Online Data Appendix: Endogenous Liquidity and the Business Cycle

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This document presents the data appendix for "Endogenous Liquidity and the Business Cycle."

Data Appendix

D1. Macroeconomic Variables

Except for TFP and the capital stock, all the macroeconomic variables are obtained from the Federal Reserve Bank of St. Louis Economic Research Database, FRED® available at http://research.stlouisfed.org/fred2/. These series are used in the construction of figures 3 and 6. The sources of the series for output, investment and consumption are the National Income and Product Accounts (NIPAs) of the United States constructed by the Bureau of Economic Analysis (BEA). The data on hours is from the Bureau of Labor Statistics (BLS).

For TFP, I use the non-utilization series computed by Fernald (2012a) available from the author's website http://www.frbsf.org/economic-research/economists/john-fernald/. The macroeconomic data is downloaded directly into MATLAB® using the Datafeed Toolbox®. The MATLAB code *FRED_TFP_accounting_iii.m* downloads the time series for these variables and reads the TFP data from Fernald's website after saved to a computer —as a .csv file.

All the data is quarterly, converted into real terms and adjusted for seasonality by the original source. The data begins at 1983:IV and ends at 2013:II. Fernald's TFP series is published in growth rates. I normalize the first value by 100. The following table summarizes the list of variables:

Variable in Model	Data Analogue Used	Source Acronym	Source
Output (Y_t)	Real Gross Domestic Product, 3 Decimal	$GDPC1$	BEA
Investment (I_t)	Real Private Nonresidential Fixed Investment	$PNFIC1$	BEA
Consumption (C_t)	Real Personal Consumption Expenditures	$PCECC96$	BEA
Labor (l_t)	NFBS: Hours of All Persons	$HOANBS$	BLS
TFP (A_t)	TFP	dtfp	Fernald (2012b)
Wages (w_t)	NFBS: Real Compensation Per Hour	$COMPRNFB$	BLS

Ratios. I use the series of labor and output described above to compute output-per-hour. Fernald also reports series for the growth rates of output and capital —acronyms dY_prod and dk. I also normalize initial values to 100. I use this data to compute an investment-to-capital ratio consistent with Fernald's TFP measure. For this, I use the invshare share published by Fernald —the series

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invshare– and multiply it by Fernald's output series and the capital stock series. To compute investment-to-capital, I multiply the investment share series by the ratio of the normalized capital stock and output. I then compute the deviations from the mean of this series, and multiply it by $(1-0.9\hat{}(1/4))$ to make the series consistent with an average 10% depreciation.

Detrending. As noted in the main text, I use a combination of the HP filter and a linear trend to extract cycles. First, I compute the linear trend of every series for 2007:IV-2013:II. I then construct an auxiliary time series where the original data is replaced by the linear trend for 2007:IV-2013:II. Finally, I run the HP filter on the auxiliary series with a parameter of 1600 and treat the HP trend of the auxiliary series as the trend of the original data. I detrend the data subtracting the trend of the auxiliary data from the original time series. To clarify the procedure, Figure D1 plots the original series for the original log of Real Output together with four other series. These series correspond to the artificial series, the trends of the original and artificial series and —for comparison— the log of Real Potential Gross Domestic Product from the Congressional Budget Office —also available from FRED. One can observe that the deviation of output from the HP filter predicts a boom during the first three quarters of the Great Recession. Moreover, the magnitude of the deviation from trend during the Great Recession is small compared to the distance from potential output. The trend of the artificial data lies in the middle and is consistent with a return to trend by the end of the sample. With this procedure, the cycle component of —for example— real output coincides with the NBER recession dates and shows a deep recession.

D2. Credit Market Variables

Credit Market Data. Credit market data is obtained from several sources. I build the time series for liquidity using data from the Financial Accounts of the United States (referred to as the Flow of Funds Accounts, FoF). Liquidity is the sum of the series for Net Worth and Total Credit Market Instruments for both Noncorporate and Corporate Non-Financial Business.

Data	Source Acronym	Source
Nonfinancial Noncorporate Business; Net worth	$TNWBSNNB$	FoF
Nonfinancial Corporate Business; Net Worth at Historical Cost	$TNWMVBSNNCB$	FoF
Nonfinancial Noncorporate Business; Credit Market Instruments	$TCMILBSNNB$	FoF
Nonfinancial Corporate Business; Credit Market Instruments	$TCMILBSNNCB$	FoF

This data is also available from FRED. The code FRED_NFNCB.m downloads the data and constructs the series for aggregate liquidity. I use the same method described above to detrend this data.

Syndicated Loans. The data on syndicated loans is obtained from the Thomson Reuters LPC DealScan© dataset. The data is downloaded from the Wharton Research Database Site, WRDS©. The dataset covers almost the entire universe of syndicated bank loans world-wide. I use loans only for the US. I use quarterly data from 2000:I to 2013:II. The data format is a cross section of loans which

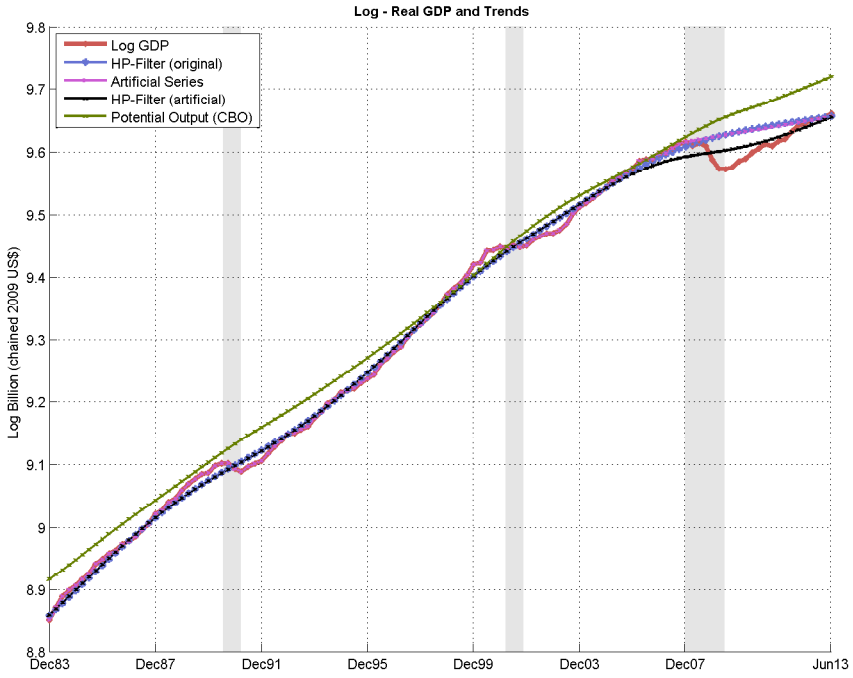

FIGURE D1. US OUTPUT — LEVEL AND TREND COMPARISONS.

include several characteristics. The STATA® do-file *DealScanBuild.do* creates time series for aggregate total amounts of loans and the number of loans. To construct the aggregate total amounts of loans, I sum across all loans the variable *dealamount* which is the descriptor for loan size. I count the number of loans across time to obtain the average loan size. DealScan does include data on interest rate spreads —*spreadoverdefaultbase*— but this data is not available for all loans.

DealScan includes information on the purpose of each loan which is encoded in the variable *purpose*. The STATA code *DealScanBuild.do* saves these time series into a .csv file labeled *SyndicatedLoans.csv*. The MATLAB code *DealScanBuild.m* loads the data from the .csv file and generates quarterly sums and average sizes for the categories used in the paper: those with an investment (INV) purpose and those with a working capital (WC) purpose. Time series for loans where the value of *purpose* is *Working Capital* end in 40 in the .csv file. For the investment-purpose time series, I use the series whose purpose variable takes values *Acquisitions line*, *Levered Buyout (LBO)*, *Project finance*, or *Takeover* —the time series ending in 1, 18, 25, 36 in the .csv file. An earlier version of the paper used these series separately. The latest version uses their weighted average.

C&I. The series for Commercial and Industrial Loans (C&I) is downloaded from FRED and corresponds to the series in Loans Assets and Liabilities of Commercial Banks in the United States — Table H.8 of the statistical release of the Board of Governors of the Federal Reserve System. The FRED acronym for this variable is BUSLOANS. The same source provides the series for Charge-Off Rates on Business Loans at all Commercial Banks. The FRED acronym is CORBLACBS.

Bond Spreads. The A and BBB spread indices correspond to the series of effective yield of the BofA Merrill Lynch US Corporate A and BBB index. These series are part of the BofA Merrill Lynch US Corporate Master Index for US dollar-denominated investment-grade-rated corporate debt publicly issued in the US domestic market. The FRED acronyms are BAMLC0A3CAEY and BAMLC0A4CBBBEY for the A and BBB ratings.

Survey of Terms of Business Lending (STL). The Data from the Survey of Terms of Business Lending, also available from FRED, collects information on loans which includes the size of loans made to businesses the first full business week of the mid-month of each quarter (February, May, August, and November). The information from the reports includes average maturity in days, average loan size, and total loan amount separately for different risk-level assessments. I report the average loan size weighted by the total volume of each series for each risk assessment level. The variable descriptor acronym is EVA (volume) and EAA (average size for within-class loan). The acronyms for risk are N (minimal), L (low), M (medium) and O (other). The series acronyms join the variable descriptor with the risk descriptor. The data series for C&I, Bonds Spreads and STL are downloaded together from FRED by the code FRC_FRED_data_upload_v5.m.

D3. Data Used in Earlier Versions

Firm Cross-Section Data: An earlier version of the paper uses the cross-sectional standard deviation of sales for all firms as an indirect measure of dispersion. This data is found in COMPUSTAT© – North America – Fundamentals Quarterly under the acronym *salesq*. The data is downloaded from WRDS. I use quarterly data from 2000:I to 2012:II. The code *createCCCdata2.do* and *data_analysis_TS2.do* aggregates across firms to generate time series for different firm sizes for the quarterly cross-sectional deviation. I use the entire sample for the computation of the dispersion of sales.

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