Where Have All the Investment Dollars Gone? A Brief on the Developments and Potential Fragility in Corporate Bond Funds

Itay Goldstein, PhD

From the beginning of 2008 to the spring of 2013, as fixed income fund assets were increasing several times faster than equity, money market, allocation, and all other fund assets combined, total bond fund assets nearly doubled.

This presents a challenge to researchers, regulators, and practitioners. Flows into and out of equity funds have been thoroughly researched over the past few decades, but there has been stunningly little investigation into the flow behavior of bond funds, which behave rather differently from equity funds and now account for a formidable portion of all investment.

Over that same five year period, investment in corporate bond funds, specifically, roughly tripled from $600 billion to $1.7 trillion. These funds began to comprise a significant part of the overall corporate bond market by the end of 2013, which at that time was worth approximately $7.5 trillion, or close to half the size of the equity market. And when scanning the entire universe of bond funds, it is even more noteworthy that corporate bond funds accounted for 57% of all fixed income funds in 2013 [Figure 1]. Given the prominence of corporate bond funds, their potential market impact, and the stark contrasts to equity funds (i.e., corporate bond funds have higher turnover rates and shorter investment horizons despite trading in a market with lower liquidity), these vehicles are the best place to start shedding light on the largely dark field of bond fund flows.

SUMMARY

• Since the beginning of the global economic crisis, investors have flocked to bond funds, and especially corporate bond funds, viewing them as the “safest” vehicles for their capital.

• However, bond funds are subject to fragilities originating from the first-mover advantage problem: when investors cash out, the cost of compensating them amplifies the funds’ price decline, making it costlier for other investors to remain. Moreover, three other conditions—general market illiquidity, lower fund liquidity, and the prevalence of retail investors—accentuate the financial fragility of corporate bond funds.

• Academic research shows that when corporate bond fund managers have to trade illiquid corporate bonds after investors redeem shares en masse, the subsequent demand shock in the secondary bond market results predictably in significant negative effects to the real economy.

• Several options are available to combat the potential fragility in corporate bond funds and mitigate their wider effects: (1) have the funds increase their liquidity by maintaining more cash on hand; (2) institute emergency redemption rules during times of macroeconomic distress; or (3) obviate the problem of first movers by changing the way funds calculate redemption prices.
In this brief, I will break down the research I conducted with my co-authors, Hao Jiang and David Ng, on fragility in corporate bond funds and offer suggestions, both policy-oriented and industry-based, for minimizing the potential for future runs and rapid price depression that might originate from the structure of bond funds—an outcome that could lead to negative macroeconomic effects.\(^2\)

**THE PROBLEM OF FIRST MOVERS AND ACCELERATED RUNS**

The vast literature on equity fund flows reveals clearly that those funds are very sensitive to good past performance and not especially sensitive to bad past performance. Therefore, there is no particularly strong concern that investors will rush to redeem their equity fund shares when the market encounters negative events, which would have the effect of further hurting the returns for the investors who choose to remain fund owners. In other words, the fragility of equity funds is quite limited in most cases, except for funds holding very illiquid assets.\(^3\)

Flows into corporate bond funds, however, do not behave in the same way. Under some circumstances, their outflows are actually more sensitive to bad performance than their inflows are sensitive to good performance. So in the face of a negative market event, investors are much more likely to exchange their fund shares for money. Portfolio adjustments then would occur in the days (or weeks, depending on how infrequently the assets trade) after investors redeem their shares, but investors receive money equal to the price of the fund the day they withdraw. There is an obvious mismatch here between fund illiquidity and the investor's claim to immediate (i.e., same day) liquidity. When managers are forced to sell the underlying assets of the fund to compensate redeemers, this imposes extra costs on the investors who remain in the fund, since any necessary liquidation costs are not

---

**NOTES**


2 This brief is based extensively off Goldstein, Jiang, and Ng (2015), “Investor Flows and Fragility in Corporate Bond Funds,” available at [http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2596948](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2596948). We analyzed actively managed corporate bond funds in the years between 1992 and 2014—the only years for which we have reliable and consistent data from CRSP. Index funds, ETFs, and ETNs were excluded from analysis so that we could compare our findings to the research on actively managed equity funds. The median share-class size in our sample was $59 million, and the median fund age was 6.88 years. Our final dataset included 4,679 unique share classes and 1,660 unique corporate bond funds.


5 Different pricing service companies or securities dealers might price underlying bonds differently, and bond fund managers can always override these price recommenda-
fully reflected in the price received by the redeemers but are absorbed by the remaining investors over time. This is what economists call negative externalities. These dynamics lead to what is known as a first-mover advantage problem. Put simply, if the price of a bond fund decreases, it could be expensive as an investor to remain in the fund because a price decline will be amplified by the costs of adjusting the fund portfolio to compensate the investors who cashed out first.

In addition to the problem of first movers, the amplified costs imposed by redemptions are accelerated in corporate bond funds by the general illiquidity of the underlying assets. Even though corporate bonds comprise over 20% of all bonds outstanding in the U.S., as previously noted, they account for only about 2.5-3.0% of all U.S. bond trading. Illiquid assets come with higher liquidation costs, which are further heightened during periods of overall market illiquidity (see below). But not only are corporate bond funds vulnerable to the aforementioned negative externalities and infrequent trading, they also must endure higher trading costs than other types of funds, as well as uncertain pricing.

### THE BEHAVIOR OF CORPORATE BOND FUND FLOWS

The research that my co-authors and I conducted recently tested three hypotheses concerning how investors in corporate bond funds make investment decisions. All three suppositions were confirmed in the data and guide the recommendations that follow.

- **Hypothesis 1**: Liquidation costs imposed from massive outflows will be greater during periods of overall market illiquidity, when trading costs are higher and pricing is more uncertain. In our implementation, we chose the VIX index, the TED spread, and Fed Funds rates as proxies for aggregate illiquidity and uncertainty, which were used to predict bond fund flows. We showed that they tend to amplify the sensitivity of outflows to bad performance.

- **Hypothesis 2**: Funds with lower asset liquidity—or, in our analysis, less cash—will be even more sensitive to bad performance and will experience greater outflows. In our sample, the funds held, on average, 3.5% of their assets in cash, but the amount varied widely with a standard deviation of 10%. The top 1% of funds held about 46.7% of their assets in cash while the bottom 1% of funds were actually leveraged and had negative cash holdings of about 36.72%. Overall, less than a fifth of the funds were leveraged with negative cash holdings.

- **Hypothesis 3**: The effect of illiquidity on the sensitivity of outflows to bad performance will weaken the more that fund ownership is composed of institutional instead of retail investors. We were able to conclude that the large size of institutional investors helped them to internalize the negative externalities.

General market illiquidity, lower fund liquidity, and the prevalence of retail investors are all signals for financial fragility in corporate bond funds recognized both by investors, who react more strongly to bad news in large part because of these conditions, and fund managers themselves. Given the high costs associated with fragility, it might be expected that funds would put measures in place to mitigate the risks of massive outflows in response to negative developments. The SEC allows mutual funds to charge voluntary redemption fees in an effort to curb short term trading, but in practice, these fees are often not utilized by the industry. Funds com-

### NOTES

2. Goldstein, Jiang, and Ng (2015).
3. See Goldstein, Jiang, and Ng for a case study on fund liquidity levels involving PIMCO after the departure of the company’s founder and most visible manager, “Bond King” Bill Gross.
pete aggressively with each other for investor capital and such redemption fees are clearly seen as deterrents.

**ECONOMIC CONSEQUENCES AND RECOMMENDATIONS**

Established academic research shows that variation in excess bond premiums, or credit risk premiums, can by itself predict with reasonable effectiveness certain macroeconomic outcomes. This is important for our purposes here because when corporate bond fund managers have to trade illiquid corporate bonds after investors redeem shares en masse, the subsequent demand shock in the secondary bond market can significantly impact corporate bond prices and excess bond premiums. To put this another way, the first-mover advantage problem sparks a demand problem in the corporate bond market, resulting in potentially and predictably significant negative effects in the real economy.

While the investigation into corporate bond flows’ influence on real macroeconomic outcomes is, at this point, only exploratory, we discovered that “an unanticipated increase by one percent in [corporate bond fund] outflow leads to reductions in future consumption, investment and output growth rates over the next several quarters. The macroeconomic effect of the outflow shock is quite substantial.” Specifically, the GDP growth rate declined a statistically significant 22 basis points over the subsequent three quarters after a surprise 1% rise in bond outflows.

Even with this knowledge, it is not clear that the potential fragility of corporate bond funds demand regulatory intervention. Some of the problems can be addressed by the funds themselves. Moreover, regulating one corner of the financial system could lead investors to flock to a different corner, the result of which may be increased fragility of a different fund type. This is what happened when the federal government increased regulation on money market funds after the collapse of Lehman Brothers in 2008. Investors then fled quickly into bond funds. However, it is still the case that negative externalities may be present beyond bond funds and are not internalized by them to fully account for the first-mover advantage problem, so that some regulation may be prudent.

As for the actual steps that the industry might consider to combat fragility in corporate bond funds, several options are available. One option is to increase liquidity in the funds. Since funds with higher cash holdings are not subject to the same sensitivity as funds with low cash or leveraged assets, one of the simplest solutions is then to have funds increase their cash on hand. It would be better for the funds to take this action themselves, but each fund operates without taking into account the negative externalities they put on the market, and it is doubtful that few, if any, consider the aggregate effects of too few funds maintaining sufficient levels of liquidity. Some guidelines concerning cash holding could thus be helpful. What that percentage of assets held in cash would be is not obvious, and regardless of whether it is the government or the funds themselves that induce larger cash holdings, any increase could be costly for fund performance.

The second recommendation involves tracking the liquidity of the overall bond market. As noted, sensitivity increases in times of illiquidity, therefore outflows might pose systemic risk. In times of U.S. macroeconomic distress, emergency rules could be instituted, including “suspension of redemption,” which means that if more than a certain (to be determined) percentage of outflows occur on a single day, investors would be prohibited from pulling their money out of a fund in order to prevent a potentially risky chain of events. This rule could be necessary if the manner in which redemption prices are calculated (see option three) or the frequency of trading on the secondary market do not change. Another emergency rule could be “redemption in kind.” If a fund finds itself at risk of a fire sale, the fund could be allowed to give the investors who are pulling out their money the underlying assets instead of cash. This way, investors internalize the full consequences of their redemptions on the value of the assets. This rule is very hard to implement and, while worth looking into, may not be the best solution, as it is difficult to know which assets to transfer to investors, how they should be split, etc.

Finally, option three entails policies that deal with the first-mover advantage problem and the associated amplification of outflows by changing the way funds calculate redemption prices. At present, fund prices do not take into account the effect of flows for the current trading day. As a result, the price that investors get upon redemption is not reflective of how many other investors have traded that day. There can be a very
large difference between the price of a fund at 4:00 PM on a Tuesday and the re-calculated price in later days after liquidations of assets have occurred. One way to deal with this issue is by implementing a forward-looking net asset value (NAV) calculation, in the spirit of “swing pricing.” Swing pricing takes into account both the last NAV and the amount of redemptions during a given day in order to factor in future liquidation costs. While this practice is difficult to implement in the market, it is something that many other countries have already utilized. Once the change is made, it could help alleviate the aforementioned price uncertainty that can fuel runs. It is a recommendation supported in Basel III, implemented in the EU, and there are, in fact, some multinational corporations, including BlackRock, that already use it for their operations outside the United States.

CONCLUSION

There is no magic bullet that eliminates all possible fragility inherent in corporate bond funds. From a greater economic perspective, it would be beneficial to eliminate or reduce the first-mover advantage problem. But having funds hold more cash, changing the pricing rules of funds, and restricting redemptions all carry costs as well. Regulating one part of the financial system, either from a policy position or from within the financial industry, will change the operation of other parts and create new risks, so implementing any of the options noted above in a manner that reduces their costs is just as important as implementing the changes themselves.

Investors have flocked to bond funds, especially corporate bond funds, since the beginning of the global economic crisis, viewing them as the “safest” vehicles for their capital. But bond funds are subject to fragilities originating from the first-mover advantage problem similar to money market funds and depository banks. With a market of their size, doing nothing to alleviate the negative implications of the first-mover advantage and reduce accelerated outflows is likely riskier than attempting to mitigate the problem in some way.
Itay Goldstein is the Joel S. Ehrenkranz Family Professor in the Finance Department at the Wharton School of the University of Pennsylvania. He is also the coordinator of the Ph.D. program in Finance. He has been on the faculty of the Wharton School since 2004. Professor Goldstein earned his Ph.D. in Economics in 2001 from Tel Aviv University. He is an expert in the areas of corporate finance, financial institutions, and financial markets, focusing on financial fragility and crises and on the feedback effects between firms and financial markets. His research has been published in top academic journals, including the American Economic Review, the Journal of Finance, the Journal of Financial Economics, the Review of Economic Studies, and the Review of Financial Studies. His research has also been featured in the popular press in the Economist, Financial Times, Bloomberg, Forbes, National Public Radio, and others. Professor Goldstein is an editor of the Review of Financial Studies. He has been an editor of the Finance Department in Management Science and an editor of the Journal of Financial Intermediation. He has served as an academic advisor at the Federal Reserve Banks of New York, Philadelphia, and Richmond, the Bank of Canada, and the Committee for Capital Markets Regulation. He was the co-founder and the first president of the Finance Theory Group. He has taught various undergraduate, M.B.A., Ph.D., and executive education courses in finance and economics. Prior to joining Wharton, Professor Goldstein has served on the faculty of Duke University’s Fuqua School of Business. He had also worked in the research department of the bank of Israel.

CONTACT THE PENN WHARTON PUBLIC POLICY INITIATIVE

At Penn
Steinberg Hall-Dietrich Hall, Room 3012
Philadelphia, PA 19104-6302
+1.215.898.1197

In Washington, DC
1350 I (“Eye”) Street, NW, Suite 1270
Washington, DC 20005
+1.202.503.3772

For additional copies, please visit the Penn Wharton PPI website at publicpolicy.wharton.upenn.edu.
Follow us on Twitter: @PennWhartonPPI

ABOUT PENN WHARTON PUBLIC POLICY INITIATIVE

The Penn Wharton Public Policy Initiative (PPI) is a hub for research and education, engaging faculty and students across University of Pennsylvania and reaching government decision-makers through independent, practical, timely, and nonpartisan policy briefs. With offices both at Penn and in Washington, DC, the Initiative provides comprehensive research, coverage, and analysis, anticipating key policy issues on the horizon.

ABOUT PENN WHARTON PUBLIC POLICY INITIATIVE ISSUE BRIEFS

Penn Wharton PPI publishes issue briefs at least once a month, tackling issues that are varied but share one common thread: they are central to the economic health of the nation and the American people. These Issue Briefs are nonpartisan, knowledge-driven documents written by Wharton and Penn faculty in their specific areas of expertise.

Follow us on Twitter: @PennWhartonPPI

Knowledge for Policy Impact

Founded in 1881 as the first collegiate business school, the Wharton School of the University of Pennsylvania is recognized globally for intellectual leadership and ongoing innovation across every major discipline of business education. With a broad global community and one of the most published business school faculties, Wharton creates economic and social value around the world.