What drives real rates? Evidence from the cross section of stocks

Data Appendix

Carolin Pflueger* Emil Siriwardane† Adi Sunderam‡

November 16, 2016

Abstract

This is the Data Appendix to "What drives real rates? Evidence from the cross section of stocks." In this appendix, we provide additional details on the construction of variables used in the main text.

*Pflueger: University of British Columbia. E-mail: carolin.pflueger@sauder.ubc.ca
†Siriwardane: Harvard Business School. E-mail: esiriwardane@hbs.edu.
‡Sunderam: Harvard Business School and NBER. E-mail: asunderam@hbs.edu.

1 Building Valuation Ratios

Our valuation ratios (e.g. Book-to-Market) derive from the CRSP-COMPUSTAT merged databases. We build valuation ratios using both the annual and quarterly update from COMPUSTAT. The advantage of the latter is that we can compute more up-to-date balance sheet information for each firm. We use both to ensure that our main conclusions are not driven the timing of balance sheet data.

1.1 COMPUSTAT Quarterly

Any variable in the main text or the online appendix that requires balance sheet information (e.g. book-to-market ratios) uses COMPUSTAT Quarterly (COMPQ). Specifically, we obtain information on all firms (INDFMT = INDL) with a standardized data format (DATAFMT = STD) that report financial information at a consolidated level (CONSOL = C). In order to avoid the well-known survival bias in COMPUSTAT, we only include firms once they have at least 2 years of data.

We define book common equity (BE) according to the standard Fama and French (1993) definition. Specifically, BE is the COMPUSTAT book value of shareholder equity, plus balance-sheet deferred taxes and investment tax credit, minus the book value of preferred stock. We use the par value of preferred stock in COMPQ to estimate the value of preferred stock.

1.2 COMPUSTAT Annual

When using COMPUSTAT Annual (COMPA) for balance sheet information, we obtain information on all firms (INDFMT = INDL) with a standardized data format (DATAFMT = STD) that report financial information at a consolidated level (CONSOL = C). In order to avoid the well-known survival bias in COMPUSTAT, we only include firms once they have at least 2 years of data. For firms that change fiscal year within a calendar year, we take the last reported date when extracting financial data. This leaves us with one set of observations for each firm (gvkey) in each year.

We define book common equity (BE) according to the standard Fama and French (1993) definition. Specifically, BE is the COMPUSTAT book value of shareholder equity, plus balance-sheet deferred taxes and investment tax credit, minus the book value of preferred stock. Following Fama and French (1993), we use the redemption, liquidation, or par value (in that order) to estimate the value of preferred stock.

1.3 Defining Valuation Ratios

For all of our reported results, we build book-to-market ratios at end of each quarter t as follows:

- The book equity comes from COMPQ, and we assume this data is known with a 3-month lag. This means we add three months to the DATADATE field in COMPQ to define the "KNOWNDATE". Then at the end of each quarter, we take the book equity on the last available KNOWNDATE. For instance, this means that in June of a given year, we are using the book value of equity from COMPQ as of March in that same year. We prefer this definition because it uses up-to-date balance sheet information (allowing for reasonable lags in information release).

- For the purposes of computing book-to-market ratios, we use the trailing 6-month average of market capitalization using CRSP Monthly. For instance, in June of a given year we take the average end-of-month market capitalization from January through June of that year. We prefer this definition because it smoothes out any high-frequency movements in equity valuations.

Book-to-market ratios for a given firm then follow naturally. We have also used the Fama and French (1993) definition of book-to-market ratios and obtain very similar results. Fama and French (1993) assume a more conservative lag in terms of when balance sheet is known and also use lagged market capitalization (e.g. in June of a year, use the previous December's market capitalization). Because our story is that the stock market incorporates precautionary savings motives into prices in real time, we like using a more up-to-date measure of value.

2 Market and Cash Flow Betas

2.1 Market Betas (CAPM)

We compute two types of market (CAPM) betas. In all cases, our benchmark index is the CRSP Value-Weighted Index. All of our individual firm data derives from the

CRSP Monthly dataset. We deal with delisted returns as in Shumway (1997) by setting missing delisted returns with codes 400-591 to a value of -30%.

he first CAPM beta we compute is a two-year rolling beta. In a given quarter, we use the previous twenty-four months worth of monthly return data to compute a CAPM beta. In order to have a valid two-year beta, a firm must have at least 80% of its observations over the previous two years.

The second CAPM beta we compute is a “long-run” beta. We first aggregate monthly returns into six-month returns. Then at the end of each quarter we use the previous ten years worth of data to compute betas from our six-month return series (e.g. 20 observations per regression). Once again, firms must have 80% of their observations in order to have a valid long-run beta.

2.2 Cash Flow Beta

We consider two alternative methods in computing cash flow betas. In both, betas are computed with respect to quarter-on-quarter growth in national income. We obtain the national income series from the FRED database (series A053RC1).

Our first cash flow beta series measures cash flow growth at the firm level as quarter-on-quarter EBITDA growth (series oibdpq from COMPUSTAT quarterly). At the end of each quarter, we use the previous twelve quarters to compute a cash flow beta, where a firm must have at least 80% of its observations to be included.

To compute our second cash flow beta series, we construct a mimicking portfolio for national income growth. We first regress national income growth on the five Fama-French factors, as well as the ten Fama-French industry portfolios. Our regression also includes a constant. For the industry portfolios, we subtract out the risk-free rate (Fama-French) in order to make all of our projection portfolios zero cost. This means that the coefficients in the regression represent portfolio weights. The mimicking portfolio is then the fitted value from the regression, but ignoring the estimated constant.

At the end of each quarter, we use the mimicking portfolio to compute cash flow betas for each firm. We use the previous two years of monthly return data (dividend-adjusted and corrected for delistings as noted above) to compute a beta for each firm. As with our other beta calculations, a firm must have 80% of its observations to have a valid beta at the end of a given quarter.

3 Volatility Calculations

3.1 Volatility Used for Portfolio Sorts

At the end of each quarter, we use daily stock data from the previous two months to compute a high-frequency measure of volatility. We exclude firms that do not have at least 20 observations over this time frame. This approach mirrors the construction of variance-sorted portfolios on Ken French's website. We define a firm's total volatility as the standard deviation of ex-dividend returns (variable RETX) in that month. We compute our measure of idiosyncratic volatility for each firm by taking the standard deviation of the residuals from a regression of daily ex-dividend returns within the month on the three Fama and French (1993) factors. We have experimented with using longer windows (e.g. all the way out to two years) to compute the volatility measure used in our portfolio sorts, with very similar results.

3.2 Realized Quarterly Volatility

In some of our tests, we require a measure of realized volatility over each quarter. For each firm and quarter, we use daily returns (dividend adjusted) to compute within-quarter volatility.

3.3 Macroeconomic Uncertainty Measures

We compute what we call quarterly macroeconomic uncertainty measures from two sources: (i) the Fama and French (1993) factors and (ii) aggregate TFP growth. When using financial returns, we compute quarterly volatility using daily data from within each quarter. To compute the quarterly volatility of aggregate TFP growth we follow Bloom, Floetotto, Jaimovich, Saporta-Eksten, and Terry (2012). Specifically, we download the quarterly_tfp.xls file from John Fernald's website (downloaded 10/4/2016) and fit an asymmetric GARCH(1,1) to the "dtfp" series. We model the mean of the dtfp series as a constant.

References

Nicholas Bloom, Max Floetotto, Nir Jaimovich, Itay Saporta-Eksten, and Stephen J Terry. Really uncertain business cycles. 2012.

Eugene F Fama and Kenneth R French. Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33(1):3–56, 1993.

Tyler Shumway. The Delisting Bias in CRSP Data. *The Journal of Finance*, 52(1): 327–340, 1997.