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# The unintended consequences of the zero lower bound policy<sup>☆</sup>

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## ABSTRACT

We study the impact of the zero lower bound interest rate policy on the industrial organization of the U.S. money fund industry. We find that in response to policies that maintain low interest rates, money funds: change their product offerings by investing in riskier asset classes; are more likely to exit the market; and reduce the fees they charge their investors. The consequence of fund closures resulting from interest rate policy is the relocation of resources in affected fund families and in the asset management industry in general, as well as decline in capital of issuers borrowing from money funds.

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## 1. Introduction

In the aftermath of the financial crisis of 2007–2008, the Federal Reserve took an unprecedented decision to lower short-term nominal interest rates to zero, a policy

commonly known as zero lower bound policy. This initial action was followed by a sequence of announcements providing guidance that the short-term rate would stay near zero for a longer period. While several economists have argued that the Fed's policy exerted a positive impact on the U.S. economy by stimulating a sluggish economic growth and boosting employment, some critics pointed out that the policy might have also produced undesired consequences, for example, inflation in asset prices, or ill-suited incentives to chase higher yields. In this paper, we show that the policy created a shock to an important part of the shadow banking system, money funds, which resulted in significant dislocations in terms of their market participation and product offerings.

By regulation, money market funds (henceforth MMFs) are obliged to invest in safe short-term assets with rates of return that are typically close to the Fed target rate. The monetary policy shock has thus driven the funds' gross profit margins nearly to zero and has seen many fund

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investors face investment opportunities with negative (net of fees) expected returns. The deteriorating investment environment, in turn, has triggered significant responses of MMFs and the broader asset management industry in terms of their product offerings, pricing policy, and organizational structure. We study empirically these adjustments using detailed micro-level data.

Traditionally, MMFs used to offer relatively low returns for the provision of safety. While this idea has been somewhat shattered with the collapse of the Reserve Primary Fund and the run on MMFs in September 2008 (e.g., Kacperczyk and Schnabl, 2013; Chernenko and Sunderam, 2014; Strahan and Tanyeri, 2015), until then, MMFs provided investors positive returns, even after paying fees. The consequence of the unprecedented change in interest rates to levels close to zero has been that returns on traditional money market instruments, such as Treasuries, repos, or deposits declined to similarly low levels. Therefore, any fund investing in these assets was likely to produce negative net-of-fees nominal returns to their investors. It has thus become obvious that such a business model cannot be sustained for too long, as money would flow out of funds with negative returns.<sup>1</sup>

Such a dire situation has posed a dilemma for money funds. On the one hand, they could accept the situation and keep their risk profiles unchanged. This, however, would force them to first reduce or even waive their fees, and in the end, if the low rates persisted, to exit the market. On the other hand, funds could change their product offerings by shifting their risk into securities with higher interest rates, thus accepting higher risk in their portfolios, an idea coined as reaching for yield. Increasing fund risk would boost returns and investor flows (e.g., Christoffersen, 2001), and would likely prevent funds from exiting the market. The cost of increasing risk would be a higher chance of being run on in the event of distress in the money market industry. The consequence of such runs would be distress of individual funds themselves, which could generate high costs either in terms of the necessity to bail out the fund or through a significant loss of reputation for the fund organization and other related business of a fund sponsor.

In this paper, we assess empirically the equilibrium response of MMFs to the low interest rate environment using weekly data on the universe of U.S. prime funds. We exploit both a time-series and cross-sectional variation in the data to identify the causal effect of the unconventional monetary policy on MMFs' strategies. Our main empirical identification comes from an event study analysis of five Federal Open Market Committee (FOMC) announcements, which signaled that interest rates would be kept near zero into the future. These decisions were plausibly exogenous with respect to the funds' behavior; hence, they constitute a useful shock. The access to high-frequency fund data allows us to measure empirical effects within short event

windows. Specifically, we compare MMFs' choices of risky product offerings, exit, and expense policy in the fund data.

In the time series, we document an increase in the probability of exit from the MMF industry, higher risk taking, lower expenses charged by MMFs, and higher fund subsidies in the period of three to six months after the announcements. Our results are economically and statistically significant. Notably, while we do not find any variation in expenses *incurred* by these funds over time, the fees *charged* are significantly reduced during a zero interest rate period, which suggests that MMFs were actively maintaining their fees as a way of keeping their business alive and did not simply go through a period of lower operating costs.

In the cross section, we find that reaching for yield is particularly strong for independent funds, that is, funds whose sponsors are not affiliated with an insurance company, commercial, or investment bank. In contrast, rather than taking more risk, affiliated funds exit the market. We do not find significant differences across fund types in terms of their expense policies. We further enhance these findings by exploiting a variation in family-level percentage of assets managed by MMFs within a group of independent sponsors. We find that funds whose families invest a greater percentage of their assets in MMFs are less likely to exit and more likely to take more risk. The results are consistent with a hypothesis that reputational concerns shape MMFs' strategic decisions. In sum, to the extent that any macroeconomic (time-series) shock would likely affect all types of funds in a similar way, the results suggest that ours is a leading mechanism explaining the data.

We conduct a number of tests to improve our identification and alleviate any empirical concerns. Our first concern is identification of the results on risk taking. To the extent that safer funds are more likely to exit, our risk results could be driven by survival of the more risky funds. The question is whether strategic behavior of individual funds also contributes to risk changes over and above the negative selection channel. To address this concern we redo all our tests by removing funds that exit the sample after the shock. Our results remain qualitatively similar, which suggests that the negative selection and strategic fund behavior are both responsible for changes in risk.

Our second concern is that our results are not specifically about the role of zero-rate policy but rather are a generic response to changes in interest rates, independent of their levels. We address this concern by estimating our basic models separately for two subperiods: a period with rates higher than 1% (control group) and a period with rates of at most 1% (treatment group). We find a strong discontinuity in the way MMFs respond to changes in the Fed target rate. While we observe no visible effect on exit, risk, and fees when the rate is above 1%, we observe a similar quality of results as our main findings in periods when interest rates equal at most 1%.

Third, we include monetary policy surprises rather than the Fed target rate changes in our regressions and confirm our results on fund exit and risk taking, which alleviates any concern that our results are driven by changes in economic conditions proxied by the Fed target rate,

<sup>1</sup> A standard portfolio theory suggests that investors should look at fund spread, returns net of Treasury bill, rather than fund returns as a way of assessing their decisions. But in times of zero interest rates both returns and spreads are virtually the same. In addition, our regression estimates account for any business-cycle variation in the data.

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