that RIK should discourage investor redemption and mitigate run-like behavior for several reasons. First, mutual funds typically deliver cash to redeeming investors. As illustrated by Chen, Goldstein, and Jiang (2010), this creates a first-mover advantage, since those who redeem first bear little transaction costs from asset sales. The reason is that redemption costs are usually not reflected in redemption prices because NAVs for redeeming investors are calculated at 4:00 p.m. on the day of redemption, while actual trading generally takes place after the redemption day due to institutional frictions. When funds use RIK to deliver a portfolio of securities, the first-mover advantage is significantly reduced because redeeming investors now bear the transaction cost of selling the securities themselves.

Second, if funds selectively deliver relatively illiquid securities in RIK transactions, it should further mitigate strategic complementarities. This is because redeeming investors would have less incentive to redeem in the first place, since the cost of selling illiquid securities is greater. In addition, remaining investors are more likely to stay invested in the fund because they do not bear the cost of funds selling illiquid securities in the secondary market.

Finally, compared with cash redemption, in-kind redemption creates tax advantages for investors that stay in the fund as they can defer capital gain taxes until it is optimal for them to redeem, a notion similar to tax-timing strategies (Stiglitz, 1983; Constantinides, 1984; Dammon and Spatt, 1996). This would also predict that RIK mitigates run-like behavior.

4. Data and variable construction

4.1 Mutual fund data

We select our equity fund sample from the CRSP Survivorship-Bias-Free U.S. Mutual Fund Database from 1997 to 2017. Following Kacperczyk, Sialm, and Zheng (2008), we classify mutual funds as actively managed U.S. domestic equity funds based on the Strategic Insight objectives, Wiesenberger Fund Type Codes, and CRSP objective codes.[10] We exclude funds with the CRSP index fund flag equal to "D" (pure index fund) or "E" (enhanced index fund). We also exclude funds with the CRSP ETF flag equal to "F" (ETF) or "N" (ETN). Finally, we exclude those funds whose names indicate they are index funds or ETFs.

Our sample starts from 1997 because prior to 1993, filings of fund disclosure documents are not electronically available on the SEC EDGAR, and from 1993 to 1996, not all funds were required to file electronically (Gao and Huang, 2020). We aggregate reported variables across share classes at the fund level by value weighting them based on the total net assets (TNA) of each share class, and exclude funds with TNA less than $5 million to mitigate the effect of outliers when calculating percentage flows. Our final sample includes 3,994 unique funds from 1997 to 2017.

[10] Specifically, we include funds with the following Strategic Insight objectives: AGG, GMC, GRI, GRO, ING, or SCG. If a fund does not have a Strategic Insight objective, we use the Wiesenberger Fund Type Code and pick funds with the following objectives: G, GCI, LTG, MCG, and SCG. If none of these objectives are available and the fund has the first three letters of CRSP objective codes as EDC or EDY, then the fund will be included.

We estimate quarterly fund flows as the three-month net flows for each fund using its quarterly returns ($Ret_{i,[t-3,t]}$) and TNA at the beginning ($TNA_{i,t-3}$) and end ($TNA_{i,t}$) of each quarter as follows:

$$flow_{i,[t-3,t]} = \frac{TNA_{i,t} - TNA_{i,t-3}(1+Ret_{i,[t-3,t]})}{TNA_{i,t-3}} \quad (1)$$

where *t* denotes the month and *i* denotes the fund.

Our performance measures include return, style-adjusted return, and three-factor alpha based on Fama and French (1993), all net of fees, and our results are robust using the alphas from the Carhart (1997) four-factor model. The style-adjusted return is the fund return minus the average returns for all funds belonging to the same investment style during a given quarter. We follow Chen, Goldstein, and Jiang (2010) to estimate out-of-sample alphas. Specifically, we estimate funds' factor loadings using the previous 24 months of returns from months [*t*−1, *t*−24]. We then estimate monthly alphas in months *t*, *t*+1, and *t*+2 by subtracting the sum of factor loadings multiplied by factor returns from funds' excess returns in months *t*, *t*+1, and *t*+2. Finally, quarterly alpha during [*t*, *t*+2] is obtained by compounding the monthly alphas.

Following Chen, Goldstein, and Jiang (2010), we create a dummy variable *illiquid* to indicate funds following illiquid investment categories, such as micro-cap, small-cap, and mid-cap equities. This definition has the advantage that it is readily available to all investors, and is not affected by fund flows because it is stated at the fund's inception. For fund holdings, we merge the CRSP mutual funds with the Thomson Reuters fund holdings using the MFLINKS file based on Wermers (2000) and the procedure in Kacperczyk, Sialm, and Zheng (2008).

We obtain several variables from the N-SAR filings. Our measure of fund borrowing (*borrow*) is the average of four indicator variables that are set to one if a fund reports "Yes" to the following questions, and zero otherwise: Questions 55A and 55B ask whether a fund borrows in

excess of 1% of its assets either through an overdraft or a bank loan; Question 70O01 asks whether borrowing is permitted by investment policies; and Question 70O02 asks whether a fund engages in borrowing during the reporting period. We also collect responses to two questions related to capital gains from the N-SAR filings: Question 72AA reports the amount of realized capital gains, and Question 72EE reports the total capital gains distribution. We then merge the N-SAR data with CRSP using ticker symbols and fund names.

Finally, following Jin (2006), we estimate the built-in (i.e., unrealized) capital gains and losses for each portfolio stock using fund holdings data. Specifically, for funds incepted before 1997, the beginning of our sample period, we assume that securities were purchased during the first quarter of 1997.[11] The quarter-end price of each stock is the starting tax basis for that stock. The tax basis is adjusted in subsequent quarters for each stock position as follows. First, the number of shares purchased or sold during a quarter is the difference between shares held at the end and at the beginning of the quarter, adjusted for stock splits. Second, because we do not observe the exact dates of purchases and sales, we assume all transactions take place at the end of the quarter. Third, when there is a net purchase during the quarter, the updated tax basis is the weighted average of the beginning-of-the-quarter tax basis and the end-of-quarter closing price, weighted by the number of shares held at the quarter beginning and additional shares purchased, respectively. When there is a net sale, we assume that all purchased stocks are sold proportionally, and consequently the tax basis remains unchanged. Finally, we compute the built-in capital gains and losses using the calculated tax basis. The gains and losses are equal to the current (quarter-end) share price minus the tax basis, multiplied by the number of shares held at quarter end. Our stock-level capital gain measure, *cgstock*, is the dollar amount of capital gains scaled by the dollar

[11] Later in the paper, we show that our results still hold if we exclude funds incepted before 1997.

position size if the stock has built-in capital gains, and zero if the stock has built-in losses. When we aggregate the estimated stock-level estimated unrealized capital gains and losses at the fund level, the correlation between our fund-level measure and actual unrealized capital gains and losses reported on funds' Form N-SAR is as high as 55%, suggesting that the methodology of Jin (2006) approximates well the actual unrealized gains and losses.

4.2 Classification of RIK funds

To identify mutual funds that reserve RIK, we first collect all Form N-18F-1 filings in the SEC EDGAR database from 1997 to 2017. This process identifies all funds that have opted for this exemption under Rule 18f-1 since year 1997. We label them as RIK funds after, but not before, they file Form N-18F-1. Second, we create a comprehensive list of keywords related to in-kind redemptions such as "redemption in kind", "in-kind redemption", and another 38 variations of keyword strings (complete list available upon request from authors), and screen fund prospectuses for these keywords during our sample period. We then read these prospectuses and confirm that such funds indeed reserve their rights to redeem in kind, and label them as RIK funds. This process identifies funds that have filed Form N-18F-1 before 1997. Finally, we merge the identified RIK funds with the CRSP mutual fund data by fund tickers and names.

Table 1 reports the summary statistics of our sample. Panel A shows that among the 3,994 funds, 27.9% reserved their rights to redeem in kind at the beginning of our sample period, 41.8% reserved RIK between 1998 and 2017, and the remaining 30.3% were non-RIK funds. Panel B shows the annual breakdown of the 41.8% or 1,668 funds that adopted RIK between 1998 and 2017. Column (2) shows the number of switchers, i.e., those that did not reserve RIK previously but reserved RIK during each year. Column (3) shows the number of new funds with RIK at a fund's inception. Column (4) lists the total RIK adoptions every year by taking the sum of Column

(2) and Column (3). Within the 41.8% or 1,668 funds, 842 funds are switchers, and 826 are new funds with RIK at inception. Finally, Figure 1 shows the trend in the proportion of RIK funds over time. Since the adoption of RIK is irrevocable, it contributes to the increase in the proportion of RIK funds over time.

Panel C of Table 1 reports the summary statistics (Columns (1) through (5)), compares the fund characteristics between RIK and non-RIK funds (Columns (6) through (8)), and compares the fund characteristics before and after RIK adoption for the sample of switchers ((Columns (9) through (11)). We find that RIK funds are older, have more assets under management, follow more illiquid investment styles, have less investor flows, and hold less cash. Among RIK funds, we find that similar differences exist before and after RIK adoption. We revisit these findings in our later empirical analyses, and account for such differences using matched samples.

5. RIK and flow-performance sensitivity

5.1 Characteristics associated with RIK

We examine the relation between the RIK status and several observable fund characteristics by estimating the following linear probability model:[12]

$$RIK_{i,t} = \beta_1 + \beta_2 illiquid_i + controls + \varepsilon_{i,t} \quad (2)$$

where $RIK_{i,t}$ is an indicator variable that equals one if fund *i* is classified as a RIK fund during quarter *t*, and zero otherwise; *illiquid* captures whether a fund has an illiquid investment style as defined previously; and *controls* is a vector of control variables that include a host of fund characteristics (percentage of assets in institutional share classes, size, turnover ratio, expense ratio, age, and load fees) and time fixed effects. We cluster standard errors at the fund level.

[12] For robustness, we use a seemingly unrelated regression approach, where dependent variables are RIK, cash holding, borrowing, and interfund lending. Our results are similar to the estimates from the OLS regressions.

We report estimation results of Equation (2) in Column (1) of Table 2. RIK funds tend to be older as shown in both Table 1 and regression results in Table 2, since funds switch from non-RIK to RIK, but not vice versa. This also helps explain that RIK funds are larger in size in Table 1, but the size difference disappears in Table 2 after controlling for fund age.

Consistent with the results in Table 1, illiquid funds are more likely to reserve RIK to manage liquidity shocks, since these funds tend to benefit more from RIK. Being an illiquid fund increases the likelihood of reserving RIK by 3.9%. In Column (2), we include a continuous proxy for liquidity of holdings (*Amihud*) and style-by-date fixed effects to examine the heterogeneity in fund liquidity and RIK adoption within an investment objective. The fund-level liquidity measure *Amihud* is computed by taking the weighted average of the Amihud (2002) liquidity measure for a fund's equity holdings. We find that within-style variations in fund liquidity on a given date do not seem to drive a fund's decision to reserve RIK.

RIK could either substitute or complement other liquidity management tools. On one hand, funds that already rely on other tools may have a lesser need to use RIK for liquidity management purposes. On the other hand, such funds may have more demand for liquidity management, which would predict that they are more likely to use RIK along with other tools. Our estimation results show insignificant coefficients on borrowing and inconclusive result on cash holdings. Since RIK is likely to be an emergency liquidity management technique while cash holding is more likely to be used in daily fund operations (Chernenko and Sunderam, 2016), it is perhaps not surprising that these two do not exhibit a strong correlation. We also find significantly positive coefficients on interfund lending and whether the fund charges back-end load fees, indicating a complementary association between RIK and interfund lending, and between RIK and load fees.

We also investigate the relation between institutional ownership and RIK reservation.[13] We use a continuous measure of institutional ownership (assets in institutional shares as a fraction of a fund's total assets under management) in Columns (1) and (2), and a nonlinear specification using quintile indicator variables for institutional ownership levels in Column (3). In all specifications, we do not find a significant relation between RIK and proportional institutional ownership. Two countervailing effects make it challenging to unambiguously predict the relation between institutional ownership and RIK. On the one hand, funds with greater institutional ownership have a greater need for RIK because institutional investors are more likely to trigger RIK due to their sizable investment. On the other hand, funds may be reluctant to opt for RIK to avoid alienating institutional investors and thereby risk losing significant amount of assets under management. That being said, Table 1 shows the institutional ownership increases after RIK, thus providing some evidence on the dominance of the first effect related to RIK being more relevant for institutional investors because of their sizable investment and redemptions.

In our sample, 35% of the fund families have both RIK and non-RIK funds in the same family, suggesting that individual funds, rather than families, choose to reserve RIK. This is in sharp contrast to interfund lending programs, where fund families apply for the program that provides access to interfund lending to all the funds in the family (Agarwal and Zhao, 2019). Nonetheless, we control for family size and family fixed effects in Columns (4) and (5) in Table 2 to account for confounding effect of fund families, and find similar results.[14]

[13] We classify fund share classes into retail and institutional based on the methodology in Chen, Goldstein, and Jiang (2010) and aggregate the total assets held by institutional share classes. Our results are similar if we use the updated institutional share class identifier in the CRSP Mutual Fund database, which was missing for a substantial number of share classes but is now available for almost all share classes.

[14] The illiquidity variable becomes insignificant after controlling for family fixed effects, and the change in significance is likely driven by families that concentrate in illiquid asset classes.

Lastly, we exploit within-fund variation and use a subsample of funds that switch from non-RIK to RIK in Column (6) (i.e., switchers) to account for unobservable fund characteristics that drive the funds' decision to switch to RIK. We continue to find a positive relation between RIK and illiquidity, interfund lending, and load fees. Taken together, findings in this section indicate that RIK funds differ from non-RIK funds in several dimensions, highlighting the importance for us to account for such differences in our analyses to follow.

5.2 RIK and investor runs

5.2.1 Baseline results

In this section, we analyze whether RIK alleviates run-like behavior in investor redemptions by estimating the following regression:

$$flow_{i,t+1} = \beta_1 + \beta_2 Perf_{i,t} + \beta_3 Perf_{i,t} \times RIK_{i,t} + controls + \varepsilon_{i,t+1} \quad (3)$$

where $flow_{i,t+1}$ is the net quarterly flow for fund *i* during quarter *t+1*, $Perf_{i,t}$ is the lagged fund performance (returns, or style-adjusted returns, or three-factor alpha) during quarter *t*, and $RIK_{i,t}$ is the indicator for RIK funds. *Controls* is a vector of control variables as in Equation (2). In addition, we control for the interaction between *age* and performance to account for the fact that RIK funds tend to be older as we show in Table 2, which may exhibit weaker flow-performance response compared with younger funds (Spiegel and Zhang, 2013). Time-invariant fund characteristics such as *load* and *illiquid* are omitted due to the inclusion of fund fixed effects. We control for quarter fixed effects and double-cluster the standard errors at the fund and quarter levels.

Following the prior literature on open-end funds, we use the sensitivity of investor flows to poor performance to proxy for run-like behavior. Specifically, we follow Agarwal and Zhao (2019) and allow for nonlinearity in the flow-performance sensitivity by separating the sensitivity for good (i.e., positive) and bad (i.e., negative) performance. The measure of good performance,

perfpos, is equal to the corresponding performance measure if the performance figure is positive, and zero otherwise. Similarly, *perfneg* is equal to the performance measure if performance is negative, and zero otherwise. Column (1) of Panel A, Table 3 shows a larger coefficient on *perfpos* than that on *perfneg* (*p*-value=0.04, not tabulated). The flow-performance sensitivity is weaker on the poor performance side, reminiscent of the well-documented convex flow-performance relation in equity mutual funds (e.g., Sirri and Tufano, 1998). Importantly, Column (2) shows that the interaction term between *RIK* and *perfneg* is significantly negative, while the interaction between *RIK* and *perfpos* is statistically insignificant. The sensitivity of flows to poor performance among RIK funds decreases by 0.068, which is 41% less relative to the same sensitivity for funds without RIK (0.164). Columns (3) and (4) corroborate these findings using style-adjusted return and three-factor alpha, where the sensitivities are reduced by 37% and 29%, respectively.

As mentioned earlier, RIK is typically not a family-level decision. Nonetheless, we control for family size in all specifications, and family fixed effects in Column (5) to account for the confounding effect of fund families. Moreover, Column (6) controls for style-by-date fixed effects given their importance in RIK reservation as we find in Table 2. Finally, Column (7) focuses on the subsample of funds that switch from non-RIK to RIK during our sample period. We find that our results continue to hold in all these specifications. Overall, our findings in this section suggest that RIK funds suffer less from investor runs and capital fragility issues.

Although our results indicate that RIK helps reduce fund runs after poor performance, we also find a negative and marginally significant coefficient on the *RIK* dummy. This finding is consistent with the results in Table 1, and suggests that post RIK adoption, RIK funds attract less flows since investors may be concerned about the risk of receiving their shares in kind. We interpret these findings as suggestive of a tradeoff associated with the RIK provision that allows

RIK funds to benefit from less net outflows during bad times but bear the cost in terms of less net inflows during good times compared with non-RIK funds.

5.2.2 Alternative explanations for flow-performance relation

In this section, we address the concern that certain fund characteristics may influence the flow-performance relation. First, the use of RIK may coincide with the use of other liquidity management tools, such as interfund lending as we show in Table 2. Second, fund liquidity influences the flow-performance relation (Chen, Goldstein, and Jiang, 2010; Goldstein, Jiang, and Ng, 2017). Third, RIK and non-RIK funds may have clienteles with different horizons. For example, RIK funds may be less appealing to clientele with short investment horizons since they may redeem more frequently and bear costs associated with in-kind redemptions.[15] Finally, institutional investors may be more likely to receive in-kind redemptions because of large redemption amounts, and since institution-oriented funds can also have less runs (Chen, Goldstein, and Jiang, 2010), our results could be driven by clientele type.

We address these issues in several ways. First, we compute a measure of "residual RIK" by orthogonalizing RIK with respect to several variables that can affect the flow-performance sensitivity, including interfund lending, fund borrowing, cash holdings, load fees, fund liquidity, investment horizon, and institutional ownership. By construction, the residual RIK is unrelated to these variables. We report the results in Column (8) of Panel A, Table 3 and find that the flow-performance results also hold using the residual RIK.[16]

[15] Since data on the identities of fund clients are not publically available, we use fund investment horizon to proxy for fund investor horizon assuming managers match the durations of their funds' assets and liabilities. Specifically, we compute fund investment horizon through the duration measure of Cremers and Pareek (2015, 2016).

[16] An advantage of orthogonalizing RIK with respect to these variables is that we can keep the model parsimonious, and avoid multicollinearity between the interaction terms of RIK and all the other variables with fund performance.

Second, we match RIK funds with non-RIK funds on observable fund characteristics such as alternative liquidity management tools, fund liquidity, institutional ownership, and investment horizon to ensure that differences in these characteristics do not drive our results. We entropy-balance match the treatment (RIK) and control (non-RIK) funds by reweighting the treatment and controls (Hainmueller, 2012; Agarwal, Vashishtha, and Venkatachalam, 2018). Online Appendix 1 discusses the advantages of entropy-balanced matching and shows that the characteristics of the matched treatment and control funds are virtually identical. Panel B of Table 3 repeats our baseline analysis in Panel A of Table 3 using a matched sample, and again shows that RIK funds experience less outflows after poor performance compared with matched non-RIK funds.

Third, we recognize the importance of clientele effects since RIK is likely to be primarily used with institutional investors. We control for institutional ownership in all the flow regressions, orthogonalize RIK with respect to institutional ownership in the last Column of Panel A in Table 3, and match RIK and non-RIK funds on institutional ownership in Panel B of Table 3 to ensure that our results are not driven by the clientele effect. To further examine the role of clientele, in Panel C we separately examine institutional and retail share classes where flows are computed by aggregating the flows from all institutional and retail share classes in a fund, respectively. We find that our result holds for both retail and institutional shares, suggesting that our result is not driven by institutional clients. When testing for the difference in our variable of interest *r_perfneg* between institutional and retail share classes, the *p*-values are 0.039, 0.094, and 0.157 for the three performance measures, respectively. This shows that the effect of RIK in mitigating fund runs is stronger in the institutional subsample, consistent with institutions being more likely to engage in substantial redemptions.

Although RIK is likely to be primarily used with institutional investors, retail investors typically share the same pool of assets with institutional clients. Therefore, if institutions exhibit less run-like behavior, this should alleviate the run incentives of retail clients as well. Moreover, although institutions are more likely to trigger RIK, retail investors can also receive in-kind redemptions as suggested by the Wall Street Journal article showing an individual client receiving 95% of his redemption in one company's stock (see footnote 6 earlier in the paper).

5.2.3 Illiquid equity funds and bond funds

If RIK alleviates fund runs, we should expect stronger effects among illiquid funds because the transaction costs from fire sales are greater among such funds. Panel D of Table 3 shows the results based on the subsamples of liquid (*illiquid*=0) and illiquid (*illiquid*=1) funds. We observe that the effect of RIK in mitigating runs presents primarily among illiquid funds. When testing for the differences on the coefficients of *RIK*×*perfneg* between illiquid and liquid funds across the three performance measures, the *p*-values are 0.044, 0.064, and 0.097 across the three performance measures. This finding is consistent with our results in Table 2 that illiquid funds are more likely to reserve RIK.

Corporate bonds tend to be more illiquid than stocks, and the heightened liquidity costs lead to more pronounced run-like behavior among corporate bond mutual funds (Goldstein, Jiang, and Ng, 2017, hereafter GJN). To see if RIK is also effective in reducing runs in this illiquid asset class, we manually collect RIK adoptions data for bond funds. Since we lack fund holdings to conduct several key analyses related to the mechanisms for RIK to alleviate fragility (such as our later analyses on the change in holdings, capital gains realization, and price pressure), we focus on equity funds and report the sample selection, data collection process, and flow-performance results of bond funds in Appendix B. Appendix Table A.B, Panel A.B1 shows that consistent with the

illiquid holdings and more need for RIK, a greater fraction of bond funds adopt RIK compared with equity funds: 31.5% of bond funds had RIK at the beginning of our sample compared with 27.9% for equity funds, and 42.1% of bond funds reserved RIK between 1998 and 2017 compared with 41.8% for equity funds.

The flow-performance results are shown in Panel A.B2. In the first column under each performance measure (Columns (1), (4) and (7)), we verify that our sample shows a concave flow-performance relation as in GJN, indicated by the larger coefficients on *perfneg* compared with those on *perfpos*. Columns (2), (5) and (8) show negative coefficients on *RIK*×*perfneg*, suggesting that RIK reduces the sensitivity of outflows to poor fund performance. Columns (3), (6) and (9) use an alternative regression specification following GJN where *negdum* is an indicator variable that equals one if the corresponding performance measure is negative, and zero otherwise. Consistent with GJN, the coefficients on *negdum*×*perf* are positive and significant, i.e., flows are more responsive to poor performance. Importantly, coefficients on *negdum*×*perf*×*RIK* are all negative and significant, indicating that RIK mitigates fund runs after poor performance.

5.2.4 Investor awareness

The effect of RIK in mitigating runs should be stronger if more investors are aware that the funds have reserved RIK. Funds disclose such information in many important documents such as prospectuses, shareholder reports, and Form N-18F-1 filings. Among them, Form N-18F-1 is specifically about RIK and does not contain any other information such as fund performance or risks. In Online Appendix 2, we examine the role of investor awareness using page views of Form N-18F-1 filings recorded in SEC EDGAR's web server log files, and find that within RIK funds, those with more views of their Form N-18F-1 experience even less redemption after poor performance.

5.3 Shocks to investor redemption

We next focus on market distress events to better evaluate the systemic effects of RIK during market-wide stress periods. We define stress periods as those when the VIX index is above the 75th percentile. Such periods include the tech bubble in 2000, the financial crisis in 2007-2008, and other periods with volatile market conditions.

We follow Jin et al. (2022) and conduct a matched sample analysis.[17] Our treated funds include all funds that switched from non-RIK to RIK (switchers). For each treated fund, we identify a control fund that is never treated or not yet treated during the event window [−24, 24] and that is matched to the treated fund based on investment style and fund characteristics (performance, size, load fee, age, turnover ratio, expense ratio, cash holdings, family size, and institutional ownership). The control fund is selected by minimizing the sum of the absolute percentage differences in these characteristics between treated and control funds during the period prior to the event date. Finally, we align all treated and control funds in event time.

In the traditional two-way fixed effect models, the comparison between already-treated units and later-treated units may contaminate the model estimation (referred to as the "bad comparison" problem in Baker, Larcker, and Wang, 2022). Since each treated fund is matched to a "clean" control and the treated and controls are stacked by the event time, our method is essentially the "stacked regression" suggested by Baker, Larcker, and Wang (2022) which illustrates that this estimation procedure avoids the bad comparison problem.

We first show that the parallel trend assumption holds in Appendix C which shows that the coefficients on *treated* are insignificant during both the stress period and normal times.[18] The

[17] We thank Dunhong Jin for helpful conversations related to this analysis.
[18] Note that unlike Table 4, the regressions in Appendix C do not include fund fixed effects since *treated* will be dropped in the presence of fund fixed effects.

parallel trend is further supported by Figure 2 where we plot the differences in residual flows between switching funds and matched counterparts before and after the switch dates as the figure does not indicate a pre-trend in investor flows.[19]

We next conduct regression analyses related to market stress periods in Table 4. *Stress*, *treated* and *post* are indicator variables for the stress periods, treated funds, and post switch dates, respectively; and "×" denotes the interaction between corresponding variables.[20] We control for family-level flows in this analysis to mitigate the concern that outflows may be at the family level. Column (1) uses only the treated funds (switchers) and shows a positive and significant coefficient on the interaction *stress*×*post*, suggesting that after switching to RIK, funds lose less flows during periods of stress. We do not find a similar effect for control funds in Column (2). This result is expected as these funds do not have RIK. In Column (3), we combine the treated and control funds, and find a positive and significant coefficient on *stress*×*treated*×*post*, indicating that RIK funds lose less flows during periods of stress compared with their matched counterparts. This result is robust if we exclude time fixed effects in Column (4). Finally, the result continues to hold when we use the subsample of illiquid funds in Column (5). Figure 2 further corroborates our finding in the regression analyses by showing that during stress periods, treatment funds lose less flows after they switch to RIK compared with the controls.

Overall, our results in this section show that RIK helps mitigate fund runs during systematic market stress events. We note that RIK can also be used in idiosyncratic shocks as well, as suggested by the anecdotal evidence of Sequoia funds that we mention earlier.

[19] Residual flows are calculated by taking the regression residuals when regressing flows on fund characteristics.
[20] *treated* is omitted due to the inclusion of fund fixed effects. *stress* is omitted due to the inclusion of time fixed effects except in Column (4). The coefficient on *stress* is insignificant in Column (4) because the total effect of *stress* is absorbed by the interaction terms related to *stress*. When regressing *flow* on *stress* without the interaction terms, the coefficient on *stress* is −0.013 and the *t*-statistic is −3.16.

6. Channels through which RIK mitigates fragility

Our results so far show that RIK funds are less subject to fund runs. In this section, we shed light on the channels that can explain this finding by focusing on the events of actual RIK usage.

6.1 Data collection and summary statistics of RIK transactions

We collect funds' disclosures of their actual usage of RIK in the footnotes of their financial statements on Forms N-CSR and N-CSRS. Specifically, we first run a Python program to search through financial statements of all funds in our sample period and identify statements that include any keyword related to in-kind redemptions from our comprehensive keyword list. Second, we go through matched filings manually and collect data on whether funds delivered securities in kind and the aggregate amount of RIK transactions.

We identify 2,985 RIK disclosures made by 367 RIK funds in our sample period. Because there are a total of 2,783 RIK funds (=1,115+1,668 as shown in Table 1), it implies that 13.1% of the RIK funds used RIK. It is important to note that the extent of RIK usage we document is likely to be a lower bound because there is no regulatory requirement for funds to disclose RIK activities during our sample period. Moreover, the percentage of funds using RIK does not capture the intensity of RIK usage because we only observe one fund disclosure at a time even if the fund delivers securities in kind to multiple investors (for example, the Sequoia fund mentioned that it made thousands of in-kind redemptions[21]). Incidentally, the percentage of funds using RIK (13.1%) is comparable to the use of other liquidity management tools (7.1% use interfund lending in Agarwal and Zhao (2019) and 10% receive liquidity provision from affiliated fund of funds in Bhattacharya, Lee, and Pool (2013)).

[21] See https://www.wsj.com/articles/sequoias-redemption-with-securities-is-tax-efficient-1460583731.

Around one-third of RIK disclosures also report dollar amounts of delivered securities. The mean and median are economically significant at $153 million and $70 million, respectively, as reported in Panel A of Table 5. The mean and median as a percentage of funds' assets under management are 10% and 4%, respectively, and are larger compared with alternative liquidity management tools (mean and median cash holdings are 3.37% and 1.98% in our sample, while Agarwal and Zhao (2019) report mean and median interfund lending amounts of 3.11% and 0.90%, all percentages of funds' assets). In Online Appendix 3, we provide several examples of in-kind transactions from RIK disclosures.

Panel B of Table 5 relates the fund characteristics to RIK utilization using a linear probability model. The dependent variable *useRIK* is equal to one if there is disclosure of RIK usage by the fund during the period, and zero otherwise. Column (1) shows that flow is negatively related to the probability of RIK usage, i.e., funds are more likely to redeem in kind when they have less flows. Columns (2) and (3) show that this relation is non-linear. Investor outflows (*outflow*=1) and large investor outflows of more than 5% (*largeout*=1) both further increase the probability of RIK usage. Overall, funds are more likely to redeem in kind when they face emergency liquidity needs from large funding liquidity shocks.

As discussed earlier, funds may also use RIK for tax management purposes. When funds deliver a basket of securities with built-in capital gains, gains are *realized* but not *recognized* for tax purposes (i.e., not considered "distributed"). Such gains are reclassified as paid-in capital and added to future tax liabilities of remaining shareholders (see examples in Online Appendix 3). Consistent with the funds using RIK for tax management, in Panel B we find that RIK usage is positively associated with capital gains realization (*realcapgain*). Meanwhile, realized capital gains are not distributed as indicated by an insignificant coefficient on *distcapgain*. These results

support our prior findings on RIK mitigating fund runs. Since RIK allows non-redeeming investors to avoid capital gain distributions, it should provide them more incentives to stay invested.

6.2 In-kind redemptions and changes in funds' portfolio composition

6.2.1 Illiquid securities

Next, we examine the changes in funds' portfolio composition with and without RIK utilization. Lou (2012) documents that mutual funds tend to sell liquid holdings to meet redemption requests. However, when funds deliver securities instead of cash, they can deliver pro rata shares or more illiquid securities to maintain a liquid portfolio to manage future redemption risk. Since our sample is more recent than that in Lou (2012), we first verify that funds sell more liquid positions after outflows in our sample. We conduct a position-level analysis by examining changes in funds' equity positions over two consecutive quarter-ends in response to outflows:

$$Change_{i,j,t} = \beta_1 + \beta_2 flow_{i,t} + \beta_3 flow_{i,t} \times Amihud_{i,j,t-1} + \beta_4 flow_{i,t} \times Amihud_{i,j,t-1} \times useRIK_{i,t} + controls + \varepsilon_{i,j,t} \quad (4)$$

The dependent variable $Change_{i,j,t}$ is the percentage change in holdings of stock *j* (after adjusting for stock splits) held by fund *i* in quarter *t*. $Amihud_{i,j,t-1}$ is the Amihud (2002) illiquidity measure for stock *j*, estimated based on the stock's daily return and trading volume over the prior quarter. $useRIK_{i,t}$ is an indicator variable that is one if a fund discloses in-kind redemption during the period, and zero otherwise. As in Lou (2012), we focus on cases when funds have net outflows.[22]

Column (1) of Panel A, Table 6 reports our baseline results. The positive and significant coefficient on *flow* means that for each 1% outflow, funds sell 0.877% of the underlying securities. Column (2) shows a negative and significant coefficient on *flow*×*Amihud*, suggesting that for the same level of outflows, funds are less likely to sell their illiquid shares, i.e., flow-induced trading

[22] We include fund and time fixed effects. Our results are robust to exclusion of fund fixed effects as in Lou (2012).

is disproportionally less for more illiquid stocks. Both results are consistent with Lou (2012). Importantly, we also observe a positive and significant coefficient on the triple interaction *flow*×*Amihud*×*useRIK*, indicating that funds experience greater declines in their illiquid securities during the periods when they utilize RIK. Interestingly, the coefficient on *flow*×*Amihud*×*useRIK* (8.507) is significantly larger than that on *flow*×*Amihud* (−3.130). If funds deliver pro rata shares to redeeming investors, we expect to see the two coefficients to be similar in magnitude, because such funds should experience the same proportional decline in both liquid and illiquid positions. In contrast, the result suggests that when funds deliver securities in kind, they experience disproportionally larger decline in illiquid positions, most likely because they deliver illiquid securities to redeeming investors.

In Column (3), we condition the sample on large investor net outflows, i.e., cases when outflows are more than 5%. The coefficient on *flow*×*Amihud* continues to be negative and significant, suggesting that funds sell relatively liquid securities after extreme funding liquidity shocks. Column (3) also shows a larger coefficient estimate on *flow*×*Amihud*×*useRIK* than that in Column (2), consistent with funds delivering even more illiquid stocks in RIK transactions after extreme funding liquidity shocks.

We acknowledge that the change in illiquid holdings can be due to either selling securities in the secondary market or delivering them in RIK transactions. We believe it is the latter for two reasons. First, it is difficult to explain why funds would disproportionally sell more illiquid positions when they use RIK, suggesting that the changes in holdings are likely to capture in-kind redemptions. Second, in Online Appendix 4, we replace *useRIK* with our indicator for RIK funds (*RIK*) and repeat our analyses in Columns (2) and (3) in Panel A (see Table OA.4). The triple interaction *flow*×*Amihud*×*RIK* is insignificant, suggesting that our prior result is not due to the

possibility that RIK funds tend to sell more illiquid securities when faced with investor redemptions, but rather deliver such securities when they actually utilize RIK.

6.2.2 Positions with built-in capital gains

In addition to delivering illiquid securities, another potential channel for RIK to mitigate runs is through the delivery of securities with built-in capital gains. In Columns (2) and (3) of Panel A, Table 6, we examine the change in fund holdings for stocks with different levels of built-in capital gains. Column (2) shows a negative coefficient on *flow×cgstock*, suggesting that funds are less likely to sell securities with more built-in capital gains after outflows. This result is consistent with Jin (2006), who shows that capital gains overhang reduces funds' incentive to sell stocks to avoid capital gain distributions. Importantly, the coefficient on the triple interaction *flow×cgstock×useRIK* is positive in all specifications, i.e., when funds utilize RIK, we observe a greater reduction in their stock positions with *more* built-in capital gains. Since the coefficient on *flow×cgstock* shows that in the absence of RIK utilization, funds have less incentive to sell securities with built-in gains, the coefficient on the triple interaction suggests that funds are likely to deliver (rather than sell) securities with built-in capital gains while using RIK. These results continue to hold in Column (3) where we condition the test on extreme outflows. Overall, this evidence is consistent with funds delivering stocks with more built-in capital gains to redeeming investors in RIK transactions.

As we show in Panel D of Table 3, the flow-performance result is more pronounced among funds following illiquid investment objectives. In Columns (4) and (5), we include only those illiquid funds and their stock holdings as the trading decisions, flows, and returns are likely distinct from those for the liquid funds. Finally, when estimating built-in capital gains, we assume that securities were purchased during the first quarter of 1997 for funds incepted before 1997

(following Jin, 2006). For robustness, we exclude funds incepted before 1997 in Columns (6) and (7). We continue to find similar results in these robustness checks.

6.2.3 Securities with abnormal short interest

It is perhaps natural to conjecture that funds may use RIK to get rid of lemons, i.e., securities that are expected to have worse future performance. If this is true, it can be another channel for RIK to mitigate runs. We use stock's short interest as an ex-ante measure of poor performing stocks (Desai et al., 2002) to investigate this possibility. Specifically, we compute the stock-level abnormal short interest measure *si* following Karpoff and Lou (2010) and interact it with *flow*, *useRIK*, and *flow*×*useRIK*.[23] The last two columns of Panel A, Table 6 show that the coefficient on the triple interaction term *flow*×*si*×*useRIK* is insignificant, suggesting that funds do not systematically deliver stocks with high short interest. Therefore, delivering "lemon" stocks does not seem to be a channel through which RIK mitigates fund runs.

6.2.4 Complete selloff and large liquidations

Investors who redeem a large amount despite receiving illiquid securities in kind are likely to face significant funding liquidity needs, and may sell these securities in a short period, which can lead to significant price pressure on such securities. If funds continue to hold a significant amount of these securities, remaining investors may suffer from the adverse impact of the price pressure. In Panel B of Table 6, we examine cases when funds either completely or largely offload the stock positions. The sample is conditional on *flow*<−5% although our results are similar for *flow*<0. The dependent variable is either *completeliq*, an indicator variable that equals one if the fund completely sells off the position, and zero otherwise; or *largeliq*, an indicator variable that equals one if the fund sells at least 80% of the position, and zero otherwise. In Columns (1) and

[23] We use monthly reported short interest for the last month in a quarter. If there are multiple reports within a month (e.g., on both the 15th and month-end date), we use the short interest closest to the corresponding quarter-end date.

(2), we find negative coefficients on *flow*, suggesting that greater outflows are more likely to trigger a complete or large liquidation of positions. Importantly, the coefficient on *flow*×*Amihud*×*RIK* is also negative. This evidence shows that upon utilization of RIK, funds tend to offload their illiquid securities completely or largely. Consequently, non-redeeming investors bear little cost from any price pressure created by redeeming investors.[24]

However, it may be practically difficult for funds to completely sell or deliver an illiquid position if the position is large to begin with. To examine this issue, we compute the ownership of mutual fund *i* in stock *j* (defined as either the number of shares owned by the fund scaled by total number of shares outstanding; or the position size scaled by the fund size following Lou (2012)) and split the sample into high and low fund ownership based on the median ownership values. Columns (3) through (10) in Panel B of Table 6 show that the evidence of completely or largely liquidating an illiquid position is stronger when the fund's ownership in a stock is smaller to begin with (the coefficients on *flow*×*Amihud*×*useRIK* are more negative in the "Low" group compared to the "High" group and significant at 10% levels under all specifications). Although funds may prefer to completely sell or deliver a sizable illiquid position, it is practically more feasible to completely exit an illiquid position when the position is small.

6.3 Performance implications of RIK usage

So far, we find evidence consistent with funds utilizing RIK to deliver illiquid securities (and complete liquidation of positions to avoid price pressure), and securities with built-in capital gains to mitigate negative tax externalities for non-redeeming investors. Both results suggest that RIK should help funds mitigate the impact of severe liquidity shocks on fund performance. In this

[24] Coefficients on *flow*×*Amihud* are not uniformly positive in Panel B. We believe complete liquidation is different from the case of selling in general in Panel A of Table 6. If funds completely sell off their liquid positions, they will be left with little liquidity buffer to accommodate future waves of investor redemptions (Zeng, 2017).

section, we examine the performance implication of RIK usage because better (worse) performance after RIK utilization should give rise to less (more) fund runs. We test the performance implication by estimating the following regression:

$$Perf_{i,t+1} = \beta_1 + \beta_2 outflow_{i,t} + \beta_3 outflow_{i,t} \times useRIK_{i,t} + controls + \varepsilon_{i,t+1} \quad (5)$$

where the dependent variable $Perf_{i,t+1}$ is fund i's quarterly performance during quarter t+1. Independent variables are lagged because contemporaneous outflows can be both a cause and consequence of poor performance. Control variables include fund size, expense ratio, and two lags of performance to allow for performance persistence. For consistency with our analyses in this study, we include fund fixed effects although our results are similar if we exclude them.

Panel A of Table 7 reports the estimation results of Equation (5). All performance figures are converted to percentage points for expositional convenience. Investor outflows lead to worse fund performance with the magnitude of 12.5 basis points as shown in Column (1). In addition, past performance is positively associated with future performance, while fund size and expense ratio are negatively associated with future performance. These findings are consistent with Chen, Goldstein, and Jiang (2010). Importantly, Column (2) shows a positive and significant coefficient on the interaction term, *useRIK*×*outflow*, indicating that the use of RIK improves future fund performance. Column (3) shows that this effect is stronger in the subsample of illiquid funds. Finally, Columns (4) and (5) repeat the analyses within the subsample of RIK funds, and show that our results are not due to heterogeneity between RIK funds and non-RIK funds.[25]

[25] We define *outflow* as an indicator variable that takes a value of one when net flows are negative, and zero otherwise. However, *useRIK* can take a value of one even when the indicator variable *outflow* is zero: when net flows are positive, fund can still have outflows even though they are less than inflows. This implies that *outflow* and *useRIK* variables are not perfectly correlated.

Contemporaneous performance and flows are likely to be mechanically related. However, any mechanical relation should not drive our results since we estimate performance in the subsequent quarter out-of-sample as we discuss in the data section.[26] In Columns (6) and (7), we further mitigate this concern by estimating alphas using daily returns only within quarter *t+1*, and find similar results. Finally, we use style-adjusted returns during the subsequent quarter in Columns (8) and (9). The coefficient on *useRIK*×*outflow* is positive and significant among illiquid funds, and has the expected sign in the full sample although is statistically insignificant.

Earlier in Table 1, we observe that RIK funds on average have worse performance compared with non-RIK funds. In addition, Panel A of Table 7 shows that RIK usage benefits fund performance in the subsequent quarter. Taken together, these two results suggest that RIK usage may just prolong the inevitable demise of these funds. However, the average probabilities of death for RIK and non-RIK funds across all quarters in our sample are comparable: 0.18% and 0.16% for RIK and non-RIK funds, respectively.[27] To further examine the relation between RIK and fund demise, we use a Cox proportional hazard model in Column (1) of Panel B, Table 7 to conduct a survival analysis. We focus on the funds incepted after 1997 since for funds that adopted RIK prior to 1997, the lack of information on the exact time of RIK adoption may lead to a biased measure of their survival time.[28] The coefficient on *RIK* is insignificant, suggesting that RIK reservation does not change the hazard rate for funds. In Column (2), we regress fund performance on *RIK* and find that RIK is negatively related to the long-term fund performance (i.e., the average

[26] Specifically, we first estimate funds' factor loadings using the previous 24 months of returns from months [$t-1$, $t-24$]. In months t, $t+1$, and $t+2$, we assume the loadings are unchanged and estimate monthly alphas by subtracting the sum of factor loadings multiplied by factor returns from funds' excess returns. Finally, quarterly alpha during months [t, $t+2$] is obtained by compounding the monthly alphas.

[27] Dead funds are identified as those that close due to liquidation (CRSP delisting code DELIST_CD="L"), and do not include those funds closed to new investors or disappeared after mergers which can be motivated by strategic reasons (Jayaraman, Khorana, and Nelling, 2002).

[28] The results are similar if we include all funds in the survival analysis.

performance in all quarters after RIK adoption) as measured by the three-factor alpha (as in Panel B of Table 1). However, the economic magnitude of underperformance is small (4.6 basis points per quarter), which is perhaps not large enough to affect fund survival.

Taken together, our analyses of the actual in-kind redemptions help explain our earlier findings of muted investor runs among RIK funds. The amounts delivered are economically large. Funds use RIK as a tool to minimize capital gains tax overhang, deliver illiquid securities, and mitigate the adverse impact of large outflows on fund performance. All these results suggest that RIK utilization benefits non-redeeming shareholders, and therefore reduces run incentives.

6.4 Price pressure associated with RIK usage

Although RIK mitigates fund runs and benefits non-redeeming investors, it may impose significant costs on redeeming investors. In the previous section, we document that redeeming investors are likely to receive illiquid securities upon RIK utilization. We now turn our attention to the price impact of flow-induced trading in the event of RIK utilization. Whether RIK utilization creates more price pressure on funds' stock holdings depends on the trading strategy and financial expertise of redeeming investors (compared with that of the fund manager).

Since stock sales can be voluntary, we start with the price pressure measure in Edmans, Goldstein, and Jiang (2012), which estimates hypothetical sales at the stock level, conditional on extreme outflows (hereafter the EGJ measure):

$$MFFlow_{k,t} = \sum_{j=1}^{n} \frac{F_{j,t} \times Shares_{k,j,t-1} \times PRC_{k,t-1}}{TA_{j,t-1} \times Vol_{k,t}} \tag{6}$$

where $MFFlow_{k,t}$ is the pressure measure induced by fund flows on stock *k* in quarter *t*, $F_{j,t}$ is the *absolute value* of dollar outflows for fund *j* in quarter *t*, $\frac{Shares_{k,j,t-1} \times PRC_{k,t-1}}{TA_{j,t-1}}$ is the ownership of

fund *j* on stock *k* as a percentage of the fund's total assets at the beginning of the quarter, and $Vol_{k,t}$ is the dollar trading volume of stock *k* during quarter *t*. The summation is only over observations in which the fund outflows are more than 5%.

To estimate the effect of flow-induced selling pressure on stocks in a fund's portfolio, we estimate the following regression:

$$CAR_{k,t} = \beta_1 + \beta_2 MFFlow_{k,t} + \beta_3 rikown_{k,t} \times MFFlow_{k,t} + controls + \varepsilon_{i,t} \qquad (7)$$

where *rikown* is the ownership of funds that use RIK as a proportion of the total mutual fund ownership in stock *k*. $CAR_{k,t}$ is the quarterly cumulative abnormal return of stock *k* in quarter *t*. Specifically, we use daily stock returns within the quarter and estimate a stock's alpha based on the Fama and French (1993) three-factor model. Following Agarwal and Zhao (2019), the control variables include the logarithm of stock's market capitalization, the book-to-market ratio, and total mutual fund ownership on the stock.

We present estimation results in Column (1) of Table 8. The estimated coefficients on the price pressure measure $MFFlow$ are negative, suggesting that more pressure from outflows leads to worse performance of underlying stocks in a fund's portfolio. In addition, the estimated coefficient on the interaction term $rikown \times MFFlow$ is also negative and significant, i.e., given the same price pressure, as more fund owners use RIK, there is greater price pressure on the underlying stock. This suggests that the price pressure generated by redeeming investors who receive in-kind redemption is greater than the selling pressure generated by fund managers.

Wardlaw (2020) argues that the EGJ measure is correlated with stock return and trading volume, and thus may lead to a mechanical relation between *MFFlow* and stock performance. Instead of scaling flow by dollar trading volume as in EGJ, he proposes to scale it by total shares outstanding of the stock. Note that this alternative measure is conservative. Although the EGJ

measure can be correlated with stock return and volume, variations in return and volume may still be a direct result of the fund flow pressure (Wardlaw, 2020). Nonetheless, for robustness we repeat our analysis using the flow-to-stock measure in Wardlaw (2020) where the pressure measure is scaled by total shares outstanding $Shrout_{k,t-1}$:

$$MFFlow_{k,t} = \sum_{j=0}^{n} \frac{F_{j,t} \times Shares_{k,j,t-1} \times PRC_{k,t-1}}{TA_{j,t-1} \times Shrout_{k,t}} \quad (8)$$

We report estimation results in Column (2) of Table 8. We continue to find that in-kind redemptions have a greater price impact on the stocks.

The EGJ measure addresses endogeneity concerns related to managers selling stocks that have lower expected future returns. Our results on short interest in Panel A of Table 6 potentially alleviates this concern. Since we show that fund's selling is not proportional (to stock liquidity) as implicitly assumed by the EGJ measure, in Column (3) of Table 8 we use actual selling in Coval and Stafford (2007) instead of hypothetical selling in EGJ for additional robustness. We continue to find greater price pressure associated with in-kind redemptions. In Columns (4)−(6), we focus on the subsample of stocks held by funds following illiquid investment styles. The effects are stronger among stocks held by illiquid funds as the coefficients on both *MFFlow* and *rikown*×*MFFlow* are generally larger than those in Columns (1)−(3). Overall, these results suggest that investors are worse off when they liquidate stocks on their own compared with liquidity transformation services provided by fund managers.

We show earlier that upon utilization of RIK, funds are more likely to completely sell off or largely offload illiquid securities (Panel B of Table 6). Although non-redeeming shareholders bear little cost from the price pressure, RIK usage shifts the liquidity costs to the redeeming investors and other market participants, and thereby threatens financial stability.

7. Conclusions

We provide the first empirical analysis on redemption in kind as a liquidity management tool in open-end mutual funds. We document contrasting effects of RIK on financial stability. RIK improves stability through reduction of fund runs, especially among illiquid funds, and alleviates panic-driven redemptions during systemic market stress periods. Further analyses of actual in-kind transactions are consistent with several novel channels through which RIK mitigates fund runs. Specifically, funds tend to use RIK to deliver relatively illiquid securities and better manage capital gains distributions, both of which mitigate the impact of outflows on fund performance. Offsetting these benefits, fund investors face the risk of receiving illiquid securities and lose liquidity transformation services provided by fund managers. As a result, RIK events can hurt financial stability due to greater price pressure on the delivered securities, and adversely affect the redeeming investors as well as other market participants holding those securities. Overall, our findings shed light on the economics of RIK, a widely used but little studied liquidity management tool employed by a large fraction of open-end mutual funds. Our study contributes to the literature on investor runs among non-bank financial institutions, and informs the recent debate on the design, implementation, and regulation of liquidity management practices.

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Figure 1. Proportion of RIK fund over time

This figure plots the proportion of RIK funds by year, defined as the total number of RIK funds at the end of the year, divided by the total number of live funds at the end of the year.

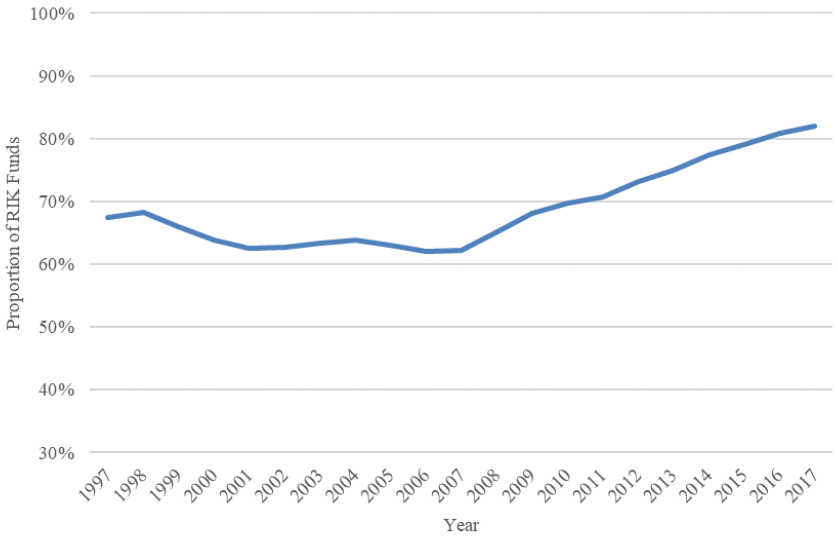

Figure 2: Investor flows before and after RIK reservation

The figures below show the average differences in residual flows between treated funds (switchers) and their matched controls before and after the switching date during stress periods in the top subplot and during normal times in the bottom subplot. Stress period is defined as when the VIX index is above the 75th percentile, and normal times are those outside the stress periods. Residual flows are the regression residuals after regressing flow on fund characteristics (performance, size, load fee, age, turnover ratio, expense ratio, cash holdings, family size, and institutional ownership). For each event period, differences in residual flows are calculated by subtracting the residual flows of control funds from the residual flows of their treated funds. The dots indicate the average of these differences at each event date. The linear plots and the 95% confidence intervals are obtained by fitting the 24 observations before and after the switching dates, for stress and normal times, respectively.

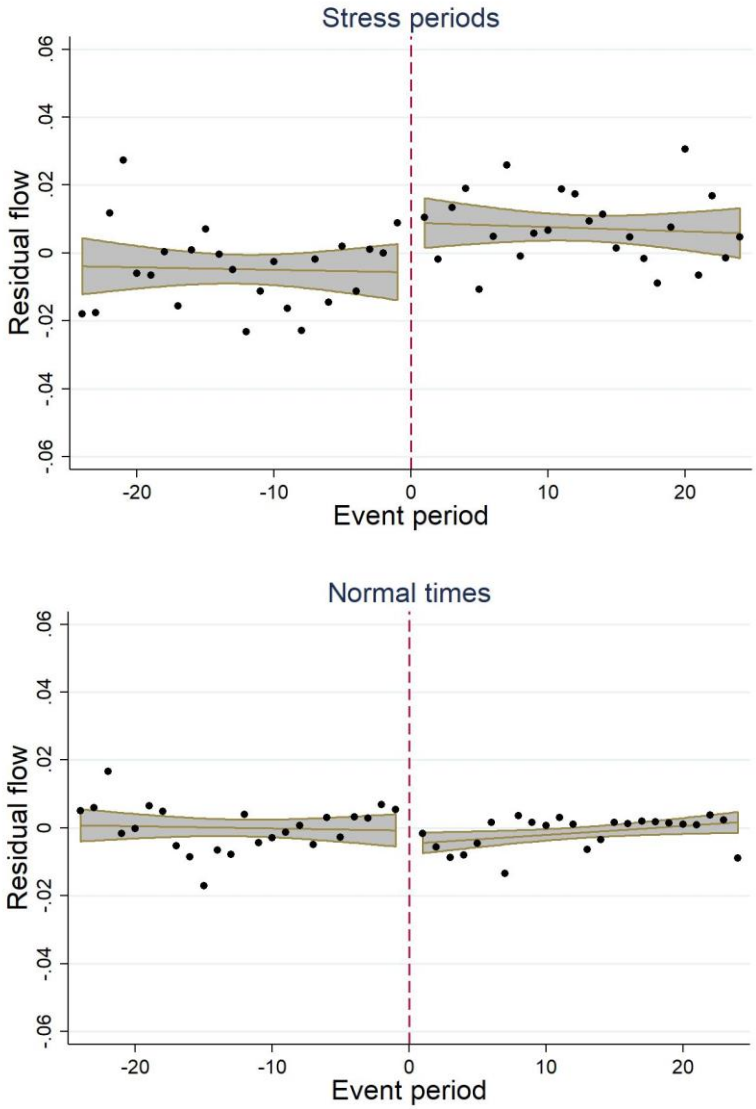

Table 1. Summary Statistics

The sample includes 3,994 actively-managed U.S. domestic equity funds from 1997 to 2017. Panel A shows the number of RIK funds at the beginning of our sample period, the number of funds that reserved RIK between 1998 and 2017, and the number of funds that are not RIK funds throughout our sample period. Panel B shows the breakdown of RIK adoptions between 1998 and 2017. In Column (2), "Switchers" is the number of funds switching from non-RIK to RIK in a given year. Column (3) reports the number of new funds with RIK at a fund's inception each year. Column (4) reports the total RIK adoptions each year. In Panel C, Columns (1)−(5) report the summary statistics. *Flow* is quarterly net flow as a percentage of fund's TNA at the end of last quarter. *Size* is the logarithm of total net asset in millions of dollars. *Lage* is the logarithm of the number of months since a fund's inception. *Ret* and *sret* are net fund return and style-adjusted return, respectively. The mean values of *sret* are reported in basis points in Columns (1), (6), (7), (9) and (10). *Alpha3* is the out-of-sample quarterly alpha from the Fama and French (1993) three-factor model where funds' factor loadings are estimated using the previous 24 months of returns. Monthly alphas in the next three months are estimated by subtracting the sum of factor loadings multiplied by factor returns from funds' excess returns. Quarterly alpha is obtained by compounding the monthly alphas. *Illiquid* is an indicator variable that equals one if a fund invests in illiquid styles such as micro-cap, small-cap and mid-cap stocks, and zero otherwise. *Instown* is ownership by institutional share classes as a fraction of total fund assets under management. *Exp_ratio* is the expense ratio of a fund as a percentage of total assets reported in the CRSP mutual fund database. *Turn_ratio* is the turnover ratio of a fund reported in the CRSP mutual fund database. *Borrow* is the average of four indicator variables that are set to one if a fund reports "Yes" to the following questions on their N-SAR filings, and zero otherwise: Questions 55A and 55B on whether a fund borrows in excess of 1% of its assets either through an overdraft or a bank loan; Question 70O01 on whether borrowing is permitted by fund investment policies; and Question 70O02 on whether a fund engages in borrowing during the reporting period. *Load* is an indicator variable that equals one if the fund charges back-end load fees, and zero otherwise. *Ilp* is an indicator variable that equals one if a fund can engage in interfund lending, and zero otherwise. *%cash* is the percentage of fund assets held in cash reported in the CRSP mutual fund database. Columns (6)−(8) compare the characteristics between RIK and non-RIK funds. Columns (9)−(11) compare the differences before and after RIK adoption for the subsample of funds that switch from non-RIK to RIK. Columns (8) and (11) report the *p*-value for testing the differences under univariate *t*-test.

Panel A: Redemption in kind status at fund level

	# of funds	% of sample
Full sample	3,994	
Funds with RIK in 1997	1,115	27.9%
Fund that reserve RIK between 1998 and 2017	1,668	41.8%
Funds without RIK throughout the sample	1,211	30.3%

Panel B: RIK adoptions by year

(1) Year	(2) Switchers	(3) New funds with RIK at inception	(4) Total RIK adoptions
1998	52	102	154
1999	41	45	86
2000	62	68	130
2001	50	40	90
2002	55	33	88
2003	62	36	98
2004	50	27	77
2005	56	74	130
2006	67	44	111
2007	72	42	114
2008	59	36	95
2009	25	1	26
2010	15	9	24
2011	15	11	26
2012	20	18	38
2013	33	62	95
2014	31	84	115
2015	24	54	78
2016	28	30	58
2017	25	10	35
Total	842	826	1,668

Panel C: Summary statistics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Mean	Std. Dev.	25%	50%	75%	non-RIK	RIK	*p*-val(Diff)	RIK-pre	RIK-post	*p*-val(Diff)
flow	0.025	0.168	−0.041	−0.010	0.039	0.038	0.018	0.00	0.056	0.004	0.00
size	5.411	1.965	4.099	5.444	6.771	4.815	5.732	0.00	5.042	5.770	0.00
lage	4.564	1.022	4.043	4.787	5.347	3.702	5.028	0.00	4.344	5.062	0.00
ret	0.021	0.093	−0.023	0.032	0.076	0.025	0.019	0.00	0.028	0.020	0.00
sret	0.000	0.036	−0.017	0.000	0.017	6.049	−2.124	0.08	10.020	−3.578	0.00
alpha3	−0.002	0.044	−0.022	−0.003	0.017	−0.002	−0.003	0.00	−0.001	−0.003	0.00
illiquid	0.299	0.458	0	0	1	0.214	0.345	0.00	0.263	0.299	0.00
instown	0.282	0.401	0	0.020	0.537	0.267	0.290	0.00	0.202	0.281	0.00
exp_ratio	0.013	0.005	0.010	0.012	0.015	0.013	0.012	0.00	0.013	0.012	0.00
turn_ratio	0.877	0.921	0.340	0.630	1.090	0.933	0.847	0.00	0.869	0.892	0.00
borrow	0.285	0.185	0.250	0.250	0.250	0.185	0.339	0.00	0.295	0.317	0.00
load	0.621	0.485	0	1	1	0.502	0.685	0.00	0.596	0.689	0.00
ilp	0.184	0.388	0	0	0	0.223	0.163	0.00	0.046	0.169	0.00
%Cash	3.371	4.488	0.460	1.980	4.510	4.619	2.699	0.00	5.036	2.741	0.00

Table 2: Characteristics associated with RIK funds

This table presents estimation results of Equation (2) using fund-quarter observations. The dependent variable *RIK* is an indicator variable that equals one if a fund reserves its right to redeem in kind during the quarter, and zero otherwise. *instown_Q5* through *instown_Q2* are indicator variables based on quintiles of institutional ownership (from high to low). Other independent variables are defined earlier. Columns (1) − (5) use the full sample of funds and Column (6) uses the subsample of funds that switch from non-RIK to RIK. Standard errors are clustered at the fund level and *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) *RIK*	(2) *RIK*	(3) *RIK*	(4) *RIK*	(5) *RIK*	(6) *RIK*
illiquid	0.039**		0.040***	0.038**	0.019	0.029*
	(2.44)		(2.60)	(2.42)	(1.30)	(1.65)
Amihud		−0.036				
		(−0.40)				
instown	−0.004	−0.007		−0.003	−0.009	−0.026
	(−0.22)	(−0.34)		(−0.16)	(−0.48)	(−1.14)
instown_Q5			−0.012			
			(−0.54)			
instown_Q4			−0.001			
			(−0.03)			
instown_Q3			−0.022			
			(−1.20)			
instown_Q2			0.023			
			(1.30)			
%Cash	−0.001	−0.001	−0.002*	−0.001	0.001**	0.000
	(−0.78)	(−0.72)	(−1.92)	(−0.65)	(2.45)	(0.01)
ilp	0.095***	0.101***	0.099***	0.091***	0.037***	0.103***
	(5.86)	(5.91)	(6.22)	(5.64)	(3.96)	(5.62)
borrow	−0.023	−0.030	−0.024	−0.024	−0.012	−0.081***
	(−1.25)	(−1.45)	(−1.37)	(−1.28)	(−1.26)	(−3.46)
size	0.007	0.008	0.006	0.002	0.001	0.005
	(1.54)	(1.61)	(1.30)	(0.48)	(0.18)	(0.88)
load	0.040***	0.045***	0.031**	0.038***	0.000	0.054***
	(2.72)	(2.81)	(2.15)	(2.58)	(0.01)	(2.93)
turn_ratio	0.034***	0.038***	0.029***	0.033***	0.005	0.031***
	(5.55)	(5.68)	(4.79)	(5.38)	(0.94)	(4.31)
exp_ratio	−4.410**	−4.012**	−4.039**	−4.137**	3.137*	−3.732*
	(−2.35)	(−1.97)	(−2.28)	(−2.21)	(1.85)	(−1.82)
lage	0.073***	0.077***	0.057***	0.072***	0.094***	0.083***
	(7.41)	(6.97)	(6.18)	(7.21)	(9.36)	(6.49)
familysize				0.005***		
				(3.24)		
Style×time FE	No	Yes	No	No	No	No
Family FE	No	No	No	No	Yes	No
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	125,588	90,940	125,588	125,588	125,588	48,920
Adj. R^2	0.066	0.073	0.086	0.067	0.687	0.274

Table 3. Redemption in kind and flow-performance sensitivity

This table reports estimation results of Equation (3) using fund-quarter observations. The dependent variable is fund's quarterly flow, and the independent variables are lagged fund characteristics. "×" denotes interaction between corresponding variables. Panel A reports the baseline results. Panel B reports the results using entropy-balance matched sample of RIK and non-RIK funds. Panel C reports results for the subsample of institutional and retail share classes, respectively. Panel D shows the results using subsamples of liquid and illiquid funds. Control variables in Panels B, C and D are the same as those in Panel A with fund and time fixed effects, and are omitted for brevity. Standard errors are double-clustered at the fund and quarter levels and *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A

	Baseline		Style Return	Alpha	Family FE	Style×time FE	Switchers	ResidualRIK
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	flow	*flow*	*flow*	*flow*	*flow*	*flow*	*flow*	*flow*
perfpos	0.151***	0.160***	0.102*	0.493***	0.137***	0.153***	0.139***	0.148***
	(3.17)	(3.54)	(1.92)	(5.77)	(3.32)	(3.52)	(3.91)	(3.07)
perfneg	0.114***	0.164***	0.183***	0.488***	0.153***	0.155***	0.193***	0.113***
	(3.40)	(4.42)	(6.29)	(10.51)	(3.12)	(4.45)	(5.37)	(3.36)
RIK×perfpos		−0.018	−0.012	0.076	−0.029	−0.016	−0.017	−0.003
		(−0.56)	(−0.35)	(0.77)	(−0.95)	(−0.54)	(−0.36)	(−0.10)
RIK×perfneg		−0.068**	−0.067***	−0.140**	−0.064**	−0.061**	−0.119***	−0.067**
		(−2.61)	(−2.90)	(−2.36)	(−2.14)	(−2.57)	(−3.58)	(−2.41)
RIK	−0.007*	−0.007*	−0.008**	−0.010***	−0.006	−0.007*	−0.008	−0.007*
	(−1.96)	(−1.86)	(−2.21)	(−2.84)	(−1.70)	(−1.84)	(−1.40)	(−1.95)
size	−0.026***	−0.026***	−0.026***	−0.024***	−0.008***	−0.026***	−0.024***	−0.026***
	(−13.18)	(−13.20)	(−13.12)	(−11.15)	(−7.18)	(−12.94)	(−10.26)	(−13.20)
lagflow	0.222***	0.222***	0.223***	0.216***	0.228***	0.217***	0.215***	0.222***
	(13.40)	(13.40)	(13.43)	(12.34)	(10.88)	(13.20)	(9.12)	(13.40)
turn_ratio	−0.002	−0.002	−0.002	−0.002	−0.001	−0.002	−0.001	−0.002
	(−1.28)	(−1.26)	(−1.21)	(−1.12)	(−0.88)	(−1.28)	(−0.87)	(−1.27)
exp_ratio	0.066	0.068	0.088	0.063	0.803	0.037	−0.344	0.074
	(0.08)	(0.08)	(0.10)	(0.07)	(1.25)	(0.04)	(−0.46)	(0.09)
lage	−0.046***	−0.046***	−0.046***	−0.042***	−0.017***	−0.046***	−0.044***	−0.046***

	(−14.07)	(−14.08)	(−13.87)	(−10.28)	(−5.33)	(−14.14)	(−9.11)	(−14.05)
lage×perf	−0.000**	−0.000*	−0.000	−0.001***	−0.000	−0.000**	−0.000	−0.000**
	(−2.50)	(−1.95)	(−1.06)	(−4.38)	(−0.07)	(−2.13)	(−0.86)	(−2.11)
%cash	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.002***	0.001***
	(7.69)	(7.74)	(7.78)	(7.48)	(7.90)	(7.62)	(5.01)	(7.64)
familysize	0.000	0.000	0.000	0.001	−0.016***	0.000	−0.000	0.000
	(0.35)	(0.35)	(0.30)	(1.15)	(−10.24)	(0.27)	(−0.03)	(0.34)
instown	0.096***	0.096***	0.096***	0.090***	0.080***	0.096***	0.085***	0.095***
	(4.05)	(4.05)	(4.05)	(3.86)	(5.03)	(4.10)	(4.06)	(4.04)
Time FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund FEs	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Observations	125,588	125,588	125,588	125,588	125,588	125,588	48,920	125,588
Adj. R^2	0.256	0.256	0.256	0.234	0.250	0.262	0.223	0.256

Panel B: Matched sample

Perf. measures	Raw Return	Style Return	Alpha
	(1)	(2)	(3)
	flow	*flow*	*flow*
RIK×perfpos	−0.012	−0.007	0.071
	(−0.45)	(−0.25)	(0.82)
RIK×perfneg	−0.054**	−0.051**	−0.140**
	(−2.36)	(−2.51)	(−2.34)
Controls	Yes	Yes	Yes
Fund and time FEs	Yes	Yes	Yes
Observations	125,588	125,588	125,588
Adj. R^2	0.258	0.258	0.240

Panel C: Institutional and retail shares

Samples	Institutional shares			Retail shares		
Perf. measures	Raw Return	Style Return	Alpha	Raw Return	Style Return	Alpha
	(1)	(2)	(3)	(4)	(5)	(6)
	flow	*flow*	*flow*	*flow*	*flow*	*flow*
RIK×*perfpos*	0.008	0.045	0.176	−0.020	−0.007	−0.029
	(0.16)	(1.09)	(0.97)	(−0.87)	(−0.25)	(−0.39)
RIK×*perfneg*	−0.150***	−0.129***	−0.258*	−0.065***	−0.068***	−0.088*
	(−2.82)	(−2.93)	(−1.86)	(−3.04)	(−3.22)	(−1.67)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund and time FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	70,305	70,305	70,305	98,962	98,962	98,962
Adj. R^2	0.146	0.146	0.141	0.252	0.251	0.239

Panel D: Liquid and illiquid funds

Perf. measures	Raw Return		Style Return		Alpha	
Samples	liquid	illiquid	liquid	illiquid	liquid	illiquid
	(1)	(2)	(3)	(4)	(5)	(6)
	flow	*flow*	*flow*	*flow*	*flow*	*flow*
RIK×*perfpos*	−0.067*	0.007	−0.054	0.011	−0.040	0.135
	(−1.76)	(0.18)	(−1.28)	(0.27)	(−0.24)	(1.23)
RIK×*perfneg*	−0.025	−0.090***	−0.028	−0.092***	−0.072	−0.185**
	(−1.10)	(−2.94)	(−0.99)	(−3.31)	(−0.86)	(−2.63)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund and time FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	84,975	40,613	84,975	40,613	84,975	40,613
Adj. R^2	0.250	0.284	0.250	0.284	0.225	0.269

Table 4. Investor flows during stress periods: matched sample analysis

This table reports investor flows during periods of market stress for funds that switch to RIK (switchers) and their matched counterparts. For each switching event, a control fund is matched to the treated fund, conditional on the fund a) being never treated or not yet treated during the event window [−24, 24]; b) following the same investment style; and c) having the smallest sum of the absolute percentage differences in fund characteristics (performance, size, load fee, age, turnover ratio, expense ratio, cash holdings, family size, and institutional ownership). *stress* is equal to one during the quarters when the VIX index is above the 75th percentile, and zero otherwise. *treated* is equal to one for funds that switch from non-RIK to RIK, and zero otherwise. *post* is equal to one for the post-RIK adoption period, and zero otherwise. Regressions are based on the switchers in Column (1), the control funds in Column (2), the switchers and control funds in Columns (3) and (4), and the illiquid funds in Column (5). Standard errors are double-clustered at the fund and quarter levels and *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Switchers	Controls	All	All	Illiquid
	(1)	(2)	(3)	(4)	(5)
	flow	*flow*	*flow*	*flow*	*flow*
stress×treated×post			0.025***	0.024***	0.031**
			(3.54)	(3.38)	(2.25)
treated×post			−0.003	−0.004	−0.002
			(−0.71)	(−1.09)	(−0.34)
stress×post	0.019***	−0.009	−0.007	−0.008	−0.005
	(3.18)	(−1.57)	(−1.55)	(−1.26)	(−0.54)
stress×treated			−0.009**	−0.009**	−0.017
			(−2.16)	(−2.16)	(−1.71)
post	−0.008	0.004	−0.001	−0.012***	−0.000
	(−1.57)	(0.86)	(−0.40)	(−3.40)	(−0.19)
ret	0.359***	0.339***	0.350***	0.119***	0.137***
	(7.07)	(6.08)	(7.93)	(4.88)	(2.45)
stress				−0.003	
				(−0.65)	
size	−0.026***	−0.039***	−0.009***	−0.010***	−0.010***
	(−8.87)	(−8.30)	(−7.15)	(−7.69)	(−4.25)
lagflow	0.210***	0.217***	0.240***	0.247***	0.236***
	(10.59)	(6.74)	(12.10)	(12.45)	(9.26)
load	0.020***	−0.011	0.008**	0.008**	0.016*
	(2.67)	(−0.84)	(2.53)	(2.31)	(2.07)
lage	−0.037***	−0.029***	−0.014***	−0.018***	−0.018***
	(−5.10)	(−2.68)	(−5.08)	(−6.14)	(−2.86)
lage×ret	−0.000	−0.000	−0.000	−0.000	−0.000
	(−1.13)	(−1.27)	(−0.72)	(−1.09)	(−0.47)
turn_ratio	0.000	−0.005	−0.000	−0.000	0.003
	(0.11)	(−1.06)	(−0.18)	(−0.03)	(0.98)
exp_ratio	−1.779**	3.431	−0.214	0.047	0.351

	(−2.12)	(1.55)	(−0.54)	(0.12)	(0.33)
%cash	0.002***	0.001**	0.001***	0.001***	0.000
	(4.23)	(2.19)	(4.66)	(3.96)	(0.70)
familysize	−0.001**	0.003**	0.000	0.000	0.001
	(−2.31)	(2.60)	(0.09)	(0.82)	(0.45)
instown	0.075***	0.085***	0.050***	0.052***	0.058***
	(6.00)	(3.96)	(6.36)	(6.51)	(3.79)
familyflow	0.462***	0.625***	0.542***	0.539***	0.535***
	(8.80)	(7.52)	(13.04)	(13.16)	(12.02)
Fund FEs	Yes	Yes	Yes	Yes	Yes
Time FEs	Yes	Yes	Yes	No	Yes
Observations	20,756	11,974	32,740	32,740	8,977
Adj R^2	0.313	0.391	0.296	0.280	0.299

Table 5. Descriptive statistics of actual RIK utilization

Panel A reports the summary statistics of in-kind transactions. Panel B relates the characteristics of RIK funds to utilization of in-kind transactions. *useRIK* is an indicator variable that is equal to one if the RIK fund reports delivery of securities in kind during the corresponding period, and zero otherwise. *realcapgain* and *distcapgain* are realized capital gain (N-SAR Q#72AA) and capital gain distribution (N-SAR Q#72EE) as a percentage of a fund's TNA, respectively. *outflow* is an indicator variable for net outflows, and *largeout* is an indicator variable for large outflows of more than 5%. Standard errors are clustered at the fund level and *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Summary statistics of in-kind transactions

	N	Mean	Std. Dev.	25%	50%	75%
RIK usage indicator	2,985	1	1	1	1	1
RIK amount ($mil)	1,016	153	235	24	70	164
RIK amount / TNA (%)	1,016	10.4	16.1	1.3	4.0	12.1

Panel B: Characteristics associated with in-kind transactions

	(1) *useRIK*	(2) *useRIK*	(3) *useRIK*
flow	−0.009***	−0.006***	−0.005**
	(−4.06)	(−2.95)	(−2.50)
outflow		0.002*	
		(1.86)	
largeout			0.003***
			(2.97)
realcapgain	0.037**	0.037**	0.036**
	(2.34)	(2.31)	(2.24)
distcapgain	0.017	0.017	0.017
	(0.79)	(0.77)	(0.76)
ret	0.001	0.001	0.001
	(0.19)	(0.34)	(0.22)
size	0.007***	0.007***	0.007***
	(6.24)	(6.31)	(6.32)
exp_ratio	−0.316	−0.314	−0.310
	(−1.21)	(−1.20)	(−1.19)
turn_ratio	0.000	0.000	0.000
	(0.57)	(0.54)	(0.51)
lage	−0.016***	−0.016***	−0.016***
	(−4.17)	(−4.19)	(−4.18)
%cash	−0.000*	−0.000*	−0.000*
	(−1.88)	(−1.80)	(−1.79)
Fund and time FEs	Yes	Yes	Yes
Observations	83,516	83,516	83,516
Adj. R^2	0.132	0.132	0.132

Table 6. Changes in funds' stock portfolio after RIK utilization

This table reports the estimation results of Equation (4), which examines the changes in mutual funds' stock portfolio in response to outflows. In Panel A, the dependent variable is the percentage change of a fund's holdings in a stock during a quarter after adjusting for stock splits. *Amihud* is the stock's Amihud (2002) illiquidity measure, estimated based on the stock's daily return and trading volume over the prior quarter. *cgstock* is the dollar amount of a stock's unrealized capital gains scaled by dollar position size of the stock if the stock has built-in capital gains, and zero if the stock has built-in capital losses. *si* is the stock-level abnormal short interest measure. Columns (1) −(3), (8), and (9) use the full sample of funds. Columns (4) and (5) use the subsample of illiquid funds. Columns (6) and (7) exclude the funds incepted before 1997. In Panel B, *completeliq* is an indicator variable that is equal to one if the position is completely liquidated, and zero otherwise. *largeliq* is an indicator variable that is equal to one if the position is liquidated by at least 80%, and zero otherwise. In Columns (3) − (6), fund ownership on the stock is defined as shares owned scaled by total shares outstanding. In Columns (7) − (10), fund ownership is defined as the dollar value of position scaled by total fund assets. Observations are at fund-stock-quarter level and standard errors are clustered at the fund level as in Lou (2012). *t*-statistics are reported in parentheses, and ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A

Samples	Full flow<0	Full flow<0	Full flow<−5%	Illiquid flow<0	Illiquid flow<−5%	Post1997 flow<0	Post1997 flow<−5%	Full flow<0	Full flow<−5%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	change	*change*	*change*	*change*	*change*	*change*	*change*	*change*	*change*
flow	0.877***	0.825***	0.841***	0.844***	0.835***	0.807***	0.847***	0.931***	1.006***
	(38.47)	(24.55)	(20.12)	(9.29)	(7.68)	(17.55)	(12.97)	(27.62)	(27.42)
flow×useRIK		−0.010	−0.075	−0.118	−0.191	−0.058	−0.230	−0.073	−0.119
		(−0.11)	(−0.77)	(−0.56)	(−0.89)	(−0.39)	(−1.53)	(−0.72)	(−0.89)
useRIK		−0.020*	−0.015	−0.040**	−0.037	−0.008	−0.037*	−0.020*	−0.016
		(−1.77)	(−0.79)	(−2.31)	(−1.11)	(−0.51)	(−1.90)	(−1.66)	(−0.73)
Amihud		−0.077***	−0.061**	−0.120***	−0.131**	−0.066*	0.028	−0.092***	−0.079***
		(−5.17)	(−2.39)	(−4.12)	(−2.03)	(−1.77)	(0.56)	(−5.60)	(−2.60)
flow×Amihud		−3.130***	−3.773***	−2.664**	−2.509*	−2.230*	−0.880	−4.204***	−5.047***
		(−3.40)	(−3.96)	(−1.98)	(−1.87)	(−1.74)	(−0.63)	(−4.02)	(−4.52)
flow×Amihud×useRIK		8.507*	14.178***	11.051***	13.038***	15.960***	17.665***	11.832**	17.416***
		(1.87)	(2.87)	(2.75)	(3.24)	(2.92)	(2.74)	(2.47)	(3.37)
Amihud×useRIK		0.036	0.109	0.151**	0.263**	0.375	0.376	0.106	0.170*
		(0.54)	(1.12)	(2.10)	(2.01)	(1.63)	(1.21)	(1.44)	(1.88)

flow×cgstock		−0.187***	−0.367***	−0.113	−0.102	−0.395***	−0.640***	−0.140*	−0.416***
		(−3.31)	(−5.86)	(−0.39)	(−0.22)	(−5.11)	(−7.62)	(−1.79)	(−5.42)
flow×cgstock×useRIK		0.591**	0.544**	1.415*	2.484*	2.236**	5.379***	0.734**	0.674*
		(2.26)	(2.18)	(1.77)	(1.90)	(2.02)	(2.90)	(2.33)	(1.86)
cgstock		−0.421***	−0.458***	−0.637***	−0.640***	−0.483***	−0.544***	−0.415***	−0.459***
		(−45.33)	(−36.09)	(−19.52)	(−8.86)	(−37.04)	(−28.19)	(−38.40)	(−32.17)
cgstock×useRIK		0.155***	0.129**	0.263***	0.390***	0.148***	0.442***	0.152***	0.128*
		(2.63)	(2.24)	(4.25)	(3.16)	(2.63)	(4.16)	(2.58)	(1.87)
flow×si								−0.141	−0.196
								(−1.15)	(−1.49)
flow×si×useRIK								0.429	0.132
								(0.55)	(0.24)
si								0.001	0.002
								(0.82)	(1.08)
si×useRIK								−0.000	−0.004
								(−0.05)	(−0.88)
Fund and time FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,406,800	5,627,024	1,735,837	2,119,096	674,997	2,708,514	843,280	3,131,339	967,989
Adj. R^2	0.039	0.058	0.089	0.030	0.050	0.055	0.084	0.060	0.093

Panel B

Samples	Full		Ownership=shares/shrout				Ownership=shares×price/tna			
			Low	Low	High	High	Low	Low	High	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	completeliq	*largeliq*	*completeliq*	*largeliq*	*completeliq*	*largeliq*	*completeliq*	*largeliq*	*completeliq*	*largeliq*
flow	−0.102***	−0.168***	−0.065***	−0.046***	−0.114***	−0.110***	−0.110***	−0.187***	−0.059***	−0.120***
	(−5.89)	(−7.91)	(−3.43)	(−2.61)	(−4.65)	(−3.48)	(−4.91)	(−6.99)	(−2.73)	(−4.67)
flow×Amihud×useRIK	−4.422**	−5.717**	−16.749***	−21.748***	−3.072**	−2.228	−6.679**	−8.308***	−3.956	−5.211
	(−2.18)	(−2.18)	(−2.63)	(−2.90)	(−2.26)	(−1.59)	(−2.55)	(−2.82)	(−1.54)	(−1.58)
flow×useRIK	−0.005	0.038	−0.005	0.072*	0.060	0.014***	−0.059	0.011	0.063	0.082
	(−0.09)	(0.48)	(−0.04)	(1.86)	(0.41)	(2.62)	(−0.50)	(0.08)	(1.52)	(1.42)
Amihud×useRIK	−0.223***	−0.256***	−0.830**	−0.079*	−0.706*	−0.004	−0.259**	−0.298***	−0.138	−0.188
	(−3.00)	(−2.79)	(−1.99)	(−1.93)	(−1.77)	(−0.23)	(−2.38)	(−2.58)	(−1.44)	(−1.52)
flow×Amihud	−0.500	−0.165	−8.069***	0.088	−7.436***	−0.058	5.263***	5.922***	−3.312***	−2.793***
	(−1.45)	(−0.45)	(−8.18)	(0.28)	(−7.31)	(−1.28)	(10.38)	(10.41)	(−4.91)	(−4.12)
useRIK	−0.004	−0.002	0.021	0.008	0.023	0.002**	−0.013	−0.009	0.007	0.007
	(−0.37)	(−0.16)	(0.79)	(1.08)	(0.87)	(2.01)	(−0.73)	(−0.47)	(0.76)	(0.69)
Amihud	−0.013	−0.007	−0.086**	−0.001	−0.081*	−0.002	0.021	0.027	−0.020	−0.007
	(−0.97)	(−0.50)	(−1.97)	(−0.06)	(−1.72)	(−1.06)	(0.88)	(0.98)	(−0.97)	(−0.33)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund and time FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,735,837	1,735,837	883,194	883,194	852,643	852,643	885,170	885,170	860,667	860,667
Adj. R^2	0.048	0.049	0.234	0.110	0.226	0.089	0.155	0.151	0.192	0.186

Table 7. RIK utilization and fund performance after large investor redemptions

Panel A reports estimation results of performance-outflow regression in Equation (5). In Columns (1)−(7), the dependent variables *alpha3* and *dalpha3* are quarterly Fama and French (1993) three-factor alphas estimated using monthly returns and daily returns, respectively. In Columns (8) and (9), the dependent variable *sret* is the quarterly style-adjusted return. All performance figures are converted to percentage points for expositional convenience. The independent variables are lagged fund characteristics. *outflow* is an indicator variable that is equal to one if the net flows are negative, and zero otherwise. *lagret1* and *lagret2* are fund returns lagged by one and two quarters, respectively. In Panel B, Column (1) shows the estimation result of the Cox proportional hazard model where fund death is defined as fund closures due to liquidation (CRSP delisting code DELIST_CD="L"). The regression includes funds incepted after 1997. Column (2) shows the relation between fund performance and RIK reservation. Observations are at the fund-quarter level and standard errors are clustered at the fund level as in Chen, Goldstein, and Jiang (2010). *t*-statistics are reported in parentheses, and ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A

Samples	All	All	Illiquid	RIK	Illiquid RIK	All	Illiquid	All	Illiquid
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	alpha3	*alpha3*	*alpha3*	*alpha3*	*alpha3*	*dalpha3*	*dalpha3*	*sret*	*sret*
outflow	−0.125***	−0.129***	−0.199***	−0.162***	−0.204***	−0.180***	−0.256***	−0.071***	−0.079**
	(−5.96)	(−6.08)	(−5.08)	(−6.60)	(−4.57)	(−7.49)	(−5.93)	(−3.60)	(−2.18)
useRIK×outflow		0.217*	0.534**	0.250**	0.437*	0.283**	0.497**	0.163	0.576**
		(1.92)	(2.52)	(2.12)	(1.93)	(2.12)	(2.19)	(1.27)	(2.43)
useRIK		−0.104	−0.279	−0.067	−0.150	−0.185	−0.278	−0.153	−0.338*
		(−1.04)	(−1.47)	(−0.67)	(−0.77)	(−1.65)	(−1.51)	(−1.45)	(−1.89)
lagret1	1.821***	1.820***	2.721***	2.014***	2.999***	−0.467***	−0.468**	4.158***	5.308***
	(11.50)	(11.49)	(10.64)	(10.77)	(9.04)	(−2.95)	(−2.01)	(12.92)	(8.71)
lagret2	0.919***	0.919***	1.255***	0.737***	1.436***	1.142***	1.958***	3.309***	4.796***
	(7.06)	(7.05)	(6.37)	(5.60)	(6.91)	(7.13)	(7.68)	(11.38)	(8.16)
size	−0.012**	−0.012**	−0.026**	−0.024**	−0.033**	−0.010	−0.015	−0.004	−0.028**
	(−2.12)	(−2.15)	(−2.18)	(−2.02)	(−2.38)	(−1.49)	(−1.12)	(−0.77)	(−2.53)
exp_ratio	−15.828***	−15.756***	−16.294***	−14.061***	−10.902	−19.371***	−14.722**	−11.434***	−13.798***
	(−5.24)	(−5.20)	(−2.69)	(−4.53)	(−1.63)	(−5.88)	(−2.12)	(−4.53)	(−2.78)
Fund and time FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	125,588	125,588	40,613	83,516	26,553	100,407	31,612	125,588	40,613
Adj. R^2	0.026	0.026	0.049	0.009	0.011	0.046	0.090	0.023	0.042

Panel B

	(1) *Liquidation*	(2) *alpha3*
RIK	−0.027	−0.046*
	(−0.11)	(−1.85)
ret	−7.753***	
	(−2.73)	
outflow	0.998***	−0.146***
	(3.87)	(−7.11)
size	−0.726***	−0.006
	(−8.60)	(−1.03)
turn_ratio	0.250*	0.028*
	(1.87)	(1.81)
exp_ratio	−1.323***	−19.174***
	(−3.52)	(−6.41)
Fund FEs	No	Yes
Time FEs	Yes	Yes
Observations	85,826	125,588
Adj. R^2	−	0.029

Table 8. Effects of RIK utilization on price pressure

This table reports estimation results of price pressure analysis conditional on large investor outflows in Equation (7). The dependent variable *CAR* is the cumulative abnormal return in percentage points estimated from the Fama and French (1993) three-factor model. Quarterly *CAR* is converted to percentage points for expositional convenience. *MFFlow* is the stock-level price pressure measure. *rikown* is the ownership by funds that utilize in-kind redemptions during a given quarter as a fraction of total fund ownership. *size* is the logarithm of stock's market capitalization and *btm* is the book-to-market ratio. *ownership* is the total mutual fund ownership on the stock. In Columns (1) and (4), the *MFFlow* is computed as in Edmans, Goldstein, and Jiang (2012). In Columns (2) and (5), *MFFlow* is scaled by total shares outstanding of a stock as in Wardlaw (2020). In Column (3) and (6), *MFFlow* is computed as in Coval and Stafford (2007). Observations are at the stock-quarter level and standard errors are clustered at the stock level as in Agarwal and Zhao (2019). *t*-statistics are reported in parentheses, and ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Sample	All	All	All	Illiquid	Illiquid	Illiquid
Pressure Measures	CGJ	Wardlaw	Coval Stafford	CGJ	Wardlaw	Coval Stafford
	(1)	(2)	(3)	(4)	(5)	(6)
	CAR	*CAR*	*CAR*	*CAR*	*CAR*	*CAR*
MFFlow	−0.107***	−0.078***	−0.044***	−0.178***	−0.117**	−0.047**
	(−4.78)	(−3.08)	(−2.70)	(−3.34)	(−2.13)	(−2.18)
rikown×MFFlow	−1.624**	−1.880**	−13.535**	−8.693***	−8.880***	−114.189***
	(−1.99)	(−2.27)	(−2.23)	(−2.99)	(−2.99)	(−5.11)
rikown	−2.897***	−2.775***	−3.492***	−1.217	−1.177	−1.814
	(−3.94)	(−3.75)	(−4.90)	(−0.97)	(−0.94)	(−1.40)
size	0.318***	0.319***	0.260***	0.044	0.049	−0.039
	(6.81)	(6.84)	(4.93)	(0.41)	(0.45)	(−0.31)
btm	−0.000	−0.000	−0.000	−0.005***	−0.004**	−0.006***
	(−0.10)	(−0.00)	(−0.32)	(−2.65)	(−2.55)	(−3.16)
ownership	0.001***	0.001***	0.000	0.001**	0.001	−0.000
	(3.44)	(2.76)	(0.23)	(2.02)	(1.21)	(−0.30)
Time FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	295,416	295,416	295,416	87,004	87,004	87,004
Adj. R^2	0.032	0.032	0.029	0.034	0.034	0.031

Appendix A: Tax consequences of in-kind redemptions

In this Appendix, we create two numerical examples to illustrate tax consequences when fund managers meet redemptions in cash or in kind. At the fund level, capital gain tax is recognized when managers meet redemptions in cash, since capital gains are considered as distributed to non-redeeming fund investors. When managers meet redemptions in kind, capital gain taxes are deferred until non-redeeming shareholders sell their fund shares. For redeeming shareholders, the tax consequence of in-kind redemption is the same as if shareholders redeem in cash, i.e., the shareholder pays for the tax on share price appreciation.

Suppose on date T1, the fund only holds one share of stock A, valued at $90. The fund only issues one fund share to one investor, investor 1. On date T2, the stock price appreciates to $100 and investor 2 buys one additional share of the fund, which now has 2 shares invested in stock A. On date T3, the stock price appreciates to $120 and investor 1 redeems 1 share at $120. For simplicity, suppose the fund follows FIFO (first in, first out) and to satisfy the redemption request by investor 1, sells the 1 share of stock A that was previously bought on date T1. Further, suppose the capital gain distributed to investor 2 on date T3 is not reinvested (although tax consequences would be the same if she does). The following two tables outline the tax consequences associated with the two scenarios where investor 1 receives her redemption in cash or in kind.

Pay investor 1 in cash

	NAV	Fund portfolio	Investor 1	Investor 2
T 1	$90	1 share @ $90	Owns 1 share (tax basis $90)	
T 2	$100	2 shares @ $100	Owns 1 share	Owns 1 share (tax basis $100)
T 3	$90[1]	1 share @ $120 (sell one with basis of $90 and realized capital gain of $30 distributed to investor 2)	Redeems 1 share @$120, pay tax on $120−$90	Owns 1 share @ $90 plus $30 distributed realized capital gain, pay tax on $30
T 4	$90	Sell @ 120		Redeems in cash and claim a tax loss of −$10(=$90−$100)

[1] The distribution of capital gain decreases the net asset value (NAV) of the fund by the amount distributed. See https://www.investopedia.com/terms/c/capitalgainsdistribution.asp.

Pay investor 1 in kind

	NAV	Fund portfolio	Investor 1	Investor 2
T 1	$90	1 share @ $90	Owns 1 share (tax basis $90)	
T 2	$100	2 shares @ $100	Owns 1 share	Owns 1 share (tax basis $100)
T 3	$120	1 share @ $120 (fund delivers the one with basis of $90)	Redeems 1 share in kind (pay tax on $120−$90)	Owns 1 share (no tax event)
T 4	$120	Sell @ $120		Redeems in cash (tax on capital gain of $120−$100=$20)

As we can see, for the redeeming investor 1, the tax consequence is the same regardless of whether her redemption is paid in cash or in kind. For the non-redeeming investor 2, the redemption in cash scenario generates a $30 capital gain bill on date T3 while the redemption in kind scenario doesn't generate any tax event on T3. However, ignoring the time value of money, the total tax liability for investor 2 in both cases is $20. In-kind redemption simply defers the tax for investor 2 till date T4.

The time value can be substantial though, if the investor stays invested in the fund for a long time between T3 and T4. In addition, investor 2 is forced to pay a tax bill on date T3 if investor 1's redemption is paid in cash, while under the in-kind redemption scenario, investor 2 has more flexibility to manage her tax liability. For example, she can voluntarily redeem her shares at a more preferred time between T3 and T4 for tax planning purposes.

Appendix B: Corporate bond funds

Sample selection

We select our corporate bond mutual fund sample from the Center for Research in Security Prices (CRSP) Survivorship-Bias-Free US Mutual Fund Database. Our sample period is from 1997 to 2017. We classify mutual funds as corporate bond funds based on the CRSP objective code, following Goldstein, Jiang, and Ng (2017) and Choi and Kronlund (2018). Specifically, these are funds with CRSP objective codes I, ICQH, ICQM, ICQY, ICDI, ICDS, or IC, which corresponds to Lipper objective codes A, BBB, IID, SII, SID, USO, HY, GB, FLX, MSI, or SFI. We exclude any index funds, ETFs, or ETNs from our sample. Our corporate bond sample consists of 1,850 unique funds. Following Goldstein, Jiang, and Ng (2017), we conduct our analyses at the share class-month level although our results are qualitatively similar if we use fund level quarterly observations as we do in the main text of the paper.

Data on RIK adoptions

We use a similar procedure to identify bond mutual funds that reserve RIK as we do for equity mutual funds in our main analyses. Specifically, we first collect all Form N-18F-1 filings in the SEC EDGAR database from 1997 to 2017, and label funds as RIK funds after they file the form. Second, for funds that file for the exemption before 1997, we use the comprehensive list of keywords related to in-kind redemptions and manually check the prospectuses containing the keywords to confirm that these funds indeed reserve their rights to redeem in kind.

Appendix B: Corporate bond funds

Sample selection

We select our corporate bond mutual fund sample from the Center for Research in Security Prices (CRSP) Survivorship-Bias-Free US Mutual Fund Database. Our sample period is from 1997 to 2017. We classify mutual funds as corporate bond funds based on the CRSP objective code, following Goldstein, Jiang, and Ng (2017) and Choi and Kronlund (2018). Specifically, these are funds with CRSP objective codes I, ICQH, ICQM, ICQY, ICDI, ICDS, or IC, which correspond to Lipper objective codes A, BBB, IID, SII, SID, USO, HY, GB, FLX, MSI, or SFI. We exclude any index funds, ETFs, or ETNs from our sample. Our corporate bond sample consists of 1,850 unique funds. Following Goldstein, Jiang, and Ng (2017), we conduct our analyses at the share class-month level although our results are qualitatively similar if we use fund-level quarterly observations as we do for equity funds in the paper.

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We use a similar procedure to identify bond mutual funds that reserve RIK as we do for equity mutual funds in our main analyses. Specifically, we first collect all Form N-18F-1 filings in the SEC EDGAR database from 1997 to 2017, and label funds as RIK funds after they file the form. Second, for funds that file for the exemption before 1997, we use the comprehensive list of keywords related to in-kind redemptions and manually check the prospectuses containing the keywords to confirm that these funds indeed reserve their rights to redeem in kind.

Table A.B. Redemption in kind and flow-performance sensitivity for bond funds

Panel A shows the RIK adoptions for a sample of corporate bond mutual funds between January 1997 and December 2017. Bond funds are selected from the CRSP mutual fund database following the procedure in Goldstein, Jiang, and Ng (2017). Panel B reports the results of the flow-performance analyses. Out-of-sample alphas are estimated using aggregate bond market return (measured by Vanguard Total Bond Market Index Fund return) and aggregate stock market return (return on the CRSP value-weighted index) as risk factors. Funds' factor loadings are estimated using the previous 24 months of returns from months [$t-1$, $t-24$]. Monthly out-of-sample alpha in month t is calculated by subtracting the sum of factor loadings multiplied by factor returns from funds' excess returns in month t. *negdum* is an indicator variable that is equal to one if a fund's corresponding performance is negative, and zero otherwise. The regressions use share class-month observations and include share class and month fixed effects. Standard errors are double-clustered at the share class and time levels. t-statistics are reported in parentheses and ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A.B1

	# of funds	% of sample
Full sample	2,140	
Funds with RIK in 1997	675	31.5%
Fund that reserve RIK between 1998 and 2017	902	42.1%
Funds without RIK throughout the sample	563	26.3%

Panel A.B2

	Raw Return			Style Return			Alpha		
	(1) *flow*	(2) *flow*	(3) *flow*	(4) *flow*	(5) *flow*	(6) *flow*	(7) *flow*	(8) *flow*	(9) *flow*
perfpos	0.171***	0.144***		0.129***	0.087*		0.081	0.033	
	(4.64)	(3.59)		(3.17)	(1.89)		(1.58)	(0.62)	
perfneg	0.245***	0.306***		0.203***	0.269***		0.139**	0.246***	
	(5.00)	(5.78)		(4.36)	(5.64)		(2.30)	(3.98)	
RIK×perfpos		0.053			0.083			0.094	
		(1.17)			(1.49)			(1.56)	
RIK×perfneg		−0.120			−0.132**			−0.213**	
		(−1.62)			(−2.01)			(−2.57)	
perf			0.114***			0.059			0.016
			(2.73)			(1.19)			(0.29)
negdum×perf×RIK			−0.179*			−0.213**			−0.320***
			(−1.83)			(−2.20)			(−2.91)
negdum×RIK			−0.000			−0.001			−0.001**
			(−0.40)			(−1.47)			(−1.97)
RIK×perf			0.045			0.041			0.052
			(0.91)			(0.65)			(0.82)
negdum×perf			0.135**			0.185***			0.204***
			(2.17)			(3.00)			(2.80)
negdum			−0.002***			−0.001*			−0.001*
			(−2.79)			(−1.84)			(−1.95)

RIK		0.002	0.002		0.002	0.002		0.002	0.002
		(0.96)	(1.01)		(0.86)	(1.15)		(0.85)	(1.20)
size	−0.009***	−0.009***	−0.009***	−0.009***	−0.009***	−0.009***	−0.009***	−0.009***	−0.009***
	(−22.32)	(−22.32)	(−22.33)	(−22.32)	(−22.32)	(−22.31)	(−22.32)	(−22.33)	(−22.34)
lage	−0.016***	−0.016***	−0.016***	−0.016***	−0.016***	−0.016***	−0.016***	−0.016***	−0.016***
	(−12.58)	(−12.57)	(−12.55)	(−12.76)	(−12.75)	(−12.75)	(−12.77)	(−12.75)	(−12.77)
lage×perf	−0.001***	−0.001***	−0.001***	−0.000	−0.000	−0.000*	−0.000	−0.000	−0.000*
	(−2.89)	(−2.89)	(−3.14)	(−1.47)	(−1.46)	(−1.74)	(−1.44)	(−1.45)	(−1.72)
lagflow	0.138***	0.138***	0.138***	0.138***	0.138***	0.138***	0.139***	0.139***	0.138***
	(18.00)	(18.00)	(18.00)	(18.00)	(18.00)	(18.01)	(18.20)	(18.20)	(18.21)
load	0.006***	0.006***	0.006***	0.006***	0.006***	0.006***	0.006***	0.006***	0.006***
	(4.35)	(4.37)	(4.38)	(4.36)	(4.38)	(4.41)	(4.35)	(4.40)	(4.41)
turn_ratio	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000
	(−0.23)	(−0.32)	(−0.33)	(−0.22)	(−0.31)	(−0.32)	(−0.19)	(−0.29)	(−0.33)
exp_ratio	−0.943***	−0.948***	−0.947***	−0.942***	−0.947***	−0.946***	−0.941***	−0.945***	−0.939***
	(−3.89)	(−3.90)	(−3.90)	(−3.88)	(−3.90)	(−3.89)	(−3.88)	(−3.89)	(−3.87)
%cash	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**
	(2.18)	(2.23)	(2.23)	(2.19)	(2.24)	(2.23)	(2.15)	(2.21)	(2.24)
Share class FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	459,813	459,813	459,813	459,813	459,813	459,813	459,567	459,567	459,567
Adj. R^2	0.088	0.088	0.088	0.088	0.088	0.088	0.088	0.088	0.088

Appendix C: Parallel trend assumption of investor flows before and after the RIK adoption

This table reports the test of the parallel trend assumption in investor flows during stress periods and normal times for funds that switch to RIK (switchers) and their matched counterparts. Regressions are based on the stress periods in Column (1), and normal times in Column (2). Standard errors are double-clustered at the fund and quarter levels and *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Stress	Normal
	(1)	(2)
	flow	*flow*
treated×post	0.014**	−0.008*
	(2.14)	(−1.67)
post	−0.009	−0.002
	(−1.63)	(−0.73)
treated	−0.005	0.002
	(−1.45)	(0.79)
ret	0.286***	0.362***
	(3.96)	(7.20)
size	−0.003	−0.003***
	(−1.61)	(−3.82)
lagflow	0.198***	0.295***
	(7.48)	(12.24)
load	−0.008**	0.006**
	(−2.47)	(2.08)
lage×perf	0.000	0.000
	(0.29)	(0.48)
turn_ratio	0.001	0.000
	(0.20)	(0.09)
exp_ratio	0.549	−0.214
	(0.86)	(−0.65)
lage	−0.008***	−0.010***
	(−3.13)	(−4.57)
%cash	0.002***	0.001***
	(4.14)	(4.00)
familysize	−0.000	−0.000
	(−0.35)	(−0.75)
instown	0.027***	0.026***
	(3.45)	(5.76)
familyflow	0.472***	0.656***
	(8.48)	(14.04)
Time FEs	Yes	Yes
Observations	7,332	25,412
Adj R^2	0.179	0.284

Online Appendix

Online Appendix 1: Matched sample under entropy balancing

Entropy balancing is a reweighting technique that generalizes the propensity score matching to achieve significantly improved matching between the treatment and controls (Hainmueller, 2012; Agarwal and Zhao, 2019). Unlike the traditional propensity score matching where a control fund is assigned a weight equal to either one or zero, entropy balancing assigns a continuous set of weights to control funds. Therefore, it creates a set of control counterfactuals that match more closely to the treatment funds. Moreover, the entropy balancing approach can better utilize the information in control funds because most control funds are assigned non-zero weights instead of being dropped from the analysis. Entropy matching does not lead to a one-to-one matching between treatment and controls; instead, the treated funds as a group are matched to the controls as a group. Through the adjustments in the weights assigned to the control funds, the fund characteristics of the control fund group is matched closely to those in the treated group. The matching results using entropy balancing are reported in Table OA.1 which shows that the matched characteristics of the treatment group (RIK funds) and control group (non-RIK funds) are almost identical both economically and statistically.

Table OA.1. Matched sample

This table shows differences of fund characteristics between RIK funds and matched non-RIK funds. *duration* is the duration measure of Cremers and Pareek (2015, 2016). Other variables are defined in Table 1.

	Treatment	Control
perfpos (*ret*)	0.046	0.047
perfneg (*ret*)	−0.021	−0.021
perfpos (s*ret*)	0.028	0.028
perfneg (s*ret*)	−0.028	−0.028
perfpos (*alpha3*)	0.010	0.010
perfneg (*alpha3*)	−0.013	−0.013
size	5.732	5.724
load	0.685	0.685
flow	0.018	0.018
lage	5.028	5.027
turn_ratio	0.847	0.847
exp_ratio	0.012	0.013
%cash	2.699	2.699
illiquid	0.345	0.345
borrow	0.339	0.339
ilp	0.163	0.164
instown	0.290	0.291
familysize	7.225	7.224
duration	9.619	9.619

Online Appendix 2: Investor awareness of RIK

To examine the role of investor awareness of the RIK, we calculate web page views of Form N-18F-1 filings recorded in SEC EDGAR's web server log files. The page view *per filing per year* has a median value of 21, and the 25th and 75th percentile values are 5 and 40, respectively. As a comparison, the page view of fund prospectus, perhaps one of the most important regulatory filings, has a median of 43, and the 25th and 75th percentile values are at 12 and 99, respectively. Therefore, although page views of Form N-18F-1 are fewer than those on fund prospectuses, they are still economically significant. We then construct an indicator variable to capture those Form N-18F-1 filings with greater number of page views. Specifically, *Highview* is equal to one if the aggregate number of page views of fund's Form N-18F-1 up to a given quarter ranks in the top quintile among all RIK funds, and zero otherwise.[1] Table OA.2 uses the subsample of RIK funds to conduct the flow-performance analysis and shows the importance of investor awareness. The interaction term between *Highview* and *perfneg* is negative and economically significant. Although RIK funds in general experience less investor redemption after poor performance, those with more page views of their Form N-18F-1 experience even less redemption after poor performance.

Table OA.2. Investor awareness

This table reports estimation results of Equation (3) using fund-quarter observations. The dependent variable is fund's quarterly flow and the independent variables are lagged fund characteristics. "×" denotes interaction between corresponding variables. The analysis uses the subsample of RIK funds. *Highview* is an indicator variable that is equal to one if the aggregate number of page views on fund's Form N-18F-1 up to a given quarter ranks in the top quintile among all RIK funds, and zero otherwise. Control variables are the same as those in Table 3 and are omitted for brevity. Standard errors are double-clustered at the fund and time levels and *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Perf. measures	Raw Return	Style Return	Alpha
	(1)	(2)	(3)
	flow	*flow*	*flow*
Highview×*perfpos*	0.082	0.037	0.126
	(1.42)	(0.66)	(0.95)
Highview×*perfneg*	−0.152***	−0.089**	−0.244*
	(−2.85)	(−2.11)	(−1.93)
Controls	Yes	Yes	Yes
Fund and time FEs	Yes	Yes	Yes
Observations	83,516	83,516	83,516
Adj. R^2	0.284	0.283	0.260

[1] The aggregate number of page views increases over time for a given fund. Therefore, one potential concern is that our results on investor awareness may be due to the possibility that funds with longer track history experience less investor runs. To address this issue, we control for the interaction between fund age and performance in Table OA.2 (as we do for all the previous flow-performance analyses in Table 3).

Online Appendix 3: Examples from disclosures of RIK utilization

In this Appendix, we include several disclosure examples of actual use of in-kind redemptions. When funds redeem their shares in kind and securities have built-in capital gains, gains are realized but not recognized for tax purposes. Gains are reclassified into paid-in capital and are reflected in the share appreciation, and thus increase future tax liabilities for non-redeeming shareholders. For example, T. Rowe Price Small-Cap Stock Fund discloses the following in its annual report as of December 31, 2007: "*Gains and losses realized on in-kind redemptions are not recognized for tax purposes and are reclassified from undistributed realized gain (loss) to paid-in capital*."[2] Sequoia Fund discloses that "During the year ended December 31, 2010 permanent differences primarily due to *realized gains on redemptions in kind not recognized for tax purposes*."[3] Vanguard Quantitative Funds Structured Large-Cap Equity Fund discloses that "During the six months ended March 31, 2009, the fund realized $20,147,000 of net capital losses resulting from in-kind redemptions—in which shareholders exchanged fund shares for securities held by the fund rather than for cash. Because such losses are not taxable losses to the fund, they have been *reclassified from accumulated net realized losses to paid-in capital*."[4]

Amounts of in-kind redemptions can be large in magnitude. Putnam Global Equity Fund discloses that for the year ended October 31, 2006, "the fund had redemptions in kind totaling $360,562,936" and out of the total net realized gain on investments of $356,448,373, $55,683,088 is from redemption in kind.[5] Sequoia Fund discloses that "The aggregate cost of purchases and the proceeds from the sales of securities, excluding U.S. government obligations, for the year ended December 31, 2010 were $567,738,908 and $757,968,488, respectively. Included in the proceeds of sales is $52,896,079 representing the value of securities disposed of in payment of redemptions in-kind, resulting in realized gains of $42,755,343.[6] Prudential Strategic Partners International Value Fund discloses that "During the fiscal year ended October 31, 2005, shareholders redeemed fund shares in exchange for Series' portfolio securities valued at $148,897,793. The Fund realized a gain of $15,428,649 related to the in-kind redemption transactions. This gain is not taxable for Federal Income Tax purposes."[7]

[2] https://www.sec.gov/Archives/edgar/data/75170/000007517008000003/arscs.htm.
[3] https://www.sec.gov/Archives/edgar/data/89043/000008904311000002/ncsr.txt.
[4] https://www.sec.gov/Archives/edgar/data/799127/000093247109001082/quantitativefundsfinal.htm.
[5] https://www.sec.gov/Archives/edgar/data/81251/000092881606001553/a_globequityfnd.htm.
[6] https://www.sec.gov/Archives/edgar/data/89043/000008904311000002/ncsr.txt.
[7] https://www.sec.gov/Archives/edgar/data/741350/000119312505250597/dncsr.htm.

Online Appendix 4

Table OA.4. Changes in funds' stock portfolio after RIK reservation

This table repeats the analyses in Columns (2) and (3) in Panel A of Table 6, by replacing the indicator variable capturing RIK usage (*useRIK*) with the indicator variable for RIK reservation (*RIK*), as well as all the interaction terms involved with *useRIK*.

Samples	Full flow<0	Full flow<−5%
	(1)	(2)
	change	*change*
flow×*Amihud*×*RIK*	−0.635	0.018
	(−0.57)	(0.01)
Controls	Yes	Yes
Fund and time FEs	Yes	Yes
Observations	5,627,024	1,735,837
Adj. R^2	0.039	0.053

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