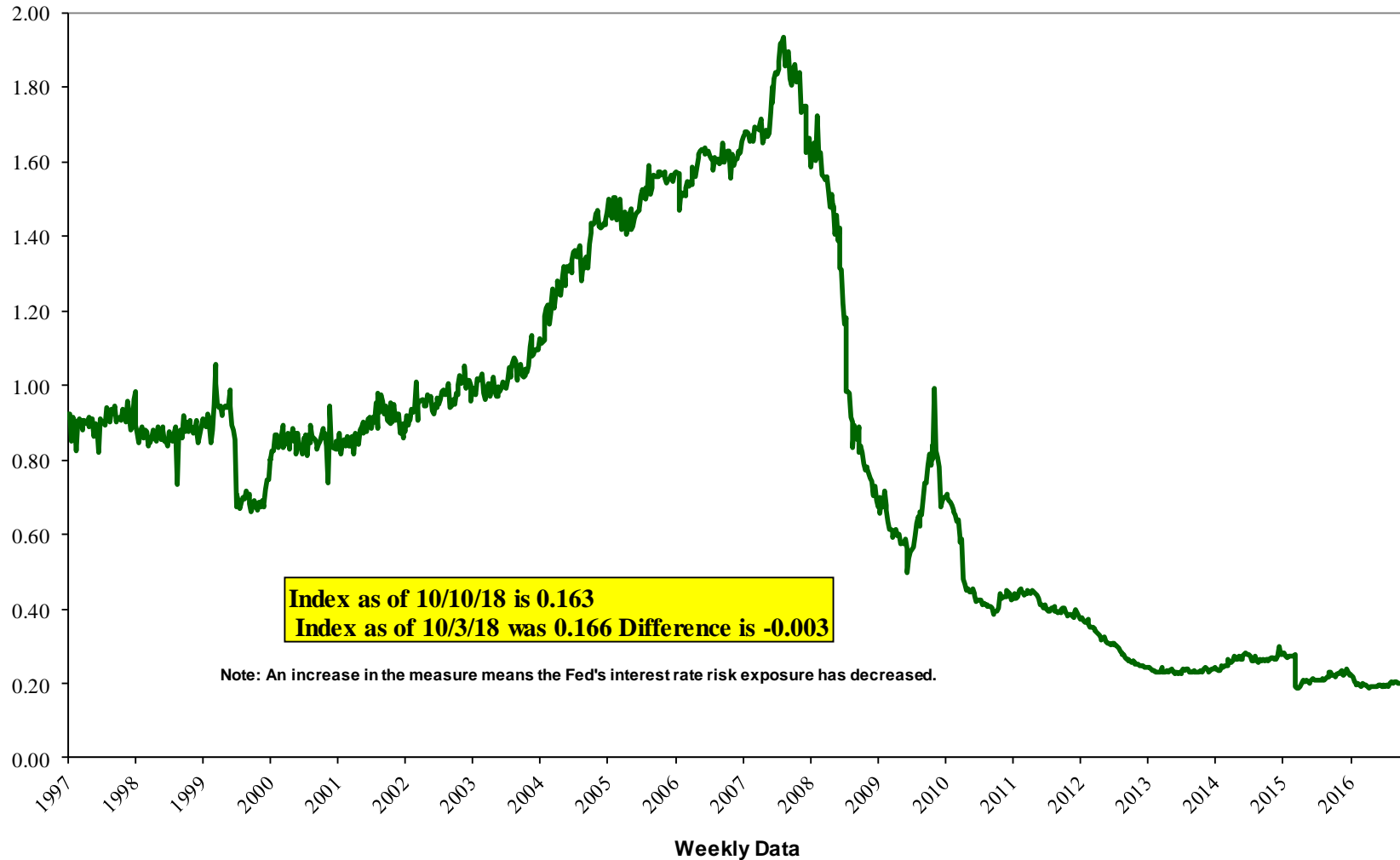


CUMB-E Index

CUMB-E Index of Fed Policy Flexibility

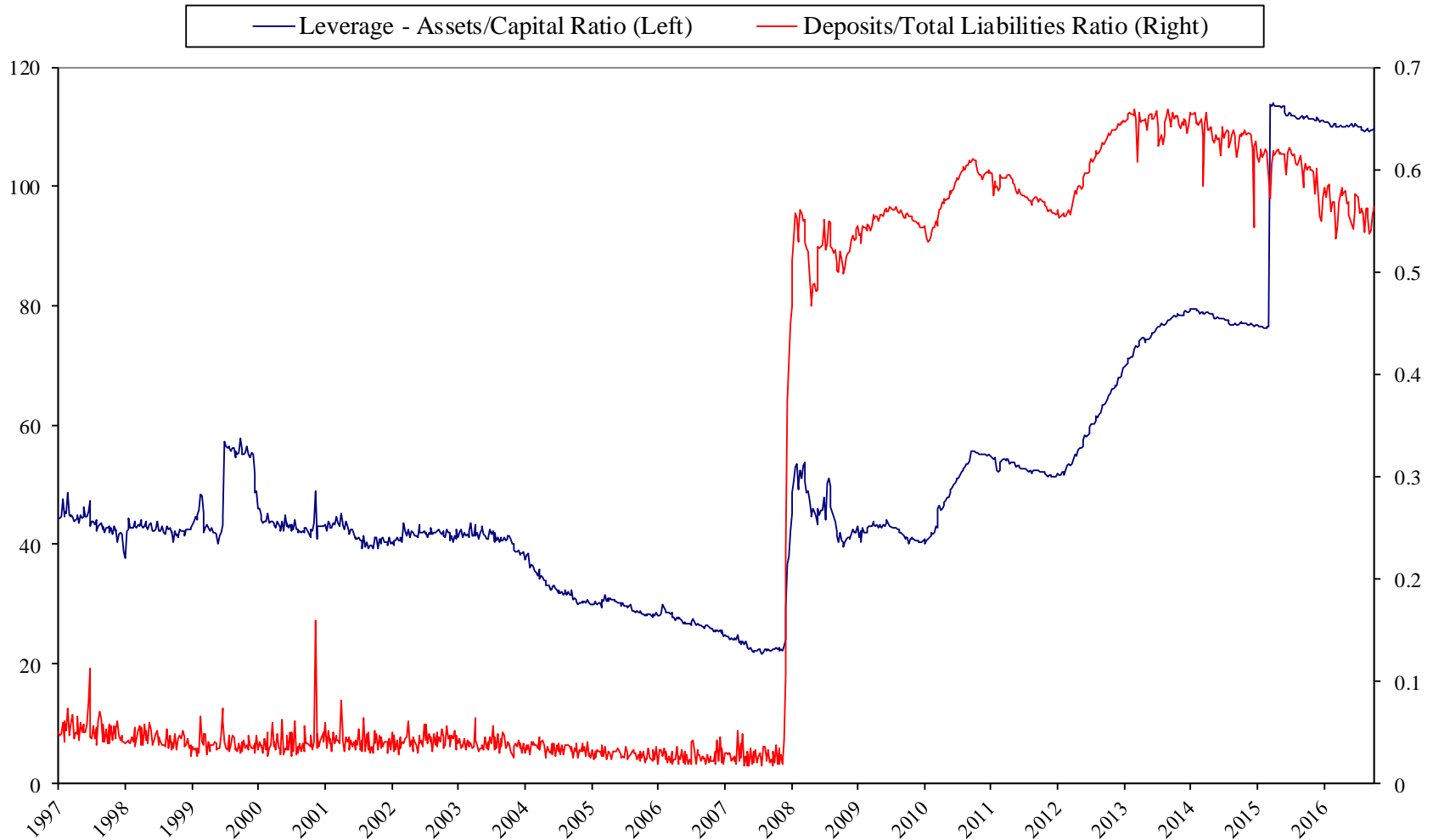
Chart 1. CUMB-E Index of Federal Reserve Policy Flexibility as of 10/10/18
Percentage Point Parallel Shift in Yield Curve Needed to Exhaust Federal Reserve Capital Account



Source: Barclays Capital, Federal Reserve H.4.1 release tables 2 and 9, Cumberland Advisors, Bloomberg

Fed Leverage & Reliance Upon Bank Excess

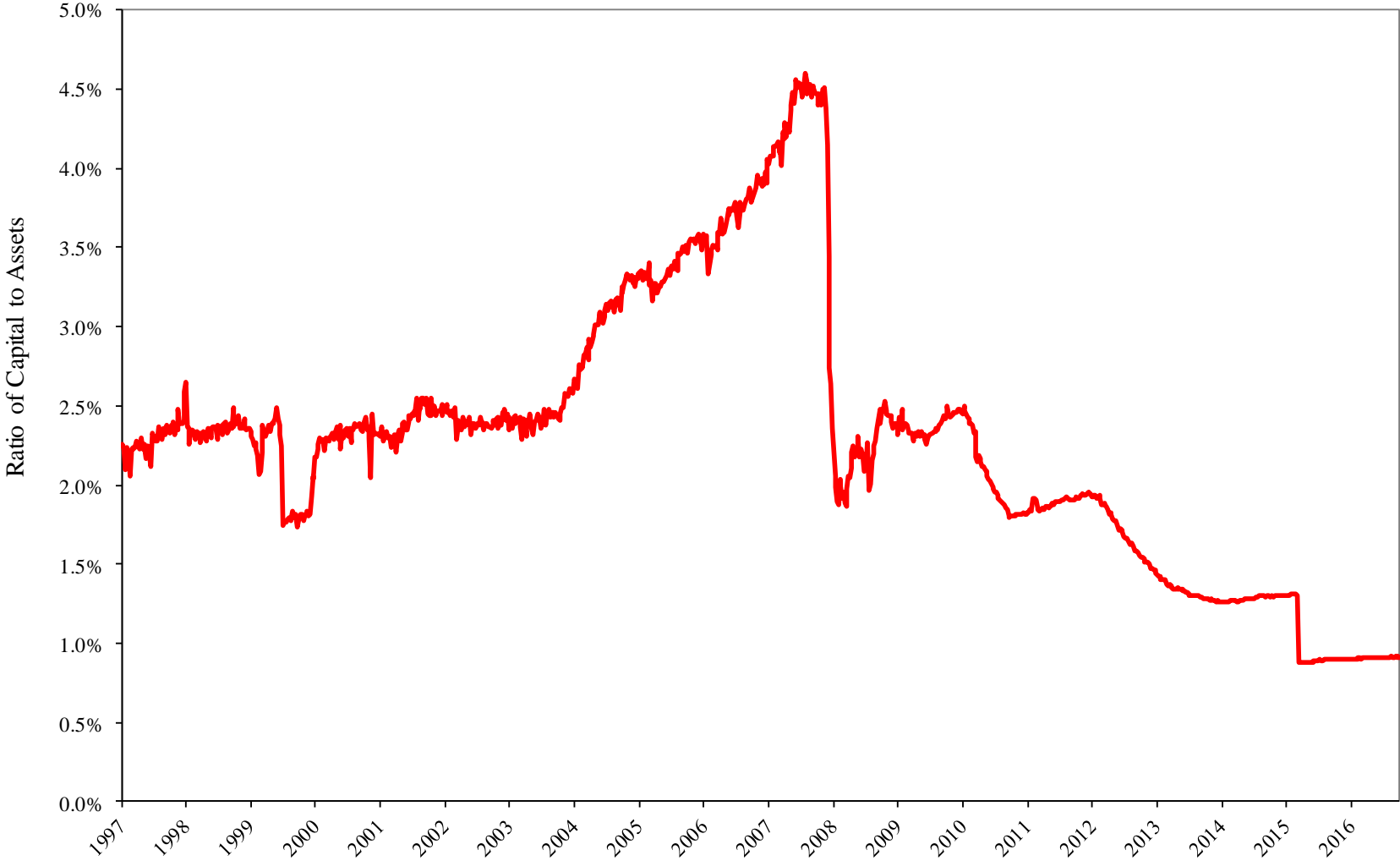
Chart 2. Federal Reserve Measures of Leverage As of 10/10/18



Source: Barclays Capital, Federal Reserve H.4.1 release tables 2 and 9, Cumberland Advisors, Bloomberg

Fed Capital Ratio

Chart 3. Federal Reserve Capital Ratio as of 10/10/18



Source: Barclays (https://live.barcap.com/BC/barcaplive?menuCode=MENU_IDX_1061), Bloomberg

Documentation of Sources & Definitions

Documentation of data sources and variable definitions for CUMB-E Indices of Federal Reserve Policy Flexibility

Standard measures of the duration of a bank's capital account (See Bierwag and Kaufman(1983)) consider changes in interest rates on both the asset and liability side of the balance sheet. Because the nominal value of all the Fed's non-capital liabilities, which consist chiefly of currency and reserve deposits of member banks, equals their book value, we assumed for purposes of the index that they were all payable upon demand, they essentially have a duration of zero for computational purposes.

The real nuances of the computations center on the Fed's asset side of its balance sheet and are taken from Table 9 and Table 2 of the Board's H.4.1 report released each week. The two asset categories that matter the most in terms of approximating the Fed's interest rate risk exposure of the large holdings of Treasury securities in the 1-5 year maturity category, the 5-10 year maturity category and over 10 years category, and the very large portfolio of mortgage backed securities which have maturities over 10 years.

To estimate the durations of the Fed's assets, approximations for the modified durations of the Fed's Loans, Treasuries and mortgage backed securities were obtained from the data provided by Barclays Capital on their website. The formula used to calculate the duration of capital is:

Where K is capital, DA is the duration of assets, A is assets and i is the percentage point change in interest rates. This formula is used to determine how much of a change in interest rates would cause a 100% decline in the Fed's capital ratio to zero.

The asset categories used and the associated duration sources are contained in the table which follows.

** We invite suggestions as to how to improve the estimates and what alternative data sources might exist.

https://live.barcap.com/BC/barcaplive?menuCode=MENU_FI_WELCOME

Source of Duration Estimates: Barclay's

Asset	Proxy Duration Measure	Source Main Source Page (Column 2)
Term Auction Credit	Short-term 1-3 Mo. Returns Modified Duration	Americas, Other Americas, Short Term Under Short Term 1-3 mo. category
Other Loans with less than 1 yr maturity	Duration of Short Term Treasuries	Americas, Other Americas, Short Treasuries
Other Loans with 1-yr to 5 yr maturity	Treasuries 1-5 year modified duration	Americas, U.S., Aggregate, Treasuries, 1-5 yr.
US Treasuries with less than 1yr maturity	Duration of Short Term Treasuries	Americas, Other Americas, Short Term - Treasuries
US Treasuries 1- 5 yr	Treasuries 1-5 year modified duration	Americas, U.S., Aggregate, Treasuries, 1-5 yr.
US Treasuries 5-10 yr	US Treasuries 5-10 year modified duration	Americas, U.S., Aggregate, Treasuries, 5-10 yr.
US Treasuries over 10 yr	Long US Treasury durations modified	Americas, U.S., Aggregate, Treasuries, Long
US Agency Securities 1 yr or less	Short Treasury Duration	Americas, Other Americas, Short Term - Treasuries
Fed Res Banks: Fed Agency Security Holdings: Over 1-Yr to 5-Yrs (EOP, Mil.\$)	Treasuries 1-5 year modified duration	Americas, U.S., Aggregate, Treasuries, 1-5 yr.
Fed Res Banks: Fed Agency Security Holdings: Over 5 to 10 Yrs (EOP, Mil.\$)	US Treasuries 5-10 year modified duration	Americas, U.S., Aggregate, Treasuries,-10 5 yr.
Fed Res Banks: Federal Agency Security Holdings: Over 10 Yrs (EOP, Mil.\$)	Long Agency (FNMA/FHLMCC Component)	Americas, Other Americas, Customized, Long Agency (FNMA/FHLMC Component)
Reserve Bank Credit: Mortgage-Backed Security (EOP, Mil.\$) - TOTAL	MBS Duration	Americas, U.S., Aggregate, Securitized, MBS Fixed Rate

Source: Census Bureau

Disclosure



All material presented is compiled from sources believed to be reliable. However, accuracy cannot be guaranteed. Past performance is no guarantee of future results. All investments involve risk including loss of principal. Fixed income investments are subject to interest rate and credit risk.