Payoff complementarities and financial fragility: Evidence from mutual fund outflows

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ARTICLE INFO

Article history:
Received 12 February 2009
Received in revised form
10 August 2009
Accepted 8 September 2009
Available online 2 April 2010

JEL classification:
G01
G23

Keywords:
Payoff complementarities
Financial fragility
Mutual fund redemptions

ABSTRACT

The paper provides empirical evidence that strategic complementarities among investors generate fragility in financial markets. Analyzing mutual fund data, we find that, consistent with a theoretical model, funds with illiquid assets (where complementarities are stronger) exhibit stronger sensitivity of outflows to bad past performance than funds with liquid assets. We also find that this pattern disappears in funds where the shareholder base is composed mostly of large investors. We present further evidence that these results are not attributable to alternative explanations based on the informativeness of past performance or on clientele effects. We analyze the implications for funds’ performance and policies.

1. Introduction

Financial fragility is often attributed to the presence of strategic complementarities among investors.1 When investors’ incentive to take a certain action increases in the expectation that other investors will take the same action, a multiplier effect is expected to emerge, amplifying the effect of fundamentals on investors’ behavior. Despite a large theoretical literature, virtually no empirical study identifies this relation in data. This paper aims to provide such empirical evidence.

1 This idea is at the core of various theories on bank runs (e.g. Diamond and Dybvig, 1983), currency attacks (e.g. Morris and Shin, 1998), bubbles and crashes in financial markets (e.g. Abreu and Brunnermeier, 2003), and others.

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We conduct our study using (open-end) mutual fund data. In mutual funds, investors have the right to redeem their shares at the fund’s daily-close net asset value (NAV) on any given day. As shown in previous studies (e.g., Edelen, 1999; Coval and Stafford, 2006), following substantial outflows, funds need to adjust their portfolios and conduct costly and unprofitable trades, which damage the future returns. Because mutual funds conduct most of the resulting trades after the day of redemption, most of the costs are not reflected in the NAV paid out to redeeming investors, but rather are borne by the remaining investors. This leads to strategic complementarities—the expectation that other investors will withdraw their money reduces the expected return from staying in the fund and increases the incentive for each individual investor to withdraw as well—and amplifies the damage to the fund.

Detecting this mechanism in the data is a difficult task. Testing directly whether agents choose the same action as others cannot credibly identify the effects of strategic complementarities because this approach is prone to a missing variable problem, that is, agents could act alike because they are subject to some common shocks or react to information about fundamentals unobserved by the econometrician. This so-called reflection problem posed a challenge for empiricists trying to detect peer effects for a long time (see discussion by Manski, 1993; Glaeser, Sacerdote, and Scheinkman, 2003). Recently, Hertzberg, Liberti, and Paravisini (2009) resort to a special setting that generates discontinuity in the information variable for identification. Instead, our empirical approach relies on the differences across mutual funds in the level of strategic complementarities faced by their investors. Investors in funds that hold illiquid assets (hereafter, illiquid funds) face a higher degree of strategic complementarities than investors in funds that hold liquid assets (hereafter, liquid funds). This is because redemptions impose higher costs on the illiquid funds than the liquid funds. Our empirical analysis tests for differences in redemption patterns across these types of funds.

We start by developing a stylized model of mutual fund redemptions that delivers our basic hypotheses. Given that the basic premise of the model is the presence of strategic complementarities in mutual fund redemptions, getting empirical predictions is non-trivial. This is because models with strategic complementarities typically have multiple equilibria and thus cannot be easily taken to the data. Our theoretical model (detailed in the Appendix) uses the global-game framework (assuming that agents do not have common knowledge about some fundamental variable that affects the returns of the fund) to overcome the problem of multiple equilibria and generate clear-cut empirical predictions.

Our main hypothesis is that the sensitivity of outflows to bad past performance is stronger in illiquid funds than in liquid funds. Intuitively, consider investors holding shares in an emerging market fund versus investors holding shares in a fund that invests in large-cap US stocks. Faced with bad performance, the former have a stronger tendency to redeem their shares because they know that redemptions by others impose non-negligible costs on the fund, which hurts them if they choose to stay in the fund. Our second prediction is based on the idea that large investors are more likely to internalize the externalities in redemptions. Knowing that they control large shares of the fund assets, large investors are less concerned about the behavior of others. Hence, the prediction is that the effect of the illiquidity of fund assets on investors’ redemptions is smaller in funds held primarily by large investors. Using data on the net outflows from US equity mutual funds from 1995 to 2005 and various measures of illiquidity (captured either by the stated investment style or the trading liquidity of the underlying assets), we find strong support for our two hypotheses.

We consider two alternative explanations for our findings. The first one is reminiscent of the empirical literature that attributes banking failures to bad fundamentals (e.g., Gorton, 1988; Calomiris and Mason, 1997, 2003; Schumacher, 2000; Martinez-Peria and Schmukler, 2001). In our context, illiquid funds could see more outflows upon bad performance because their performance is more persistent, and so, even without considering the outflows by other shareholders, bad performance increases the incentive to redeem. We entertain this explanation by examining in data whether, absent large outflows, performance in illiquid funds is more persistent than in liquid funds. We find no such evidence, both for open-end funds (after excluding observations with extremely large outflows) and for closed-end funds (where, by definition, outflows do not exist).

The second alternative explanation is based on a clientele effect. Suppose that investors in illiquid funds are more tuned to the market than investors in liquid funds, and thus they redeem more promptly after bad performance. We address this point by analyzing the behavior of one sophisticated clientele, institutional investors. We show that in the subsample of retail-oriented funds where strategic complementarities are expected to have an effect, large investors’ redemptions are more sensitive to bad performance in illiquid funds than in liquid funds. Moreover, this result does not hold in the subsample of institutional-oriented funds. These

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2 In fact, a common view on such models has been that they impose no restrictions on the data and thus cannot be tested (see Gorton, 1988).

3 The theoretical global-game literature was pioneered by Carlsson and Van Damme (1993). The methodology has been used in recent years to study various finance-related phenomena, such as currency crises (Morris and Shin, 1998; Corsetti, Dasgupta, Morris, and Shin, 2004), bank runs (Goldstein and Pauzner, 2005; Rochet and Vives, 2004), contagion of financial crises (Dasgupta, 2004; Goldstein and Pauzner, 2004), and stock-market liquidity (Morris and Shin, 2004; Plantin, 2009). It is also related to the model of Abreu and Brunnermeier (2003) on financial market bubbles and crashes. Strictly speaking, what we test in the paper is the joint hypothesis about the effect of strategic complementarities and the validity of the global-game structure. Previous attempts to test predictions from a global-game setting were based on laboratory experiments (see Heinemann, Nagel, and Ockenfels, 2004).

4 Large investors could still redeem more for informational reasons. The feature that we emphasize is that they respond less to the complementarities, which are proxied by the level of illiquidity.
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