

MONEY MARKET FUNDS RUN RISK: WILL FLOATING NET ASSET VALUE FIX THE PROBLEM?

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The instability of money market mutual funds (“MMF”), a relatively new form of financial intermediary that connects short-term debt issuers with funders who want daily liquidity, became manifest in the financial crisis of 2007–2009. The bankruptcy of Lehman Brothers, a major issuer of money market debt, led one large fund to “break the buck” (that is, violate the \$1 net asset valuation convention (“NAV”)) and triggered a run on other funds that was staunched only by major interventions from the U.S. Treasury and the Federal Reserve. One common reform proposal has been to substitute “floating NAV” for “fixed NAV,” on the view that MMF run risk was strongly affected by the potential to arbitrage between the “true” value of MMF assets and the \$1 fixed NAV. It turns out that European MMFs are issued in two forms, “stable NAV” and “accumulating NAV,” which offer a reasonable proxy for the distinction between fixed and floating NAV. Thus, the comparative run rate of these two MMF types during “Lehman week” offers a natural

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experiment of the effect of NAV “fixedness.” We find that the stable/accumulating distinction explains none of the cross-sectional variation in the run rate among these funds. Instead, two other variables are explanatory: yield in the period immediately prior to Lehman week, which we take as a proxy for the fund’s portfolio risk, and whether the fund’s sponsor is an investment bank, which we take as proxy for sponsor capacity to support the fund. We then argue that these findings indicate that other stability-enhancing reforms are necessary.

I.	Introduction	314
II.	Prior Literature	332
III.	European Money Market Funds	333
IV.	Data on European Money Market Funds	335
V.	Econometric Model and Results	346
	A. Variables	346
	B. Results	349
	C. Robustness Checks	356
VI.	Conclusion (and a Policy Coda)	358
	A. The Current SEC Proposal	365
	B. In Sum	368
	Appendix	369

I. INTRODUCTION

Money market funds (“MMFs”) were at ground zero of the financial crisis.¹ Lehman Brothers failed on Monday, September 15, 2008. One day later, an important money

¹ For detailed sources on the following account, see CONG. OVERSIGHT PANEL, NOVEMBER OVERSIGHT REPORT: GUARANTEES AND CONTINGENT PAYMENTS IN TARP AND RELATED PROGRAMS 22–34 (2009), *available at* <http://www.gpo.gov/fdsys/pkg/CPRT-111JPRT53348/pdf/CPRT-111JPRT53348.pdf>; INV. CO. INST., REPORT OF THE MONEY MARKET WORKING GROUP 47–67 (2009), *available at* http://www.ici.org/pdf/ppr_09_mmwg.pdf [hereinafter MONEY MARKET WORKING GROUP REPORT]; Naohiko Baba, Robert N. McCauley & Srichander Ramaswamy, *US Dollar Money Market Funds and Non-US Banks*, BIS Q. REV., Mar. 2009, at 65.

market fund, the Reserve Primary Fund, “broke the buck” because of its holdings of Lehman short-term debt, even though these holdings amounted to only 1.2% of the Reserve Primary Fund’s portfolio, well below the 5% single-issuer maximum set by the Securities and Exchange Commission’s (“SEC”) rules.² Immediately thereafter, investors—led by institutional investors—began to withdraw from other “prime” money market funds.³ During “Lehman week” these withdrawals—call it a run—amounted to approximately \$300 billion, approximately 15% of prime money market fund assets.⁴ Several other money market funds almost broke the buck, rescued by interventions from their sponsors.⁵ Pressure arose not because of the serial bankruptcy of other issuers of money market instruments, but rather from risk-fleeing investors who wanted to switch to Treasury securities or cash. The redemptions exhausted the funds’ cash and highly-liquid asset reserves. As redemption requests accelerated and as the short-term credit market froze, funds faced the prospect of selling the

² See SEC Rule 2a-7, 17 C.F.R. § 270.2a-7(c)(4)(i)(A) (2013). Money market funds are a type of open-ended mutual fund, which are generally valued on the basis of the “net asset value” (“NAV”) of their portfolios. As elaborated below, money market funds are valued by convention at a \$1.00 NAV, unless and until the actual NAV of the fund slips below \$0.995, at which point the fund is said to have “broken the buck.” CONG. OVERSIGHT PANEL, *supra* note 1, at 22–23.

³ “Prime” funds may hold issuance of highly-rated non-governmental issuers. See *Federated Financial Glossary*, FEDERATED INVESTORS, http://www.federatedinvestors.com/FII/leaf/display.do?category=Financial_Glossary (last visited Apr. 24, 2014) (defining “Prime Money Market Funds” as funds which “offer the potential for comparatively higher yields with the same attributes of all money funds governed by SEC Rule 2a-7: credit quality, portfolio diversity and daily liquidity at par. Prime funds invest only in high-quality, First or Second Tier money market instruments and—like all 2a-7 regulated funds—have a dollar-weighted average maturity not greater than 90 days and final maturity of the individual security not greater than 397 days”).

⁴ MONEY MARKET WORKING GROUP REPORT, *supra* note 1, at 62.

⁵ See *infra* note 23 and text accompanying notes 69–70; see also HENRY SHILLING ET AL., MOODY’S INVESTORS SERV., SPONSOR SUPPORT KEY TO MONEY MARKET FUNDS 4–5 (2010).

remaining assets at fire sale prices. The realization of such shortfalls would have meant below-\$1 net asset value (“NAV”) at many funds. Indeed, the \$0.97 valuation initially anticipated from the Reserve Primary Fund liquidation, which exceeded the 1.2% projected loss on its Lehman holdings, reflected this phenomenon.⁶

The U.S. Government rode to the ultimate rescue. On Friday, September 19, 2008 the Treasury announced a “Temporary Guaranty Program for Money Market Funds.”⁷

⁶ The ultimate liquidation turned out somewhat better than anticipated for the Reserve Primary Fund shareholders. As of June 2009, the SEC expected the fund’s shareholders to receive \$0.984, including interest received after the Fund was closed. See Appendix to Order at 7–8, SEC v. Reserve Mgmt. Co., 732 F. Supp. 2d 310 (S.D.N.Y. 2010) (no. 09-4346), ECF No. 11, available at https://www.sec.gov/spotlight/reserve_primary_fund_investors/gardephe_order.pdf#distributionplan. The fund’s investors ultimately received slightly more, \$0.99, in large part because of higher realizations on Lehman Brothers securities in bankruptcy. The final payout came in July 2011. None of these valuations takes account of the shareholders’ lost liquidity during the period. See SEC v. Reserve Mgmt. Co. (*In re* The Reserve Fund Sec. and Derivative Litig.), 732 F. Supp. 2d 310, 314 (S.D.N.Y. 2010); SEC v. Reserve Mgmt. Co. (*In re* The Reserve Fund Sec. and Derivative Litig.), 673 F. Supp. 2d 182, 188–90 (S.D.N.Y. 2009); *Fund Update: Additional Information Regarding the Primary Fund-In Liquidation*, PRIMARY FUND IN LIQUIDATION (July 29, 2011), <http://www.primary-yieldplus-liquidation.com/pdf/FundUpdate-July2011.pdf>.

⁷ See Press Release, U.S. Dep’t of the Treasury, Treasury Announces Temporary Guaranty Program for Money Market Funds (Sept. 19, 2008), available at <http://www.treasury.gov/press-center/press-releases/Pages/hp1147.aspx>. The Congressional Oversight Panel reports that 1486 MMFs participated, representing \$3.2 trillion (93% of the industry total). CONG. OVERSIGHT PANEL, *supra* note 1, at 28. Presumably most of the uninsured funds invested solely in Treasury securities. That many “government” funds participated may reflect investments in “agency” securities, debt issued by the “Government-Sponsored Entities,” (“GSEs”), Fannie Mae and Freddie Mac, which were then in conservatorship and whose debt was trading at below par. The program was extended twice, finally expiring a year later. The Treasury collected \$1.2 billion in fees but was never called to perform on its guarantee. See Press Release, U.S. Dep’t of the Treasury, Treasury Announces Expiration of Guarantee Program for Money Market Funds (Sept. 18, 2009), available at <http://www.treasury.gov/press-center/press-releases/Pages/tg293.aspx>.

This program, capitalized by the then-\$50 billion Exchange Stabilization Fund, offered a U.S. government guarantee on all existing deposits in participating money market funds, in effect, the entire \$3.5 trillion industry.⁸ On the same day, the Federal Reserve (the “Fed”) announced it would use emergency powers to create a credit facility to fund no-risk bank purchases of asset-backed commercial paper from MMFs, the “Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility” (“AMLF”).⁹ These purchases, at amortized-cost, were funded by non-recourse Fed loans matched to the maturity of the purchased assets. Asset-backed commercial paper (“ABCP”) constituted, as a class, the dodgiest money market instruments on offer, since they largely represented claims on pools of mortgage-backed securities and other receivables created off-balance sheet by various financial institutions. Ordinarily, loans against securities like ABCP would be over-collateralized to protect the Fed against loss, but the structural inability of MMFs to bear loss required a concessionary set-up. Moreover, the Fed lent money to fund the ABCP purchases at its primary credit rate, which meant that the banks earned a spread between the ABCP rate and the Fed rate. Both of these moves contradicted the Bagehot dictum for central bank behavior in a crisis: to lend freely to solvent firms against good collateral

⁸ CONG. OVERSIGHT PANEL, *supra* note 1, at 5, 24, 43.

⁹ See *Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility*, BD. OF GOVERNORS OF THE FED. RESERVE SYS., <http://www.federalreserve.gov/monetarypolicy/abcpmmmf.htm> (last visited Apr. 24, 2014); *Frequently Asked Questions and Answers*, FED. RESERVE DISC. WINDOW, <http://www.frbdiscountwindow.org/mmmf.cfm> (last visited Apr. 24, 2014). For information about AMLF facilities generally, see OFFICE OF INSPECTOR GEN., BD. OF GOVERNORS OF THE FED. RESERVE SYS., *THE FEDERAL RESERVE’S SECTION 13(3) LENDING FACILITIES TO SUPPORT OVERALL MARKET LIQUIDITY: FUNCTION, STATUS, AND RISK MANAGEMENT* 59–66 (2010) [hereinafter *INSPECTOR GENERAL REPORT*]; Burcu Duygan-Bump et al., *How Effective Were the Federal Reserve Emergency Liquidity Facilities? Evidence from the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility*, 68 J. FIN. 715, 718–24 (2013).

at a penalty rate.¹⁰ Why? Apart from liquidity support, the Fed was also protecting Treasury's somewhat undercapitalized guarantee by taking the credit risk on the most fragile MMF assets.¹¹ The Treasury guarantee was never called upon, but the Fed lent out \$150 billion under this program in its first ten days.¹²

Because of the shrinkage of prime MMF assets, and because of the shift by those MMFs to Treasury securities, parties that counted on such financing faced an immediate funding crisis. The Fed therefore created an additional emergency facility, the "Commercial Paper Funding Facility," to support commercial paper issuers, especially asset-backed securitization vehicles, which could no longer

¹⁰ WALTER BAGEHOT, *LOMBARD STREET: A DESCRIPTION OF THE MONEY MARKET* 187–88 (14th ed. 1915).

¹¹ The Fed expanded the capabilities of institutions to access the AMLF on January 30, 2009. The expanded capabilities provided (1) a temporary limited exception eliminating any capital requirements for purchases of ABCP through the facility and (2) a temporary limited exception to sections 23A and 23B of the Federal Reserve Act. See INSPECTOR GENERAL REPORT, *supra* note 9, at 62–63. These exemptions effectively reduced the cost of purchasing ABCP (eliminating capital requirements) and removed limitations on the quantity of ABCP an institution could purchase from a sponsored MMF. The need for these exemptions also points to a limitation in the strategy of sponsor support for struggling MMFs, since many fund complexes could not be supported within the existing affiliate-lending constraints that applied to banks.

¹² See Duygan-Bump et al., *supra* note 9, at 724–25 (observing that use of the AMLF was widespread among MMFs—105 MMFs participated, participation being heaviest among institutional funds). Treasury charged for its guarantee; the Fed did not. See *Summary of Terms for the Temporary Guaranty Program for Money Market Funds*, DEP'T OF THE TREASURY, <http://www.treasury.gov/about/organizational-structure/offices/Domestic-Finance/Documents/TermSheet.pdf> (last visited Apr. 24, 2014); see also Ben Levisohn & Daisy Maxey, *Absent Help, More Funds Might Have Broken Buck*, WALL ST. J., Dec. 1, 2010, <http://online.wsj.com/news/articles/SB10001424052748704594804575648872562084814> (noting that nine of the ten largest MMFs, representing two-thirds of all MMF assets, used the AMLF. Only Vanguard did not use the emergency credit facility).

count on purchases from money market funds.¹³ In its first week (starting on October 27, 2008), this federal facility bought \$144 billion in commercial paper. Maximum use of this facility peaked at \$350 billion in January 2009.¹⁴

These large-scale government interventions successfully halted the run and stabilized money markets.¹⁵ At year-end 2008, prime MMFs had virtually the same level of assets as at year-end 2007.¹⁶

Addressing the fragility of money market funds has been a major post-crisis regulatory objective. In 2010, the SEC adopted changes to the rule under the Investment Company Act of 1940 that governs MMFs, so as to raise standards on portfolio securities, shorten maturities, increase liquidity requirements, and spell out orderly liquidation procedures

¹³ See Tobias Adrian, Karin Kimbrough & Dina Marchioni, *The Federal Reserve's Commercial Paper Funding Facility*, FED. RESERVE BANK OF N.Y. ECON. POL'Y. REV., May 2011, at 25, 34, available at <http://www.newyorkfed.org/research/epr/11v17n1/1105adri.pdf>.

¹⁴ *Id.* at 35; see also INSPECTOR GENERAL REPORT, *supra* note 9, at 77 fig.7-3. European banks also faced a funding crisis because U.S. MMFs, which had been the major purchasers of dollar-denominated certificates of deposit issued by these banks, withdrew from this market. The Fed entered into uncapped swap lines with European central banks that amounted over \$200 billion. See Baba et al., *supra* note 1, at 76–77.

¹⁵ The Fed also created the Money Market Investor Funding Facility (“MMIFF”) on October 21, 2008. The MMIFF created a special purpose entity (“SPE”) to purchase the assets of MMFs with 90% cash and 10% subordinated commercial paper issued by the SPE. Effectively, the participating MMFs would collectively self-insure and take the first 10% loss on the combined assets purchased under MMIFF. MMFs never participated in the facility, as the MMFs were unwilling to assume any risk. See INSPECTOR GENERAL REPORT, *supra* note 9, at 81, 85–89. The creation of the MMIFF shows the Fed’s resolve to support MMFs during the financial crisis. More revealing is the way the absence of capital constrains the kind of liquidity support the Fed can provide. As the comparison between the AMLF and the MMIFF demonstrates, MMFs cannot take the usual “haircut” associated with collateralized loans from a lender of last resort. This means that Fed liquidity support will entail risk-bearing that is not customary for a lender of last resort, effectively subsidizing the industry.

¹⁶ INV. CO. INST., 2013 INVESTMENT COMPANY INSTITUTE FACT BOOK 180 tbl.39 (2013), available at http://www.ici.org/pdf/2013_factbook.pdf.

for firms that “break the buck.”¹⁷ However, a wide range of discussants inside and outside of the government have regarded these SEC actions as insufficient or incomplete,¹⁸ perhaps even counter-productive.¹⁹

¹⁷ See Money Market Fund Reform, 75 Fed. Reg. 10,060 (Mar. 4, 2010) (codified at 17 C.F.R. pts. 270, 274). See Jill Fisch & Eric Roiter, *A Floating NAV for Money Market Funds: Fix or Fantasy?*, 2012 U. ILL. L. REV. 1003, 1017–28 (2012).

¹⁸ See generally DEP’T OF THE TREASURY, FINANCIAL REGULATORY REFORM, A NEW FOUNDATION: REBUILDING FINANCIAL SUPERVISION AND REGULATION 10, 14 (2009) (proposing establishment of the Financial Services Oversight Counsel, to identify systemic risks, and the Consumer Financial Protection Agency, to protect consumers from unfair and deceptive practices), available at http://www.treasury.gov/initiatives/Documents/FinalReport_web.pdf; MONEY MARKET WORKING GROUP REPORT, *supra* note 1, 69–119 (recommending liquidity requirements; portfolio maturity limits; increased credit quality standards; enhanced risk disclosure requirements); GROUP OF THIRTY, FINANCIAL REFORM: A FRAMEWORK FOR FINANCIAL STABILITY 24–56 (2009), available at <http://fic.wharton.upenn.edu/fic/Policy%20page/G30Report.pdf> [hereinafter GROUP OF THIRTY] (proposing four core recommendations for reforming the policies, practices, and market standards of the financial system, and create a more robust infrastructure for promoting transparency within financial markets); DEP’T OF THE TREASURY ET AL., REPORT OF THE PRESIDENT’S WORKING GROUP ON FINANCIAL MARKETS: MONEY MARKET FUND REFORM OPTIONS 3–6, 13–35 (2010), available at <http://www.treasury.gov/press-center/press-releases/Documents/10.21%20PWG%20Report%20Final.pdf> [hereinafter PRESIDENT’S WORKING GROUP REPORT] (stating that “more should be done to address systemic risk and the structural vulnerabilities of MMFs to runs” and suggesting floating NAV, private emergency liquidity facilities for MMFs, and other safeguards); SQUAM LAKE GRP., REFORMING MONEY MARKET FUNDS 1, 3–8 (2011), available at <http://www.squamlakegroup.org/Squam%20Lake%20MMF%20January%2014%20Final.pdf> (observing that, despite the changes in the SEC rules, “money market funds continue to pose significant systemic risk” and arguing for a floating NAV and a regulatory buffer requirement for stable NAV funds).

¹⁹ For example, the SEC’s post-2008 reforms shortened portfolio maturities. This may enhance liquidity, but it also makes it easier for funds to not roll over their assets, which adds to systemic fragility because of the immediate funding shortfalls on the demand side. The shortened maturities will also change the composition of MMF portfolios. Non-financial firms are not well-equipped to use short-term liabilities to finance long-term assets. Thus, financial firms, which specialize in such

Exactly what further policy intervention to take has been contentious.²⁰ The industry prefers an emergency liquidity facility—in effect a discount-window version of the support provided by the Fed during the crisis.²¹ Some parties, including former Fed Chairman Paul Volcker, have endorsed a floating NAV approach, based on the view that the dynamics of a fixed NAV significantly figures into run risk.²²

maturity transformation, will increase their share of MMF financing. Indeed, this has already occurred. *See infra* Chart C; *see also* Money Market Fund Reform; Amendments to Form PF, 78 Fed. Reg. 36,834, 36,835 (June 19, 2013) (to be codified at 17 C.F.R. pts. 210, 230, 239, 270, 274, 279) [hereinafter 2013 SEC MMF Reform Proposal]. As the financial crisis demonstrated, financial firm solvency is likely to be highly correlated. Thus the effort to address stability by enhancing liquidity may well undermine stability by creating correlated solvency risk.

²⁰ Some think there is no problem to be addressed. *See, e.g.*, Jonathan Macey, *Reducing Systemic Risk: The Role of Money Market Mutual Funds as Substitutes for Federally Insured Bank Deposits*, 17 STAN. J.L. BUS. & FIN. 131, 162–73 (2011) (arguing that further reforms, particularly those suggested by the President’s Working Group on Financial Markets, would actually increase systemic risk in MMFs).

²¹ *See* Letter from Paul Schott Stevens, CEO, Inv. Co. Inst., to Elizabeth M. Murphy, Sec’y, SEC (Jan. 10, 2011), *available at* http://www.ici.org/pdf/11_sec_pwg_com.pdf (providing the Investment Company Institute’s views on the President’s Working Group Report on Money Market Fund Reform).

²² *See generally* GROUP OF THIRTY, *supra* note 18, at 29 (Recommendation 3). Additionally, the reason for former Fed Chairman Volcker’s support for a move to a floating NAV may involve a desire to see funds move from the MMFs to the banking sector. For example, *see* Paul Volcker’s response to a question on how the proposal for the Volcker Rule focuses banks on commercial activities:

[The purpose of the Volcker Rule is to] remov[e] the temptation [for banks] to get highly involved in more speculative type of activities where the immediate returns may seem to be very high and you have got some very highly paid people who want to keep that kind of activity going. . . . [T]here is a question about money market mutual funds, that they originated in a kind of regulatory arbitrage some years ago because they did not have to put up with some of the restrictions that banks put up with, and they have attracted trillions of dollars. *And if more of those dollars were in the banking system, I think the*

Other parties favor a loss-absorbency layer for each fund—in effect, capital. Currently, a fund's capacity to absorb loss from a defaulting security or a security that trades below its amortized cost depends upon the sponsor's willingness to cover the shortfall.²³ As in the case of the Reserve Primary Fund, a sponsor may be unable to cover such a loss or unwilling to do so.²⁴

incentive to lend, whether to businesses or homeowners or whatever, would be greater. That is an area where the Administration has made some proposals, and I think it ought to be taken seriously.

Prohibiting Certain High-Risk Investment Activities by Banks and Bank Holding Companies: Hearing Before the S. Comm. on Banking, Housing, & Urban Affairs, 111th Cong. 34 (2010) (statement of Paul Volcker, Chairman, President's Economic Recovery Advisory Board) (emphasis added).

²³ Former SEC Chairman Mary L. Schapiro recently referred to an internal SEC study that identified sponsor support on more than 300 occasions since the first MMF offerings in the 1970s. *Perspectives on Money Market Mutual Fund Reforms: Hearing Before S. Comm. on Banking, Housing, and Urban Affairs, 112th Cong. 2 (2012) (statement of Mary L. Schapiro, Chairman, SEC). See also Henry Shilling & Dagmar H. Silva, US Money Market Fund Proposals Are Credit Positive for Investors; Negative for Sponsors, MOODY'S WKLY. CREDIT OUTLOOK, July 2, 2012, at 30–31, available at http://www.risk-compliance-association.com/Moodys_to_the_members_of_the_International_Association_of_Risk_and_Compliance_Professionals_July_2_2012.pdf (reporting at least 201 instances of sponsor support from 1980 through 2011). Searching through SEC no-action letters, Kacperczyk and Schnabl found forty-seven instances of sponsor support during 2008. Marcin Kacperczyk & Philipp Schnabl, *The Risk-Taking Incentives of Money Market Funds* 37–38 (Feb. 2012) (unpublished manuscript), available at <http://economics.mit.edu/files/7588>. For other estimates of the extent of sponsor support of MMFs during the financial crisis, see *infra* notes 68–70 and accompanying text.*

²⁴ These risks become greater as concentration in the MMF industry grows. As of May 31, 2012, approximately 50% of MMF assets were held by funds of five sponsors. The top three sponsors, Fidelity, JP Morgan Chase, and Federated, account for approximately 35% of MMF assets. The top ten sponsors account for approximately 75% of MMF assets. See *Largest Money Fund Managers*, CRANE DATA, <http://cranedata.com> (last visited Apr. 24, 2014).

For a time, disagreement among the SEC Commissioners blocked consideration of further regulatory action; this deadlock provoked the Financial Stability Oversight Council (“FSOC”) into offering its own proposals for MMF reform.²⁵ Three reform options were offered: (1) floating NAV; (2) a combination of a sponsor-supplied NAV capital buffer and a “minimum balance at risk” for MMF users; and (3) a higher level of sponsor-supplied NAV buffer and other risk-reducing measures.²⁶ Fearful of losing its regulatory autonomy (and after a change of Chairs), the SEC finally came forward with its own reform proposals.²⁷ Two major proposals are on offer: floating NAV for institutional funds, fixed NAV for the rest; and retention of fixed NAV, but liquidity fees or “gates” on

²⁵ See Proposed Recommendations Regarding Money Market Mutual Fund Reform, 77 Fed. Reg. 69,455 (Nov. 19, 2012) (recommendations of the Financial Stability Oversight Council) [hereinafter FSOC Proposed Recommendations]. The FSOC Proposed Recommendations emanated from its separate authority to address systemic risks apart from actions of the primary regulator. See Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, Pub. L. No. 111-203, §§ 113, 120, 124 Stat. 1376, 1398–1402, 1408–10 (2010). In the face of deadlock at the SEC, the FSOC’s 2012 Annual Report identified money market funds as presenting “structural vulnerabilities in wholesale short-term funding markets” that required “structural reforms.” FIN. STABILITY OVERSIGHT COUNCIL, 2012 ANNUAL REPORT 11–12 (2012), available at <http://www.treasury.gov/initiatives/fsoc/Pages/annual-report.aspx>. The FSOC can make specific recommendations to the SEC and thereby force a resistant SEC to offer public explanation. See Dodd-Frank Act § 120, 12 U.S.C. § 5330 (2012). Or, the FSOC can determine that specific MMFs or sponsors “could pose a threat to the financial stability of the United States” and remit them to prudential supervision by the Federal Reserve. Dodd-Frank Act § 113, 12 U.S.C. § 5323.

²⁶ In functional terms, the “minimum balance at risk” proposal called for a hold-back of 3% of an MMF investor’s funds (over \$100,000) for thirty days. This was designed to reverse the first-mover advantages of early redemption and thus avoid “run” dynamics at times of financial stress. See FSOC Proposed Recommendations, *supra* note 25, at 69,470–73 (describing the minimum balance at risk proposal).

²⁷ See 2013 SEC MMF Reform Proposal, *supra* note 19, at 36,961 (proposing reforms intended to shorten portfolio maturities, among other things).

investor redemptions at times of financial stress, both measures optional with the fund.

Floating NAV has been a favorite reform strategy because it eliminates the regulatory artifact (to adopt a more neutral term than “distortion”) that distinguishes money market funds from other mutual funds.²⁸ Rule 2a-7 permits MMFs to report a fixed \$1 NAV as long as the difference between the market value of the fund’s portfolio and its aggregate amortized cost does not exceed a \$0.005 band. That is, if a fund’s NAV is greater than or equal to \$0.995, it can report a \$1.00 NAV. Proponents claim that floating NAV will reduce run risk because (1) it would eliminate the fund users’ incentive in distressed markets to arbitrage between the \$1.00 and the actual market value, (2) it will condition investors to understand that “markets fluctuate” so that a decline in market prices does not necessarily signal an imminent default on portfolio securities, and (3) it will relieve sponsors of the implicit guarantee of zero investor losses that can lead to unrealistic expectations of safety.²⁹

²⁸ For a useful account of the regulatory history of amortized cost accounting for MMFs and a defense of the practice, see Fisch & Roiter, *supra* note 17, at 1007–17. For an account of the MMF industry’s early successful campaign for SEC permission to use fixed NAV, see William A. Birdthistle, *Breaking Bucks in Money Market Funds*, 2010 WIS. L. REV. 1155, 1160, 1174–77 (2010). In 1983, the SEC granted class-wide relief permitting fixed NAV. Valuation of Debt Instruments and Computation of Current Price Per Share by Certain Open-End Investment Companies (Money Market Funds), Investment Company Act Release No. 13,380, 48 Fed. Reg. 32,555 (July 18, 1983) (codified at 17 C.F.R. pt. 270).

²⁹ See 2013 SEC MMF Reform Proposal, *supra* note 19, at 36,850–51. On this view, breaking of the buck by even a single fund can trigger a run because of the high salience demonstration that sponsor support for a threatened MMF is merely common practice not a sure thing, and that such support will be based on separate sponsor calculations of convenience and capacity. The 2007 asset-backed commercial paper crisis shows the importance of this sponsor practice in maintaining stability. Although thirty-nine funds received sponsor support, through low visibility interventions, investors did not run on MMFs; to the contrary, MMF inflows increased from investors seeking a safe haven. Yet a regime that depends on implicit third party guarantees is inherently unstable, if only because the implicit guarantor does not internalize the cost of its defection

Opponents, especially institutional users, say that floating NAV will destroy the utility of MMFs, because it would create significant tax, accounting, and disclosure problems.³⁰

Skeptics wonder whether floating NAV has much effect on run risk. The purported arbitrage operates over a very limited range, one-half of a penny. That's a maximum of \$50,000 on a \$10 million portfolio, not taking into account transaction costs. Not a trivial amount but not compelling. Moreover, investors are unlikely to have the real-time pricing information that would encourage such arbitrage. Large MMF portfolios typically contain dozens of securities and many money market instruments do not trade. Instead, the strongest reasons for a run on an MMF are the same as for an uninsured bank account: uncertainty about the full payment of principal and a prisoner's dilemma dynamic in which the first party to withdraw stands the greatest chance of a full recovery. Withdrawal (immediate redemption from a fund) is rational whenever the current redemption price is higher than the "true" NAV or is significantly likely to be higher. This circumstance may arise in the case of fixed NAV, in the gap between \$1 and \$0.995, *but it is also true in the case of floating NAV*, because in a crisis that increases the default risk for MMF assets, today's NAV is likely to be a lagging, higher indicator of "true" NAV.

from the implicit arrangement. This then leads to the argument that floating NAV will enhance stability because it will avoid creating unsustainable expectations of sponsor support in difficult times. See Patrick E. McCabe, *The Cross Section of Money Market Fund Risks and Financial Crises* 3, 35 (Fed. Reserve Bd. Fin. & Econ. Discussion Series, Working Paper No. 2010-51, 2010), available at <http://ssrn.com/abstract=1898341>.

³⁰ Opponents may also believe that the desire to eliminate the utility of MMFs is the point of various reform proposals, including floating NAV, the goal of which is to make banks the exclusive provider of transaction accounts. That is, even if floating NAV does not in fact reduce run risk, it will lead many MMF users to turn to banks instead because of the transactional conveniences of a fixed dollar account. So, MMFs will be less of a systemic threat because they will be smaller. See Fisch & Roiter, *supra* note 17, at 1006.

To unpack this point: money market assets are likely to present a highly correlated risk of default or loss of value because they mainly consist of short term credit issuances of financial firms and their affiliates.³¹ Financial firms are often deeply linked to one another through various counterparty relationships; firms may “herd” in a way that produces similar business strategies. Both routes of systemic distress propagation mean that the failure of a significantly important financial firm is likely to lead to defaults, or the threat of default, on securities held by many MMFs. But since the short-term financial claims held by MMFs typically do not trade on secondary markets, asset prices will be relatively slow to adjust “stale” prices.³² Investors also know that redemption by *other* investors at today’s higher stale price will further reduce tomorrow’s

³¹ As of May 31, 2012, at least 80% of the non-governmental assets of prime MMFs were short-term claims on large banks; most of these assets were claims on large foreign banks. See *Perspectives on Money Market Mutual Fund Reforms: Hearing Before S. Comm. on Banking, Housing, and Urban Affairs*, 112th Cong. 126 ex. 1 (2012) (testimony of David Scharfstein, Edmund Cogswell Converse Professor of Finance and Banking, Harvard Business School) [hereinafter *Scharfstein Testimony*] (relying on Crane Data). See also HENRY SHILLING, MOODY’S INVESTORS SERV., MONEY MARKET FUNDS 2010 REVIEW AND 2011 OUTLOOK 1–2 (2011) (estimating that more than two-thirds of assets of prime MMFs and tax free MMFs are directly or indirectly exposed to banks). A secular trend to this effect can be established by analyzing the Federal Reserve Board’s Commercial Paper Release (financial v. non-financial categorization) in conjunction with Flow of Funds data on commercial paper held by MMFs. See *infra* Chart B.

³² See Dan Covitz & Chris Downing, *Liquidity or Credit Risk? The Determinants of Very Short-Term Corporate Yield Spreads*, 62 J. FIN. 2303, 2305 (2007); Duygan-Bump et al., *supra* note 9, at 720. A recent SEC staff study underscores the liquidity costs of a crisis. The buy-sell spread on even the highest quality prime securities significantly widened, to approximately fifty-one basis points, which indicates the expectation of lagging prices. See SEC DIV. OF ECON. & RISK ANALYSIS, LIQUIDITY COST DURING CRISIS PERIODS (2014), available at <http://www.sec.gov/comments/s7-03-13/s70313-321.pdf>.

NAV.³³ Investors will therefore run even without a buck to break.

In short, the circumstance that produces genuine concern that the fund may break the buck and therefore will trigger a run on a fixed NAV fund will also produce strong concern that MMF assets will generally decline in value, which is sufficient to trigger a run on a floating NAV fund. Floating NAV run risk is a combination of two factors: a correlated expected decline in asset values and “stale pricing.”³⁴ Thus, an investor in a floating NAV fund will have powerful incentives to exit ahead of an advancing wave.³⁵

³³ This is because there are proportionately fewer investors to bear the losses in a now-smaller pool of assets. See Qi Chen et al., *Payoff Complementarities and Financial Fragility: Evidence from Mutual Fund Outflows*, 97 J. FIN. ECON. 239, 240 (2010) (stating that “[b]ecause 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.”). In other words, where actual NAV is below realized NAV, each redemption increases the losses for remaining investors, because the embedded loss is distributed across a smaller investor base. This is easiest to see in the case of a fixed NAV fund, where the \$1.00 redemption amount may be greater than the “shadow” NAV. But the same problem arises for a floating NAV fund because of the stale pricing problem.

³⁴ Fixed NAV fund prices at a time of systemic distress are stale as a result of regulatory structure—the gap between \$1.00 and actual or “shadow” NAV. Floating NAV fund prices in similar circumstances will be stale because of the structure of the relevant asset markets.

³⁵ Consider the example in the President’s Working Group Report as to how fixed NAV may induce a run. See PRESIDENT’S WORKING GROUP REPORT, *supra* note 18, at 19–20. First, there is a default on a portfolio security, which leads to a meaningful reduction in Fund Alpha’s actual NAV. Investors in Alpha redeem to arbitrage the difference between the \$1.00 fixed NAV and the actual NAV; this may lead to wide-scale redemptions and quick sales by Alpha of fund assets to raise cash to meet redemption requests, in other words, a run. But what produces contagion from the run on Alpha to other MMFs is the correlation risk between the defaulting security and many other money market instruments. First,

Similarly, utilizing floating NAV as a means to desensitize investors to fluctuating MMF valuations seems to misperceive what drives a systemic MMF run: it is not the breaking of the buck at any particular fund, but rather a high-enough probability that the underlying portfolio event(s) that produced a break will correlate across MMFs generally.³⁶ The prior instance of buck-breaking—the Community Bankers Mutual Fund in 1994—provides an instructive example.³⁷ The fund broke the buck because of

such correlation may produce a fire sale valuation externality (meaning: the depressed asset valuations from Alpha's sales may force other firms to report lower NAV). Second, investors may also come to believe that similar securities will also default, and they will want to redeem before realization of such losses. But note: correlated default risk will produce a run even without fixed NAV. The default of a money market security may lead investors at other funds to run not because they are trying to arbitrage a gap but because they want to avoid the realization of loss.

³⁶ Professors Fisch and Roiter argue that the main reason for MMF run risk is not investors' fear of loss on MMF portfolios but rather lost liquidity because of uncertain consequences should a fund break the buck. Their solution is either conversion of the fund to floating NAV (meaning immediate loss realization for investors reflected in NAV), or, for liquidating funds, in effect, a partial suspension of convertibility. Specifically, investors would be able to redeem part of their investment, pending a final winding up of a fund. See Fisch & Roiter, *supra* note 17, at 1045–47. Another way to frame the Fisch & Roiter point is to say that fixed NAV adds a distinct vector of run pressure. This pressure is not found in floating NAV funds because breaking the buck triggers a liquidation that deprives investors of liquidity for a substantial period, even if the ultimate losses are relatively small. The liquidity costs of a fixed NAV fund's breaking the buck are addressed in detail in Patrick E. McCabe et al., *The Minimum Balance at Risk: A Proposal to Mitigate the Systemic Risks Posed by Money Market Funds* 12, 31 (Fed. Reserve Bd. Fin. & Econ. Discussion Series, Working Paper No. 2012-47, 2012), available at <http://www.federalreserve.gov/pubs/feds/2012/201247/201247pap.pdf>. Such liquidity risk seems secondary to the underlying correlated solvency risks that are fundamental to a systemic run, although streamlining of the liquidation process to reduce the liquidity costs seems highly desirable.

³⁷ See John E. Backlund, Securities Act Release No. 7626, Investment Company Act Release No. 23639, Investment Advisers Act Release No. 1783, 1999 WL 8164 (Jan. 11, 1999) (enforcement action brought subsequent to fund's breaking the buck). A Federal Reserve policy change

valuation changes in a portfolio “unsuitably” concentrated (27%) in interest-rate sensitive structured notes. The fund was small (only \$130 million), its portfolio concentration violated the SEC rule, and the securities did not default. The fund’s idiosyncratic investment strategy (and small size) meant that the industry did not suffer a run.³⁸ By contrast, the Reserve Primary Fund (\$60 billion) held defaulted-upon securities of a large financial firm (Lehman) at a time of (1) high concentration of MMF assets in the financial sector and (2) increasing and correlated instability among financial firms.³⁹ In other words, it appears that the correlation of possible portfolio losses rather than the “focal point” effect of a buck-breaking was the main driver of the MMF run. These portfolio losses can arise not only through defaults but also through fire sale prices on non-faulted assets as funds scramble to meet redemption requests.⁴⁰

The point is this: unless floating NAV significantly reduces run risk relative to fixed NAV, it will not produce systemic stability. Instead, one of the other proposals on offer becomes necessary. Since the Fed has shown no desire to become lender of last resort to MMFs, loss-absorbing capital becomes the obvious alternative.⁴¹

that abruptly raised short-term interest rates reduced the valuation of money fund instruments generally.

³⁸ An additional factor in avoiding a run was that money market fund sponsors stepped up to provide support to forty-three of the 963 then-registered MMFs. See 2013 SEC MMF Reform Proposal, *supra* note 19, at 36,834, 36,840 tbl.1.

³⁹ See *infra* Charts A and C.

⁴⁰ Economists sometimes refer to this as a “cash in the market” problem. Even if investors believe that particular assets are undervalued at today’s price, they will postpone buying if they also believe that tomorrow’s price will be even lower.

⁴¹ The industry apparently prefers the status quo. That would be roughly the result of adopting the SEC’s proposal of optional liquidity fees and gates for fixed NAV funds. Investors have historically relied on sponsors’ implicit guarantees of MMF solvency. The SEC proposal would invite investors to rely upon sponsors’ implicit guarantees of MMF liquidity. See *infra* text accompanying notes 95–96. Against the argument that a financial institution that engages in liquidity transformation

This Article takes advantage of a natural experiment presented by European money market funds to provide empirical evidence on that run-risk question. Although all U.S. MMFs are fixed NAV funds, money market funds offered in Europe come in both “stable NAV” and “accumulating NAV” varieties. A “stable NAV” fund is equivalent to the “fixed” U.S. counterpart. An “accumulating” fund does not maintain fixed NAV and, while it does not fully “float,” it does offer a useful proxy for the effects of a “floating NAV” fund. We examined the performance of these European MMFs during Lehman week to test the factors that contributed to run propensity. Although virtually all funds experienced a significant run, the only internal factor that consistently predicted extra run propensity in our various models was ex ante risk, proxied by reported yield before Lehman week. By contrast, the difference in run propensity between stable and

without the backing of a creditworthy insurer, a lender of last resort, or loss-absorbing capital will present a systemic hazard, the industry response appears to be that, like it or not, the Federal Reserve will be obliged to support MMFs during a financial crisis. See Letter from John D. Hawke, Arnold & Porter LLP (on behalf of Federated Investors), to Hon. Mary L. Schapiro, Chairman, SEC (Aug. 17, 2012), *available at* <http://www.sec.gov/comments/s7-03-13/s70313-107.pdf> (listing “the Federal Reserve’s authority and responsibility to provide liquidity to the markets” as first alternative to further SEC rule-making). For a discussion of the way in which such Federal Reserve action would entail a subsidy to the industry, see the discussion of the mechanics of the AMLF *supra* note 9 and accompanying text.

There are many variants of loss-absorbing capital. One proposal is for the sale of bundled Class A/Class B units offered by one of the authors of this paper in August 2011. Another is proposal by the Federal Reserve staff calling for a “Minimum Balance at Risk” Requirement that similarly envisions a hold-back for a period of time of a certain percentage of the investor’s deposit into the fund, with an additional subordination requirement for early-redeeming investors in the event of the fund’s liquidation. Compare Jeffrey N. Gordon, *Comment on Money Market Funds for SEC* (Columbia Law & Econ. Working Paper No. 425, 2011), *available at* <http://ssrn.com/abstract=2133588>, with Patrick McCabe et al., *supra* note 36. The FSOC Proposed Recommendations included a Minimum Balance at Risk proposal, *supra* note 25, at 69,469.

accumulating NAV funds was not economically or statistically significant. Focusing in particular on U.S. dollar (“USD”) funds that provide the best institutional comparison, our point estimate is that a 1% increase in yield (e.g., from 2.00% to 2.02%) was associated with approximately a 0.6% decrease in fund assets (e.g., from \$100 million to \$99.4 million). Over the approximately 1.8% yield range of the USD European MMFs (“EMMFs”), this suggests that the highest-yielding funds on average should have experienced asset contractions approximately 24% greater than the lowest-yielding funds. To repeat, none of the contraction was explained by the difference between stable and accumulating NAV, indicating that NAV “fixedness” did not contribute to the run.⁴²

We also examine the performance of a subsample of USD funds held out as following the portfolio constraints of SEC Rule 2a-7, which makes for an even tighter comparison than the full universe of USD EMMFs. Ex ante risk was more strongly correlated with run risk during Lehman week for this group of funds. Our point estimate is that a one% increase in yield would explain an asset decrease of 2.85%. Among these funds, the reported yield varied from 2.12% to 2.72%, which meant that the highest yielding funds should have experienced asset contraction loss of 31% more than the lowest yielding funds. The difference between stable NAV and accumulating NAV funds was, once again, insignificant.

In a sense, these results should not be surprising. Although in theory a bank run can be triggered by an event uncorrelated with solvency risk (“sunspots”), the usual

⁴² On the debate as to whether bank runs are “panic-driven” or are “information-based,” we find, “both.” Of the 19% contraction in USD European prime MMFs, roughly 16% of that run is explained by firm-specific “information-based” factors in our models; the rest is driven by unobservables, probably meaning the external events. Compare Douglas W. Diamond & Philip H. Dybvig, *Bank Runs, Deposit Insurance, and Liquidity*, 91 J. POL. ECON. 401, 405–11 (1983), with Charles J. Jacklin & Sudipto Bhattacharya, *Distinguishing Panics and Information-Based Bank Runs: Welfare and Policy Implications*, 96 J. POL. ECON. 568, 570–89 (1988).

liquidity of MMF assets means that MMF runs are, instead, highly likely to be associated with correlated credit concerns about money market instruments.⁴³ Our conclusion is that floating NAV will not address the credit concerns associated with MMF assets.

Part II of this paper describes the prior literature on the MMF run during fall 2008. Part III describes European money market funds. Part IV describes our data and provides descriptive statistics. Part V provides our results. Part VI concludes. Part VI also provides a “policy coda” that discusses the current SEC proposals, focusing on the “fees/gates” proposal and addressing the need for MMFs to develop the capacity to absorb loss apart from the implicit sponsor guarantees that now stabilize the industry.

II. PRIOR LITERATURE

Post-2008 literature on money market funds tries to understand the factors that led to the MMF run by looking at various cross-sectional factors, such as yield, investor characteristics, and sponsor characteristics of United States-based MMFs. Because all U.S. funds are, of course, fixed NAV, there is no cross-sectional variation on this dimension. We are aware of no prior study that looks at European MMFs in this regard.

McCabe (2010) finds that three factors increased run propensity: portfolio risk, proxied by average yield in the year prior to Lehman week; sponsor risk, proxied by credit default swap spreads; and investor risk, chiefly whether the

⁴³ The report of the industry’s Money Market Working Group is also instructive on this point. The Reserve Primary Fund was widely known to be “reaching for yield” in the effort to attract deposits. In the year before its failure, it significantly increased its holdings in higher yielding asset-backed commercial paper, giving it a meaningful yield advantage over its competitors (almost fifty basis points in February 2008). This strategy change moved the Reserve Fund’s yield from the bottom 20% of institutional MMFs into the top 10%. In the July 2007–September 2008 period, its assets and market share roughly doubled. MONEY MARKET WORKING GROUP REPORT, *supra* note 1, at 54–58.