A Broad Monetary Services (Liquidity) Index and its Long-Term Links to Economic Activity*

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*The views expressed are those of the speaker and should not be attributed to the Federal Reserve Bank of Dallas or the Federal Reserve System.
What We Do:

• Extend to 1947-1958, monthly, the series formerly known as the M2-level “St. Louis” Monetary Services Index

• Extend to 1929-1946, annual, the same series

• Expand the extended series to include bond and equity mutual funds held by households
References:


Task 1: Extension to Earlier Dates

• Anderson and Jones (2011) produced the most accurate (and detailed) historical MSI series, to date, for the United States at the M1 and M2 levels

• The Anderson and Jones data and algorithms are the core of the current Divisia M2 series published by the Center for Financial Stability
Task 1: Extension to Earlier Dates
Anderson and Jones (2011) con’t

• Due to data limitations, series began 1967
• Limitations mostly were w.r.t. rates paid on deposits during the Regulation Q era
• Newly compiled data now permits us to build 1947-1966

• Benchmark rate
  • Employed two alternative benchmark rates
  • (1) Envelope over included rates + money market rates (incl CP)
  • (2) Envelope + Baa bond yield
  • Plus small liquidity premium
Task 1: Extension to Earlier Dates

• Using a variety of manually collected data from previously unused historical sources, we have extended the quarterly M2-level MSI back to 1947, annual back to 1929

• We feel the quality of the extension is excellent

• To protect our work and intellectual property, we are not disclosing the data and methods until publication.
FR M2, CFS M2, and Historical Extension

Percent annual rate, quarterly

FR M2

CFS M2

MSI Extension 1948-1966
Task 2: Add Bond and Equity Mutual Funds to the MSI

- Follow Friedman and Schwartz in using M2. Also, construct an extended series starting 1929 of M2 plus bond and equity funds.
- For households, bond and equity funds are the most practical way to own non-M2 assets.
- Explored the demand/velocity of the M2 aggregate in a VECM/cointegration model.
- Excellent tracking of quantity demanded.
Task 2: Add Bond and Equity Mutual Funds to the MSI
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Figure 7: Stock Mutual Fund Load 1929-2015
(percent of assets, front end plus back end loads, roundtrip within 1 year)

Source: CDA/Wiesneberger; IBC Donaghue; Morningstar; Duca (2005); and authors' calculations
Task 2 (con’t)

- In the MSI, including “risky” assets requires an adjustment to user costs.
- Barnett, Liu and Jensen (Macro Dynamics, 1997) explored the risk-adjusted user cost of the services of a monetary asset.
- Under risk, the Divisia index becomes an *economic* index number, no longer a *statistical* index number, because it no longer can be calculated only from data – unknown (estimated) parameters necessarily are included.
- “Risk” is uncertainty regarding future asset price. Current (beginning of period) price is assumed known.
- Traditional assumption is that future prices of assets that provide monetary services are known with certainty.
- When uncertainty regarding the future level of the cost-of-living price index is included, all assets are risky.
Task 2 (con’t)

- Extent of risk adjustment depends on degree of risk aversion of investors
- A representative household should be risk neutral (“Owns” the entire economy)
- A risk neutral investor accepts a fair game and accepts a fair game
  - The expected value is his unit price of risk
- A risk averse investor prefers the expected value rather than the fair game and requires a premium to compensate for the loss in satisfaction
Task 2 (con’t)

• Under risk neutrality, the adjusted user cost is familiar

\[
\pi_{i,t} = \frac{E_t R_t - E_t r_{i,t}}{1 + E_t R_t}
\]

• We interpret the expectation operator in a rational expectations sense: The representative investor knows the “true” CDFs of the future prices of the monetary and benchmark assets – i.e., these are statistical expected value operators.
• Other studies have used market surveys and expectations.
• If the CDF of the future price collapses (zero variance), the user cost is the familiar one.
Task 2 (con’t)

• Under risk aversion, the most general case is complex.

• But:
  • (1) if the benchmark asset is risk-free (that is, its future price is known with certainty) and
  • (2) either
    • (i) utility is quadratic in consumption or
    • (ii) the bivariate CDF for the future price of asset i and future consumption is Gaussian...

then the risk-adjusted user cost may be expressed as...
Task 2 (con’t)

\[ \pi_{i,t} = \frac{E_t R_t^* - (E_t r_{i,t}^* - \phi_{i,t})}{1 + E_t R_t^*} \]

\[ \phi_{i,t} = c_t \left( \frac{-E_t [V'']}{E_t [V']} \right) \text{Cov} \left( r_{i,t}^*, \frac{c_{t+1}}{c_t} \right) \]

where

\[ 1 + r_{i,t}^* = \left( \frac{p_t^*(1+r_{i,t})}{p_{t+1}^*} \right) \]

\[ 1 + R_t^* = \left( \frac{p_t^*(1+R_t)}{p_{t+1}^*} \right) \]

and \( r_{i,t} = \frac{p_{i,t+1} - p_{i,t}}{p_{i,t}} \), \( R_t = \frac{P_{t+1} - P_t}{P_t} \) are nominal rates of return

and \( p^* \) denotes the price level (or cost of living).
Task 2 (con’t)

• The empirical questions:

  (1) Does the correction for risk aversion matter?
  • Should it even be included?
  • Why would a representative consumer be risk averse?
  • Simple test: Correlation of returns on risky assets with growth rate of personal consumption expenditures

  (2) How to measure the statistical expected values for the risk neutral case?
  • Assume that perfectly anticipated prices fluctuate randomly and hence returns are martingales or random walks.
Task 2 (con’t)

Real Return on S&P 500 vs Consumption

annual data 1947-2016

Stock Return (percent annual rate)

Consumption Growth (ratio)
Task 2 (con’t)

Real Return on Bonds vs Consumption

*annual data 1947-2016*

- Bond Return (10 year maturity, percent annual rate)
- Consumption Growth (ratio)
Task 2 (con’t)

Next Installment:

• Explore appropriate level of disaggregation for mutual funds
  • Funds are not perfect substitutes
    • e.g., large cap, small cap, foreign equity funds
    • e.g., corporate bond funds, Treasury bond funds

• Create an acceptable statistical model for the expected rates of return on bond and equity mutual funds

• Build Divisia M2 containing bond and equity mutual funds
  • Bond and equity funds are the margin at which households substitute away from M2-type assets
Thank you