China Time Series

Instructions

Annual data
Most annual series are downloaded directly from public sources. Some key series, however, are constructed by ourselves.

Quarterly data
All quarterly series, bar interest rates and reserve requirement ratios, are seasonally adjusted and all the series are constructed to cover as long a period as possible.


Monthly data

Revisions and copyrights
The dataset will be revised, expanded, and updated on a biannual basis, which can be downloaded at FRBA.

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Excel or csv files
- Annual data: outdata*_hz_annual.xlsx or outdata*_hz_annual.csv
- Quarterly data: outdata*_hz_quarterly.xlsx or outdata*_hz_quarterly.csv
- Monthly data: outdata*_hz_monthly.xlsx or outdata*_hz_monthly.csv

Note that * stands for the vintage date when the data was released.

Matlab .mat data files
The name of the Matlab data file is outdata*_hz.mat, where * stands for the vintage date when the data was released.

- The dataset hz_data_*_struct.mat contains the annual data hz_data_a_struct, the quarterly data hz_data_q_struct, and the monthly data hz_data_m_struct.
- To access the data, type at the Matlab prompt load data*_hz and then hz_data_a_struct.V, hz_data_q_struct.V or hz_data_m_struct.V, where V stands for a particular variable explained below.
- For example, hz_data_a_struct.GDPDeflator gives the annual implicit price deflator for GDP,
hz_data_q_struct.GDPDeflator contains the quarterly implicit price deflator for GDP, and hz_data_m_struct.M2 gives the monthly data of M2 supply.


For quarterly data, for example, when you type at the Matlab prompt:

```matlab
>> q_dates_data = hz_data_q_struct.q_dates_data;
>> logrealHHC = hz_data_q_struct.logrealHHC;
>> logrealBusI = hz_data_q_struct.logrealBusI;
>> logrealLaborIncome = hz_data_q_struct.logrealLaborIncome;
>> ratioNewLoansNFEST2GDP = hz_data_q_struct.ratioNewLoansNFEST2GDP;
>> ratioNewLoansNFESTBF2GDP = hz_data_q_struct.ratioNewLoansNFESTBF2GDP;
>> [q_dates_data, logrealHHC, logrealBusI, logrealLaborIncome,
    ratioNewLoansNFEST2GDP, ratioNewLoansNFESTBF2GDP]
```

you will see many NaNs. The symbols indicate no available data for those dates.

### Annual data

The variable `yr_dates_data` represents annual dates (years). Some identities bar numerical rounding errors are:

- NominalGDP = NominalPrivC + NominalGovtC + NominalGCF + NominalNetExports
- NominalGCF = NominalInvty + NomalGFCF
- NomalGFCF = NominalGovtGFCF + NominalPrivGFCF + NominalHHGFCF + NominalSOExGovtGFCF + NominalNonSOEGFCF
- NominalBusGFCF = NominalPrivGFCF + NominalSOEGFCF + NominalNonSOEGFCF
- NominalNarOutput = NominalBusGFCF + NominalHHC

Other variables are listed below.

- **CPI**: Consumer price index
- **FAIPriceIndex**: Fixed asset investment price index
- **GFCFPriceIndex**: Price index for gross fixed capital formation
- **GDPDeflator**: Implicit price deflator for GDP by value added
- **NominalGDPva**: GDP by value added (RMB billion)
- **NominalRetailGoodsC**: Retail sales of consumer goods (RMB billion)
- **NominalFAI**: Fixed asset investment (RMB billion)
- **NominalGDP**: GDP by expenditure (RMB billion)
- **NominalNetExports**: Net exports by expenditure (RMB billion)
- **NominalHHC**: Household consumption by expenditure (RMB billion)
- **NominalGovtC**: Government consumption by expenditure (RMB billion)
- **NominalGCF**: Nominal gross capital formation (RMB billion)
- **NominalInvty**: Changes in inventories (RMB billion)
- **NominalGFCF**: Gross fixed capital formation with no inventories (RMB billion)
- **NominalGovtGFCF**: Gross fixed capital formation: government (RMB billion)
- **NominalPrivGFCF**: Gross fixed capital formation: private sector (RMB billion)---excluding government, households, SOEs, and other non-SOE enterprises (joint ventures for example)
- **NominalHHGFCF**: Gross fixed capital formation: households (RMB billion)
- **NominalSOEGFCF**: Gross fixed capital formation: SOE (RMB billion)
- **NominalSOExGovtGFCF**: Gross fixed capital formation: SOE excluding government (RMB billion)
- **NominalNonSOEGFCF**: Gross fixed capital formation: other non-SOE enterprises (RMB billion)
- **NominalBusGFCF**: Total business investment (gross fixed capital formation excluding household investment)
- **NominalNarOutput**: Narrow definition of output NominalBusGFCF + NominalHHC (investment + consumption)
- **RatioGFCFPrice2CPI**: Relative prices of investment goods (to CPI)
- **LaborIncomeShare**: Labor income as a share of total value added
DPI: Disposable personal income (RMB billion)
DPIBeforeTax: Disposable personal income before taxes (RMB billion)
SavingRate: Saving rate (as a percent of total value added): total
HHSavingRate: Saving rate (as a percent of total value added): households
GovtSavingRate: Saving rate (as a percent of total value added): government
NFESavingRate: Saving rate (as a percent of total value added): non-financial enterprises
FlSavingRate: Saving rate (as a percent of total value added): financial institutions
AvgNominalWage: Aggregate average nominal wages
ratioNewSTLoan: Total short-term new bank loans (including those to financial institutions) as a percent of GDP
ratioNewMLTLoan: Total medium- and long-term new bank loans (including those to financial institutions) as a percent of GDP
ratioNewNFESTLoan: Short-term new bank loans to non-financial enterprises as a percent of GDP
ratioNewNFEMLTLoan: Medium- and long-term new bank loans to non-financial enterprises as a percent of GDP
logrealHHC: log real household consumption by expenditure (deflated by CPI)
logrealGovtC: log real government consumption by expenditure (deflated by CPI)
logrealGCF: log real gross capital formation (deflated by GFCFPriceIndex)
logrealGFCF: log real gross fixed capital formation (with no inventories) (deflated by GFCFPriceIndex)
ValAdded: CEIC ticker "CAAFTX CN: CN: Flow of Funds: Source: Value Added". This series is virtually identical to annual GDP-va (CEIC ticker "CATA -- Gross Domestic Product") except in 2012 (perhaps due to revisions). Also, this series is in the same table is labor compensation in the online Flow of Funds table.
LaborISValAddInd: 100*LaborCompensation/ValueAdded.
LaborISValAddIndHeavy: Labor income share of value added in the heavy sector. Labor income is constructed by adding remuneration of employees for the heavy subset of the 17-industries in the input-output tables using the same heavy/heavy classification as in the 2016 NBER Macro Annual paper. These data are only available every two or three years and are Denton interpolated using the products of annual wage data and annual employment data by industry. We extrapolate the series beyond 2012, using regressions with annual value added industry (VAI) growth and annual "employment*wage" growth. Annual value-added is the sum of quarterly series VALinpOutHeavy across the 4-quarters of the year.
LaborISValAddIndLight: Labor income share of value added in the light sector. Labor income is constructed by adding remuneration of employees for the light subset of the 17-industries in the input-output tables using the same light/heavy classification as in the 2016 NBER Macro Annual paper. These data are only available every two or three years and are Denton interpolated using the products of annual wage data and annual employment data by industry. We extrapolate the series beyond 2012, using regressions with annual value added industry (VAI) growth and annual "employment*wage" growth. Annual value-added is the sum of quarterly series VALinpOutLight across the 4-quarters of the year.

Quarterly Data

NominalGDP = NominalPrivC + NominalGovtC + NominalGCF + NominalNetExports
NominalGCF = NominalInvty + NominalGFCF
NominalGFCF = NominalGovtGFCF + NominalPrivGFCF + NominalHHGFCF + NominalSOexGovtGFCF + NominalNonSOEGFCF
NominalBusGFCF = NominalPrivGFCF + NominalSOEGFCF + NominalNonSOEGFCF;
NominalNarOutput = NominalBusGFCF + NominalHHC

Other variables are listed below.

CPI: Consumer price index, 1984Q1-
RetailPriceIndex: Retail Price Index, 1986Q1-
FAIPriceIndex: Fixed asset investment price index, 1984Q1-
GFCFPriceIndex: Price index for gross fixed capital formation, 1984Q1-
GDPDeflator: Implicit price deflator for GDP by value added, 1992Q1-
NominalGDPva: GDP by value added (RMB billion), 1992Q1-
Nominal Lending Rate: Within 1 Year (Including 1 Year). This is the administered PBOC policy benchmark 1-year lending rate. First converted to a monthly average and then an average of the three months. It systematically differs from PBOCLendRate1yr_Q a number of times in the early to mid 1990s, not just because one use monthly averages and one uses end-of-month observations. 1988Q4-

- **DepositRatePBC1year**: One-year PBC benchmark deposit rate. Daily CEIC ticker CDDAD "Time Deposit Rate: Household: CNY: 1 Year". This is the administered PBOC policy deposit rate. It appears to be end-of-month. First converted to a monthly average and then an average of the three months. It appears to be the same as TimeDepRate1yr_Q except for the fact that it uses monthly averages instead of end-of-month observations.

- **Employment**: Average of contemporaneous and 1-period lag of EmpQSA. Approximates quarterly average of employment level. 1992Q1-

- **NGDPva_Heavy**: Nominal GDP value-added for heavy sector (RMB billion) seasonally adjusted.

- **NGDPva_Light**: Nominal GDP value-added for light sector (RMB billion) seasonally adjusted.

- **VA_InpOut_Heavy**: Derived from the corresponding annual series (the input-output table for value added to the heavy sector) interpolated by quarterly heavy NGDP series with the proportional Denton method modified to account for the corresponding annual series being available only every 2 or 3 years. Note that 1992 values are unreliable as proportional Denton interpolation is unreliable for the first 4 values or so of a series. Beyond 2012q4, this series is extrapolated by setting its growth rate to be identical to the growth rate of heavy value-added GDP series. 1992Q1-

- **VA_InpOut_Light**: Derived from the corresponding annual series (the input-output table for value added to the light sector) interpolated by quarterly light NGDP series with the proportional Denton method modified to account for the corresponding annual series being available only every 2 or 3 years. Note that 1992 values are unreliable as proportional Denton interpolation is unreliable for the first 4 values or so of a series. Beyond 2012q4, this series is extrapolated by setting its growth rate to be identical to the growth rate of light value-added GDP series. 1992Q1-

- **NHeavyFAI**: Heavy sector net fixed asset investment [RMB million]. The series is is constructed with detailed fixed asset investment by industry.

- **NLightFAI**: Light sector net fixed asset investment [RMB million]. The series is is constructed with detailed fixed asset investment by industry.

The following series are used for the VAR analysis in "Trends and Cycles in China’s Macroeconomy" by Chang, Chen, Waggoner, and Zha, published at NBER Macroeconomic Annual Vol 30.

- \( \text{logrealHHC} = \log(\text{NominalHHC}) - \log(\text{CPI}) \);
- \( \text{logrealBusI} = \log(\text{NominalBusGFCF}) - \log(\text{GFCFPriceIndex}) \);
- \( \text{logrealHHC_nipa} = \log(\text{NominalHHC}) - \log(\text{GDPDeflator}) \);
- \( \text{logrealBusI_nipa} = \log(\text{NominalBusGFCF}) - \log(\text{GDPDeflator}) \);
- \( \text{logrealNarrowY_nipa} = \log(\text{NominalNarOutput}) - \log(\text{GDPDeflator}) \);
- \( \text{logrealGDP_nipa} = \log(\text{NominalGDP}) - \log(\text{GDPDeflator}) \);
- \( \text{logrealGDP_va} = \log(\text{NominalGDPva}) - \log(\text{GDPDeflator}) \);
- \( \text{logrealLaborIncome} = \log(\text{LaborIncome}) - \log(\text{GDPDeflator}) \);
- \( \text{logrealDFI} = \log(\text{DFI}) - \log(\text{GDPDeflator}) \);
- \( \logM2 = \log(M2) \);
- \( \text{ratioNewLoansNFEST2GDP} = \text{NewBankLoansNFEST} \div \text{NominalGDP} \);
- \( \text{ratioNewLoansNFESTBF2GDP} = \text{NewBankLoansNFESTBF} \div \text{NominalGDP} \);
- \( \text{ratioNewLoansNFEMLT2GDP} = \text{NewBankLoansNFEMLT} \div \text{NominalGDP} \);

The following series are used for "Impacts of Monetary Stimulus on Credit Allocation and Macroeconomy: Evidence from China" by Chen, Higgins, Waggoner, and Zha, NBER Working Paper 22650.

- **LendingRatePBC1year** One-year PBC lending rate
- **DepositRatePBC1year** One-year PBC deposit rate
- **Employment** Total employment (rural + urban)
- **NHeavyFAI** Nominal FAI for the heavy sector
- **NLightFAI** Nominal FAI for the light sector
- **PPI** Producer price index, SA. Last 12 monthly observations are based on the CEIC ticker CIAIEJ "CN Producer Price Index MoM". All of the monthly observations before that are based on the CEIC ticker CIUA "Producer Price Index: Industrial Products (Previous Year = 100)". 1995Q4-2017Q1

The following time series are constructed for "Impacts of Monetary Stimulus on Credit Allocation and Macroeconomy: Evidence from China" by Chen, Higgins, Waggoner, and Zha, NBER Working Paper No. 22650.
The following time series are constructed for Liu, Wang, and Zha’s "Land-Price Dynamics and Macroeconomic Fluctuations" published in Econometrica Vol. 81, No. 3 (May, 2013), 1147–1184.

- **LandPrice:**
- **NominalGCF:** Nominal Gross Capital Formation
- **FAInvPrice:** Fixed asset investment price
- **NominalGDPva:** Value added nominal GDP
- **RealGDPva:** Value added real GDP
- **GDPDeflator:**
- **R7dRepo:**
- **BankLoansTotal:**
- **BankLoansST:**
- **NGDPva_Heavy:**
- **NGDPva_Light:**
- **EntrustedLoans:** Total entrusted lending, 2001Q4-2016Q2 (extrapolated before 2013)
- **TrustedLoans:** Total trusted lending, 2001Q4-2016Q2 (extrapolated before 2013)
- **BankAccts:** Bank acceptance bills, 2001Q4-2016Q2 (extrapolated before 2013)
- **ShowdowBanking:** Total lending in the shadow banking industry, 2001Q4-2016Q2 (extrapolated before 2013)
- **AggFinancing:** Total aggregate social financing, 2002Q1-2017Q1 outstanding
- **RealEstateDomesticLoanFAI:** New loans to real estate, 1998Q1-2017Q1
- **HeavyIndustryDomesticLoanFAI:** New loans to the heavy sector in the whole economy, 2003Q1-2015Q4
- **LightIndustryDomesticLoanFAI:** New loans to the light sector in the whole economy, 2003Q1-2015Q4


- **pop:** Total population
- **CPriceExHousing:** Consumer goods price, excluding housing investment
- **NonFinBusinessLoans:** Bank loans outstanding to non-financial firms


- **NomGDP:** We interpolate seasonally adjusted quarterly nominal GDP value added with seasonally adjusted monthly nominal retail sales of consumer goods, nominal exports, nominal imports, and nominal value added of industry. For data prior to 1995M10, where nominal value added of industry is not available, we use a slightly different set of interpolaters.
- **GDPDeflator:** This monthly series is constructed in two steps. In the first step, we interpolate the seasonally adjusted quarterly GDP deflator with the seasonally adjusted monthly series of producer price index (PPI), retail price index, CPI and M2. The PPI is only available since 1995M10 and thus it is not used for interpolation prior to this month. The first-step GDP deflator is used to construct monthly real GDP as described below. In the second step, the monthly series is derived by dividing monthly nominal GDP by monthly real GDP as constructed below.
- **RealGDP:** This monthly series is constructed in two steps. In the first step, the monthly series is derived by dividing nominal GDP by the first-step monthly GDP deflator. In the second step, we perform an interpolation by constraining monthly real GDP to an quarterly aggregate equal to quarter real GDP.
- **NomConsumption:** We seasonally adjust the monthly series of retail sales of consumer goods. Before
the seasonal adjustment the January and February year-to-date value is disaggregated.

- **NomInvestment**: We seasonally adjust both "capital construction + innovation" and total fixed-asset investment. The fixed-asset investment series starts in 1994 and the series for "capital construction + innovation" exists before 1994. We slice the two series, which gives rise to our investment series. The splice point is 1994. For this investment series, residual seasonality still exists because the January and February value needs be disaggregated and because a drop off in value after December is large. Hence, we perform a second round of seasonal adjustments using the X11-ARIMA method with its default settings. This additional adjustment eliminates much of the residual seasonality.

- **InvestmentPrice**: Based on the the seasonally adjusted quarterly investment price series, the monthly series is interpolated with the producer price index whose inflation rates are highly correlated with inflation rates of the investment price, value added of industry, and CPI. The series, starting in 1994 and ending in 2016M6, is relatively reliable since 2004Q1 when the CEIC began to publish the quarterly series. Prior to 2004, we interpolate the annual investment price deflator with the PPI.

- **CPI**: We seasonally adjust the monthly consumer price index series using the X-12 ARIMA method with regression dummies to account for the Chinese New Year effect.

- **M2**: We derive the M2 level series from the level series from 2015M7 to 2016M6 and the year-over-year growth rates published by the People’s Bank of China for all other months. This constructed series alleviates serious problems of sudden changes or misalignments of statistical coverage for certain periods of the sample. We then seasonally adjust this series with dummy regressors for the months so that the year-over-year growth rates are the same as the year-over-year for the original data prior to seasonal adjustment. This method works well because the seasonal factors in the M2 level series are stable during our sample period.

- **NomImports**: The original monthly series is from the Chinese customs. The series is seasonally adjusted with the X-12 ARIMA method and with regression dummies to account for the Chinese New Year effect.

- **NomExports**: The original monthly series is from the Chinese customs. The series is seasonally adjusted with the X-12 ARIMA method and with regression dummies to account for the Chinese New Year effect.

- **Repo7Day**: The 7-day market rate for national interbank bond repurchases. This is a market rate available since 1996M1.

- **DepositRate1YBench**: The one-year benchmark deposit rate set by the People's Bank of China. This series exists from 1988M10 on.