Section I. Introduction

China’s economy, already the second-largest in the world, continues to grow in global importance. Monitoring the cyclical and structural changes in China’s economy—and understanding Chinese economic statistics—is therefore more crucial than ever for investors and policymakers.

The Goldman Sachs Economics Research team has invested considerable effort in reviewing Chinese statistics, analyzing their relationships with the business cycle, and identifying their limitations. We have also developed a series of proprietary indices for monitoring the Chinese economy—both at the macroeconomic level, such as the Goldman Sachs Current Activity Indicator (CAI) and the Goldman Sachs China Financial Conditions Index (FCI), and at the sector level, for example, our trackers of consumption and investment activity.

This “little red book” is a comprehensive update of our original Understanding China Economic Statistics, published in 2006. It is similar in format to our long-established statistics handbooks for the US, UK and Europe, but contains several distinct features owing to the challenges of interpreting China’s data and policy settings. It has been expanded considerably from the original edition, reflecting the
increased importance of China’s economy and economic data for the rest of the world and for a diverse set of markets. We hope it will serve as a useful reference both for clients investing in China directly and for those who need to track the Chinese economy due to its influence on other markets.

Notable changes to this updated edition include:

**A longer list of indicators.** In particular, we have expanded the section on real estate/property-related indicators, given this sector’s importance to China’s macroeconomic outlook.

- Numerous additional charts and tables to summarize key data and display time series.
- Updated notes on caveats to the data. We have assigned subjective rankings for “signal to noise ratio” and “macro importance” to key data series.
- Detail on the extensive collection of proprietary indicators we have developed over the years. While our colleagues around the world have also developed proprietary indicators, and in many cases (e.g., the CAI and FCI) we apply those techniques, we have also developed many China-specific indicators.

In general, with respect to official data provided by the government, we find that:

1. The production side of the statistics is better at capturing growth momentum than the expenditure side, mainly because the basic infrastructure for data compiling in China remains geared toward the production-based approach. This assessment may change gradually because China’s statistical authorities plan to improve data collection for expenditure items.

2. We find the *monthly* growth indicators, especially in the industrial/manufacturing sector, such as industrial production, are of better quality than the quarterly and annual GDP figures, partly because monthly data are subject to less non-economic interference, but also because service sector measurement is generally more difficult.

3. The reported *growth rates* for data series such as value-added industrial output, fixed asset investment and retail sales do not always correspond with the reported *levels* over time. In most cases, this is because of changes in the survey sample. For example, more companies have grown above the minimum size threshold required to be included in the sample each year, leading to an upward bias to the level of the series over time. The National Bureau of Statistics (NBS) does attempt to correct for this bias by requesting companies to report year-on-year growth rates.
In terms of where the data are most inadequate but are of great importance, we believe the higher-frequency expenditure side of the data reporting ranks at the top, in particular for government investment and consumption, as well as for inventory changes.

Second on the list are data such as the industrial capacity utilization ratio, total housing stock, and the property vacancy ratio (as properties built but not inhabited, whether sold or not). Some of these data, such as the industrial capacity utilization ratio, are compiled but not released officially, apart from occasional mentions in official speeches.

Third are data related to the labor market and wage development. Some information (such as the surveyed unemployment rate covering both registered and unregistered urban workers) has promise but is not released on a consistent and timely basis. Though we have developed some proprietary measures, such as our employment and wage growth trackers, the lack of frequent and reliable data series on labor market slack constitutes a major macroeconomic data gap.

Fourth, the quality of export and import price series needs to be improved substantially. (This issue is certainly not unique to China.) As far as nominal trade values are concerned, we have developed “outside-in” measures of trade and find that these generally corroborate the official data except during periods of very high capital flow pressures. Also on the issue of prices, greater transparency on the Consumer Price Index—in particular in terms of the detailed components and weights—would help avoid confusion in the market.

Last, the breakdowns of many categories are outdated. For example there is limited information on RMB loan breakdowns by the type of borrowers and industrial sectors.

As with our other research products, we have tried to make this handbook as user-friendly as possible and accessible for readers with different levels of understanding of China’s macro data. As always, we would greatly appreciate your comments and suggestions.

**How to use the ranking for each data series**

To make it easier for readers to put the data in perspective, we have assigned ratings of one to five stars for the signal to noise ratio and macro importance of each indicator. The ratings are on a relative scale.
within the China space. Therefore, a five-star rating means an indicator is among the top series in China’s data space, but does not mean it is free of deficiencies, or that it necessarily ranks highest among its international peers.

The rating for the **signal to noise ratio** is fairly self-explanatory: In our judgment, how well does the series measure what it is designed to measure? Where possible, we have tried to corroborate data series with other related indicators, including aggregated corporate data or foreign data.

The rating for **macro importance** is based on how essential the series is: (1) in helping to read the overall state of the economic cycle; and (2) in assessing the likely direction of macroeconomic policy.

Although these factors are related, there can be significant differences between them. To illustrate, GDP is not especially useful in gauging the cyclical state of the economy, partially because of its low signal to noise ratio (discussed in more detail later in this publication), and also because of its low (quarterly) frequency. However, policy makers pay a good deal of attention to this data series, and the tolerance for missing the growth target is low. Therefore, the GDP growth data are useful in judging policy risks. As a result, we have assigned GDP a higher score for macro importance than for the signal to noise ratio.

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**Exhibit 1: Overview of official Chinese economic indicators**
<table>
<thead>
<tr>
<th>Indicator</th>
<th>Signal to noise ratio</th>
<th>Macro importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Production</td>
<td>★★★★★</td>
<td>★★★★★</td>
</tr>
<tr>
<td>CPI</td>
<td>★★★★★</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Money Supply</td>
<td>★★★★★</td>
<td>★★★★★</td>
</tr>
<tr>
<td>PPI</td>
<td>★★★★</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Electricity Production and Consumption</td>
<td>★★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Merchandise Trade</td>
<td>★★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Government Revenue, Expenditure and Balance</td>
<td>★★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Balance of Payments</td>
<td>★★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Loan and Deposit</td>
<td>★★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>NBS manufacturing PMI</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Home Sales</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>GDP</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Total social financing</td>
<td>★★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Foreign Exchange Reserves</td>
<td>★★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Rail Freight Traffic</td>
<td>★★★★★★</td>
<td>★★</td>
</tr>
<tr>
<td>Service Trade</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Industrial profits</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>NBS non-manufacturing PMI</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Caixin manufacturing PMI</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Caixin service PMI</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>GDP Deflator</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Home inventory</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Housing Starts, Under Construction and Completion</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Land Acquisition, Transaction and Development</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Land Price Indices</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Fixed Asset Investment</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Retail Sales of Consumer Goods</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Auto Sales</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Property Price Index</td>
<td>★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Investment in Real Estate Development</td>
<td>★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Household Income Survey</td>
<td>★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Household Expenditure Survey</td>
<td>★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>External Debt</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Total Employment</td>
<td>★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Urban Registered Unemployment Rate</td>
<td>★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Average/total wage of Employees in Urban Units</td>
<td>★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Average income of migrant workers</td>
<td>★</td>
<td>★★★★</td>
</tr>
</tbody>
</table>

Source: Goldman Sachs Global Investment Research

The Ten Most Frequently Cited Chinese Economic Statistics

https://research.gs.com/content/research/en/reports/2017/07/07/97827859-81e3-42ef-bd1e-8982d86e0c91.html
The indicators that we find most useful are not necessarily the ones discussed most frequently by market participants. Here is our take on the ten indicators that, from our subjective point of view, are most often cited by government officials, investors, and the media (listed in order of appearance in this publication).

**GDP.** Despite all its flaws, this is the most comprehensive indicator of economic growth and also the growth indicator most watched by the government and the market.

**Industrial Production.** Industrial production is perhaps the best gauge of short-term economic activity at a higher (monthly) frequency.

**Fixed Asset Investment.** This is an important indicator for gauging short-term investment momentum. However, data quality and reliability is a concern.

**Retail Sales.** Growth rates appear over-smoothed and the data do not cover service consumption except catering. It is still the most frequently used indicator for consumption growth.

**Merchandise Trade.** Trade data provide information on both domestic (through imports) and foreign (through exports) demand.

**Foreign Exchange Reserves.** China’s foreign exchange reserves are still the largest in the world; however, recent capital outflows have led to a decline in FX reserves.

**Consumer Price Index.** This is the most watched indicator of inflation. We believe it does a fair job of capturing inflationary pressures on household consumption in China.

**Producer Price Index.** This is often assumed to lead downstream inflation and influences industrial profitability, although these relationships are not as simple as commonly perceived.

**M2.** This is a key factor in assessing financial conditions, although in our view its relevance has decreased given the ongoing financial diversification in China.

**Total Social Financing.** This provides information on broad credit growth, including indirect financing, such as bank loans, and direct financing, such as bond/stock issuance, but coverage is still not wide enough to capture all credit extended to the real economy.
A Typical Cycle of China’s Statistical Releases
<table>
<thead>
<tr>
<th>Name</th>
<th>Approximate Release Date</th>
<th>Time</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monthly</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caixin Manufacturing PMI</td>
<td>1st Workday</td>
<td>9:45</td>
<td>Markit</td>
</tr>
<tr>
<td>Canon Service PMI</td>
<td>3rd Workday</td>
<td>9:45</td>
<td>Markit</td>
</tr>
<tr>
<td>FX Reserves</td>
<td>7th of each month</td>
<td></td>
<td>PBOC</td>
</tr>
<tr>
<td>CPI</td>
<td>2nd Week</td>
<td>9:30</td>
<td>NBS</td>
</tr>
<tr>
<td>PPI</td>
<td>2nd Week</td>
<td>9:30</td>
<td>NBS</td>
</tr>
<tr>
<td>Merchandise Trade</td>
<td>2nd Week, revised later in the same month</td>
<td>10:00</td>
<td>China Customs</td>
</tr>
<tr>
<td>PBOC FX position</td>
<td>Mid-month</td>
<td></td>
<td>PBOC</td>
</tr>
<tr>
<td>Activity Data</td>
<td>2nd/3rd Week</td>
<td>10:00</td>
<td>NBS</td>
</tr>
<tr>
<td><strong>Industrial Production</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Retail Sales</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fixed Asset Investment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Property Development and Sales</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Money and Credit</td>
<td>2nd/3rd Week</td>
<td></td>
<td>PBOC</td>
</tr>
<tr>
<td><strong>New Loans</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Social Financing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>M2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAFE data on FX settlement onshore and cross-border RMB flow</td>
<td>2nd/3rd Week</td>
<td></td>
<td>SAFE</td>
</tr>
<tr>
<td><strong>Industrial Profits</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Profits</td>
<td>4th Week</td>
<td>9:30</td>
<td>NBS</td>
</tr>
<tr>
<td>NBS PMIs</td>
<td>End of each month*</td>
<td>9:00</td>
<td>NBS</td>
</tr>
<tr>
<td>PBOC Forward Position</td>
<td>End of the month</td>
<td></td>
<td>PBOC</td>
</tr>
<tr>
<td><strong>Quarterly</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross Domestic Product</td>
<td>2nd/3rd week after the reference quarter</td>
<td>10:00</td>
<td>NBS</td>
</tr>
<tr>
<td>Balance of Payments</td>
<td>5-6 weeks after the reference quarter</td>
<td></td>
<td>SAFE</td>
</tr>
<tr>
<td>PBOC Monetary Policy Report</td>
<td>5-6 weeks after the reference quarter</td>
<td></td>
<td>PBOC</td>
</tr>
<tr>
<td><strong>Annual</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National People’s Congress &amp; CPPCC Annual Sessions March</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese Communist Party Plenum Meeting</td>
<td>Autumn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Economic Work Conference</td>
<td>Early Dec</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular Politburo Meetings</td>
<td>Monthly, meetings focusing on Economy: Apr, July, Oct(possible) &amp; Dec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Central Leading Group Meeting for Comprehensively Deepening Reforms</td>
<td>Monthly**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Central Leading Group Meeting on Financial and Economic Affairs</td>
<td>Irregular</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Financial Work Conference</td>
<td>2017, Every 5 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Congress of the Communist Party of China</td>
<td>Oct 2017; Every 5 years</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The NBS PMIs are reported at the end of the reference month; all other data are reported in the following month.
** Reported by news media.

Note: The Statistics Bureau may adjust or suspend release times.
Web Addresses for Official China Economic Databases


China Customs database: http://www.customs.gov.cn/publish/portal0/tab68101/ (http://www.customs.gov.cn/publish/portal0/tab68101/)


Basics of Interpreting the Numbers

Economic data are of considerable importance to financial markets, both because of their information about the state of the economy, and because of their implications for economic policy. Important considerations to be aware of include:

- **Year-over-year versus “sequential” growth.** We use the term “sequential” to describe period-on-period changes within a year (e.g., month-over-month or quarter-over-quarter, depending on the series). The Chinese government typically reports year-over-year series as a way to minimize seasonal influences. But year-over-year data can mask significant changes in sequential momentum, so we often calculate and refer to sequential figures. (Note that the term “base effect” refers to a particularly high or low sequential change from one year ago that affects the year-over-year calculation. For example, if GDP normally grows at a 4% annual rate but temporarily stalls at 0% quarter-over-quarter growth for one quarter, growth will be reported at 3% year-over-year in that quarter and the following three quarters, then one year later will jump back to 4% yoy due to the “base effect” as the weak quarter drops out of the calculation.)
Seasonal adjustment. This is critical when working with sequential data (more on this topic below).

Revisions. As in other countries, initial data reports may be revised as more comprehensive information becomes available or methodological revisions are made. The corollary is that the current data series do not necessarily reflect how the historical data looked at the time of release.

Survey versus “hard” data. Government agencies typically report samples or censuses of actual economic activity, which we sometimes refer to as “hard” data. In addition, a variety of government and private sector surveys (sometimes referred to as “soft” indicators) can give a useful qualitative sense of the direction of the economy. Often, these take the form of “diffusion indices” where respondents answer questions with either favorable, neutral or unfavorable responses; the percentage answering favorably plus half the percentage answering neutral are added to yield a score from 0 to 100. The widely quoted Purchasing Managers’ Indices (PMIs) take this form. While less precise than hard data and potentially subject to other biases (such as inflation), these reports can provide a more timely read on changes in direction and therefore are a useful reference for forecasting and policymaking.

A Note on Seasonal Adjustment
Seasonal adjustment is a mainstay of macroeconomic analysis, allowing comparisons of growth over periods of less than a year. The biggest value of seasonal adjustment is to separate cyclical signals from seasonal patterns so as to gauge trends in activity, inflation, or other indicators within the period. Though often taken for granted, the choice of seasonal adjustment method inherently involves judgment calls about whether incremental changes are seasonal or cyclical, and can at times have a major impact on the economic data.[1]

Challenges to seasonal adjustment include:

Limited data history. It takes three years or more to obtain a result from standard seasonal adjustment algorithms, and longer time series are preferable. Short time series are prone to one-off shocks such as those during the GFC. Ensuring that such shocks do not throw off the seasonal factors requires manual intervention.

Rapid structural change. Even when sufficient data are available, economies experiencing rapid structural change are more likely to see changing seasonal patterns as well. For example, as China grows in economic importance,
fluctuations around the Chinese New Year are more likely to affect trading partners\cite{2}.

**Floating holidays.** Patterns of economic activity change around holidays: production tends to slow during holidays (factories and ports tend to shut or operate at less than the usual pace), while consumption tends to rise before holidays (retail activity is often boosted by holiday gift-giving, eating out, etc.). The presence of Chinese New Year triggers a particular challenge because the holidays may fall in either January or February, and therefore affect each month’s data to a different degree each year. It also complicates the *year-over-year* growth rates for January and February because of differences in the number of working days. A simple solution to these problems is to average data for the first two months of the year. Adjusting monthly growth rates for the number of working days does not help much, especially for the production data, because many companies still operate with varying capacity during holidays, and some may not resume operation at full capacity until days after the holiday. As a result, especially if the Chinese New Year falls in late February, the March data may also be affected (and therefore even year-on-year growth rates for March can be distorted by the Chinese New Year effect).

According to the NBS, the official seasonal adjustment method adjusts for working day difference and floating holidays in China. For most seasonally adjusted series, there is not an obvious residual seasonal distortion, though floating holiday effects (especially Chinese New Year) are difficult to fully eliminate as their magnitude varies over time with structural changes in the economy and behavior.

Conceptually, seasonal adjustment techniques penalize the months that tend to have high values and compensate those months that tend to have low values relative to an average month. Many of the statistical agencies in China use Census X-12 or its predecessor, X-11\cite{3}. In addition, some reliable data vendors, such as Haver Analytics, will adjust series using GENHOL to parameterize holiday factors. Specifically, the program takes a list of dates for holidays and a “window” (days before, days during, and days after) around each holiday, and then generates a set of holiday regressors/dummy variables for each.

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Exhibit 2: The choice of seasonal adjustment can have a substantial impact on sequential growth
Despite their challenges, seasonal adjustments are a useful tool. Without them, one has to rely on year-on-year growth rates, which can be heavily influenced by last year’s base and are slower to reflect the latest changes in growth momentum.

**Evaluating Data Surprises**

**Goldman Sachs China Macro-data Assessment Platform (GS China MAP)**

Source: Goldman Sachs Asia Economics Research

Availability: Daily since Jan 2006

Timing: Real-time

Release: GS China Proprietary Indicators update

**Overview**

The Goldman Sachs China Macro-data Assessment Platform (GS China MAP) measures economic growth surprises in China[^4]. It is constructed in the same manner as our surprise indices for other economies[^5].

**Compilation**
In the MAP system, the importance of a particular release is calculated in two dimensions.

- First is the **relevance score**, which is based on the historical correlation with real GDP growth (quarter-over-quarter). This score can range from 0 (irrelevant) to 5 (most relevant), as illustrated in Exhibit 3.

- Second is the **surprise score**, measured as the difference between a particular release of that indicator and the Bloomberg “consensus” forecast for that indicator, measured in standard deviations. We assign a score from -5 to +5 depending on whether the actual figure is above or below expectations, and by how much. If the actual release is less than half a standard deviation from the consensus expectation, we will assign a score of 0. A difference of between ½ and 1 standard deviation will generate a surprise score of +1 or -1. Surprise scores rise with ½ standard deviation increments, with any surprise of greater than 2 ½ standard deviations generating a score of 5.

- Multiplying the relevance score by the surprise score gives a range of -25 to +25 for a given indicator; the time series of MAP scores for all indicators in China creates the China MAP score.

**Exhibit 3: MAP relevance and surprise scales**

![Exhibit 3: MAP relevance and surprise scales](image)

Note that the Bloomberg consensus forecasts are generally made by sell-side economists. As a result, they may not precisely reflect the expectations of the broader investor community. In addition, these forecasts are often released in publications many days in advance of the official data, and subsequent changes in forecasters’ views may not always be updated in the published consensus.
There was a very large shock during the sample period due to the GFC, and relative to the magnitude of the surprises during that period of time any surprises today tend to appear small but are nevertheless significant for the market. Therefore, in setting our surprise score thresholds we have used the standard deviation of surprises based on data releases since 2010 (Exhibit 4).

**Exhibit 4: Indicators in the MAP for China**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Available since</th>
<th>Std deviation of surprise</th>
<th>Correlation with real GDP growth</th>
<th>Relevance score</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>Apr 2001</td>
<td>0.16</td>
<td>1.00</td>
<td>5</td>
</tr>
<tr>
<td>Industrial Production</td>
<td>Mar 2001</td>
<td>0.69</td>
<td>0.84</td>
<td>5</td>
</tr>
<tr>
<td>NBS Manufacturing PMI</td>
<td>Sep 2009</td>
<td>0.62</td>
<td>0.60</td>
<td>3</td>
</tr>
<tr>
<td>Exports</td>
<td>Apr 2003</td>
<td>5.96</td>
<td>0.57</td>
<td>3</td>
</tr>
<tr>
<td>Imports</td>
<td>Apr 2003</td>
<td>6.47</td>
<td>0.67</td>
<td>3</td>
</tr>
<tr>
<td>Retail Sales</td>
<td>Jul 2004</td>
<td>0.42</td>
<td>0.25</td>
<td>1</td>
</tr>
<tr>
<td>Fixed Asset Investment</td>
<td>Aug 2005</td>
<td>0.36</td>
<td>0.34</td>
<td>2</td>
</tr>
</tbody>
</table>

*Date refers to first availability of Bloomberg consensus forecasts for the given indicator.

^We excluded Jan/Feb data released in Feb/Mar in the standard deviation calculation for all monthly indicators. Jan/Feb data and their surprises tend to be distorted by the Chinese New Year holiday, so we have a separate set of standard deviations when calculating MAP scores for Jan/Feb data.

**China exports/imports relevence weight based on correlation with estimated real exports/imports.

Source: Goldman Sachs Global Investment Research

**Exhibit 5: China data surprised to the upside in late 2016 and early 2017**
List of Acronyms
Section II. Overall Activity and Production

Gross Domestic Product

Signal to noise ratio: ***
Overview

GDP measures the overall economic activity of an economy on a value-added basis (the value of output minus purchased inputs). It is the most comprehensive measure of domestic economic activity.

Signal to noise ratio

- China’s gross domestic product (GDP) data are mostly compiled in accordance with the System of National Accounts (SNA) 2008 standard by treating R&D expenditure as part of capital formation. The data are historically and internationally comparable.

- However, the real GDP growth data are exceptionally smooth relative to other countries and to other indicators of activity, contributing to skepticism among market participants over their accuracy. It is common for China to announce quarterly GDP growth with a variation of less than 0.5 pp, even as some high-frequency indicators experience double-digit swings in growth. The problem seems to have worsened in recent years with the first three quarters of 2016 completely steady at 6.7% yoy and Q4 at 6.8% yoy. To get a better sense of cyclical momentum, we cross-check real GDP growth with other indicators.
including our proprietary Current Activity Indicator, using high frequency data on a monthly basis. This indicator shows considerably higher volatility than GDP growth rates by construction, as well as slower growth in 2014-16.

- GDP revisions are supposed to capture the newly available data in the whole economy, though in practice they are most relevant for tertiary industry (services). Measuring service-sector activity is inherently more difficult, and the Chinese statistical system—which grew out of the Soviet system that did not recognize services as value added—is particularly ill-equipped to do so. The shift from SNA 1993 to SNA 2008 in 2016 increased 2015 total GDP by 1.3% to US$11 trillion, and the real growth rate was also revised up slightly. The upward revision was due to the fact that China’s R&D expenditure growth has been consistently faster than that of overall GDP.

**Macro importance**

GDP measures the value of final goods and services produced by whole economic entities in China. Although the GDP data suffer from various quality issues, they are still probably the most widely cited macro indicator because:

1. The government pays considerable attention to GDP growth, and the official real GDP growth target is one of the most binding targets in terms of policy making. Therefore, it is useful in judging policy risks.
2. It is compiled largely in accordance with international standards, and is often used for comparison with other countries. It also covers a broad sample for the overall economy, and therefore enables analysis to be carried out on many ratios, such as the national savings rate, which would be difficult to do using monthly indicators.

**Compilation and reporting**

There are three approaches to calculating GDP data series in China:

- GDP by industry
- GDP by expenditure
- GDP by income

**Availability**

Exhibit 6: Only GDP by industry data are available on a quarterly basis
**GDP by industry**

Within this framework, the whole economy is divided into three broad industries:

- **Primary industry**: Farming, forestry, animal husbandry and fishing (excluding related services).
- **Secondary industry**: “Industry” (including mining, manufacturing, and utilities) and construction.
- **Tertiary industry**: Any industry other than the primary and secondary industries. Activities in the service sector (such as wholesale and retail trade, finance, catering, and transportation) are captured in this category. As in many other countries, this sector has been growing as a share of overall economic activity in China (see Exhibit 7).

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*Exhibit 7: Gradually rising share of services in the Chinese economy*
GDP by expenditure
The expenditure approach is a method for calculating GDP by totaling household consumption, investment, government consumption and net exports.

- All goods and services that consumers have purchased (with the exception of houses and housing construction materials) are included in household consumption (houses and housing construction-related items are mostly treated as gross fixed capital formation). Although retail sales data are often used as an indicator for household consumption, there are crucial differences between the two (see the section on consumption).
- Government consumption measures the non-investment goods and services purchased by government.
- The sum of household and government consumption equals final/total consumption.
- Gross Fixed Capital Formation (GFCF) is a key component in the expenditure approach of national accounts reporting. It is different from fixed asset investment (FAI) because the latter includes spending on assets that do not directly contribute to GDP (e.g., land and used equipment), while GFCF does not. Other differences include a minimum project size cutoff for FAI, and...
property developer profits and IT investment being covered in GFCF but not FAI. Moreover, FAI data collection is susceptible to a lot of statistical noise (see the section on investment).

- Changes in stocks are the net changes in inventories during the observed period. China’s changes in stocks data appear to be useful in assessing the direction, but not necessarily the degree, of inventory adjustments. Despite their importance, changes in stocks are generally the least reliable component of GDP by expenditure in China, as well as in many other countries, due to difficulties in data collection. Some countries estimate this as a residual item by balancing GDP by expenditure data and GDP by industry data. The NBS is supposed to make independent estimates for changes in inventories based on a wide range of data sources, though in practice the level of volatility and the very stable gap between GDP by expenditure and GDP by industry suggest it may have an element of residual as well.

- The sum of GFCF and the change in inventories is defined as Gross Capital Formation (or just “investment”, which remains a very large share of economic activity in China; see Exhibit 8).

- Net exports are the balance of trade in goods and services, which is equivalent to the balance of payments (BOP) definition for the trade balance. It differs from Customs trade data in three main aspects: (1) it includes trade in services, whereas the Customs data only cover trade in goods; (2) conceptually, it is based on the principle of exchanges between residents and non-residents, instead of goods moving across national frontiers; and (3) imports reported by Customs are based on CIF, while BOP/trade under GDP is based on FOB (see section on international trade).

- GDP by expenditure data are only available annually in nominal levels. One needs to deflate official data to obtain real levels and growth rates.

- We use the Consumer Price Index (CPI) to deflate household and government consumption, the FAI deflator to deflate GFCF (FAI) and inventory, and goods trade price indices to deflate goods trade. We use CPI to deflate services trade separately.

*Single-quarter GDP*: From Q1 1992 to Q2 2015, quarterly GDP data were estimated on a year-to-date (ytd) basis. Since Q3 2015, quarterly GDP data have been estimated on a single-quarter basis. This change should help reduce uncertainty in quarterly GDP estimates because in the previous formulation, the difference between Q3 ytd and Q4 ytd data contained both information about Q4, and net revisions to the first three quarters after the Q3 ytd data were initially compiled.
**Exhibit 8: Chinese “rebalancing” from investment to consumption has been limited to date**


**GDP by income**

The *income approach* accounts for the income generated during the process of production activities for various industries. The value-added GDP data are composed of four parts: employees’ compensation, net taxes on production, depreciation of fixed assets and operating surplus.

The NBS does not release national aggregates for GDP by income, only for individual provinces. Users need to aggregate the provincial GDP-by-income data to get a national figure.

Conceptually, the level and growth rate of GDP measured by the industry, expenditure, and income approaches should be the same. However, in practice there are some discrepancies among them due to measurement issues. When calculating the consumption/investment/net export share of GDP, GDP by expenditure should be used; in other cases, GDP by industry should be used as the benchmark. In addition, we often use the GDP by income approach as a reference of how the national income is split.

**Revision**
In early 2017, the NBS simplified GDP data accounting into preliminary estimation and final revision.

**Preliminary estimation:** The timeliness requirement is high for the preliminary release of quarterly GDP data (approximately 15-23 days after the end of the reference quarter). Annual preliminary GDP is calculated by aggregating quarterly results. The first release of annual data comes out early in the following year. The preliminary estimate is calculated using the industry approach.

**Final revision:** The final revision of annual GDP will be released towards the end of the following year, based on audit, fiscal budget outturns and other survey data.

**Economic Census:** An economic census is conducted every five years and will revise historical GDP series based on the census results. The latest such revision (the 3rd economic census) was conducted on 2013 annual data and results were released in late 2014. The next consensus will be conducted in 2018 with results to be released in 2019.

**Other issues**

**Regional GDP and per capita GDP**

- Historically there have been significant discrepancies between national and regional GDP data. The sum of provincial GDP tends to be higher than the national GDP, and the aggregate of municipal GDP tends to exhibit the same pattern vs. the provincial GDP. A number of factors lead to these discrepancies. Among the most important are: (1) double-counting of the value added for enterprises that operate across different regions; (2) differences in data sources; and (3) human factors in compilation. The revised national GDP after the Census is much closer to the aggregate of provincial GDP data before the revision. Although it has long been assumed that regional GDP data have overstated the growth and size of the economy, the revisions made by the NBS subsequently indicate early readings of national data may be too conservative as they tend to under report service-sector activities relative to the census.

- Another problem is the estimation of regional GDP per capita in China, especially at the city level. As there are two regional population data series in China, those of actual residents and those with household registration (Hukou) in the reporting location, GDP per capita calculated using the two series can differ substantially. In 2004, the NBS noted that for population inflow cities with large migrant populations, such as Shenzhen where the *registered* population is...
smaller than *residential* population, using the registered population may overstate GDP per capita. It is important to use the actual population series to avoid serious over-estimation of GDP per capita, though even that series suffers from the problem of under-reporting due to large migrant inflows, which are difficult to capture. Someone who stays five months in a city is technically not a resident according to the statistical standards, but nevertheless contributes to local activity significantly. Moreover, city-level GDP per capita data are not always reported on a timely basis.

- Given population estimates reported are year-end data, to capture the “period” feature of GDP for the whole year, the NBS will average the year-end residential population when calculating GDP per capita. For example, average 2015 population = (2015 year-end + 2014 year-end)/2.

**GDP and GNI/GNP**

- Another concept closely related to GDP is gross national income (GNI), also called gross national product (GNP). The difference between the GDP and GNI/GNP is net factor income, which is the income of investment and labor by domestic residents earned abroad minus those of foreign residents earned in the country. Despite their apparent similarities, these two series measure two different aspects of the economy: GDP measures production and GNI measures income.

- Owing to the large amount of foreign direct investment, China’s income balance was mostly negative until 2005, when the net balance turned positive mainly because of the large income from foreign exchange reserves. As China continues to increase its direct investment abroad, net factor income will play a more important role in the future.

**Industrial Production (Value-added of Industry)**

Signal to noise ratio: ****

Macro importance: *****

Source: National Bureau of Statistics

To avoid volatility related to the Chinese New Year, since 2006 the NBS has released industry data for January-February combined.

Timing: Typically around the 2nd /3rd week of the following month.

In January, April, July and October, it is released with GDP data during a press conference around the 2nd week of the month.

Hour: 10:00 am

Publication: NBS monthly releases

**Overview**

- This data series measures the real value added in the industrial sector. (The deflator for headline IP is PPI.) This indicator is an important reference for macroeconomic management and is widely used to estimate short-term trends in industrial growth.

**Signal to noise ratio**

- We have long viewed industrial production (IP) as among the more reliable monthly activity indicators China publishes because: (1) related to the structure of the Chinese economy, China’s statistical system has focused on tracking growth in industrial production since it was founded; and (2) historically there seemed to be less “smoothing” in this series than in some other politically more sensitive data series, such as GDP, though this might have become less true in recent years.
- The IP data series generally tends to be reliable (much more so than fixed asset investment and retail sales data) and is representative of the manufacturing sector. The only difference between IP and manufacturing output is that IP includes the mining and utilities industries.

**Macro importance**

- Historically we have found the IP data quite useful given: (1) their high frequency (monthly), and (2) they are a reasonably good proxy for overall economic activity and especially GDP data, since IP is a direct and important GDP component.

**Compilation**

- The sectoral coverage of IP is selective in the following respects:
1. It covers only “industries”, which include “mining and quarrying, manufacturing, and utilities”—otherwise known as “secondary industry” by GDP classification, *excluding construction*. There are 41 industrial divisions in total, in which manufacturing accounts for the vast majority of the components. Value added in a particular industrial division is the sum of value added from companies whose primary activities are in that division (in practice, this may include some ancillary activities which should technically be categorized in other areas). This issue is especially tricky when it comes to conglomerates, and as the level of sector detail increases.

2. By business type, the value added of industries covers state-owned & holding enterprises, collectively owned enterprises, shareholding & cooperative enterprises, foreign funded enterprises, and Hong Kong, Macau & Taiwan-funded enterprises. The classification is based on the controlling stake. If the company is controlled by a minority shareholder, it will be classified as a company under that shareholder, as is often the case with state-controlled firms.

3. Minimum threshold: enterprises with annual sales of RMB20 million or above are included. Therefore, this series covers only a portion of the total value added by industry in the economy, though the portion is large (more than 80% in recent years). Given regular adjustments of the minimum threshold, the NBS releases comparable growth rates to eliminate statistical discrepancies in levels.

- Export delivery value: Refers to the nominal value of industrial products for exports (including to Hong Kong, Macao and Taiwan). Prices are generally denominated in FX, and converted back to RMB based on the respective exchange rates. This category includes products from processing and assembling trades, etc.
- IP data are announced in terms of real growth and real year-to-date growth. The reporting of the nominal level of value added by industry was discontinued in 2007 and official real level data have never been published. When nominal value-added series are needed one can “inflate” official real growth data by the PPI to generate a rough estimate, though this approach can yield results quite different from the official nominal series over the period when they were still published. This is due to technical issues such as whether the deflation is done first at the sector level and then aggregated, and/or whether value added is deflated with a single price index or output and intermediate input are deflated separately (“double deflation”, technically the preferable approach).
- The most important sub-sectors of manufacturing are electronic equipment (including communications equipment, computers and other equipment), transportation equipment, smelting and pressing of ferrous/nonferrous metals,
chemicals, electric machinery and equipment, and textiles.

Revision
Seasonal adjustment is carried out every time a new data point comes in, and therefore historical seasonally adjusted growth rates will be revised accordingly. More recent growth rates are usually the most sensitive to this process.

Other issues
When the Chinese New Year falls into two different months between two consecutive years, year-on-year growth rates for January and February will be seriously distorted. It is not possible to correct the distortions by adjusting for the number of working days, mainly because not all businesses are closed during holidays. Since 2006, the NBS has released only one year-over-year reading for January and February, which is often assumed to be free from Chinese New Year distortions. However, this assumption is not always correct since activity in March can also be affected when the Chinese New Year occurs late, as was the case in 2015. The NBS does report month-over-month growth for January and February and all other months of the year back to 2011. These data can be used to derive a year-over-year time series for January and February, as they are supposed to be adjusted for Chinese New Year effects already.

Electricity Production and Consumption
Signal to noise ratio: *****
Macro importance: ****
Source: China Electricity Council, National Bureau of Statistics, State Electricity Regulatory Commission
Availability: Electricity Production: daily from Aug 1st, 2012; monthly from 1996; Electricity Consumption: monthly from Dec 2012 (year-to-date); annual from 2002
Publication: China Energy Statistical Yearbook

Overview
Electricity production: Refers to the power generated by industrial enterprises with annual revenue from principal business above RMB20 million.
Electricity consumption: Refers to the electricity consumption of the whole society including primary sector, industrial enterprises, tertiary sector and residents from urban and rural areas.

**Signal to noise ratio**
The signal to noise ratio of electricity production and consumption is relatively high—as the information collection is largely automated, there's relatively less room for local governments to distort the numbers. As a matter of fact, industrial electricity consumption per unit of GDP has been closely watched by local governments with rising concerns about eliminating outdated capacity in heavy industry.

Periodic divergence between industrial electricity consumption and industrial production growth may in part reflect a shift towards less energy-intensive sectors. Other factors also affect electricity usage. For example, weather-related factors (e.g., hot summers which lead to more air conditioning demand) lead to strong seasonality in residential electricity consumption. Abnormal weather can therefore distort even seasonally adjusted data.

**Macro importance**
Electricity data is of lower macro importance than GDP, as it is heavily affected by a small number of industrial sectors. (Though with the development of the service sector, electricity consumption in logistics and other services sectors is playing a more important role.) Thus it is somewhat less comprehensive in gauging the state of the economy.

**Rail Freight Traffic**
Signal to noise ratio: *****

Macro importance: **

Source: Ministry of Transport

Availability: Freight volume: monthly from Aug 1998 (year-to-date from Jan 2005); annual from 1949

Freight turnover: monthly from Aug 1998; annual from 1952

Transport distance: annual from 1949

Publication: China Statistical Yearbook
Overview
By category of cargo, national rail freight traffic data have information on freight volume, freight turnover and transport distance. The year-over-year growth rates of freight volume and freight turnover turned positive in August 2016 after 31 consecutive months of deceleration.

Signal to noise ratio
Rail freight traffic data are generally reliable. However, they have strong seasonality. For example, rail shipments for coal tend to increase in winter given rising demand for the fuel from the northern part of China.

Macro importance
Similar to electricity data, the macro importance to GDP is relatively low—rail traffic primarily reflects the supply and demand in heavy industry. Freight rail was subject to severe under-capacity issues at times in the past and hence its historical data may not reflect demand changes well (since a change from 50% excess demand relative to the capacity to 10% will not show up in the actual amount of freight carried). This has generally not been an issue in recent years as demand cooled and railway investment increased further.

Total Profits of Industrial Enterprises
Signal to noise ratio: ***
Macro importance: ***
Source: National Bureau of Statistics
Availability: Monthly from 1999, year-to-date
Timing: Around 27 days after the end of each month
Publication: NBS monthly releases

Overview
- **Total profits of industrial enterprises**: Total profits are the sum of "operating profits" and net "non-operating income", on a before-income-tax basis. Operating profits equal total revenue from principal business minus cost items...
(such as cost of goods sold, management, operation, and interest payments etc.), plus some residual terms such as investment return. The sample is based on industrial enterprises above the minimum size threshold.

- **Revenue from principal activities**: Revenue from principal activities refers to the sum of income gained from principal business operations.

- **Profits from principal business** = Revenue from principal business – Cost of principal business – Tax and extra charges of principal business – Selling expenses – Administrative expenses – Financial expense. It differs from “operating profits” in the sense that “profits from principal business” does not include “investment returns”.

- The NBS also releases financial data stating the operational condition of industrial enterprises such as total assets, total liabilities, total owners’ equity, and main business income, etc.

### Signal to noise ratio

- We believe the data series are generally reliable, at least in terms of the overall growth rates, though probably less so at the industry level. SOEs are often assumed to over-report their profits and under-report losses because of performance assessment systems, while private enterprises tend to under-report them to avoid taxes. But to the extent that there is no major change in the degree of over/under-statement (at least in the short run), the growth rates should be useful in terms of gauging profitability trends of large industrial firms. The trend in profit growth is also broadly consistent with that of enterprise income tax receipts reported by the Ministry of Finance.

- Profit/revenue data contain a lot of seasonal noise, i.e., profits and revenue levels usually show an uptick in December. Although seasonal adjustment should deal with this, given the pronounced seasonal effects an alternative approach to minimize this noise is to compare the data point with the same period in the previous year.

### Macro importance

- Profitability is useful in gauging the strength of the corporate sector. Profitable firms are able to, and often do, reinvest their retained profits. Other industrial financial data such as interest payments can also help assess the debt sustainability of the industrial sector.

### Compilation and reporting
The coverage is the same as that of the industrial production data, i.e., all industrial enterprises with annual sales of RMB20 million or more. Similar to industrial production, the minimum threshold for profit data sampling increased since 2011. Previously the minimum threshold was annual sales of RMB5 million or above. Official year-over-year growth rates are based on comparable samples, according to the NBS.

In 2012, the NBS released the new Industrial Classification for National Economic Activities which expanded the industrial coverage from 39 to 41 in total. Therefore, many sub-sectors’ data are not precisely comparable over longer periods of time even though the sectors may have very similar names; analysts should watch out for jumps in series around times of revised classifications.

Profits are on an accrual basis, and China onshore stock market listed companies follow the same standard, per enterprise accounting rules from the Ministry of Finance. However, NBS profits are pre-income tax, and for listed companies, investors usually pay attention to post-tax earnings.

Other issues

The NBS typically releases the amount of losses (year-to-date) made by loss-making firms at the same time as it publishes the total profits of industrial enterprises. (As one would expect, the reported total profits number for all industrial enterprises already nets out the losses from loss-making companies.)

The main cost categories in the monthly profit report are cost of goods sold, finance costs (interest payments and fees paid to financial companies, which can often be significant especially when commercial banks are under window guidance not to charge high interest rates), and management/operation costs.

Purchasing Managers’ Indices

Signal to noise ratio: NBS mfg: ****, Caixin mfg: ***

NBS non-mfg: ***, Caixin Service: ***


Availability: NBS manufacturing PMI: since January 2005
NBS non-manufacturing PMI: since January 2007

Caixian manufacturing PMI: since April 2004

Caixian services PMI: since November 2005

Timing: NBS PMIs: Last day of each month (starting from March 2017); 9:00am

Caixian manufacturing PMI: 1st workday of the following month; 9:45am

Caixian service PMI: 3rd workday of the following month; 9:45am

Publication: NBS monthly releases, Caixian PMI Reports

Overview

There are two sets of Purchasing Managers’ Indices (PMIs) in China, one compiled jointly by the NBS and the China Federation of Logistics and Purchasing (CFLP) (hereafter referred to as the “NBS PMI” for convenience), and the other by Caixian/Markit Economics. Currently, each organization releases separate indicators for the manufacturing and non-manufacturing sectors.

Signal to noise ratio

- Of the two manufacturing surveys, China’s official manufacturing PMI historically performed slightly better, as its production and new orders indices appear to be the best coincident indicators of sequential industrial activity growth among all PMI related data.[7]
- This advantage could be because the NBS manufacturing PMI is more representative, due mainly to the fact that it is compiled by the official statistical authority:

1. The NBS manufacturing PMI is based on a sample size of 3000 firms while the Caixian manufacturing PMI is based on roughly 500 firms.

2. The NBS survey is likely to have a higher response rate. The response rate of the NBS survey is said to be as high as 99.6%, as the NBS has the legal right to demand that firms respond. While this can be a double-edged sword as some firms reporting unwillingly might be reporting with less care, the net effect of having a large effective sample size is probably a good thing. While the rate for the Markit survey is unknown, it is unlikely to attain such a consistently high response rate.
China’s two manufacturing PMIs sometimes send different signals (Exhibit 9). Sample size difference and discrepancies in data-collecting periods may explain divergences. The Caixin survey is conducted in the middle of each month, while the official survey is conducted later, at around the 20-25th of each month. When the economy is changing rapidly, this timing difference can be significant.

It is often said that the official PMI is a better reflection of large manufacturers and the Caixin PMI is a better reflection of smaller and often export-oriented producers. However, the index provider (Markit) disagrees with this characterization, and at least in terms of design both PMIs are designed to capture large manufacturers as well as SMEs. In its early years the Caixin PMI covered mainly coastal provinces and might indeed have had a bias towards exporters, but this feature was addressed many years ago.

The NBS non-manufacturing PMI samples 4000 enterprises of different sizes in the construction and service sectors. The surveys for 10 individual indices within the non-manufacturing sector each ask ten questions, about expectations for production, new orders, export, existing orders, finished goods inventory, intermediate input price, subscription price, employees, suppliers’ delivery times, and business activities. Meanwhile, the Caixin Services PMI sample covers more than 400 enterprises in the service sector.

Unlike the manufacturing PMIs which are conceptually identical, these two PMIs are different—the official one is not just a services PMI but includes construction as well. It is therefore natural that these two indicators diverge more often than the manufacturing PMIs. But even if we look at the service sub-index of the official non-manufacturing PMI, it is still quite different from the Caixin Service PMI (Exhibit 10). The construction sub-index of the non-manufacturing PMI has a relatively weak relationship with the construction component of GDP.

Exhibit 9: Official and Caixin manufacturing indices show similar trends, but occasionally send different signals
Exhibit 10: Only modest correlation between NBS and Caixin service sector surveys
- PMIs can be useful leading indicators occasionally, but are much more reliable as coincident indicators. They are also useful in gauging upstream inflation, via their input price indexes.

**Compilation and reporting**
- Both the NBS and the Caixin PMIs are compiled and summarized through the results of a monthly survey of enterprise purchasing managers. In reality it is not necessarily the purchasing managers who are filling out the forms but other employees, especially those in the finance department. Statisticians send out questionnaires to firms every month to ascertain whether the situation in certain aspects of the business has improved, or if there is no change, or if it has deteriorated. Responses in each category are given the weights of 1.0, 0.5 and 0, respectively. An index between 0 and 100 is then compiled for new orders, new export orders, production, inventory (both for raw materials and finished goods), employment, suppliers' delivery times, order backlogs, and prices (separately for input and output prices). The overall manufacturing PMI is a weighted average of the new orders (30%), production (25%), employment (20%), supplier delivery time (inverted, 20%), and raw material inventories (10%) components in accordance to the weights used internationally. Data are then reported as a reading between 0-100 for the overall indicator and different categories, by adding the share of respondents indicating “improved” plus half the share indicating “no change”.
- The Caixin services PMI and NBS non-manufacturing PMI do not have aggregate readings and only report readings for different components; the “Business Activity Index” is often used as the headline reading.

**Interpretation of the readings**
A 100 reading means all respondents reported improvement. A 0 reading means all respondents reported deterioration. In theory, the 50 level threshold is critical because, as long as the reading is above this level, the PMI is suggesting that the economy is expanding. In China’s case, however, we do not think too much attention should be paid to the 50 threshold itself. Historical data show that the 50 threshold has not consistently separated sequential expansion from contraction (positive/negative sequential growth) in IP or GDP, or necessarily marked a change in their second derivatives (accelerating/decelerating growth rates).

**GS Proprietary Activity Measures**
Goldman Sachs China Current Activity Indicator (GS China CAI)
Source: Goldman Sachs Asia Economics Research

Availability: Monthly since Jan 2006

Timing: Preliminary reading available after the release of IP, final reading available towards the end of the following month.

Release: GS China Proprietary Indicators update

Overview
- The Goldman Sachs China Current Activity Indicator (GS China-CAI) was created to provide an alternative measure with higher frequency and quality to identify shifts in the economic cycle.[8] It attempts to encompass indicators from the main producing sectors of the economy – manufacturing, construction, and services – as well as the labor market. The China CAI is shown on a month-over-month annualized basis, after recent adjustments to harmonize CAIs around the world by the GS global economics team (it is available on the GS research portal or on Bloomberg at ticker: GSCNCAI[9]). The components of CAI include: industrial production, NBS non-manufacturing PMI, employment tracker, electricity consumption, real retail sales, cement production, freight volume, real exports, floor area started, the Caixin Service PMI, automobile sales, the Caixin Manufacturing PMI, passenger volumes, and real imports.
- The CAI is calculated on a sequential basis. Statistically, our CAI is constructed as the first principal component of 14 standardized monthly economic indicators after seasonal adjustment, converted to GDP-equivalent terms through a regression of historical real GDP growth on this principal component.
- We extend the CAI back to 2006, by backcasting a few series (mainly survey indicators) for which a complete history is not available. Other indicators on activity growth such as trade flows, corporate revenue and sector-level data all showed a higher amplitude of fluctuation than the official GDP data, so we adjusted for volatility when constructing the CAI.

Exhibit 11: Our China CAI picked up over the course of 2016
Exhibit 12: Manufacturing contributed the most to headline CAI acceleration in 2016
Goldman Sachs China Physical Output Index

As a supplement to the official industrial output data, we constructed a “physical output” indicator of the industrial sector by aggregating raw quantities of industrial products (such as kilograms or units of goods produced\(^\text{[10]}\)). The output growth of different products is then weighted by the respective revenues in each sector. Our “physical output” indicator is more volatile than the IP series (see Exhibit 13 for a comparison of sequential growth data), and decelerated sharply in 2015 before showing a rebound in late 2016.

Exhibit 13: Physical output indicator significantly more volatile

An important caveat to this “physical industrial output” measure is that it captures only a part of all industrial activity, i.e., the more traditional products, given that it is relatively easier to measure quantity output in these areas. Some of these products are being replaced and therefore tend to see slowing growth—but not all new products are added on a real-time basis, which creates an observational bias. Also, and perhaps more importantly, commodity use and physical production units will not capture technological improvements in the efficiency of production or the value per unit of output. This factor tends to bias the “physical output” indicator to the downside given that high-tech sectors in general tend to grow faster than more traditional/lower-tech sectors.
Goldman Sachs China Metals Consumption Index (MCI)
Source: Goldman Sachs Asia Economics Research

Data Since: March 2008

Timing: Around 25 days after the end of each month

Publication: GS Proprietary Indicators Update

Overview
- The GS China MCI is based on an equally-weighted basket of “physical output” data for the main commodity-consuming components of China’s industrial production. The GS China MCI is designed to provide greater visibility into developments in Chinese metals and mining consumption.

Methodology
- We currently use data on 30 available sectoral IP series, removing food, commodity production (coal output, copper output, etc. – as opposed to commodity consumption), and other miscellaneous non-metals and mining consuming products (plastics, leather, candy, etc.). We then seasonally adjust and equally weight the components and remove outliers with observations more than two standard deviations away from the monthly mean.
- As well as concentrating on the components of China’s industrial production that consume metals and mining commodities or are related to metals and mining commodity consumption (i.e., excluding production of metals and mining commodities and food, etc.), our measure differs from industrial production in that it does not include value-added weights reflecting technological improvements in the efficiency of production or the value per unit of output.
- Our methodology fits well with the China PMI, metals and currency pricing.

Reporting
- The China MCI is generated on a monthly basis in both a full version and a partial version.
- The NBS suspended the release of data on certain categories under IP in November 2015. The history of the partial version is based only on the categories that continue to report data since that time.

Exhibit 14: Heavy industry activity slumped in 2015, but has recovered steadily since then
Li Keqiang Index
Source: Various sources publish this index so there is no “official” version of the Li Keqiang Index

Data Since: October 2003

Timing: 20-30 days following month end

Publication: Unofficially, in media (GS also calculates)

Overview
- Premier Li Keqiang, when he was still a provincial governor, supposedly commented when meeting a foreign official that China's economic data was ‘man made’. (In one sense, this is true of all economic data, but the implication was that some of it might be unreliable.) Then-governor Li indicated that he looked at three data series to gauge the performance of the economy: electricity consumption, loans, and railway transportation.
- There is obviously not an official version of this index, but the first published version we know of was featured in The Economist in 2010[^12]. In this and in most other references, the Li Keqiang Index is then created based on weighted/simple average growth of the indicators: bank lending (published by

[^12]: Source: CEIC, Goldman Sachs Global Investment Research
PBOC), railway freight (published by China Railway Corporation), and electricity consumption (published by NBS). Sometimes industrial electricity consumption is used, instead of total electricity consumption.

- This index has the advantage of being based on data that: (1) are relatively free from manipulation; (2) experience pronounced swings over the cycle so changes are easy to spot; and (3) are of high frequency.

- There are at least two caveats to the Li Keqiang Index: First, it is dependent on a small number of indicators that tend to be disproportionally related to FAI on the expenditure side and heavy industrial production on production side. Second, the reliability of these indicators may have worsened in recent years, partially because it is now known that the Premier is focused on them. The behavior of the Li Keqiang Index is somewhat similar to our Physical Output Index and the CAI, but it leads the CAI slightly because its data are not smoothed, and hence are very volatile.

**Exhibit 15: Li Keqiang Index displays a similar trend to our physical output index**

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Source: CEIC, Goldman Sachs Global Investment Research

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**Section III. Investment**
**Fixed Asset Investment**

Signal to noise ratio: **

Macro importance: ****

Source: National Bureau of Statistics

Availability: Monthly from 1994, annually from 1980

Type: Monthly: Year to date

Timing: Typically around the middle of the following month.

In January, April, July and September, it is released with GDP data

Publication: NBS monthly releases

**Overview**

Fixed asset investment (FAI) excluding rural households measures spending on durable assets that are used repeatedly in the production process.

**Compilation and reporting**

FAI data include construction projects on fixed assets and real estate involving total planned investment of RMB 5 million and over.

The data are broken down into a number of categories. The following breakdowns are provided after 2004:

- FAI undertaken by nature of enterprises:
  - a. SOEs: These are enterprises solely owned by the government.
    - There is a subcategory called “State-Owned and State Holding Enterprises”. This category includes all SOEs and those enterprises over which the government has effective control. New PPP projects complicate the picture, as projects with 50% state share are accounted for as SOE investments, which overstates the true share of the state. Currently, these companies account for less than half of the total FAI and their share has been falling.
  - b. Collectively owned enterprise (COEs): Another kind of publicly-owned enterprise which has become less common.
  - c. Foreign Funded Enterprises.
d. Hong Kong, Macau and Taiwan Funded Enterprises (note that foreign-funded enterprises and Hong Kong, Macau and Taiwan Funded Enterprises are two separate categories that do not overlap).
e. Share-Holding Enterprises: Enterprises that have a share-holding structure.
f. Private enterprises and individual businesses: Both are private businesses. Businesses run by one person and small private businesses that employ fewer than eight people are called “individual businesses”; larger businesses are called private enterprises. Private-sector FAI has remained weak despite recent fiscal stimulus implemented by the government.
g. Joint Ownership Enterprises: Typically enterprises set up by two or more independent firms. This was a popular form of enterprise in the earlier years of reform but is now much less common.
h. Limited Liability Company: Including state sole proprietor and other limited liability companies.
i. Others.

- Funds designated for FAI (this is sometimes referred to as FAI by source of funding, but we view this as a misleading term because these data refer to the amount of funds that became available for FAI, which is not the same as the amount of FAI completed):
  a. State budget.
  b. Domestic loans from banks.
  c. Bonds: Corporate bonds issued.
  d. Foreign capital.
     - Among which: Foreign direct investment (FDI). In practice this can include significant capital from “round-tripping” (see more in the section on FDI).
  e. Self-raised.
     - Self-owned: This is intended to be mainly from retained earnings. In practice this likely includes a variety of funding channels including non-standard loans borrowed from financial institutions. This might be driven by regulatory requirements, such as those requiring a project to have a certain share of self-owned capital before it is qualified to borrow from banks.
     - Share Issues: Capital raised through public offerings.
  f. Others.

- FAI by work type: FAI data by work type are released with a monthly frequency, and the main categories include construction and installation, equipment purchase and others. In 2016, construction and installation was the major work
type under FAI, accounting for around 70% of overall FAI.

a. Construction and installation includes construction of buildings (materials and labor), and installation of machinery and equipment. Note that land purchase costs are not included here.

b. Equipment purchase. Equipment purchase includes spending not only on new equipment, but also on old equipment.

c. Other FAI primarily includes spending on land acquisition, old buildings, and management fees.

- FAI by industry is available in terms of primary, secondary and tertiary industries. Detailed breakdowns for specific industries are available from 2004. In 2012, the NBS re-categorized the components and expanded the industrial coverage from 39 to 41. As is the case for IP by industry, FAI by a given industry is not exactly the same as investments in any particular type of project, but just FAI by companies in that industry.

For analysis we typically aggregate the sectors into four major categories: manufacturing, infrastructure, real estate and others (see Exhibit 16). In 2016, FAI in these four sectoral categories accounted for around 31%, 31%, 17% and 21% of total FAI, and rose by 4%, 16%, 7% and 4% respectively. The share of manufacturing FAI used to be the largest by far, but after slowing considerably in recent years, while infrastructure FAI continued to grow rapidly during the same period, the two now have roughly the same weight. Property FAI, often regarded as very important, has a smaller share than either of these. Furthermore, the value-added share of property FAI is likely to be significantly lower than in other components of FAI, since a chunk of FAI is in land transfers (which are non value-added and almost by definition are more closely related to property FAI). Hence the share of property investment in total GFCF is most likely significantly lower than its share in total FAI.

Exhibit 16: Infrastructure investment has been robust in recent years
There is considerable confusion and controversy over China’s FAI statistics. There are three data series related to investment, with different definitions and scope of coverage:

1. FAI (available quarterly and annually; excluding rural households; available monthly).
2. Gross Fixed Capital Formation (GFCF) (in GDP by expenditure; available annually).
3. Funds designated for FAI (monthly, often mistaken to be an allocation of actual FAI by source of funding).

The monthly FAI growth rate, which is monitored closely by investors, has the most noise and narrowest scope of coverage among all three data series.

There are major differences between the definitions of FAI and of the investment concept (GFCF) in national accounts.

The monthly FAI data are not reported on a value-added basis. That is, they do not reflect the incremental new capacity added to the capital stock, but just total nominal investment spending reported by companies. FAI includes spending on assets that do not directly contribute to GDP (e.g., land and old equipment), while GFCF does not.

FAI includes a minimum project size cutoff (RMB5 million as of 2017), while GFCF does not.
- FAI does not include spending on intangible fixed assets such as computer software and IT investment, while GFCF does.

- Both the monthly and annual investment series are in **nominal** terms. The NBS does release an official FAI deflator on a quarterly basis; however, capturing price changes in this sector is difficult—especially land prices (see the section on price indicators).

- Year-on-year (yoy) nominal growth rates for the monthly FAI series need to be read with caution due to abnormalities in data reporting. First, the classification for monthly reported FAI data changed materially a number of times in the past, most recently at the beginning of 2004. This change has made the yoy growth rates not completely comparable over time.

- FAI data collection is susceptible to a good deal of statistical noise. Over-reporting may be the major factor behind the high level of FAI growth, which has also been acknowledged by the government. There is the problem of potential double-counting (e.g., of the same project by different regions) and misreporting (FAI data are based largely on questionnaire responses which do not always have to be backed by hard evidence). Moreover, statistical officials may adjust the collected data in an attempt to align the reported FAI with other related economic metrics. We note that, since the late 1990s, monthly FAI as a share of annual total FAI has risen notably each month from January till October, but has fallen in December. This may reflect efforts by the statistical authorities to improve intra-year data reporting by making it less concentrated at the year end. However, such an “improvement” makes it difficult to obtain an accurate reading of true investment strength from the monthly data and could possibly introduce even more noise into the reporting process, because it will overstate the year-over-year and sequential growth rates for the earlier months of the year, and understate them at the end of the year. A seasonal adjustment to the year-over-year growth rate normally should have little impact but may help when looking at FAI data. However, the degree of adjustment is not constant over time and there is no way to eliminate completely the noise affecting monthly FAI data, so we suggest investors supplement them with other indicators, such as capital goods imports and our GS China Investment Tracker (discussed later in this section), to help form a better assessment of true investment growth momentum on a monthly basis.

**Macro importance**
Despite all these caveats, the monthly FAI series remains very important in assessing policy risks, because policy makers do pay very close attention to it. The NDRC announces an annual target for FAI growth, although this target is not very restrictive for policy-making. A significant rise in FAI growth rates tends to lead to policy tightening and vice versa.

**Projects Started and Under Construction**

Source: National Bureau of Statistics

Availability: Monthly from 2004

Timing: As FAI data

**Overview**

- The value of total planned investment in new projects and under construction reflects changes in the pipeline of investment projects.
- Data are compiled together with FAI data and therefore many of the problems associated with FAI data also apply to these series.
- “Projects started” data are often used as a leading indicator of investment activities. Policy makers and investors also monitor this series to assess trends in fixed asset investment on a 1-2 year horizon. In reality, however, there is no stable lead-lag relationship between the two series.

**Compilation and reporting**

- FAI projects started and under construction are released in terms of value and number of units.
- **Project started, planned (value):** This refers to all projects planned to start during the reporting period (they may or may not be under construction at this stage but will be started before the reference period end). It excludes ongoing investment projects, (including those suspended and restarted in this period).
- **Projects under construction (value):** This contains ongoing investment projects and new starts.
- New projects started (unit) are included in the under construction series (unit).
- **Total planned investment:** Refers to FAI projects’ planned investment amount. Note these plans are not binding and therefore this is not a reliable indicator for future FAI. Availability of funding and subsequent changes in costs can have large impacts on investment.
The relationship between the number of units and value is a complicated one because of regulatory approval issues. For example, sometimes local projects find it difficult or costly to obtain approval for a new project and therefore just report the new project as an extension of existing project.

**Foreign Direct Investment**

**Source:** Ministry of Commerce (MOFCOM); State Administration of Foreign Exchange (SAFE)

**Availability:** (MOFCOM) Monthly from 1997; (SAFE) quarterly/annual with BOP data


**Overview**

- Foreign Direct Investment (FDI) measures investments made by foreign residents who seek to have significant long-term interest in a domestic enterprise.
- FDI has made a significant contribution to the development of the Chinese economy. FDI data reflect the flow of such investments, as well as the confidence of international investors. FDI data are also useful in estimating other data points, such as total capital flows.
- As with GDP data, there are considerable issues in FDI data compilation at the regional level. The central government has in recent years strengthened the requirements for the verification of data reporting. For example, data on cash FDI are double-checked against capital flow records at the SAFE, and data on goods FDI are double-checked against the records of the Customs Administration. Data that cannot be verified are, in principle, discarded. Moreover, FDI’s importance as a part of the assessment metric for local government officials has declined, and hence the incentives to over-report have diminished relative to earlier years.
- Data provided by the MOFCOM measure *gross* inflows of FDI and do not take into account debits such as capital withdrawals. The SAFE does make this adjustment in the BOP data, however. Since 2006, the SAFE has made further adjustments to the MOFCOM data by adding to FDI flows related transactions.
such as long-term loans, purchases of domestic properties by foreign residents, and reinvested profits. As a result, there is a significant discrepancy between the two series, and the data reported by the SAFE are more comparable internationally, although available at a lower frequency than from MOFCOM (quarterly instead of monthly).

**Other issues**

- Assessment of the true strength of FDI is also complicated by the issue of round-tripping, which refers to funds originated in China but reinvested back as FDI. Money laundering and preferential policies for foreign enterprises are the most important reasons for round-tripping. The top three originating economies for China’s FDI (as of 2016) are Hong Kong, Singapore and Korea. Offshore transactions of these source jurisdictions via the British Virgin Islands, the Cayman Islands, Samoa, Mauritius and Barbados are also taken into account. While it is difficult to make a reliable estimate of the magnitude of round-tripping, the World Bank and other independent research have in the past estimated it at more than a quarter of China’s total FDI[14].

**Outward Direct Investment (ODI)**

- Although FDI attracts most attention, ODI has gained momentum in recent years, especially under the backdrop of increasing capital outflow pressures. In 2015 and 2016, ODI from China soared to a record high. According to MOFCOM data, ODI surpassed FDI for the first time in 2015 and according to the more internationally comparable SAFE BOP data it did in 2016. Hong Kong typically tops the destinations for outward investment while other destinations on the table change frequently.

**GS China Investment Tracker**

Source: Goldman Sachs Asia Economics Research

Availability: Since Q1 2007, quarterly basis

Timing: Around 45 days after the end of each quarter

Release: GS China Proprietary Indicators update

**Overview**
Reflecting considerable reporting issues related to the data, FAI has grown consistently faster than the GDP-consistent investment concept (gross fixed capital formation) in recent years.

It is difficult to reconcile these differences systematically (Exhibit 17). However, booming real estate development and rising land prices in recent years have clearly contributed to the growing gap between annual investment expenditure reported under GDP accounting and those from the monthly FAI data.

Exhibit 17: Difference in measurement scope between FAI and GFCF cannot explain divergence of two concepts

<table>
<thead>
<tr>
<th>RMB Billion</th>
<th>FAI (100.0%)</th>
<th>Adjusted FAI (97.0%)</th>
<th>Presumed over-reporting (56.0%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAI</td>
<td>50,126</td>
<td>48,514</td>
<td>20,351</td>
</tr>
<tr>
<td>Land acquisition</td>
<td>3,470</td>
<td>3,331</td>
<td>1,531</td>
</tr>
<tr>
<td>Old building</td>
<td>179</td>
<td>172</td>
<td>7</td>
</tr>
<tr>
<td>Old equipment</td>
<td>66</td>
<td>63</td>
<td>3</td>
</tr>
<tr>
<td>Value added in property sector</td>
<td>1,024</td>
<td>1,020</td>
<td>2</td>
</tr>
<tr>
<td>Computer software spending</td>
<td>979</td>
<td>976</td>
<td>3</td>
</tr>
<tr>
<td>Below-cutoff investment</td>
<td>100</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>GFCF</td>
<td>28,164</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Data on spending on land, old buildings, and old equipment under FAI are for 2012 (the latest data available). Other data are for 2014.

Source: Goldman Sachs Global Investment Research

We have developed an alternative investment tracker, based on construction output and machinery sales—the data quality of which we believe is notably higher than that of the official data. Indeed, our investment tracker shows a much higher correlation with upstream industrial output than reported FAI does.

Compilation

Construction output: NBS releases quarterly data on construction output. They are out the same day as the quarterly GDP release, about 2-3 weeks after quarter-end.

Adjusted machinery sales: We use monthly machinery sector sales, netting out the estimated portion for passenger cars (which should count toward consumption rather than investment) and exports.
- **Investment tracker:** We use the sum of construction output and adjusted machinery sales as our investment tracker. Like FAI, our tracker is a nominal concept. It is still not entirely the same as GFCF, as it excludes certain items such as IT spending and property developer profits, as discussed in the beginning of this section (see Exhibit 18).

Exhibit 18: GS investment tracker troughed in mid-2015

Source: CEIC, Goldman Sachs Global Investment Research

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**Section IV. Real Estate**

**Investment in Real Estate Development**

Signal to noise ratio: **

Macro importance: ***

Source: National Bureau of Statistics

Availability: Monthly from 2004, annual from 2003
Overview
There are two sets of real estate investment data. The most widely tracked one is the total FAI conducted by real estate developers. The data are surveyed and released together with other real estate indicators such as new starts, completion, sales, etc. They cover investment in land, equipment purchases and construction activities such as residential, commercial and office buildings. Like FAI data, investment details by ownership of enterprises (annual), work type (monthly and annual), and sources of funding are available.

The other data on real estate investment is the FAI by industry–real estate. The definition of this dataset is different because it supposedly includes real estate related investment by all types of enterprises, not just property developers. However, the general trends of these two indicators are similar.

Signal to noise ratio
Both series of real estate investment have similar drawbacks as other FAI data series. For example, the official year-over-year growth rate series are not entirely compatible with the official level series, mainly due to sample changes over the years (for details on other noise in FAI data, see section III on FAI). Other noise in real estate FAI is caused by the fact that these two indicators do not capture rural properties without property rights. Rural properties without property rights can represent a significant amount but by definition cannot be reported as they are illegal.

Macro importance
Despite the drawbacks, real estate investment is still widely tracked by investors, because: (1) real estate FAI is informative in terms of gauging the strength of the real estate sector; (2) real estate FAI (reported by all property developers) takes around 17% of overall FAI in China (based on 2016 data), and thus is an important driver of overall FAI.

Land Acquisition, Transaction and Development
Signal to noise ratio: ***

Macro importance: ***

Source: National Bureau of Statistics, Ministry of Finance, Ministry of Land and Resources, China Real Estate Index System (CREIS), Soufun
Overview
There are several useful sources of data on land transactions and development.

**Land purchase area (NBS):** This is defined as land area (m$^2$) purchased by real estate developers during the reporting time period. As all land in China is owned by the state, buyers can only purchase the right to use land instead of ownership. These rights range from 20-70 years. It is still unclear what the government will do when the right leases are up, but various government officials have indicated they are exploring plans to ensure the smooth extensions of rights. Premier Li stated after the 2017 NPC that the usage right will be automatically renewed when the right leases are up, but this is not stated in any laws yet.

**Land purchase value (NBS):** This refers to the final amount (value) of the land-use right transacted in both the primary and secondary market by real estate developers. Land purchase value has the same statistical caliber as land purchase area, so we can derive the average price of land purchases from these two indicators. However, this is not precisely the same as a land price index because the quality of land transacted may not be comparable.

Land purchase area and value data are also available on city-level for 40 major cities, released by the NBS.

**Land transaction volume and value by city (CREIS/Soufun):** CREIS/Soufun collect and summarize the data (data access requires subscription) on land transactions in more than 300 cities in China (There are two data series- one covers residential land transactions, based on 209 cities (often referred to as “200+ cities residential land transactions’’); another covers all types of land transactions, based on 302 cities (often referred to as “300-city land transaction/price data’’). The definition of the data is broader than the land purchase value/volume data mentioned above, given that these data cover land purchases by different types of enterprises, not just developers. However, these data aggregate more than 300 cities rather than being based on all transactions nationwide. This data series may lead NBS data (the two indicators above) because land purchases are recorded (in
principle) when investment is completed, while CREIS series on land transactions are recorded when transactions occur. There is typically some time lag between land transactions and actual settlement of land purchases.

**Land-use right transfer value (Ministry of Land and Resources)** is a more comprehensive nationwide indicator of land transactions. However, it is available only at a quarterly frequency and there are missing data points, so the data series is incomplete.

**Land sales in government income/expenditure data:** This is reported by Ministry of Finance along with other government income and expenditure data. The Ministry of Finance series is slightly different in scope from the land-use right transfer value reported by the Ministry of Land and Resources. For instance, the former series also includes income from renting land by land administrations. Land sales remain a very important source of income/expenditure for local governments. Please refer to the fiscal section for more details.

**Signal to noise ratio**
Among all the land sales indicators mentioned above, we tend to rely more on the land transaction volume and value series from CREIS. The data coverage of land purchase value and volume reported by property developers is much narrower, and NBS land purchase data lag the CREIS data series slightly as discussed above.

**Macro importance**
Land sales tend to lead property construction activity (see Exhibit 19) and thus it is important to track land sales. As mentioned above, land sales are also important sources of income/expenditure to local governments, and therefore can impact the financing need/spending capability of local governments. Land price fluctuations are also important for future property price trends and the financial health of property developers.

**Exhibit 19: Land sales tend to lead property construction activity**
Housing Starts, Under Construction and Completion

Signal to noise ratio: ***

Macro importance: ***

Source: National Bureau of Statistics

Availability: Monthly and annual

Timing: Typically around the 3rd week of the following month.

Overview

**Floor space started:** This measure refers to the total floor space of buildings that are newly started within the reporting period. Only housing newly started by real estate developers and enterprises within the reference timeframe is counted. Continued building activities carried over from the preceding reporting period or restarted projects are excluded.

**Floor space under construction:** Refers to the total floor space of all new starts under construction, postponed projects that restart in the reporting period and uncompleted projects continuing in the current period.

Source: CREIS, CEIC, Goldman Sachs Global Investment Research
**Floor space completed:** Refers to total floor areas that fulfil all the completion requirements of property developers and could be delivered for sale.

The three indicators above are all reported by property developers, and released monthly together with the real estate FAI indicator, as mentioned above. There are two more indicators, “housing under construction” and “housing completion”, which cover not just commercial housing but also other types of housing constructed by all types of enterprises. These two indicators are seldom used by investors/researchers.

**Social housing related construction indicators:** Apart from commercial housing, NBS also publishes data on social housing. There are annual data on the total number of flats planned to be started, as well as the total number of flats completed. In recent years, the government has also set targets for the total units of flats started under the shanty town redevelopment program. Although social housing related data is not quite as important as commercial housing related data, construction of social housing still drives upstream/downstream industries (such as construction materials) and thus is useful to track. Social housing units could also be converted from commercial housing—during the property down-cycle in 2014-2015, this was one inventory destocking measure adopted by many local governments.

**Signal to noise ratio**

The survey target of the first three indicators above includes only property developers, so these data cover only newly started floor spaces constructed by developers. Properties built by other corporates and institutions (often as a form of welfare) which are not for sale on the market are not included. Rural properties without property rights are also not captured. Moreover, the series for floor space under construction, completed, and started are not consistent with each other, and researchers have different views on which indicator is more reliable.

**Macro importance**

Floor space started, under construction and completion series are all widely tracked by investors and researchers. Floor space started tends to lag property sales (given the majority of property sales are pre-sales), and can lead demand in other sectors such as metals/cement. Floor space completed, on the other hand, can be informative on the future demand of furniture, interior design materials, etc.
Exhibit 20: Property starts and completions generally improved in 2016 and early 2017

Home Sales
Signal to noise ratio: ****
Macro importance: ****
Source: National Bureau of Statistics
Availability: Daily, monthly and annual
Timing: Monthly series typically around the 3rd week of the following month.

Overview
Floor area sales and total value sales of commercial buildings: These two indicators measure the sales value and volume of residential buildings, office and commercial buildings in the primary market. They are released together with new starts, under construction, and completion data mentioned in the previous section.

There is also a breakdown of data on presales and existing home sales. In 2016, 79%/75% of the sales value/volume for all commercial housing transactions was presales. Revenue from presales is therefore a major source of funding for Chinese
property developers.

**Daily floor area sold in 30 major cities:** This indicator covers transaction volume of commercial housing in 30 major cities in China, available in daily frequency. The aggregate series is available on the WIND database, and the original source is various local housing bureaus.

As China’s housing market evolves, the secondary market becomes more important, especially in top tier cities where land supply and new residential buildings are more limited. There are indicators on secondary housing market transactions in top tier cities in China.

Real estate investment, new starts, under construction, completions, and sales data are also available for 40 major cities in China, reported by local housing bureau and collected by the NBS. However, there are many missing data points in these city level indicators.

**Signal to noise ratio**

Property transactions data are generally reliable, but people sometimes under-report the transaction value to evade transaction tax, though this mostly occurs in the secondary market.

**Macro importance**

Property transactions are important to track for several reasons. Most directly, they serve as an indicator of housing demand. The fluctuations of property sales impact housing construction activities, and also the profitability of property developers. Property sales are also correlated with a number of other industries such as furniture, interior design and real estate agencies (which is linked to real estate related services in GDP).

Exhibit 21: Property sales growth has diverged between top tier and lower tier cities
Home inventory

Signal to noise ratio: ***

Macro importance: ***

Source: National Bureau of Statistics, local housing bureau

Availability: Daily, monthly and annual

Timing: Monthly series typically around the 3rd week of the following month.

Overview

Housing vacant area: This data refers to completed but unsold floor area. It is published by NBS. There is monthly data on the total stock of vacant area by different types of properties (residential, office building, commercial). By province data are also available, but only in yearly frequency.

Inventory months: Other common measures of housing inventory include the ratio of total sellable gross floor area divided by monthly floor area sold, which measures the number of months needed to digest inventory. There are no official
data on this, but total sellable gross floor areas are reported in major cities in China by the local housing bureaus.

There are no vacancy statistics on properties sold but not inhabited, leading to speculation about possible “ghost towns”. There was a report in 2010 suggesting the State Grid found 65 million apartments used no electricity for a year\[\textsuperscript{17}\]. But this report was subsequently denied by the State Grid and the government.

**Signal to noise ratio**
Inventory data tend to be noisy. Total sellable gross floor area data can be patchy, with missing values within the series. Also, there is no nationwide data on inventory months, because only major cities report total sellable gross floor area data.

**Macro importance**
Despite challenges in interpretation, inventory data are very important to gauge the cycle of the property market, and thus can be indicative to future housing price trends. After significant inventory destocking, housing price may face upward pressure, and vice versa.

**Exhibit 22: Housing inventory declined in 2015 and 2016**

![Exhibit 22: Housing inventory declined in 2015 and 2016](https://research.gs.com/content/research/en/reports/2017/07/07/97827859-81e3-42ef-bd1e-8982d86e0c91.html)

Source: CREIS, Goldman Sachs Global Investment Research
Property Price Indices
Signal to noise ratio: **

Macro importance: ****

Source: National Bureau of Statistics: 70 cities
CREIS/Soufun: 100 cities

CREIS/Soufun: Monthly from June 2010

Overview
There are two main indices of property prices in major cities, from the NBS and CREIS/Soufun. “Properties” refer to commercial buildings built to be sold in the market, including both residential and non-residential properties, newly constructed properties, and second-hand properties. Soufun data have a broader coverage of cities than the NBS but a shorter historical series.

Signal to noise ratio
The methodology used in compiling the price index is fairly well-designed, and controls for the impact of quality (both the NBS 70-city property price index and CREIS/Soufun 100-city property price index are quality-adjusted). However, given that there is a higher degree of estimation involved in compiling the index and pressures on local governments to control property prices, there are some concerns that the indices are over-smoothed, showing less of an increase in prices than actual property price inflation in some cities. Sometimes the rise in property prices is hidden when developers are forced to sell properties at prices below market price because of local government pressures, and the excess demand leads to alternative expenses, such as requirements for property purchasers to deposit funds well in advance to be able to purchase the property. These distortions are typically more relevant for new properties. Price indexes on second-hand properties are therefore often a useful reference when the two diverge.

Macro importance
We believe the trend in property price inflation contains useful information despite potential distortions. Policy makers regard these indices as important indicators of the state of the property sector.

**Compilation and reporting**

When compiling the Property Price Index, the statistical authorities in China try to control for differences in the quality of properties. They consider the features of the property and attempt to compare prices for comparable properties. Factors such as location, structure, and type of property are all taken into consideration to make price comparisons.

Further breakdowns are available for non-residential properties in terms of industrial properties, office buildings and other commercial properties. Newly constructed properties include commercial properties and social housing, and a separate set of data on newly constructed commercial housing is also released by the NBS.

The CREIS/Soufun property index is compiled by taking the weighted (by floor area) average of indices of 100 underlying cities in the reporting period. It includes the price changes for commercial residential buildings, cottages and social housing. Data are collected by field visit, corporate survey, from real estate intermediaries, and as information provided by local governments.

**Other issues**

The NBS changed the methodology for the Property Price Index in 2011. Property sales prices were split into primary and secondary housing price indices.

The index initially covered 35 major cities and was expanded to 70 cities in 2005. Rural areas are not covered. Data are collected via a mixture of reporting forms from real estate companies and site visits by NBS staff.

Two related NBS series are the Rental Price Index and Land Price Index, both of which are compiled using a similar methodology.

The Soufun 100-city property price index has been discontinued from public websites since December 2016, but the overall index is still available with subscription. The release of the 100-city property price index used to be on the first day of the following month, but since late 2016 has been delayed to around the 10th day of the following month, or even later.
The divergence of housing price trends among different tiered cities in China reflects differences in housing market fundamentals—top tier cities face more supply restrictions and resilient demand, and thus upward pressures on housing prices are the strongest (see Exhibits 23 and 24). Lower-tier cities tend to have diverse circumstances but on average face less restrictive supply and weaker demand, and thus housing price growth tends to be slower and/or prices tend to fall more in property market down-cycles.

**Exhibit 23:** “Tier 1 cities” have seen more pronounced price appreciation in boom periods

![Graph showing percentage change in housing prices for different tiers from January 2011 to January 2017.]

Source: NBS, Goldman Sachs Global Investment Research

**Exhibit 24:** Housing price trends can diverge significantly between city tiers
Note that there is no official classification of city tiers in China. Although there is widespread agreement on the definition of tier 1 cities (Beijing, Shanghai, Guangzhou, and Shenzhen), categorization beyond that point is not always consistent among different analysts, particularly for lower tier cities. Exhibit 25 shows our GS property research team’s classification for the cities included in the NBS 70-city property price data.

**Exhibit 25: Most cities in the NBS 70-city property price dataset are in tiers 1-3**
Land Price Indices

Signal to noise ratio: ***

Macro importance: ***

Source: Ministry of Land and Resources; CREIS, academic research

Availability: Wharton/NUS/Tsinghua Chinese Residential Land

Price Indices (CRLPI): quarterly from Q1 2004

Ministry of Land and Resources land data: quarterly from Q1 2008

GS 300+ city residential land price tracker: monthly from January 2008

Overview

Ministry of Land and Resources land data: Monitors the average market land price in 105 major Chinese cities on a quarterly basis. The data are categorized by land prices for residential, commercial and service, and industrial purposes. In May 2002, the Ministry of Land and Resources permitted the transfer of state-owned land-use right mainly by bidding, auction and quotation.
**Benchmark land price:** Measures the price set on the average condition (e.g., land grades, land use, land density, land improvement and tenant resettlement costs) of a region. It has served as a reference for the government to judge the rationality of land appraisal so as to ensure acceptable prices assigned by individual appraisers. Benchmark land price data in major cities are available from local land and resources bureaus, but there are only few data points for each city over the past 10 years or so.

**Wharton/NUS/Tsinghua Chinese Residential Land Price Indices (CRLPI):**
Reports national land price growth at real (CPI-deflated) constant quality by 35 cities in China on quarterly basis. The provider also reports region-/city-level land price indices on semi-annual/annual basis. While technically this series may be preferable, it is updated only with significant lags.

**GS 300+ city Residential Land Price Tracker:** The GS property sector team has aggregated land base prices, transacted prices, and land price premiums in 302 major cities based on data from the China Real Estate Index System (CREIS). In detail, the average headline series is grouped into 3 tiers.

**Signal to noise ratio**
As discussed above, there are no nationwide data on overall land prices. We tend to rely more on the 300-city residential land price tracker given it is more timely and has a relatively wide coverage compared with other land price indexes. Similar to property price indices, land price indices ideally should adjust for quality differences. The Wharton/NUS/Tsinghua land price index is adjusted for quality differences, but not the 300-city residential land price series. The average price of land sold is subject to policy distortions similar to property-related policy distortions. Facing pressures to control land prices, governments often restrict or suspend the supply of premium land (or properties) relative to non-premium land in order to lower the average selling price (total land value divided by total land area). As a result, it is conceptually always better to look at the quality-adjusted data, though adjusting for quality differences is a difficult job that cannot be done without significant effort by specialists (and it is not always clear how much effort has been made).

**Macro importance**
Land price inflation is important because it is a main factor behind input cost of property developers, and thus also affects housing price trends. Given land sales are important financing sources for the local governments, land price fluctuations...
will also impact the financing needs of local governments.

**Exhibit 26: Land prices surged in tier 1 cities in 2016**

Source: CREIS, Goldman Sachs Global Investment Research

**Exhibit 27: Real constant-quality land price index also shows that land prices rose in 2015-16**
Section V. Consumption

There are four main sources of consumption-related data:

1. Retail sales reported by the NBS: Compiled using a combination of administrative reporting and sampling.
2. Retail sales of large retailers reported by the MOFCOM.
4. Household consumption (in GDP by expenditure): Compiled using mainly the two series mentioned above.

There are also other indicators on consumption in specific categories compiled by non-official entities (see the table shown in the discussion of the GS consumption tracker at the end of this section).

Exhibit 28: Comparison of different consumption indices
### Retail Sales of Consumer Goods

**Signal to noise ratio:** **

**Macro importance:** ****

Source: National Bureau of Statistics

Availability: Monthly from January 1990, annual from 1952

Timing: Typically around the middle of the following month.

In January, April, July and September, it is released with GDP data around 3 weeks after the end of the quarter.
Overview

- Total Retail Sales of Consumer Goods measure goods and catering services sold at the retail level (as opposed to wholesale). These goods may be purchased by households, firms or the government.
- A separate indicator named “Online Retail Sales of Consumer Goods” refers to goods and services transacted over online platforms.

Signal to noise ratio

- The main issue with retail sales data is that their growth rates appear over-smoothed. We suspect the problem is caused by the fact that sales made by companies below the minimum threshold are compiled using various sample surveys, which involve a significant degree of discretion. Reported retail sales growth was also probably too high relative to the growth rate of the economy in the years before the GFC. While this issue seems to have been addressed in recent years, it may have come at the cost of (downwardly) distorted growth rates during the adjustment process.

Macro importance

- Although monthly retail sales data are often used as the main indicator for private consumption, users should be aware of a few data issues:
  a. The most serious problem is that services consumption (apart from catering services) is not included in the retail sales data. Experiences of other countries show that the share of services in total consumption typically rises as the economy develops. However, retail sales data in China are unable to reflect this increasingly important component of consumption.
  b. Retail sales include non-household (i.e., government and corporate) purchases and it is currently impossible to obtain a breakdown between household and non-household purchases. While household consumption probably constitutes the largest part of the reported retail sales, some of the retail sales expenditure should not be classified as private consumption under the GDP by expenditure framework.
- That said, the monthly retail sales data have the advantage of being timely. Policy makers also pay significant attention to these figures, roughly on par with IP, FAI and trade data. By incorporating more online sales and service data, we believe our macro consumption tracker (discussed at the end of this section) is more comprehensive in gauging total consumption.

Compilation methodology
- All large firms above the designated size report sales data monthly. Data from small firms below the designated size are compiled through sampling. In practice it is not clear how much and how well the sampling is actually carried out on a monthly basis.
- Retail enterprises (units) with an annual revenue from primary business of RMB 5 million and above, and hotel and catering enterprises (units) with an annual revenue from primary business of RMB 2 million and above are jointly defined as enterprises (units) above designated size.
- The NBS revised data of the total retail sales of consumer goods in 2013, according to the results of the Third National Economic Census.

**Reporting**

- Retail sales data are available in nominal terms only. To deflate the series, the Retail Price Index (RPI) should be used.
- There are three kinds of breakdown available for retail sales data:
  a. By location, i.e., consumer goods sold in city, county and rural areas. Urban retail sales may be goods purchased by rural households and do not necessarily represent urban household consumption, and vice-versa.
  b. By industry, i.e., sales made by wholesale and retail industry, catering industry and other industries (such as postal services, etc.).
  c. By commodities. These data are only available for sales made by firms at or above the designated size and may not always give an accurate picture of consumption growth.

**Retail Sales of Consumer Goods by Large Retailers**

Source: Ministry of Commerce (MOFCOM)

Availability: Monthly from January 2006 but there are many missing data points; continuous monthly data available from March 2010.

Timing: Usually released three weeks after the reporting month ends. The release of data for the first two months of the year tends to be slightly later than in other months.

The MOFCOM publishes aggregated retail sales for 5,000 large retail enterprises that report data directly to the MOFCOM. This series is much more volatile than the official retail sales and shows a slower growth rate. Unlike the official retail sales data, this series does not include catering.
There are three drawbacks to this series. First, the time series is relatively short and a continuous series is only available from March 2010. Second, the MOFCOM does not release the level data and only year-over-year growth rates. Third, the sample of enterprises (i.e., the 5,000 large retail enterprises) changes over time, which may bias the growth rate data.

MOFCOM also releases data during major holidays, especially the Chinese New Year and October 1st National Day Golden Week holidays. Growth rates are calculated by comparing the level of retail sales during the holiday period of the previous year.

In our view, this indicator is under-valued by policy makers and the market. It is a relatively “clean” indicator that is still fairly representative. The fact that it draws little attention means it is less subject to distortions or attempts to harmonize the data with other series, although since 2015 the growth rates appear smoother than before.

**Household Income Survey**

Signal to noise ratio: ***

Macro importance: **

Source: National Bureau of Statistics

Frequency: Quarterly, annual

Timing: Around 20 days after the end of each quarter

Availability: See the table below

---

**Exhibit 29: Availability of China NBS income data**
Overview

- Urban and rural income is classified in terms of total and disposable income.
  Cash income is available for rural households.
- **Total income** is composed of wages, business profits, return on assets (e.g.,
  interest, dividends, rents) and other “transfer income” (gifts, insurance claims,
  retirement pensions, etc.). Prior to 2012, samples were collected from 66,000
  households which were presumably rotated every three years. Starting from Q4
  2012, the NBS issued a new survey format to reflect the reform of urban-rural
  integration, which adjusted the sample to 2 million households nationwide for
  general investigation and selected 160,000 households for direct survey.\[19\]
- **Disposable income** is total income for final consumption expenditure and
  households’ savings excluding income tax and social security contributions. It
  includes both cash income and physical income.

Disposable Income by sources:
1. Income of wages and salaries
2. Net business income
3. Net income from property
4. Net income from transfer

- There are some differences between the concepts of rural net income and urban disposable income. Rural households are treated as production as well as consumption units. As a result, their net income excludes “household operation costs”, such as costs of fertilizers and pesticides.

Signal to noise ratio
- Two factors seriously affect the reliability of household surveys:
  a. Households participating in the survey are required to provide very detailed notes on their expenditure, which is time-consuming. Households are rewarded financially for taking part in the survey. However, the financial payments are small and have not increased over the years. Therefore, the incentive for households to respond accurately may not be high. This problem is especially serious for urban high-income households.
  b. Lack of confidentiality may lead people to under-report their income/expenditure or simply refuse to participate in surveys. Again, this is likely to be especially serious for high-income groups, as well as households with grey or illegal income. As a result, there is likely a downward bias in reported expenditure levels. The direction of any bias on growth rates is less clear since under the aggressive anti-corruption campaign of recent years, under-reported grey and illegal income growth likely fell dramatically. Since these sources of income were never reported in the first place, the impact would not show up in official statistics. However, on the other hand, it cannot be ruled out that the income growth of very top income group might have accelerated.

Macro importance
- This series is useful in gauging growth rates in purchasing power and living standards.

Per Capita Disposable Income
Starting from year-end 2012, disposable income per capita is disclosed in the new survey on both a quarterly and annual frequency. The population used here is not year-end data but the average level for the whole year.
**By source:** Per capita disposable income is the sum of wage and salary, net business income, net income from property and net income from transfers (gifts, insurance claims, retirement pension etc.) at urban and rural level separately.

**By income level (nationwide):** Per capita disposable income is divided into five income levels: low, low middle, middle, upper middle and high. In our view, data for the high income group are by far the least reliable.

### Household Expenditure Survey

**Signal to noise ratio:** ***

**Macro importance:** **

**Source:** National Bureau of Statistics

**Timing:** Around 20 days after the end of each quarter

**Availability:** See the table below

#### Exhibit 30: Varying availability of household expenditure data

<table>
<thead>
<tr>
<th>Expenditure</th>
<th>Quarterly (ytd)</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash expenditure per capita: rural</td>
<td>Q4 1995</td>
<td>1978</td>
</tr>
<tr>
<td>Consumption Expenditure per Capita: urban</td>
<td>Q1 2002</td>
<td>1957</td>
</tr>
<tr>
<td>Consumption Expenditure per Capita: rural</td>
<td>Q1 2013</td>
<td>1954</td>
</tr>
<tr>
<td>Consumption Expenditure per Capita: by province</td>
<td>Q1 2013</td>
<td>2013</td>
</tr>
</tbody>
</table>

**Source:** Goldman Sachs Global Investment Research

### Overview

- The **urban household consumption expenditure** survey measures households’ expenditure on consumption, social security contribution and others, including:
  - Food (including tobacco and liquor, catering)
  - Clothing
  - Housing*

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https://research.gs.com/content/research/en/reports/2017/07/07/97827859-81e3-42ef-bd1e-e8982d86e0c91.html
d. Household appliances, articles and services

e. Healthcare, medicines, medical appliances and services

f. Transportation and communication

g. Recreation, education and cultural goods and services

h. Others

(*Note that the housing component contains rent, costs of decoration and utilities, and property management fees. Purchases of property are not included.)

- **The rural household consumption expenditure** survey is similar to that of the urban household survey, but it also has a separate set of “cash expenditure” data, designed to exclude the larger portion of transactions in rural areas on non-cash and non-consumption items (e.g., farming equipment). Rural Household Cash Living Expenditure Per Capita refers to cash expenditures by rural residents on:

  a. Household operations

  b. Taxes and fees

  c. Purchase of fixed assets

  d. Household consumption

  e. Expenses on properties and transfers

*Total expenditure of rural households* refers to all expenses on production, consumption and redistribution including expenditure on fixed assets, properties, and operating costs, etc.

### Signal to noise ratio

- The compilation methodology for expenditure data is the same as for income data (described above), and therefore entails the same problems.

### Macro importance

- Household survey data provide useful information that is not available from other data sources. But these data tend to have only a limited impact on short-term government policy decisions.

### Compilation

- Household consumption in GDP data incorporates data from retail sales as well as household surveys.

- As no one official data series provides a timely and comprehensive reading of household consumption, we have constructed our own GS China Consumption Tracker (see the end of this section).
Auto Sales

Signal to noise ratio: ****

Macro importance: **

Source: China Association of Automobile Manufacturers (CAAM), National Bureau of Statistics


NBS auto sales value: monthly from Jan 1997

Overview

- CAAM data report car sales in units on a monthly basis, covering both retail and wholesale data. For the value of sales of automobiles, the NBS retail car sales data under commodity retail category provides some information.

- Auto sales data are generally reliable over time, though subject to potential temporary distortions. Companies that already reached their annual sales targets, for example, may delay booking some sales to make it easier to reach the target in the following year.

- Auto-related data tend to be highly pro-cyclical, though sales are sensitive to macro policy measures, as well as administrative measures such as purchasing restrictions in large cities. When many cities impose restrictions in a short period of time, sales may be temporarily low in those areas. But this can lead to panic buying in other cities in anticipation of possible future restrictions in those areas. Strong auto production was an important cyclical sector that supported growth in 2016 owing in part to a 5% tax rebate that encouraged frontloading of purchases, but it may be a headwind in 2017 as the rebate has been halved (Exhibit 31).

- In terms of contribution to GDP growth, if we consider the value-added of the auto sector alone (about 2% of GDP based on our estimation), in 2016 the contribution of auto sector to real GDP growth would be approximately 0.3pp. Including the entire auto supply chain (e.g., domestically sourced raw materials and manufactured components from other sectors used in auto production) would suggest a significantly bigger contribution.
GS China Macro Consumption Tracker
Source: Goldman Sachs Asia Economics Research
Availability: Monthly from January 2012
Timing: Typically around 20 days after the end of each month
Source: GS; underlying data from NBS, Ministry of Commerce (MOFCOM), China National Commercial Information Center (CNCIC), China State Post Bureau, UnionPay
Release: GS China Proprietary Indicators update

Overview
- Tracking consumption in China has been difficult, given the lack of broad timely and high frequency (weekly or monthly) indicators. As discussed above, NBS retail sales data show remarkably stable growth, despite the fluctuations in other indicators of activity. Moreover, NBS retail sales cover only a portion of consumption (goods sales and catering), while services have been increasingly important in China’s consumption. To overcome the deficiencies of retail sales

Exhibit 31: China auto sales growth has been influenced by tax changes in recent years

Source: CEIC, Goldman Sachs Global Investment Research
data (these include extremely low volatility and under-coverage of services consumption), we constructed a monthly consumption tracker for China that is intended to be more representative of overall consumption in the economy.

**Methodology**

- Our total consumption tracker has two broad components: goods consumption and service consumption. The components of the proxy are selected from the subcomponents in the monthly retail sales and household survey data. Given the fast-changing structure of Chinese consumption, we aim to capture emerging consumption sectors such as online shopping and (where possible) services consumption. After screening a large number of possible components, we selected seven to be included in our consumption tracker (see Exhibit 32).

- Our offline goods retail sales indicator was derived from the MOFCOM and CNCIC retail sales series. Because of the similar coverage of these two data series, we simply averaged them to derive the offline goods retail sales indicator.

- We then added an online sales proxy to offline goods retail sales, by weighting online sales by its share in total retail sales reported by the NBS.

**Exhibit 32: Components of GS China Consumption Tracker**

<table>
<thead>
<tr>
<th>Component</th>
<th>Reference data series</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goods consumption</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offline retail goods sales</td>
<td>Retail sales of key retail enterprises</td>
<td>Ministry of Commerce (MOFCOM)</td>
</tr>
<tr>
<td></td>
<td>Retail sales of 100 key retail enterprises</td>
<td>China Nation Commercial Information Center (CNCIC)</td>
</tr>
<tr>
<td>Online retail goods sales</td>
<td>Package delivery, which we used as a proxy for online sales</td>
<td>China State Post Bureau</td>
</tr>
<tr>
<td>Service consumption</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catering/ Food service</td>
<td>NBS catering sales</td>
<td>NBS</td>
</tr>
<tr>
<td>Health Care</td>
<td>Medicine manufacturing revenue</td>
<td>NBS</td>
</tr>
<tr>
<td>Tourism</td>
<td>Union Pay cards transactions on hotel services</td>
<td>Union Pay</td>
</tr>
<tr>
<td>Transportation</td>
<td>Passenger turnover (adjusted for price effect)</td>
<td>NBS</td>
</tr>
</tbody>
</table>

Source: Goldman Sachs Global Investment Research, CEIC, WIND

- With the retail goods sales indicator (covering both offline and online distribution channels) in hand, we added a few service consumption indicators to derive our final total consumption tracker. We draw on available information
in four big service consumption categories: transportation, health care, tourism and dining out/catering. These four categories add up to 23% of overall household final consumption, according to weightings in the GDP household final consumption.

- We summarized these indicators by using their relative weights within GDP household final consumption. This implies some re-weighting of categories in existing indicators. In the final step, we normalized these weights so that the sum of weights equals to one.

Signal to noise ratio

- While limited by data availability, our consumption tracker (Exhibit 33) has a relatively close relationship to the category mix of household final consumption in GDP, which we believe can make it useful for gauging overall consumption growth in China.

- However, there are some caveats. In the construction of our consumption tracker, we re-weighted the sub-categories within the MOFCOM and CNCIC series to align the mix more closely with broader goods consumption patterns. This should reduce the sector bias inherent in these series, but it introduces other potential problems. First, because only growth data (total and by category) are available, and not absolute level series, we had to estimate each category’s original weight in the MOFCOM and CNCIC series by regression. This creates a possibility of “tracking error” in the sense that our estimated weights are unlikely to be precisely the same as the official data. Secondly, because we re-weight the data, we are implicitly using the sector-level data in the surveyed retailers as a proxy for consumption at other outlets which we do not measure. This seems a reasonable assumption to us but is obviously debatable.

- In early 2017, the CNCIC data for 100 major department store sales data from CNCIC are no longer available to the public without charge. As a result, our tracker has been discontinued temporarily. We intend to resume publishing a version based on publicly available data in the near future.

Exhibit 33: Our consumption tracker decelerated significantly in 2014-2015
Section VI. External Sector

Merchandise Trade

Signal to noise ratio: *****

Macro importance: ****

Source: General Administration of Customs

State Administration of Foreign Exchange (SAFE)

Availability: China Customs: monthly from 1992, annual from 1950

SAFE: monthly from Jan 2015, quarterly from Q1 1998

Timing: 10-12 days after the end of the month; end of next month for SAFE

Publication: China Customs Statistics

Overview
- Merchandise trade by China Customs measures the value of goods transactions (both in RMB and USD terms) across national borders. Exports are valued on an FOB (free on board) basis, which includes costs to deliver goods onto the vessels but not further costs, such as insurance or freight. Imports are calculated on a CIF (cost, insurance and freight) basis, which includes insurance and freight charges.

- Trade data in the Balance of Payments standard, as published by SAFE, place greater emphasis on transactions between residents and non-residents, rather than physical movements across borders as shown in the China Customs data. (Though making this distinction can be difficult in practice.) The credit and debit sides of trade under SAFE data are both accounted on an FOB basis.

**Signal to noise ratio**

- Customs trade data are among the most reliable macro-economic data in China. Their high volatility is a clear indication of lack of the smoothing prevalent in other economic data. However, in recent years, especially in 2012-13 and 2015-16, there were distortions to trade reporting due to importer/exporter incentives to move capital either onshore or offshore. For example, when there were strong capital inflows into China, exporters tended to over-report exports in order to facilitate higher payments from offshore. When there are outflow pressures, importers tend to over-report imports to disguise the movement of capital offshore. Exporters sometimes also create “false exports” to gain government subsidies such as export rebates. Therefore, at the end of this section, we have estimated an alternative series that relies on information from China’s trading partners.

- Besides over-/under-reporting, there are significant discrepancies between bilateral trade data compiled by China and the corresponding data from its counterparts due to re-exports via Hong Kong. There are various ways to adjust for these data problems. For example, the statistical authorities in Hong Kong provide detailed data on the region’s re-export trade by country and surveys of re-export margins. The difficulty with this analysis is that much of the false reporting is done via companies set up in Hong Kong often solely for this purpose. These companies tend to use high-value-added goods that are easy to report large values for, but are often hard to judge in terms of underlying value.

**Macro importance**
Trade data are very useful in judging economic cycles. Imports can give a useful indication of the strength of domestic demand. Exports can shed light on the strength of global demand. Net exports may provide clues about the potential misalignment of the foreign exchange rate. The government also often quotes the total amount of trade (exports plus imports) to gauge the level of openness of the economy. The goods trade share of GDP was around 31% of GDP in 2016 (based on SAFE data on goods exports and imports, average share in 2011-16 was 37% of GDP).

Compilation and reporting
- Commodity breakdowns are available in either the Standard International Trade Classification (SITC) or the Harmonized System (HS), or by custom regime.
- Goods trade volume and price index are separately released by China Customs with a slightly longer lag (usually 20-25 days).

Other issues
- A significant share of China’s imports are for eventual export. Total imports therefore can be divided into imports for processing trade and those for domestic use. We derive our estimates of total imports for processing trade by aggregating the following import categories:
  a. Imports for processing and assembling
  b. Equipment imported for processing and assembling
  c. Customs warehousing trade
  d. Entrepot trade by bonded area
  e. Imports for outward processing
- The share of “imports for processing” in total imports has declined in recent years. “Imports for processing” declined to around 42% of total imports in 2014-2016, from around 51% in 2004-2006.
- Note that there are a few differences between the Customs trade data and the net exports data in GDP. Net exports in GDP capture the net trade balance in goods as well as in services, whereas Customs trade data only cover trade in goods. Furthermore, in GDP data, both exports and imports are valued on an FOB basis, whereas Customs imports data are valued on a CIF basis. GDP standard is consistent with BOP standard.

Service Trade
Signal to noise ratio: ***
Macro importance: ***

Source: SAFE

Availability: Monthly from Jan 2014, quarterly from Q1 1998

Timing: At the end of the following month

Exports/Imports of services refer to income/payment from/to foreigners on intangible products such as transport, tourism, entertainment, telecommunication and financial services.

In recent years, with the pace of structural reform and the development of China’s service industry, services trade has seen rapid growth. The deficit in service trade has widened (Exhibit 34), almost entirely due to expanding Chinese tourism expenditure abroad. The service trade deficit rose to US$244 billion in 2016, double its size of three years earlier, with the deficit due to travel accounted for US$217 billion. Education abroad, which is included in the travel category under service trade, has been on a continuous rise as well.

Service trade data are probably subject to a significantly higher level of misreporting, because it is usually harder to verify the underlying fair value of services provided than goods traded. Although less subject to reporting distortions aimed at benefiting from government subsidies, as local governments are much more focused on goods trade, on balance the services trade data appear to mask substantial net capital outflows. Spending per traveler roughly doubled in 2013-16, suggesting the possibility that a significant part of “travel expenditure” is really hidden capital outflow; correcting for this would suggest a current account surplus 1-1.5% of GDP larger (and commensurately higher capital outflows).[20]

Exhibit 34: Service trade deficit has widened substantially in recent years
Balance of Payments

Signal to noise ratio: ****

Macro importance: ****

Source: State Administration of Foreign Exchange

Availability: Quarterly from Q1 2010, semi-annual from 2000, annual from 1982

Timing: Preliminary readings after 30 days; final readings after 3 months.

Publication: Semi-Annual Report on Balance of Payments

Overview

- The Balance of Payments (BOP) records the external transactions of an economy with the rest of the world over a certain period of time. It records transactions between residents and non-residents. Transactions are flows of goods, services, capital and financial claims.

Signal to noise ratio

SAFE must rely on other government agencies for data on various subcomponents, which are often not compiled in accordance with IMF standards and are difficult to adjust (for example, the FDI data).

Misreporting of data to evade capital controls are common and likely worsened after 2015 given significant capital outflow pressures. The misreporting of goods trade data is well known but the problem is likely to be more serious in terms of services trade because it is more difficult for the government to prove any wrongdoing.

Macro importance

The BOP data have attracted rising interest in recent years because of the attention on the CNY.

Reporting

1. Balance of payments data (China’s are summarized in Exhibit 35) consist of two main components. Broadly, they are:
   a. Current Account (CA): This records the flow of international trade (both goods and services), primary income (i.e., income that accrues to foreign-owned inputs to production and other assets, e.g., profits generated by foreign-owned enterprises and investment income paid to foreign-owned property and financial securities), and secondary income (i.e., income transferred to or received from foreigners without “quid pro quo”, e.g., remittances from workers working overseas).
   b. Capital and Financial Accounts: this essentially records the flow of investment. Main components are
      - Direct investment: Investment in the financial or non-financial corporate sectors, where the foreign investor has at least 10% of the ownership of the enterprise.
      - Portfolio investment: Investment in equity securities and debt securities.
      - Other investment: Holdings of currency/deposits, bank loans, trade credit, etc.
      - Reserve assets: Foreign assets that are readily available to and controlled by the central bank—including gold and foreign exchange assets.
Net errors and omissions: This does not represent any investment, but is a residual in the BOP that balances the current account and the capital and financial accounts. In some cases, this may reflect capital flows that are not captured in official statistics.

The current account captures current transfers and transactions in goods, services, and income...

- The merchandise trade by BOP accounting is conceptually different from the monthly trade data from the Customs Administration as it is supposed to capture transactions between residents and non-residents instead of cross national borders. Besides, its valuation standards are different: BOP measures both exports and imports on an FOB basis, whereas Customs value exports on an FOB basis and imports on a CIF basis. As FOB excludes costs of insurance and freight, imports are smaller by BOP accounting than by Customs accounting (by around 5%). SAFE also makes other minor technical adjustments to the customs trade data in accordance with IMF standards, such as subtracting goods exported but then returned. SAFE counts only the cargo with ownership change. Trade with no ownership change is accounted for as service trade.

- The services component in the current account consists of items such as transportation, travel, and insurance. Data are compiled by SAFE directly, as well as by various other government agencies, such as the Ministry of Transportation and the National Bureau of Tourism. Most of the service trade in China are through the “travel” channel, and “travel” under services trade includes spending while traveling, and education tuition abroad.

- The income account records compensation for employees working abroad and returns on investments. The numbers of Chinese residents working abroad and foreign residents working in China are both relatively small, and total compensation is in the order of several billion US dollars per annum. In addition to primary income, secondary income through current transfer is taken into account.

...and the capital account captures investment flows

- Capital Account: Includes capital transfers and reduction or cancellation of debts, etc. Financial accounts include international reserve assets and non-reserve financial accounts. Non-reserve Financial Accounts include direct investment, portfolio investments, financial derivatives and other investments. The direct investment balance (FDI-ODI) under the financial account turned
negative for the first time in 2016 (under BOP data), owing not only to the ongoing structural transformation in China but to the increasing demand by domestic residents to hold foreign assets.

- Reserve Assets are external financial assets held by the monetary authorities, including gold, foreign exchange, special drawing rights (SDRs) with the IMF, and the use of the Fund’s credits.
- Net Error and Omissions (NEO) (also called “statistical discrepancy”) balances the credit and debit items in the BOP. It captures the errors and inconsistencies in data recording and processing in all sections of the BOP. China’s NEO has been growing more negative in recent years. Our analysis suggests that the NEO has a significant correlation with RMB sentiment and anti-corruption efforts.\(^\text{[22]}\)

Exhibit 35: China’s balance of payments deteriorated in 2015-16

<table>
<thead>
<tr>
<th>Level (Bill USD)</th>
<th>2015 Q1</th>
<th>2015 Q2</th>
<th>2015 Q3</th>
<th>2015 Q4</th>
<th>2016 Q1</th>
<th>2016 Q2</th>
<th>2016 Q3</th>
<th>2016 Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Account Balance</td>
<td>76</td>
<td>76</td>
<td>68</td>
<td>84</td>
<td>45</td>
<td>65</td>
<td>74</td>
<td>12</td>
</tr>
<tr>
<td>Trade in Goods Balance</td>
<td>119</td>
<td>138</td>
<td>160</td>
<td>160</td>
<td>100</td>
<td>100</td>
<td>127</td>
<td>140</td>
</tr>
<tr>
<td>Exports</td>
<td>484</td>
<td>528</td>
<td>560</td>
<td>572</td>
<td>420</td>
<td>494</td>
<td>528</td>
<td>542</td>
</tr>
<tr>
<td>Imports</td>
<td>355</td>
<td>350</td>
<td>400</td>
<td>411</td>
<td>320</td>
<td>367</td>
<td>388</td>
<td>421</td>
</tr>
<tr>
<td>Trade in Services Balance</td>
<td>-49</td>
<td>-56</td>
<td>-63</td>
<td>-51</td>
<td>-54</td>
<td>-55</td>
<td>-67</td>
<td>-68</td>
</tr>
<tr>
<td>Exports</td>
<td>51</td>
<td>54</td>
<td>53</td>
<td>59</td>
<td>50</td>
<td>51</td>
<td>52</td>
<td>56</td>
</tr>
<tr>
<td>Imports</td>
<td>100</td>
<td>110</td>
<td>116</td>
<td>110</td>
<td>104</td>
<td>106</td>
<td>118</td>
<td>124</td>
</tr>
<tr>
<td>Income and transfer balance</td>
<td>5</td>
<td>-5</td>
<td>-29</td>
<td>-26</td>
<td>-5</td>
<td>-7</td>
<td>1</td>
<td>-41</td>
</tr>
<tr>
<td>Capital and Financial Account Balance</td>
<td>-156</td>
<td>-63</td>
<td>-228</td>
<td>-199</td>
<td>-169</td>
<td>-100</td>
<td>-211</td>
<td>-161</td>
</tr>
<tr>
<td>Direct Investment</td>
<td>45</td>
<td>30</td>
<td>-11</td>
<td>5</td>
<td>-18</td>
<td>-32</td>
<td>-30</td>
<td>33</td>
</tr>
<tr>
<td>Portfolio Investment</td>
<td>-8</td>
<td>-16</td>
<td>-17</td>
<td>-25</td>
<td>-41</td>
<td>8</td>
<td>-11</td>
<td>-19</td>
</tr>
<tr>
<td>Other Investment</td>
<td>-128</td>
<td>-65</td>
<td>-111</td>
<td>-130</td>
<td>-99</td>
<td>-25</td>
<td>-93</td>
<td>-116</td>
</tr>
<tr>
<td>Net errors and omissions</td>
<td>-54</td>
<td>-13</td>
<td>-87</td>
<td>-49</td>
<td>-42</td>
<td>-47</td>
<td>-75</td>
<td>-58</td>
</tr>
<tr>
<td>Reserve Assets**</td>
<td>80</td>
<td>13</td>
<td>101</td>
<td>115</td>
<td>123</td>
<td>35</td>
<td>-130</td>
<td>150</td>
</tr>
</tbody>
</table>

* Included net error and omission
** Positive sign means increase in reserve assets

Source: SAFE, Goldman Sachs Global Investment Research

**International Investment Position (IIP)**

The IIP is closely related to the BOP. Whereas the BOP measures the flow of transactions between an economy and the outside world, the IIP measures the stock of assets and liabilities an economy has with the rest of the world at a given point of time. Although most BOP transactions are reflected in IIP changes, there are other factors that impact IIP that do not appear in the BOP, notably those due to asset valuation changes. China began to publish IIP data in 2006 on an annual basis and in Q4 2010 on a quarterly basis.
External Debt
Signal to noise ratio: ****

Macro importance: *

Source: State Administration of Foreign Exchange

Availability: Quarterly from Q2 2003, semi-annual from 2001, annual from 1985

Timing: Together with the final release of BOP

At the end of 2016, the outstanding external debt of China (excluding that of Hong Kong and Macao, but including debt both in FX and RMB) was US$1.42 trillion.

In regard to currency type, the total external debt is composed of foreign debt in RMB and foreign debt in other currencies. By the end of Q3 2016, 79% of FX-denominated external debt was denominated in USD, 8% in EUR, 5% in HKD, 4% in JPY and 4% in SDR, respectively.

By original maturity, short-term refers to external debt with a term of one year or less. Medium- and long-term refers to external debt with a contract term of more than one year.

The external debt is also classified by institutional sector, with general government accounting for 9%, central bank for 4%, deposit-taking corporations except central bank for 43%, other sectors for 30% (including other financial corporations and nonfinancial corporations), and intercompany lending under direct investment for 15%, by the end of Q4 2016. There used to be data by type of debtor, but the latest data for this classification was Q3 2014, with Chinese financial institutions accounting for 48%, foreign enterprises for 32%, foreign financial institutions for 13%, central government for 6% and Chinese non-financial enterprises for 1%.

Manufacturing, transport, storage and postal service, utilities, real estate, and information technology services are the major sectors that have raised external debt.

As we think official data do not capture some of the FX debt raised by offshore Chinese companies, we compiled our own estimate of Chinese corporates and households’ FX debt by aggregating onshore FX loans, claims on the Chinese nonbank sector by BIS reporting banks (offshore, non-Chinese), FX bonds, and
Foreign Exchange Reserves

Signal to noise ratio: ***

Macro importance: ****

Source: State Administration of Foreign Exchange, PBOC

Availability: SAFE: Monthly from 1993, annual from 1950

PBOC: Monthly from 1989

Timing: PBOC data are usually the 7th day of the following month.

SAFE data are released with other BOP data.

Link: http://www.pbc.gov.cn/english/xinwen/

Overview

- Foreign exchange reserves are liquid external foreign currency assets readily available to and controlled by central banks, which can be used to finance current account deficits and influence the foreign exchange rate. They include securities, bank deposits, derivatives and other assets, as long as they meet the above criteria. Apart from foreign exchange reserves, the more broadly defined “international reserves” can take other forms, such as gold and Special Drawing Rights (SDRs); however, these holdings are typically very small relative to foreign exchange reserves.

Compilation and reporting

- Foreign exchange reserve data are compiled by the PBOC and the SAFE, and are reported in USD levels. They do not include holdings in gold and SDRs (Special Drawing Rights), which are reported separately.

Signal to noise ratio

- PBOC FX reserve data can be opaque and influenced by factors other than capital flow fundamentals. Because reserves data are based on market prices and denominated in USD, exchange rate and asset price fluctuations affect trade liabilities. Our approach indicates that Chinese corporates’ and households’ total FX-denominated debt stood at around US$1.6 trillion as of Q2 2016.

Our approach indicates that Chinese corporates’ and households’ total FX-denominated debt stood at around US$1.6 trillion as of Q2 2016.

[23]

[24]
reserve values. When calculating changes in reserves, we usually adjust for the estimated effect of exchange rate fluctuations, but the impacts of asset price changes are impossible to estimate because of the lack of detailed information on portfolio holdings.

- In order to estimate valuation effects on reserves, we assume the currency composition of China’s FX reserves is similar to that of the global average and follows the Currency Composition of Official Foreign Exchange Reserves (COFER) published by the IMF.

- Given possible PBOC balance sheet management and shifts in banks’ net open position, in our view the SAFE data on banks’ FX settlements on behalf of their onshore clients are a preferred gauge of the FX-RMB conversion trend among onshore non-banks.

- SAFE’s reserve data and IIP data on reserve assets are based on market price, and thus will be impacted by valuation effects. Reserve changes in BOP data on the other hand are free from valuation effects as they are supposed to measure flows.

- China has nominally used its foreign exchange reserves to recapitalize its state-owned banks, state-owned funds and policy banks as part of a process to reform the financial system (though conceptually this recapitalization was a fiscal transfer), as well as to facilitate international activities such as the “one belt one road” project (US$40 billion were injected into the Silk Road Fund in 2014, and then US$93 billion were injected into the two policy banks namely China Development Bank and China Exim Bank in 2015). The central bank has also undertaken a few foreign exchange (FX) swaps with commercial banks.

**Macro importance**

- Foreign exchange reserves are often used to measure a country’s external vulnerability. China’s foreign exchange reserves are still the largest in the world, but the outstanding amount has fallen in recent years. Exhibit 36 compares Chinese reserves to IMF metrics for reserve adequacy, although it should be noted that experts hold different views on the adequate levels of reserves.

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**Exhibit 36: Despite decline, China’s FX reserves still consistent with IMF guidelines**
FX purchases/PBOC FX position
Released by the PBOC, these data measure the net amount the PBOC pays to financial institutions each month for the foreign currency they receive from trade surpluses, foreign investments, and other sources. This is an important indicator in capturing capital flows in and out of China as well as onshore RMB liquidity. In many cases foreign capital that enters the onshore market will be sold to the PBOC. This indicator is based on cumulative flows and thus is free from valuation effects.

Exchange Rate Terminology and Offshore RMB Development

Renminbi (RMB)
The official currency of the People’s Republic of China, translated as “the people’s currency”. The currency is issued by the People’s Bank of China, the monetary authority of China and is the official legal tender in mainland China.

Yuan
The Yuan is the basic unit of the renminbi, but is often used synonymously with renminbi in referring to the Chinese currency more generally. One yuan has 10 jiăo; one jiăo has 10 fēn.
CNY
CNY is the code determined by the International Organization for Standardization (iso code) for the renminbi/yuan.

In practice, it refers to the Chinese currency traded onshore in mainland China.

Despite some gradual steps toward liberalization, the CNY market remains managed by Chinese officials, who maintain strict capital controls and set a daily “CNY fix” against a basket of world currencies and a pre-determined trading band around that fix, which the “CNY spot” must settle within. The trading band was initially established at 0.3% but was expanded to 0.5% in May 2007, to 1.0% in April 2012, and to 2.0% in March 2014.

On August 11, 2015, the PBOC adjusted the CNY fixing mechanism, so the USD/CNY fixing reflected the closing FX rate of the previous day, market supply-demand conditions and movements of a basket of currencies against the USD. In May 2016, the PBOC fine-tuned the language, saying that the change in USD/CNY between the fixing vs. the close price of the previous trading day depends on the movement of the basket of currencies, while the intra-day CNY change reflects market demand and supply conditions. (This basket of currencies was expanded effective January 1, 2017.) In May 2017, there was yet another adjustment, with CFETS confirming that the daily fixing will also take into account an unspecified “counter-cyclical adjustment factor”, in addition to the USD’s movement against a basket of currencies. In our view, the latest mechanism provides greater scope for the PBOC to manage the CNY through the “signaling” channel (via fixing), potentially reducing the need for actual FX market operations.

CNH
CNH refers to RMB that is traded offshore of the Chinese mainland.

Establishment of the offshore CNH market by Chinese policy makers reflected their desire to pursue greater use of RMB for international trade and financial transactions (aka the “internationalization” of the RMB) post the 2008 financial crisis. The CNH market was established in July 2010 when the PBOC and HKMA jointly announced that RMB would be deliverable in Hong Kong.

Although the CNH market remains concentrated in Hong Kong, RMB has since become deliverable in Singapore, Taiwan, Paris, Luxembourg, London, etc. Any offshore corporate entity or individual investor can participate in CNH by
establishing non-resident accounts in a country where CNH is delivered, typically through local banks that have a relationship with banks in those countries.

Unlike the CNY market, the CNH market is not directly managed by the Chinese authorities and instead is determined by the supply and demand for CNH. It is therefore a “floating” currency much like the US dollar (with the important caveat that the PBOC and SAFE regulate RMB flows between onshore and offshore accounts, and official entities may participate in the market to influence the exchange rate).

Thus, while CNY and CNH both refer to the Chinese currency, the two maintain different exchange rates to the US dollar and other currencies globally. However, arbitrage tends to keep the two exchange rates closely aligned.

### CNY Trade Weighted Indices

Source: PBOC, China Foreign Exchange Trade System (CFETS)

Availability: Weekly data quoted by CFETS

Link: http://www.chinamoney.com.cn/english/

### Overview

The Chinese government has for some time been revamping its foreign exchange mechanism in an effort to make the RMB more market-oriented and relatively stable against a basket of currencies.

On August 11, 2015, the PBOC announced a major reform to the formation of the RMB’s central parity rate against the US dollar, by referring to the closing price on the inter-bank foreign exchange market of the previous day. The PBOC considered this a “one-time correction” to remedy previously accumulated differences between the central parity rate and the spot market rate. However, an abrupt weakening in the RMB occurred during the days following the announcement of this reform, triggering considerable market volatility and additional capital outflow.

Starting from December 2015, the PBOC released a new index called the CFETS RMB index based upon international trade weights after adjusting for re-export factors. Compared with CFETS, the BIS and IMF also compile RMB trade-weighted
indices. Exhibits 37 and 38 show the currency share in each basket and the movement of indices. The CFETS basket was updated to include 11 more currencies as of January 1, 2017.\(^{[27]}\)

Exhibit 37: Significant differences between alternative currency reference baskets

<table>
<thead>
<tr>
<th>Currency</th>
<th>CFETS basket (as of Jan 2017)</th>
<th>CFETS basket (original)</th>
<th>SDR basket (as of Oct 2016)</th>
<th>SDR basket (pre-CNY)</th>
<th>BIS basket</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD</td>
<td>22.4%</td>
<td>26.4%</td>
<td>41.7%</td>
<td>41.9%</td>
<td>17.0%</td>
</tr>
<tr>
<td>EUR</td>
<td>16.3%</td>
<td>21.4%</td>
<td>30.9%</td>
<td>37.4%</td>
<td>18.7%</td>
</tr>
<tr>
<td>JPY</td>
<td>11.5%</td>
<td>14.7%</td>
<td>8.3%</td>
<td>9.4%</td>
<td>14.1%</td>
</tr>
<tr>
<td>KRW</td>
<td>10.8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AUD</td>
<td>4.4%</td>
<td>6.3%</td>
<td></td>
<td></td>
<td>1.5%</td>
</tr>
<tr>
<td>HKD</td>
<td>4.3%</td>
<td>6.6%</td>
<td></td>
<td></td>
<td>0.6%</td>
</tr>
<tr>
<td>MYR</td>
<td>3.8%</td>
<td>4.7%</td>
<td></td>
<td></td>
<td>2.2%</td>
</tr>
<tr>
<td>SGD</td>
<td>3.2%</td>
<td>3.8%</td>
<td></td>
<td></td>
<td>2.7%</td>
</tr>
<tr>
<td>GBP</td>
<td>3.2%</td>
<td>3.9%</td>
<td>6.1%</td>
<td>11.3%</td>
<td>2.9%</td>
</tr>
<tr>
<td>THB</td>
<td>2.9%</td>
<td>3.3%</td>
<td></td>
<td></td>
<td>2.1%</td>
</tr>
<tr>
<td>RUB</td>
<td>2.6%</td>
<td>4.4%</td>
<td></td>
<td></td>
<td>1.8%</td>
</tr>
<tr>
<td>CAD</td>
<td>2.2%</td>
<td>2.5%</td>
<td></td>
<td></td>
<td>2.1%</td>
</tr>
<tr>
<td>SAR</td>
<td>2.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AED</td>
<td>1.9%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZAR</td>
<td>1.8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHF</td>
<td>1.7%</td>
<td>1.5%</td>
<td></td>
<td></td>
<td>1.4%</td>
</tr>
<tr>
<td>MKN</td>
<td>1.7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRY</td>
<td>0.8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLN</td>
<td>0.7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEK</td>
<td>0.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZD</td>
<td>0.4%</td>
<td>0.7%</td>
<td></td>
<td></td>
<td>0.2%</td>
</tr>
<tr>
<td>DKK</td>
<td>0.4%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HUF</td>
<td>0.3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOK</td>
<td>0.3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>—</td>
<td>—</td>
<td>10.9%</td>
<td>—</td>
<td>31.8%</td>
</tr>
</tbody>
</table>

Source: CFETS, BIS, IMF

Exhibit 38: RMB was roughly steady against broad currency baskets in H2 2016
Goldman Sachs China “Outside-In” Trade Measures

Source: Goldman Sachs Asia Economics Research

Data since: January 2006

Timing: Around 1-2 months after the end of each month

Publication: GS China Proprietary Indicators update

Overview

- In recent years, the prevalence of export/import over-invoicing to bring in/move out funds to invest in the “carry trade”/transfer assets offshore have distorted officially reported trade data. In an attempt to identify the underlying trends in export and import flows, we compiled an “outside-in” trade measure based on trading partners’ reported data on trade with China.\(^{[28]}\)

- In addition to less pronounced invoicing distortions, another benefit of the “outside-in” trade measures is that they are less affected by Chinese New Year holiday shutdowns, given that most trading partners do not observe this holiday and that shipping times to/from trading partners vary.

- Drawbacks of the “outside-in” measures are delayed data availability and less-than-total coverage of China’s trading partners.
Methodology

- We collect data from 14 major Chinese trading partners (including the Euro area as a single “partner”) that together import more than two-thirds of Chinese exports. Where necessary, we convert import data into US dollars. Note that all figures discussed here are nominal dollars (not adjusted for inflation).

- Adding up the adjusted import/export data for the trading partners gives us “adjusted exports/imports to/from China’s major trading partners”.

- Because exports are usually reported on an FOB basis and imports on a CIF basis (see the discussion above on goods trade indicators and re-exports), there will be a gap between China’s reported exports and trading partners’ reported imports from China. We also adjusted for this in the calculation.

- Comparisons of the outside-in estimates to China’s official data are shown in Exhibits 39 and 40.

Exhibit 39: There were particularly large gaps between China’s reported exports and its trading partners’ imports in 2012-14

Exhibit 40: Outside-in China import growth tracks the official data relatively well
Goldman Sachs China FX Flow Metric

We focus on two separate sets of SAFE data to gauge the underlying FX flow situation: One for onshore FX settlement, and the other for the cross-border movement of RMB. These are combined in our FX flow metric (Exhibit 41).[29]

- **SAFE dataset on onshore FX settlement**: FX settlement and sales on behalf of clients by banks refers to the transaction of FX settlement, sales and other business conducted by banks for their clients. Deals on their own behalf and interbank market transactions are not taken into account.

- **Cross-border RMB flows**: In late 2015 through 2016, while there was a large amount of net cross-border RMB flow from onshore to offshore, there was no corresponding observed increase in foreigners' holdings of RMB assets. It is possible that some Chinese financial institutions buy RMB in the offshore market and either sell it back in the onshore FX market or invest it in onshore RMB assets. These RMB/FX transactions conducted by Chinese financial institutions do not necessarily show up on the PBOC’s balance sheet. Thus we believe that tracking the data on cross-border RMB flow (foreign-related receipts and payments reported by SAFE) is also important to developing a comprehensive view of the underlying flow picture.
Section VII. Money, Credit, and Banking

Money Supply

Signal to noise ratio: ****

Macro importance: *****

Source: People’s Bank of China

Availability: Monthly from 1997, quarterly from 1990

Timing: Typically 8 to 16 days after the end of each month

Overview

The People’s Bank of China (PBOC) reports three series on China’s money supply:

1. M0: currency in circulation (bills and coins)
2. M1: M0 + demand deposits
3. M2: M1 + quasi-money (time, savings, and other deposits)

**Signal to noise ratio**
- China’s money supply data are subject to significant distortion, in large part arising from the attempts of financial institutions to evade regulatory controls. For example, commercial banks used to depress month-end data to evade quantitative controls and minimize regulatory costs such as required reserves; the PBOC responded by changing the required data from month-end to month-average in September 2014. This alleviated the old problem but the time series is no longer directly comparable. Under the new macro prudential assessment framework (MPA), quarter-end data tend to be distorted.

**Macro importance**
- Changes in broad money supply provide useful leading information for short-term economic activity because banks remain the dominant financial intermediaries in China. It is also a useful tool in gauging the policy stance, as M2 remains one of the intermediate policy targets for the central bank.

**Compilation and reporting**
- Breakdowns are available from M0 to M2. M2 is the broadest measure currently available but is clearly becoming inadequate as the financial market has become more sophisticated.

**Other issues**
- The government sets a target for M2 growth at the beginning of each year (12% in 2017), which is consistent with its desired growth and inflation targets. However, these targets are meant generally as “guidance” and have frequently been missed by a large margin.

**Exhibit 42: Although M1 growth has been robust, M2 gradually decelerated in 2016**
Loans and Deposits
Signal to noise ratio: ****

Macro importance: ****

Source: People’s Bank of China

Availability: Monthly from 1997

Timing: Around 8 to 16 days after the end of each month

Overview
- Loan data published by the PBOC include loans made by depository institutions and banking non-depository financial institutions (e.g., trust and insurance corporations). Recipients of loans include non-financial institutions and individuals, including non-residents. Loans to non-bank financial institutions have been included since the start of 2015. Loans denominated in CNY and foreign currencies are compiled separately and aggregated to provide total loans data.
- Likewise, deposit data include deposits in CNY and other currencies. There is further information on deposits broken down by different sectors of the economy such as households, government, non-financial corporates, etc.
- Balance sheet of Monetary Authority: Main liabilities come from currency issued and commercial bank reserves.
- Source and uses of funds of financial institutions: This describes major sources and uses of commercial banks and other financial institutions. Sources can be deposits (including from households, corporates, government and related organizations, and non-bank financial institutions), bond issuance, money in circulation, and funds owned by banks. Uses include loans and financial investments.

**Signal to noise ratio**
- The level and growth rates of loans announced by the PBOC are not always consistent with each other. The main reason for this discrepancy is non-performing loan (NPL) write-offs, which have been subtracted from level data, while growth rates are calculated after adjusting for these write-offs. It is hard to reconcile fully the two series using announced data.

**Macro importance**
- Like M2 data, loan growth data are useful for gauging the current policy stance, as well as possible policy changes, when combined with other indicators such as FAI. Given that China’s capital markets are still under-developed, bank loans are the major source of external funding for many companies. However, their importance has been falling as more alternative financing methods have become available.

**Compilation and reporting**
- Loans are broken down by borrower type – households, nonfinancial enterprises and state agencies/organizations, and nonbank financial institutions. To some degree, loans are broken down by tenor as well: short-term vs long-term for households, short-term/medium to long-term/bill financing for nonfinancial entities. There is insufficient detail to allow one to identify finer categories such as LGFV borrowings.
- Foreign Exchange Loans include foreign-currency-dominated loans extended to domestic and foreign residents/institutions by domestic and foreign financial institutions based in China.

**Total Social Financing**
Signal to noise ratio: ***
Macro importance: *****
Overview

- Total social financing (TSF) includes both direct and indirect financing from the financial industry to the “real economy”. In particular, TSF consists of RMB bank loans, FX loans, trust loans (higher-yielding loans intermediated by trust companies), entrusted loans (on-lending from enterprises with favorable access to credit or excess cash, intermediated by banks), undiscounted bank acceptance bills, net corporate bond issuance, and equity financing to corporates in the domestic stock market. The concept captures total financing of non-government sectors, though in reality a chunk of the financing is for government-owned entities and effectively adds to (explicit or implicit) government liabilities.

Signal to noise ratio

- Total social financing (TSF) statistics are intended to be a comprehensive measure, but their accuracy has been affected by recent events—in particular, the ongoing municipal bond swap program and continued evolution in shadow banking and/or off-balance-sheet lending by financial institutions.
- Because LGFV borrowing has been recorded as corporate borrowing, LGFV debt is included in TSF while the local government bonds are not. TSF includes neither central government borrowing (i.e., MOF bond net issuance) nor official local government borrowing (through local government bond net issuance). Therefore, with the swap program, when local government bonds are issued and their proceeds are used to repay LGFV debt, TSF is reduced.
- We have therefore been adding the municipal bond issuance for the swap program to the reported TSF to arrive at our measure of adjusted TSF.

GS Total Credit Growth Metric

Source: Various government and third-party entities such as PBOC, CIRC, China Central Depository & Clearing Co., Ltd. (CCDC), China Trustee Association

Availability: Quarterly from Q1 2013

Timing: Typically two to five months after the reporting period
Overview
TSF looks at the growth in lending, but because TSF does not capture all shadow banking activity, we believe it still understates China’s recent credit growth, especially since 2015. We have developed an alternative measurement of China’s credit growth by looking at the growth in “money” in the economy. The rationale is that credit growth should lead to money generation, so specifically following and quantifying the money flow from households/corporates should provide us with a proxy for the economy’s overall credit growth.\(^{[30]}\) We found the gap between our measure of credit and official data has widened notably since 2015, and remained wide in at least the first half of 2016 (Exhibit 43).

Exhibit 43: Alternative measures of credit growth accelerated significantly in 2015-16

![Graph showing credit growth measures](image)

Source: PBOC, WIND, Goldman Sachs Global Investment Research

Central Bank Policy Tools
The PBOC uses the following tools to conduct monetary policy:

1. Open Market Operations
2. Changes in the Required Reserve Ratio (RRR)
3. Adjustments in interest rates
4. Lending facilities (such as PSL, SLF, MLF)
5. Window guidance, i.e. indirect influence on bank lending

A full summary of the PBOC’s toolkit appears in Exhibit 44 toward the end of this section.

**Open Market Operation**
- Open market operations by the PBOC currently include:
  a. Repurchase (REPO) agreements, reverse repurchase
  b. Issuance of PBOC bills.

**Reserve Requirement Ratio**

The Reserve Requirement Ratio (RRR) is the ratio of deposits that financial institutions are required to keep at the central bank. It is effectively a tax levied on the banking system, and central banks can use it to affect the commercial banks’ capacity to lend. The PBOC set up a system of “Discretionary Reserve Requirements” in April 2004, which allows for differential reserve requirements for different types of banks according to a number of criteria, such as the capital adequacy ratio, the NPL ratio and the soundness of the internal control system. In 2016, this was upgraded to become the macro prudential assessment (MPA) system. In practice, the MPA is often used as the tool to conduct quantitative controls on credit supply, which have historically been a main policy lever in addition to interest rate adjustments.

**Adjustments in Interest Rates**

China has made significant progress in interest rate liberalization in recent years. Currently, the system is a hybrid of market and regulated interest rates. De jure, the interest rate system has been liberalized, though de facto this is not the case, as banks still rely heavily on benchmark deposit/loan interest rates in their pricing model.

**Central Bank Benchmark Interest Rates**

- Benchmark interest rates are those that are directly controlled by the central bank, and changes to them will impact other interest rates. There are several benchmark interest rates in China:
  a. Rediscount and re-lending rates
  b. Interest rates paid on required and excess reserves
  c. Benchmark lending and deposit rates
- The rediscount rate is the rate at which central banks discount commercial banks’ unexpired paper. Since this rate affects borrowing costs for commercial banks, it can be used as a policy tool. However, this rate is infrequently adjusted in China.
- The re-lending rate is the rate the PBOC uses to lend to financial institutions and is conceptually similar to the Fed’s discount rate. However, unlike the discount window system, loans from the PBOC are a regular source of funding for Chinese commercial banks.
- The PBOC pays interest on required reserves and excess reserves that financial institutions hold at the PBOC. The interest rate for excess reserves creates the floor for China’s short-term interest rate.
- Benchmark nominal lending/deposit rates are set by the PBOC for commercial banks. In October 2004, the PBOC abolished the upper limit of the lending rate and the lower limit for deposit rates that commercial banks can use for their customers. However, the lower band for the lending rate (10%) and the ceiling for the deposit rate were maintained to prevent competitive bidding among banks. In 2013, China removed the floor of the benchmark lending rate. Later in 2015, the ceiling on deposit rate for financial institutions was also removed. In theory commercial banks are free to offer any interest rate to depositors and borrowers, though in reality the actual rates are subject to clear window guidance from the central bank.

Others
- **Pledged Supplementary Lending (PSL):** This refers to collateralized long-term loans from the PBOC to financial institutions, targeted for specific purposes.
- **Standing Lending Facility (SLF):** This refers to collateralized loans from the PBOC to financial institutions that request funding. It was first introduced in early 2013 with maturity concentrated in 1m-3m, but then expanded in early 2014 to smaller institutions, with maturity <= 14-day.
- **Medium-term Lending Facility (MLF):** Medium-term base money from PBOC to commercial banks and policy banks with high-quality collateral. Designed to provide guidance to the medium-term interest rate and to adjust the funding cost of real economy.

These vehicles have become major channels for affecting base money.

Exhibit 44: The PBOC utilizes a wide range of tools to affect the price and quantity of money and credit

https://research.gs.com/content/research/en/reports/2017/07/07/97827859-81e3-42ef-bd1e-8982d86e0c91.html
<table>
<thead>
<tr>
<th>Tools</th>
<th>What is it?</th>
<th>Typical duration</th>
<th>Transparency</th>
<th>Immediate objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMOs (Open market operations)</td>
<td>PBOC makes short-term collateralized loans/borrowings (or issues central bank bills) with financial institutions to adjust reserve money supply. OMOs can be conducted on any day of the week</td>
<td>Ranging from 7-day to 3-month, typically 7/14-28-day</td>
<td>5 (disclosed after each OMO)</td>
<td>Direct and immediate impact on the overall interbank liquidity conditions</td>
</tr>
<tr>
<td>MLF (Medium-term Lending Facility)</td>
<td>Medium-term base money from PBOC to commercial banks and policy banks with high-quality collateral, designed to provide guidance to the medium-term interest rate and to adjust the funding cost of real economy.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLF (Temporary-lending facility)</td>
<td>Temporary liquidity facility offered by the PBOC to large banks with high propensity to on-lend the liquidity to interbank borrowers, likely collateralized. Introduced on Jan 20, 2017</td>
<td>28-day</td>
<td>3 (disclosed after operation, but quantity and rates undisclosed)</td>
<td>Meet seasonal liquidity needs on temporary basis</td>
</tr>
<tr>
<td>SLF (Standing Lending Facility)</td>
<td>Collateralized loans from PBOC to financial institutions who request funding. First introduced in early 2013 with maturity concentrated in 1m-3m, but expanded in early 2014 to smaller institutions, with maturity &lt;= 14-day</td>
<td>Typically ranging from 1 month to 3 month, but shorter maturity up to 14-day for small institutions</td>
<td>5 (disclosed after operation)</td>
<td>Meet relatively large liquidity needs with maturity less than 3 month</td>
</tr>
<tr>
<td>PSL (Pledged Supplementary Lending)</td>
<td>Collateralized loans from PBOC to financial institutions, targeted for specific purposes.</td>
<td>Relatively long, probably up to 3-year</td>
<td>3 (disclosed monthly with uncertain lag)</td>
<td>Long-term financial support for targeted areas (e.g., social housing), possibly provide long-term interest rate guidance</td>
</tr>
<tr>
<td>RRR change (required reserve requirement)</td>
<td>PBOC can adjust reserve requirement ratio (the portion of deposits that financial institutions are required to put in PBOC) for all financial institutions or targeted group of financial institutions.</td>
<td>Liquidity impact permanent</td>
<td>4 (typically disclosed immediately as enacted; except for &quot;targeted RRR cuts&quot;)</td>
<td>Long-lasting liquidity release (when RRR is lowered) or withdrawal (when RRR is increased), high profile</td>
</tr>
<tr>
<td>SLO (Special Lending Operations)</td>
<td>Short-term (collateralized) liquidity operations with 12 largest and policy banks. Regarded as the upper bound of an interest rate corridor.</td>
<td>Very short-term, typically a few days</td>
<td>3 (disclosed monthly with probably 1-month lag)</td>
<td>Meet very short-term liquidity needs</td>
</tr>
<tr>
<td>Re-lending</td>
<td>Major types: 1) loans to financial institutions for short-term liquidity needs; 2) loans to financial institutions to support certain sectors (e.g., agricultural sector, small/micro enterprises). Typically uncollateralized</td>
<td>Typical maximum maturity around 1-year</td>
<td>2 (irregular disclosure in quarterly PBOC reports)</td>
<td>1) short-term liquidity support for commercial banks; 2) targeted support for underserved borrowers</td>
</tr>
<tr>
<td>Benchmark interest rate change</td>
<td>PBOC can adjust benchmark interest rate to change the reference rate of deposits and lending. Strict floor/ceiling on lending/deposit rates were eliminated late 2015.</td>
<td>Not clear. Mainly serve as guidance to interest rates</td>
<td>5 (publicly announced)</td>
<td>Deposits/lending rate guidance, high profile</td>
</tr>
<tr>
<td>Bill Rediscount</td>
<td>Commercial banks discount undue bills with PBOC in exchange for cash</td>
<td>Short term</td>
<td>2</td>
<td>Meet liquidity need for commercial banks</td>
</tr>
<tr>
<td>Window Guidance</td>
<td>PBOC’s dialogue with commercial banks to provide guidance on lending activities and to communicate on policy intentions and macro conditions. Flexible, typically target lending activity during a certain period of time.</td>
<td></td>
<td>1 (no official disclosure, often reported by the media)</td>
<td>Provide guidance on the volume and allocation of bank lending</td>
</tr>
</tbody>
</table>

Source: Goldman Sachs Global Investment Research

https://research.gs.com/content/research/en/reports/2017/07/07/97827859-81e3-42ef-bd1e-8982d88e0c91.html
Interbank Interest Rates
Source: National Interbank Funding Center

Availability: Daily data since January 3, 1996

- China’s interbank market was established in 1996, and market participants include all financial institutions. The interbank rate is a good indicator of liquidity in the market. Interbank Offered Rates and Interbank Repo Rates are the two main rates quoted in the market.

- Interbank markets have been fully liberalized, with the interest rate paid on excess reserves the effective lower bound for interbank rates. Repo rates are typically less volatile and lower than the offered rate, as they have higher liquidity and are collateralized. The 7-day repo rate is the best proxy for the overall interbank market rate.

7-day repo (R007): This is broadly considered to be a key policy target. However, we believe that the emphasis by the PBOC in its Q3 2016 monetary report on an alternative interbank interest rate, i.e., the depository institution repo rate (or “DR007“ as it is known onshore), which specifically covers only banks and has been structurally more stable, hints at a potential shift of focus to that rate as the de facto policy rate instead.

SHIBOR: This refers to the Shanghai Interbank Offered rate, consisting of eight maturities, overnight, 1-week, 2-week, 1-month, 3-month, 6-month, 9-month and 1-year. This is a simple short-term wholesale interest rate with no collateral required.

Negotiable certificates of deposits (NCDs): In December 2013, the PBOC launched the NCD program. NCDs allow banks to broaden their funding beyond deposits and manage liquidity. The major issuers of NCDs are city commercial banks and joint stock banks.

Loan Prime Rate (LPR): Based on the best loan rate quoted by selected commercial banks to their primary clients, the LPR is a reference for the loan market.

Policy Financial Bond (PFB) yields: Yields of bonds issued by the three policy banks; these are the non-government bonds with the highest credit rating because they are typically viewed as quasi-government bonds. Major tenors of the bonds range from 3 months to 10 years.
**Swap Rate (IRS rate):** Refers to fixed payment rate for interest rate swaps that exchange a fixed payment for a floating payment. IRS rates referenced against 7-day repo rate are a set of more widely traded interest rates compared with SHIBOR, and thus often used as the representative for China interbank interest rates.

**Exhibit 45: Short-term interest rates moved lower for most of 2014-2016**

![Graph showing short-term interest rates]

Source: CEIC, Haver Analytics, Goldman Sachs Global Investment Research

**Flow of Funds Accounts**

Source: National Bureau of Statistics

Availability: Annual data since 1992

Timing: Long release lag, about 18 months after the period end

**Overview**

These accounts record financial flows amongst five key economic sectors: non-financial enterprises, financial institutions, government entities, households, and the rest of the world. Their main value is to provide a summary of cross-sector financial transactions with different instruments under consistent definitions.
For China, the main features shown by the flow of funds data are that: (1) households are the largest net lenders, and non-financial enterprises are the largest net borrowers; (2) China as a whole is a net lender to the rest of the world, as also reflected in the fact that China runs a significant current account surplus; (3) bank deposits are the most popular savings instruments for households and non-financial enterprises (accounting for over 50% of the two sectors’ all financial investments in 2014); (4) loans are the most common form of borrowing for households and non-financial enterprises.

The major drawback to this dataset is that it is quite lagging (latest available data is for 2014). Higher-frequency and more promptly released financial data such as M2, insurance premiums, wealth management product balance, etc., would provide more timely information on various aspects of different sectors’ financial balances. This information can in turn be pieced together systematically to produce some of the key components of the flow of funds accounts: e.g., the methodology underlying our GS Total Credit Growth Metric essentially tracks the flow of funds originated from households and non-financial enterprises.

Compilation and reporting
- The data are designed to cover all domestic residents, and foreign residents who transact with domestic residents. The first step of the compilation involves collection of raw data by the PBOC and the NBS for each type of transaction and for each sector. The raw data are then processed to be consistent with other national economic datasets such as the balance of payments and sectoral balance sheets.
- The sectors are mutually exclusively classified as non-financial enterprises, financial institutions, government entities, households and the rest of the world. The main financial instruments covered include deposits, loans, securities, insurance technical reserves, foreign direct investment, etc.

Section VIII. Prices

Consumer Price Index
Signal to noise ratio: ****
Macro importance: *****
Source: National Bureau of Statistics
Overview

The Consumer Price Index (CPI) measures the price of a basket of goods and services that a typical household purchases. The basket is updated every five years. The last major update was in 2016, when the NBS updated the goods and services covered, reclassified the categories (e.g. dining out was moved from the food category to another category including tobacco, liquor, etc.), and also lowered the overall weight of food items according to an updated mix of household purchases. Exhibit 46 below shows our most recent estimate of the basket’s composition.

Exhibit 46: Shifting structure of China’s CPI basket

<table>
<thead>
<tr>
<th>Category name</th>
<th>January 2011 CPI basket</th>
<th>January 2016 CPI basket</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weights</td>
<td></td>
</tr>
<tr>
<td>Food#</td>
<td>29.8%</td>
<td>Food*</td>
</tr>
<tr>
<td>Tobacco, Liquors &amp; Article#</td>
<td>3.5%</td>
<td>Tobacco, Liquors*</td>
</tr>
<tr>
<td>Clothing</td>
<td>5.2%</td>
<td>Clothing</td>
</tr>
<tr>
<td>Household Facility, Article &amp; Maintenance Service</td>
<td>6.3%</td>
<td>Household Facility, Article &amp; Service</td>
</tr>
<tr>
<td>Medicine, Medical Care &amp; Personal Article</td>
<td>10.2%</td>
<td>Health Care</td>
</tr>
<tr>
<td>Transportation and Communication</td>
<td>13.0%</td>
<td>Transportation and Communication</td>
</tr>
<tr>
<td>Recreational, Educational, Cultural Article &amp; Service</td>
<td>13.1%</td>
<td>Education, Culture &amp;Entertainment</td>
</tr>
<tr>
<td>Residence</td>
<td>18.9%</td>
<td>Residence</td>
</tr>
<tr>
<td>Miscellaneous goods and services</td>
<td></td>
<td>Miscellaneous goods and services</td>
</tr>
</tbody>
</table>

*In the 2016 basket, “Food* no longer includes "tea and beverage", nor "dining out", but these were included in the “Food” category in 2011 basket. "Dining out" in 2016 basket is included in “Tobacco, Liquors* in our view.

Source: CEIC, NBS, Goldman Sachs Global Investment Research

Signal to noise ratio

Availability: Monthly from 1985; Annual from 1985
Timing: NBS schedule, usually the 2nd week of the following month
Despite some data quality issues, we believe the CPI inflation rate is largely reliable, at least in terms of the direction of change. Some common criticisms of China’s CPI—not all necessarily warranted—include:

a. It does not have adequate coverage of items whose prices rise rapidly, most notably housing.
b. Some prices, such as gasoline prices, are regulated despite being benchmarked to the broad trend of global oil prices.
c. Its components and weights are revised infrequently, so the basket composition might diverge somewhat from actual consumption behavior.

It is standard international practice to exclude property prices from the CPI basket. The CPI basket does have a housing component, which captures price changes in rent, implied rent for self-owned houses, utilities, and real estate management fees. However, home purchases are usually considered as investment following the international standard.

In terms of other components, such as medical services and education, it is possible that the CPI data may fail to capture all the price changes. For example, CPI captures standardized education costs, such as tuition fees; however, most of the “grey” charges levied by schools (tuition for supplementary classes, other administrative charges, etc.) are not included. This is likely to bias reported inflation downward at least slightly, and possibly significantly.

CPI inflation is also distorted by government controls in gasoline prices, electricity prices and medical service prices, though the share of controlled prices in the CPI basket is relatively small. Pass-through of international oil prices to domestic refined product prices is fairly meaningful, occurring every 10 working days if changes are large enough to warrant an adjustment in the period (though there was a period in early 2016 when international prices were very low during which domestic prices were not adjusted down, perhaps due to concerns about the impact on profitability of oil suppliers, most of which are SOEs).

**Macro importance**

Policy makers in China pay close attention to CPI data, and any rapid change in inflation tends to lead to swift policy action.

**Compilation and reporting**

The CPI basket has eight broad categories. Under each category, there are a few more detailed subcomponents (e.g., the “Transportation and communication” category is further broken down into “transportation facility”, “vehicle fuel”, “using and upkeep fare”, “communication facility”, “communication service”
and “postal service”). The components of the CPI and their weights are determined by using the regular household expenditure surveys and other non-regular surveys. The latest round of updating was carried out at the beginning of 2016.

- As in many other developing countries, food accounts for a relatively large share of consumer consumption expenditures in China. However, the share of food has fallen as living standards in the country have improved. Currently, food (not including dining out) accounts for about 20% of the total CPI basket.
- Data are collected at different retail outlets by statisticians. Goods that have large weights and are subject to frequent price changes, such as vegetables, are sampled several times a month. On the other hand, some items, such as tuition fees, are only sampled once a month or every several months.
- The NBS does not officially publish weights in the CPI basket. It did mention weight changes in a few major categories following the basket update in 2016.

Other issues

- Core CPI is often a useful indicator of the underlying inflationary pressures because of the high volatility of food and energy prices. Even though China’s energy prices are regulated, they still show higher volatility than many other components. There is no separate energy component in the CPI but this and its weight can be inferred from other data. If we estimate energy’s weight based on the headline CPI, nonfood CPI, core CPI and China domestic gasoline prices, the implied weight for energy is around 2%; if we estimate energy’s weight by summing up the estimated weights for “utilities” and “transportation fuel and parts” (which would suggest at least some over-estimation as these categories contain elements other than energy), the implied energy weight is around 7%.

Producer Price Index (ex-Factory Price Index of Industrial Products)

Signal to noise ratio: *****

Macro importance: ****

Source: National Bureau of Statistics

Availability: Monthly from 1996, annual from 1980

Overview

- The Producer Price Index (PPI) measures the price of industrial products when they are sold for the first time after production.
Signal to noise ratio
- We believe the PPI index is generally reliable. It is based on a large sample of approximately 10,000 products at factory gate prices. Both large and small enterprises, i.e., those above or below the standard minimum threshold, are sampled.

Macro importance
- PPI is more sensitive to changes in investment demand, and to some extent export demand. Therefore, it contains more information on the state of the industrial cycle than the CPI. It can also be affected by controls on production in relevant sectors, as has been the case recently with “supply-side reform” in the coal and steel industries.

Compilation and reporting
- Currently, more than 50,000 industrial enterprises report prices twice a month. Weights of components are determined by the sale value. The basket is adjusted every five years, though adjustments can also be made during the interim if there are rapid changes in the production pattern. Weights of the PPI are not disclosed.
- There are sub-indices of the PPI for consumer goods and producer goods. Consumer goods can be further broken down into food, clothing, daily articles, and durables. Producer goods can be further broken down into mining, raw materials and manufacturing goods.

Other issues
- There has been extensive commentary by media and analysts on the relationship between the PPI and the CPI. It is commonly assumed that the gap between the two represents the margin squeeze for producers. We have argued that the issue is more complicated. For instance, transmission from PPI to CPI seems to occur to different degrees for different components of the CPI. PPI inflation seems to matter for the CPI’s component of goods (particularly consumer goods) excluding food, but not for services.\footnote{32}
- China’s PPI remained in deflation for more than four years before turning positive at the end of 2016, due to a combination of factors including stronger investment demand, the depreciation of the RMB, the recovery in oil prices and reduced capacity in certain sectors.\footnote{33}
There is another price indicator named “input price for industrial enterprises” (also known as the “purchasing price index”), which measures the change in raw material input costs. The difference between this indicator and PPI can be informative on the margins of industrial enterprises, although other factors also affect margins.

Exhibit 47: Producer price inflation exhibits much wider swings than the CPI

Source: CEIC, NBS, Goldman Sachs Global Investment Research

Corporate Goods Price Index
Source: People’s Bank of China

Availability: Monthly from 1999

Timing: Around 15th day of the following month

Overview
- The Corporate Goods Price Index (CGPI) measures price changes of goods traded between firms. It has a wider coverage than PPI in two aspects: (1) it covers all intra-business transactions, whereas PPI only measures ex-factory
prices and excludes further transactions between firms; (2) it covers agricultural as well as industrial goods, whereas PPI covers industrial goods only. The two indicators typically follow each other fairly closely.

- CGPI is compiled and used by the PBOC, which can be a useful cross check against PPI data from NBS. But PPI is much more frequently quoted than CGPI.

**Compilation and reporting**

- The compilation methodology for CGPI is very similar to that of the PPI. However, PPI is based on a larger sample than that for the CGPI.
- Two kinds of breakdown are available: capital/investment goods and consumer goods. The other available breakdown is by sector, i.e., agricultural, mining, processed products and coal, oil and electricity.
- Weights of components are allocated based on sales value from the input-output table and various censuses/surveys. Components and weights are revised every five years.

**Fixed Asset Investment Deflator**

Source: National Bureau of Statistics

Availability: Annual from 1991, semi-annual from 1998, quarterly from 2004

Frequency: Quarterly, Semiannual, Annual

**Overview**

- The Fixed Asset Investment deflator measures price changes in investments. It takes into account the price changes of capital inputs as well as labor inputs.
- Trends in the FAI deflator have been quite similar to PPI, which is not surprising given the significant overlap between the two indices.\(^{[34]}\)
- The FAI deflator provides limited additional information about upstream inflation compared with PPI and is not closely followed by investors or policy makers.
- Conceptually this is the correct price index to deflate FAI data since none of the other price indexes contain information on land prices. However, in practice changes in land prices are hard to capture.

**Compilation and reporting**

- The FAI deflator is composed of three sub-indices:
a. **Construction and installation**: Includes material and labor costs, as well as costs to use machinery. Steel and cement constitute the largest share in materials.

b. **Costs for equipment and tools**.

c. **Other costs**, such as obtaining permission to use land (all land in China is state-owned, so only the right to use land can be sold).

- Weights of sub-indices are based on the contribution of the three components to the total FAI in the preceding three years.

**GDP Deflator**

Signal to noise ratio: ***

Macro importance: ***

Source: National Bureau of Statistics

Availability: Quarterly from 2000, annual from 1978; (previous year=100)

**Overview**

The GDP deflator covers the prices of all final goods and services in consumption expenditure, investment and trade.

**Macro importance**

The GDP deflator reflects inflationary pressures in the broad economy, whereas PPI only covers secondary industry. With the development of the service sector, the weight of PPI in the GDP deflator has been falling.

**Signal to noise ratio**

The GDP deflator is derived indirectly from official nominal and real GDP data, and thus is subject to considerable noise from these two indicators.

**Section IX. Labor Market**

**Economically Active Population**

Source: NBS

Availability: Annual from 1952
Overview
This data series refers to the population aged 16 or over who are able and willing to participate in the labor market, including both employed and unemployed people in both urban and rural areas. Its historical readings are revised based on new information in population surveys. It differs from the commonly used working-age population because it does not have an upper limit on age, while working-age population usually excludes population aged above 64.

Employment Data

1. Total Employment
Signal to noise ratio: **

Macro importance: **

Source: National Bureau of Statistics
Availability: Headline series is available in annual frequency from 1952. Detailed breakdowns have shorter history.

Publication: China Statistical Yearbook

Overview
This series measures the overall employment of laborers above 16 years of age in the economy based on sample surveys of the Chinese population. Under the dataset of “total employment”, there is a breakdown into rural vs. urban employment. Under “urban employment”, there are further breakdowns by enterprise type (such as state-owned, collective-owned, private, self-employed individuals, etc.) and by industry (primary/secondary/tertiary, with the sum of these three equal to total employment).

Signal to noise ratio
The methodology used for collecting these data is sound, though growing flexibility in the labor market—such as self-employed online store owners, retired employees who are re-hired on part time basis, as well as greater geographic mobility of labor—are making it very difficult to measure the true picture. Historical readings are revised as new population surveys become available.
**Macro importance**
This series is useful, as we see it as the only official/most reliable measure available for overall employment in the economy.

**Compilation and reporting**
This series is based on samples conducted by the NBS annually. During years ending with “0,” such as 2010, the NBS conducts a comprehensive population census. During years ending with “5,” such as 2015, 1% surveys are conducted. In the meantime, surveys of around 0.1% of the population are conducted annually. Population censuses and 1% population surveys are used as benchmarks to adjust annual surveys, which are much less comprehensive.

**2. Employed Persons in Urban Non-private Units**

**Source:** Ministry of Labor and Social Security

Availability: Headline series is available in quarterly frequency from 1992, annual from 1952. Detailed breakdowns have shorter history.

Timing: Around 25 days after the end of the quarter

**Overview**
- This data series covers the number of persons employed in government agencies and non-private enterprises. It does not include private enterprises nor self-employed individuals.
- Detail behind “employed persons in urban non-private units” include industry breakdown such as primary industry, manufacturing, construction, financial industry, property, wholesale and retail industry etc.
- There is another set of data based on a subset of “employed persons in urban non-private units”, named “on the spot” staff (“Zai Gang Zhi Gong”). This “on the spot” dataset refers to persons who hold certain positions in the enterprise, and who still receive payment even they are temporarily absent for reasons such as vacation, study or sickness. Compared with total employed persons in urban non-private units, this dataset excludes the retired but re-employed population, soldiers and religious workers. There are also industry breakdowns available of “on the spot” staff.
- Although there are quarterly data available on “employed persons in urban non-private units”, some quarterly data points are missing from the original source. For example, there are no quarterly data points available for 2015—only 2015 full
year data is available.

**Signal to noise ratio**
Potential inaccuracies arise from intentional under-reporting by employers who pay social security contributions on a per-head basis. Frequent re-organization of SOEs and other previously state-owned organizations has also complicated data collection. Because of local government pressures not to lay off employees, some companies nominally still employ workers but do not require them to go to work and only pay a basic subsistence wage, thereby creating a grey area in terms of employment.

**Macro importance**
The usefulness of this series is very limited because: (1) it only covers employment in non-private enterprises; and (2) there are significant inaccuracies in data reporting. As a result of the narrow coverage, the level of this series fell for a number of years until 2004 and has increased at a modest rate since then.

**Compilation and reporting**
Labor bureaus in different regions collect raw data, which are then reported to the Ministry of Labor and Social Security (MOLSS) for compilation.

**3. Employed Persons in Private Enterprises and Self-employed Individuals**
Source: Ministry of Labor and Social Security

Availability: Headline series available in annual frequency from 1978; detailed breakdowns have shorter history.

Timing: Almost one and a half years after the reporting period (e.g. 2015 yearend data were reported in 2016 statistical yearbook, which was published in May 2017)

**Overview**
- This indicator covers people who work in private enterprises/individual business, which have been registered at the departments of industrial and commercial administration, including self-employed persons as well as helpers and hired laborers who work in individual households. There is industry breakdown
information available, such as “employed persons in private enterprises and self-employed individuals” in manufacturing, construction, financial industry, wholesale and retail etc.

- A subset of the “employed persons in private enterprises and self-employed individuals” dataset is “urban employed persons in private enterprises and self-employed individuals”. It covers only the portion of the employed persons at urban areas. Similar to all employed persons in private enterprises and self-employed individuals, this “urban employed persons in private enterprises and self-employed individuals” also has industry detail available.

4. Employment in Industrial Enterprises
Source: NBS

Availability: Monthly from December 1998

Timing: Around 25 days after the end of the quarter

Overview
This indicator is available monthly, and has breakdown information on major sub-industries including mining, manufacturing and utilities. Note the construction sector does not belong to “industry” and instead is one of the two components of secondary industry, together with “industry” (manufacturing, mining, and utilities). It is based on the same survey that the NBS conducts with industrial enterprises, and thus captures only the above-designated-size enterprises.

Unemployment Data

Urban Registered Unemployment Rate
Signal to noise ratio: *

Macro importance: ***

Source: Ministry of Labor and Social Security

Availability: Quarterly from 1999

Timing: Around 25 days after the end of the quarter
Overview
- This series reports the share of urban registered unemployed persons in the urban labor force. Urban registered unemployment measures the number of urban residents who are capable of working, but are out of work, want to work, and register themselves as such.

Signal to noise ratio and Macro importance
- The accuracy of the “Urban Registered Unemployment Rate” is very limited because: (1) it covers only people who have an urban registration (hukou) and excludes a large number of migrant workers, who normally live in urban areas but do not have urban registrations, and (2) many unemployed people may not have registered with government agencies. As a result, the official urban unemployment rate has been very stable at around 4%. Having said that, the direction of changes may still be indicative, as their small deviations from the stable trend level are typically counter-cyclical and lag activity growth as one would expect.

Other issues
- One useful source of information on the status of the labor market is the quarterly Labor Supply and Demand in Major Cities published by the MOLSS (Ministry of Labor and Social Security). The report provides data on the number of jobs offered and job seekers, as well as other information on the labor market. These data are collected through affiliated regional job centers. Although the indicator does not cover the whole labor market, as many employment activities do not take place at these employment centers, it nevertheless covers a significant portion of it, and can provide some useful color on changes in the labor market.

- Another drawback of this indicator is that it does not cover employment activities on other platforms such as online job researching websites, etc., which have become increasingly popular in recent years.

Surveyed unemployment data
Source: NBS

Availability: Irregular from June 2013

Timing: No formal releases. Officials quote the numbers occasionally
Overview
The surveyed unemployment rate is the ratio of urban surveyed unemployment to the sum of surveyed unemployment and employment. This survey started some time ago (the first data that we have seen mentioned by officials was for June 2013), but results were not released to the public until recently. It was originally based on surveys in 65 major cities in China, and survey coverage has recently been expanded nationwide. It differs from the registered unemployment rate in the following ways:

- Compilation method: Registered unemployment rate is from official registration, while surveyed unemployment is based on labor surveys;
- Definition of unemployment: Surveyed unemployment follows ILO standards;
- Data coverage: Registered unemployment is based on population with Hukou, while surveyed unemployment also covers migrants in theory, though this is difficult to implement in practice (see Exhibit 48).

Exhibit 48: Very small fluctuations in registered and surveyed unemployment rates

Source: CEIC, Goldman Sachs Global Investment Research

Wages
Overview
There are three main sets of data on wages: “Average/Total Wage of Employees in Urban Non-private Units”, “Average Wage of Employees in Urban Private Units” and “Compensation to Laborers” in Flow of Funds data. (There is another series on average income of migrant workers, which we discuss below.) The importance of these wage-related indicators has been falling in recent years because of their inadequacies. They are increasingly being replaced by data such as household survey data and national accounting data, which are at least conceptually comparable.

Average/Total Wage of Employees in Urban Non-private Units
Signal to noise ratio: *

Macro importance: *

Source: National Bureau of Statistics

Availability: Headline series is available in quarterly frequency from 1999, annual from 1952. Detailed breakdowns have shorter history.

Timing: Around 25 days after the end of the quarter

Overview
- Average/total wages cover labor compensation to all employees, including wages, bonus, subsidies, etc, in urban non-private units. They are on a pre-tax basis and include rents, utility bills, etc. paid by employers. The average wage is total wages divided by the average number of employees within the reporting period.
- Similar to the employment data, 2015 quarterly data points are missing from the original source, e.g. there are no quarterly data points available for 2015. Only 2015 full year data is available.

Average/Total Wage of Employees in Urban Private Units
Source: National Bureau of Statistics

Availability: Headline series is available in annual frequency from 2008. Detailed breakdowns have shorter history.

Timing: Around May of the following year.
Overview
Average/total wages cover labor compensation to all employees, including wages, bonus, subsidies, etc in urban private enterprises. They are on a pre-tax basis and include rents, utility bills, etc. paid by employers.

Average Income of Migrant Workers
Signal to noise ratio: *
Macro importance: *
Source: National Bureau of Statistics
Availability: Quarterly from Q4 2008
Timing: Around 25 days after the end of the quarter

Overview
This measure is based on migrant worker quarterly surveys conducted since 2008 by the NBS. Sample covers the rural areas in 31 provinces.
These data are inherently difficult to capture as by definition migrant workers move around and often are employed in informal sectors.

Compensation to Laborers
Source: National Bureau of Statistics
Timing: Lags can be as long as three years
Publication: China Statistical Yearbook

Overview
This series is recorded under Flow of Funds data, and it covers all employed persons.

Signal to noise ratio and macro importance
The release of the average/total wage data can be irregular, for example there are no quarterly data points on average/total wages in urban non-private enterprises in 2015, which limits its macro importance.

“Compensation to Laborers” in input-output data does not suffer from the problem of narrow coverage like the two series mentioned above, as it covers all employed persons. Furthermore, it has the advantage of including non-monetary income, such as social security contributions. However, this measure has two limitations: (1) the data are reported with a significant delay (the last reported data were for 2014), and (2) many non-monetary compensations have to be estimated roughly, which affects the signal to noise ratio of the data.

The issue of under-reporting of income data also likely affects wage data, especially in terms of state sectors. In these sectors, official wages can be restricted by regulations, so there is a tendency to compensate employees via other types of payments. Besides, some private company owners can choose to be paid at the minimum wage level, to help with the development of their own companies. This may also bias wage data to the downside.

Other indicators on wages include the minimum wage threshold, available by province, and corporate wage growth guidance, also available by province. These two indicators are released annually, and can be informative for overall wage growth trends. Typically the minimum wage threshold is not a binding constraint, since the informal sectors usually pay the lowest wages and legal enforcement is rare. When actual wages go up quickly, the minimum wage threshold is also raised accordingly. These thresholds are rarely revised down during economic downturns, and are substituted by non-enforcement instead. The minimum wage requirement may also affect the accuracy of wage data as employers paying less than the legal level are not likely to report as such.

**GS Employment Tracker**

**Availability:** Quarterly from 2007

**Timing:** Around 25 days after the end of the quarter

**Publication:** GS China Proprietary Indicators update

**Methodology**

We constructed an indicator of employment growth based on company survey data—the four employment indices in PMI surveys (the NBS manufacturing and non-manufacturing PMI surveys and Caixin manufacturing and service PMI
surveys) available monthly, as well as the Manpower survey indicator, which is available quarterly. All of the survey indicators are based on questions to employers on whether their workforce increased/will increase in the reporting period. We derived the first principal component of these indicators, and then mapped it to historical urban employment growth. The resulting series is our employment growth tracker (see Exhibit 49).

Exhibit 49: Employment growth tracker has improved in late 2016 after several years of deceleration

![Graph showing employment growth tracker and NBS urban employment growth]

Source: NBS, Goldman Sachs Global Investment Research

**GS Wage Tracker**

Availability: Quarterly from 2001

Timing: Around 25 days after the end of the quarter

Publication: GS China Proprietary Indicators update
Wage data are among the least transparent official statistics in China. The data are available only annually (the quarterly series has not been released since 2015 and covers mainly non-private enterprises). We compiled our wage tracker by summarizing and adjusting a few official series based on more frequently released surveys.

**Methodology**

Our wage tracker is comprised of the following seven component series. All of them are originally from the NBS, but are based on different surveys, namely urban household surveys, corporates surveys/direct reports, migrant worker survey, and national account statistics.

1. Urban income per capita, from the NBS household survey.
2. Urban disposable income per capita, from the NBS household survey.
3. Urban consumption expenditure per capita, from the NBS household survey.
4. Wage income under urban disposable income per capita, from the NBS household survey.
5. Average wage, non-private enterprise, from the NBS corporates surveys/direct reports.
6. Labor income, which is based on the labor compensation series under “flow of funds” in the national account statistics. The original series is available in annual frequency and is extrapolated into a quarterly series by Professor Tao Zha et al. from the US Federal Reserve Bank of Atlanta.
7. Migrant worker wages, from the NBS migrant worker survey.

We first transformed the above series into year-over-year growth rates and then use “locally weighted least squares” (LOESS). Intuitively, this is a type of smoothing/filter based on local regressions. This filter identifies the common trend across various indicators, but unlike principal components analysis, which we use in some of our other “tracker” work such as the CAI, LOESS is essentially a combination of fitted values from regressions and therefore we will not lose the units of the component series.

**Signal to noise ratio**

This method has its drawbacks, including the endpoint problem and potential bias in the filtered trend if not all components are available throughout the full history. Indeed, two of the seven series listed above (urban total income per capita and wages in non-private enterprises) were discontinued in recent years, and the labor compensation series is reported with a significant lag (the last data point we have
These data limitations may add noise to the wage tracker, although we have done back-testing and believe the bias from inclusion/exclusion of these three series is small.

Exhibit 50: Our wage tracker shows that wage inflation has been decelerating in recent years

Source: NBS, Goldman Sachs Global Investment Research, Federal Reserve Bank of Atlanta center for quantitative economic research

Section X. Population

Total population, urban population, working population, migrant population

Source: National Bureau of Statistics

Availability: Annual from 1949

Timing: February/March of the following year

Publication: Annual statistical communique on national economic and social development
Overview

**Total population** refers to the total number of inhabitants of a particular area at a certain point of time. It can be broken down by urban vs rural, female vs male, and by age structure. Total population is also available by province/city.

Under the population data set, **urban population** is based on the total number of usual residents in an urban area, and “rural population” is the remainder after subtracting urban population from total population. There is also a set of data on registered population, split into agricultural and non-agricultural, available at the total national level and provincial level.

**Working age population**: There is no explicitly defined series from NBS on this, but under population by age group, one sub-group captures population aged 15-64, which follows the usual international definition of working age population.

**Migrant population**: Refers to people who reside in a particular area but do not have household registration (“hukou”) in that area. It excludes the group of people who have household registration in other districts of the area they reside.

This set of data is based on samples conducted by the NBS annually. During years ending with “0,” such as 2010, the NBS conducts a comprehensive population census. During years ending with “5,” such as 2015, 1% surveys are conducted. In the meantime, around 0.1% surveys are conducted annually. Population censuses and 1% population surveys are used as benchmarks to adjust annual surveys.

**Birth rate, death rate, natural growth rate**

Source: National Bureau of Statistics

Availability: Annual from 1949 for birth rate and death rate, annual from 1981 for life expectancy

Timing: February/March of the following year

Publication: Annual statistical communique on national economic and social development

Overview

**Birth rate**: Also called “crude birth rate”. It refers to the ratio of total number of new births to average population at a particular area within a particular time range.
**Death rate:** Also called “crude death rate”. It refers to the ratio of the number of deaths to average population at a particular area within a particular time range.

**Natural growth rate:** The crude birth rate minus the crude death rate.

These rates are typically expressed in permillage (per-thousand). There are also other relevant population data in this release such as the dependency ratio.

**Signal to noise ratio of population data**
Due to sampling difficulty, population-related data in China are in general exposed to uncertainties such as relatively big revisions (based on population census) and sampling errors.

**Macro importance**
Population data are very important to economic analysis given their close link to labor supply, which is a key component of potential growth.

- Working-age population is related to the potential labor supply to the whole economy, and a shrinking working-age population (as in China in coming years) will be a headwind to potential economic growth.
- The migrant population also can serve as a barometer of cyclical employment conditions given they are in general more sensitive to changes in urban labor market conditions. Migration to cities is more likely when urban/formal labor market conditions are strong, with new migration slowing (or existing migrants even returning to agricultural work in rural areas) when urban employment conditions are weak.

**Exhibit 51: China’s population and especially labor force growth slowing**
Section XI. Government Finance

Government Revenue, Expenditure and Balance
Signal to noise ratio: ****
Macro importance: ****
Source: Ministry of Finance
Availability: Monthly from 1995, annual from 1950
Timing: Around 15 days after the end of the month
Publication: China Fiscal Statistics Yearbook

Overview
In China, the national fiscal budget is composed of four accounts: the General Public Budget Account, the Government Managed Fund Account (GMF), the State Capital Operation Account and the Social Insurance Fund Account (Exhibit 52).
The **headline fiscal balance** that the government targets is actually the difference between revenue and expenditure in the General Public Budget Account. The Government Managed Fund Account (GMF) is comprised of around 40 sub-funds or sub-accounts (e.g., the Three Gorges project construction fund, the railway construction fund), and each is designed for a specific area. Land sales proceeds account for 73% of national GMF revenue, and land-income related spending, of which about 80% is for compensation and development costs, also accounts for around 72% of national GMF expenditure (2015 data). Land sales revenue and expenditure are collected or spent by local governments subject to approval by the central government, except for proceeds from newly supplied land for construction, which are shared by the central and local governments.

**Government revenue** comes from various taxes and charges the government imposes. Government borrowings were included in the revenue statistics before 1994 but have been excluded since then. Government expenditure includes funds the government spends on goods and services it provides, as well as on interest payments. Conceptually, the fiscal balance is the difference between revenue and expenditure, although in China’s case there are some complications related to the fiscal deficit, especially the fiscal stabilization fund at the central government level and carryover/surplus funds at the local level.
The on-budget fiscal balance does not cover the GMF, most of which is based on land sales-related revenue and expenditure, and is important to local governments.

As the Chinese economy decelerated in recent years, the government turned again to active fiscal policy to arrest the slowdown in the economy, through both on-budget fiscal policy and quasi-fiscal spending in areas like infrastructure. We tried to “augment” the official fiscal policy measures by incorporating off-budget quasi-fiscal policy to obtain a comprehensive picture of the stance of China’s fiscal authority and to examine the implications of the augmented fiscal balance for the growth of the Chinese economy at the end of this section. [37]

Fiscal data used to be considered to be among the most reliable data since it is assumed that mis-reporting is financially costly. However, this may not be the case. The government disclosed cases of over-reporting of fiscal data by Liaoning Province in 2011-2014. The MOF listed four methods used: (1) fake tax collection from corporates that is refunded back; (2) over-reporting of tax revenue from state asset sales or the right to use state assets, which was offset by over-reporting of government expenditure, often related to these transactions; (3) over-reporting of non-tax revenue such as revenue from the rights to use state resources; and (4) outright number cooking. [38] In reality such practices unlikely just happened in one province and for that province only during 2011-2014.

**Macro importance**

This series is useful in assessing the stance of fiscal policy. In addition, growth rates in tax revenue also provide useful information on the strength of the economy, though revenue growth is also affected by the degree of effort to collect taxes, which is often counter-cyclical. In previous years, the government tended to accumulate large budget surpluses in the first 10 months of the year, leading to a significant fiscal spending in the last two months. In recent years though, the government has tended to front-load fiscal expenditure early in the year, leading to a significant slowdown of fiscal expenditure towards the end of the year, especially in December.

**Compilation and reporting**

Reported fiscal revenues and expenditures cover both central and regional governments.
Besides government agencies, a portion of state-controlled non-governmental institutions (Shi Ye Dan Wei) are also included. These institutions are set up, owned, and fully or partly funded by the government. However, as reform progressed, many of these institutions changed in nature and became self-funded and profit-making.

China’s fiscal year is the same as the calendar year. Monthly expenditure and revenue data are released in China Monthly Statistics, published by the NBS. Complete annual data including additional adjustments, such as those related to fiscal stabilization fund, only become available when the Ministry of Finance reports to the National People’s Congress in March of the following year, and are then released in the Statistical Yearbook and Fiscal Statistics Yearbook.

SOEs were an integral part of the public sector and were previously included in government finance statistics. As the economic reform progressed, SOEs increasingly became responsible for their own financing and are now increasingly excluded from government financial accounts.

Other issues

- Government expenditure is closely related to government consumption expenditure in GDP accounting. However, not all government expenditures are government consumption. Most notably, expenditures on capital construction, mine exploration, and new product R&D costs are counted as GFCF.
- China conducted VAT tax reform in May 2016 to replace the former business tax, aiming to improve the efficiency of tax system, and this change may relieve tax burdens on some enterprises, though the effects are uneven across industries.

Local Government Debt

Source: Ministry of Finance, National Audit Office

Availability: Annual from 2014

(also available for 2010, 2012 and first half of 2013 from audit reports)

Timing: Around 3 months after the end of the year

Overview

- In China, local governments had been prohibited to borrow directly according to the budget law until 2009, when pilot programs were initiated to allow some local governments to issue bonds, although at the beginning it remained the
central government who helped issuance and repayment, and the quota of issuance was limited. In late 2014, the budget law was revised to allow all local government to issue government bonds.

- Given their limited on-budget revenue space and prohibition from borrowing from banks, local governments turned to off balance sheet entities (e.g., local government financing vehicles or LGFVs) as a financing and spending platform, but they had repayment obligation for a large part of those off-budget borrowings, which was actually not in line with the budget law. According to the audit reports, by the end of 2013 H1, outstanding local government debt that local governments have repayment obligation amounted to Rmb10.9 trillion (18% of GDP), among which around 37% was borrowed by LGFVs.
- In late 2014, the central government started to implement local government debt reform, and a series of documents had been issued, including Document #43, which required local governments to classify proper local government debt from existing LGFV debt and also reinforced the policy of no new borrowing through LGFVs. Starting from 2015, local governments in theory can only borrow through issuing bonds, and local government debts formed before 2015 (excluding outstanding local government bonds) started to be swapped into bonds through the debt swap program. By the end of 2016, outstanding local government debt was Rmb15.3 trillion or 21% of GDP. In practice, the LGFVs are still borrowing in a grey area with implicit supports from the local governments, so the situation is fundamentally not very different from before. Furthermore, the rapidly expanding Public Private Projects (PPP) have often become the new substitute of financing functions LGFVs played and there is no far no public information on the size of potential local government liabilities related to PPPs. In May 2017 the government initiated a fresh round of regulation on local government borrowing. These measures are likely to put additional caps on how and how much they can borrow apart from local government bonds though they are unlikely to eliminate them.

Exhibit 53: Official local government debt has been rising steadily
Overview

- In the case of China, the headline (effective) fiscal balance involves only a part of China’s fiscal budget system, which is actually the difference between revenue and expenditure in the general public budget account.
- In addition to on-budget fiscal tools, the government can affect the economy through off-budget activities (which are also referred to as “quasi-fiscal policy”). The most important and frequently used measure is infrastructure investment carried out by PPPs (Public Private Partnerships), local government financing vehicles (LGFVs) or other state-owned enterprises (SOEs).
- The stance of fiscal policy is typically measured by the fiscal balance to GDP ratio. An increase in this ratio (i.e., a decrease in the deficit) means a contractionary fiscal policy and a decrease in the ratio (i.e., an increase in the deficit) indicates an expansionary fiscal policy.
We “augment” the official fiscal policy measures by incorporating off-budget quasi-fiscal policy to obtain a comprehensive picture of the stance of China’s fiscal authority, and to examine its implications for the growth of the Chinese economy.\footnote{[39]}

Compilation

- Our augmented fiscal balance data (Exhibit 54) are constructed with monthly frequency, in order to monitor the government’s overall fiscal stance in a timely manner and accordingly serve as a relatively reliable policy parameter input for our forecasting of the real economy.

- Based on the expenditure approach, we assume that the off-budget activities concentrated on the expenditure side all belong to infrastructure spending.

- First, we calculate infrastructure investment from the fixed asset investment (FAI) data. Specifically, we sum up the FAI in sectors such as transport, storage and postal service, and water conservancy, environment and utility management. We assume most of the spending in these sectors is state-driven, which means it is either directly carried out by the government or indirectly under the government’s mandate.

- Second, to obtain off-budget infrastructure spending we exclude infrastructure spending funded by the state budget from the constructed total infrastructure spending in the first step.

- Then we can estimate monthly data for the augmented fiscal deficit, and by interpolating GDP data, we are even able to derive a monthly augmented deficit-to-GDP ratio.

- We note several caveats to this approach. First, the sectors we choose for infrastructure investment that are state-driven might not be complete. Second, the government’s off-budget activities might not be confined to infrastructure spending and not limited to the sectors we choose. Specifically, the government has the goal of poverty elimination and tends to raise social welfare spending. In addition, one other shortcoming of the expenditure approach we use is that it relies to a large extent on FAI data, which are of low reliability in part because they include purchases of land or existing assets. A rising share of PPP projects complicates the picture as these projects are often difficult to classify.

Exhibit 54: Alternative measures of the fiscal deficit widened substantially beginning in 2015
Source: Goldman Sachs Global Investment Research, China National Bureau of Statistics, IMF
Investors should consider this report as only a single factor in making their investment decision. For Reg AC certification and other important disclosures, see the Disclosure Appendix, or go to www.gs.com/research/hedge.html (http://www.gs.com/research/hedge.html).
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Gallery
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<td>Property Price Index</td>
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<tr>
<td>Average/total wage of Employees in Urban Units</td>
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<tr>
<td>Average income of migrant workers</td>
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View all 56 exhibits