Managing the Guarantees Associated with U.S. Money Market Mutual Funds

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Context

• US Money Market Mutual Funds (MMMFs) are a large and economically important sector ($3.4 T)
• In September 2008, threat of run on funds when Reserve Fund “broke the buck.”
• Substantial government and private action to eliminate threat
• Contentious debate about regulation
  – SEC promulgated first round of 2a-7 revisions last week
  – Treasury has expressed an interest in restructuring MMMF
Purpose of talk and paper

• Mechanics: Explain how MMMFs deliver the promise of a fixed redemption price

• Economics: Characterize this complex promise as a put option and how the cost is shared by non-redeeming shareholders, sponsor and government

• Discuss policy alternatives and implications

• (Will not discuss pricing in detail today)
Recent developments for MMMF

- Obama Administration Plan for Regulatory Reform (PWG) is considering fundamental changes to address systemic risk
  - moving away from a stable net asset value for MMMFs
  - requiring MMMFs to obtain access to emergency liquidity facilities from private sources that are reliable, scalable, and designed in such a way that drawing on the facilities to meet redemptions would not disadvantage remaining MMF shareholders

- SEC proposing release:
  - Tighten asset restrictions (maturity, credit)
  - Effect shareholder transactions at the market-based net asset value ("floating" rather than stabilized NAVs),
  - Require that funds satisfy redemption requests in excess of a certain size through in-kind redemptions.
  - Publish shadow prices
What is a *Money Market Mutual Fund*?

- **Mutual Funds** (or UCITS=Undertaking for Collective Investment in Transferable Securities)
  - “Narrow” financial organizations that:
  - invests in a portfolio of relatively liquid instruments,
  - delivers returns to single class of investors, and
  - permits investor purchases and redemptions at net asset value (NAV) on at least a daily basis

- **Money Market Mutual Fund**
  - Investment portfolio consists of short-maturity, relatively liquid, relatively low risk (money market) instruments
What is a *U.S.* MMMF?

- *Corporate* form, overseen by independent trustees.
- Investment restrictions set by *Rule 2a-7* of the Investment Company Act
- Rules engineered to keep *NAV at $1.00*
- Note: First US MMMF was Reserve Fund in 1971, set up by Bruce Bent.
Crisis precipitated by Reserve Funds

• Reserve Primary Fund
• Invested in Lehman CP ($785M)
  – Following collapse of LEH recognized loss on paper
• Net Asset Value fell to $0.97 on Sept 16, 2008
  – First major MMMF to “Break the buck”
• There were actual three Reserve Funds that broke the buck
• SEC “hard locate” 12(k)(2) order
Who redeemed?
Weekly Industry Data

Retail Up
1.0%

Overall
Down 4.7%

Institutional Down
7.25%

Weekly Flows to Money Market Mutual Funds

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Immediate Regulatory Actions

• September 19, 2008: Treasury announces temporary guarantee program for investors in public MMMFs
  – For investors as of 9/19/09
  – For publicly offered funds that hadn’t broken the buck (exclude Reserve)
  – Only if liquidate fund
  – 1.5 bp premium through Dec 18, 2008, but extended for year (6 bp annualized premium)
  – Reports that retail investors demanded insurance for US Treasury-only MMMF
Subsequent Regulatory Responses

• 9/19: Asset Backed Commercial Paper Money Market Liquidity Facility (AMLF) – funds can sell Asset Backed Commercial Paper (ABCP) to banks funded by Fed. Thru 1/09

• 9/25: SEC No Action Letter- Banks can purchase ABCP from affiliated funds

• 10/3: Economic Stabilization Act passed – FDIC limits increased to $250,000.

• 10/10: SEC Shadow Pricing No Action Letter – funds can used amortized cost and not market prices to shadow price certain assets. Thru 1/09

• 10/21: Money Market Investor Funding Facility (MMIFF). FRBNY sets up and funded SPVs to buy high quality money market assets issued by a group of 50 financial institutions from MMMFs. Thru 4/09.
MF Industry Position

• Keep fixed-NAV structure
• Should not announce shadow prices
• Government insurance was overpriced
• Take actions to reduce likelihood of put being exercised (e.g., greater investment restrictions, track and ban hot money, lock the doors if necessary)
• Consider an industry insurance fund (not new)
Breaking the buck

• What’s the buck? $1.00 NAV for MMMFs
• No US MMMF had previously (except Community Bankers Money Fund in 1994) broken $1.00/share
  – But there were 144 CSA by 34 sponsors for 84 funds between 8/2007 and 12/2008
• No deposit insurance and no capital.
• How do MMMF maintain stable NAVs and avoid “breaking the buck?”
MMMFs issue two related guarantees

- Right to redeem *within one day* (liquidity)

- Right to redeem *at $1.00 NAV* (price)
Delivering a fixed $1.00 NAV

• Investment restrictions
• Rounding rules (penny rounding)
• Amortized cost accounting
Reducing principal risk through Investment Restrictions

• Rule 2a-7 establishes investment restrictions for funds

• Credit risk
  – Ratings requirements
  – Diversification tests

• Interest rate risk
  – Weighted average maturity requirement

• Liquidity risk
  – Illiquid security limits
Penny Rounding

• NAV is set at $1.00 and prices are set to nearest $0.01

“Penny-Rounding Method of pricing means the method of computing an investment company's price per share for purposes of distribution, redemption and repurchase whereby the current net asset value per share is rounded to the nearest one percent.” (2(a)-7(a)(18))
Reducing Price Fluctuations: Amortized Cost Accounting

- MMMFs maintain two sets of “books”
- NAV calculations, permitted to use *Amortized Cost Accounting*
  - “*Amortized Cost Method* of valuation means the method of calculating an investment company's net asset value whereby portfolio securities are valued at the fund's Acquisition cost as adjusted for amortization of premium or accretion of discount rather than at their value based on current market factors.” (2a-7(a)(2))

- Perform “shadow pricing” using market prices
  - “current net asset value per share calculated using available market quotations (or an appropriate substitute that reflects current market conditions)” (2a-7(c)(7))
Obligations when Shadow Price and NAV diverge (Rule 2a-7(c)(7)(ii))

(A) Shadow Pricing. Written procedures shall provide:

1. That the extent of deviation, if any, of the current net asset value per share calculated using available market quotations (or an appropriate substitute that reflects current market conditions) from the money market fund's amortized cost price per share, shall be calculated at such intervals as the board of directors determines appropriate and reasonable in light of current market conditions;

2. For the periodic review by the board of directors of the amount of the deviation as well as the methods used to calculate the deviation; and

3. For the maintenance of records of the determination of deviation and the board's review thereof.

(B) Prompt Consideration of Deviation. In the event such deviation from the money market fund's amortized cost price per share exceeds 1/2 of 1 percent, the board of directors shall promptly consider what action, if any, should be initiated by the board of directors.
Shadow Prices and Stated Policies

- $0.995
- $1.00
- $1.005

Use Amortized Cost
Report and Trade at $1.00
Notify board at +/- $0.0025

Use Shadow Price
Avoiding positive surprises

Doesn’t Happen:
Pay out income every day
Pay out appreciation to keep NAV below $1.005
Reaction to “breaking the buck”

$0.995  $1.00  $1.005

“Voluntary Fund Sponsor Support”
Ad hoc Government Guarantee
Creating Call and Put Options

- **Call Option**: Right to buy for $1
- **Put Option**: Right to sell for $1

Prices:
- $0.995
- $1.00
- $1.005
Who are the option writers?

Fund Sponsor & Government

Buy-and-Hold shareholders

$0.995

$1.00

$1.005

Put Option
Right to sell For $1

Call Option
Right to buy for $1

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Complicated options

• When writer is the fund (buy-and-hold shareholders) really a dilutive warrant.

• If put exercised, fund may have to sell assets at a liquidity discount to meet redemptions.

• Exercise involves classic “run”
What is the economic cost of the guarantee?

• Acknowledge guarantee as put option
• As a framework, it can allow observation of:
  – Total cost
  – Amount borne by non-redeeming shareholders, sponsors and government
  – How rule changes can affect cost of put
Traditional of option pricing to model guarantees

• Starts with Merton (1977) pricing of FDIC insurance
• Use same intuition, coupled with specific institutional details (different writers, appreciation cushion, level of support)
• Use numerical method for actual estimation
Assumptions and method

• Fund pays income and expense ratio daily.
• Fund pays out appreciation to keep share price at $1.00 (or $1.0045) at the end of each day (appreciation cushion)
• Longstaff and Schwartz (2001)
  – cross-section of a Monte Carlo simulation used to estimate the conditional expectation function giving continuation values.
  – Determine the optimal exercise strategy and payoffs along each of 10,000 simulated paths
Modeling considerations

• Pricing is difficult because the underlying asset is a managed portfolio of discount paper
• Declines in value of portfolio securities arise from both market and credit risk
• Credit risk can be modeled via a hazard model or a jump process, but calibration is difficult
• Other considerations
  – Portfolio securities likely illiquid upon distressed sale
  – Put is actually a dilutive warrant
  – Put exercise is a strategic decision

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Policy framework

- Merton and Bodie (1992) set out a framework for an intermediary to provide assurances associated with its customer liabilities:
  - Capital
  - Purchase of a third party guarantee of liabilities
  - Government guarantee
- Guarantors, in turn manage, their risk through:
  - Monitoring and mark-to-market
  - Asset restrictions
  - Risk-based premiums
Policy alternatives

- Key in our framework is to decrease the value of the put issued by the MMMF
  - Abandon the fixed NAV and let the NAV float on a finer pricing increment, perhaps splitting fund offerings into 2 categories
  - Create an industry, third-party, or government insurance fund
  - Suspend redemptions in times of trouble
  - Increase information to investors
    - 17a-9 disclosures
    - Shadow price disclosure
  - Allow MMMF to issue a second class of shares with limited redemption rights (capital) and higher yields
  - Create a “side car” fund for problematic assets
  - Protect retail investors by cordon off institutional investors
Variable NAV MMMFs

• Leaves fund structure in place but eliminates a substantial portion of the put guarantee
• Set market value floating NAVS for MMMFs, like other MFs
  – Eliminate narrow rounding rule. Inflate NAV to $10 or higher. Round to $0.01 or smaller.
  – Use shadow market prices, not amortized costs, to set NAVs.
  – Allow funds to build up capital gains, like other mutual funds.
European experience with variable and stable NAV MMMF

• European MMMF UCITS about €1.03 Trillion
• Stable NAV and Variable NAV MMMFs co-exist
• Constant NAVs represent about 25% of all value, mostly held by institutions (IMMFA)
• Variable NAVs represent about 75% of all value, mostly held by retail investors
VNAV products don’t give rise to a run because no buck to break